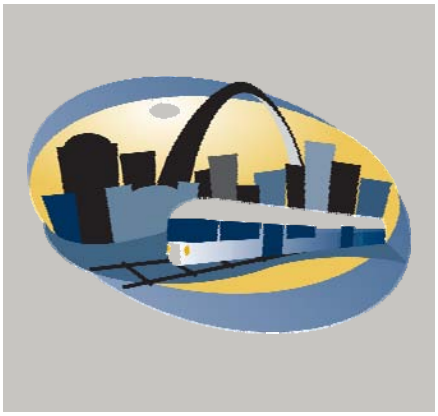

Southside Study
Final Report

October 10, 2008

Volume 2 of 2

Northside-Southside Study

Planning Transit Improvements for St. Louis City

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Executive Summary

Chapter 1.0

Northside-Southside Study

Planning Transit Improvements for St. Louis City

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.

Southside 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 MOS's 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.

Chapter 1.2: Report Structure

This AA report is organized in 8 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 and all 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

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.

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 and further, more detailed, project development.

Purpose and Need

Chapter 2.0

Northside-Southside Study

Planning Transit Improvements for St. Louis City

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 (MTIA's) in 2000, which resulted in the selection of locally-preferred alternatives (LPA's) 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. 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 (Figure 2.1-2).

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

Two factors influenced this decision to study only the MOS's in each corridor. First, funding for additional analysis of the LPA's 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 MOS's. 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 LPA's, 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 Southside are downtown St. Louis and the I-55 park-and-ride, which is intended to attract riders from the highway. Likewise, on the Northside, the termini are downtown St. Louis and the I-70 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 MOS's could be extended for short distances. For example, if there is no suitable site for a park-and-ride lot at I-55 and Loughborough Avenue, the line could be extended south 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 MTIA's. The 2000 MTIA Southside 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 MOS's. 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 Southside MOS, called the "Southside study area."

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

FIGURE 2.1-1: METROLINK ALIGNMENTS

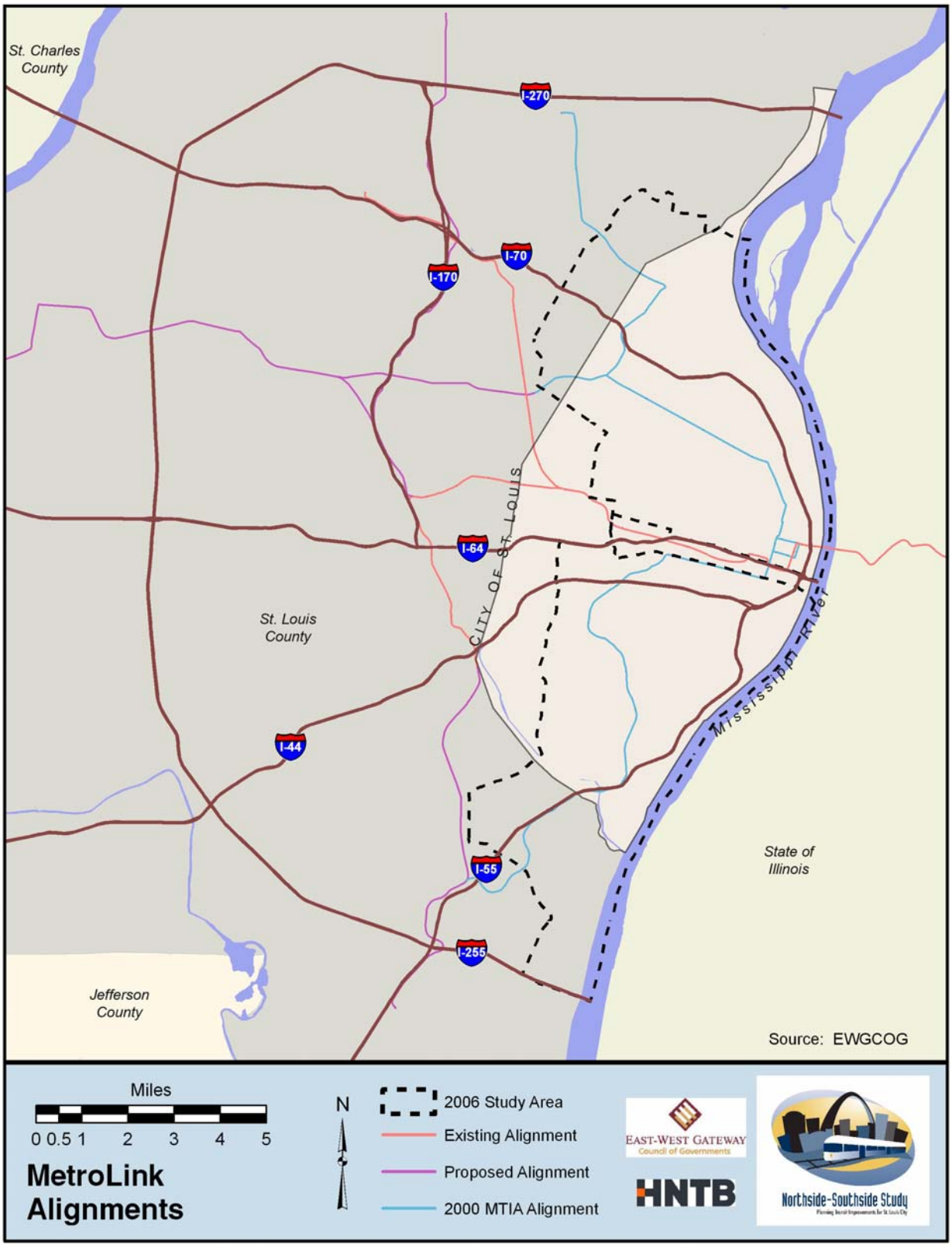


FIGURE 2.1-2: MTIA STUDY AREA, 2000

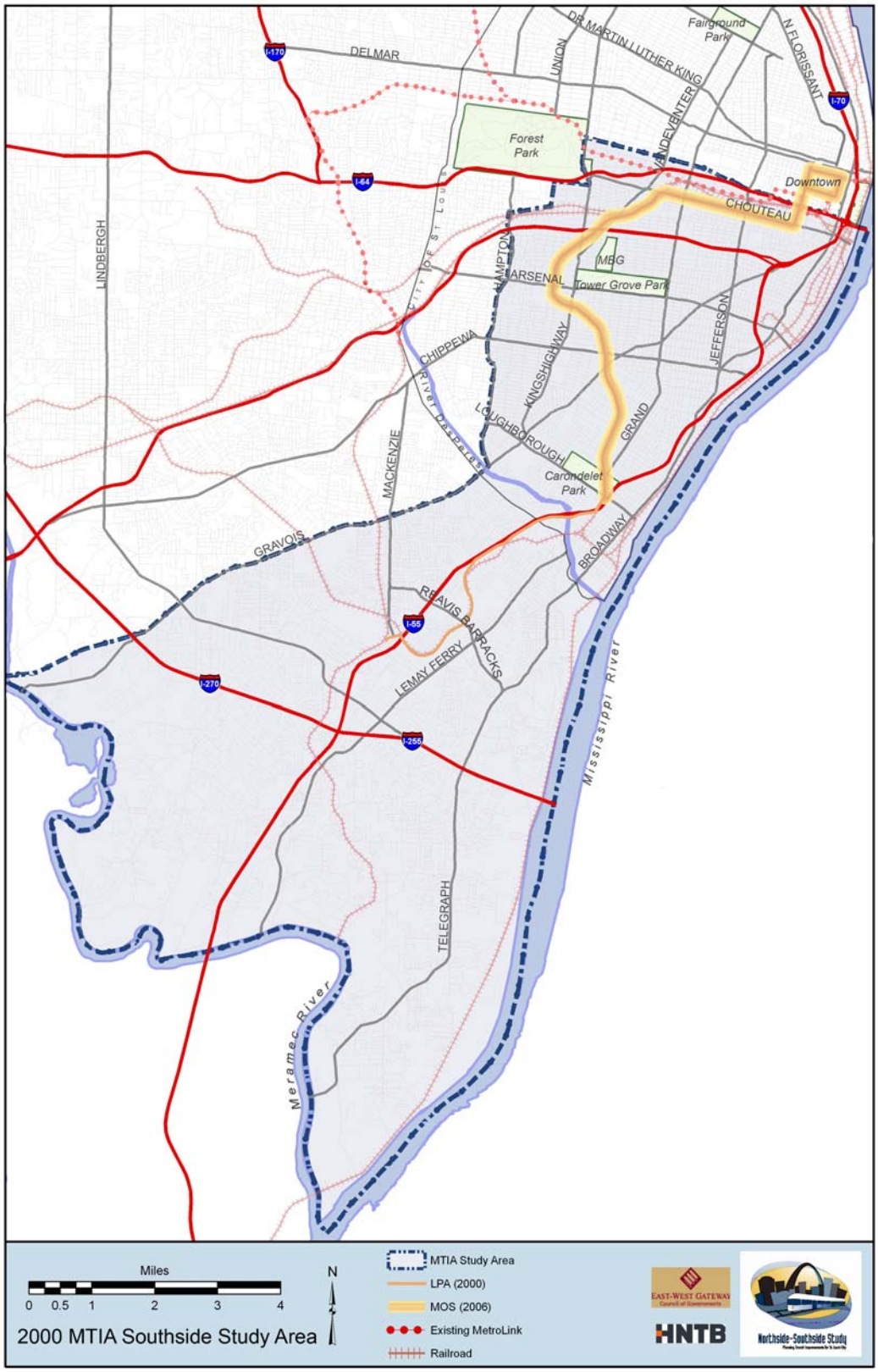
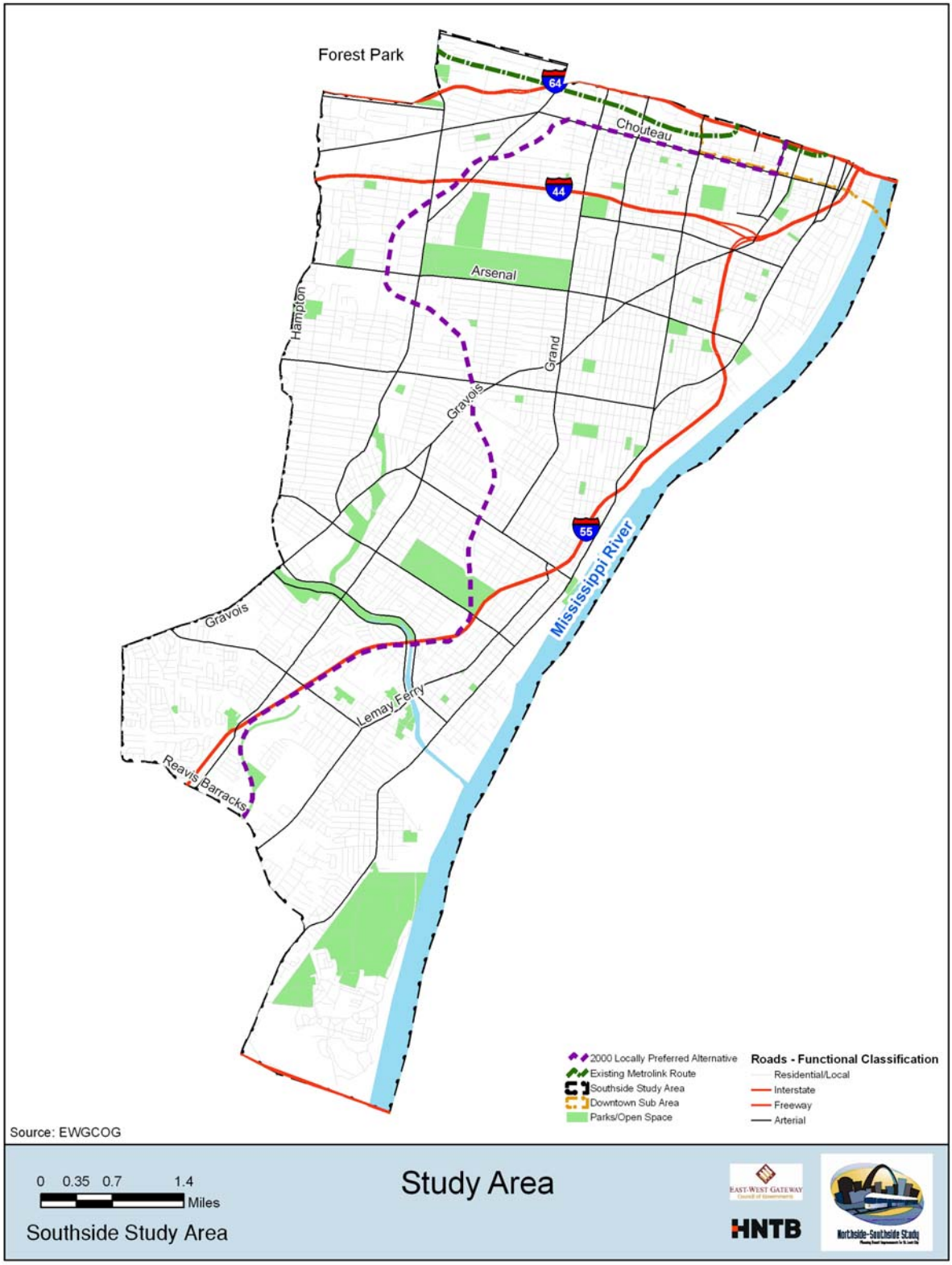


FIGURE 2.1-3: STUDY AREA, 2006



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 Southside study area encompasses 36 square miles, predominantly within the City of St. Louis. It extends approximately two miles south of Interstate-55 and Loughborough Avenue (Figure 2.1-3).

The 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. The area covers most of the south side of the City of St. Louis and extends slightly beyond the MOS limits to effectively capture the transit marketshed. As shown in Figure 2.2-1, almost all Southside and some Central Corridor neighborhoods in the City of St. Louis are included in the study area, such as Boulevard Heights, Patch, Central West End, Midtown, and parts of downtown, as well as portions of the communities of Affton, Lemay, Bella Villa, and unincorporated St. Louis County. 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.

Population Characteristics

Table 2.2-1 displays the total population of the Southside study area, 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. Since 1990, the Southside lost at a rate less than the rest of the City: 5% compared to 12%. There were pockets of increases in the neighborhoods of South Hampton, North Hampton, St. Louis Hills, Dutchtown, and Shaw. Between 2000 and 2030, projections indicate that downtown (treated in further detail in the Northside report) is expected to grow significantly, more than doubling in population. Population decline in the Southside area is projected to continue through 2030, though overall rate of loss within the City of St. Louis is expected to improve from 12% between 1990 and 2000, to 6% 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]

TABLE 2.2-1: TOTAL POPULATION

	SOUTHSIDE		ST. LOUIS CITY		ST. LOUIS COUNTY	
YEAR	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*
1990	209,582	--	396,685	--	993,529	--
2000	199,395	-5%	348,189	- 12%	1,016,315	2%
2030	184,704	-7%	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 Southside areas qualify as “high” or “very high” need, with the highest needs located near the intersection of Grand Boulevard and Gravois Road.

The study area has a high percentage of people whose mobility is impaired. Most two-car households are in the same general areas as those with higher incomes, and many one-car households are located east of Grand Boulevard in lower-income neighborhoods. In certain census tracts, 20% of the population uses transit, which is high by national standards. Approximately 35% of the study area population is either under the age of 16 or over the age of 65, and 17% of the workforce-age residents are considered disabled. These groups are traditionally considered more transit-dependent.

Employment Characteristics

Table 2.2-2 displays the total employment of the study area, the City of St. Louis, and St. Louis County for 1990 and 2000, as well as 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 in the study area and the City of St. Louis has decreased slightly over the past decade, primarily due to the outward migration of jobs to suburban county locations. Projections indicate, however, that employment in the City of St. Louis and the study area will remain relatively stable to 2030, and 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

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

addition, various types of redevelopment of previous industrial or commercial uses into residential uses will affect overall employment.

TABLE 2.2-2: TOTAL EMPLOYMENT

	SOUTHSIDE		ST. LOUIS CITY		ST. LOUIS COUNTY	
YEAR	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*
1990	129,851	--	317,198	--	518,137	--
2000	116,455	-10%	278,500	- 12%	621,000	20%
2030	115,560	-.7%	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, Anheuser-Busch, the Nooter industrial area, Barnes-Jewish Hospital, Saint Louis University Hospital, Cardinal Glennon Hospital, the Grand-South Grand area, and the Missouri Botanical Garden.

FIGURE 2.2-1: CITY NEIGHBORHOODS, SOUTHSIDE

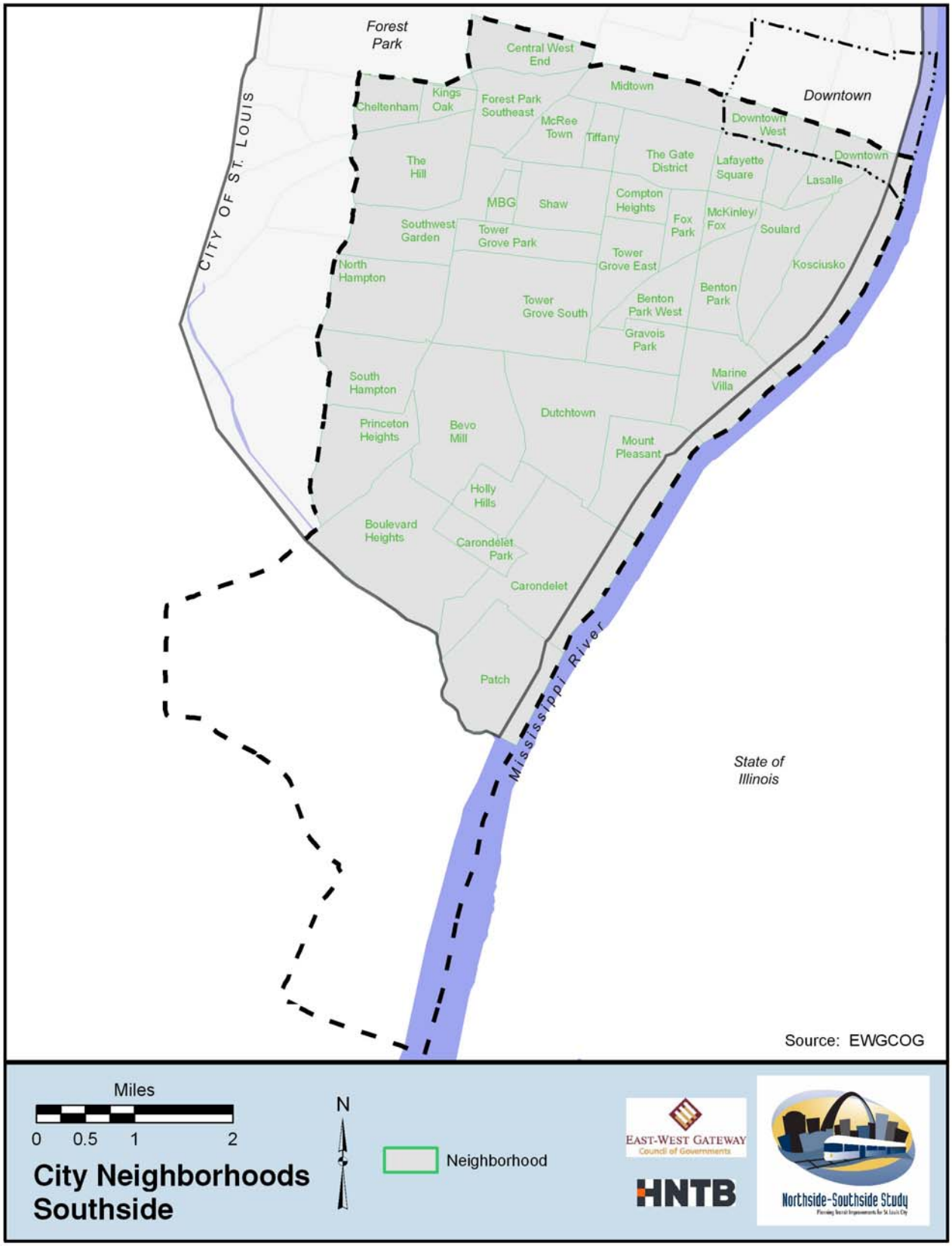
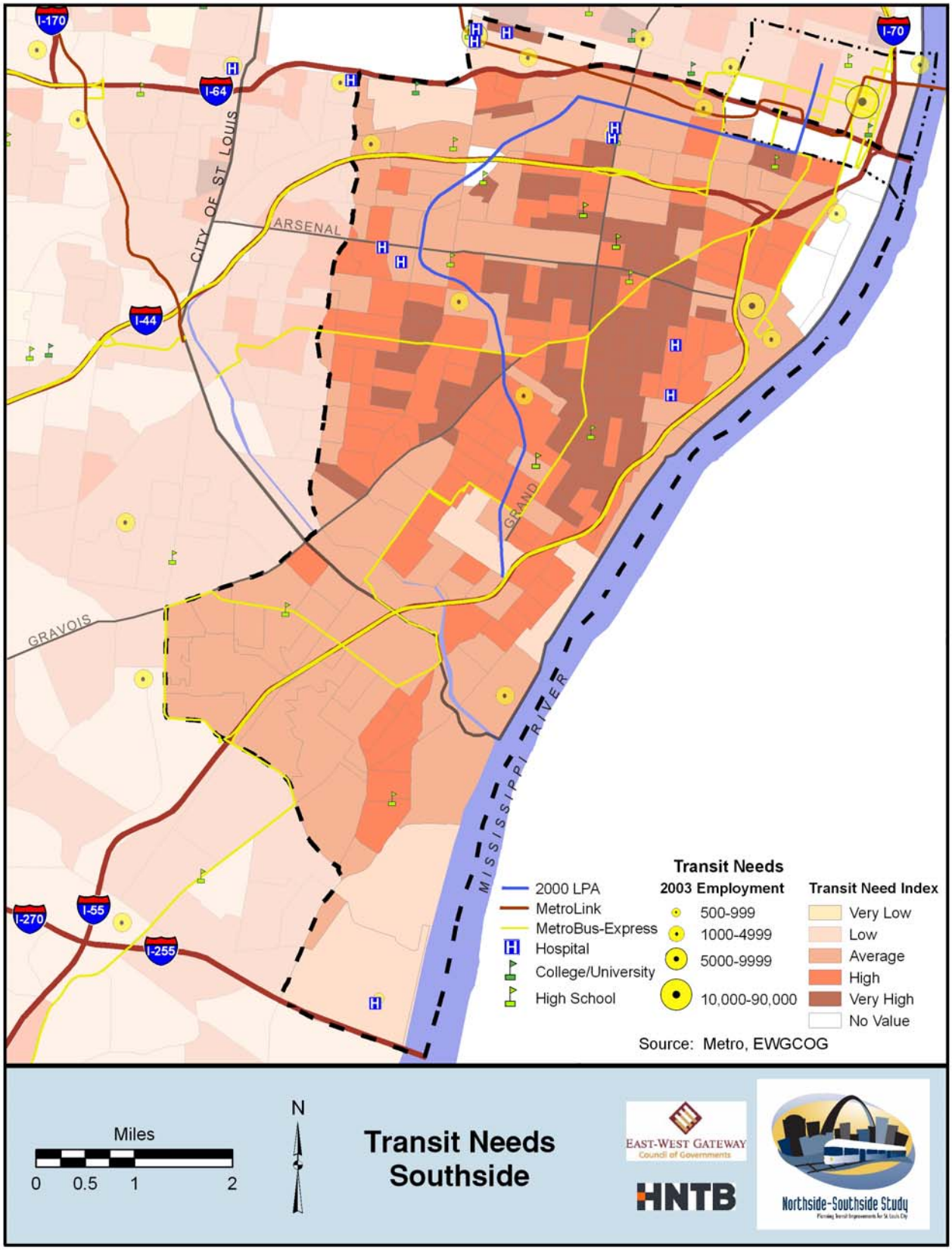


FIGURE 2.2-2: TRANSIT NEEDS, SOUTHSIDE



2.2.2 EXISTING TRANSPORTATION NETWORK AND FACILITIES

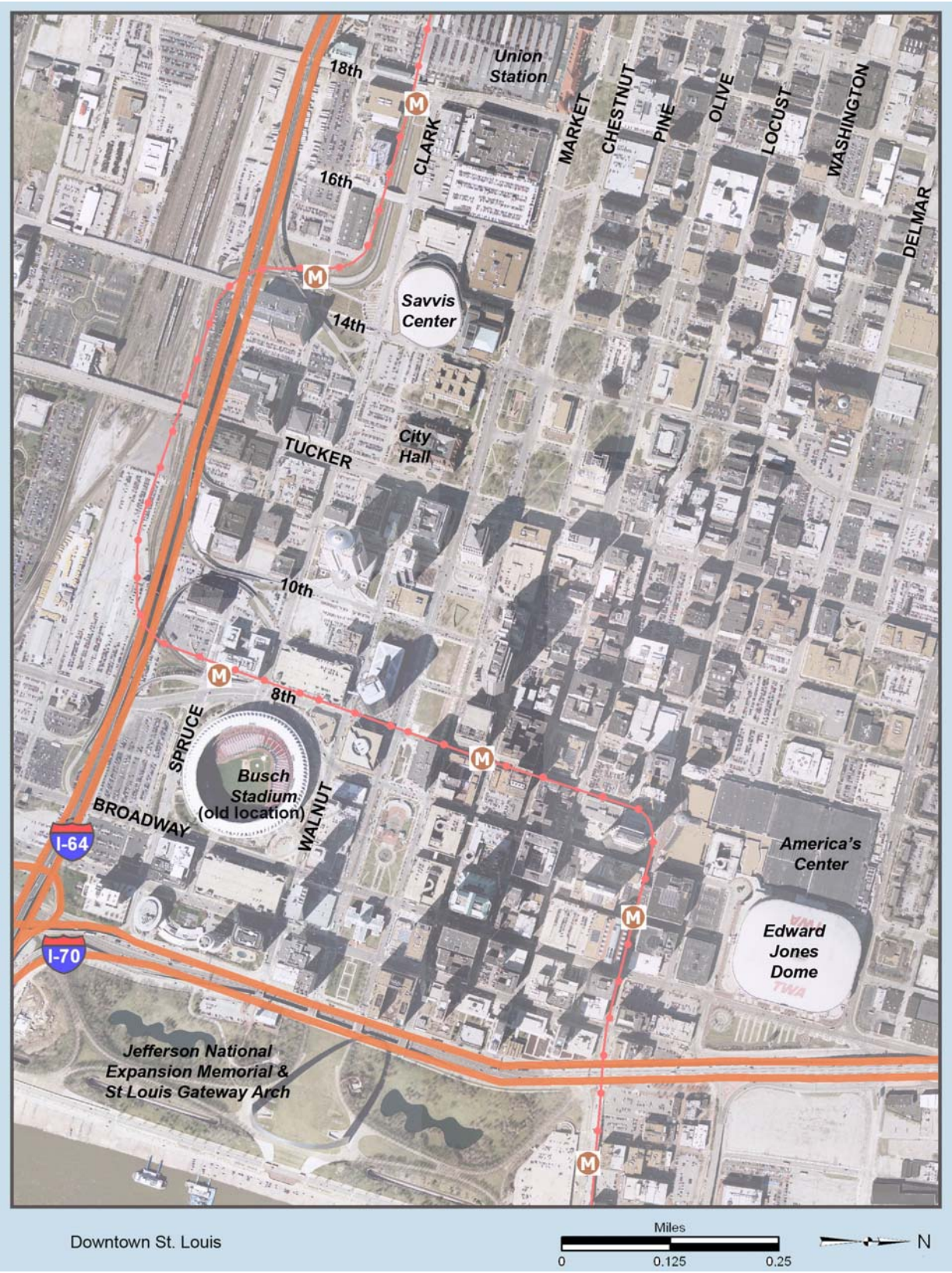
Roadways
Three interstates are found in the study area. Interstate-64 (I-64/Highway 40/61) runs east-west through the northernmost portion of the study area. Interstate-44 (I-44) runs east-west parallel to and south of I-64 in the northern portion of the study area. Finally, Interstate-55 (I-55) runs north-south along the eastern edge for the length 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.

- Route 30 (Gravois Road).
- Route 100 (Manchester Road/Chouteau Avenue).
- Route 231 (Broadway Street).
- Route 267 (Lemay Ferry Road).
- Route 366 (Chippewa Street).

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



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 light rail transit (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 the "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 regionwide 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 which traverse the more established residential and commercial neighborhoods in the City of St. Louis. These routes include Grand (#70), Kingshighway (#95), Chippewa (#11), and Hampton (#90).

In addition to the local bus routes, three 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. I-55 is used as an express route and has increased trips to serve more commuters. Express routes operate in the peak direction, traveling northbound in the morning peak, and southbound in the afternoon peak. These routes connect Southside 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 and 19 stations, running from a western terminus at the Lambert Airport station to the Shiloh-Scott station east of the Mississippi River in Illinois. Within the study area, the line runs from

[2] http://www.metrostlouis.org/

downtown St. Louis west to Forest Park, with two stations in the study area. A fleet of 65 vehicles 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 station, 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.

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.

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*:

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 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 MTIA's.** In 2000, multimodal MTIA's 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.

- **Northside Transit Study.** As described previously, the Northside study area defined in the 2000 MTIA now has been reduced to boundaries that coincide with the current MOS. The Northside Study is being conducted in tandem with the Southside 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 vicinity of the I-64/Tower Grove interchange in the City of St. Louis. Subsequent studies focused on the Cross County LRT extension now under construction.

- **Metro South DEIS (2006).** The Metro South Corridor examined possible further extension of MetroLink Cross County light rail service from the Shrewsbury-Lansdowne

I-44 station into south St. Louis County and the City of St. Louis. The study boundaries are the River Des Peres on the north, the Mississippi River on the east, the Meramec River on the south, and Gravois Road (Route 30) on the west.

- **Sixth County Council District Community Area Study (1999-2000).** The boundaries of the Sixth County Council District of St. Louis County are roughly the same as those for the Metro South study area, i.e., the River Des Peres on the north, the Mississippi River on the east, the Meramec River on the south, and Gravois Road (Route 30) on the west. The principal issues identified in this study included the need to improve the transportation infrastructure and manage traffic congestion on the area's roadways. Other areas of interest were: increasing employment opportunities, converting underutilized commercial property to other uses, and improving the visual character of the area.

- **I-55 River Des Peres Communities Transportation Investment Plan, MoDOT (2004).** This plan's recommendations include interchange modifications to enhance access to I-55 at Loughborough Avenue, Germania Street, Carondelet Boulevard, and Weber Road; extending Carondelet Boulevard/Weber Road to Broadway; enhancing the streetscapes of Lemay Ferry Road and South Broadway; and creating a local transit circulator route bounded by Carondelet Boulevard, Union Avenue, Reavis Barracks Road and S. Broadway Street. Although this plan is supported by several agencies and elected officials, there is currently no funding for design, right-of-way acquisition, or construction for any projects.

- **Lemay Comprehensive Plan (2006).** This community plan prepared by the St. Louis County Department of Planning recommends construction of the Lemay Access Road, an extension of Carondelet Boulevard/Weber Road to the Port Authority site. It also recommends the upgrade of the I-55/Weber Road interchange.

- **Chouteau Greenway Plan.** 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. Detailed planning and engineering is currently underway.

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 Alternatives 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.

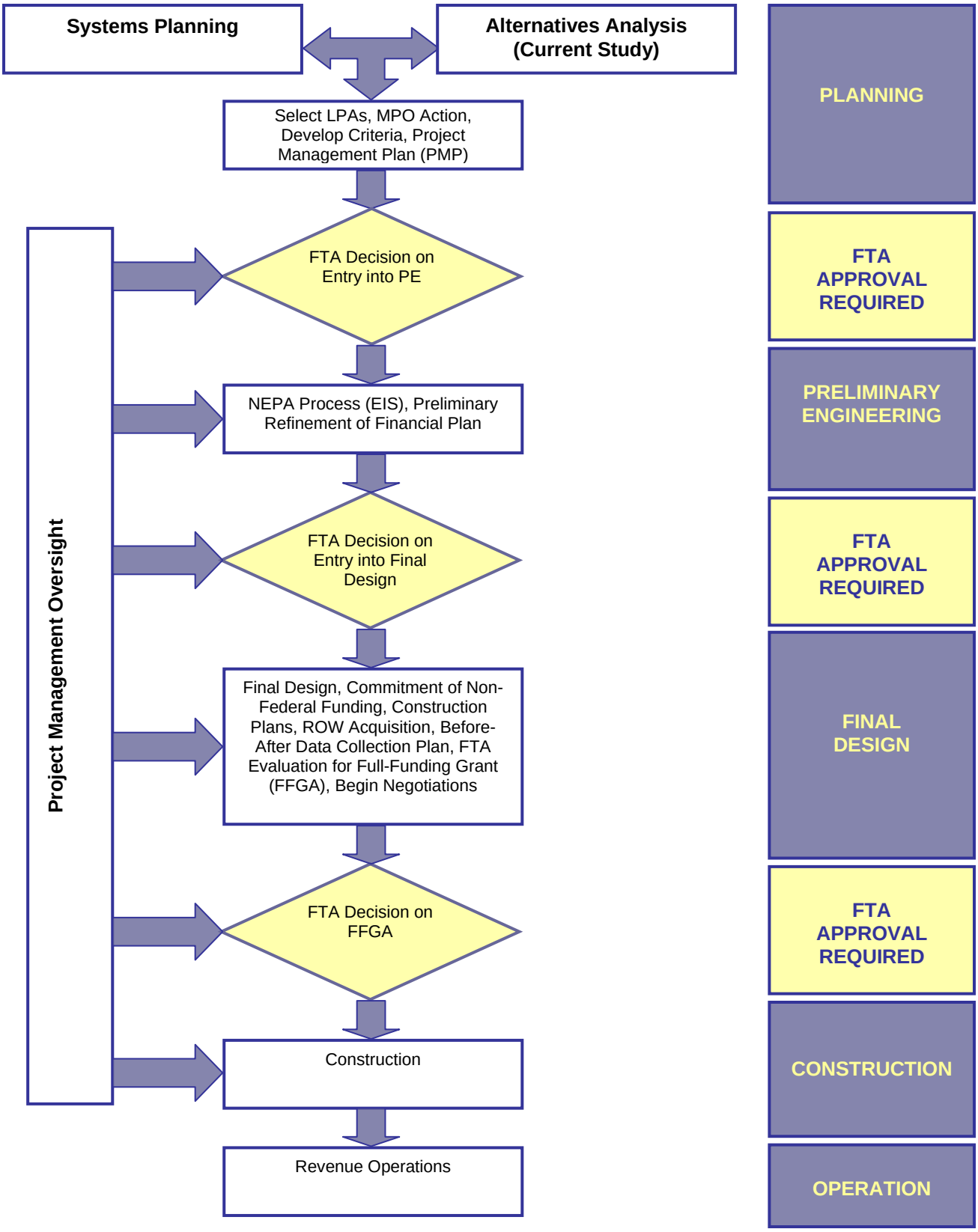
The overall transportation-project development process is illustrated in Figure 2.2-4. The purpose of this study is to re-examine and refine the Northside and Southside MTIA's preferred

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 MTIA's 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 MTIA's. 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



2.2.4 STATEMENT OF PURPOSE AND NEED

Problems and Opportunities

Problem: Sustainable Development
As stated previously, virtually all Southside neighborhoods and portions of many nearby suburbs are included in the study area. The Southside study area includes nearly 200,000 people. The City of St. Louis, including the Southside study area, has experienced decades of population loss. Though there are many stable residential areas, there are also several areas, particularly east of Grand Boulevard, which are in need of rehabilitation. These are areas where the housing stock is relatively old and in need of residential redevelopment in order to remain viable and attractive. Much of the area east of I-55 and between I-64 and I-44 is located in a federally-designated Empowerment Zone (EZ) (Figure 2.2-5). 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.

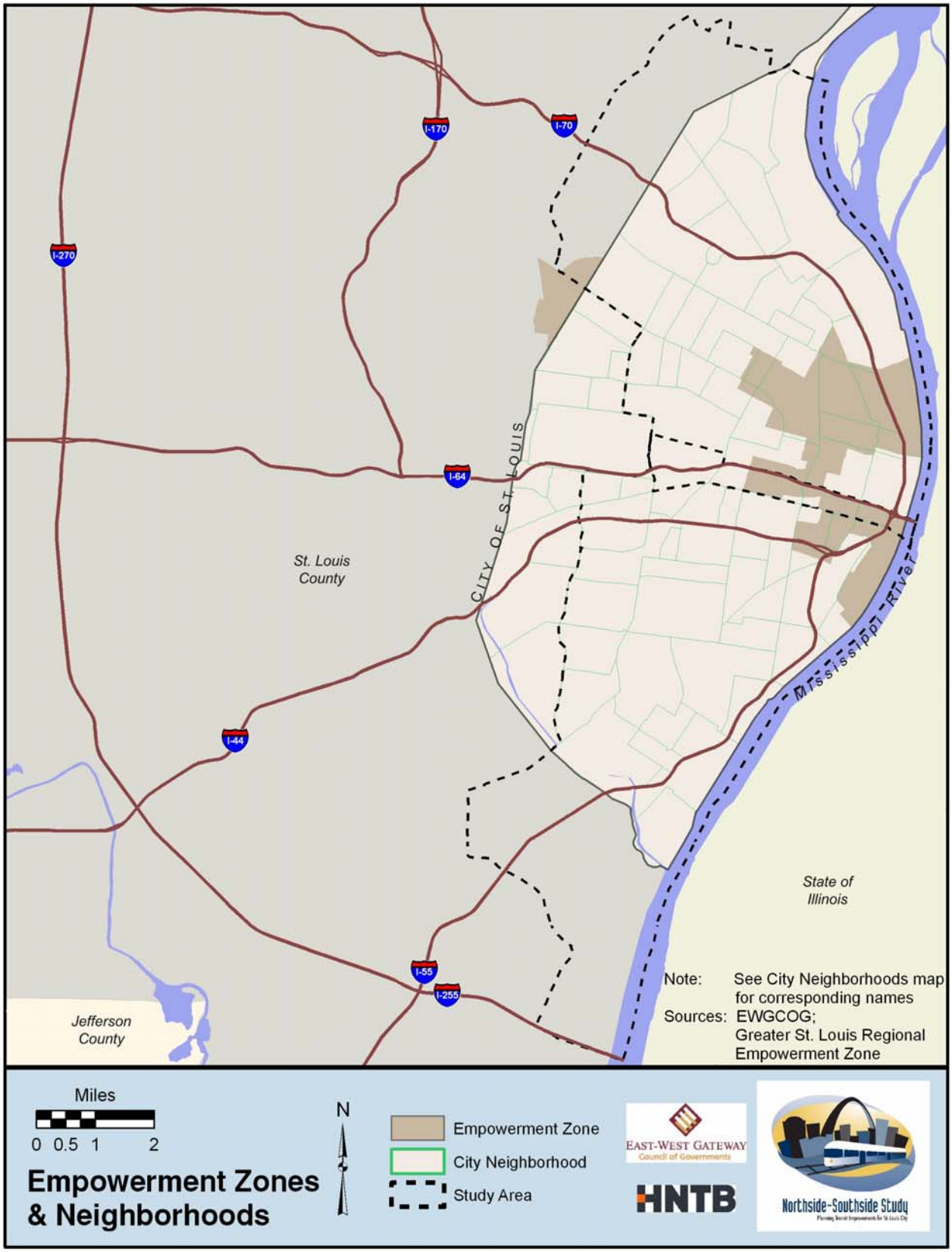
The following needs for sustainable development emerged from the review of local plans, the examination of existing conditions, and stakeholders' comments:

- Supporting stabilization, revitalization, and redevelopment in the study area.
- Preserving the character of existing stable residential areas.
- Capitalizing on recent and planned investments, particularly those along Chouteau Avenue and Grand Boulevard.
- Increasing personal safety in areas of decreased commercial and residential development.

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. Between 2000 and 2005, population increases were seen in portions of the EZ, primarily east of Grand Boulevard near the I-44/I-55 interchange. These neighborhoods include Lafayette Square, Peabody-Darst-Webb, LaSalle Park, Soulard, and Benton Park. While the EZ designation has influenced some successful revitalization efforts in these areas, the Southside as a whole 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.

FIGURE 2.2-5: EMPOWERMENT ZONES & NEIGHBORHOODS



One area outside of downtown in which transit has played a role in development is the 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 southeastern edge of the study area near the Mississippi River.

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 Southside, 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 Southside 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.

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 Southside 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

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.

- 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 Southside 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 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.

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 or Southside options, 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 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 FTAs recommended framework, and on the process developed for and used in the 2000 Northside and Southside MTIAs.

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 FTAs evaluation framework (since modified), EWGCOGs 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 2.2-1 and 2.2-2. 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

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 will include detailed capital and operating costs, ridership forecasts, and assessments of economic development opportunities. Those 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	• Access to Opportunity • Preserve Existing Infrastructure • Sustainable Development • Safety and Security	• Improve transportation service for all populations • Sustain existing neighborhoods • Enhance neighborhoods and foster sustainable development	• 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”	Major travel markets Employment, population concentrations Sustainable development opportunities Transportation system connectivity and multi-modal interface Physical feasibility

Evaluation Framework	*Legacy 2030* Focus Areas	Northside/ Southside Goals	Northside/Southside Objectives	Evaluation Criteria
Economic, Environmental & Local policy impacts	• Access to Opportunity • Preserve Existing Infrastructure • Sustainable Development	• Improve transportation service for all populations • Sustain existing neighborhoods • Enhance neighborhoods and foster sustainable development	• 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	Major travel markets Employment, population concentrations Sustainable development opportunities Right-of-way impacts Parking impacts Traffic impacts Environmental impacts Utility impacts
Cost Effectiveness		• Develop a cost-effective transportation system improvement	• Achieve public consensus and institutional support • Encourage strong local policies that foster TOD and enhance quality of life	Capital Costs
Financial Feasibility		• Develop a cost-effective transportation system improvement	• Achieve public consensus and institutional support • Encourage strong local policies that foster TOD and enhance quality of life	Capital Costs
Equity	• Access to Opportunity • Sustainable Development • Safety and Security	• Improve transportation service for all populations • Sustain existing neighborhoods • Enhance neighborhoods and foster sustainable development	• 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	Major travel markets Transportation system connectivity and multi-modal interface Transit-dependent population Sustainable development opportunities Physical feasibility

TABLE 2.3-2: EVALUATION FRAMEWORK (DOWNTOWN)

Objective	Evaluation Criteria
Ridership	• Employment Centers • Activity Centers • Special Events • Directness • Speed • Proximity
Development	• Existing • Potential
Costs	• Capital • Operation & Maintenance
Impacts	• Traffic • Parking • Safety • Existing MetroLink • Construction

Existing Conditions

Chapter 3.0

Northside-Southside Study

Planning Transit Improvements for St. Louis City

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 Southside area, the LPA included either light-rail transit (LRT) or bus rapid transit (BRT) within the existing Union Pacific Railroad right-of-way, terminating at a downtown loop (Figure 3.1-1). On the Northside, the LPA was identified as LRT along Natural Bridge Avenue and a downtown loop.

In late 2005, EWGCOG began technical analyses for Minimal Operating Segments (MOSs) of the LPAs in the Southside and Northside areas. The results of those analyses showed the Southside Northside MOS terminating at a park-and-ride lot near I-55 and Loughborough Avenue. The Northside MOS terminates at a similar facility near I-70 and Goodfellow Boulevard. 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 Southside 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 area for the Southside MOS, called the “Southside Study Area.”

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. This 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 Southside Study Area, as defined in the 2000 MTIA, is located in the south and southeast portion of the City of St. Louis and St. Louis County (Figure 3.1-1) and is roughly bounded by the Mississippi River on the east, Interstate 64 on the north, Gravois Avenue and Hampton Avenue on the west and the Meramec River on the south, comprising an area of approximately 85 square miles. Seven municipalities lie wholly, or in part, within the 2000 MTIA Southside Study Area as well as a portion of unincorporated St. Louis County and over 30% is within the City of St. Louis.

The concentrated Southside study area that is the subject of this study is bounded roughly by the Mississippi River on the east, Chouteau Avenue on the north, Gravois Avenue and Hampton Avenue on the west, and Reavis Barracks Road on the south, covering approximately 36

square miles (Figure 3.1-2). These boundaries cover all of the south side 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 Affton, Lemay, and Bella Villa, as well as a portion of unincorporated St. Louis County.

FIGURE 3.1-1: MTIA STUDY AREA, 2000

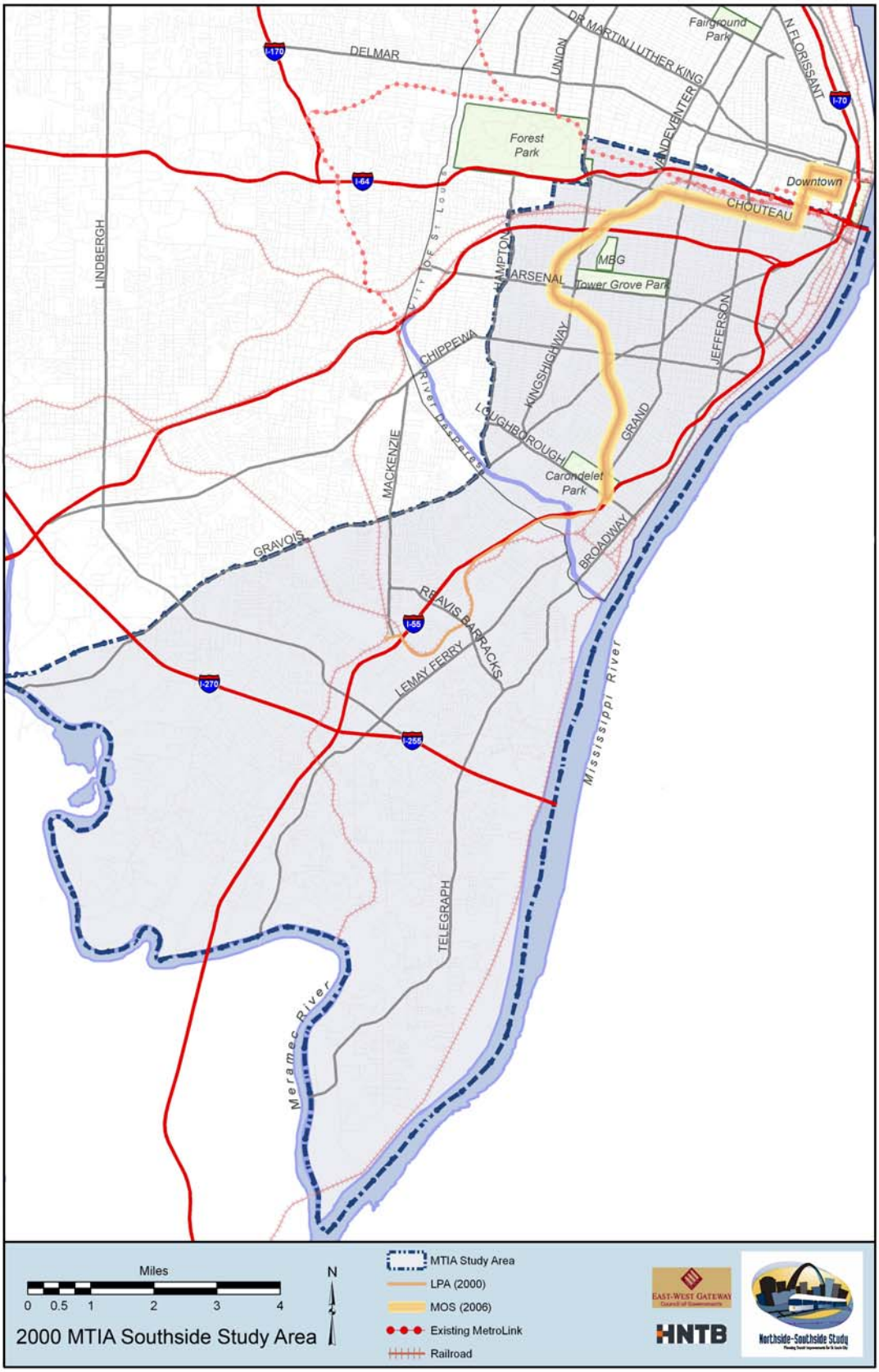


FIGURE 3.1-2: STUDY AREA

Chapter 3.2:
Land Use Characteristics

This section describes land use characteristics within the Southside study area. 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, 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. 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.

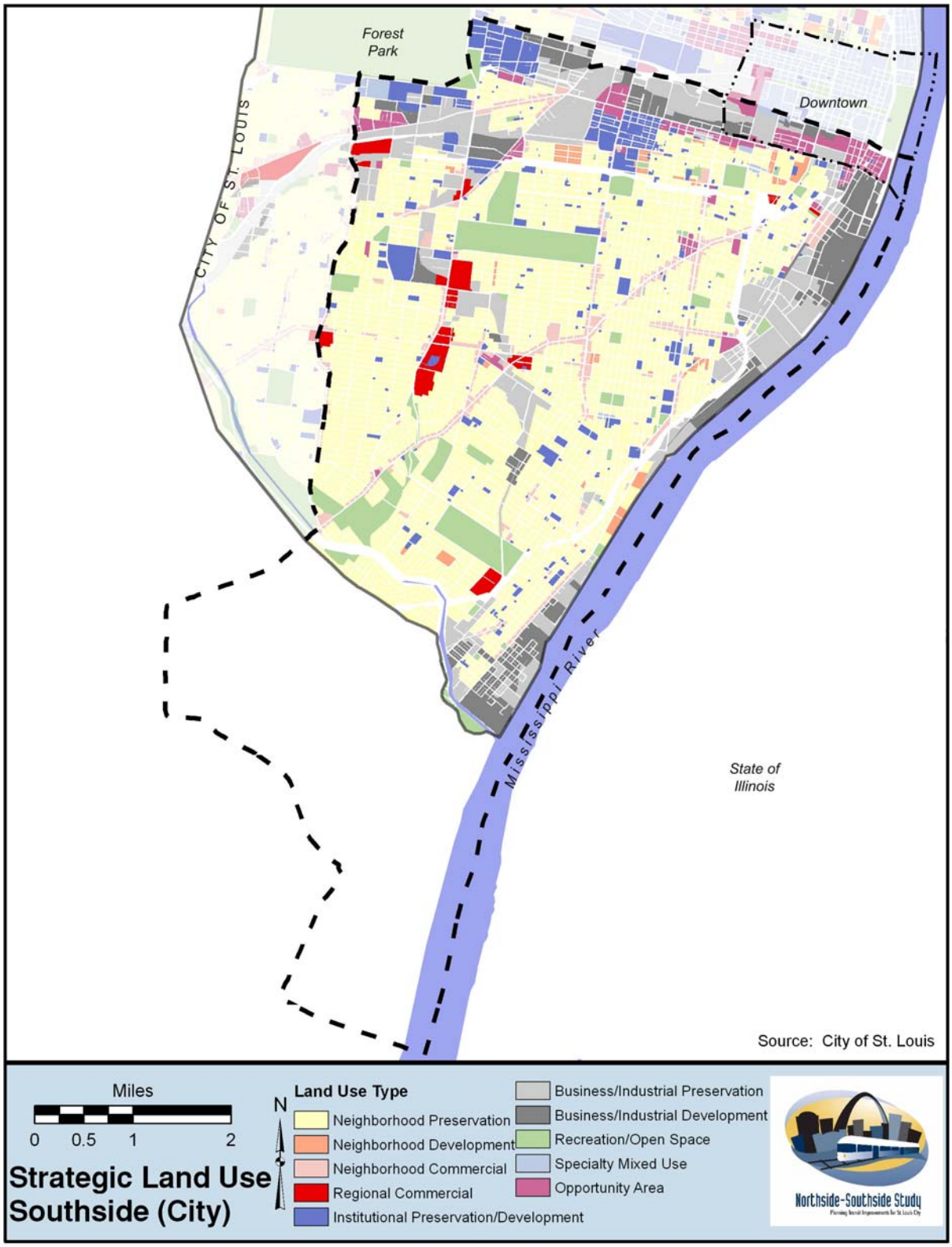
The Plan was developed under management by the City's Planning and Urban Design Agency and reflects the resources and collaboration of the City of St. Louis Mayor's office, St. Louis' 28 aldermen, city and state agencies, developers, and other stakeholders involved in the City's built environment. These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

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.

The vast majority of the Southside study area within the City of St. Louis is designated as Neighborhood Preservation 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. Limited Neighborhood Development Areas occur in the northern part of the Southside and in small spaces along the Mississippi River.

FIGURE 3.2-1: STRATEGIC LAND USE (CITY)



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.

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 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.

Development
Several projected developments (Figure 3.2-2) fall within the scope of this study and may play greater or lesser roles in a future light rail line's implementation. Highlights include:

- A new DESCO Schnucks and Lowe's shopping center is under construction near Interstate 55 and Loughborough. This new development may provide parking for a future Southside light rail station/terminus.

- 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 Avenue 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.

- Carondelet Park's new master plan identifies a forthcoming recreation center, likely in the eastern corner of the park.

- Planned residential developments include Parc Ridge Estates, Botanical Heights, Mississippi Street Lofts, and Mississippi Place.

- Institutions including the Missouri Botanical Garden and Saint Louis University Medical Center plan to expand.

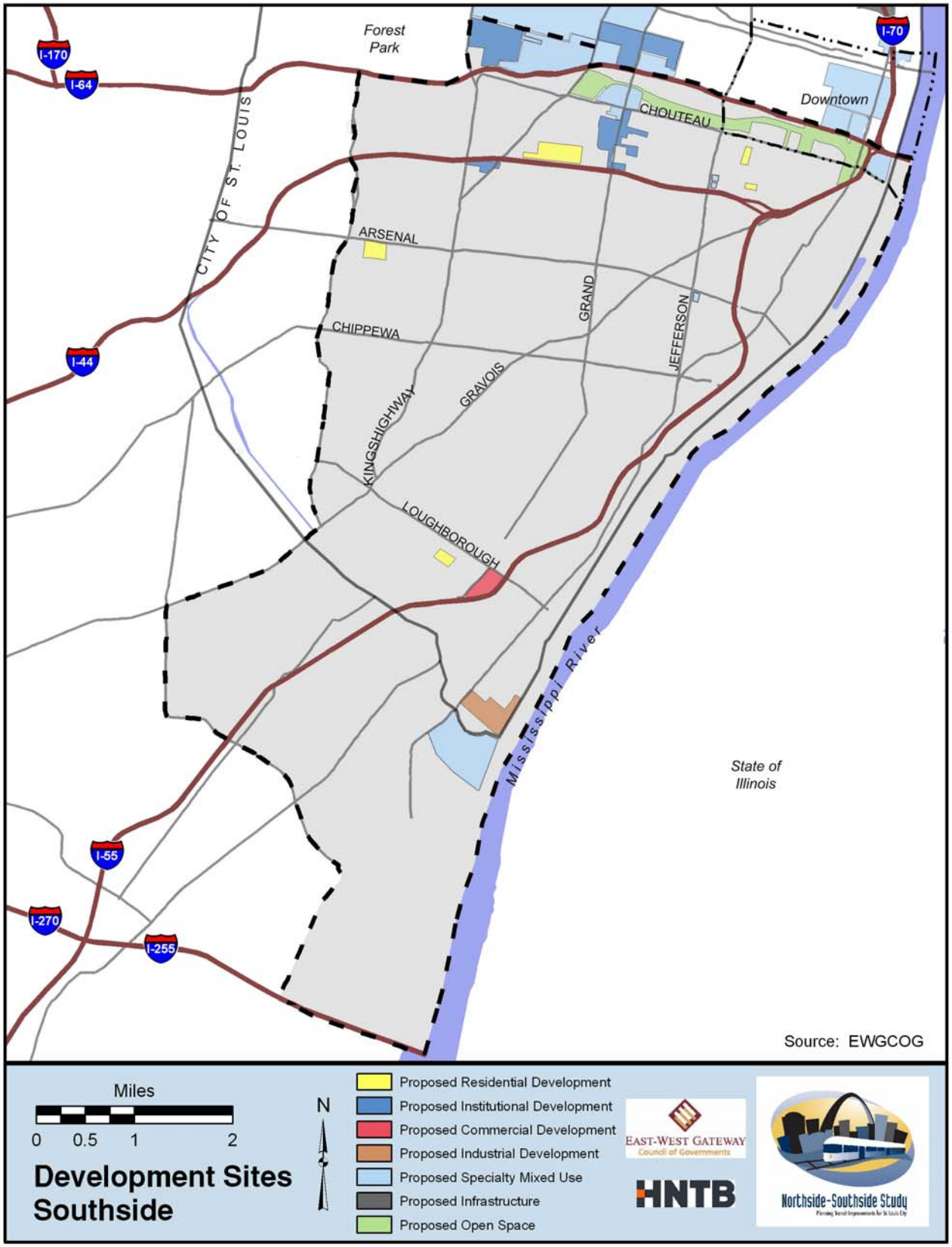
- Specialty mixed use developments such as Chouteau's Landing and Pinnacle Casino Lemay are planned activity centers.

- Industrial uses such as the Carondelet Coke development may create a new employment center.

Legacy 2030
Legacy 2030, managed by East-West Gateway Council of Governments, 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 Southside LPA light rail route was included within the Legacy 2030 list of illustrative projects, with a projected cost of $720 million 2007 dollars.

FIGURE 3.2-2: DEVELOPMENT SITES



3.2.3 STUDY AREA AND SIZE

The 2000 MTIA considers a total area of approximately 160 square miles, of which about 85 comprise the Southside. This land falls within the bounds of both the City of St. Louis and St. Louis County. As described in Section 3.1, the Southside MTIA study area is roughly bounded by the Mississippi River on the east, Interstate 40/64 on the north, Gravois Road and Hampton Avenue on the west, and the Meramec River on the south.

The 2007 focus 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 Southside focus area (Figure 3.2-4). This Southside area extends from Chouteau Avenue on the north to Reavis Barracks Road on the south, and from the Mississippi River on the east to Gravois Road and Hampton Avenue on the west. More than 200,000 residents, or 15% of the combined St. Louis City and County populations, occupied this area in 2000. The vast majority of these residents live 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 focus 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.

FIGURE 3.2-3: STUDY AREA COMPOSITE

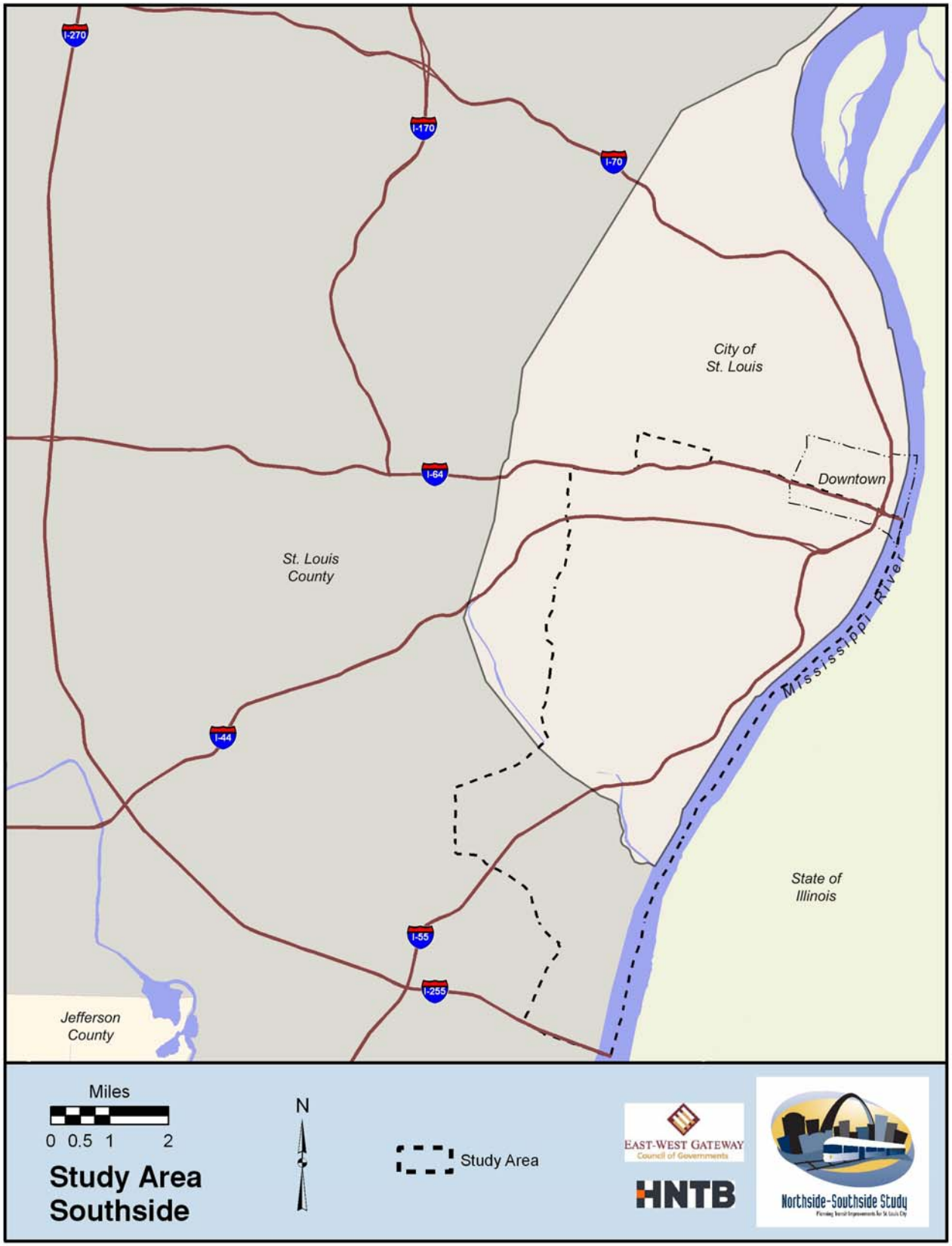


FIGURE 3.2-4: STUDY AREA

FIGURE 3.2-5: CITY NEIGHBORHOODS

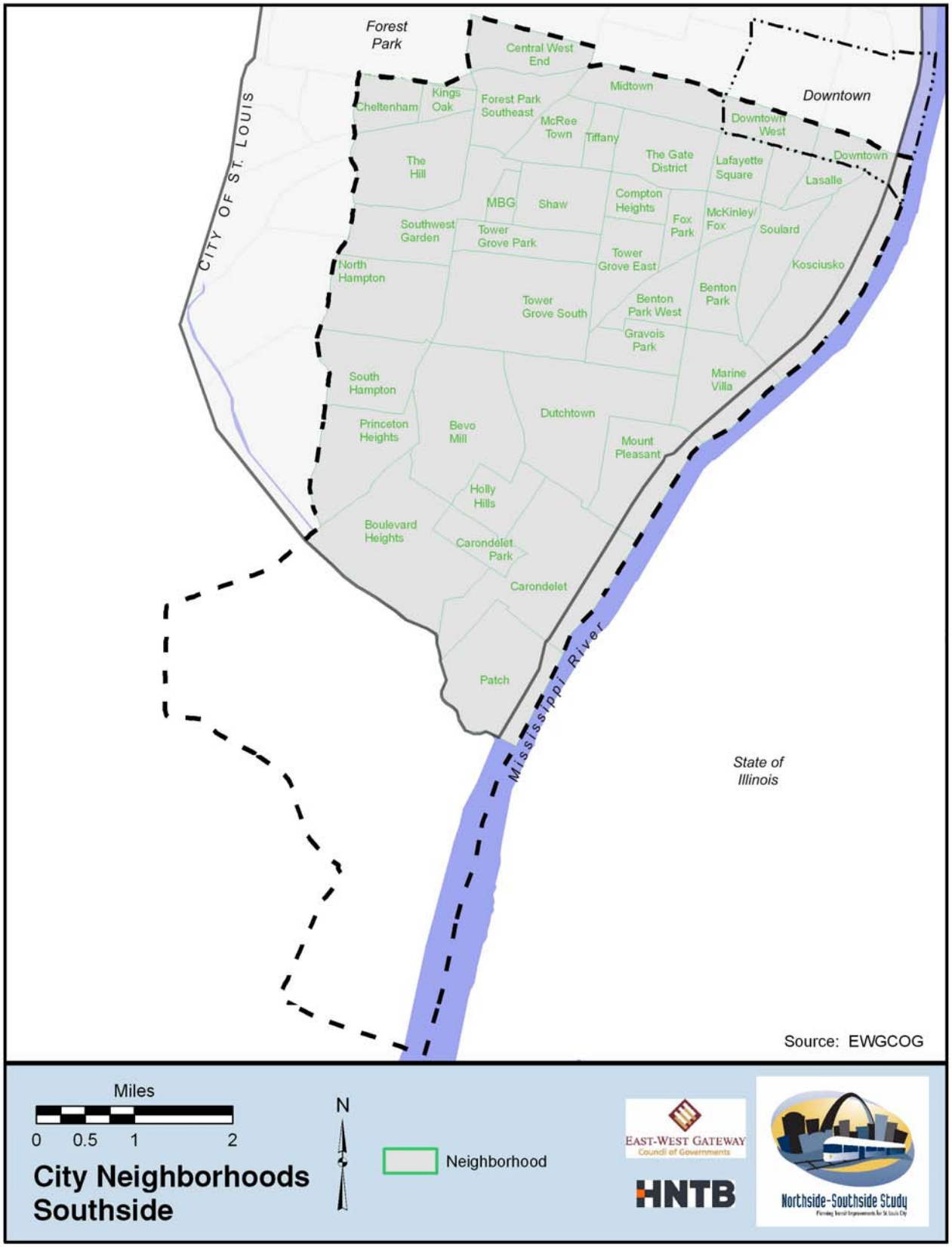
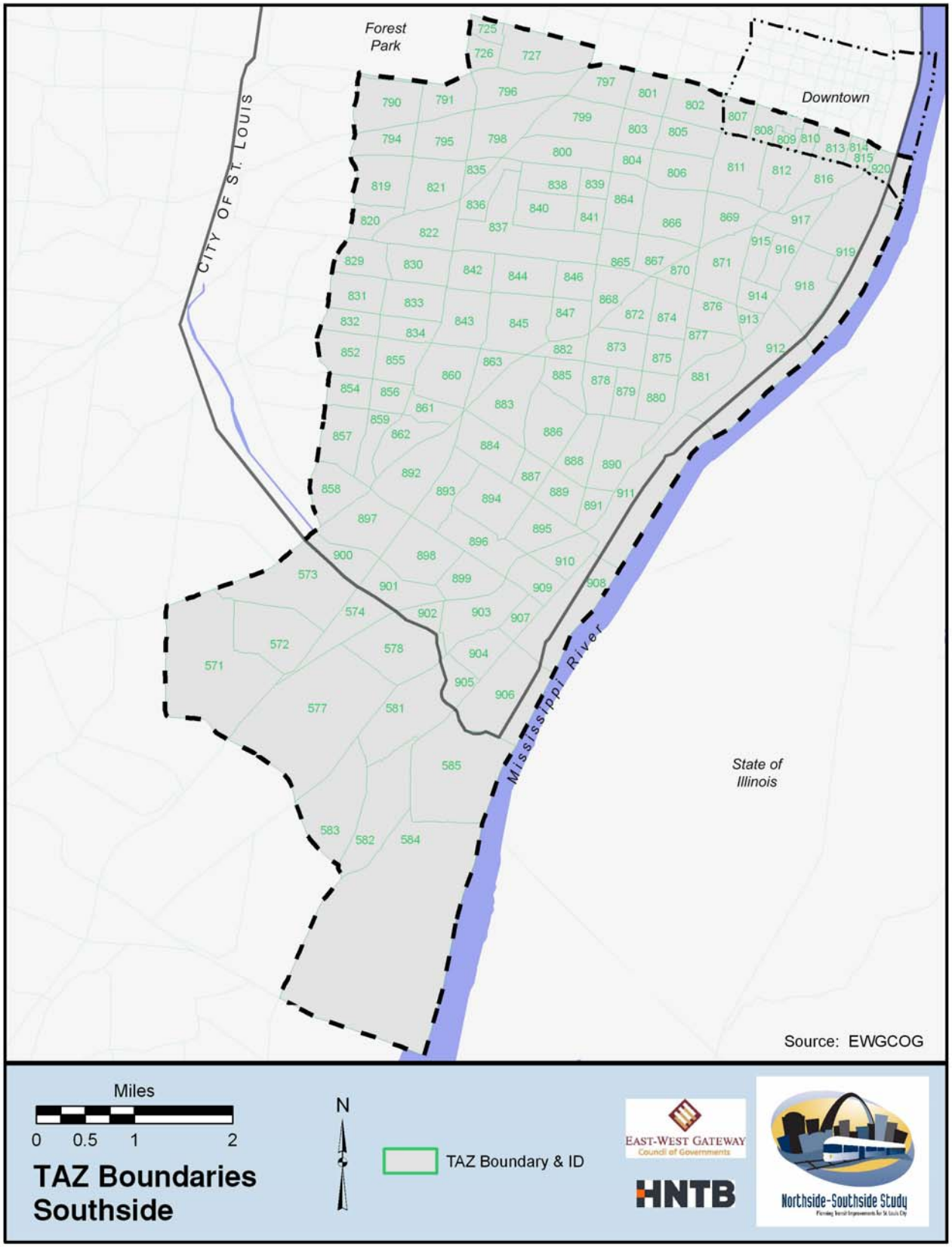


FIGURE 3.2-6: TAZ BOUNDARIES



3.2.4 EXISTING LAND USE

Existing land use throughout the Southside 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 nearly 17,000 acres.

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

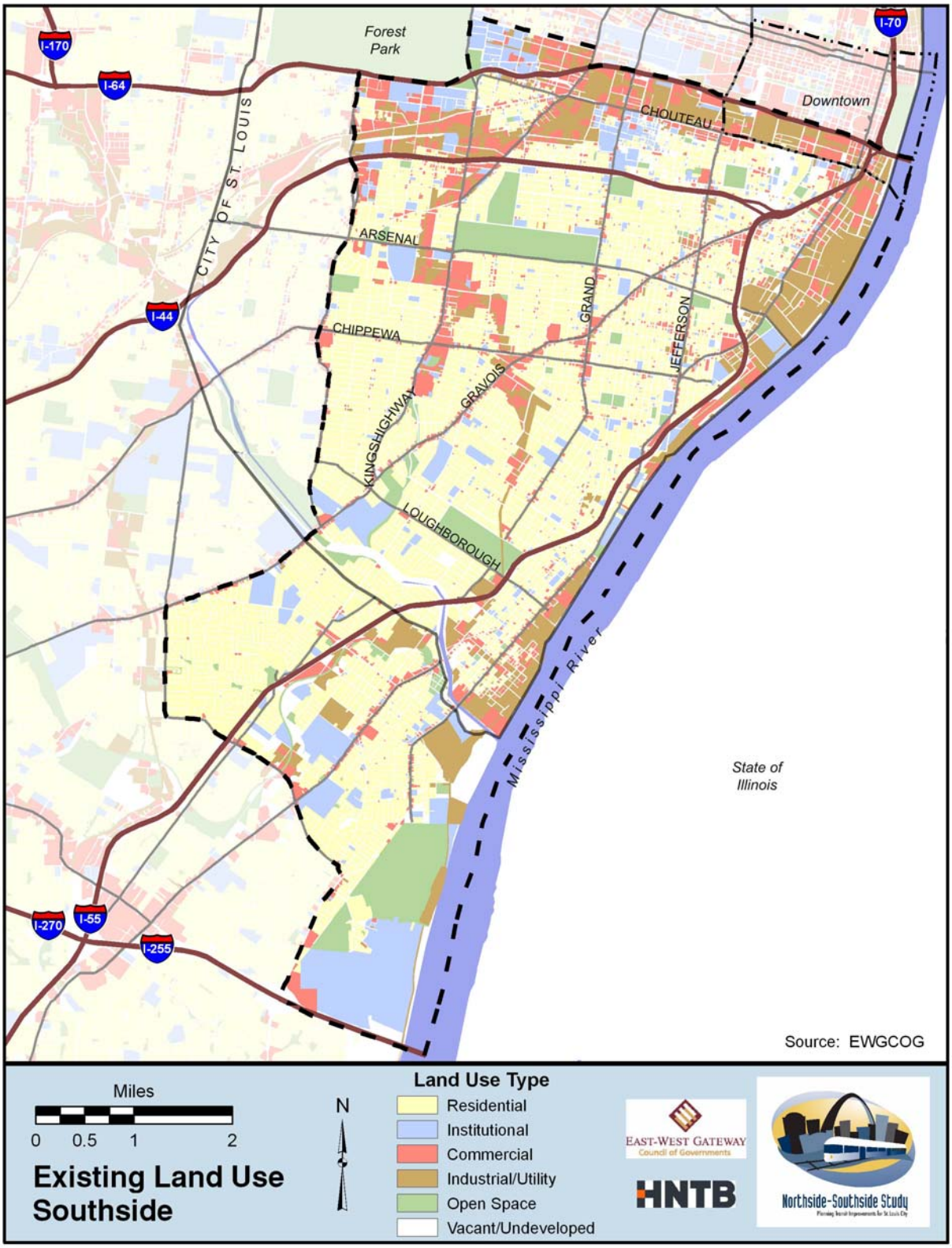
TABLE 3.2-1: LAND USE BY TYPE

	SOUTHSIDE		CITY OF ST LOUIS	
LAND USE	**ACREAGE**	**SHARE OF TOTAL ACREAGE**	**ACREAGE**	**SHARE OF TOTAL ACREAGE**
Residential	7523.87	44.67%	4979.09	28.03%
Institutional	1560.69	9.27%	1632.85	9.19%
Commercial	1899.42	11.28%	3335.77	18.78%
Industrial/Utility	2487.35	14.77%	3869.74	21.78%
Open Space	2691.97	15.98%	2553.00	14.37%
Vacant/Undeveloped	679.39	4.03%	1394.42	7.85%
TOTAL	16,842.70	100%	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.

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.

Residential Neighborhoods
Residential development, covering 7524 acres or 45% of the area, is the dominant land use within the Southside study area. This percentage is considerably higher than the City's average of 28%. Nearly all of Southside residential development is west of Broadway. Particularly high residential concentrations occur south of Tower Grove Park, west of Interstate 55 and south of Carondelet Park, and on much of the land surrounding Chippewa between Kingshighway and Hampton Avenue.

Non-Residential Neighborhoods
Commercial land uses occupy approximately 11% of the Southside study area. This number is low relative to the City of St Louis' average of nearly 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 Kingshighway, Grand Avenue, Gravois Road, Chippewa, and Jefferson. These commercial corridors are typically one or two parcels deep; parcels further than this from the supporting roads are more often residential.

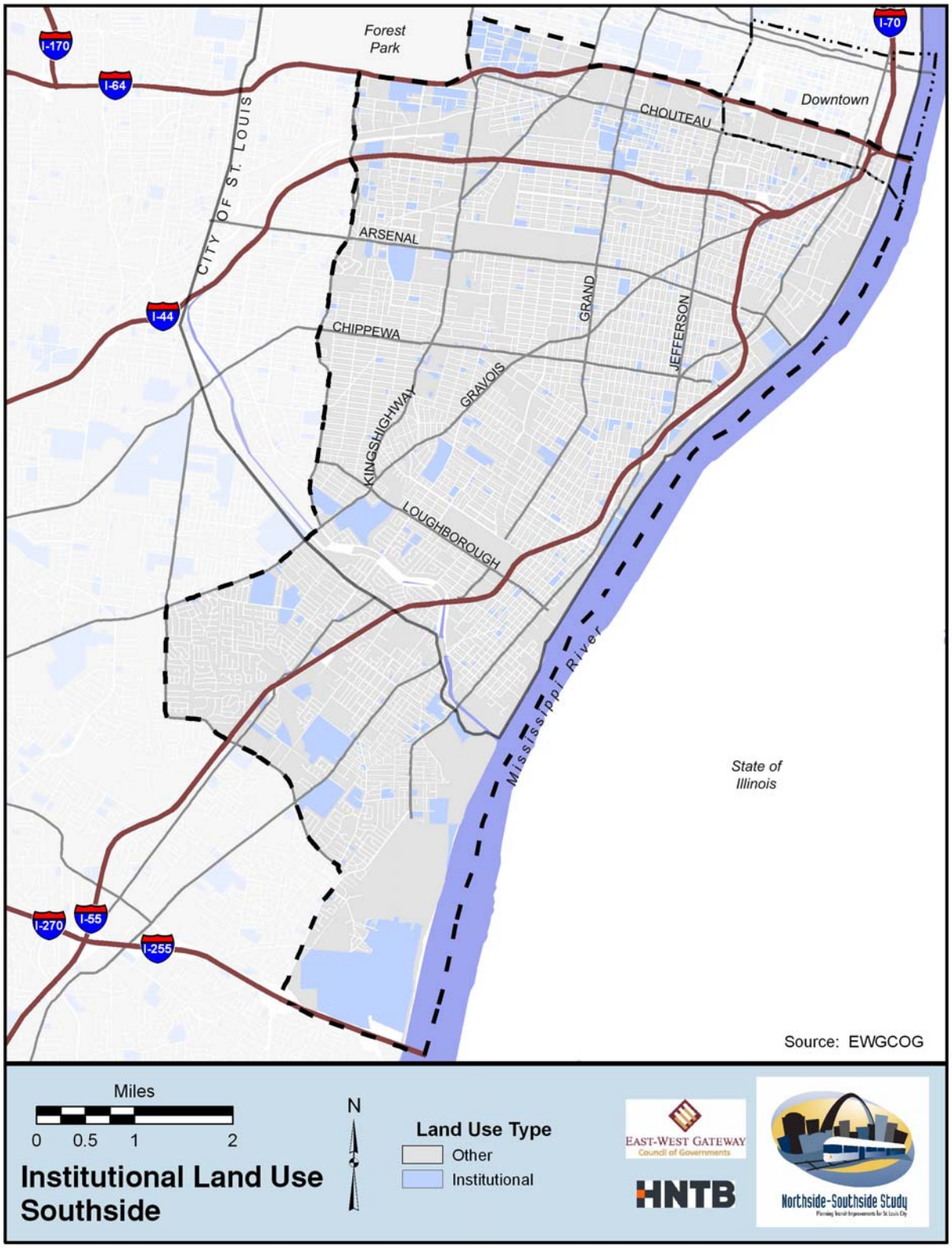
Institutional uses, which occupy slightly more than 9% of the Southside study area, are distributed more evenly throughout the study area (Figure 3.2-8). Particular concentrations occur near Forest Park, along sections of Grand Avenue, near the intersection of Kingshighway and Gravois Road, and north of the intersection of Reavis Barracks Road and Lemay Ferry Road.

Industrial and utility land uses cover nearly 15% of the study area, as compared to the city-wide average of almost 22%. These uses are concentrated in corridors along the Mississippi River east of Broadway, through Mill Creek Valley north of Chouteau Avenue, and along the Union Pacific Railroad right-of-way. 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 16% of the study area, which is slightly more the City's average of over 14%. Sites are well-distributed and primarily occur as parks and recreation.

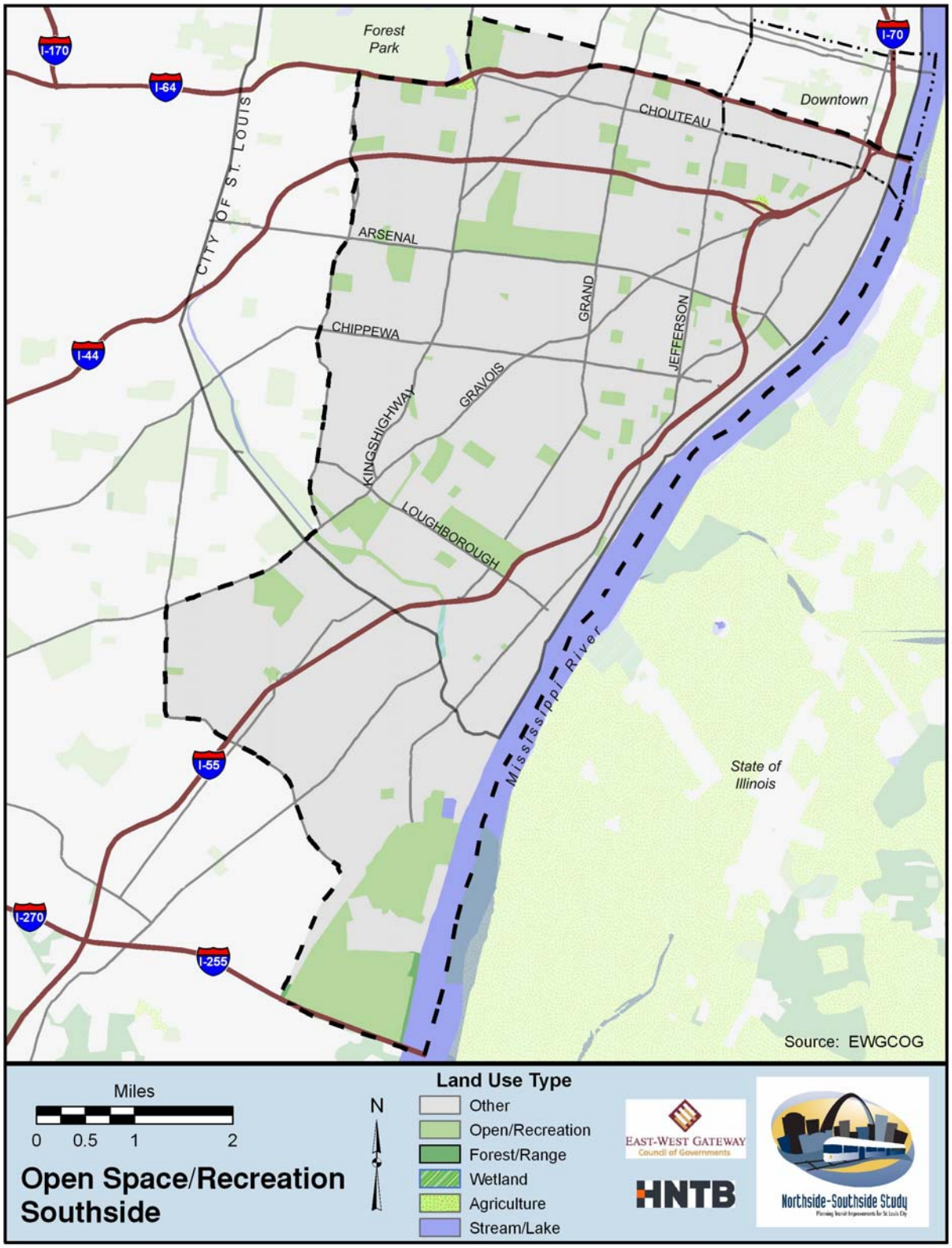
Vacant and undeveloped uses (Figure 3.2-10) are notably low within the Southside study area, covering roughly 4% of the land, as opposed to the City's average of nearly 8%. Higher concentrations occur between Chouteau Avenue and Interstate 44, east of Interstate 55, and near the intersection of Interstates 44 and 55. Most vacant and undeveloped parcels are small and likely represent vacated residences. Some, particularly south of the City of St. Louis boundary, however, are considerably larger.

FIGURE 3.2-8: INSTITUTIONAL LAND USE



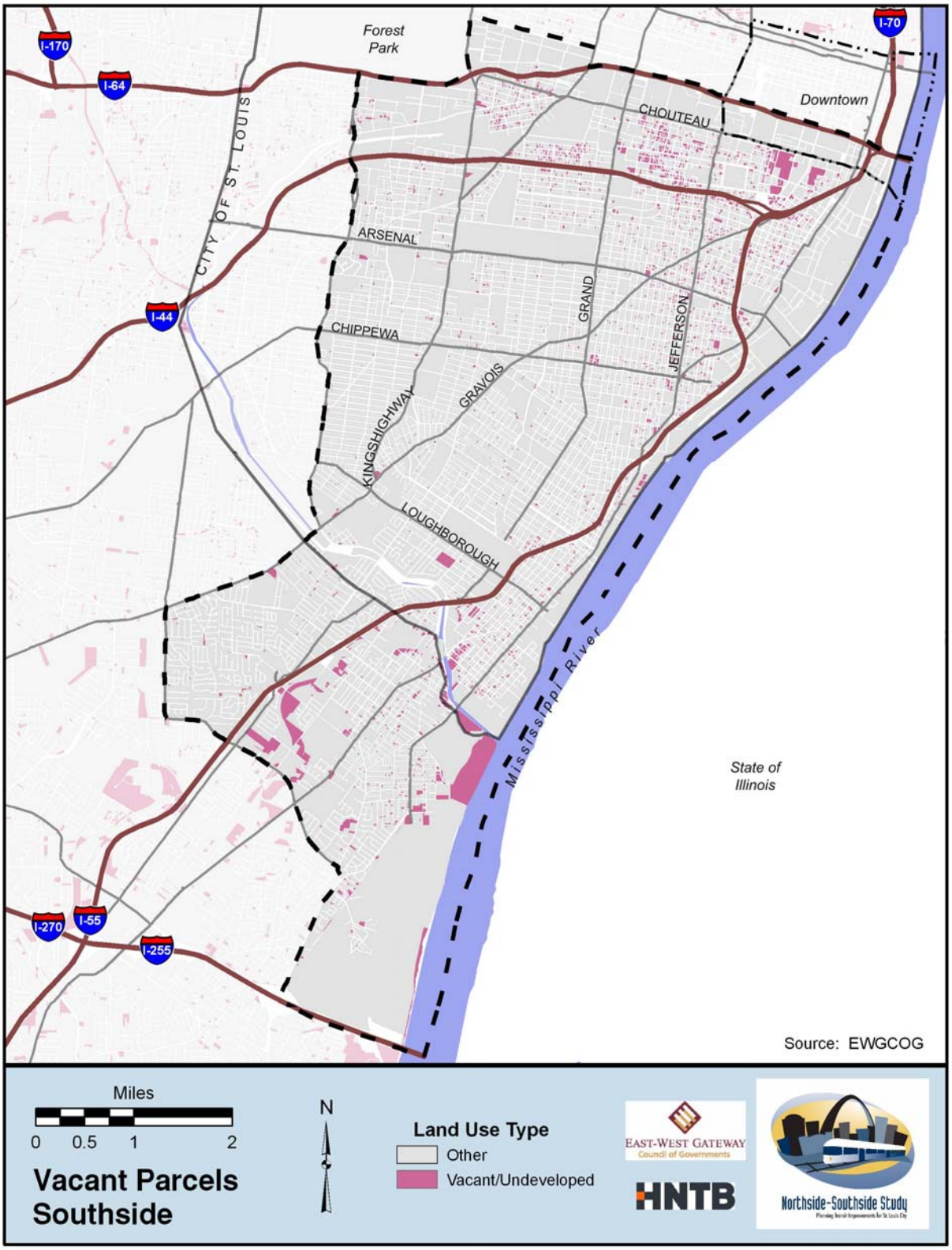
Note: Files from the City of St. Louis and EWGCOG classify the land use of some parcels differently. These conflicting data are maintained here in order to preserve the integrity of all referenced source files.

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.

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 Southside study area.

Residential Areas: Development Character
Residential land use is a dominant feature of the Southside study area. The character of the residential areas of the Southside vary in housing type and density. However, the residential neighborhoods in general are very viable and stable. The residential areas, within the study area, developed within the urban street grid. As a result the neighborhoods have an excellent network of streets and sidewalks for connectivity by vehicle to major arterials such as Chouteau Avenue, Grand Boulevard and Gravois Avenue.

The residential areas east of Grand Boulevard have housing which is predominantly older. The neighborhoods consist of single-family units of attached and unattached, as well as multi-family units of two- and four-family flats or apartments. Many neighborhoods contain parcels, which are or were commercial uses on street corners. Such parcels have often been converted to residential or institutional uses, as well as commercial. These neighborhoods are more likely to contain residents dependent on transit. The neighborhoods of McKinley/Fox, Benton Park West and Tower Grove East exhibit these characteristics. While this area is older in housing stock, including many units constructed in the 19th century, there are numerous neighborhoods, with renovated housing units. Neighborhoods such as LaSalle Park, Lafayette Square, the Gate District, Compton Heights, and Benton Park have experienced renovations over the past 20 years.

The neighborhoods west of Grand Boulevard are also a mixture of single family and multi family units. The neighborhoods have predominance of single-family detached units, especially south of Chippewa Street as the City developed in the 1920s through the 1950s, south to the River Des Peres. The residential neighborhoods are well connected by a street grid of intersecting streets connecting to local collector and commercial corridors such as Kingshighway Boulevard and Gravois Avenue.

Commercial Corridors
The Southside study area is fortunate to have many commercial corridors which have stable and growing commercial areas. Gravois Avenue is comprised of various commercial land uses which front along the state highway (MO 30) for the entire length in the City. The land use is predominantly neighborhood commercial, which serve the adjacent neighborhoods and residents. Typically the commercial uses are on the street level and mixed uses on the upper stories of buildings. Such uses include restaurants, hair salons, used car dealerships and convenience stores, most of which have a curb cut access to the street. The commercial areas along Gravois Avenue are concentrated at the intersections with major arterial streets or local collectors, including Jefferson Avenue, Grand Boulevard, Morganford Avenue and Hampton Avenue. Particularly significant is the concentration of commercial uses at the intersection of Gravois and Grand. The stable commercial properties of The Schnucks Grocery Store, Gravois Plaza, restaurants, service businesses and redevelopment of the Southside National Bank building illustrate a stable and growing commercial area for the adjacent neighborhoods.

Grand Boulevard has a small but vibrant neighborhood commercial area from Arsenal Street to the intersection of Gravois Avenue. The shops along the street are predominantly restaurants,

service businesses such as banks, floral shops, and other services. Many of the businesses utilize on-street parking for customers.

Kingshighway Boulevard is a major north/south arterial with a mix of neighborhood commercial areas and regional commercial areas. The neighborhood commercial areas serve the adjacent neighborhoods and help to support the larger regional commercial areas also located along Kingshighway. There is a concentration of commercial uses, both neighborhood and regional at the intersection of Kingshighway and Southwest Avenue. South of Arsenal Street the land use is predominantly regional commercial with numerous car dealerships, a Home Depot home improvement center, the South Towne Shopping Center and numerous outlet stores. In addition to these uses, smaller parcels of local neighborhood commercial uses exist. The heavy concentration of commercial uses with numerous curb cuts and traffic signals gives Kingshighway Boulevard a busy auto-oriented character, similar to more suburban corridors.

Redevelopment Opportunities

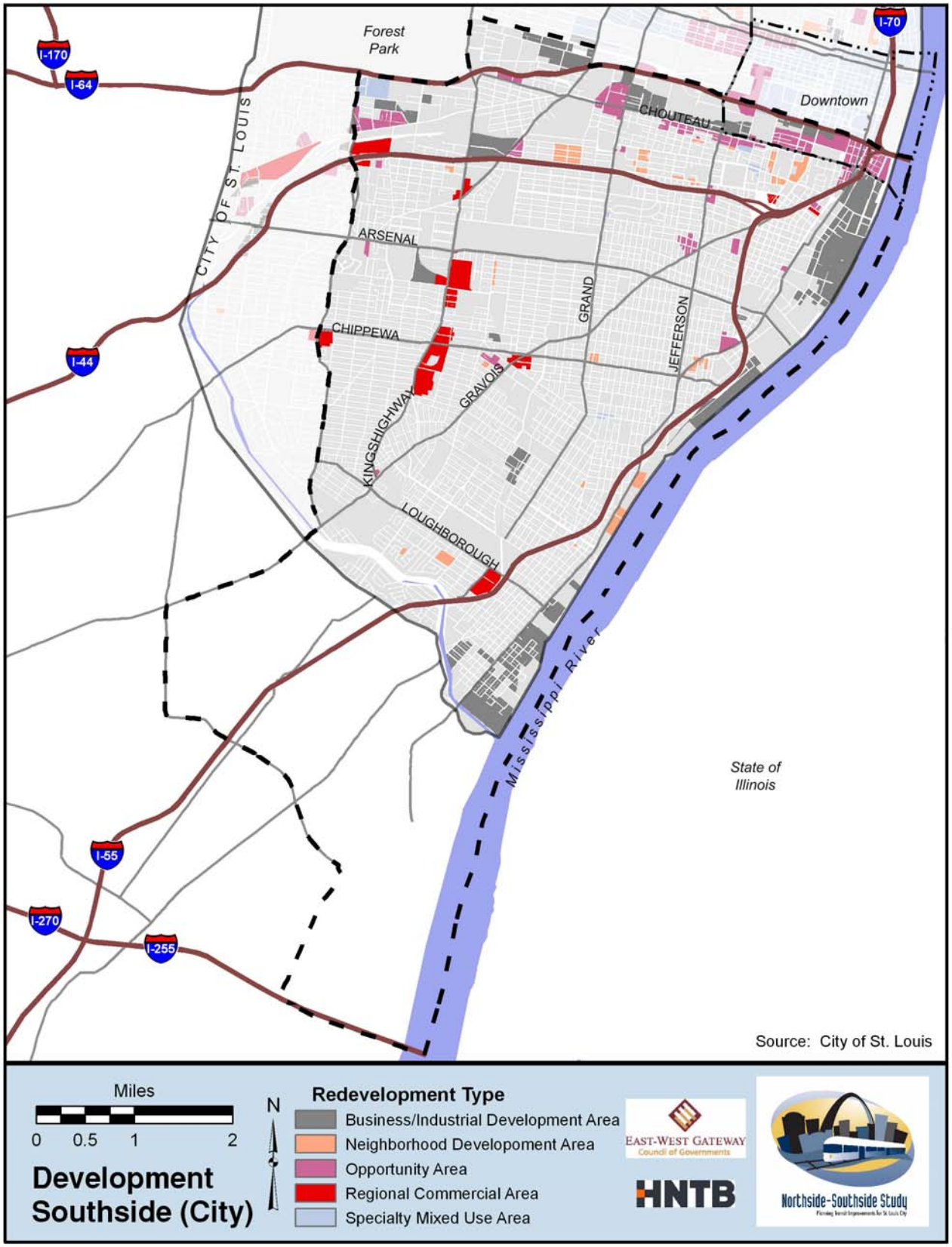
The Southside Study Area is a predominantly stable urban environment with a few areas with the potential for redevelopment. The City's Strategic Land Use plan identifies properties for redevelopment located throughout the Southside Study Area (Figure 3.2-11). A summary of these potential redevelopment sites are listed below:

- Chouteau Avenue – The busy roadway has many parcels with the potential for redevelopment from 18th Street to Grand Boulevard. The numerous parcels with potential for redevelopment provide the opportunity of transit stations and transit oriented development (TOD.) which would serve the existing residential neighborhoods of Lafayette Square and the Gate District. The redevelopment areas also have the opportunity to support the growing Saint Louis University Medical Center Campus located on Grand Boulevard.

- CORTEX South Campus – The intersection of Grand Boulevard and Chouteau Avenue is the proposed location of the CORTEX South Campus, a proposed biotechnology center. The property has the potential to be a major employment and activity center which could be served by transit.

- Union Pacific Railroad Corridor – The railroad corridor has a few underutilized areas which are predominantly industrial. Large concentrations of properties in the McRee Town neighborhood have the potential for redevelopment with good access to local arterial streets and Interstate 44. A transit station in this area could build upon such potential. Another redevelopment site along the railroad is on Brannon Avenue between Arsenal and Fyler Street. The property is a mix of industrial or vacant property with adjacent uses of institutional and residential properties. The property has good access to The Hill neighborhood, Kingshighway and Tower Grove Park.

FIGURE 3.2-11: STRATEGIC DEVELOPMENT AREAS



Chapter 3.3: Demographics

This section describes past and current, as well as future, projections of demographic information for the Southside study area. For comparison purposes, information for the City of St. Louis and St. Louis County is also included. The section describes 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 in the Southside study area.

3.3.1 POPULATION

Table 3.3-1 displays the total population of the study area, 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. Since 1990, the Southside lost at a rate less than the rest of the City (5% compared to 12%). There were pockets of increases in the neighborhoods of South Hampton, North Hampton, St. Louis Hills, Dutchtown, and Shaw. Study area population is expected to decrease at a slower rate by 2030.

Since 2000, the City of St. Louis has been implementing programs to draw population back to the City. 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)

TABLE 3.3-1: TOTAL POPULATION

	SOUTHSIDE		ST. LOUIS CITY		ST. LOUIS COUNTY	
YEAR	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*
1990	209,582	--	396,685	--	993,529	--
2000	199,395	-5%	348,189	- 12%	1,016,315	2%
2030	184,704	-7%	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 area, the city, and the county. The Southside area continues to have higher population density than the rest of the City, with the highest density in the Grand/Gravois area. 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 Southside and the City as a whole. 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	SOUTHSIDE	ST. LOUIS CITY	ST. LOUIS COUNTY
1990	5,871	6,010	1,897
2000	5,585	5,275	1,941
2030	5,174	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

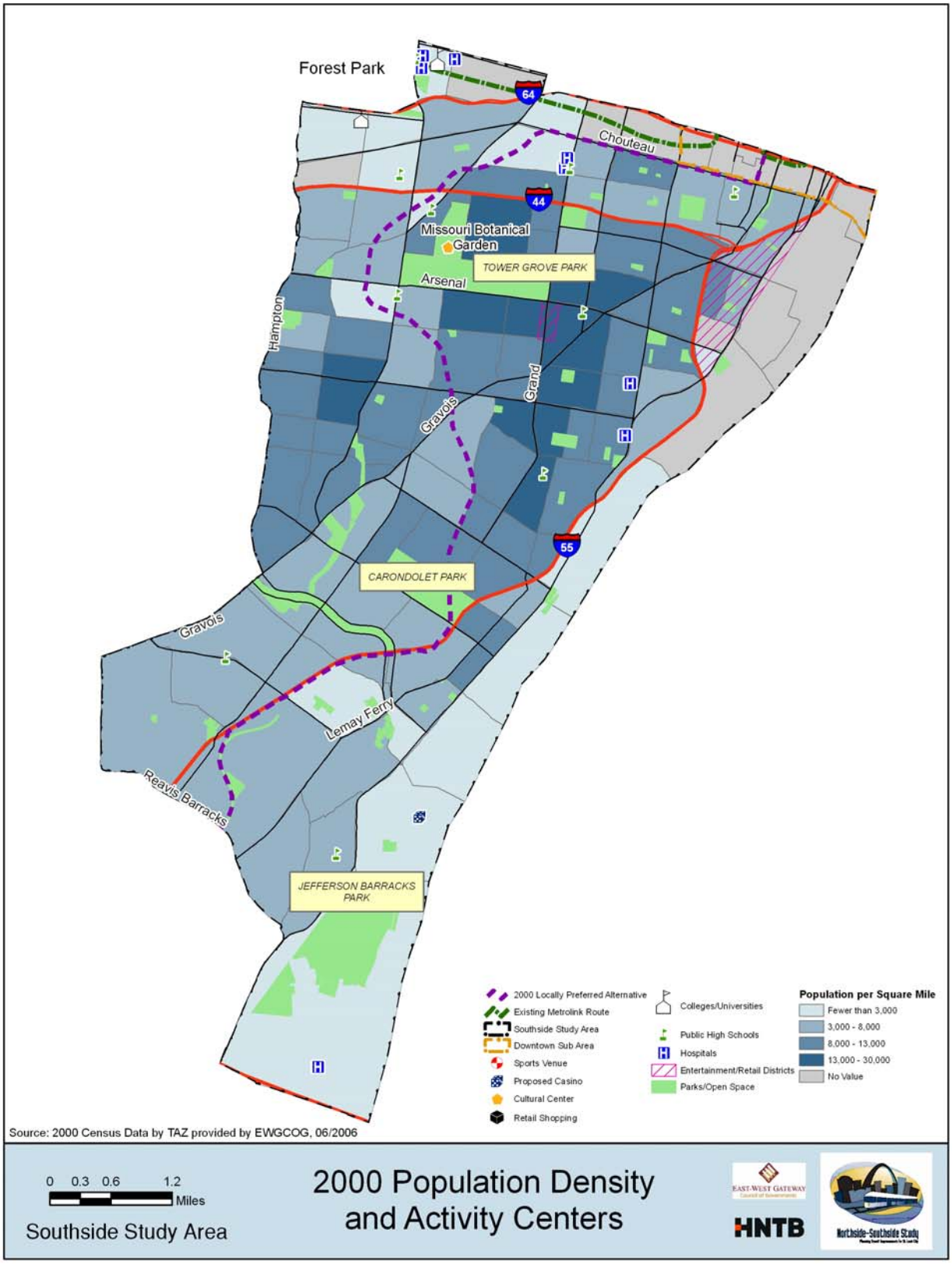
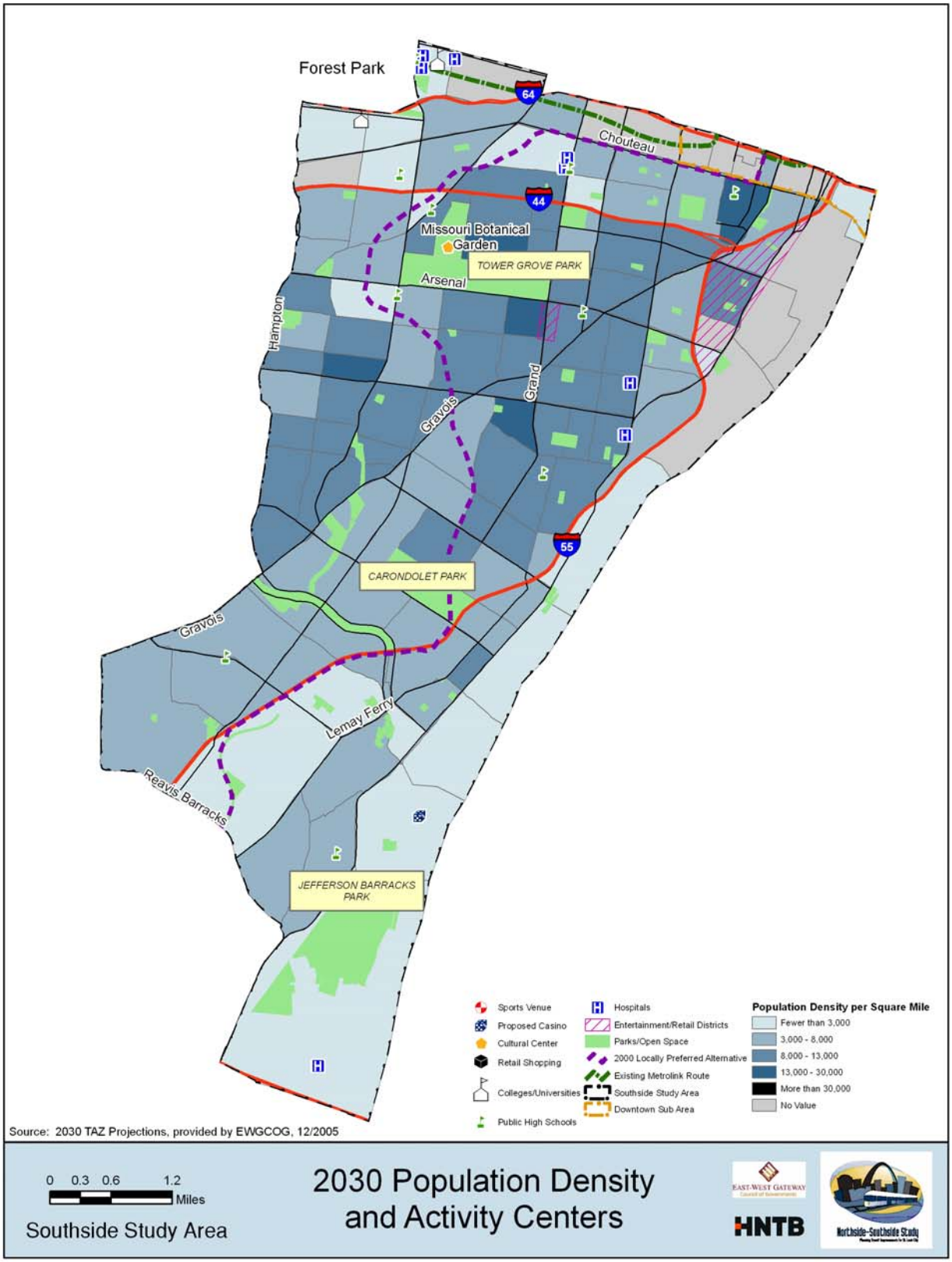


FIGURE 3.3-2: POPULATION DENSITY AND ACTIVITY CENTERS, 2030


Forest Park
64
Chouteau
44
Missouri Botanical Garden
TOWER GROVE PARK
Arsenal
Hampton
Grand
Gravois
55
CARONDOLET PARK
Gravois
Lemay Ferry
Reavis Barracks
JEFFERSON BARRACKS PARK
Sports Venue
Proposed Casino
Cultural Center
Retail Shopping
Colleges/Universities
Public High Schools
Hospitals
Entertainment/Retail Districts
Parks/Open Space
2000 Locally Preferred Alternative
Existing Metrolink Route
Southside Study Area
Downtown Sub Area
Population Density per Square Mile
Fewer than 3,000
3,000 - 8,000
8,000 - 13,000
13,000 - 30,000
More than 30,000
No Value
Source: 2030 TAZ Projections, provided by EWGCOG, 12/2005
0 0.3 0.6 1.2 Miles
Southside Study Area
2030 Population Density and Activity Centers
EAST-WEST GATEWAY
HNTB
Northside-Southside Study

3.3.2 AGE DISTRIBUTION AND WORKFORCE DISABILITY

Table 3.3-3 shows the percentage distribution of the population by age group for the study area based on the 2000 census data. The distributions in the City of St. Louis and St. Louis County in total are also presented for comparison. 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-three percent of the population in the study area was under the age of 16, and 12% was over the age of 65, consistent with the rest of the city and the county.

Figure 3.3-3 shows that higher concentrations of the elderly population are located in the south portion of the study area. The elderly population is expected to continue increasing, as the baby boomer generation reaches ages 66-84 by 2030.

TABLE 3.3-3: PERCENT POPULATION BY AGE GROUP, YEAR 2000

AGE GROUP	SOUTHSIDE STUDY AREA	CITY OF ST. LOUIS	ST. LOUIS COUNTY
Under 16	23%	23%	22%
16-20	7%	7%	7%
21-24	5%	6%	5%
25-34	16%	15%	13%
35-44	17%	16%	17%
45-54	12%	12%	14%
55-64	7%	7%	9%
65+	13%	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 percentage is slightly less in the Southside, where 17% are considered disabled (Figure 3.3-4).

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

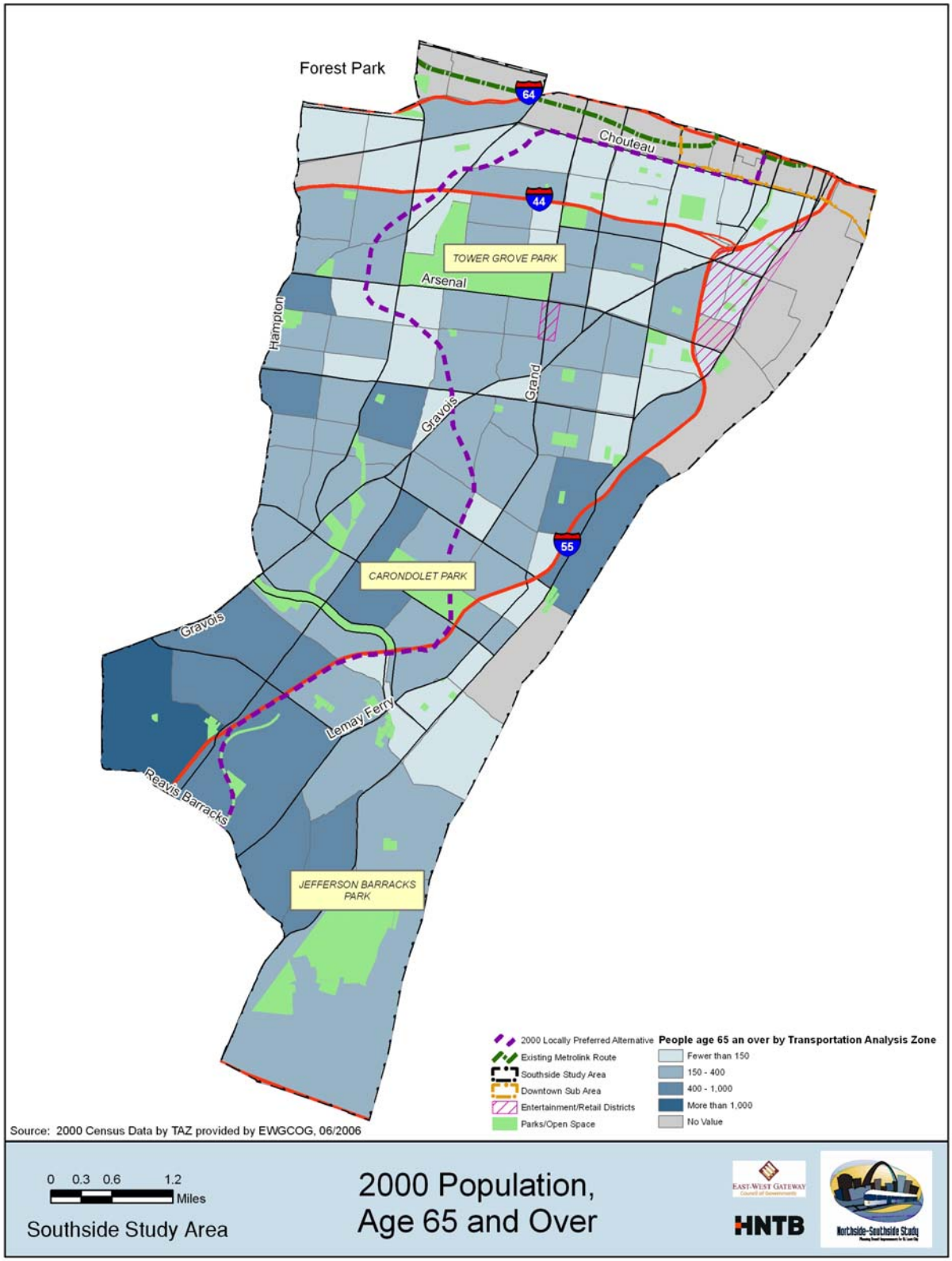
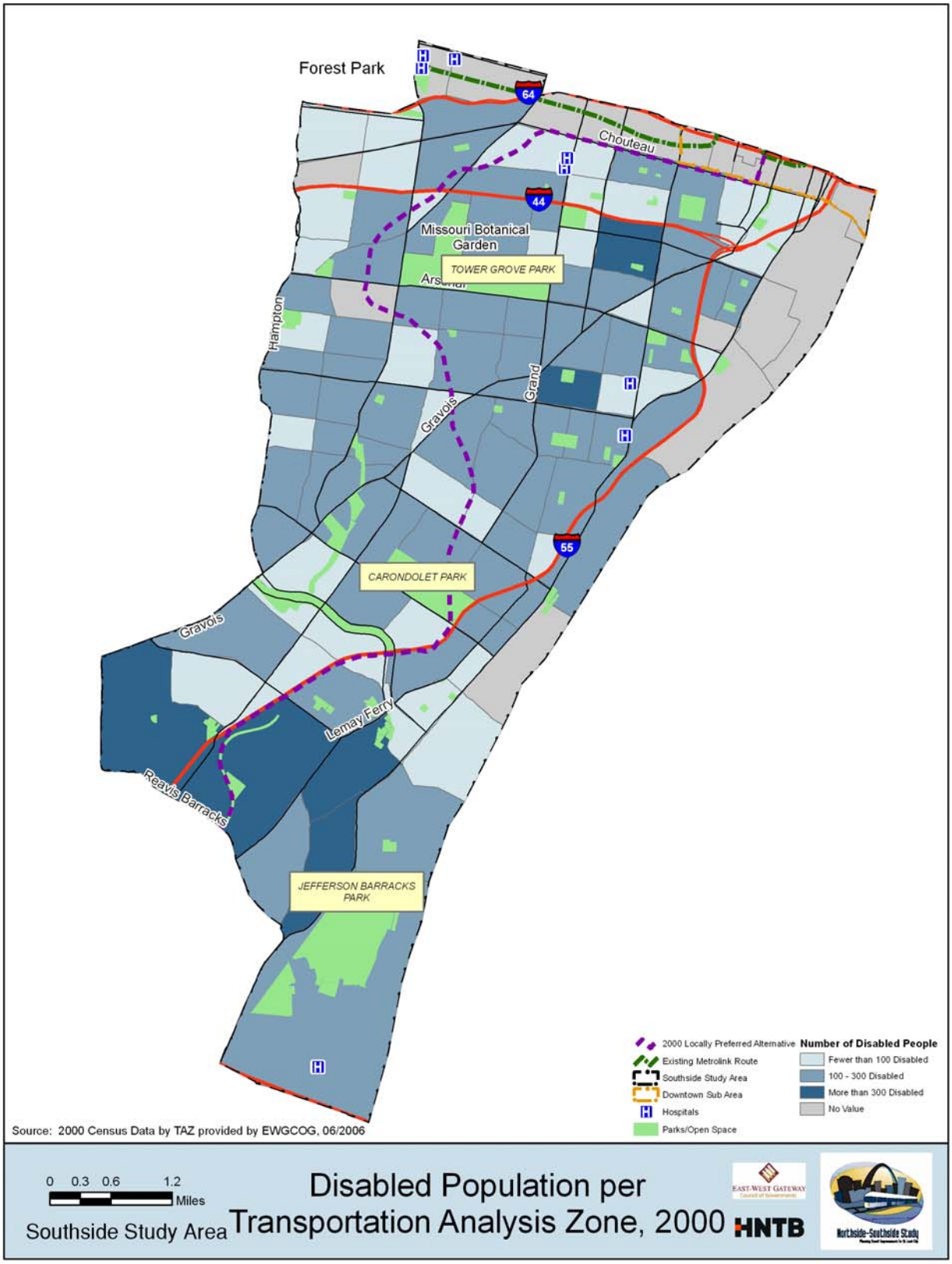


FIGURE 3.3-4: DISABLED POPULATION PER TAZ, 2000



3.3.3 RACE AND ETHNICITY

Table 3.3-4 illustrates the racial breakdown within the study area, the City, and the county. The Southside is predominantly white, with African-Americans making up the second largest group. The Hispanic population in St. Louis City increased by 37% between 1990 and 2000, and now makes up 2% of the City's population[3]. The Southside has a higher percentage of Hispanics than either the City or the county.

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.[4]

TABLE 3.3-4: RACIAL BREAKDOWN, YEAR 2000

RACE	SOUTHSIDE STUDY AREA	CITY OF ST. LOUIS TOTAL	ST. LOUIS COUNTY TOTAL
White/Caucasian	74%	44%	77%
African-American	20%	51%	19%
Asian	3%	3%	2%
Hispanic or Latino*	3%	2%	1%
Other	4%	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: 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.[5] 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 31% earning less than $15,000. Most of the lower income neighborhoods are located east of Grand Boulevard.

[3] http//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)

[4] 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

[5] 1999 HHS poverty guidelines (Department of Health and Human Services)

Generally speaking, households with lower incomes have less ability to own a vehicle and therefore are more dependent on transit. There are many households in the study area earning less than $15,000, indicating that transportation options are limited.

The City's median income was $27,276. Median household income for the study area was slightly higher at $28,965. Figure 3.3-5 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 study area is relatively evenly-split, with lower-income areas in the northern and eastern sections, and higher incomes in the southern and western areas. 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, 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 $18,850[6] in 2004, compared to 7% in the county.

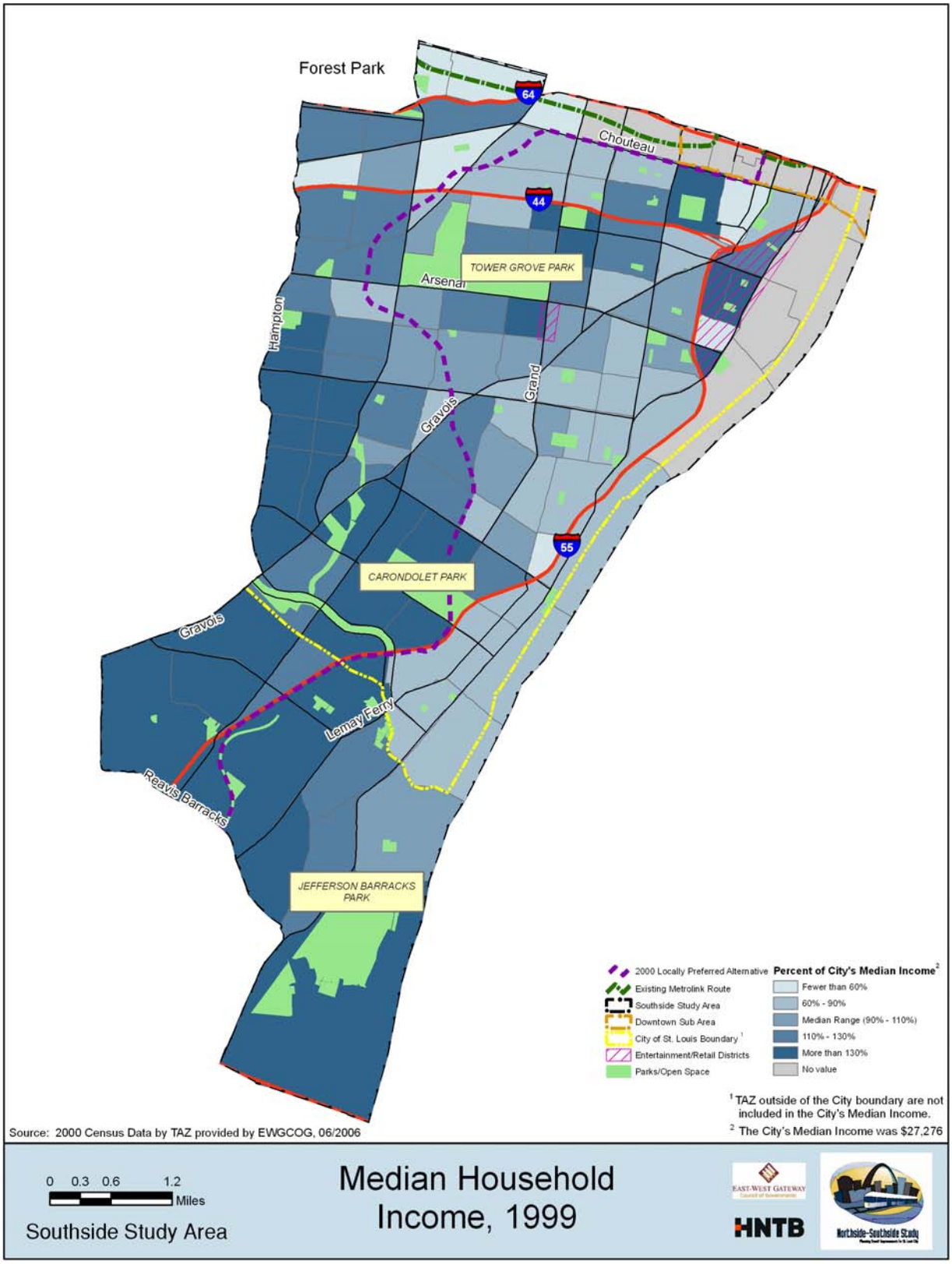
TABLE 3.3-5: HOUSEHOLD INCOME

ANNUAL INCOME	SOUTHSIDE STUDY AREA (1999)	CITY OF ST. LOUIS (1999)	CITY OF ST. LOUIS (2004)	ST. LOUIS COUNTY (1999)	ST. LOUIS COUNTY (2004)
0-$15,000	31%	29%	26%	10%	11%
$15,000-$35,000	44%	32%	30%	23%	21%
$35,000-$50,000	15%	16%	15%	16%	17%
$50,000-$75,000	7%	13%	13%	21%	19%
$75,000+	2%	10%	16%	30%	32%
Median Household Income	$28,965	$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.

[6] 2004 HHS poverty guidelines (Department of Health and Human Services)

FIGURE 3.3-5: MEDIAN HOUSEHOLD INCOME, 1999



3.3.5 HOUSING

Table 3.3-6 displays the number of households in the study area in 1990, 2000 and 2005, 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 in the study area has decreased since 1990, consistent with a decrease in population. Projections indicate that households will continue decreasing, and at a faster annual rate than the previous rate.

TABLE 3.3-6: TOTAL HOUSEHOLDS

	SOUTHSIDE		ST. LOUIS CITY		ST. LOUIS COUNTY	
YEAR	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*
1990	90,409	--	164,931	--	380,110	--
2000	88,485	-2%	146,969	-11%	404,225	6%
2030	74,502	-16%	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 housing statistics for the study area 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 Southside study area. This pattern is consistent with housing trends observed throughout the St. Louis region. The study area has lower vacancy rates compared to other areas of the City. Fifty-five percent of the housing in the study area is owner-occupied, while 45% of the housing in the study area is occupied by renters.

TABLE 3.3-7: 2000 HOUSING STATISTICS

	SOUTHSIDE STUDY AREA	CITY OF ST. LOUIS	ST. LOUIS COUNTY
Housing Units	97,490	176,354	423,749
Percent Occupied	87%	83%	95%
Percent Vacant	13%	17%	5%
Percent Owner-Occupied	55%	47%	74%
Percent Renter-Occupied	45%	53%	26%

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

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 two or more vehicles, compared to 29% for the City as a whole. Nine percent of Southside households do not have access to any vehicle, which is slightly higher than in the county (6%). 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 two-car households are in the same general area as those with higher incomes. Many one-car households are located east of Grand Boulevard in lower-income neighborhoods.

Eleven percent of St. Louis workers use public transportation to get to work, compared to less than 2% in the county. There are some Southside areas where more than 10% of workers use public transportation.[7] More information about transit usage can be found in Section 3.7.

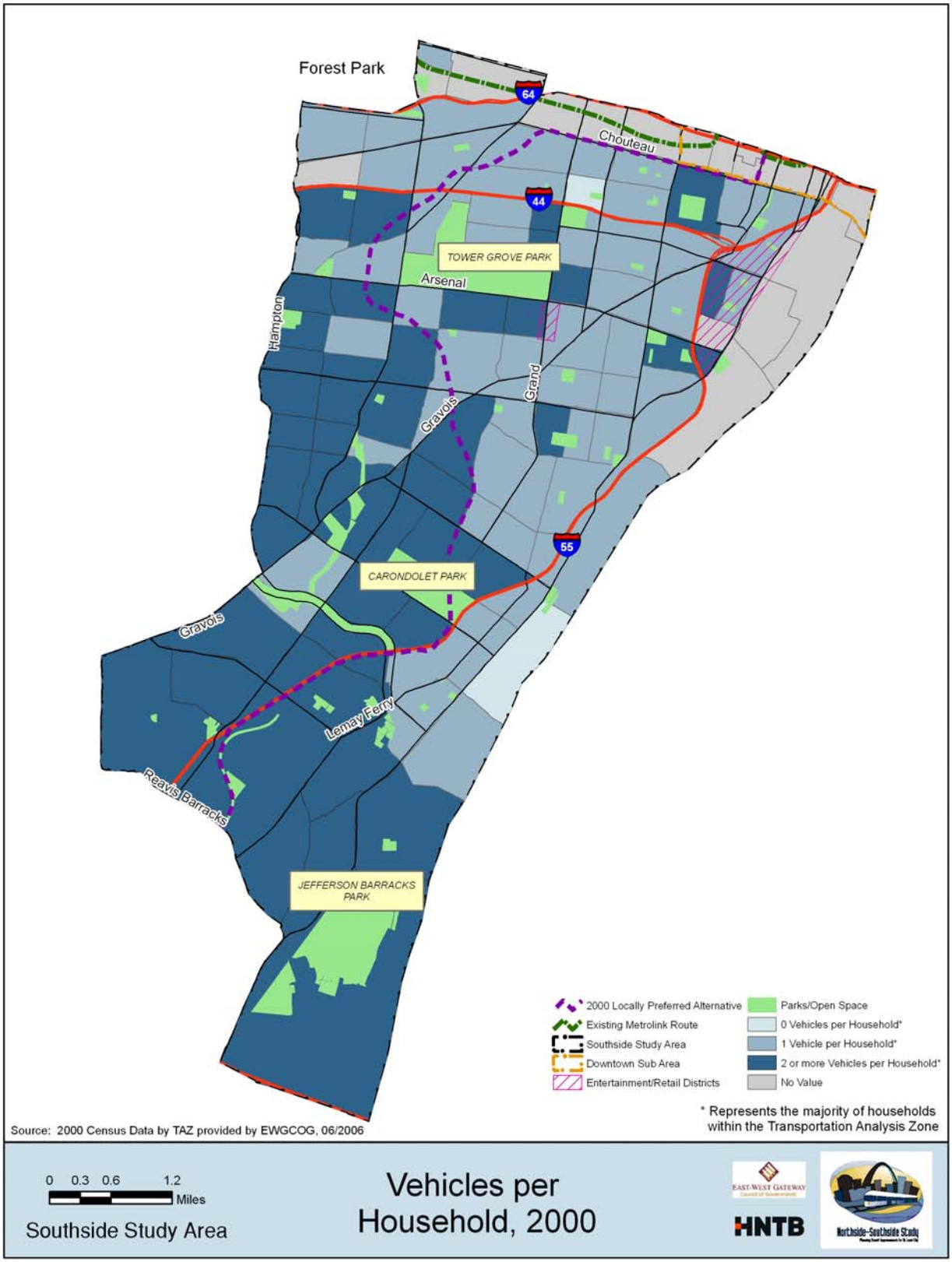
TABLE 3.3-8: 2000 DISTRIBUTION OF VEHICLES PER HOUSEHOLD

Number of Vehicles Per Household	Southside Study Area	City of St. Louis	St. Louis County
0	9%	25%	6%
1	36%	46%	36%
2+	55%	29%	58%

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

[7] U.S. Census 2000 Summary File 3

FIGURE 3.3-6: VEHICLES PER HOUSEHOLD, 2000


Forest Park
64
Chouteau
44
TOWER GROVE PARK
Arsenal
Hampton
Grand
Gravois
55
CARONDOLET PARK
Gravois
Lemay Ferry
Reavis Barracks
JEFFERSON BARRACKS PARK
2000 Locally Preferred Alternative
Existing Metrolink Route
Southside Study Area
Downtown Sub Area
Entertainment/Retail Districts
Parks/Open Space
0 Vehicles per Household*
1 Vehicle per Household*
2 or more Vehicles per Household*
No Value
* Represents the majority of households within the Transportation Analysis Zone
Source: 2000 Census Data by TAZ provided by EWGCOG, 06/2006
0 0.3 0.6 1.2 Miles
Southside Study Area
Vehicles per Household, 2000
EAST-WEST GATEWAY
HNTB
Northside-Southside Study

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.

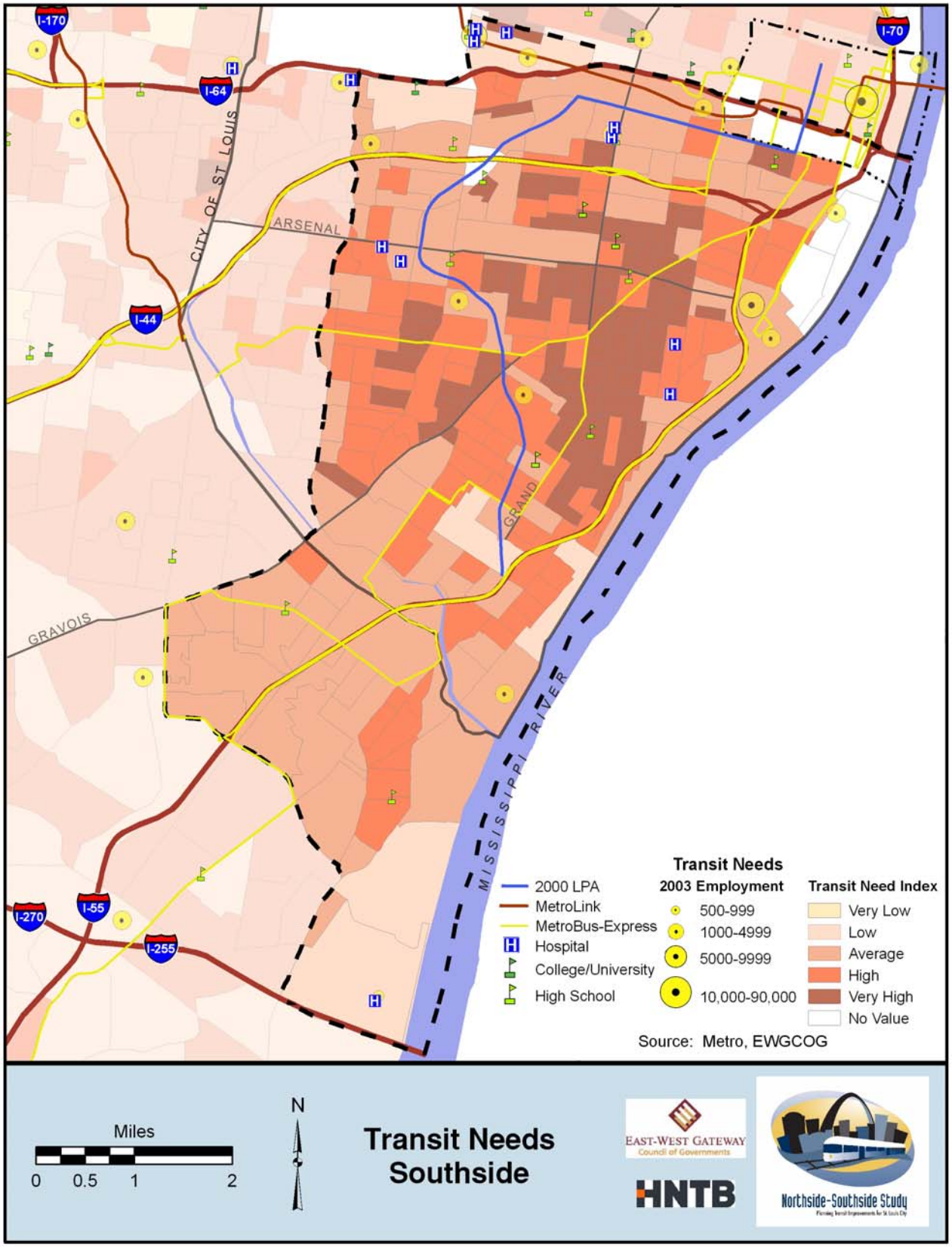
TABLE 3.3-9: TRANSIT NEED INDEX

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. Consistent with the data presented thus far, the highest needs tend to be located near the intersection of Grand Boulevard and Gravois Avenue.

FIGURE 3.3-7: TRANSIT NEEDS



3.3.8 EMPLOYMENT

Table 3.3-10 displays the total employment of the study area, 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 in the study area has decreased slightly during the past decade, primarily due to the outward migration of jobs to suburban county locations. However, employment in the study area is expected to remain relatively stable to 2030, similar to the City of St. Louis as a whole. 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 will affect overall employment[8].

TABLE 3.3-10: TOTAL EMPLOYMENT

	SOUTHSIDE		ST. LOUIS CITY		ST. LOUIS COUNTY	
YEAR	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*
1990	129,851	--	317,198	--	518,137	--
2000	116,455	- 10%	278,500	- 12%	621,000	20%
2030	115,560	- 0.7%	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 45% of the total Southside employment, 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.

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

TABLE 3.3-11: 2000 EMPLOYMENT BY TYPE

TYPE OF EMPLOYMENT	SOUTHSIDE STUDY AREA	CITY OF ST. LOUIS	ST. LOUIS COUNTY
Management and professional	9%	10%	11%
Educational, health, and social services	20%	24%	21%
Finance, insurance, real estate, and rental and leasing	7%	7%	9%
Public administration	6%	6%	3%
Information	3%	3%	4%
Arts, entertainment, recreation, accommodation and food service	11%	11%	8%
Construction, manufacturing	19%	16%	18%
Wholesale and retail trade	14%	13%	16%
Transportation and warehousing, utilities	6%	6%	5%
Agriculture, foresting, fishing and hunting, and mining	0.3%	0.3%	0.2%
Other services (except public administration)	6%	6%	5%

Year 2000 and 2030 employment concentrations are displayed in Figures 3.3-8 and 3.3-9. The highest existing employment concentrations are generally found in the northern portion of the study area, including the BJC Medical Center Complex; the St. Louis University/Cardinal Glennon Hospitals; Anheuser Busch; the Kosciusko Industrial Area/Nooter Campus; and various areas along the Union Pacific Railroad. The industrial areas along the Mississippi River, as well as the Jefferson Barracks and the proposed Pinnacle Casino, also have higher employment concentrations. The employment projections anticipate a relatively stable situation overall for the study area.

FIGURE 3.3-8: EMPLOYMENT CONCENTRATIONS, 2000

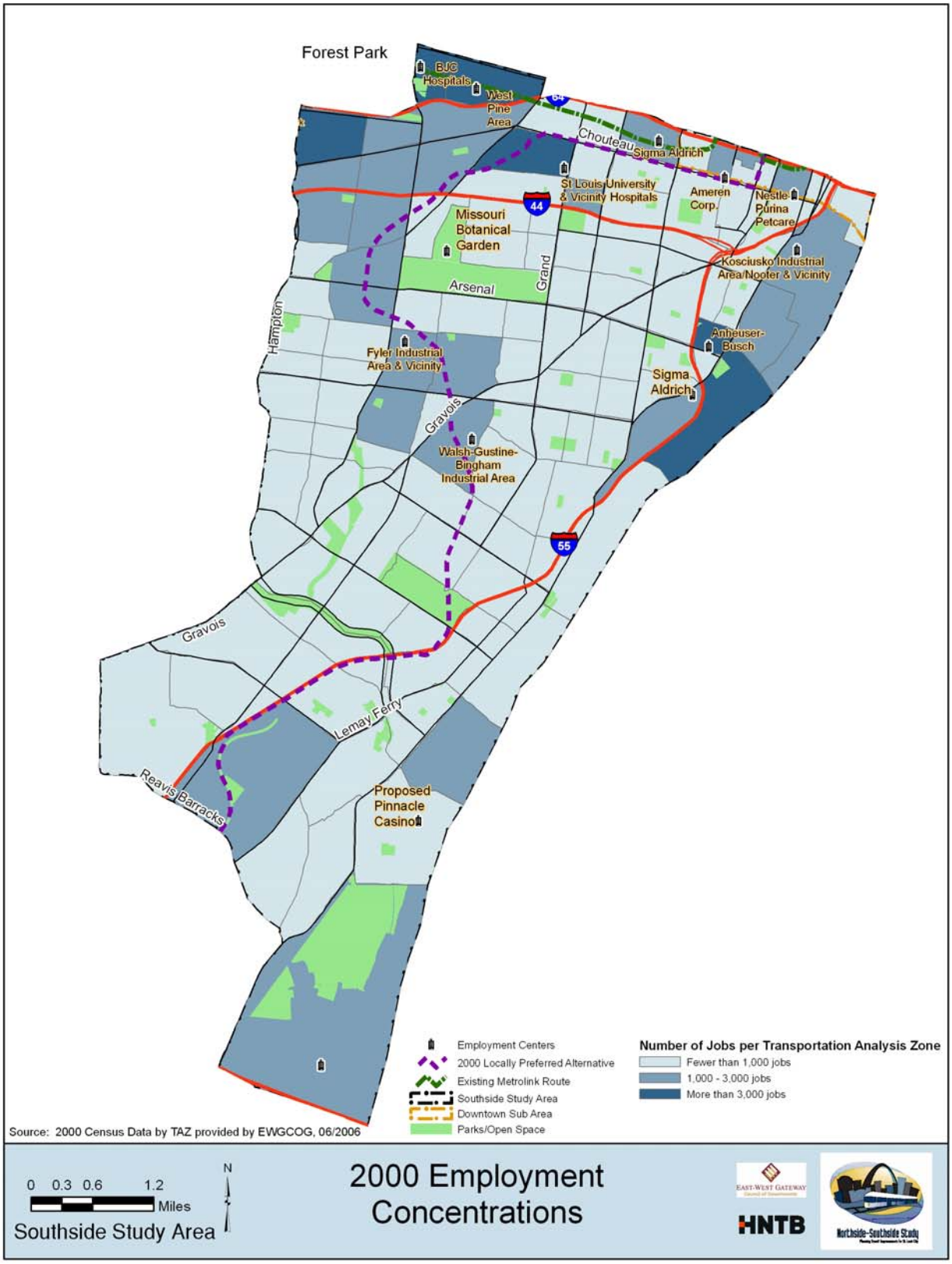
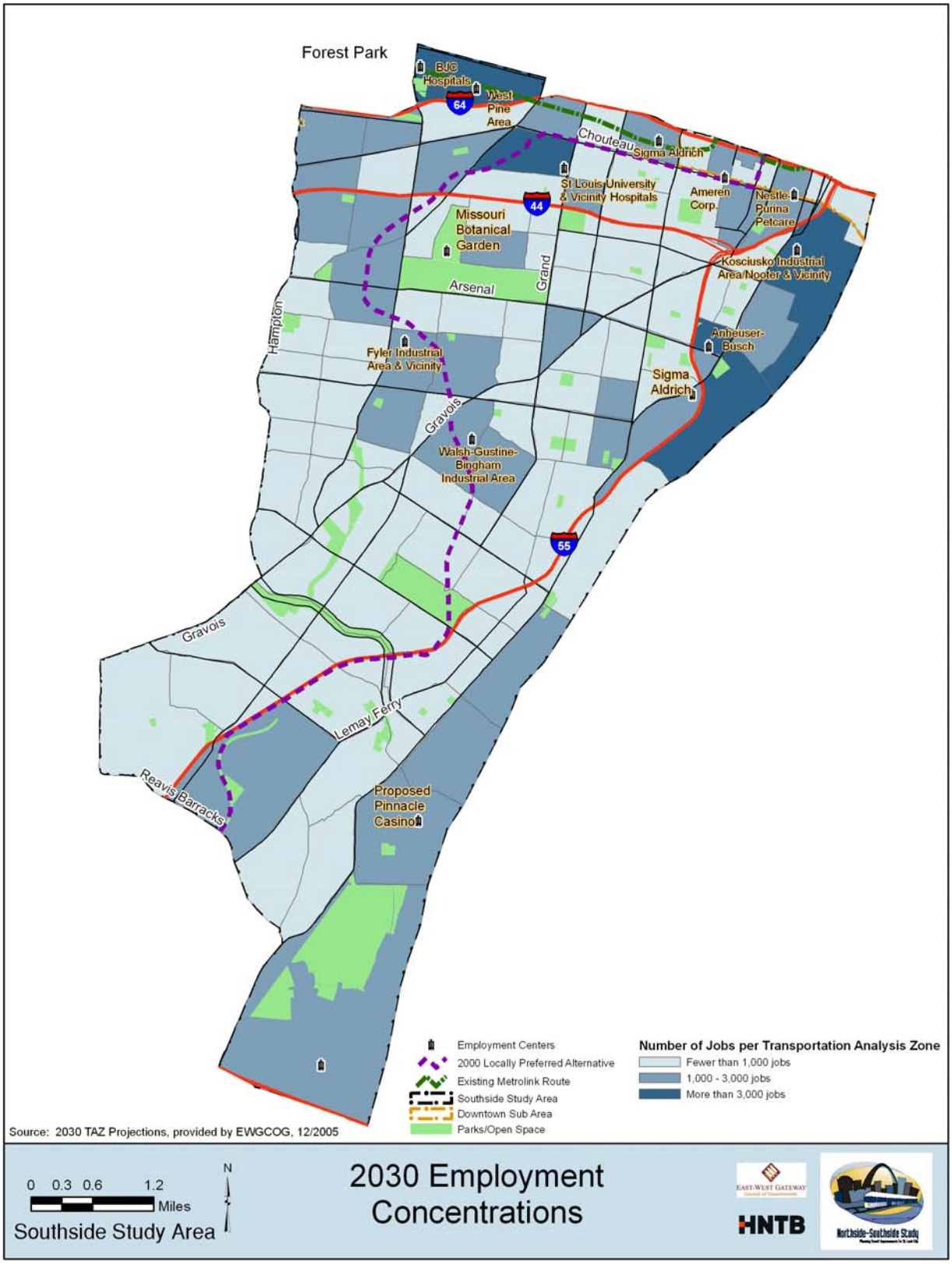


FIGURE 3.3-9: EMPLOYMENT CONCENTRATIONS, 2030



3.3.9 CONCLUSION

St. Louis has experienced decades of population and employment loss, and the Southside is no exception. 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. 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. The Southside is denser than other parts of the City. Higher population densities tend to result in higher transit use, as more people live within walking distance of transit stops.

Employment in the study area has been decreasing in the past decade, but is projected to remain relatively stable into 2030. Employment in the county is expected to continue to increase, but at a much slower rate than in previous decades.

The study area is predominately White, with African-American making up the second largest racial group. There is also a higher percentage of Hispanics in the study area compared to the rest of the City. A large Bosnian American and immigrant population is also concentrated in the study area. Thirty-six percent of the population is either under 16 or over 65, populations which are traditionally more transit dependent, and 9% of households do not have access to any vehicle. Most two-car households are in the same general area as those with higher incomes. Many one-car households are located east of Grand Boulevard in lower-income neighborhoods east of Grand Boulevard and southeast of Gravois Avenue. There are many census tracts where more than 10% of workers use transit to get to work, which is high when compared to the national average of 5%. Not surprisingly, most of the areas characterized as "high" or "very high" transit need are located in these same areas.

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.

TABLE 3.4-1: COUNTY-LEVEL JTW TRAVEL PATTERNS

	Destination Location								
Origin 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

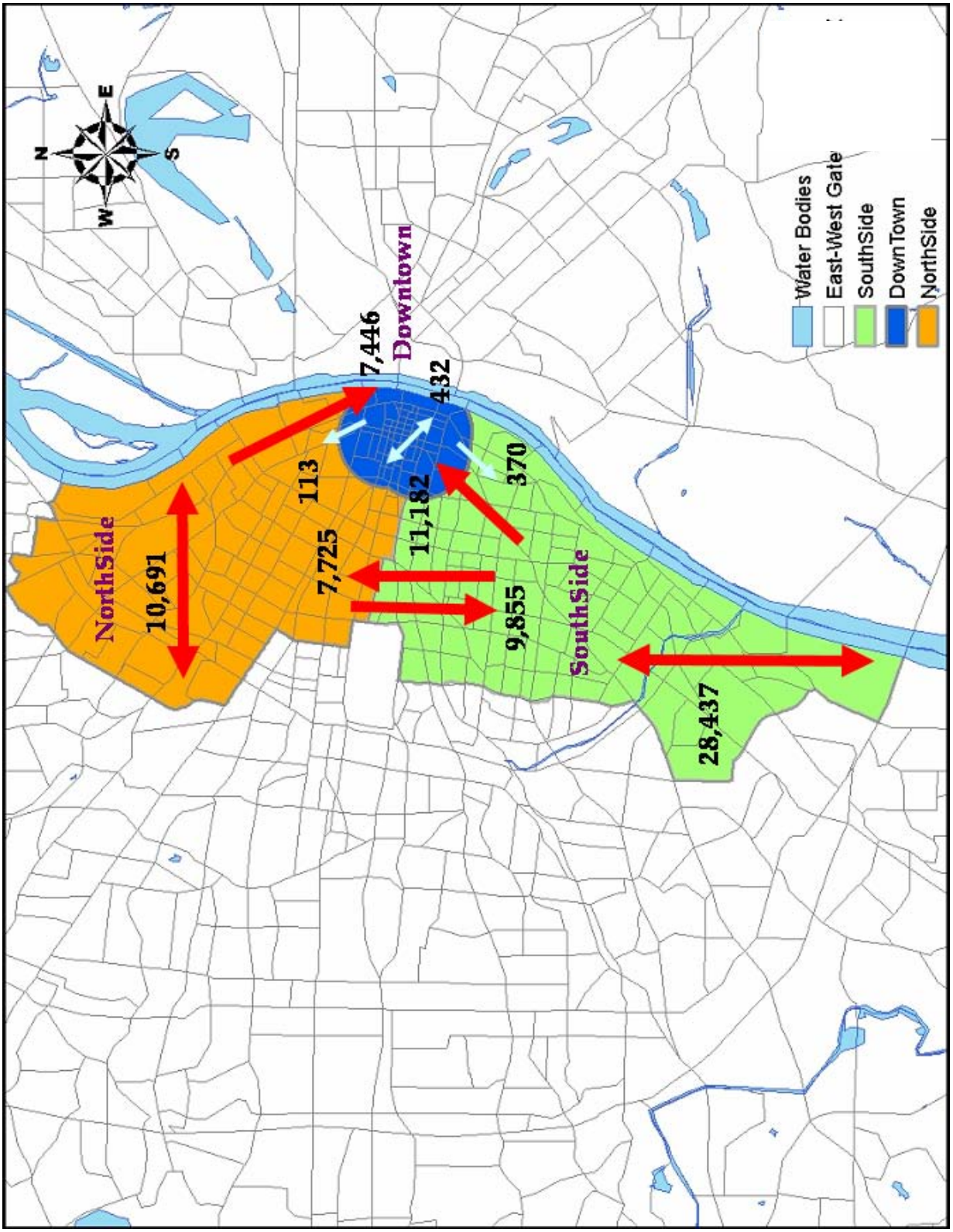
Census JTW travel patterns are also analyzed for the areas that are most likely to be affected by the proposed transit service (Figure 3.4-1). The Northside-Southside study area includes most of the City of St. Louis and some parts of St. Louis County. The most important findings include the following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

	Destination Location			
Origin 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



Chapter 3.5: Activity Centers

Activity centers in the Southside study area 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 area 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 (which constitutes a significant portion of the southern edge of the study area) houses several major facilites and venues. Those activity centers and their 2005 reported attendance are shown in Table 3.5-1. See Section 3.8 for source information.

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

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.

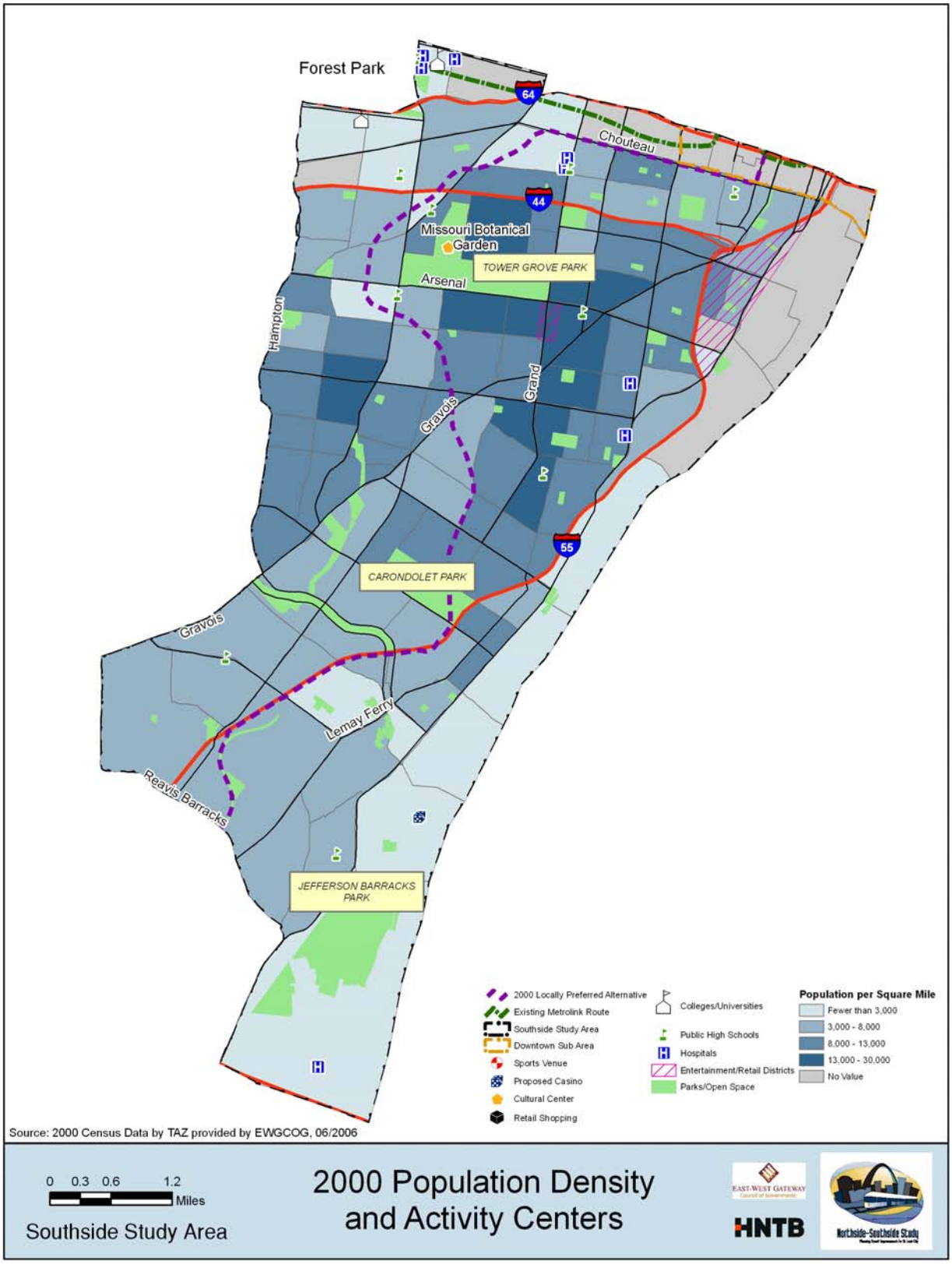
The Bottle District is a new development located on the north side of downtown. The property is bounded by Cole Street to the south, Broadway to the east, 7th Street to the west and Interstate Highway 70 to the north, near the Edward Jones Dome and America's Center. This $280-million development will 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]

The Pinnacle River City Casino and Hotel is planned in the southeast portion of the study area, near the confluence of the River Des Peres and the Mississippi River. It is currently under construction.

[2] www.stlouis.missouri.org
[3] www.bottledistrict.com
[4] http://stlcin.missouri.org/devprojects/

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



Soulard is a culturally diverse, ethnic neighborhood just south of downtown, with numerous daytime activities and nightlife attractions. It is a historic neighborhood defined by 7th Street and Broadway to the Southeast and I-55 to the West and North. It is one of the oldest neighborhoods in the City with homes dating from the mid to late 1800s. Many events take place in the neighborhood throughout the year, including Bastille Day; Soulard Mardi Gras; Soulard Oktoberfest; and the year-round Soulard Market. These events draw thousands of people into Soulard every year.

Cultural

There are four major cultural centers that are located within or adjacent to the study area, including the Missouri Botanical Garden, the Grand South Grand Area, Forest Park, and Soulard (described previously).

Missouri Botanical Garden

Founded in 1859, the Missouri Botanical Garden is one of the oldest botanical institutions in the country and a National Historic Landmark. The Garden is a center for botanical research and science education, comprising 79 acres of horticultural display and founder Henry Shaw's original 1850 estate home. The Garden draws more than 600,000 visitors annually.[5]

Grand South Grand Area

The Grand South Grand area, a commercial district along Grand Boulevard between Arsenal Street and Utah Street, is part of a collection of smaller neighborhoods known as “the Grand neighborhoods.” They include, among others, Tower Grove East, Tower Grove South and Tower Grove Heights. The commercial area along Grand Boulevard features ethnic restaurants and shops. Grand South Grand and the surrounding residential areas are regarded as St. Louis’ international district, as many of St. Louis’ newest immigrants make their homes there. An annual international festival and parade are held in nearby Tower Grove Park.[6]

Forest Park

Although Forest Park only abuts the northwestern 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). (See Section 3.8 for source information.)

[5] http://www.mobot.org/
[6] http://www.explorestlouis.com

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 area has an established system of parks, including Forest Park (described above), municipal and county facilities, and a system of regional greenways and trails. Major parks (over 20 acres in size) are listed below, followed by a discussion of the most predominant facilities. Many other parks are located throughout the study area, as shown in Figures 3.5-2 and 3.6-1.

- Jefferson National Expansion Memorial (94 acres).
- Forest Park (1,293 acres).
- Tower Grove Park (289 acres).
- Compton Hill Reservoir Park (36 acres).
- Tilles Park (29 acres).
- Carondelet Park (180 acres).
- Willmore Park (106 acres).
- River Des Peres Park (156 acres).
- Olendorf County Park (47 acres).
- Jefferson Barracks County Park (426 acres).

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 is shown in Figure 3.5-3.

Tower Grove Park
Tower Grove Park is a 289-acre park bounded by Grand Boulevard, Magnolia Avenue, Kingshighway Boulevard, and Arsenal Street. It is a 19th century Victorian walking park adjacent to the Missouri Botanical Garden and the Grand South Grand neighborhood. The grounds of the park are punctuated with pavilions, ponds, statuary, fountains, and mock classical "ruins." The park has a diverse urban forest and features modern park amenities such as tennis courts, baseball fields, soccer fields, and biking/jogging paths. Tower Grove Park is also a prime site for observing a variety of bird life.

Carondelet Park
Carondelet Park is in the southern end of the study area along I-55 near the River Des Peres. At 180 acres, Carondelet Park is the third largest park in St. Louis and is the focal point of five surrounding neighborhoods. Carondelet Park is unique for its rolling hills, picturesque landscape, and historic boathouse, bridges, and pavilions.[7]

The City has drafted a Park Master Plan to improve Carondelet Park and provide residents with enhanced recreational and cultural opportunities. The plan also includes provisions for a new Southside Community Center on the eastern edge of the park. This center would include indoor and outdoor pools, a gymnasium, fitness center, as well as a police substation.[8]

Jefferson Barracks County Park
Jefferson Barracks County Park is located along the Mississippi River in south St. Louis County. It is a 426-acre facility that has been designated as a National Historic Place. Several of the original stone buildings are still in use today. Jefferson Barracks National Cemetery is adjacent to the park.

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 lead 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 area include the restoration of the Chouteau Greenway, the Confluence Greenway and Riverfront Trail, the Mississippi Trail, Grant’s Trail, and the River Des Peres Greenway.

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,

[7] Draft Carondelet Park Master Plan. H3 Studio, 02/12/03.
[8] City of St. Louis Southside Community Center, Executive Summary. City of St. Louis Department of Parks, Recreation and Forestry (no date)

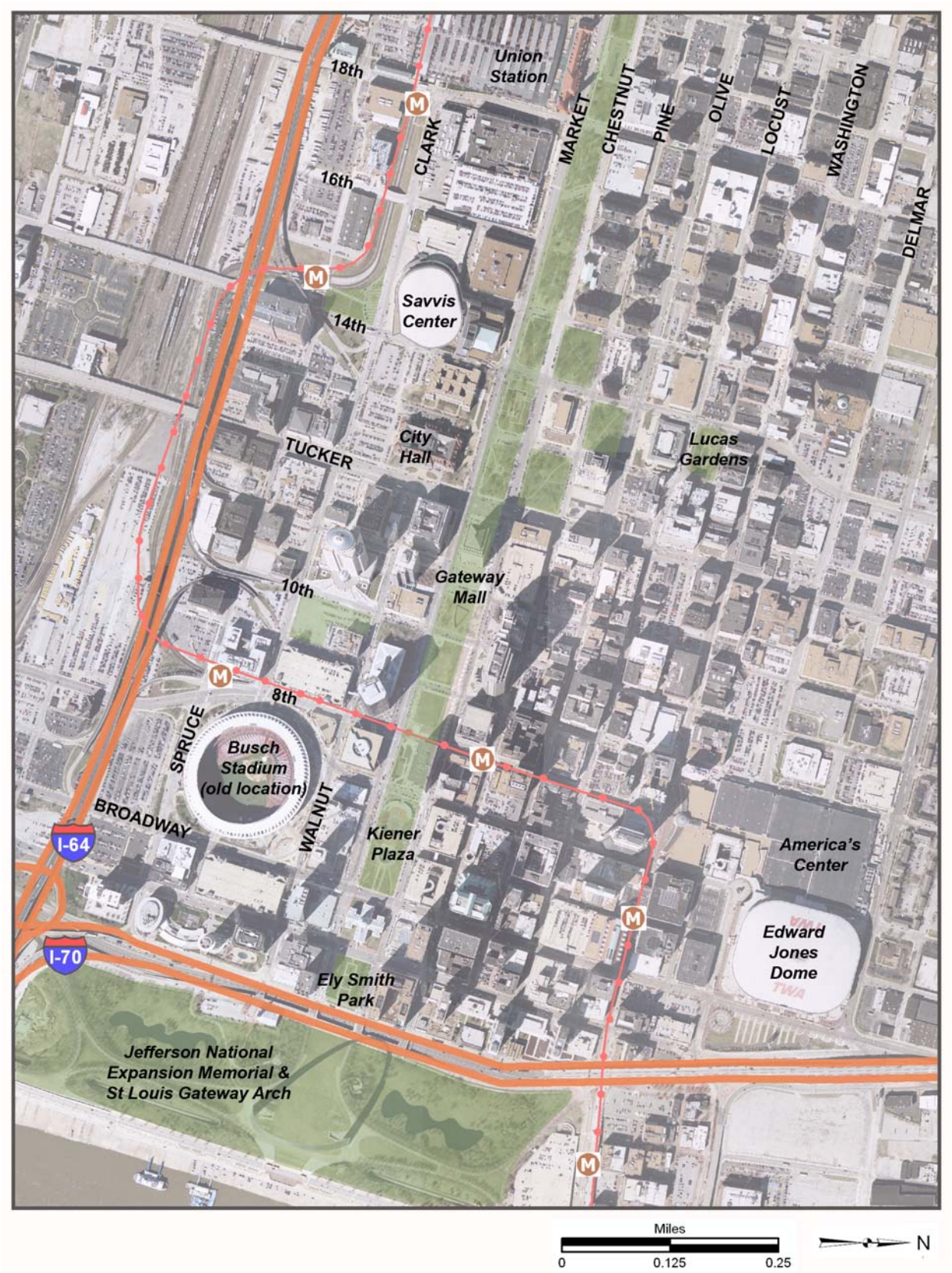
which is just outside the study area. Planning for extension of the trail from the Arch to Soulard is currently underway, in connection with the Downtown Riverfront Master Plan.

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 area, portions of the trail have been completed. A signed trail begins at Biddle Street, traveling south along the river into South County.

Grant's Trail is a paved bicycle trail that follows Gravois Creek. Portions of Grant's Trail are located in the study area, east of I-55. The trail begins in the study area near Hoffmeister Avenue and ends at I-44. Within the study area, there are various attractions along the trail, including the St. Louis BMX Bike Park and The Lodge at Grant's Trail.

The **River Des Peres** Beautification Plan calls for the development of an 11-mile linear park along the River Des Peres between the Mississippi River and Forest Park. The pilot project, called the Christy Greenway, is a four-mile greenway which will run along the river between Gravois Avenue and Morganford Street, with a spur to the Holly Hills neighborhood. The Christy Greenway will connect the River Des Peres Greenway to Carondelet Park in south St. Louis.

FIGURE 3.5-2: DOWNTOWN PARKS



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 are shown in Figure 3.5-3.

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

COMPANY	NUMBER OF EMPLOYEES IN ST. LOUIS METRO AREA	TYPE OF BUSINESS
Washington University* 1 Brookings Drive	12,324	Higher Education
BJC Health Systems 444 Forest Park Avenue	9,201	Health Vare
City of St. Louis** 1200 Market Street	7,895	Government
Anheuser-Busch Cos. Inc. 1 Busch Place	5,500	Brewery, entertainment
Ameren Corp. 1901 Chouteau Avenue	3,831	Energy utility
SLU Hospital 3635 Vista Avenue	1,400	Healthcare
Cardinal Glennon Children's Medical Center 1465 Grand Boulevard	1,200	Healthcare
Nestle Purina Petcare Checkerboard Square	2,000	Petcare

*Just outside study area
**Entire City, including outside study area

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

Many of the major employers in the region are located within the St. Louis Central Business District (CBD), just to the north of the study area. Other employment centers include the Anheuser-Busch Campus and the Nooter Industrial Area. Two major industrial parks, the Fyler Industrial Area and the Walsh-Gustine-Bingham Industrial Area are located south of Arsenal Street and Gravois Avenue along the Union Pacific Railroad. Together, these two areas employ 3,300 people.

The Pinnacle River City Casino and Hotel is planned in the southeast portion of the study area, at the confluence of the River Des Peres and the Mississippi River. It is currently under construction. It is projected to generate 6,000 permanent jobs.[9]

St. Louis Central Business District
The St. Louis CBD is located just north of the study area, and is a major employment center of the region with over 90,000 jobs. However, CBD employment has been declining, 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.

[9] Pinnacle Entertainment, Inc. River City Casino and Hotel, Lemay, South St. Louis County. 2006

According to market reports published by Colliers International[10], job loss continues to negatively affect the downtown office market. Downtown Class A occupancy (characterized by excellent location, access and professional management[11]), 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 construction[12]) 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.

Anheuser-Busch Campus

The Anheuser-Busch Headquarters Campus is located on Broadway, just north of Arsenal Street in the northeast section of the study area. Anheuser-Busch has recently constructed a new 110,000 square foot office building, located on Lynch Street. Anheuser-Busch employs more than 5,500 people.

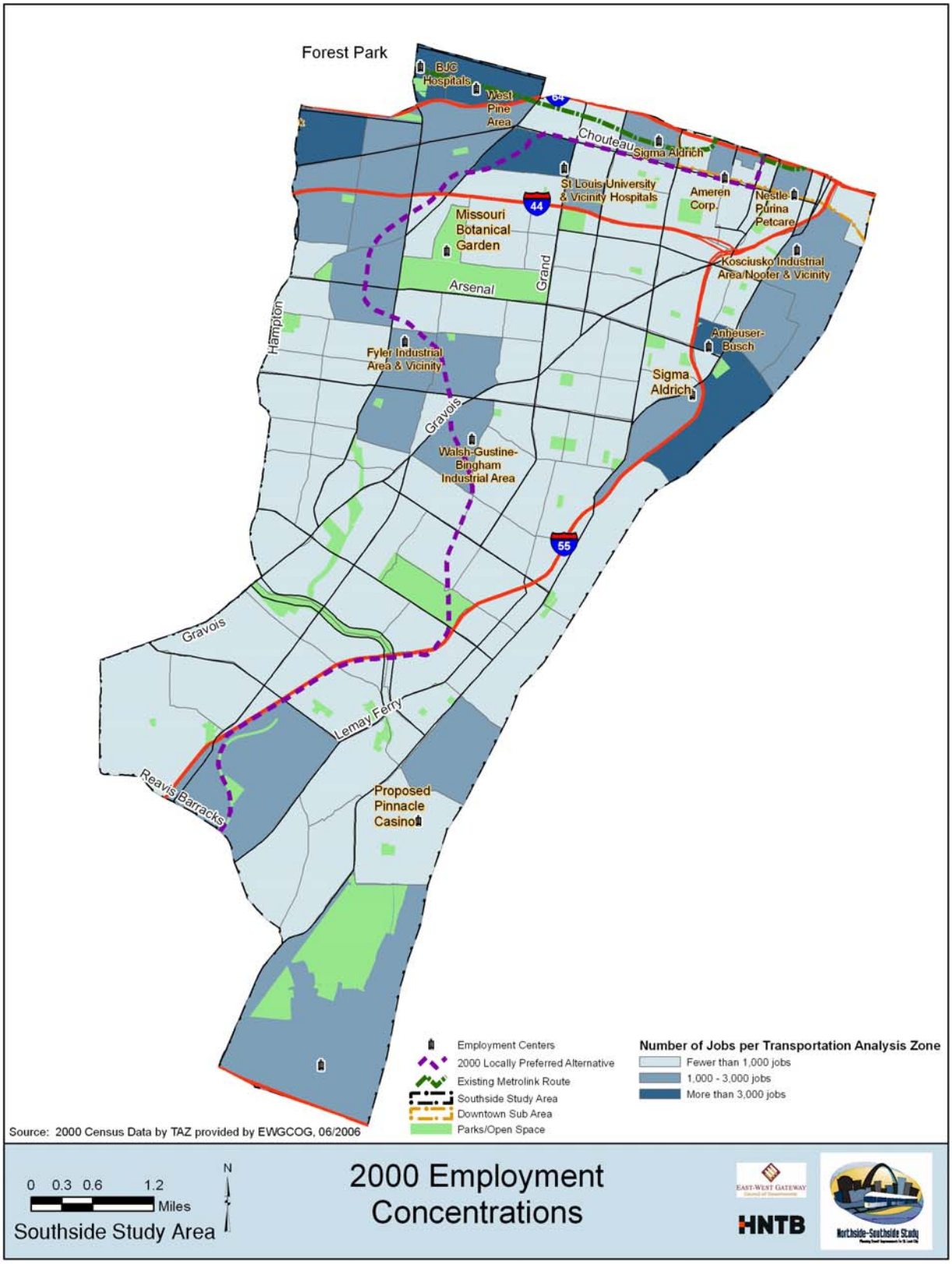
Nooter Industrial Area

The Nooter Industrial Area is located in the Kosciusko neighborhood of the City, a non-residential area bounded by I-55 to the north, St. George and Dorcas Streets to the south, Seventh Boulevard and Eighth Street to the west, and the Mississippi River to the east. It is located on the eastern side of the study area, near the Mississippi River. It is a major industrial business and employment center, with over 1,100 employees.

The Nooter/Ethyl Petroleum campus located on the riverfront has long been used for industrial purposes. This campus covers 68 acres of land, and construction is currently underway to redevelop the site. The old laboratory building will be renovated into offices, and Nooter is using building an 86,000-square foot office and warehouse.[13]

[10] Colliers International, Turley Martin Tucker Commercial Real Estate Report: St. Louis, January 2006.
[11] Urban Land Institute, Office Development Handbook, 1998.
[12] Ibid.
[13] http://stlcin.missouri.org/devprojects/

FIGURE 3.5-3: EMPLOYMENT CONCENTRATIONS, 2000



3.5.3 RETAIL SHOPPING

There are no major shopping centers located within the study area. Smaller centers include the Hampton Village Shopping Center at Hampton Avenue and Chippewa Street; the Grand South Grand Area at Grand Boulevard and Arsenal Street; Gravois Plaza at Gravois and Gustine Avenues; South Towne Shopping Center at Kingshighway and Arsenal Street; and Cherokee Street and Antique Row, east and west of Jefferson Avenue. Just outside the study area near Forest Park are the Central West End shopping and restaurant district along Euclid Avenue, and the Lindell Marketplace at Lindell and Sarah Boulevards. Union Station, the City's major retail mall, is located at 18th Street and Market Street just outside of the study area.

3.5.4 EDUCATIONAL INSTITUTIONS

There are no major institutions of higher education located within the study area, but there are several that are adjacent to its northern limits. The names of these institutions and enrollment are provided below. The study area also has numerous public and private elementary and high schools.

Colleges and Universities (adjacent to study area)	**Enrollment**
St. Louis University	13,847
Harris-Stowe State College	1,835
Washington University Medical School	1,012
St. Louis College of Pharmacy	900
St. Louis Community College, Forest Park Campus	6,750

High Schools
Roosevelt High School
St. Louis University High School
Bishop DuBourg High School
St. Elizabeth Academy
St. Mary's High School
St. John's High School Bayless High School
Lutheran High School South
Lindbergh High School
Mehlville High School
Hancock High School
Notre Dame High School
Cor Jesu Academy

3.5.5 HOSPITALS

There are a number of hospitals located in or adjacent to the Southside Study Area. The largest of these hospitals is Barnes-Jewish Hospital, located in the north portion of the Study Area near 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. [14]

[14] http://www.barnesjewish.org/

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, as well as 1,300 auxiliary members and volunteers.[15]

St. Louis University (SLU) Hospital is located on Grand Avenue, between Chouteau Avenue and I-44. It is a teaching hospital with over 350 beds and over 1,400 staff. Cardinal Glennon Children's Hospital is located adjacent to SLU Hospital. It has 190 beds and employs over 1,200 people. The hospital is currently undergoing expansion, which is scheduled to be completed in 2007.

Just west of the 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 Centennial Pavilion, which provides some of the college's classrooms, an event center and other facilities.[16]

St. Alexius Hospital - Broadway Campus is located just south of Chippewa Street on the east side of the study area. The hospital has 203 beds and provides general medical-surgical, psychiatry, and emergency services.

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. The Southside is a culturally-diverse community, and there are many neighborhoods that generate activity. Many are located along or near Grand Boulevard, including the SLU/Cardinal Glennon Hospital complex; the Grand/South Grand Area; Tower Grove Park; and the Missouri Botanical Garden. Other major activity centers are located downtown and in the central corridor, as well as in vibrant neighborhoods like Soulard.

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 at the hospital complex along Grand Boulevard; Anheuser-Busch; the Nooter Industrial Area; and the various industrial areas along the Union Pacific Railroad.

[15] http://www.stlouischildrens.org/
[16] http://www.forestparkhospital.com/

Chapter 3.6: Environmental Considerations

This section describes the types of environmental concerns that may be encountered within the Southside study area. This level of analysis will identify "environmental fatal flaws" and other potential environmental constraints. A greater depth of environmental analysis is presented in Chapter 7 of this document, as the detaled 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 Southside study area is located within the Cahokia-Joachim watershed of the Mississippi River. The major water body located in the Study Area is the Mississippi River, running along the entire length of the eastern boundary of the study area and beyond. The major tributaries traversing the study area are the River Des Peres and Gravois Creek.

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 floodways to avoid the possibility of significantly increasing upstream flood elevations. As such, communities must prohibit development within the designated floodway that would cause any additional rise in base 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), 180 acres of wetlands are scattered throughout the study area. The wetland classes within the study area are identified as palustrine or riverine on the NWI maps. Palustrine wetlands are those wetlands 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 area include forested wetlands, scrub shrub wetlands, emergent wetlands, and unconsolidated bottom. Most of the wetland areas are associated with the reservoirs, ponds and lakes found throughout the study area. Riverine habitats are those areas contained within a channel. This wetland class includes those along the Mississippi River, excavated ditches and drainageways found throughout the study area and lined tributaries.

A 56-acre wetland area associated with Gravois Creek is located at the southern end of the study area, north of Reavis Barracks Road, and east of I-55. These wetlands are characterized as palustrine, inland, forested wetlands that are temporarily flooded.

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.

- 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.

During the detailed alternatives phase, attention will be given to wetlands so as to avoid or minimize impacts, especially at the southern end of the study area where a terminal station would be located. Any impacts to wetlands would need to be mitigated according to federal and/or state regulations. Impacts to Gravois Creek and the River Des Peres will also need to be evaluated during the detailed alternatives phase.

FIGURE 3.6-1: POTENTIAL ENVIRONMENTAL CONCERNS

3.6.2 HAZARDOUS MATERIALS AND WASTE

A review of the Missouri Department of Natural Resources (MDNR) database was conducted to identify properties containing hazardous materials, hazardous waste, and solid waste. The database identified 57 properties containing hazardous materials and waste, with clusters in the northern portion of the study area and in the industrial areas along Broadway Avenue (See Figure 3.6-2). According to the MoDNR website, there are 11 sites or properties that are listed on the Brownfields/Voluntary cleanup program in the study area. Four of the sites are listed under remediation phase and one site under an investigation phase. 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 on those alignments and at station locations. This will include site reconnaissance to identify properties with potential hazardous materials concerns, and searching federal and state environmental databases to better ascertain potential risks. The size of the site or property will also be included in the site summary.

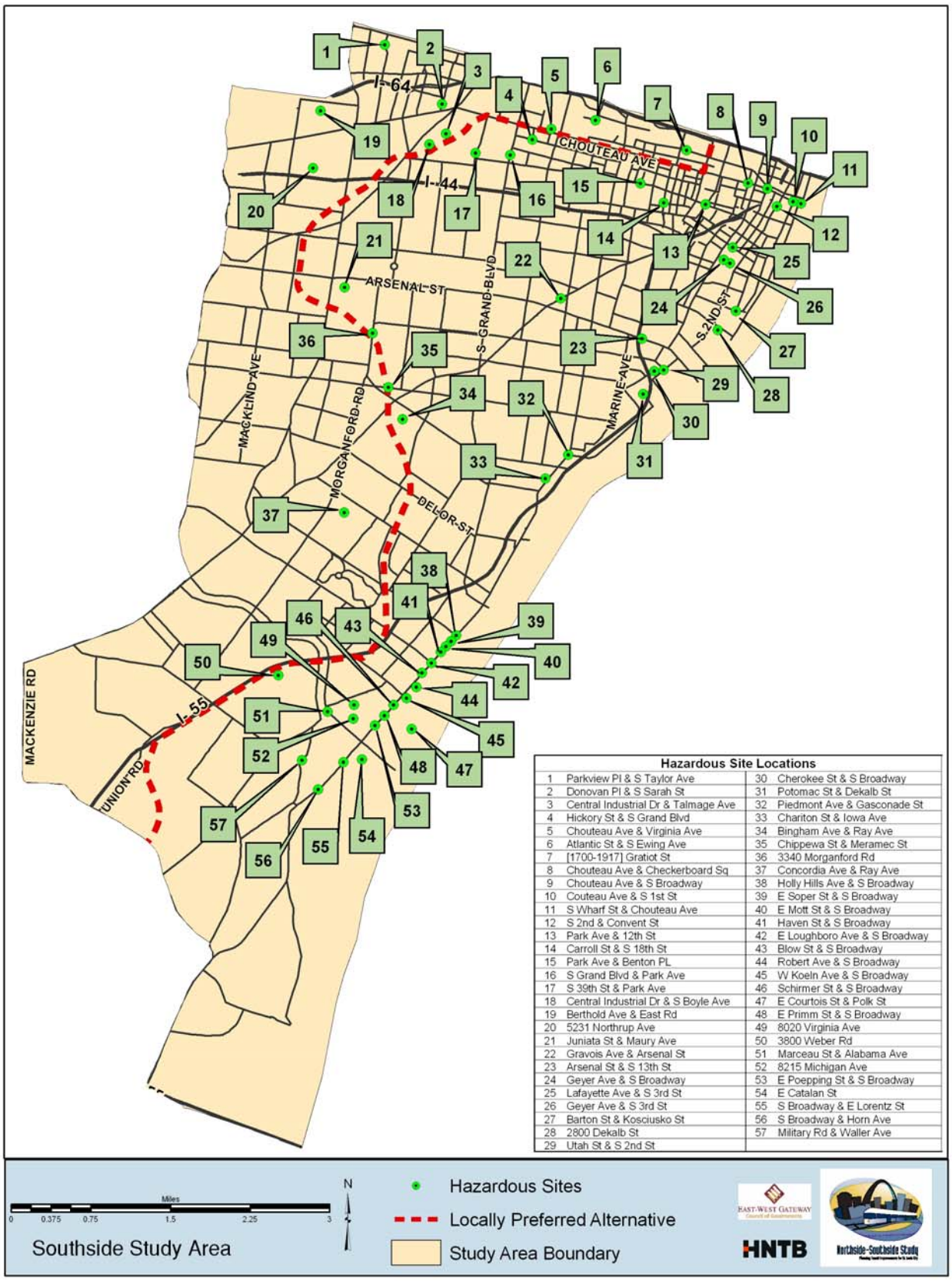
3.6.3 THREATENED/ENDANGERED SPECIES

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 natural heritage sites have been identified within the study area.

[1] According to Telephone Call with Mr. Mike Arduser, Missouri Department of Conversation, on 1/24/06.

FIGURE 3.6-2: HAZARDOUS MATERIALS SITES



Hazardous Site Locations

1	Parkview Pl & S Taylor Ave	30	Cherokee St & S Broadway
2	Donovan Pl & S Sarah St	31	Potomac St & Dekalb St
3	Central Industrial Dr & Talmage Ave	32	Piedmont Ave & Gasconade St
4	Hickory St & S Grand Blvd	33	Chariton St & Iowa Ave
5	Chouteau Ave & Virginia Ave	34	Bingham Ave & Ray Ave
6	Atlantic St & S Ewing Ave	35	Chippewa St & Meramec St
7	[1700-1917] Gratiot St	36	3340 Morganford Rd
8	Chouteau Ave & Checkerboard Sq	37	Concordia Ave & Ray Ave
9	Chouteau Ave & S Broadway	38	Holly Hills Ave & S Broadway
10	Couteau Ave & S 1st St	39	E Soper St & S Broadway
11	S Wharf St & Chouteau Ave	40	E Mott St & S Broadway
12	S 2nd & Convent St	41	Haven St & S Broadway
13	Park Ave & 12th St	42	E Loughboro Ave & S Broadway
14	Carroll St & S 18th St	43	Blow St & S Broadway
15	Park Ave & Benton PL	44	Robert Ave & S Broadway
16	S Grand Blvd & Park Ave	45	W Koeln Ave & S Broadway
17	S 39th St & Park Ave	46	Schirmer St & S Broadway
18	Central Industrial Dr & S Boyle Ave	47	E Courtois St & Polk St
19	Berthold Ave & East Rd	48	E Primm St & S Broadway
20	5231 Northrup Ave	49	8020 Virginia Ave
21	Juniata St & Maury Ave	50	3800 Weber Rd
22	Gravois Ave & Arsenal St	51	Marceau St & Alabama Ave
23	Arsenal St & S 13th St	52	8215 Michigan Ave
24	Geyer Ave & S Broadway	53	E Poepping St & S Broadway
25	Lafayette Ave & S 3rd St	54	E Catalan St
26	Geyer Ave & S 3rd St	55	S Broadway & E Lorentz St
27	Barton St & Kosciusko St	56	S Broadway & Horn Ave
28	2800 Dekalb St	57	Military Rd & Waller Ave
29	Utah St & S 2nd St		

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 (SO_2), particulates (PM_{10}, 10 microns and smaller; $PM_{2.5}$, 2.5 microns and smaller), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (0_3), and lead (Pb). In addition to these pollutants, the State of Missouri has established additional criteria for hydrogen sulfide (H_2S) and sulfuric acid (H_2S0_4). 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, NOx, CO, and particulates. Hydrocarbons (HC) and Nitrogen oxides (NOx) 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. PM_{10} 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.

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

POLLUTANT	AVERAGING TIME	STANDARD VALUE	STANDARD TYPE
Ozone (O_3)	Eight Hour(1)	0.08 ppm (157 $\mu g/m^3$)	Primary, Secondary
Carbon Monoxide (CO)	One Hour(2) Eight Hour(2)	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)	Primary Primary
Nitrogen Dioxide (NO2)	Annual Arithmetic Mean	0.053 ppm (100 $\mu g/m^3$)	Primary, Secondary
Particulate (PM_{10})	Annual Arithmetic Mean 24-hour average	50 $\mu g/m^3$ 150 $\mu g/m^3$	Primary, Secondary Primary, Secondary
Particulate ($PM_{2.5}$)	Annual Arithmetic Mean 24-hour average(3)	15 $\mu g/m^3$ 65 $\mu g/m^3$	Primary, Secondary Primary, Secondary
Lead (Pb)	Quarterly average	1.5 $\mu g/m^3$	Primary, Secondary
Sulfur Dioxide (SO2)	Annual Arithmetic Mean 24-hour average(2) 3-hour average(2)	0.03 ppm (80 $\mu g/m^3$) 0.14 ppm (365 $\mu g/m^3$) 0.50 ppm (1300 $\mu g/m^3$)	Primary Primary Secondary
Hydrogen Sulfide (H2S)(4)	One-half Hour(5) One-half Hour(6)	70 $\mu g/m^3$ (0.05 ppm) 42 $\mu g/m^3$ (0.03 ppm)	
Sulfuric Acid (H_2SO_4)(4)	Twenty-four Hour(7) One Hour(8)	10 $\mu g/m^3$ 30 $\mu g/m^3$	

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
$\mu g/m^3$ – micrograms of pollutant per cubic meter of air
mg/m^3 – 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 "Southside 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,

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: 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 area is typical of those commonly found in urban areas. There are three Interstates that traverse the area, I-64, I-44, and I-55, as well as numerous freight railroad tracks. The study area is primarily residential with scattered commercial, industrial, and recreational land uses.

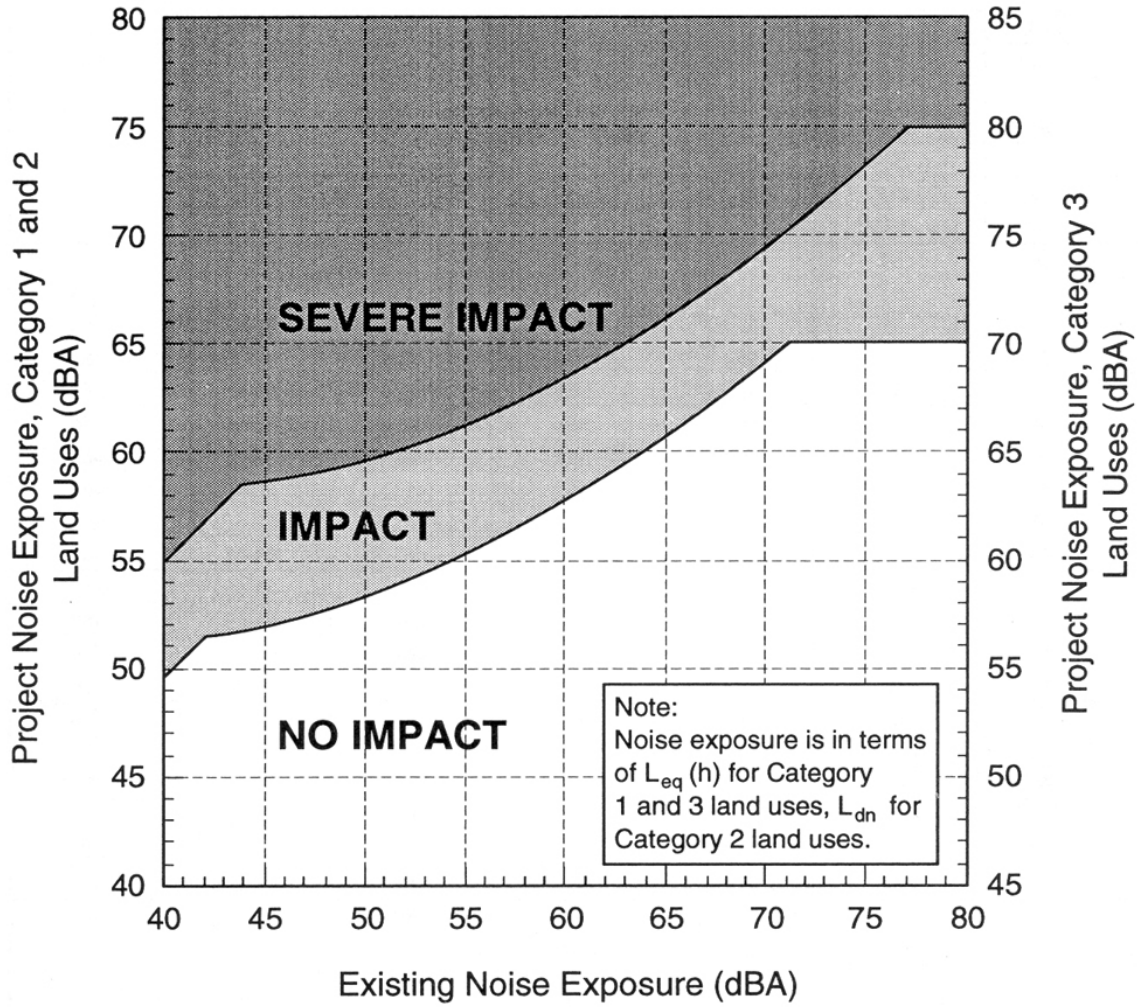
Existing noise levels in the study area were developed according to the FTA's procedures for estimating the existing L_{dn} noise exposure based upon the population density (people per square mile) and the distance from major noise sources (feet). Within the study area, the population density ranges 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 the interstate is present, the noise level would range from 50 – 75 dBA based upon the distance to the highway. In the vicinity of other roadways, the noise level would range from 50 – 70 dBA depending on the distance to the roadways.

For the study area, 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 probable mitigation measures.

FIGURE 3.6-3: FTA NOISE IMPACT CRITERIA



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

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, 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 VdB[2].

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 1x10-6 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 noise[3] are presented in Table 3.6-3.

[3] 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.
[3] Ibid

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

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 micro inch/sec)		Ground-Borne Noise Impact Levels (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

Source: FTA, April 1995.

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.

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.

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

Type of Building or Room	Ground-Borne Vibration Impact Levels (VdB re 1 micro inch/sec)		Ground-Borne Noise Impact Levels (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

Source: FTA, April 1995.

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.

Existing vibration levels in the study area were developed based upon information presented in FTA's manual General Transit Noise and Vibration Assessment[4]. 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 to 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 in the study area are mostly characterized as 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 low. These upland soils have slopes up to 20%.

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

In and around Carondelet Park the soil is classified as Menfro Silt Loam, Karst, and Wilbur Silt Loam. The Menfro series consists of very deep, well drained, moderately permeable soils formed in thick loess deposits on upland ridgetops, backslopes and benches adjacent to the Missouri and Mississippi rivers and their major tributaries (Gravois Creek and River Des Peres). Slopes range from 2 to 14% in this area. The Wilbur series consists of very deep, moderately well drained, moderately permeable soils that formed in alluvium. These soils are on floodplains and floodplain steps. Slopes range from 0 to 2%.

Further south, near Gravois Avenue and Bayless Road, the soil is characterized as Menfro Silt Loam, Karst and Winfield Silt Loam. The Winfield series consists of very deep, moderately well drained, moderately permeable soils formed in loess. These soils are on ridgetops and sideslopes of hills, and on terraces. Slopes in this area range from 5 to 9%.

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. Near the Union Pacific railroad alignment, 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. In addition, the development of clay mines and coal mines in South City resulted in occasional cave-ins and sinkage, because of the relative instability of limestone when it is undermined.[5]

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.[6] There are numerous sinkholes in the study area (as shown in Figure 3.6-1). Many are present in Carondelet Park and also near I-55, south of Bayless Road.

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. 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 HISTORIC/CULTURAL AND ARCHAEOLOGICAL

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

[5] "Geography of St. Louis." City of St. Louis. http://stlouis.missouri.org/citygov/planning/research/data/about/geography.html

[6] http://www.dnr.mo.gov/geology/geosrv/gdam/sinkhole_formation.htm

and Adverse Effect were established in 36 CFR 800.9. 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." Sugar Loaf Mound, located between I-55 and the Mississippi River, still remains and is listed on the National Register of Historic Places. According to the State Historic Preservation Office, remnants of many 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 area, there are 21 historic districts, 36 historic buildings, one historic site, and one historic structure currently listed on the NRHP[7] (see Figure 3.6-4 and Table 3.6-5). In addition, the City of St. Louis has designated five Certified Local Historic Districts, three local historic districts, and numerous City landmarks throughout the study area. Many are located along Grand Boulevard, and in the neighborhoods of Lafayette Square, LaSalle, Carondelet, and Patch.

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 NRHP is affected by the proposed alternatives, a 4(f) and 6(f) evaluation will be required.

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

FIGURE 3.6-4: HISTORIC PLACES

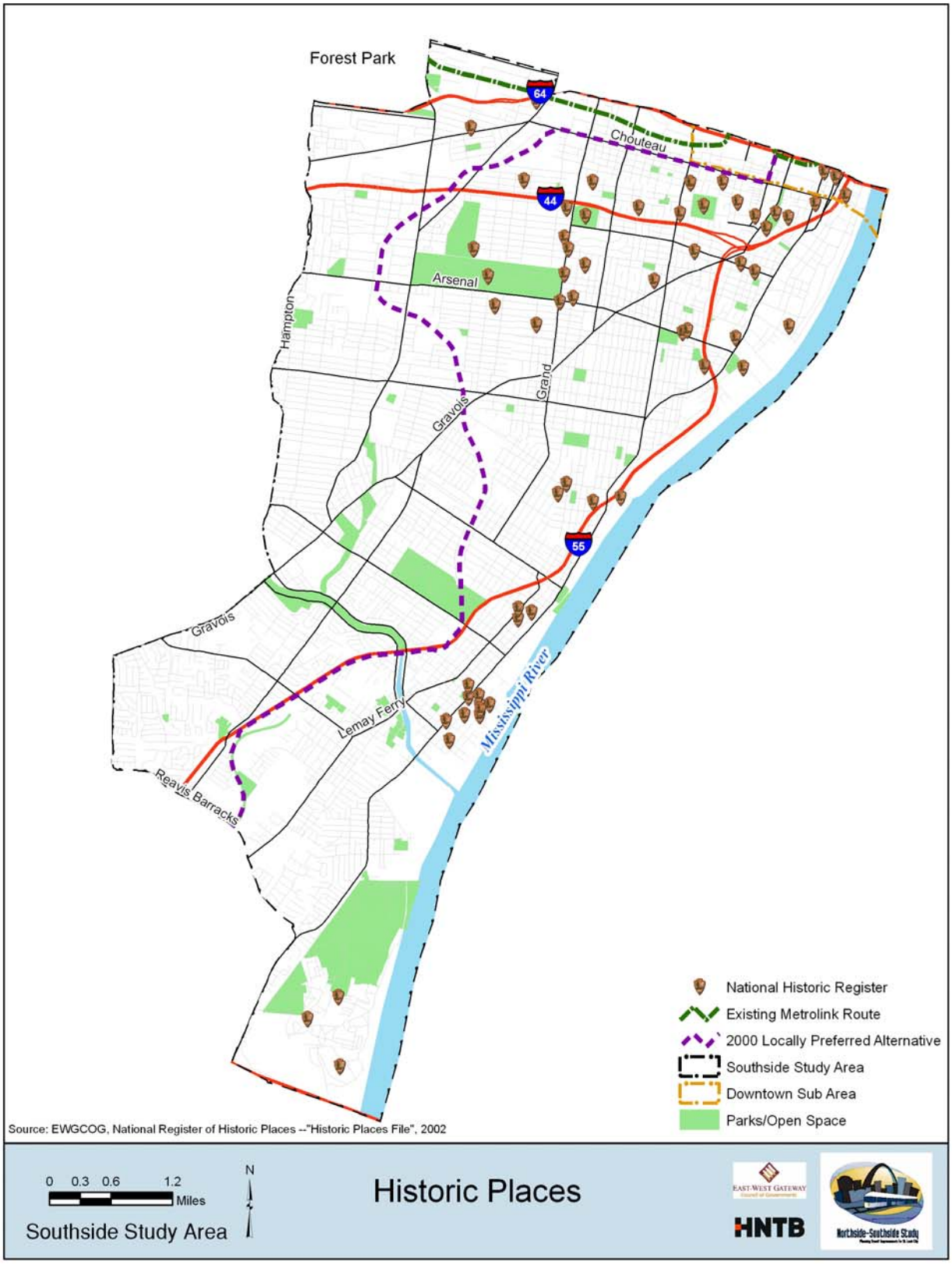


TABLE 3.6-5: SOUTHSIDE HISTORIC REGISTER SITES & DISTRICTS

NAME	ADDRESS
Anheuser-Busch Brewery	721 Pestalozzi Street
Anton Schmitt House	7727 S Broadway Street
B'Nai el Temple	3666 Flad Avenue
Barr Branch Library Historic District	2500-2630 Lafayette Avenue
Benton Park District	Bounded by Gravois Avenue, I-55, S. Broadway Street and Jefferson Street
Brown Shoe Company's Homes-Take Factory	1201 Russell Boulevard
Buildings at 2327-31 & 2333-35 Rutger Street	2327-31 and 2333-35 Rutger Street
C. Hager and Sons Hinge Co.	139 Victor Street
Carlin-Rathgeber House	122 Davis Street
Chatillon-Demenil House	3352 DeMenil Place
City Hospital Historic District	Bounded by Lafayette Avenue, Grattan, Carroll, Dillon, St. Ange, and 14th Streets
Compton Hill Water Tower (#3), Reservoir Park	Grant & Russell Boulevards and Lafayette Avenue
Convent of the Sisters of St. Joseph of Carondelet	6400 Minnesota Avenue
Crittenden Historic District	3401 Arsenal Avenue, 3400 & 3500 blocks of Crittenden Avenue
Des Peres School	6307 Michigan Avenue
Dickmann Building	3115 S Grand Boulevard
Dolman Row	1424-1434 Dolman Street
Edward Wyman School	1547 S Teresa Street
Eugene & Marianne Miltenberger House	3218 Osceola Street
Eugene Field House	634 S Broadway Street
Forest Park Southeast Historic District	Bounded by I-44, Kingshighway Boulevard, I-64 & Vandeventer Avenue
Fulton Bag Company Building	612-618 S 7th Street
Hickory Street District	Bounded roughly by LaSalle, Missouri, Rutger, and Jefferson Streets and along Hickory Street
Historic Resources of Carondelet	Carlin-Rathgeber House, Steins Street District, Otzenberger House at Carondelet Park
Horace Mann School	4047 Juniata Street
Immaculate Conception School	2912 Lafayette Street
Jacob Steins House	7600 Reilly Street
Lafayette Square Historic District	Area surrounding Lafayette Park
McKinley Fox District	Bounded roughly by 18th Street, I-44, Jefferson Avenue and Gravois Avenue
Missouri Botanical Garden	2345 Tower Grove Avenue
Moloney Electric Co. Building	1141-1151 S. 7th Street
Mount Pleasant School	4528 Nebraska Avenue
Otzenberger House	7827 Reilly Street
Quinn Chapel A.M.E. Church	227 Bowen Street
Roberts, Johnson and Rand-International Shoe Co	Mississippi & Hickory Streets
Rock Spring School	3974 Sarpy Avenue
S. John Nepomuch Parish Historic District	11th & 12th Streets between Carroll Street and Lafayette Avenue

NAME	ADDRESS
Schlichtig House	8402 Vulcan Street
Schollmeyer Building	1976-1982 Arsenal Avenue
Seventh District Police Station, Former	2800 S Grand Avenue
Shaw Avenue Place	Bounded roughly by DeTonty Street, S. Spring Avenue, Shaw Avenue and S. Grand Avenue
Soulard Neighborhood Historic District	Bounded roughly by 7th Boulevard, Soulard, Lynch and 12th Streets
Soulard-Page District	Bounded roughly by Soulard, 8th, 12th, and LaSalle Streets
Speck District	Bounded roughly by S.11th, Park, Rutger, and S. 12th Streets
St. Boniface Neighborhood Historic District	Bounded by Broadway Street, Koeln Street Tesson Street, and MOPAC Railroad
St. Francis de Sales Church	2653 Ohio Street
St. Louis Air Force Station	2nd Street and Arsenal Avenue
St. Mary of Victories Church	744 S Third Street
Steins Street District	Steins Street.
Stone Houses	200-204 Steins Street
Stork Inn	4526 Idaho Avenue
Strassberger's Conservatory	2302-2306 S Grand Boulevard
Sugar Loaf Mound	Ohio Street
Tiffany Neighborhood District	39th Street, Park Avenue, Grand Avenue and Lafayette Avenue and Vandeventer Avenue, Tower Grove Avenue, and Folsome Avenue
Tower Grove Heights Historic District	Bounded by Grand Boulevard, Arsenal Avenue, Gustine Avenue and McDonald Avenue
Tower Grove Park	Bounded by Magnolia Avenue, Grand Boulevard, Arsenal Avenue and Kingshighway Boulevard
William Buehler House	2610 Tennessee Avenue
Ziess Houses	7707-7713 Vulcan Street

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 included 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.

The study area contains approximately 1,585 acres of federal, state, county and/or city parks. Of particular importance in the study area are Carondelet Park, Tower Grove Park, and Jefferson Barracks County Park. Carondelet Park is a 179-acre park located in the south end of the study area, and a portion of the Union Pacific Railroad alignment travels through the park. Tower Grove Park, located at Grand Boulevard and Arsenal Avenue, is the second largest park in St. Louis at 289 acres, and is adjacent to the Missouri Botanical Garden. The northern section of the 426-acre, historically significant Jefferson Barracks County Park is located in the very southeastern portion of the study area. 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. Therefore, there will be no constraints to the development of transit improvements alternatives with regards to prime farmlands.

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, but are not limited to, impacts to Gravois Creek and the River Des Peres; impacts to hazardous waste sites; noise and vibration impacts; the presence of karst topography and sinkholes, especially in the southern portion of the study area; impacts to Section 106 (historic) properties; and 4(f) impacts to Carondelet Park, as it contains a portion of the Union Pacific Railroad alignment on which the current LPA is located. All of the environmental issues must be considered, and impacts and mitigation measures must be discussed. The study will include agency coordination regarding these potential impacts, and possibly mitigation measures.

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 facilities and planned improvements, operating conditions and safety. This section also reviews transit, covering system description, ridership, planned changes, the Paratransit/Demand Responsive System, and MetroLink LRT. The section concludes with a description of bicycle/pedestrian facilities and movement of goods in the region.

3.7.1 ROADWAYS

Interstate System

Existing Characteristics

The Southside study area has three major interstates. Interstate 64 (I-64) runs east-west through the northernmost portion of the study area. Interstate 44 (I-44) runs east-west parallel to and south of I-64 in the northern portion of the study area. Finally, Interstate 55 (I-55) runs north-south along the eastern edge for the length of the study area. Figure 3.7-1 shows the existing interstate system and remaining roadway classifications within the study area. The state-maintained facilities are shown in Figure 3.7-2.

Interstate 64 provides three lanes for eastbound and westbound traffic with a full interchange at Kingshighway Boulevard and partial interchanges at Grand Boulevard and Boyle Avenue. Some auxiliary lanes are provided between these interchanges.

Interstate 44 provides interchanges with Hampton Avenue, Kingshighway Boulevard/ Vandeventer Avenue, South Grand Boulevard, South Jefferson Avenue, and I-55. Each of these interchanges is diamond type with the exception of the I-55 interchange, which is fully directional. The I-55 interchange also provides feeder ramps for access to Lafayette Avenue.

Interstate 55, the longest highway segment within the study area, provides full or partial interchanges with I-64, Park, I-44, Gravois Avenue, Arsenal Street, Broadway Street, Potomac Street, Gasconade Street, South Broadway Street, Bates, Loughborough Avenue and Germania Street/Carondelet Boulevard.

Planned Improvements

A list of planned improvements within the study area have been graphically represented and listed in Figure 3.7-3. In addition to projects found on this list, numerous resurfacing and bridge rehabilitation and reconstruction projects are planned. With regard to bridge rehabilitation for structures spanning the Mill Creek Valley, the Jefferson Street and Grand Avenue bridges are currently scheduled to be replaced. No bridge plans are currently in place for bridge replacement at either the 14th Street or Tucker Street locations.

FIGURE 3.7-1 EXISTING ROADWAY CLASSIFICATION

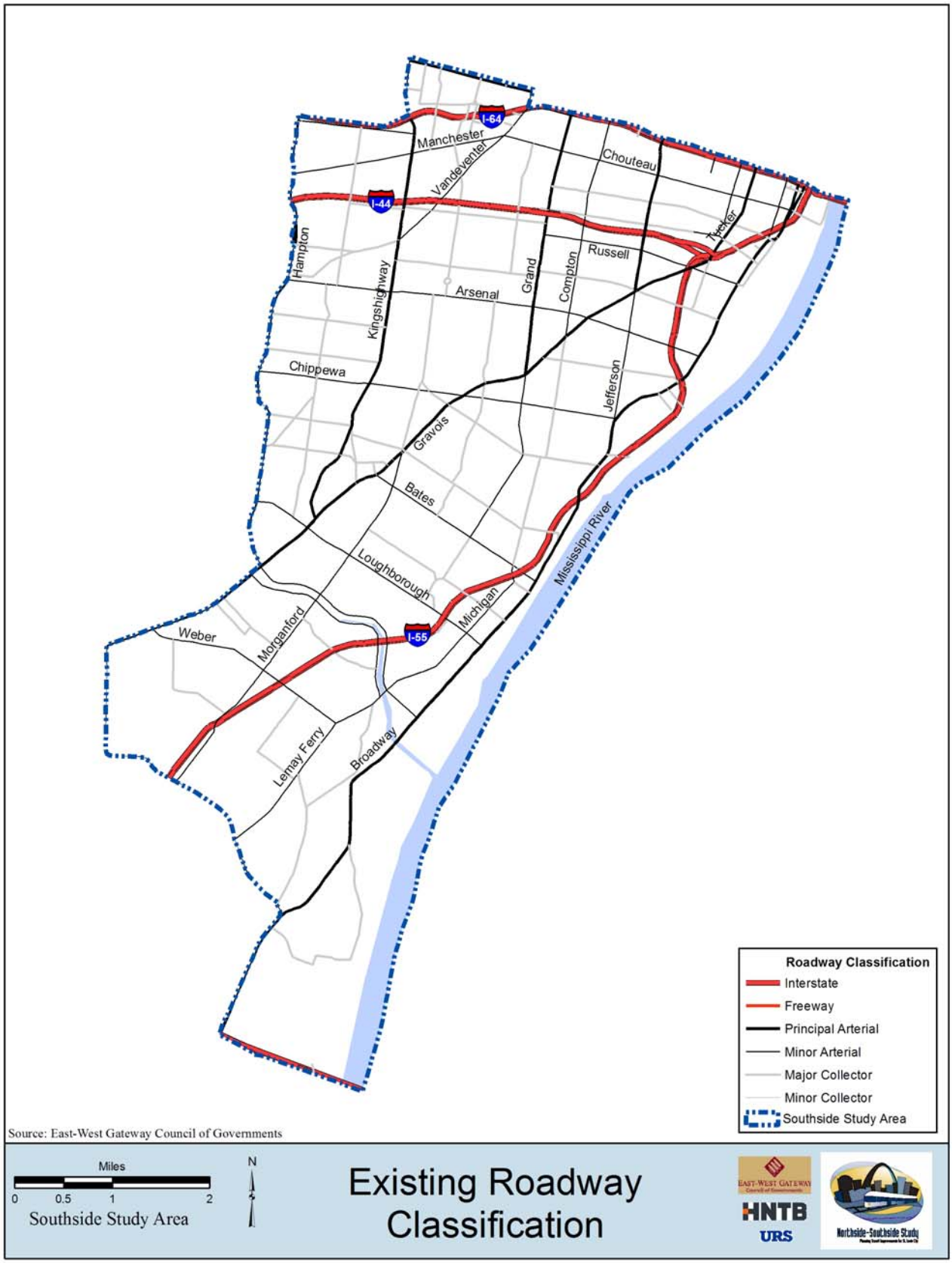


FIGURE 3.7-2: STATE HIGHWAYS

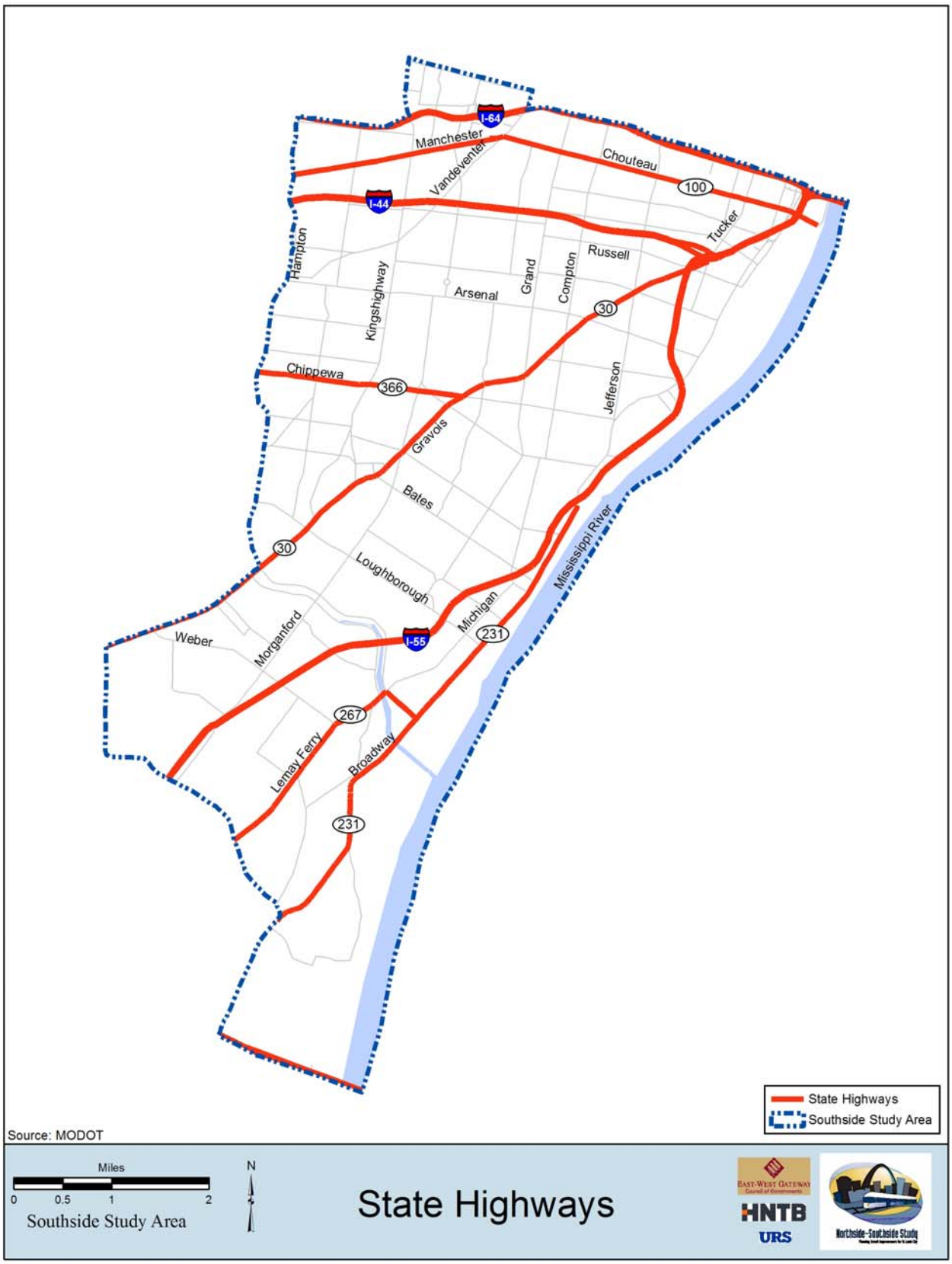
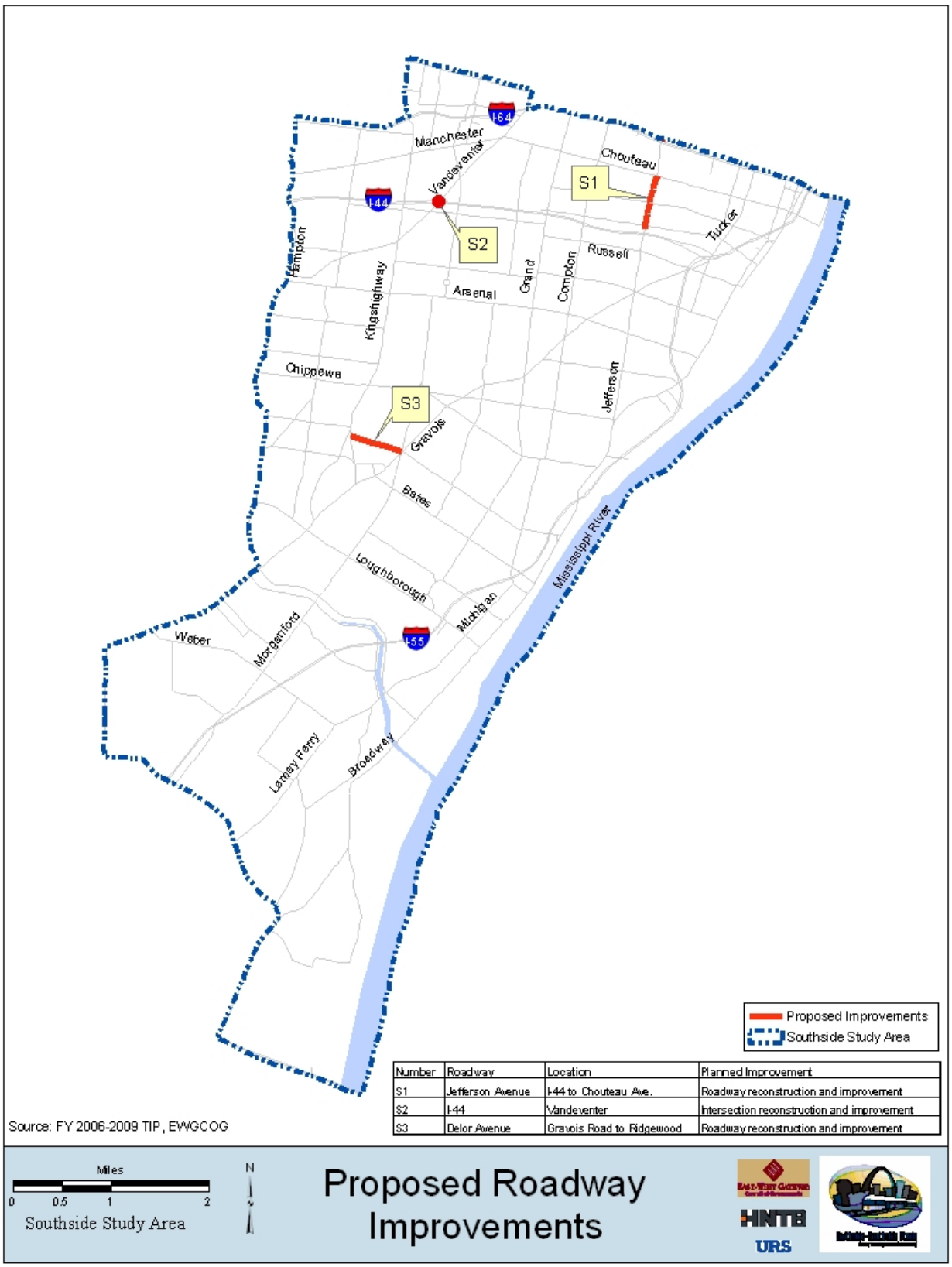


FIGURE 3.7-3: PROPOSED ROADWAY IMPROVEMENTS



Number	Roadway	Location	Planned Improvement
S1	Jefferson Avenue	I-44 to Chouteau Ave.	Roadway reconstruction and improvement
S2	I-44	Vandeventer	Intersection reconstruction and improvement
S3	Delor Avenue	Gravois Road to Ridgewood	Roadway reconstruction and improvement

Average Daily Traffic
The existing average daily traffic throughout the Southside 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 or congestion.

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

The accident rates for 2004 were significantly higher than the statewide average for Route 267 (Lemay Ferry Road), Route 30 (Gravois Road) and Route 366 (Chippewa). Most of the accidents were property damage only, ranging from 68% on Lemay Ferry Road to 79% on Chippewa Avenue. As alternatives are developed and screened in future tasks, further analysis will be completed 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.

FIGURE 3.7-4: AVERAGE DAILY TRAFFIC VOLUMES, 2003

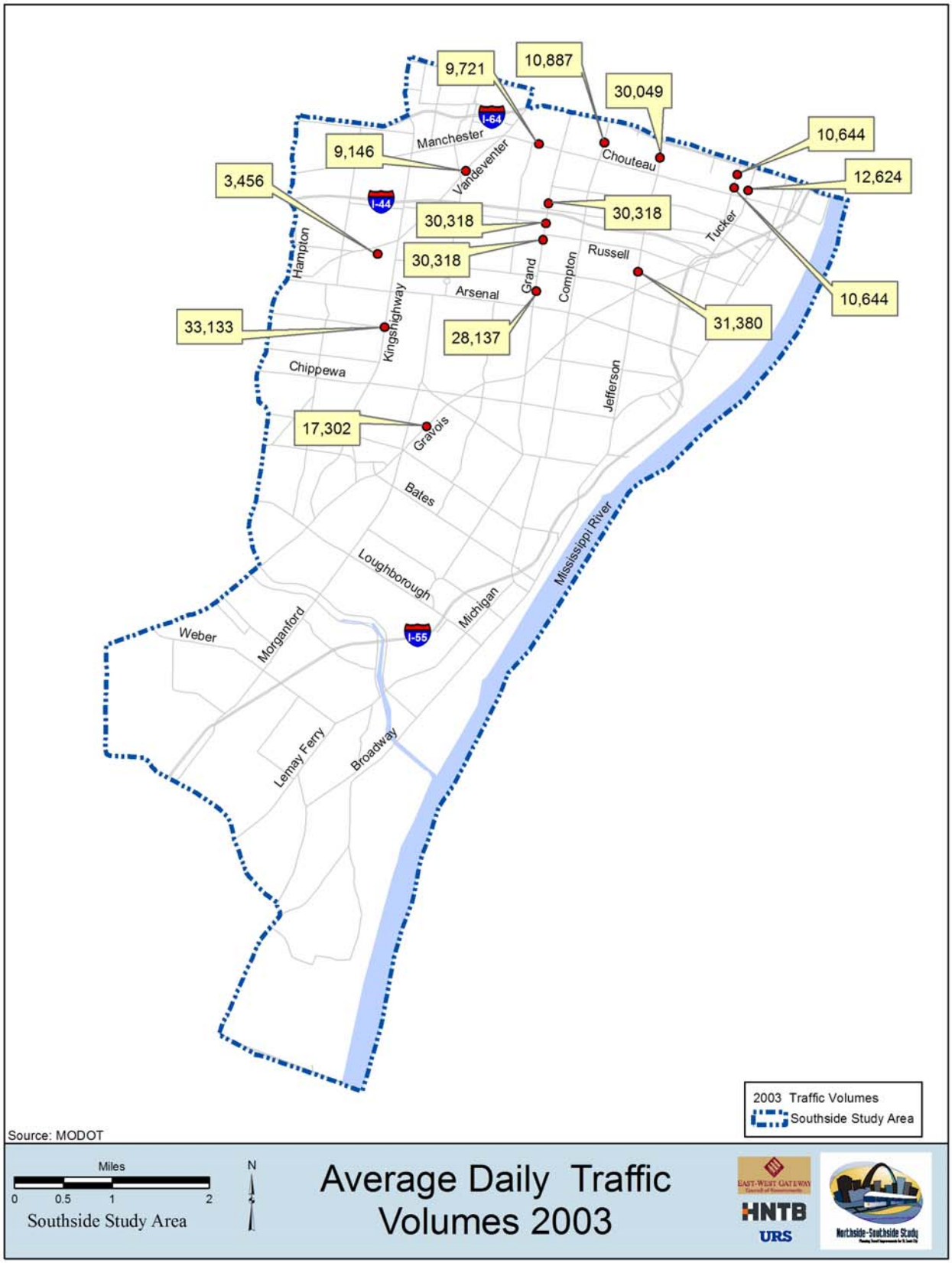


TABLE 3.7-1: 2004 ACCIDENT RATES

Roadway	Segment	Accident Rate	Statewide Accident Rate
I-55 Northbound	Reavis Barracks to Mississippi River	200.45	110.20
I-55 Southbound	Reavis Barracks to Mississippi River	196.42	110.20
I-44 Eastbound	Hampton to I-55	272.39	110.20
I-44 Westbound	Hampton to I-55	136.48	110.20
Route 231/Broadway	Reavis Barracks to Broadway	303.68	269.63
Route 267/Lemay Ferry Road	Reavis Barracks to River Des Peres	1212.00	269.63
Route 30/Gravois Road	Hampton to I-55	1808.76	269.63
Route 366/Chippewa	Hampton to Gravois	1770.04	269.63

Source: Missouri Department of Transportation, 2006.
Note: Number of accidents per million vehicle miles traveled

Commuter Carpool Lots
The study area has two MoDOT-designated parking lots for carpooling commuters, which serve Southside residents. The first is located outside the study area in the northwest quadrant of the interchange of Gravois Road and I-270. The second is located within the study area at the southeast quadrant of the interchange of I-55 and Reavis Barracks Road.

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:

- Route 30 (Gravois Road).
- Route 100 (Manchester Road/Chouteau Ave).
- Route 231 (Broadway).
- Route 267 (Lemay Ferry Road).
- Route 366 (Chippewa Street).
- I-64 (Interstate 64).
- I-44 (Interstate 44).
- I-55 (Interstate 55).

These roadways vary in the number of lanes they provide and the type of access control. Roadways such as Chouteau Avenue and Gravois Road provide up to four travel lanes with

varying levels of access control. In most cases, these facilities usually provide a median turn lane.

Planned Improvements
Improvements are planned for Jefferson Avenue, Delor Avenue and the Grand Boulevard viaduct near I-64. The City of St. Louis is also planning to integrate the traffic signal system. See Figure 3.7-3 for additional illustrative planned projects within the study area.

Truck Percentages
The 2006 truck percentages range between 7% and 18% on Chouteau Avenue between 14th Street and Jefferson Avenue. The 2006 percentages of trucks vary between 4% and 6% along Jefferson Avenue between Chouteau Avenue and Gravois Avenue. Between Gravois Avenue and Gasconade Street, the Jefferson Avenue truck percentage range increases to between 9% and 17% which is to be expected due to the access to I-55 at Gravois and at Gasconade.

Level of Service
The 2006 level of service throughout the Southside 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 was abandoned in 1966. Today, public transportation is provided by Bi-State Development Agency (Metro).

Intraregional Bus Services
Local Routes
Bus service is provided by Metro. Approximately 13 local fixed routes provide regular service to the study area. Local route coverage is shown in Figure 3.7-5. The local routes that serve the Southside study area tie into Metro's regional transit network, shown in Figure 3.7-6.

Fixed route service in the Southside is more concentrated in the northern portions of the study area, due mostly to higher population and employment densities (Chapter 3.3). The Southside's more established neighborhoods and many of the activity centers are generally located in the north, and the bus network exhibits a conventional grid pattern within this area.

In the southern half of the study area, local service is more dispersed and oriented towards serving clusters of development along major travel corridors such as Gravois Road and Lemay Ferry Road. These routes also serve a major commute pattern, linking residential areas to downtown St. Louis and major employers, such as Ameren UE and Anheuser Busch.

Although service frequency varies, typical weekday headways during the peak periods are between 15 and 30 minutes (Table 3.7-2). Off-peak, buses tend to run every 30 minutes. On Saturdays, headways are 30 to 40 minutes, whereas on Sundays and Holidays, headways follow 60-minute intervals.

Hours of operation vary by route. During a typical weekday, buses generally run from 5:00 a.m. to 12:30 a.m. On those routes where service is provided on Saturdays and Sundays, buses typically operate from 6:00 a.m. to 12:00 a.m.

Existing ridership correlates strongly with the level of transit service provided. "Revenue hours of service" listed in Tables 3.7-2 through 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 15 to 20 minutes tend to exhibit the highest numbers of average daily passengers compared to routes with headways of 30 to 60 minutes. For example, the Grand route (#70) has peak headway of 7 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 which traverse the more established residential and commercial neighborhoods. These routes include Grand (#70), Kingshighway (#95), Chippewa (#11) and Hampton (#90). In general, transit ridership is fairly stable and consistent in the Southside. The existing ridership on most of these routes averages between 2,000 and 3,000 riders per weekday.

In Fall 2006, Metro implemented improvements to the MetroBus system throughout the City of St. Louis. These improvements were part of Metro's "Metro Redefined 2006" program. The Redefined 2006 goals were, among others:

- 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 study area. These changes include:

- 80-Shaw-Southampton – This route was eliminated and replaced with the Route 80-Lafayette Square. This new route operates as a neighborhood loop shuttle between the 14th Street Transit Center and the neighborhoods east of Grand Boulevard on Park, Russell, and Mississippi Streets. Portions of the eliminated Shaw-Southampton route west of Grand operate as parts of the Route 13-Union-Shaw, Route 59-Shaw-Kirkwood, Route 92-Macklind, and Route 93-Midtown-South County.

- 11-Chippewa – This route was re-routed to serve the I-44 Lansdowne Station at Lansdowne and River Des Peres and continues to serve the City of St. Louis along Chippewa, Jefferson and Market Streets. Hours of operation were modified to run on weekdays and weekends from 5:00 am to midnight; buses run every 20 minutes during the day and 40 minutes during the evening.

Express Routes
Seven bus routes provide express service in the study area, as summarized in Table 3.7-5 and shown in Figure 3.7-7.

These express routes primarily serve commuter trips and provide limited stop service in the peak periods along major arterials throughout the study area. Several of these routes (Oakville, Tesson Ferry, and Mehlville) use I-55 to complete their trip to the downtown area. Express routes operate in the peak direction, traveling northbound in the a.m. peak and southbound in the p.m. peak.

The Metro Redefined 2006 program eliminated the 52X-Tesson Ferry Express and the 240X-Oakville Express routes.

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

		Weekday				
		Headways (minutes)		Revenue	Average	
Route #	Route Name	Peak	Non-Peak	Hours	Trips	ADP
Local Routes						
70	Grand	7	12	210	226	11,705
95	Kingshighway	10	15	132	122	5,890
11	Chippewa	15	20	137	109	5,082
90	Hampton	15	30	114	112	3,732
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
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
92	Lindenwood	30	60	49	45	404
15	Hodiamont	30	30	33	48	401

Source: Metro, 2006
Note: ADP = Average Daily Passengers

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

Route #	Route Name	Saturday					Sunday				
		Headways (minutes)		Rev-enue	Aver-age		Headways		Rev-enue	Aver-age	
		Peak	Non-Peak	Hours	Trips	ADP	Peak	Non-Peak	Hours	Trips	ADP
70	Grand	7	12	117	126	6,520	7	12	86	94	4,051
95	Kings-highway	10	15	102	93	3,378	10	15	67	68	2,064
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
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
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
92	Lindenwood	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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

TABLE 3.7-4: SERVICE FREQUENCY – ALL EXPRESS ROUTES

Route #	Route Name	Weekday				
		Headways (minutes)		Revenue	Average	
		Peak	Non-Peak	Hours	Trips	ADP
10X	South Grand Express	30		10	9	181
340X	I-55 Mehlville Express	30		8	8	128
410X	Eureka Express	30		11	9	160
11X	Shrewsbury Express	30		12	9	132
52X	Tesson Ferry Express	30		10	8	72
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 Trips	ADP
10X	South Grand Express	9	181
340X	I-55 Mehlville Express	8	128
410X	Eureka Express	9	160
11X	Shrewsbury Express	9	132
52X	Tesson Ferry Express	8	72
240X	Oakville Express	7	76
357X	Twin Oaks Express	10	141

Source: Metro, 2006
Note: ADP = Average Daily Passengers

FIGURE 3.7-5: EXISTING LOCAL BUS ROUTES

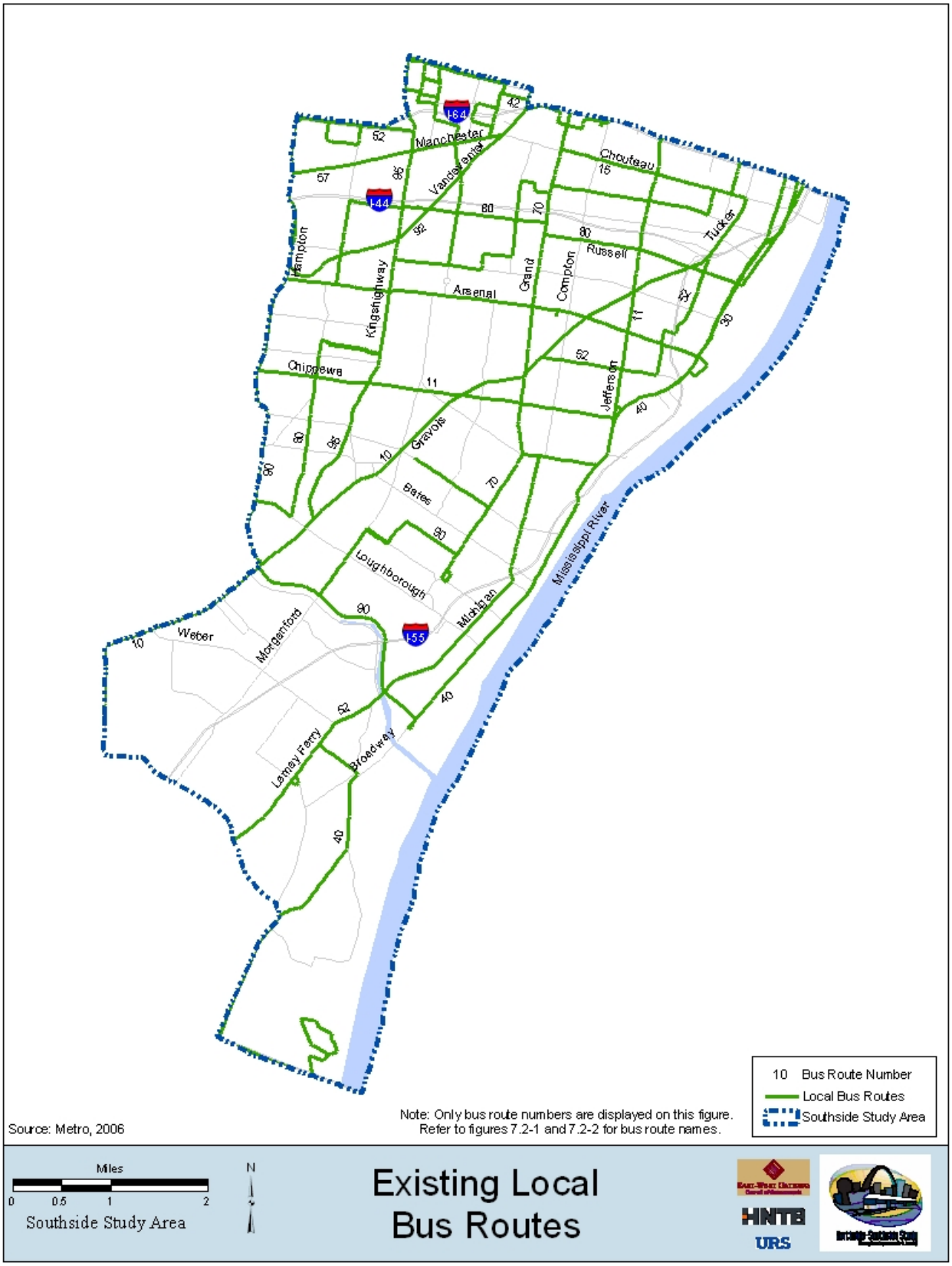


FIGURE 3.7-6: EXISTING REGIONAL BUS TRANSIT NETWORK

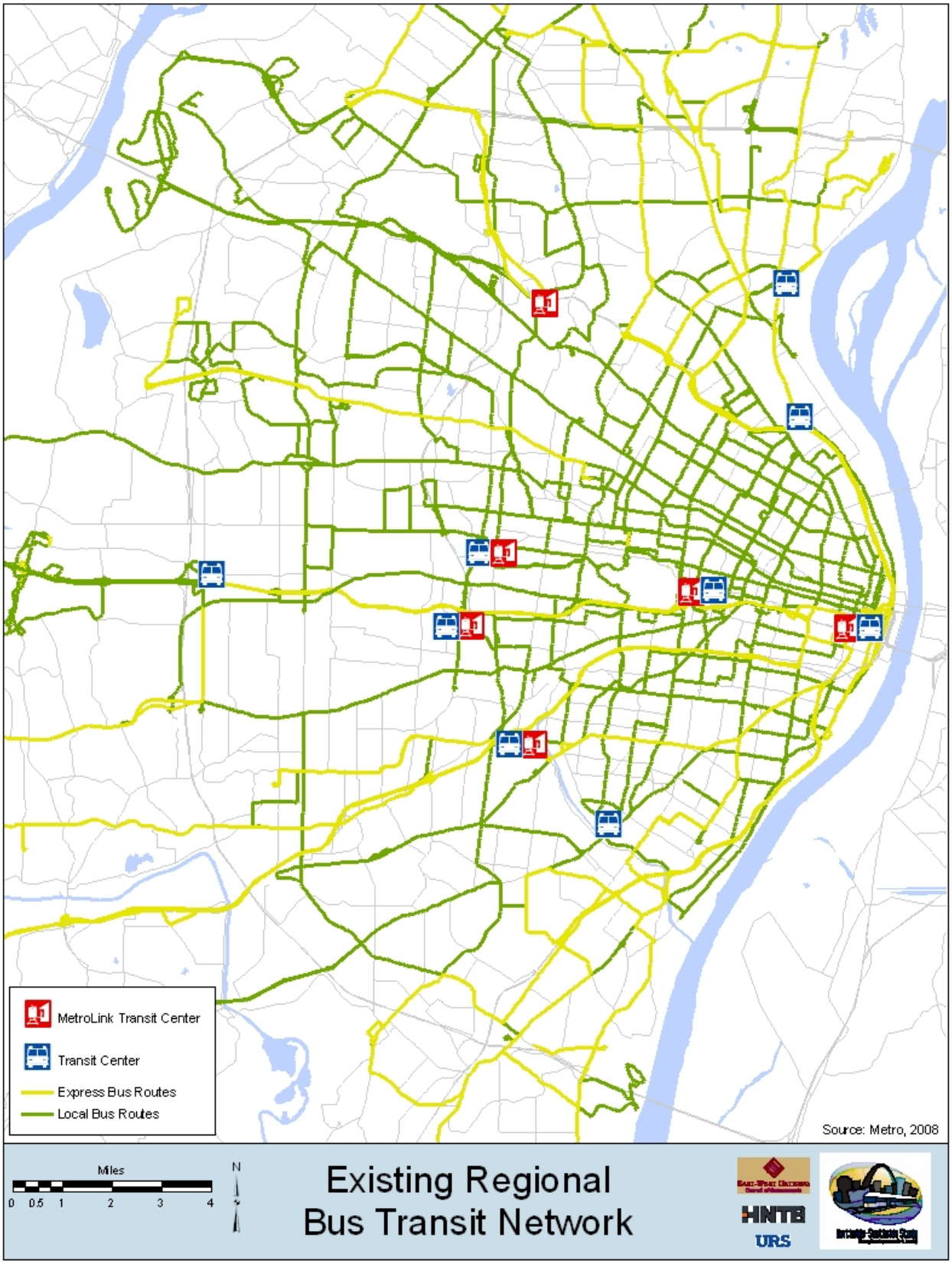
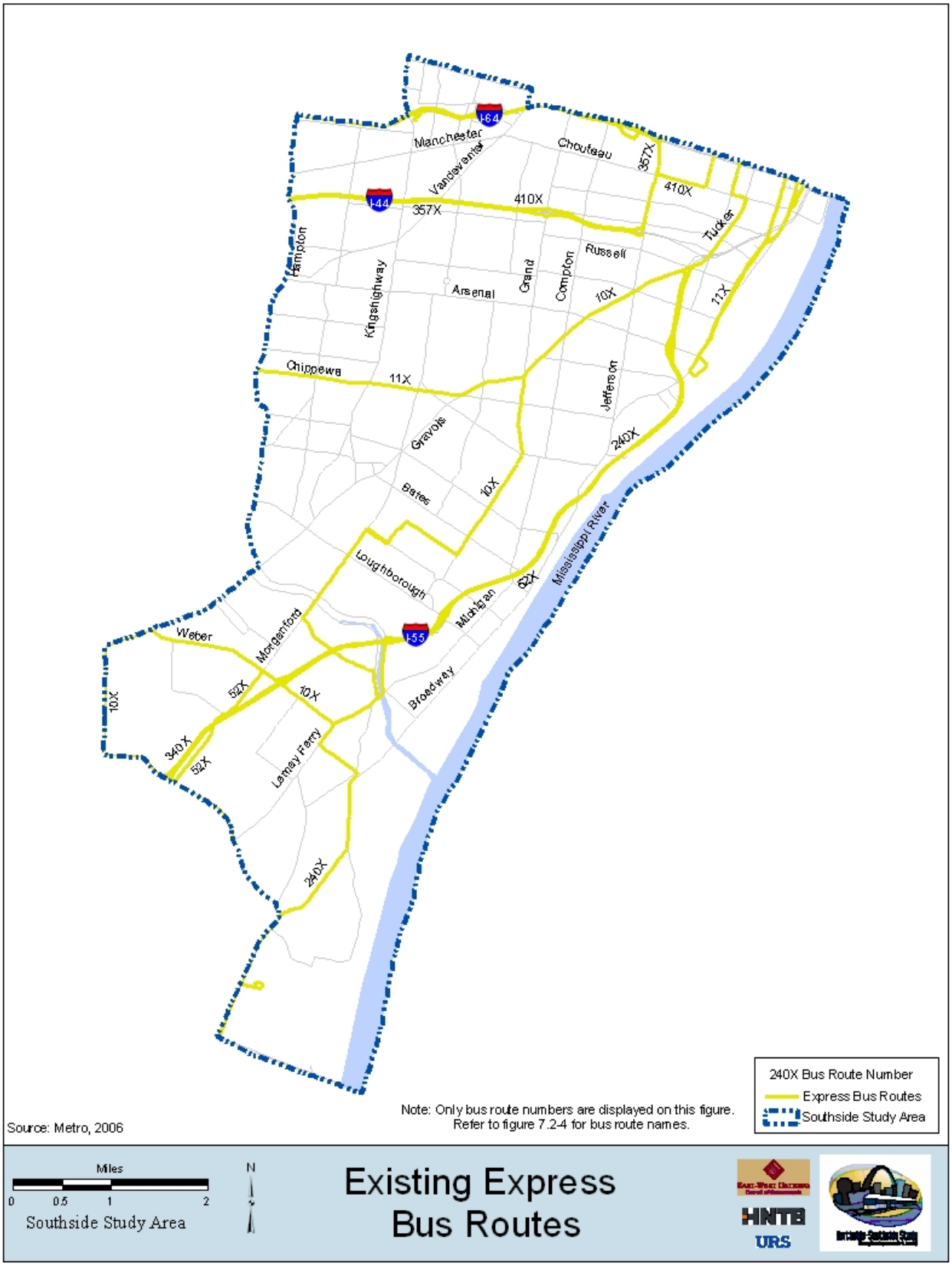


FIGURE 3.7-7: EXISTING EXPRESS BUS ROUTES



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 also initiated efforts to develop 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 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.

MetroLink Light Rail Transit (LRT)
The existing MetroLink light rail system between Lambert International Airport and Scott Air Force Base in Illinois skirts the study area to the north as it approaches downtown St. Louis from the west. Two MetroLink stations, Central West End and Grand, fall within the study area.

During a typical weekday, MetroLink runs at 7 to 8-minute headways during the peak periods (both a.m. and p.m.) and at 10-minute headways, off-peak. On Saturdays, typical headways are 10 minutes and on Sundays and holidays, trains run every 15 minutes. The hours of operation for MetroLink service are 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 shows 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. The Central West End and Grand Stations are among the busiest stations in the system.

TABLE 3.7-6: METROLINK RIDERSHIP

	Average Daily Passengers		
MetroLink Station	**Weekday**	**Saturday**	**Sunday**
Laclede's Landing	1,150	1,734	1,303
Convention Center	1,935	1,404	1,068
8th and Pine	2,348	1,951	922
Busch Stadium	3,527	3,171	3,104
Kiel 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

Portions of the study area are connected to MetroLink stations by feeder bus service. Table 3.7-7 lists the local routes in the study area that provide direct connections with MetroLink rail stations.

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.

TABLE 3.7-7: FEEDER BUS ROUTES

Route Number	Route Name	MetroLink Station(s) Served
70	Grand	Grand Station
95	Kingshighway	Central West End
11	Chippewa	Civic Center
90	Hampton	Forest Park
10	Gravois	Convention Center, Civic Center
52	Clayton South County	Convention Center, Civic Center, Central West End
30	Soulard	8th & Pine, Stadium
42	Sarah	Grand Station
57	Manchester	Grand Station
80	Shaw-Southampton	Convention Center, Civic Center
92	Lindenwood	Grand Station
15	Hodiamont	Civic Center

Source: Metro Development Agency, 2006.

Transit Facilities

As previously discussed, Metro implemented its Redefined 2006 plan to transition from the more traditional radial configuration of fixed route bus service to a transit center-based system. This was driven, in part, by the need to better serve changes in regional travel patterns resulting from shifts in population and employment throughout the region (Chapter 3.3). General locations for these transit centers included in Metro Redefined 2006 are shown in Figure 3.7-9.

Four of the transit centers serve the Southside study area:

- Central West End Station.
- Civic Center Station.
- Shrewsbury – Lansdowne I-44 Station.
- Gravois – Hampton MetroBus Center.

Three of these transit centers, Central West End MetroLink Station, Civic Center MetroLink Station, and Hampton MetroBus Center, are located in the study area. The transit centers facilitate intermodal transfers between bus and MetroLink riders, as well as direct transfers for fixed route and express bus patrons. The Central West End Station and the Civic Center Station are located on the existing MetroLink line and serve as transfer points between bus and rail. At 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 (i.e., the “reverse commute.”)

In addition, Call-A-Ride and Call-A-Ride Plus vehicles can 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

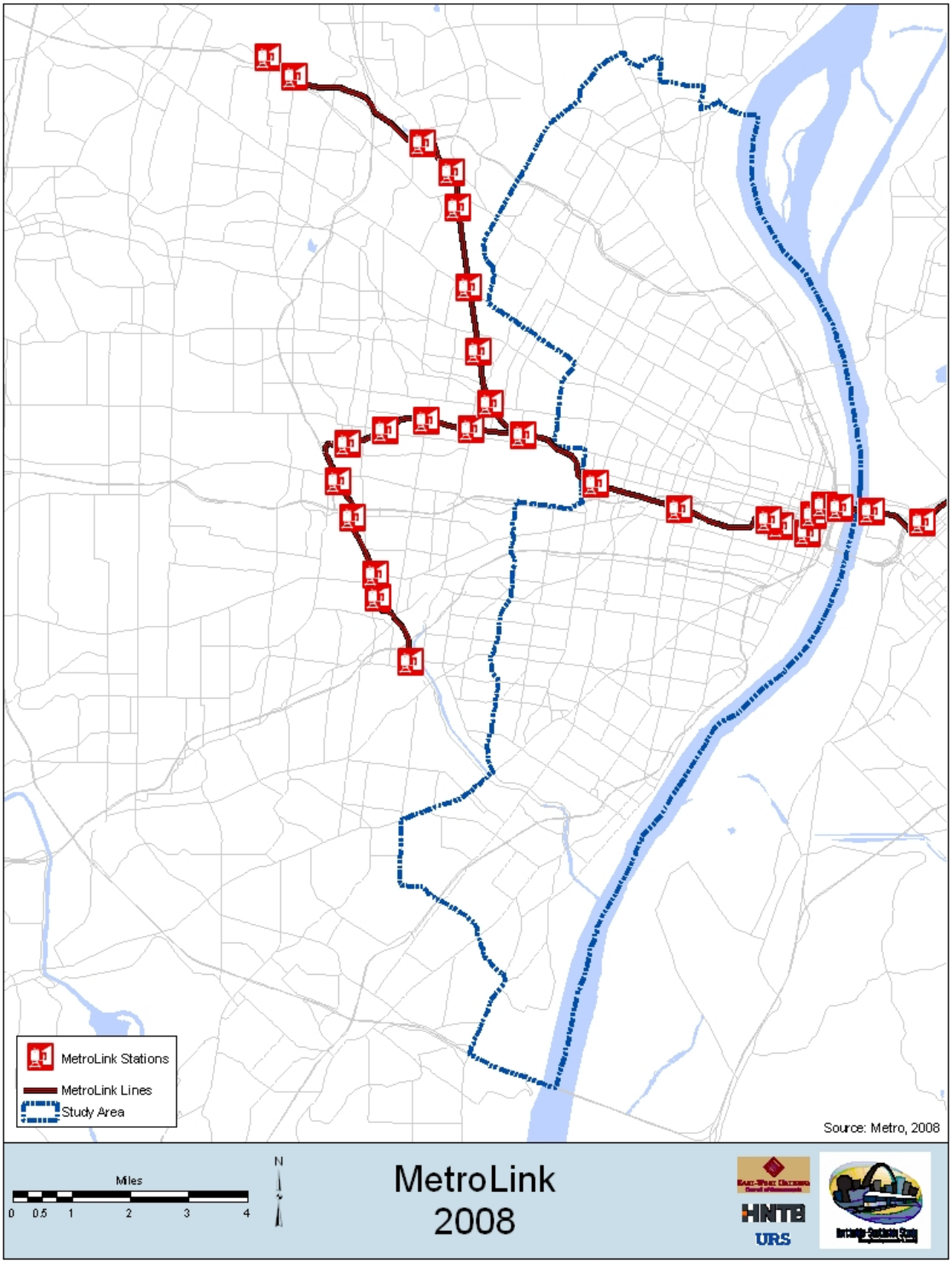
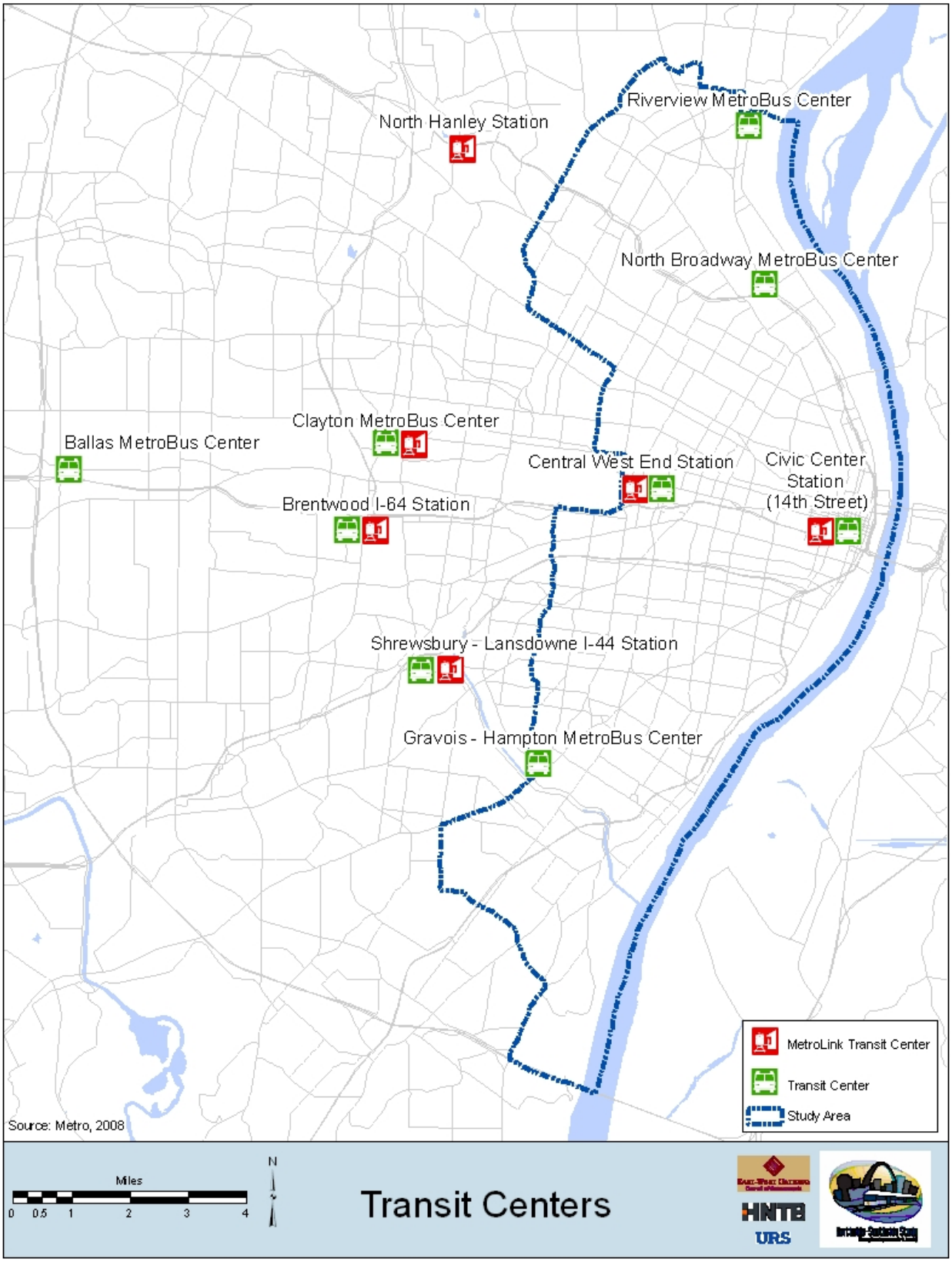


FIGURE 3.7-9: EXISTING AND PROPOSED TRANSIT CENTERS



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 study area where 10-20% of workers use public transportation. Table 3.7-8 provides a comparison of public transportation usage between St. Louis and other similar Midwestern cities. St. Louis ranks on par with Milwaukee and Cincinnati, and is higher than Kansas City, Indianapolis, and the United States as a whole.

TABLE 3.7-8: PUBLIC TRANSPORTATION USAGE

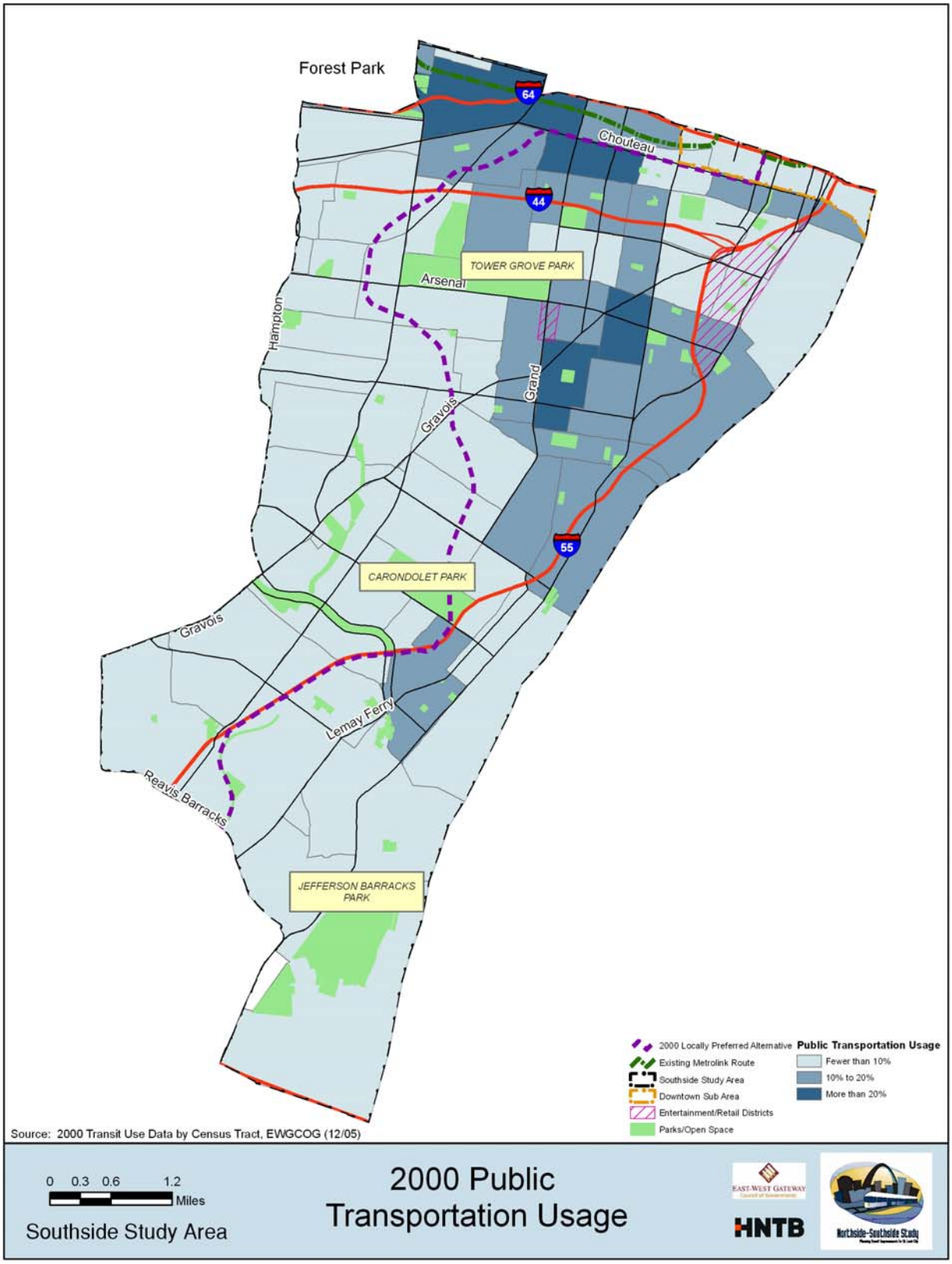
Place	# Workers Age 16+	# Using Public Transportation	% Using Public Transportation
St. Louis City, MO	140,747	15,074	10.7%
Indianapolis, IN	385,208	9,260	2.4%
Kansas City, MO	208,554	7,960	3.8%
Cincinnati, OH	147,616	14,882	10.1%
Milwaukee, WI	249,889	25,634	10.3%
Minneapolis, MN	203,951	29,681	14.6%
Pittsburgh, PA	141,844	29,062	20.5%
United States	128,279,228	6,067,703	4.7%

Source: 2000 Census

Metro has pointed to additional night and weekend service on MetroBus as a significant factor in the increase in Metropolitan St. Louis area residents who 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."

FIGURE 3.7-10: PUBLIC TRANSPORTATION USAGE, 2000



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 parts 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] 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.

To that end, an important proponent of bike trails in the St. Louis Metropolitan area has been The Great Rivers Greenway District (GRG). 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 and these bike routes are detailed in Figure 3.7-11. Bicycle routes exist along Russell Boulevard from Grand Avenue to 7th Street; along Chouteau Avenue from the Mississippi River to the Truman Parkway; and along Lafayette Avenue from Mississippi Avenue to Compton Avenue.

Other GRG projects include the restoration of the Chouteau Greenway, the Confluence Greenway/Riverfront Trail, the River Des Peres Beautification Plan, and the Gravois Creek Greenway.

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.

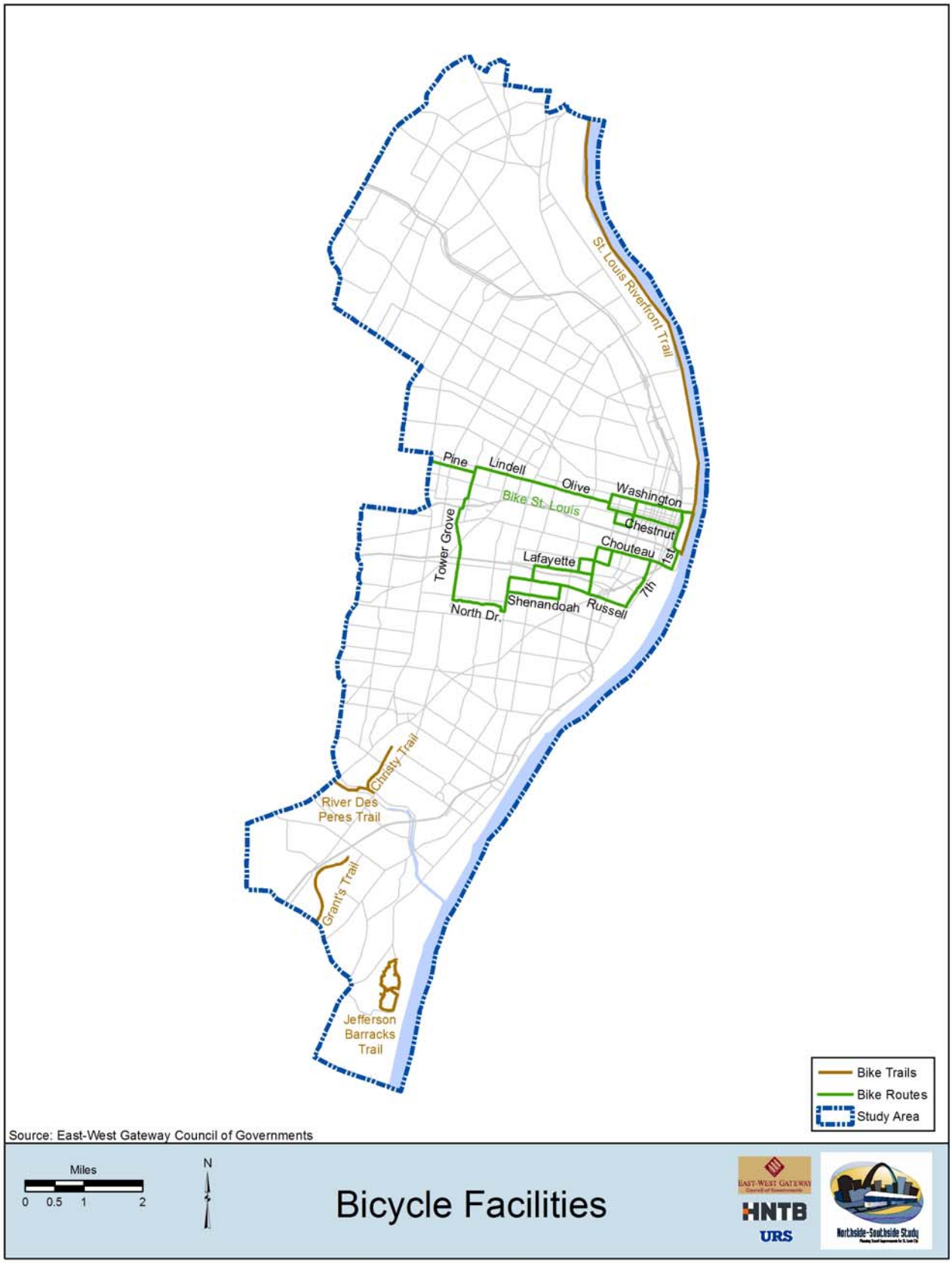
The Confluence Greenway will link the confluence of the Mississippi and Missouri rivers to the riverfront in downtown St. Louis. The "Riverfront Trail" will extend the Confluence Greenway from the Gateway Arch to Soulard. The projects are being pursued in connection with the Downtown Riverfront Master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

The Gravois Creek Greenway includes Grant's Trail, a six-mile trail system following the Gravois Creek from the River Des Peres through portions of South St. Louis County. Planning for the eastern extension of this trail was completed in fall 2004, and construction started in 2005.

The River Des Peres Beautification Plan calls for a continuous, 11-mile greenway from Forest Park to the confluence of the River Des Peres and the Mississippi River. The pilot project, a four-mile greenway, will begin where the current city parks trail ends and extend to Morganford Avenue. It will include 12-foot trails, two dedicated pedestrian bridges, signed crosswalks, a dedicated path through the Christy Greenway, and a smaller extension through St. Marcus Park.

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 area, portions of the trail have been completed. A signed trail begins at Biddle Street, traveling south along the river into South County.

FIGURE 3.7-11: BICYCLE FACILITIES



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 has 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 (see Figure 3.7-12).

St. Louis is the second largest freight hub in the Midwest, and the 1-70 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.

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

Company	Facility Name	Facility Type[1]
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:[1]A 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.

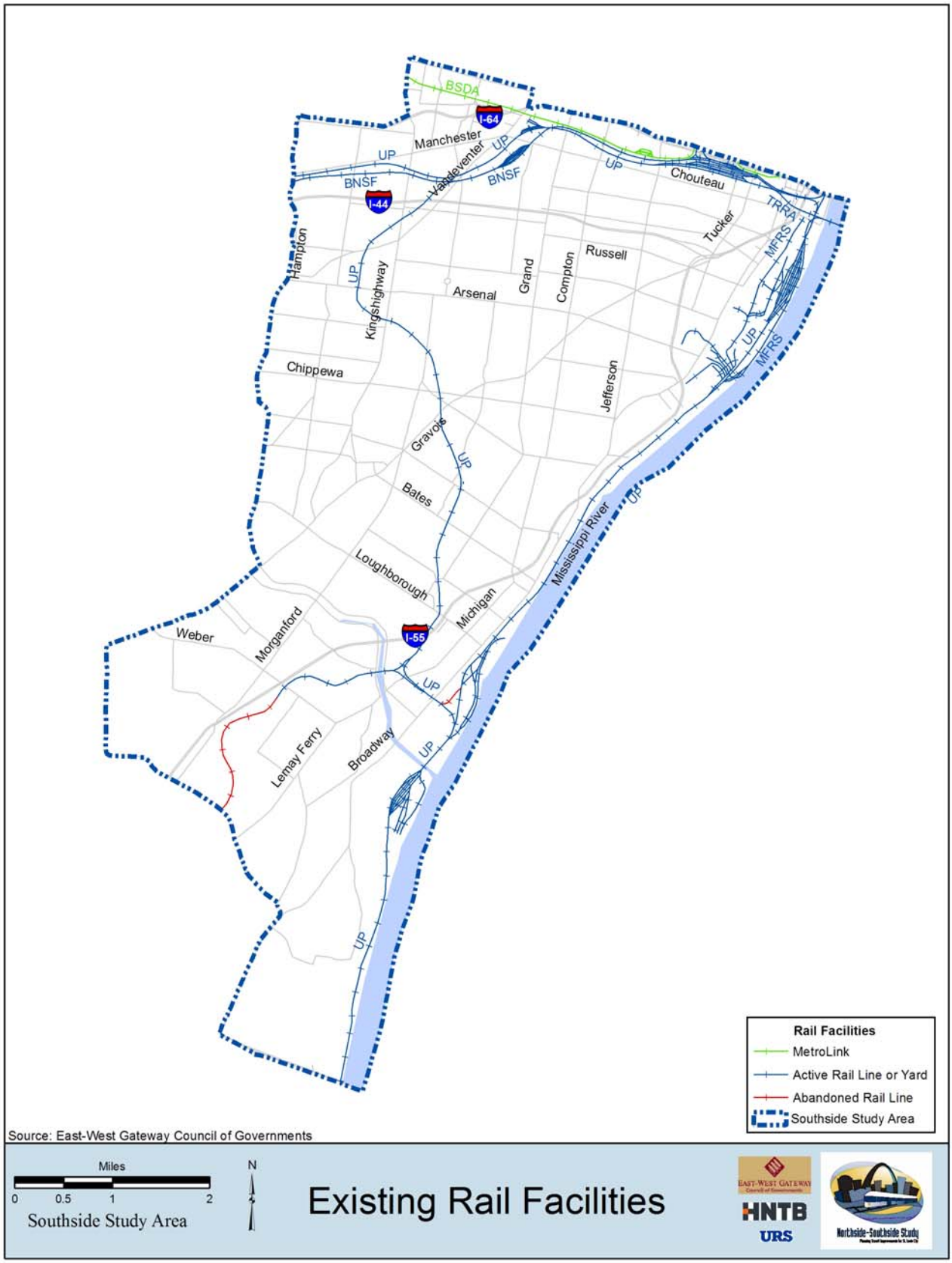
3.7.5 PORTS

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, wharves 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.

FIGURE 3.7-12: EXISTING RAIL FACILITIES



Public Involvement

Chapter 4.0

Northside-Southside Study

Planning Transit Improvements for St. Louis City

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.

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:

- Seeking 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. *See Appendix A for the e-mail contact database.*

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. *See 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. *See 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. *See 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. *See 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.

- 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.

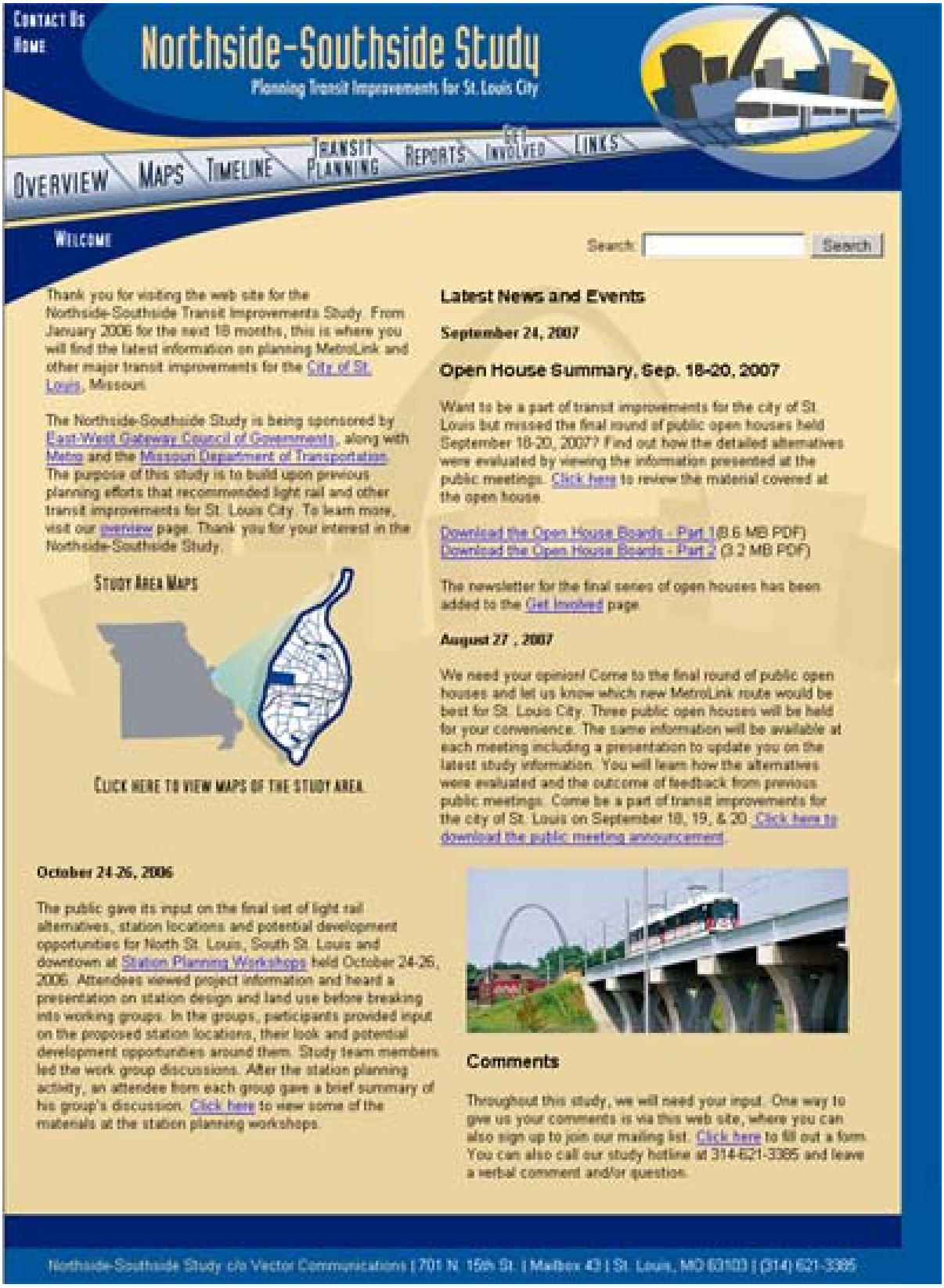
- The final newsletter presented the LPA recommended by the study team and adopted by the EWGCOG Board of Directors.

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: 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.

October 24-26, 2006

The public gave its input on the final set of light rail alternatives, station locations and potential development opportunities for North St. Louis, South St. Louis and downtown at Station Planning Workshops held October 24-26, 2006. Attendees viewed project information and heard a presentation on station design and land use before breaking into working groups. In the groups, participants provided input on the proposed station locations, their look and potential development opportunities around them. Study team members led the work group discussions. After the station planning activity, an attendee from each group gave a brief summary of his group's discussion. Click here to view some of the materials at the station planning workshops.

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 314-621-3385 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) 621-3385

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).

Southside 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.

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	• Light rail will enhance development. • Connect light rail to developments: o Greenways (Chouteau, Dr. King, Great Rivers, St. Vincent). o Loughborough Commons and bikeway. o St. Louis University. o Benton Park neighborhood. o Rehabbed multi-family homes along Natural Bridge . • Could negatively impact Northside small businesses and residences.
Street/Road Key Issues	• 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	• 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	• 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	• 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	• 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	• Medical complexes provide riders. • Southside has more prospective riders. • MRB toll will increase MetroLink riders.
Other Comments	• 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: o Study and City's land use plan and development. o Study and downtown traffic study. o EWGCOG and Metro.

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. *See 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 seek 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. *See 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 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. *See 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 LPA. *See 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 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. *See 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 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 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.

- 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 seems 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. *See 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).

- **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 seen 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

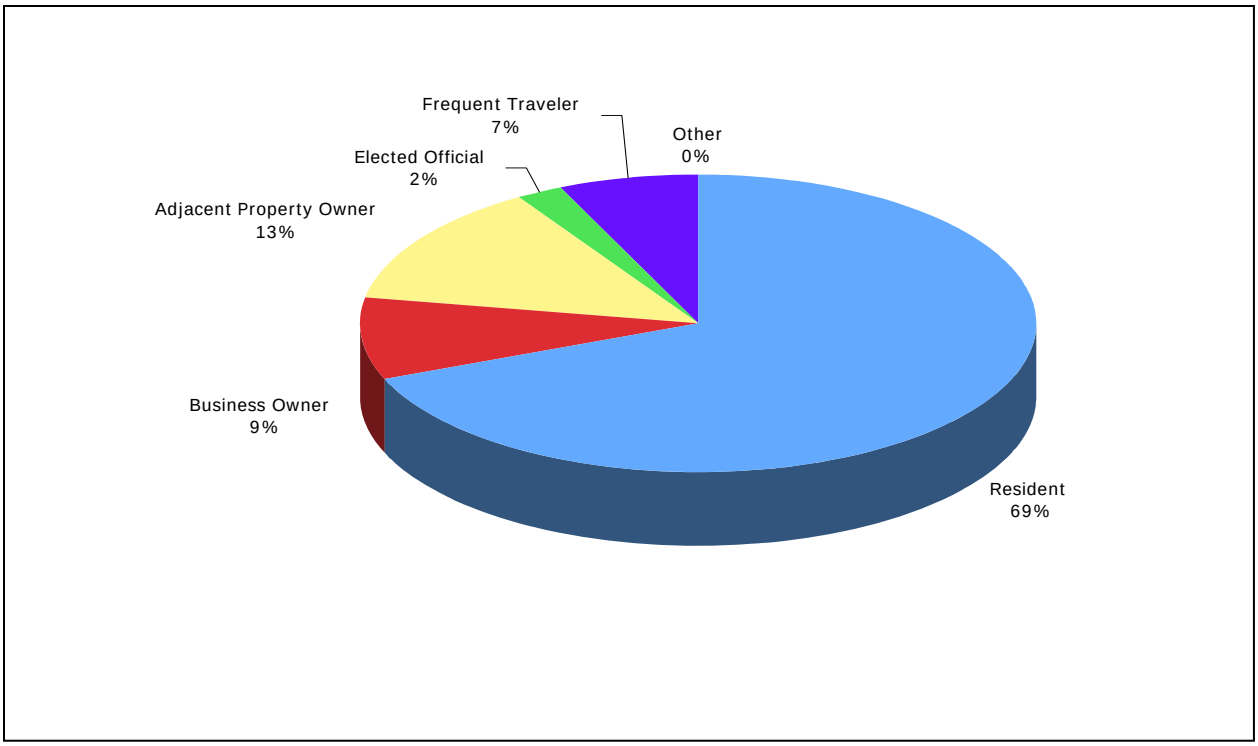


FIGURE 4.2-3: MEETING NOTIFICATION

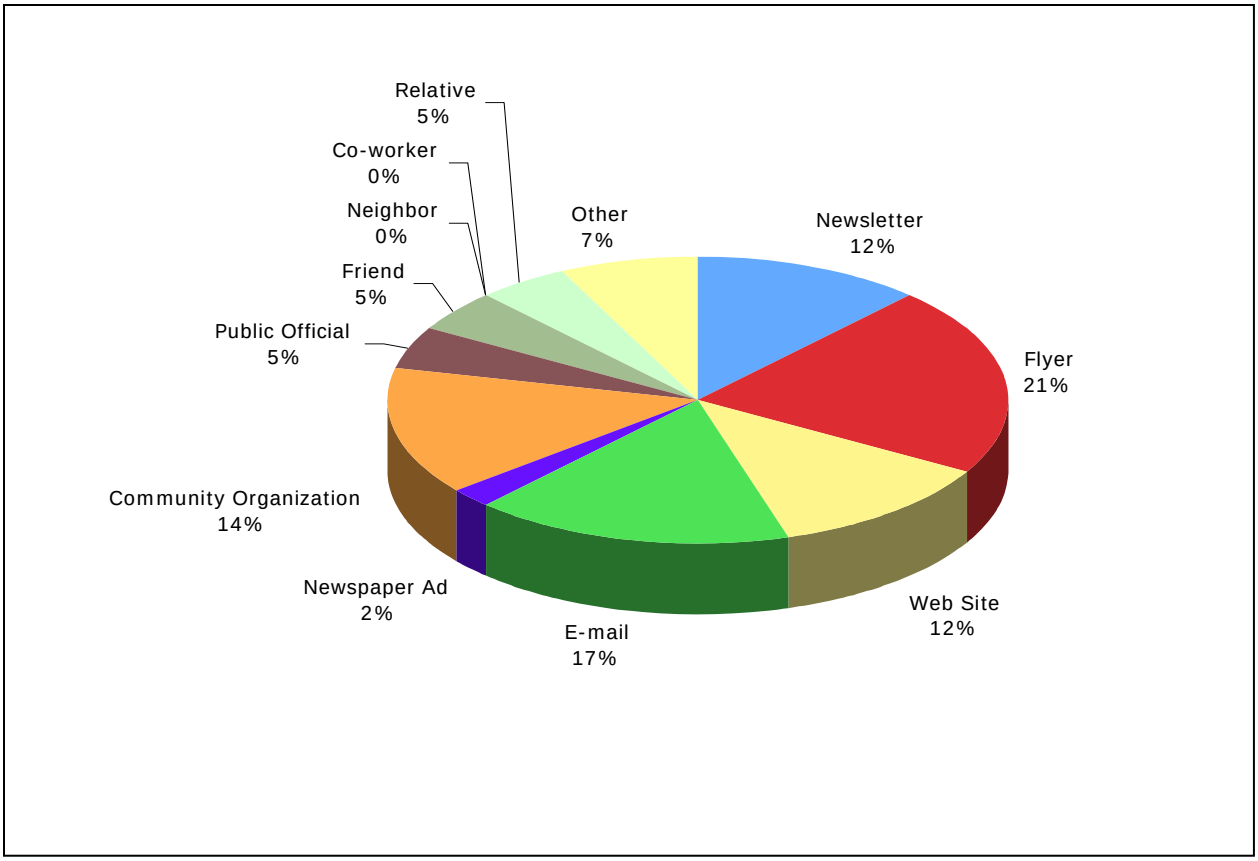


FIGURE 4.2-4: MEETING INFORMATION

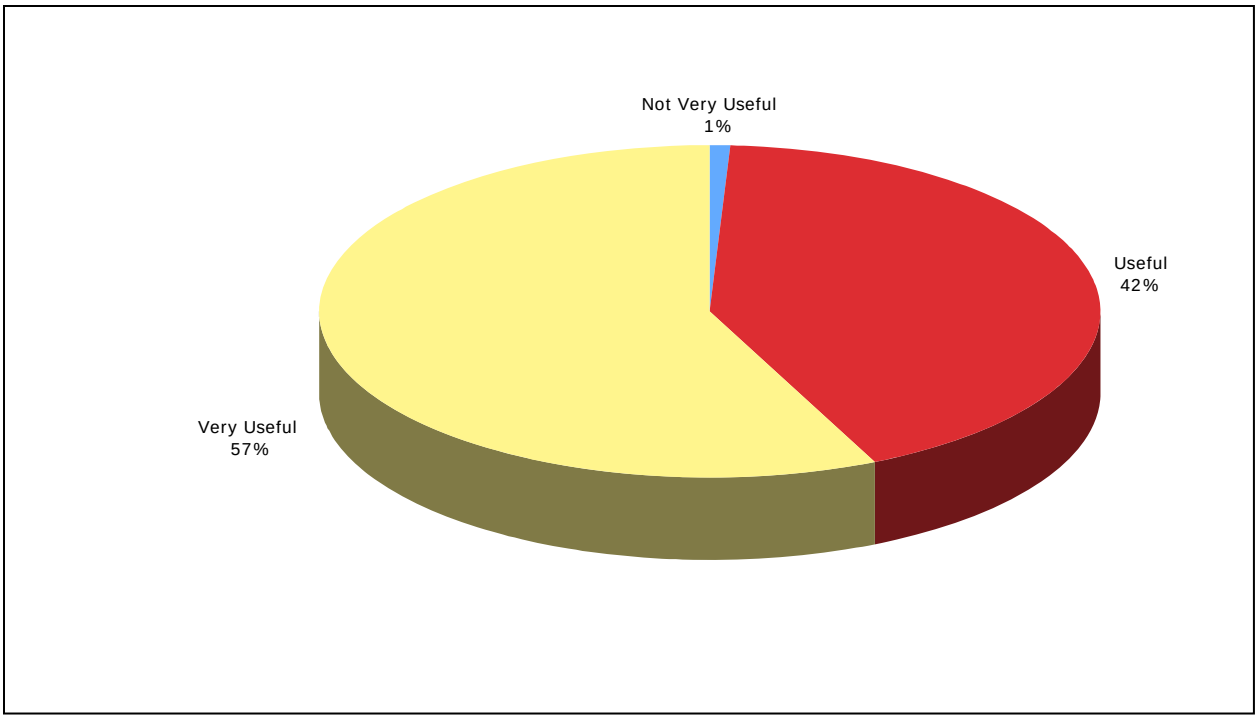


FIGURE 4.2-5: STUDY TEAM HELPFULNESS

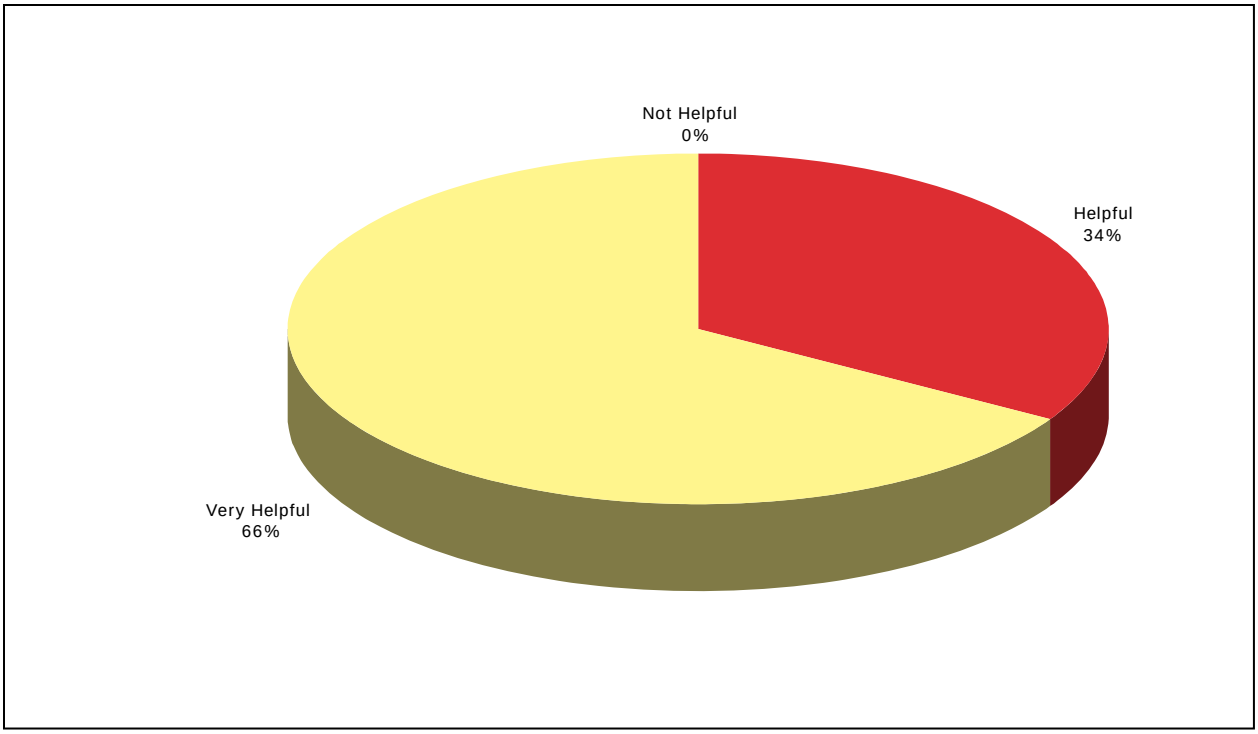


FIGURE 4.2-6: WORKSHOP ORGANIZATION

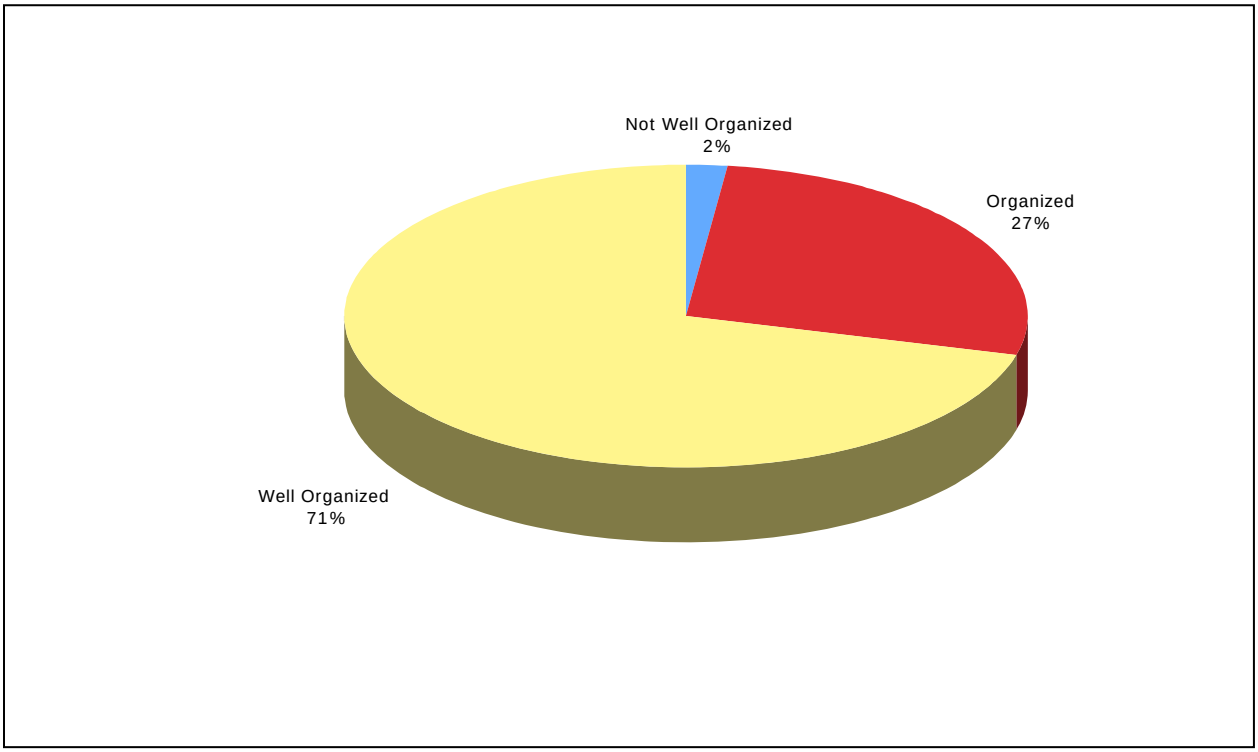
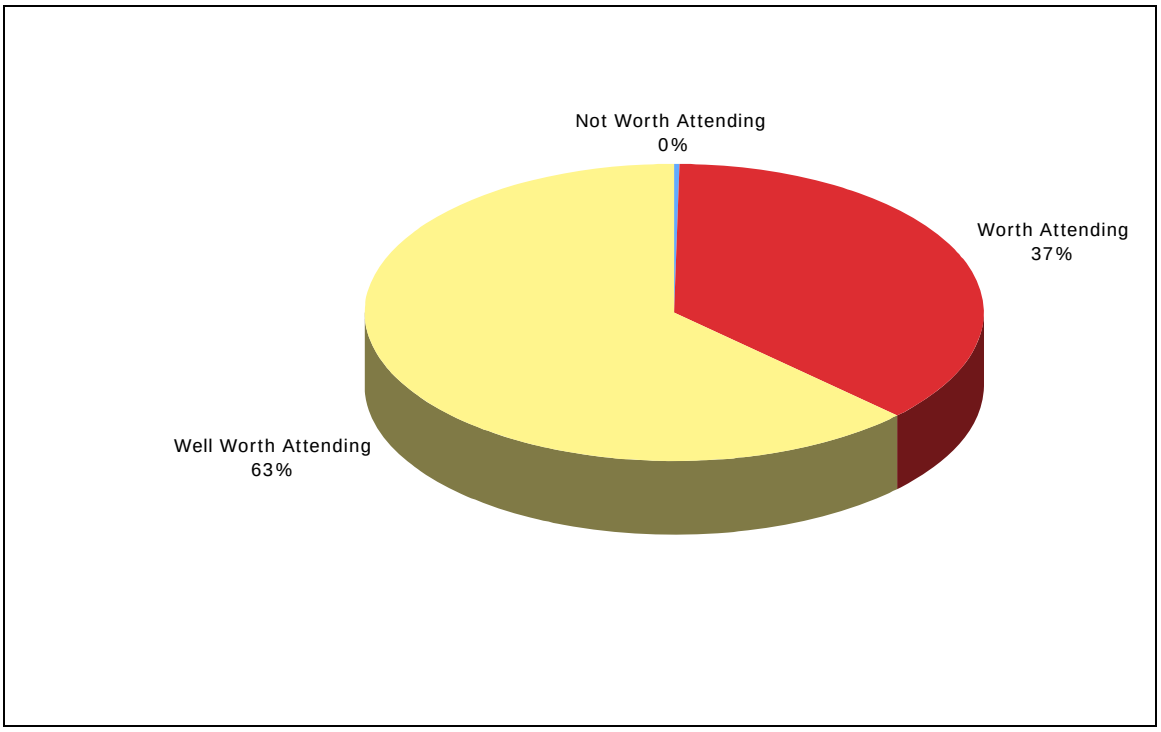


FIGURE 4.2-7: WORKSHOP WORTH



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 see 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.

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.

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-Southside Study

Planning Transit Improvements for St. Louis City

Chapter 5.1: Introduction

This chapter describes processes leading to the selection of the initial sets of alternatives – for the Southside 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 Southside 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 Southside MTIA that recommended LPAs 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 alternative screening considered numerous criteria; major differentiators included rider ship potential, development impacts (both existing and potential), and right-of-way impacts. The potential for integration of the various alternatives with the Metro Bus 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 the alternative 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*.

Chapter 5.2: Development and Screening

This section provides relevant policy review and corridor analysis. Southside 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.)

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.

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 study area for the Southside MTIA is shown in Figure 5.2-2. (Note that this area is considerably larger than that in the current Northside-Southside study. See discussion below.) The *Purpose and Need* statement for the Southside MTIA consists of the following elements:

- Provide Direct Access to Jobs: Need to serve the commute trip from home to work within the study area.

- Preserve Neighborhoods: Use of new transportation infrastructure to maintain and/or enhance the quality of life in communities and neighborhoods.
- Promote Economic Opportunities: Use of new transportation infrastructure as a catalyst for new development in areas of declining employment.
- Relieve Congestion: Improve mobility on major arterials and roadways experiencing high levels of traffic congestion.
- Minimize Traffic Impacts: Mitigate secondary travel impacts on local city streets due to high traffic demand from South County to downtown St. Louis and from South County to Clayton and other destinations.

A preliminary set of alternatives was developed for initial evaluation. These included a TSM option, six LRT alternatives, a BRT alternative, a high-occupancy vehicle lane (HOV) alternative and two roadway options.

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.

That process resulted in the selection of six alternatives for more detailed evaluation: No Build, TSM, two LRT alternatives (Figures 5.2-3 and 5.2-4), a BRT alternative (Figure 5.2-5), and a roadway alternative.

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 process resulted in the selection of LRT Alternative 3 and BRT Alternative 5 as LPAs, a recommendation 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 Southside Study. (Since Southside LPAs were carried into the Southside Study, they are described in detail in the discussion below of initial alternatives for this study. Note that the downtown LPA and alternatives are discussed in the Northside 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; its path and connection to the Southside LRT LPA is depicted in Figure 5.2-6.

FIGURE 5.2-1: LONG-RANGE RAIL TRANSIT PLAN

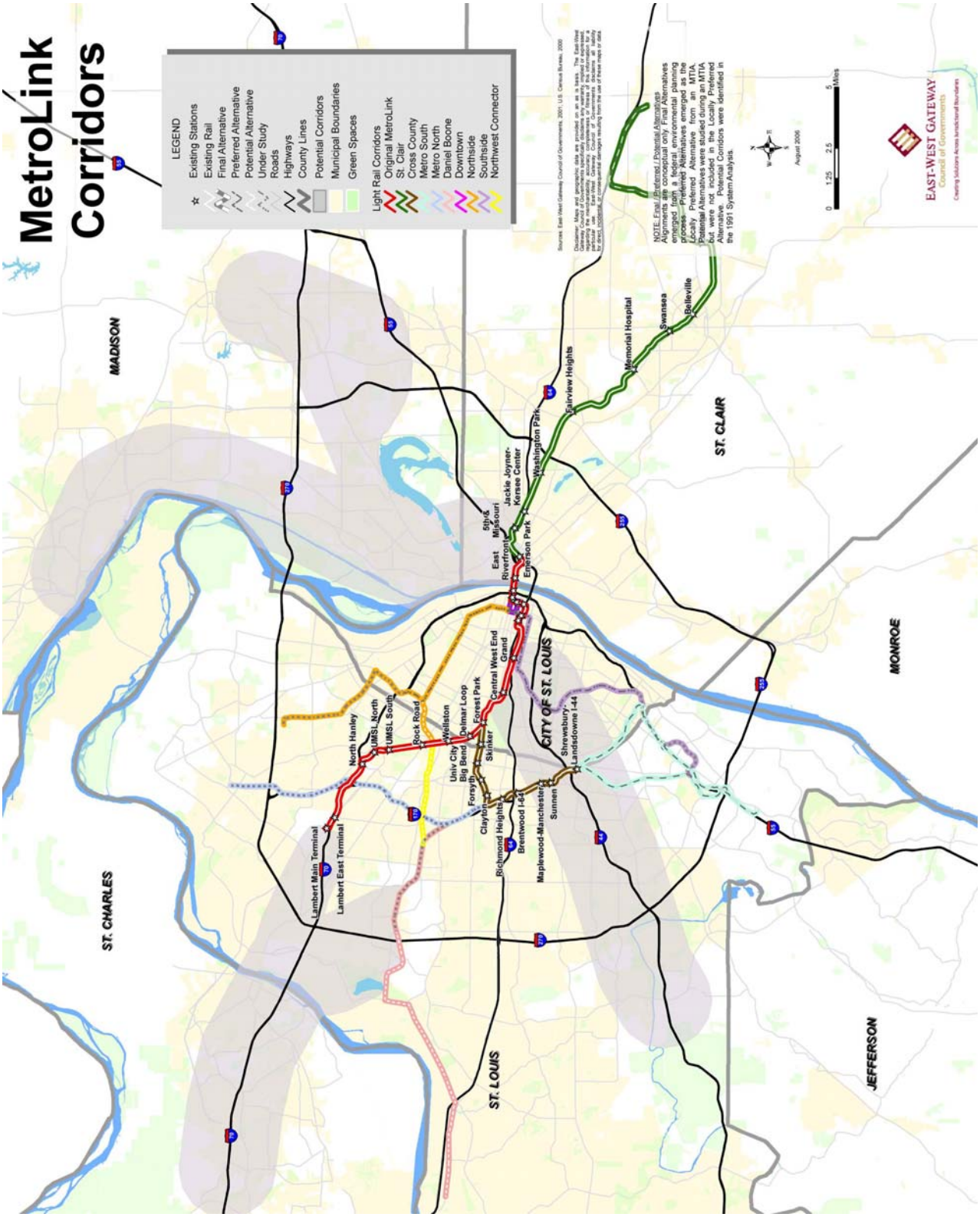
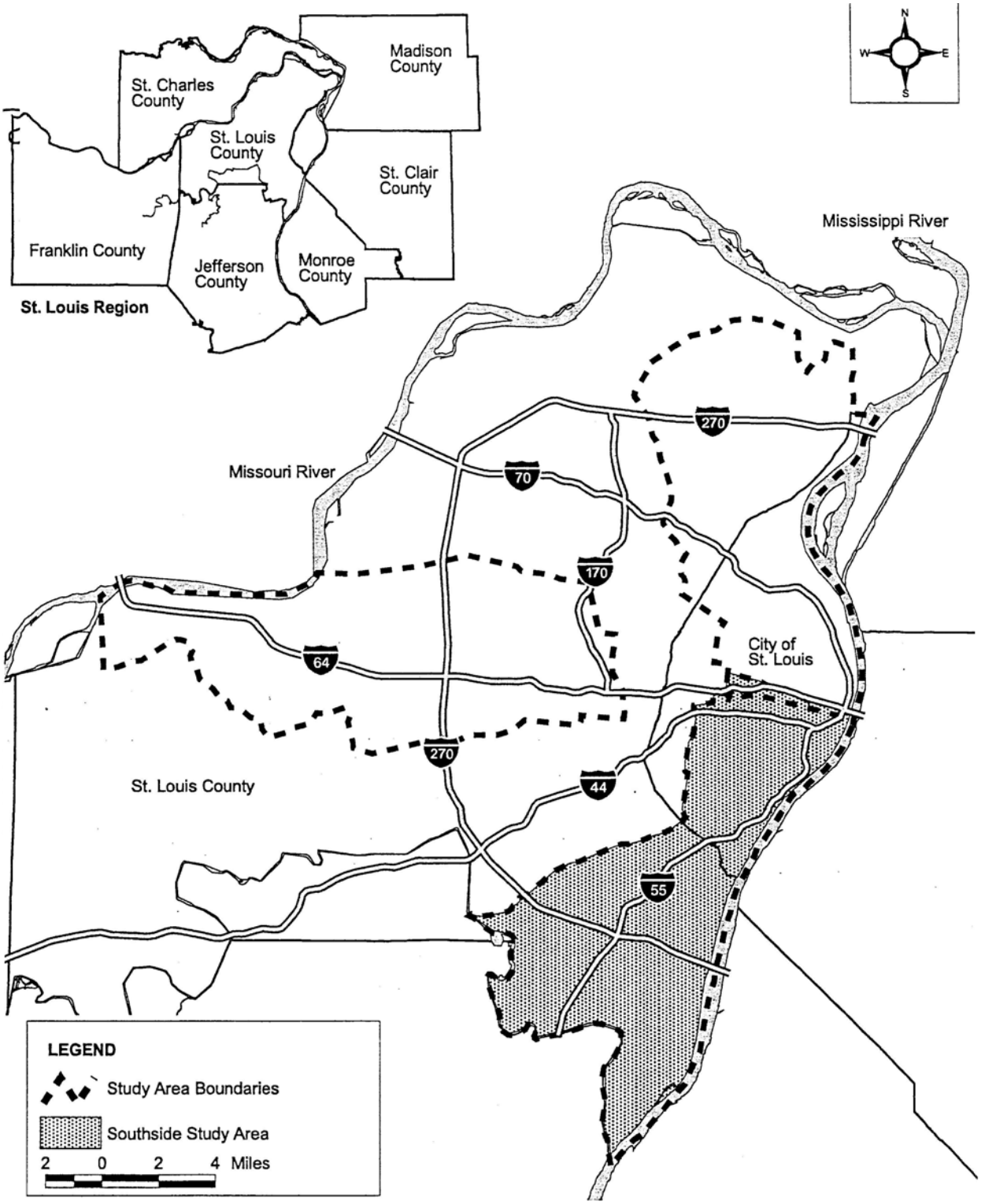
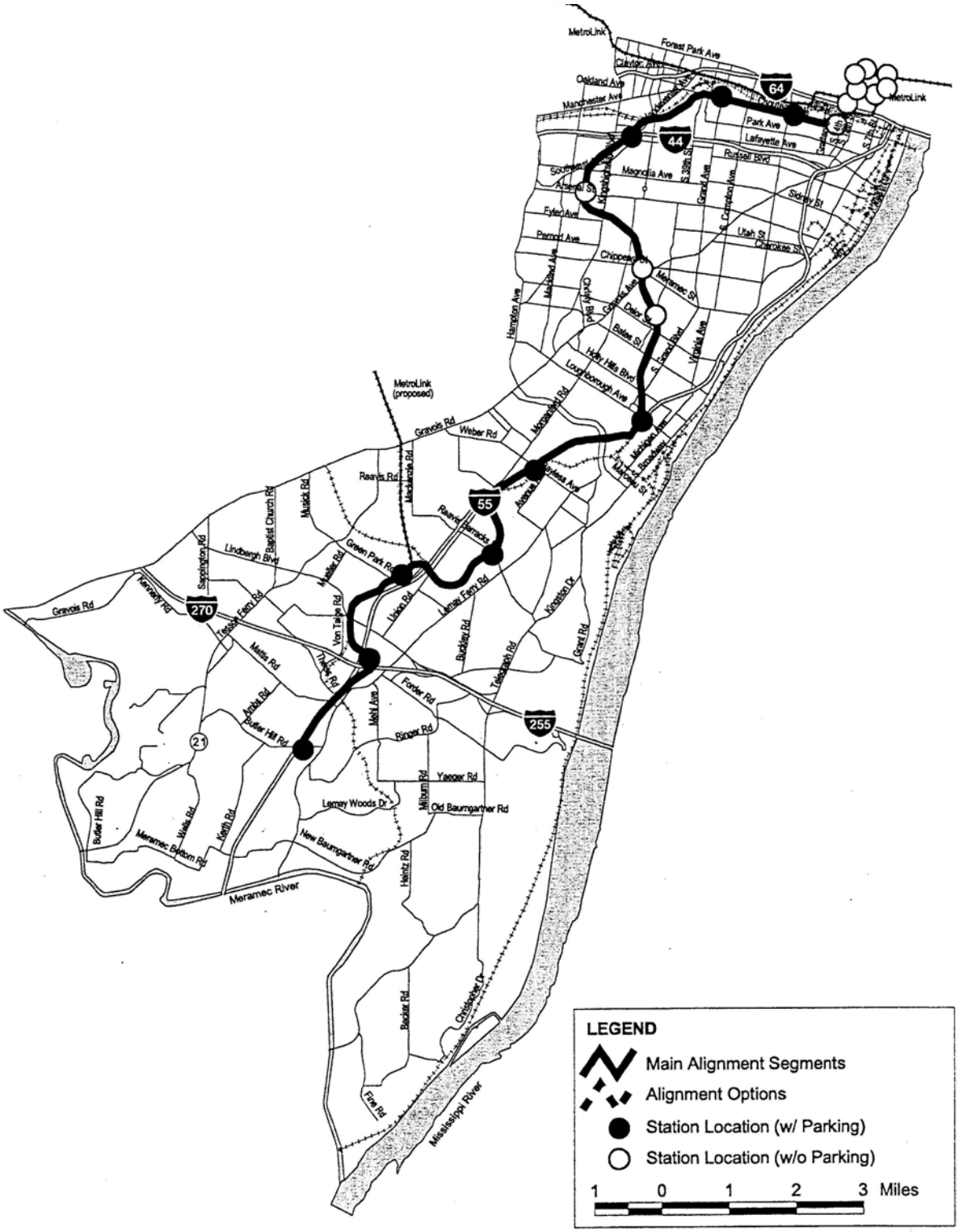


FIGURE 5.2-2: SOUTHSIDE MTIA STUDY AREA (2000)



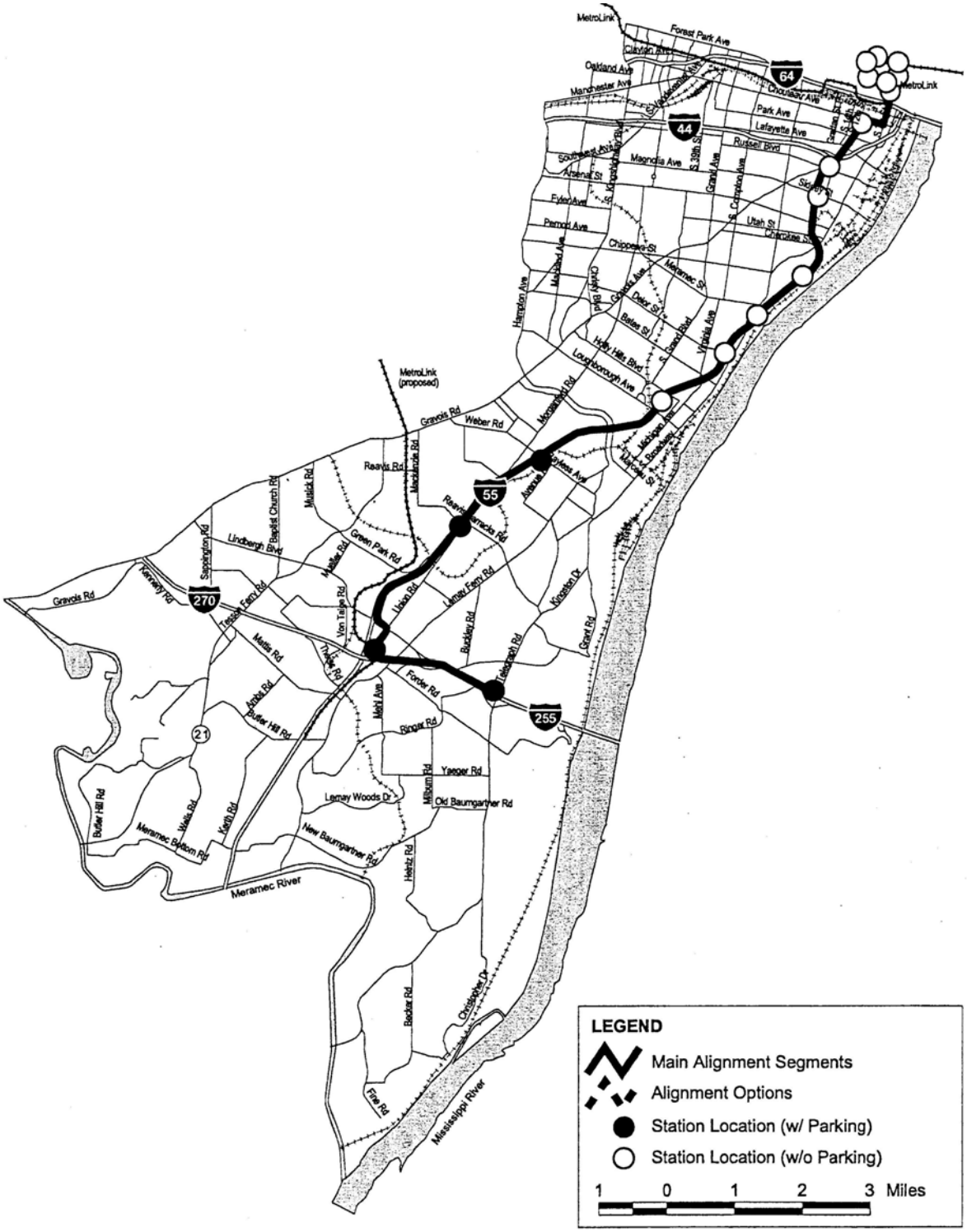
Source: Parsons Brinckerhoff Quade & Douglas, Inc., June 2000.

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



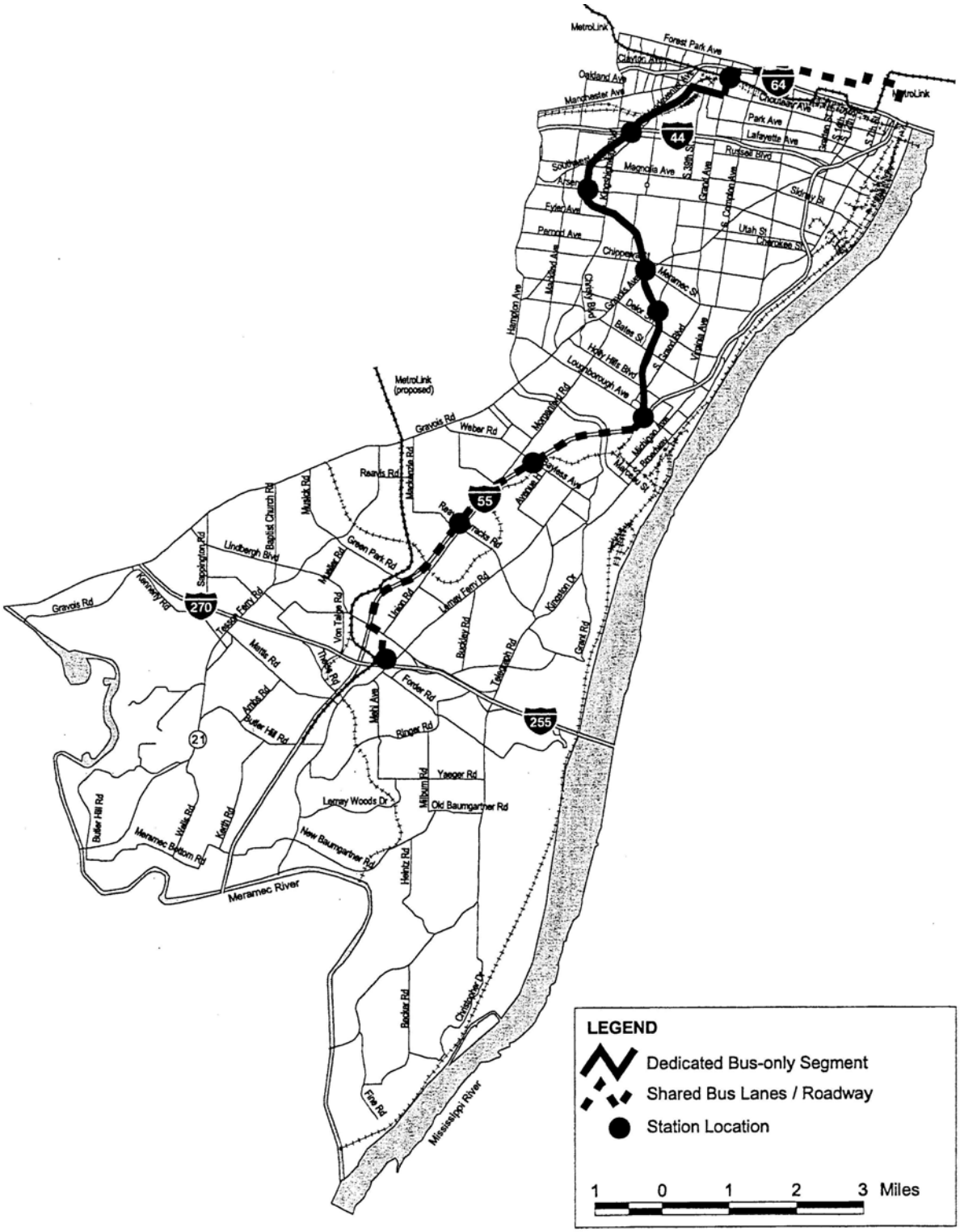
Source: Parsons Brinckerhoff Quade & Douglas, Inc., June 2000

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



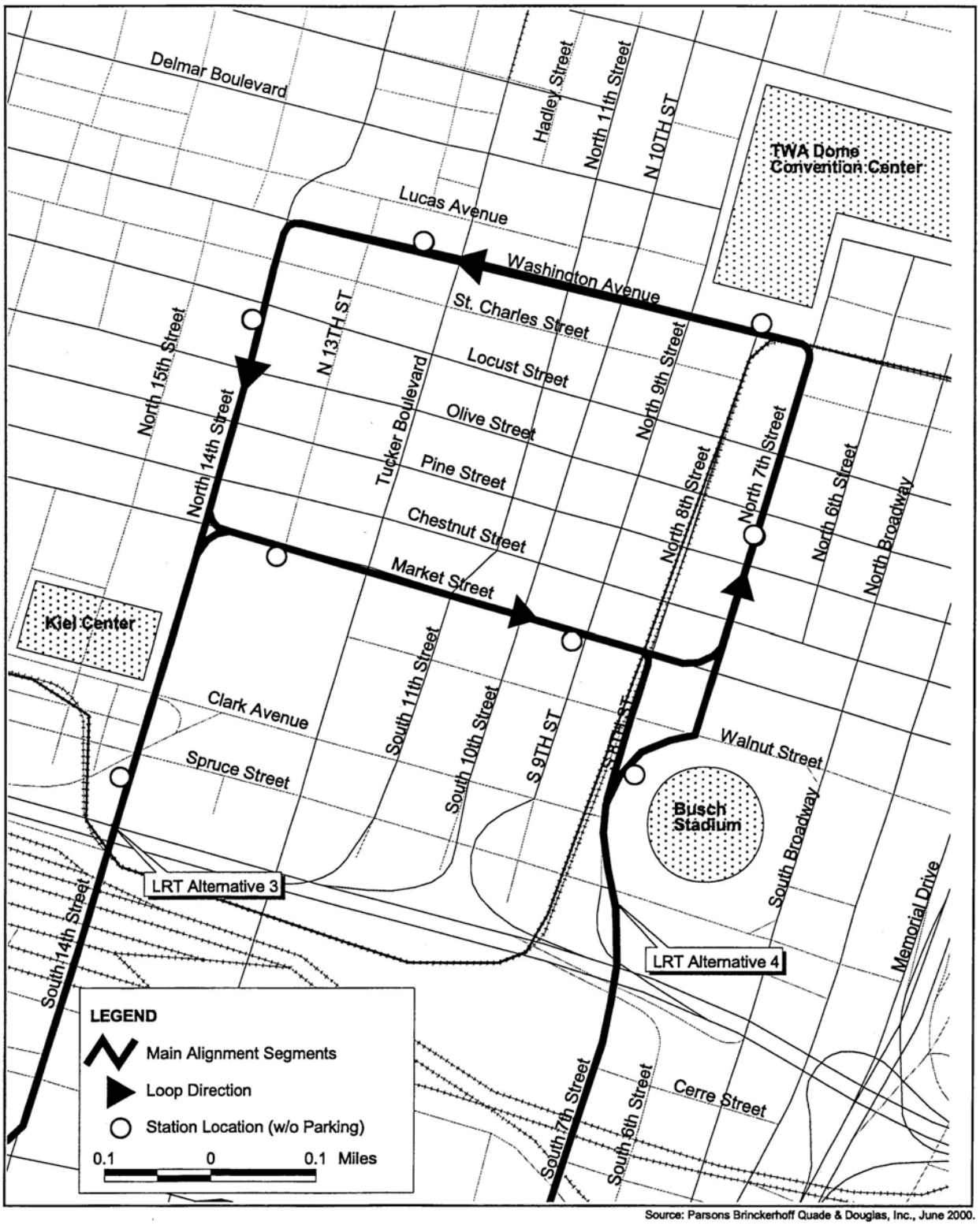
Source: Parsons Brinckerhoff Quade & Douglas, Inc., June 2000.

FIGURE 5.2-5: SOUTHSIDE MTIA BRT ALTERNATIVE (2000)



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

FIGURE 5.2-6: DOWNTOWN MTIA LRT LOOP (2000)



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

5.2.3 SOUTHSIDE ALTERNATIVES

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 Southside MOS terminates at a park-and-ride lot near Interstate-55 and 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 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 Interstate-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 Interstate-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 Interstate-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 Southside study area is reflected in Figure 5.2-7, 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 5.2-8 reflects the concentrated area for the Southside MOS, called the "Southside Study Area."

FIGURE 5.2-7: SOUTHSIDE STUDY AREA W/LPA (2000)

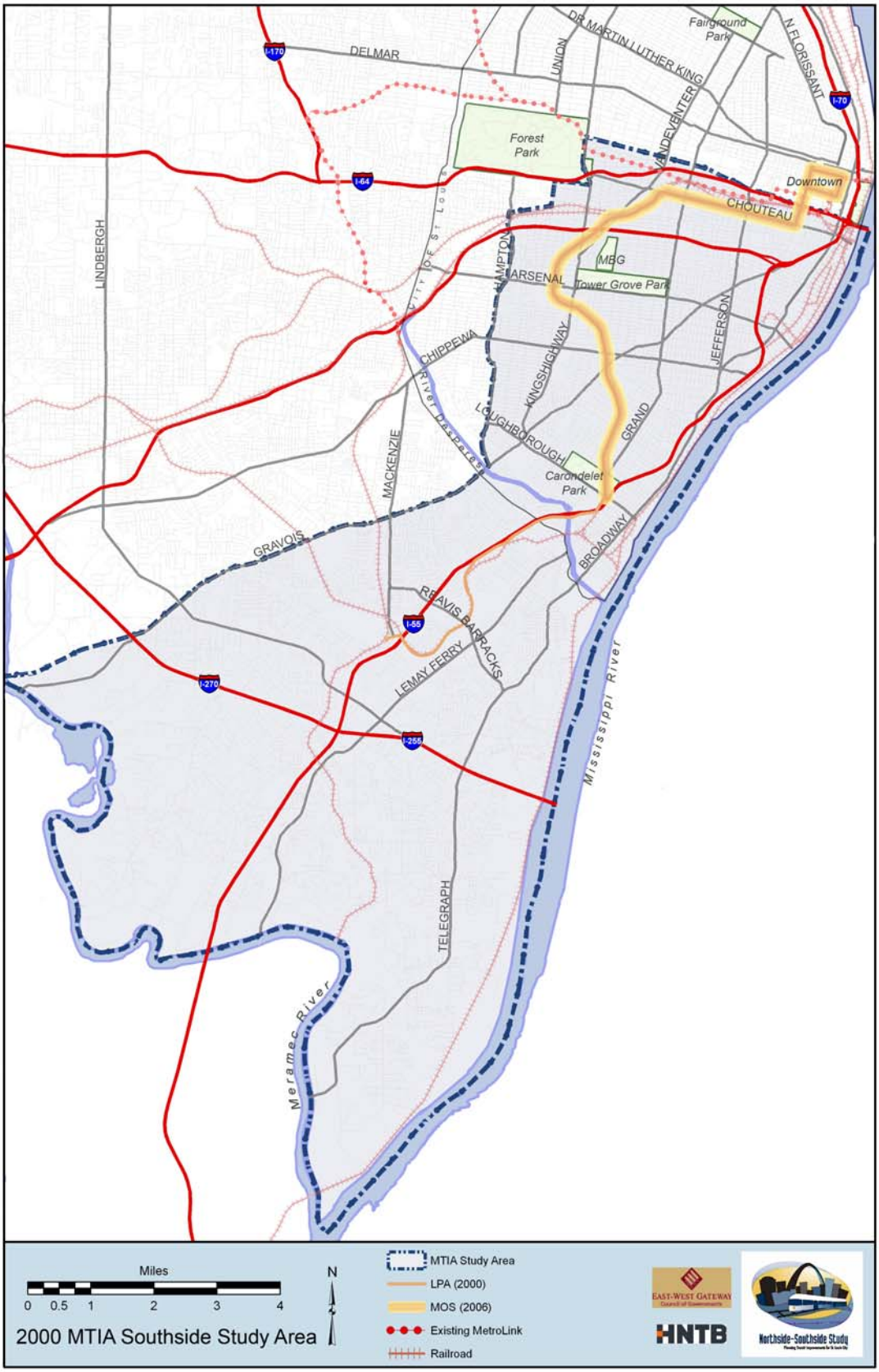
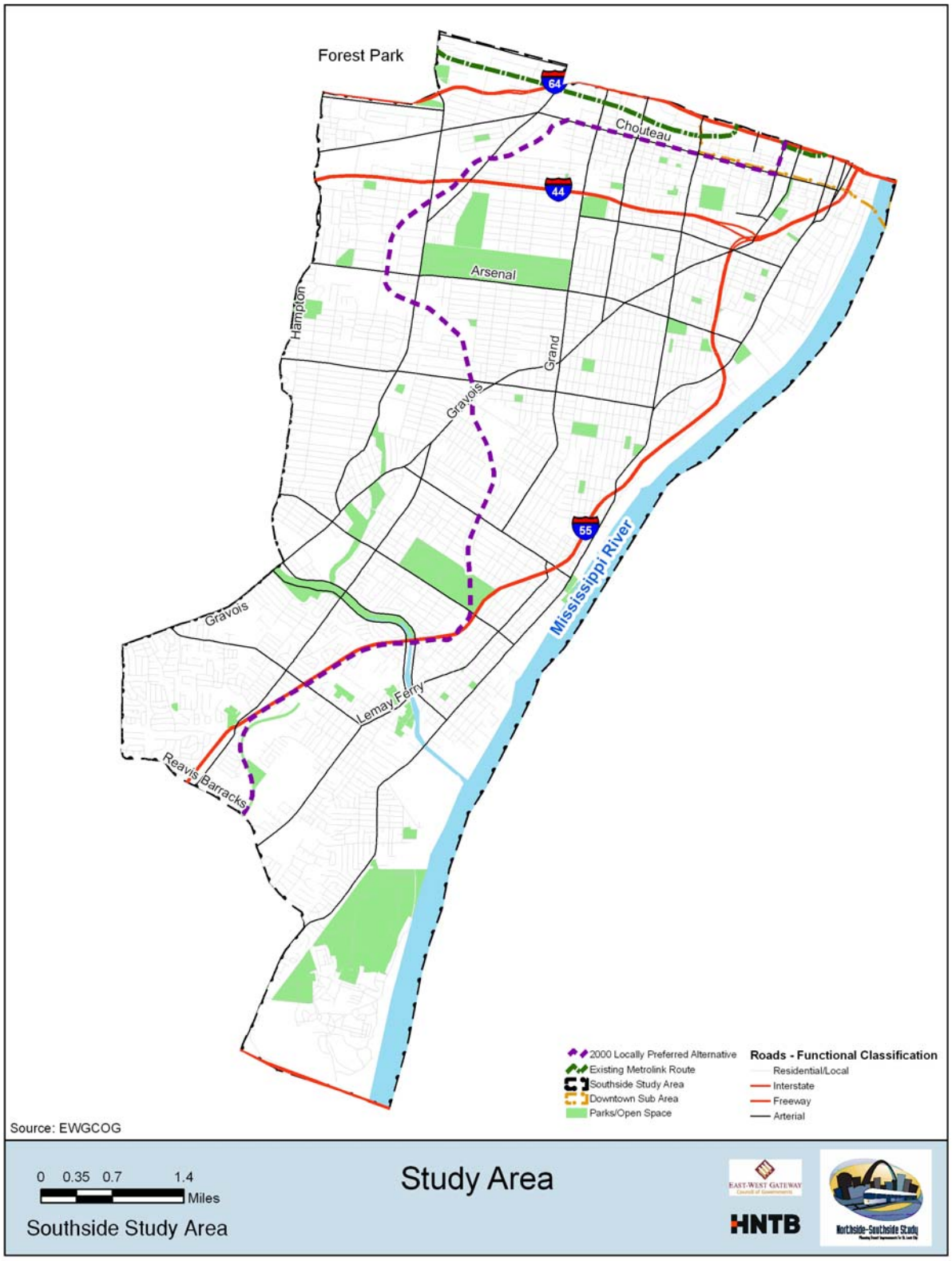


FIGURE 5.2-8: SOUTHSIDE STUDY AREA, REVISED (2005)



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 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 the 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.

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-n-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.
- Wherever possible, maintain existing automobile and pedestrian circulation patterns to reduce conflicts between transit and automobiles and pedestrians.

Goal: Improve Access to Opportunity for Southside 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.

Finally, an evaluation framework was developed that included the Federal Transit Administration's (FTA's) 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 Southside MTIA concluded with the selection of two LPAs, which served as the starting point for alternative definition and evaluation for the Northside/Southside study. One was an LRT, the Chouteau/Union Pacific Railroad alternative (Figure 5.2-9), that included street-running rail leaving downtown and crossing the Mill Creek Valley on South 14th Street and turning west on Chouteau Avenue. At a point west of Grand Avenue the alternative joined the Union Pacific Railroad (UPRR) right-of-way from that point south to Loughborough just south of Carondelet Park, from which point it used the I-55 right-of-way south to Butler Hill Road. (Note that the option shares the UPRR right-of-way, but not tracks.) As discussed above, for this study the study area was reduced and the LRT alternative was initially truncated, with a southern terminus at a park-and-ride at Loughborough.

The second MTIA LPA was a BRT line (Figure 5.2-10) that ran west from downtown St. Louis on Market Street and Forest Park Avenue, turning south and crossing Mill Creek Valley on Grand Avenue. After turning west on Chouteau Avenue, the option accessed the UPRR right-of-way on which a busway, a two-lane roadway for the use of buses only, would be constructed. The busway ends at Loughborough/I-55 where buses would join I-55, terminating at Butler Hill Road. As was the case with the LRT LPA, for purposes of this study the alternative was initially truncated at Loughborough.

The study team then decided to add two LRT alternatives to the analysis and to locate the southern terminus of all alternatives at a park-and-ride at Bayless Avenue and I-55, the terminus decision reflecting the lack of an adequate park-and-ride site at Loughborough.

The first added LRT, the Gravois alternative (Figure 5.2-11), leaves downtown on Tucker Boulevard south to Gravois Avenue. It runs in a reserved right-of-way in the center of Tucker southwest to the UPRR from which point it shares the right-of-way south to Loughborough. From there it shares the I-55 right-way to Bayless. This alternative was added because of the route's directness, physical capacity in the Gravois right-of-way and development potential along that street.

The second added LRT, the Grand alternative (Figure 5.2-12), follows the MTIA LPA alignment from downtown to the intersection of Chouteau and Grand. At that point it turns south on Grand until the intersection with Gravois, where it runs southwest along Gravois to the UPRR right-of way. From there, the alignment is identical to the Chouteau/Union Pacific Railroad LRT outlined above. This alternative was added because of existing transit-supportive development and additional development potential on Grand. Although the team's initial assessment indicated that the Grand alternative did exhibit very strong development potential and moderately high ridership potential, the constrained Grand right-of-way south of Arsenal Street would lead to serious impacts on traffic flow and on adjacent properties. For these reasons this alternative was screened out of the study.

Partly as a result of that decision a new alternative that shared Grand's development and ridership benefits, but without the negative traffic and property impacts, was developed. This LRT, the Jefferson alternative (Figure 5.2-13), leaves downtown on South 14th Street, heads west on Chouteau and south on Jefferson Avenue. It continues on Jefferson, south on

Broadway to I-55. Then it shares the I-55 right-of-way to the terminus at the Bayless park-and-ride.

As was the case on the Northside, preliminary assessment of the alternatives focused on major strengths and weaknesses, or differentiators, of each. These are listed below. This analysis resulted in a decision to carry both modified LPAs (LRT and BRT) as well as the Jefferson LRT alternative into detailed definition and evaluation in the next phase of the study. The Gravois/UPRR alignment was eliminated from further analysis because of major traffic and LRT operations impacts, especially at the numerous complex intersections along Gravois, and because of its lower development potential (particularly compared with Jefferson) resulting from the corridor's automobile orientation and high supporting investment requirements. The Grand/Chouteau/UPRR alignment was eliminated primarily because of the major traffic, parking, sidewalk, and LRT operations impact resulting from the very constrained right-of-way on Grand south of Arsenal. In addition, those constraints had the potential for negative impact on adjacent property. Each alignment is described in more detail below.

Chouteau/UPRR

- Separate right-of-way on UP improves travel times.
- Serves development along Chouteau.
- Existing development along UP less transit-supportive.
- UPRR right-of-way requirement (50-foot horizontal clearance) could require significant property takings.
- May be most negatively affected by UPRR spurs.
- Moderate development opportunity.
- Moderate ridership potential.
- No serious right-of-way constraints.

Gravois/UPRR

- Strong transit-dependent markets.
- More direct end-to-end access than Chouteau/Grand, Chouteau/UP options.
- Strong auto-oriented existing development, less transit-supportive.
- Potential major traffic impacts, especially at complex intersections.
- Serves development opportunities along Chouteau.
- May be impacted by UP right-of-way requirements (50-foot horizontal clearance).
- Moderate development opportunity, but would require major ancillary investment.
- Moderate ridership potential.
- No serious right-of-way impacts.

Grand/Chouteau/UPRR

- Existing development strongly transit-oriented along Grand.
- Serves development along Chouteau.
- Serves major Southside employment concentration, hospital complex on Grand.
- Potential major traffic, parking, sidewalk, transit-speed impacts south of Arsenal.
- Potential strong political opposition.
- May be impacted by UP right-of-way requirements.
- Moderate/high development potential.
- Moderate ridership potential.
- Potentially serious right-of-way impacts through Grand South Grand.

Jefferson/I-55

- Existing development strongly transit-supportive.
- Potential for major transit-supportive development projects.
- Strong transit-dependent markets.
- Serves development along Chouteau.
- Most direct end-to-end access.
- High speed along I-55 improves travel times, attractiveness for extension.
- No use of UP right-of-way.
- Moderate/high development potential.
- Moderate ridership potential.
- No serious right-of-way constraints.
- Preferred alternative of City of St. Louis administration.
- Preferred alternative of senior Metro staff.

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 both modified LPAs (LRT and BRT) as well as the Jefferson LRT alternative into detailed definition and evaluation in the next phase of the study. (More detailed definitions of these alternatives are included below in the discussion of the final set of alternatives.) The Gravois/UPRR alignment was eliminated from further analysis because of major traffic and LRT operations impacts, especially at the numerous complex intersections along Gravois, and because of its lower development potential (particularly compared with Jefferson) resulting from the corridor's automobile orientation and high supporting investment requirements. The Grand/Chouteau/UPRR alignment was eliminated primarily because of major traffic, parking, sidewalk and LRT operations impacts resulting from the very constrained right-of-way on Grand south of Arsenal. In addition, those constraints had the potential for negative impact on adjacent property. Each alignment is described in more detail below.

TABLE 5.2-1: EVALUATION FRAMEWORK

FTA Evaluation Framework	*Legacy 2030* Focus Areas	Northside/Southside Goals	Northside/Southside Objectives	Evaluation Criteria
Effectiveness	• Access to Opportunity. • Preserve Existing Infrastructure. • Sustainable Development. • Safety and Security.	• Improve transportation service for all populations. • Sustain existing neighborhoods. • Enhance neighborhoods and foster sustainable development.	• 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.	Major travel markets. Employment, population concentrations. Sustainable development opportunities. Transportation system connectivity and multi-modal interface. Physical feasibility.

FTA Evaluation Framework	*Legacy 2030* Focus Areas	Northside/Southside Goals	Northside/Southside Objectives	Evaluation Criteria
			• Maintain existing automobile and pedestrian circulation patterns. • Enhance neighborhood safety through transit-oriented development that promotes pedestrian activity for more "eyes on the street."	
Economic, Environmental & Local policy impacts	• Access to Opportunity. • Preserve Existing Infrastructure. • Sustainable Development.	• Improve transportation service for all populations. • Sustain existing neighborhoods. • Enhance neighborhoods and foster sustainable development.	• 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.	Major travel markets. Employment, population concentrations. Sustainable development opportunities. Right-of-way impacts. Parking impacts. Traffic impacts. Environmental impacts.
Cost Effectiveness		• Develop a cost-effective transportation system improvement.	• Achieve public consensus and institutional support. • Encourage strong local policies that foster TOD and enhance quality of life.	Capital Costs.
Financial Feasibility		• Develop a cost-effective transportation system improvement.	• Achieve public consensus and institutional support. • Encourage strong local policies that foster TOD and enhance quality of life.	Capital Costs.
Equity	• Access to Opportunity. • Sustainable Development. • Safety and Security.	• Improve transportation service for all populations. • Sustain existing neighborhoods. • Enhance neighborhoods and foster sustainable development.	• 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.	Major travel markets. Transportation system connectivity and multi-modal interface. Transit-dependent population. Sustainable development opportunities. Physical feasibility.

FIGURE 5.2-9: SOUTHSIDE, CHOUTEAU/UPRR ALTERNATIVE

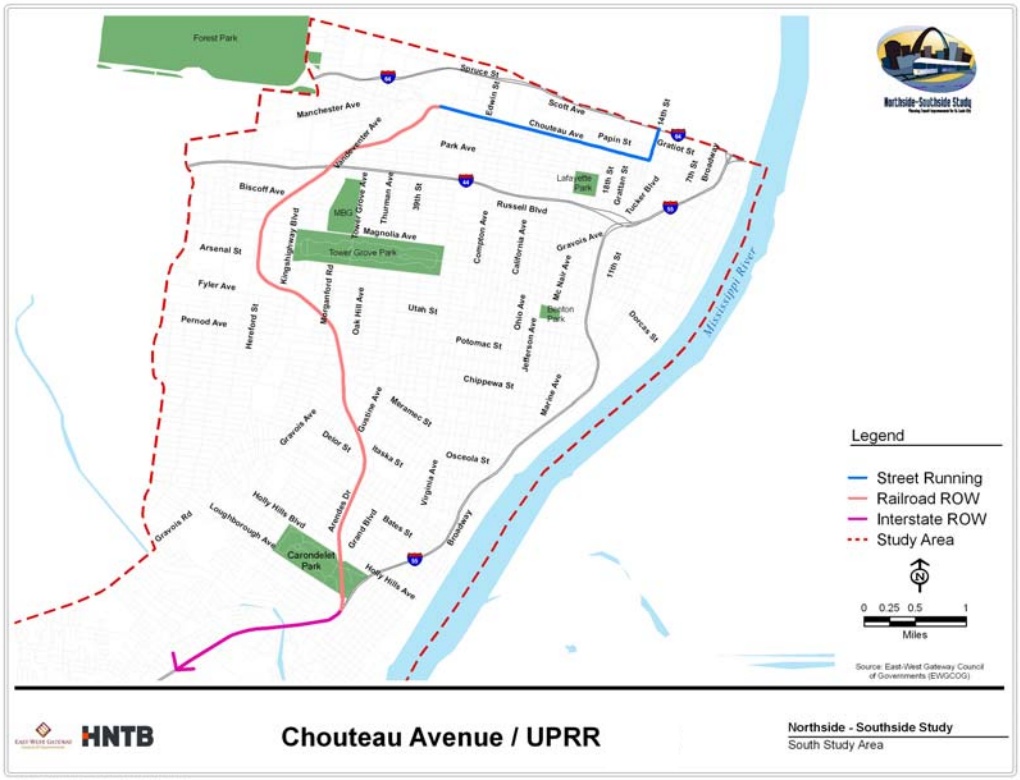


FIGURE 5.2-10: SOUTHSIDE, BRT ALTERNATIVE

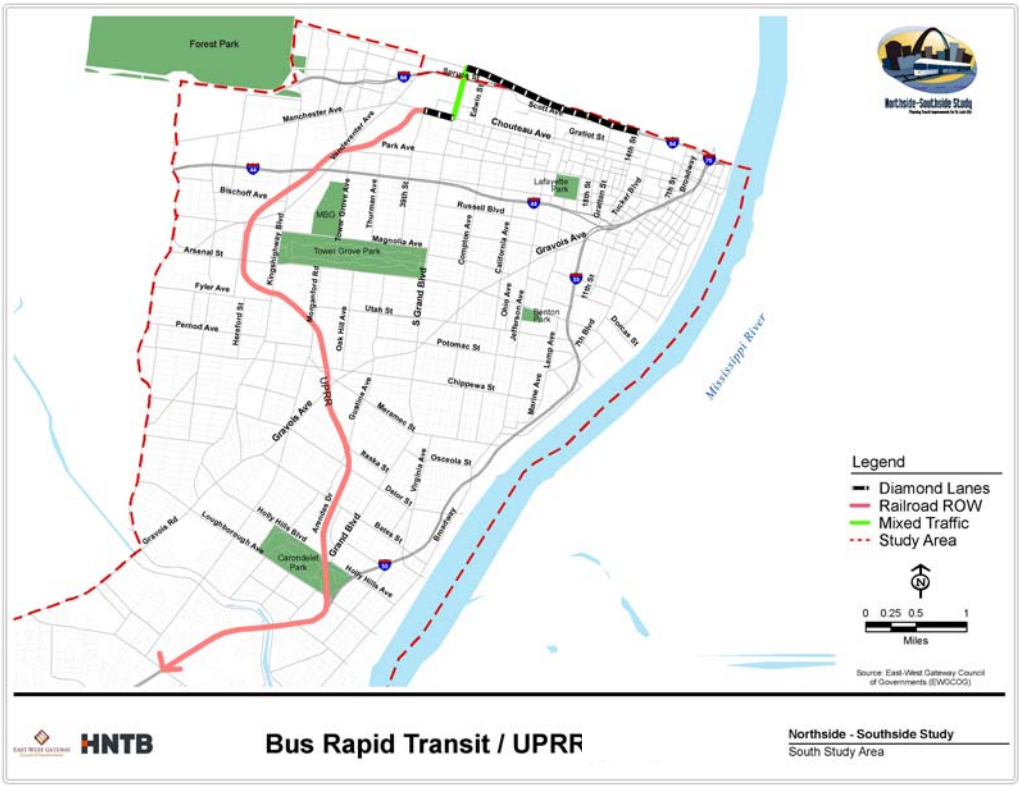


FIGURE 5.2-11: SOUTHSIDE, GRAVOIS ALTERNATIVE

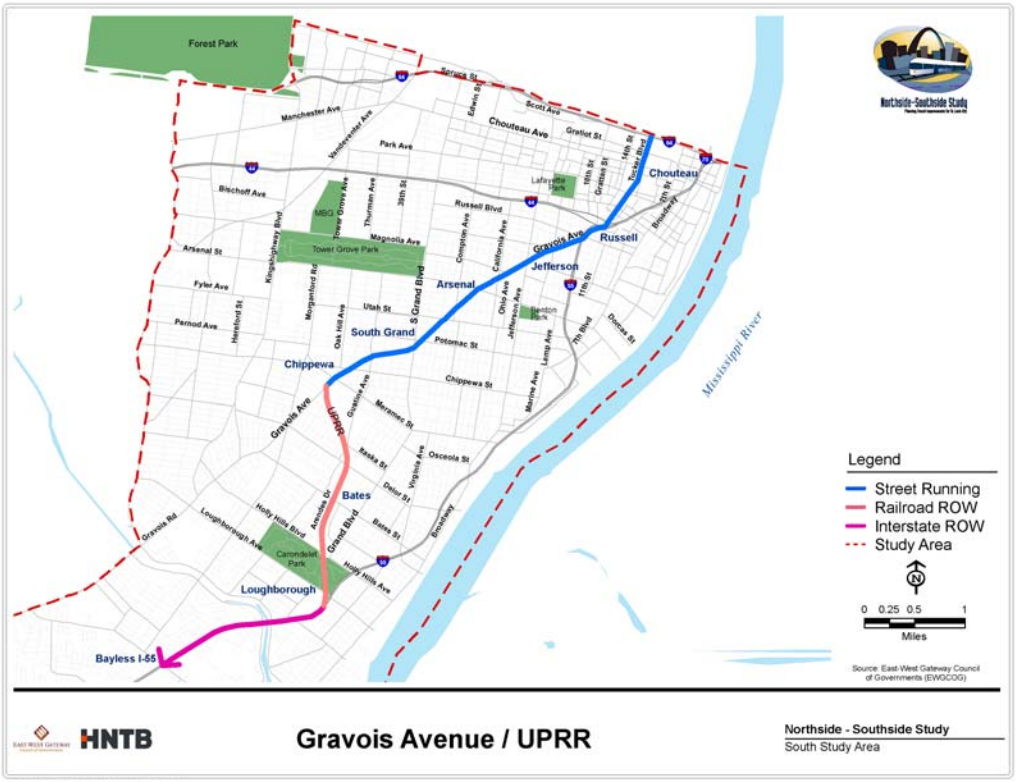


FIGURE 5.2-12: SOUTHSIDE, GRAND ALTERNATIVE

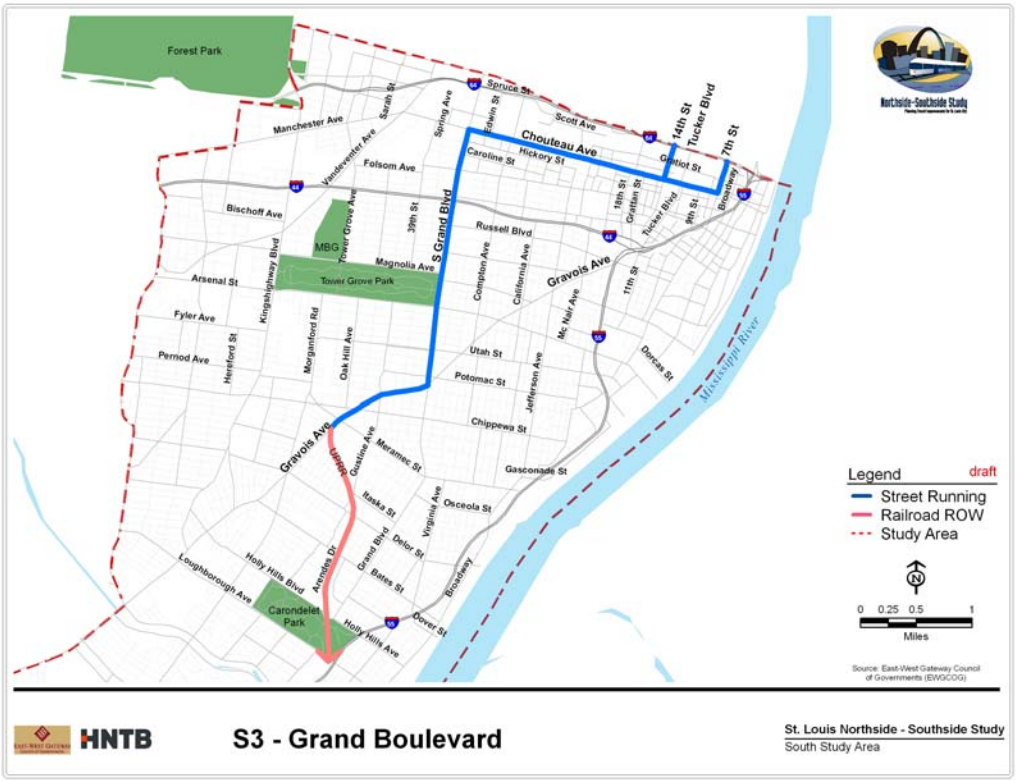
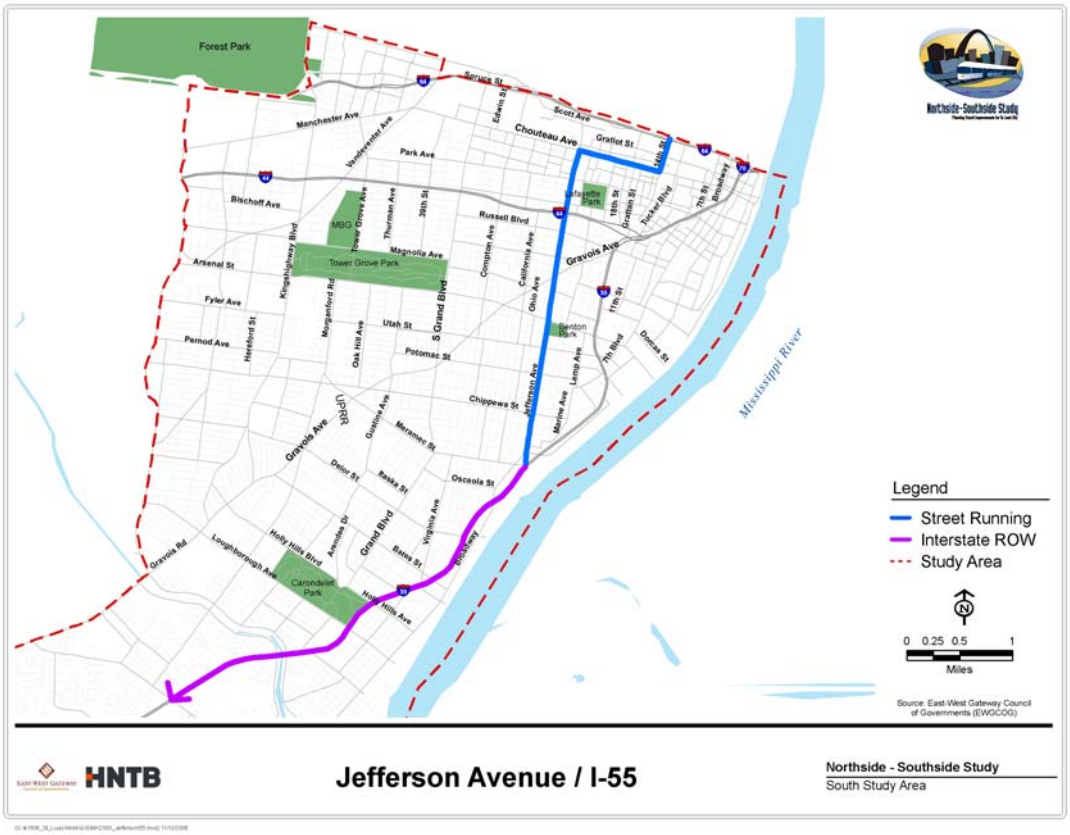


FIGURE 5.2-13: SOUTHSIDE, JEFFERSON ALTERNATIVE



5.2.4 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.

Chouteau/Union Pacific Railroad Alternative
Table 5.2-2 lists all 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, CHOUTEAU/UPRR ALTERNATIVE

Route #	Name	Description of Change	Headway (min) Peak	Headway (min) Off-Peak	LRT Stations & Transit Centers Served
8	Bates	Connect to Bates station.	30	30	Loughborough, Bates, Lansdowne.
10	Gravois	Station stop.	8	20	Hampton Loop, Gravois/Chippewa.
10X	South County Express	*Terminate at Bayless station.*		x	Bayless.
11	Chippewa	Add station stop.	20	40	Gravois/Chippewa, CBD.
13	Union-Morganford	Link to stations.	30	30	CWE, Shaw, Chippewa, Bayless.
30	Soulard	Add station stops.	30	30	CBD, Arsenal.
40	South Broadway	Connect to Loughborough station.	30	30	Loughborough, 14th transit center.
40X	I-55 Express	*Terminate at Bayless station.*		x	Bayless.
57	Manchester	Thru station Grand-Chouteau.	30	30	Chouteau/Grand, Jefferson, Truman.
59	Shaw Kirkwood	Add station stop.	30	30	Shaw.
70	Grand-Loughborough	Continue south via Grand, east on Loughborough.	7	12	Grand, Chouteau/Grand, Loughborough.
70	Grand-Meramec	Existing routing.	7	12	Grand, Chouteau/Grand.
80	Lafayette Square	Add station stops; re-route via Park, 39th, Lafayette, Vandeventer, Shaw.	30	30	Shaw, Truman.
92	Macklind	Add stop at Shaw station.	40	40	CWE, Shaw, Hampton Loop.
93	Lindell	Add stop at Shaw station.	30	30	Shaw.
73	Carondelet	Deviate to Loughborough station; to CBD.	30	30	Loughborough, CBD, Shaw.
95	Kingshighway	Deviate via Shaw station.	10	15	CWE, Shaw.

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

FIGURE 5.2-14: BUS PLAN, CHOUTEAU/UPRR ALTERNATIVE

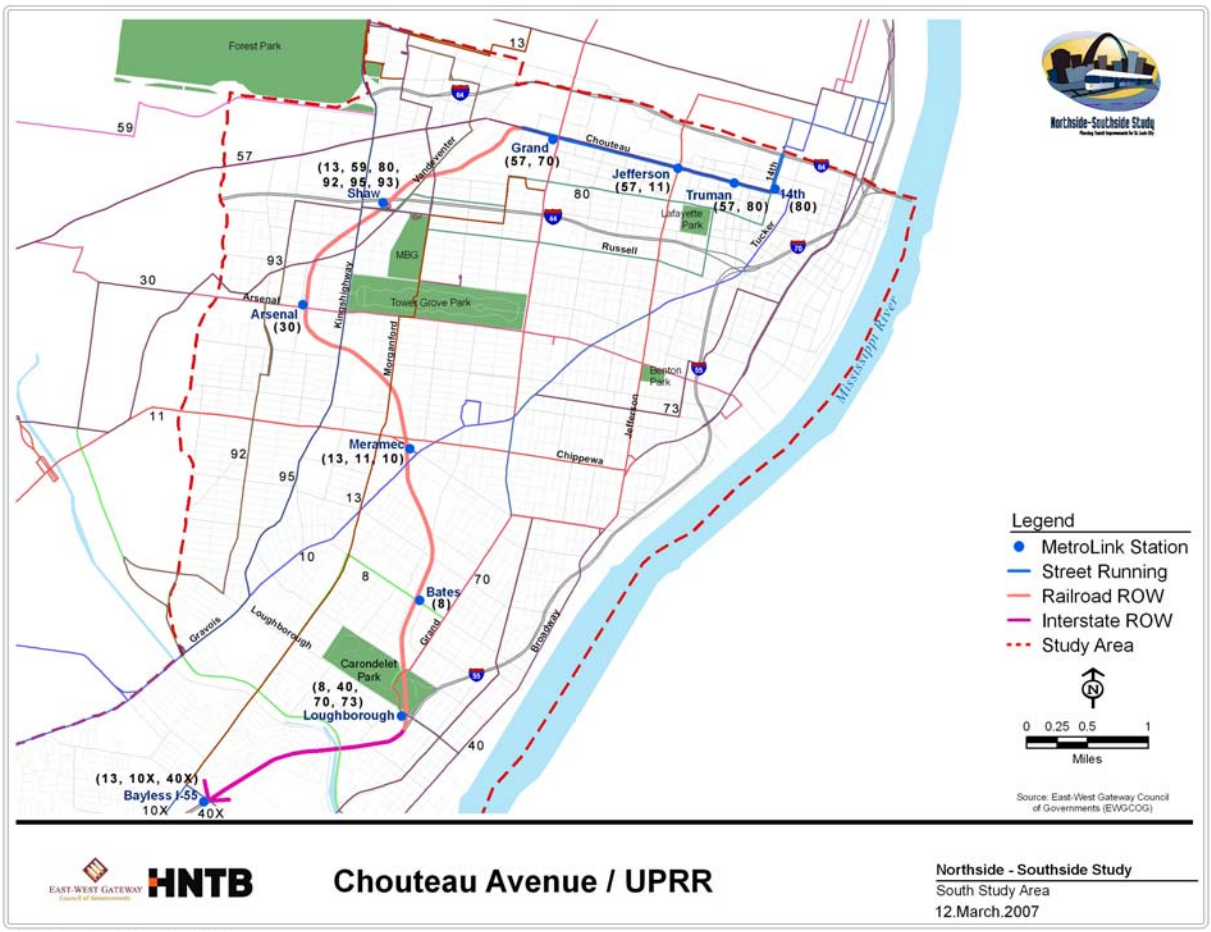


Table 5.2-3 is a listing of all stations showing the bus routes that connect to each station. The most significant service changes include:

- *Shaw Station.* Will be a connecting point for six routes (#13, #59, #80, #92, #93, and #95) to utilize the current park-n-ride lot in close proximity to the Missouri Botanical Garden.

- *Chippewa/Gravois Station.* Will serve three major routes and is a possible small transit center. It will be a connecting point for the Chippewa and Gravois (#11 and #10).

- *Bayless Station.* Several express routes (10X, 40X) to downtown will be converted to feeder routes since the rail line would provide replacement service: This station will have parking (800 to 1,000 spaces) and a transit center with 4 to 6 bus bays.

TABLE 5.2-3: CONNECTING STATIONS, CHOUTEAU/UPRR ALTERNATIVE

Station	Route		Terminate or Thru	Notes
Truman Parkway	57	Manchester	Thru	Via Chouteau to 14th transit center.
	80	Lafayette Square	Thru	To 14th transit center.
Chouteau/Jefferson	57	Manchester	Thru	Via Chouteau to 14th transit center.
	11	Chippewa	Thru	Via Jefferson.
Chouteau/Grand	57	Manchester	Thru	Via Chouteau to 14th transit center.
	70	Grand	Thru	Via Grand.
Shaw (Park-n-Ride)	13	Union-Morganford	Thru	Deviate via Shaw then south on Morganford.
	59	Shaw Kirkwood	Thru	Via Shaw.
	80	Lafayette Square	Terminate	Via Russell, Tower Grove, Shaw.
	92	Macklind	Thru	Via Vandeventer.
	95	Kingshighway	Thru	Deviate via Shaw.
	93	Lindell	Thru	Via Shaw.
Arsenal	30	Soulard	Thru	Via Arsenal.
Chippewa/Gravois	13	Union-Morganford	Thru	Via south on Morganford to Bayless.
Potential Transit Center	11	Chippewa	Thru	Via Chippewa.
	10	Gravois	Thru	Via Gravois.
Bates	8	Bates	Thru	Shrewsbury, Hampton Loop, Bates.
Loughborough	8	Bates	Thru	Shrewsbury, Hampton Loop, Loughborough.
	40	South Broadway	Thru	Deviate via Loughborough.
	70	Grand (branch)	Terminate	
	73	Carondelet	Thru	Deviate via Loughborough.
Bayless/I-55	10X	South County	Terminate	At station.
(Park-n-Ride)	40X	I-55 X	Terminate	At station.
	13	Union-Morganford	Terminate	Via south on Morganford to Bayless.

Jefferson/I-55 Alternative

Table 5.2-4 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 5.2-4: BUS ROUTES, JEFFERSON/I-55 ALTERNATIVE

Route			Headway (min)		LRT Stations & Transit Centers Served
#	Name	Description of Change	Peak	Off-Peak	
8	Bates	Connect to Bates station; loop of neighborhood.	30	30	Loughborough, Bates.
10	Gravois	Extend from Hampton Loop to Gravois station.	8	20	Hampton Loop, Gravois.
10X	South County Express	Terminate at Bayless station.	20	x	Bayless.
11	Chippewa	Terminate at station.	20	40	Chippewa.
11X	Shrewsbury Express	Via Gravois.		x	Gravois.
13	Union - Bayless	Via Morganford to Bayless.	30	30	Bayless.
30	Soulard	Add station stop.	30	30	CBD, Arsenal.
40	South Broadway	Connect to South Broadway & Bates stations.	30	30	S. Broadway, Bates, Chippewa.
57	Manchester	Via Chouteau to CBD.	30	30	Truman Parkway.
70	Grand-Loughborough	Continue south via Grand, E. on Loughborough.	7	12	Grand, Loughborough.
70	Grand-Meramec	Existing routing.			Grand, S. Broadway.
73	Carondelet	Deviate to Cherokee and Bates stations.	30	30	Cherokee, Bates.
80	Lafayette Square	Reroute via 14th St., Park, Grand, Russell, 7th, Park.	30	30	Park, Russell.
40X	I-55 X	Terminate at Bayless station.		x	Bayless.
58 X	Twin Oaks X	Thru to CDB.		x	Park.
410X	Eureka X	Thru to CDB.		x	Park.

The proposed feeder bus plan for the Jefferson/I-55 Alternative is shown in Figure 5.2-15.

FIGURE 5.2-15: BUS PLAN, JEFFERSON/ I-55 ALTERNATIVE

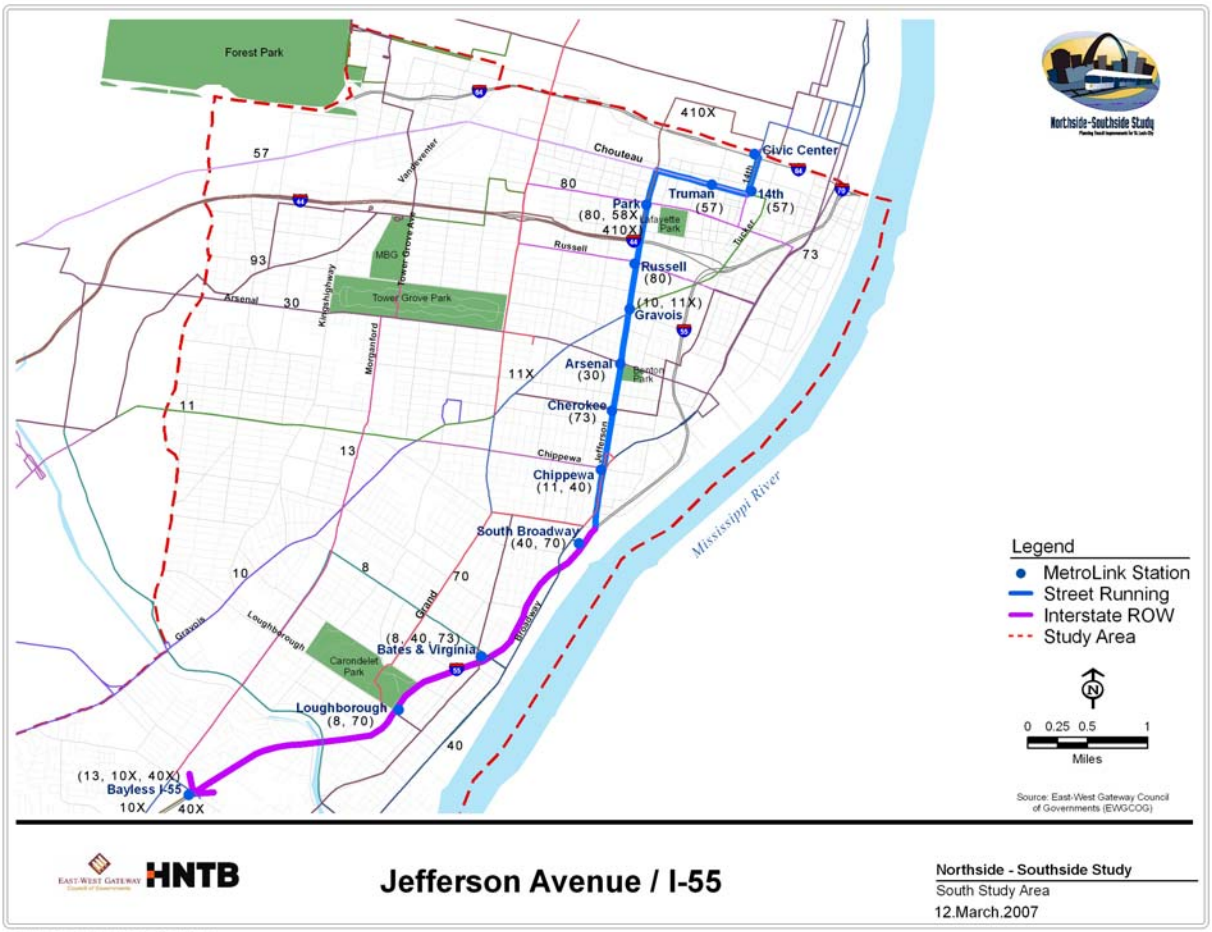


Table 5.2-5 is a listing of all stations showing the bus routes that connect to each station.

The most significant service changes include:

- *Chippewa Station.* Will be served by two routes (#11, #40). The Chippewa route will terminate at the station since LRT service will be on Jefferson Avenue. The #40 will be a station stop and continue serve South Broadway.

- *South Broadway Station.* Will have parking and will be served by two routes (#40, #70).

- *Bayless Station.* It will be served by three routes. Several express routes (10X, 40X) to downtown will be converted to feeder routes since the rail line would provide replacement service: This station will have parking (800 to 1,000 spaces) and a transit center with 4 to 6 bus bays.

TABLE 5.2-5: CONNECTING STATIONS, JEFFERSON/I-55 ALTERNATIVE

Station	Route #	Route Name	Terminate or Thru	Notes
Truman Parkway	57	Manchester	Thru	Via Chouteau to 14th transit center.
Park	58 X	Twin Oaks X	Thru	To CBD.
	410X	Eureka X	Thru	To CBD.
	80	Lafayette Square	Terminate	Via Tucker & Park.
Russell	80	Lafayette Square	Terminate	Via Russell.
Gravois	10	Gravois	Thru	Via Gravois to CBD.
	11x	Shrewsbury X	Thru	Via Gravois.
Arsenal	30	Soulard	Thru	Via Arsenal.
Cherokee	73	Carondelet	Thru	Via Cherokee.
Chippewa	11	Chippewa	Terminate	At station.
	40	South Broadway	Thru	Station stop, continue south.
S. Broadway	40	South Broadway	Thru	Via Broadway.
Potential Park-Ride	70	Grand (branch)	Terminate	Via Meramec.
Bates & Virginia	8	Bates	Thru	Shrewsbury, Hampton Loop, Bates.
	40	South Broadway	Thru	At station.
	73	Carondelet	Thru	At station.
Loughborough	8	Bates	Thru	At station.
	70	Grand (branch)	Terminate	Via Grand.
Bayless/I-55	10X	South County X	Terminate	At station.
(Park-n-Ride)	40X	I-55 X	Terminate	At station.
	13	Union Morganford	Terminate	At station.

Gravois Alternative

Table 5.2-6 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 5.2-6: BUS ROUTES, GRAVOIS/UPRR ALTERNATIVE

Route #	Name	Description of Change	Headway (min)		LRT Stations & Transit Centers Served
			Peak	Off-Peak	
8	Bates	Connect to Bates station.	30	30	Loughborough, Bates.
10	Gravois Shuttle	Jefferson station to Gravois Bluffs.	30	60	All along Gravois.
10X	South County Express	Terminate at Bayless station.		x	Bayless.
11	Chippewa	Add station stop.	20	40	Chippewa, Jefferson, CBD.
30	Soulard	Add station stops.	30	30	CBD, Arsenal.
40	South Broadway	Connect to Loughborough station.	30	30	Loughborough, CBD.
40X	I-55 X	Terminate at Bayless station.		x	Bayless.
57	Manchester	Station stop Tucker- Chouteau.	30	30	Tucker/Chouteau to 14th transit center.
70	Grand-Loughborough	Continue south via Grand, E. on Loughborough.	7	12	Grand, Chouteau/Grand, Loughborough.
70	Grand-Meramec	Existing routing.			Grand, Chouteau/Grand.
73	Carondelet	Deviate to Loughborough station; then to CBD.	30	30	Loughborough, CBD.
80	Lafayette Square	Chouteau, 7th, Sidney, Grand, Park, 14th.	30	30	Jefferson, Chouteau and Tucker.

The proposed feeder bus plan for the Gravois Alternative is shown in Figure 5.2-16.

FIGURE 5.2-16: BUS PLAN, GRAVOIS/UPRR ALTERNATIVE

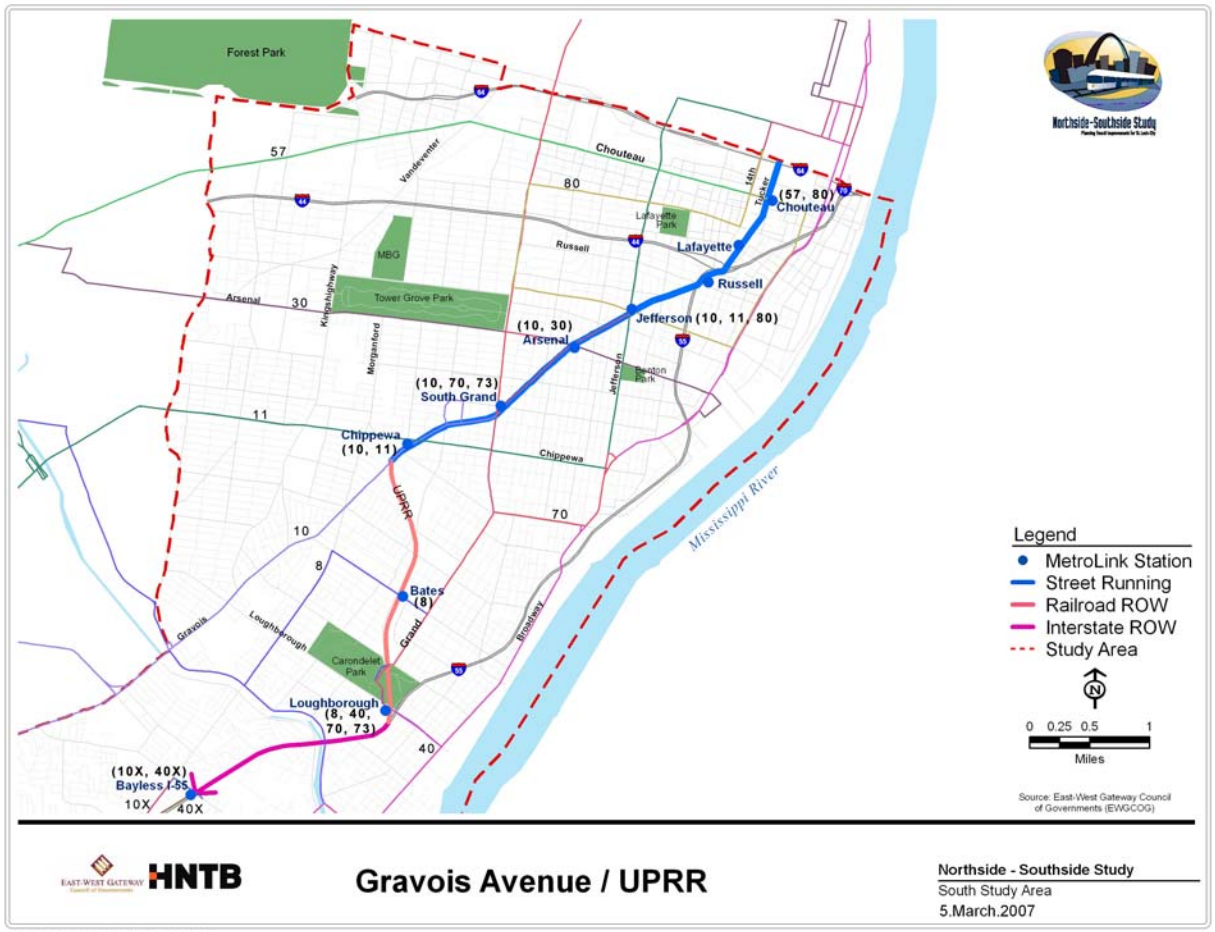


Table 5.2-7 is a listing of all stations showing the bus routes that connect to each station. The most significant service changes include:

- *Jefferson Station.* Will be served by three routes (#10, #11, and #80). The #10 Gravois shuttle will provide service along Gravois from Jefferson station west to Gravois Bluffs.

- *Chippewa/Gravois Station.* Will serve three major routes and is a possible small transit center. It will be a connecting point for the Chippewa and Gravois corridors (#11 and #10).

- *Bayless Station.* Several express routes (10X, 40X) to downtown will be converted to feeder routes since the rail line would provide replacement service: This station will have parking (800 to 1000 spaces) and a transit center with 4 to 6 bus bays.

TABLE 5.2-7: CONNECTING STATIONS, GRAVOIS/UPRR ALTERNATIVE

Station	Route #	Route Name	Terminate or thru?	Notes
Chouteau and Tucker	57	Manchester	Thru	Via Chouteau to 14th transit center.
	80	Lafayette Square	Thru	To 14th transit center.
Jefferson	10	Gravois Shuttle	Thru	Along Gravois.
	11	Chippewa	Thru	Via Jefferson to CBD.
	80	Lafayette Square	Thru	Via Sidney.
Arsenal	10	Gravois Shuttle	Thru	Station stop.
	30	Soulard	Thru	Via Arsenal.
Grand	10	Gravois Shuttle	Thru	Station stop.
	70	Grand	Thru	Via Grand.
	73	Carondelet	Thru	Via Cherokee to Gravois.
Chippewa / Gravois	11	Chippewa	Thru	Via Chippewa.
Transit Center	10	Gravois Shuttle	Thru	On Gravois.
Bates	8	Bates	Thru	Shrewsbury, Hampton Loop, Bates station.
Loughborough	8	Bates	Thru	Shrewsbury, Hampton Loop, Loughborough.
	40	Broadway	Thru	Deviate via Loughborough.
	70	Grand (branch)	Terminate	Via Grand.
	73	Carondelet	Thru	Deviate via Germania.
Bayless/I-55	10X	South County	Terminate	
(Park-n-Ride)	40X	I-55 X	Terminate	

5.2.5 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:

Southside

- Chouteau/UPRR LRT.
- Jefferson/I-55 LRT.
- Market/UPRR BRT.

The accompanying maps (Figures 5.2-17 through 5.2-19) depict each of the alternatives, with station sites identified. In addition, illustrations (Figures 5.2-20 through 5.2-23) 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 5.2-24. 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.

5.2.6 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.

FIGURE 5.2-17: SOUTHSIDE, CHOUTEAU/UPRR LRT

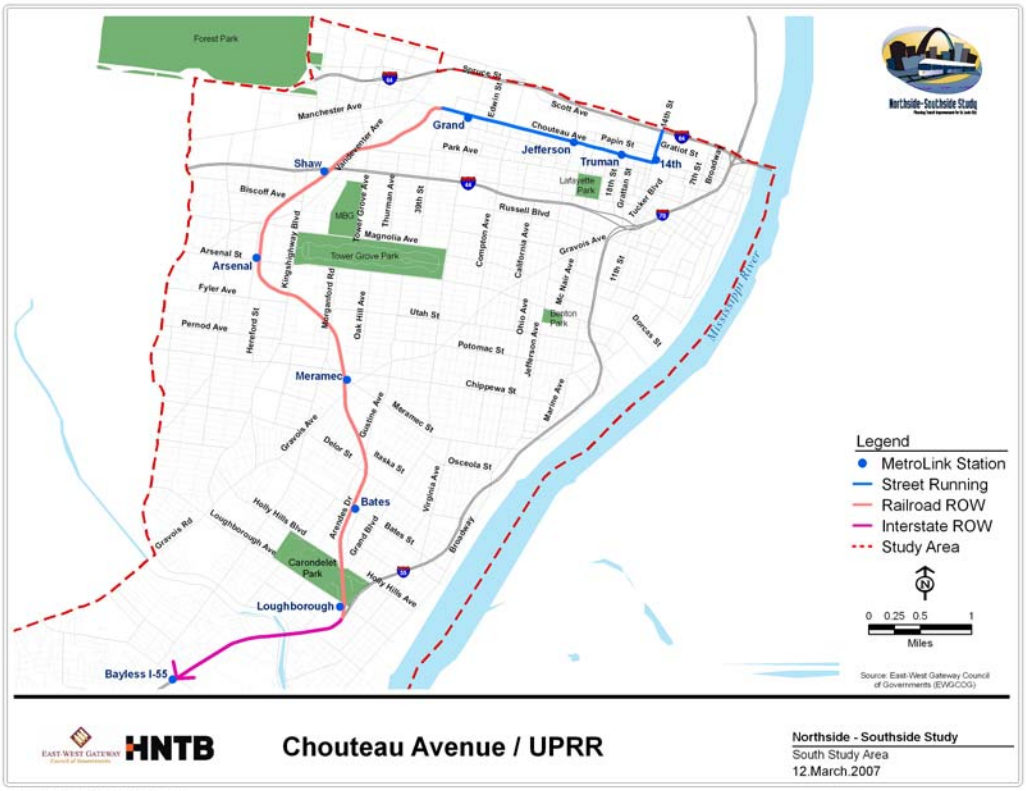


FIGURE 5.2-18: SOUTHSIDE, JEFFERSON/ I-55 LRT

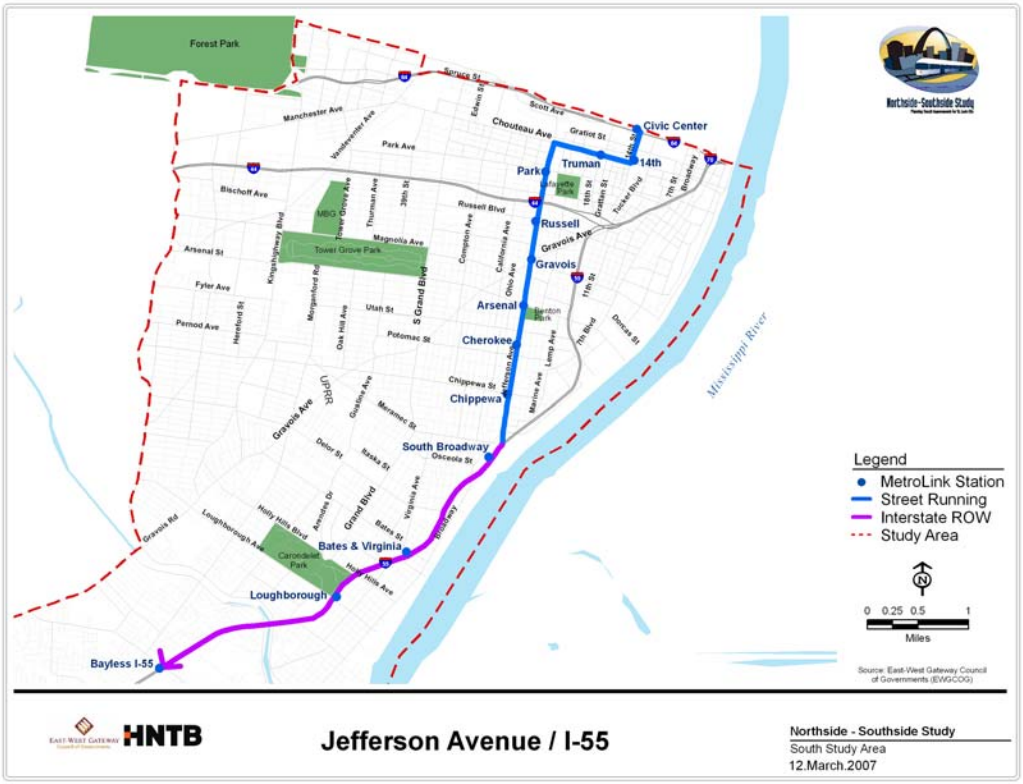


FIGURE 5.2-19: SOUTHSIDE, MARKET/UPRR BRT

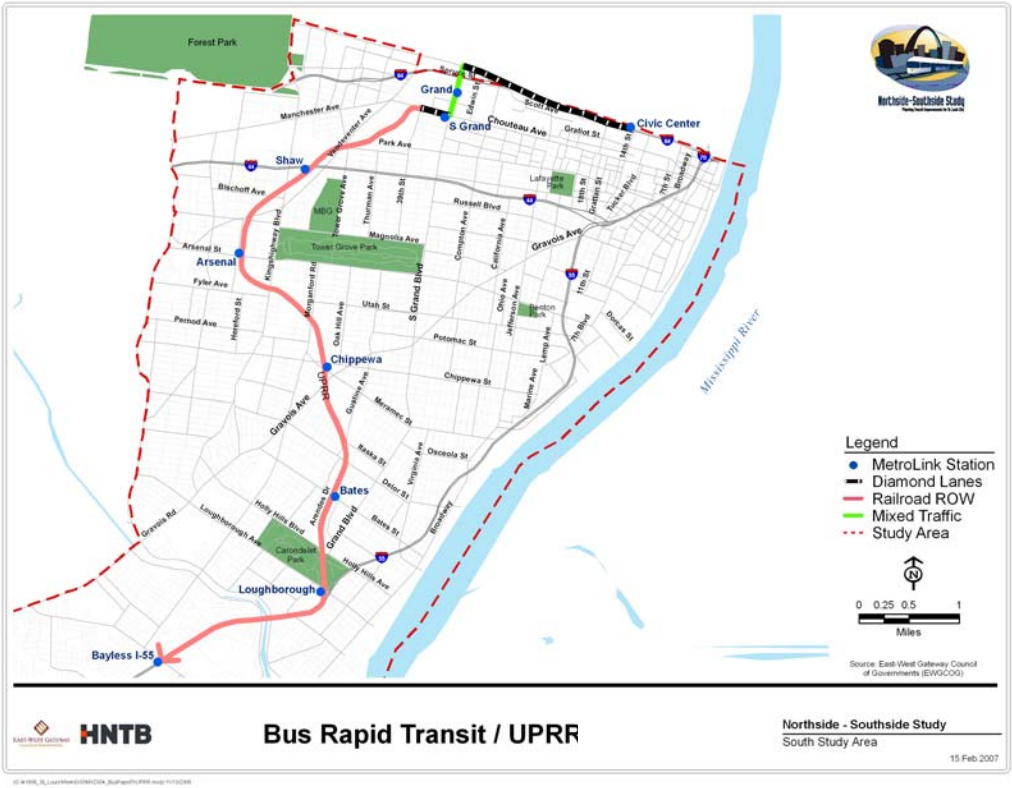


FIGURE 5.2-20: SOUTHSIDE, CHOUTEAU/ JEFFERSON STATION

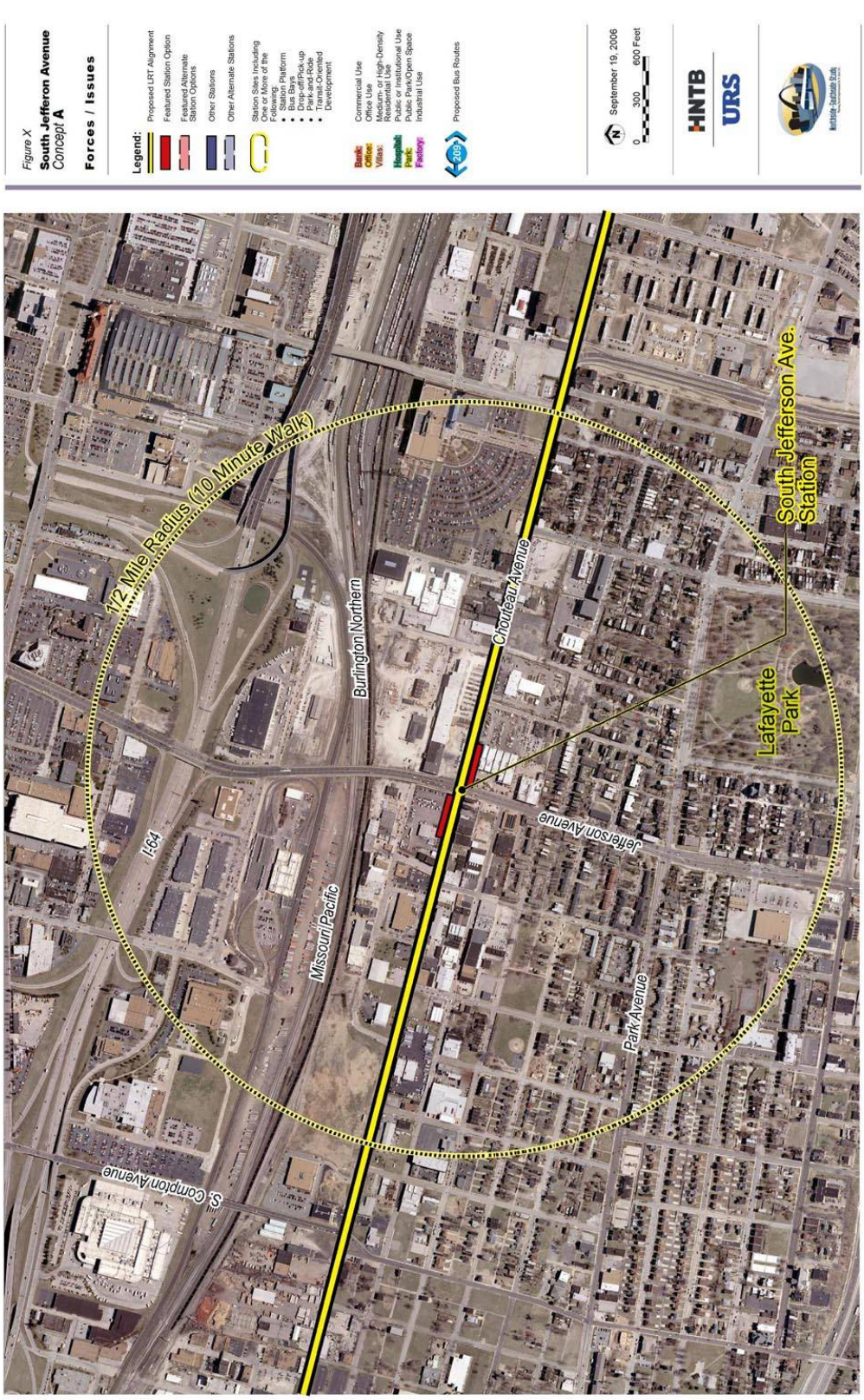


FIGURE 5.2-21: SOUTHSIDE, MERAMEC/UPRR STATION

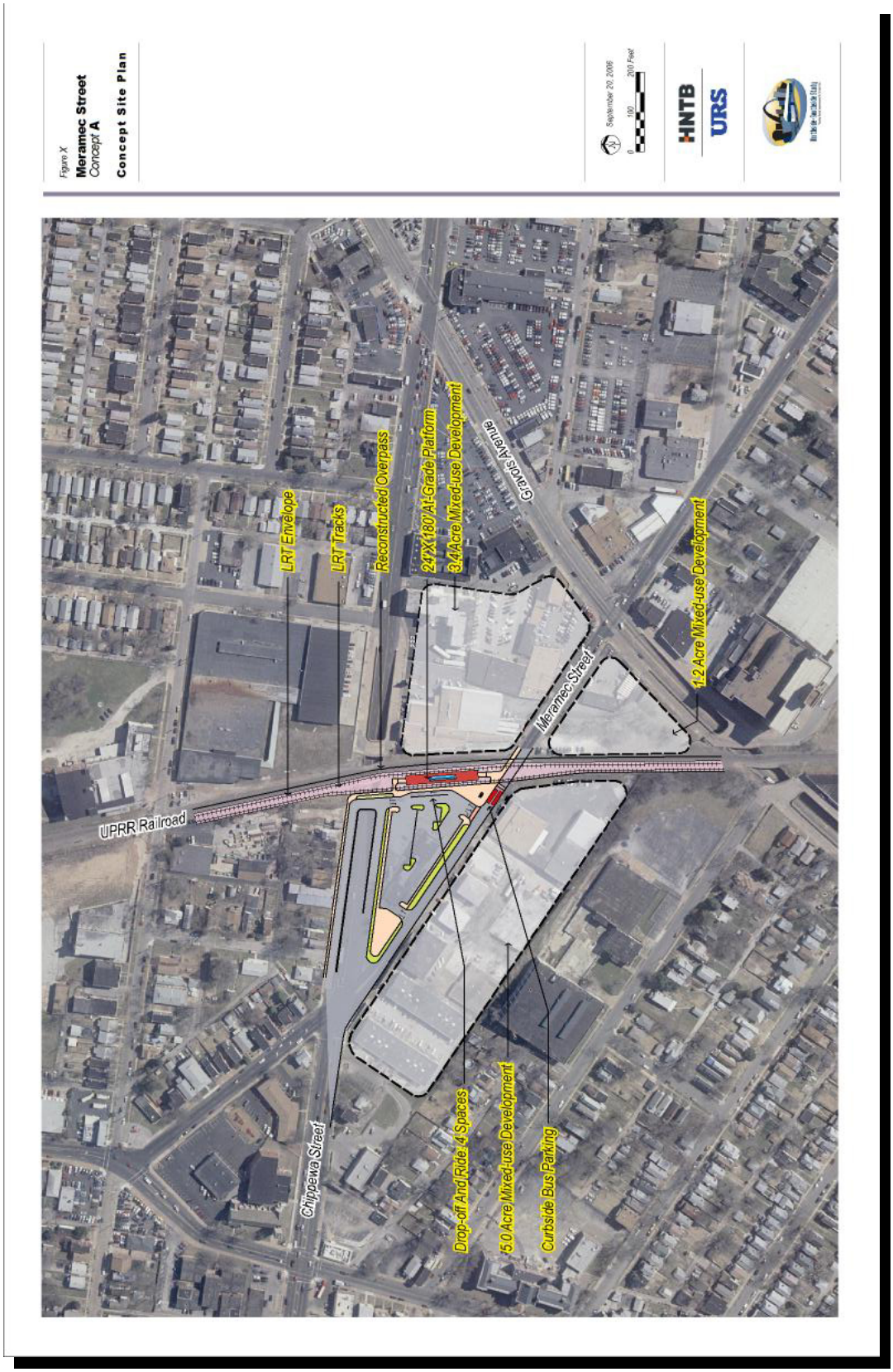


FIGURE 5.2-22: SOUTHSIDE, BAYLESS TERMINUS

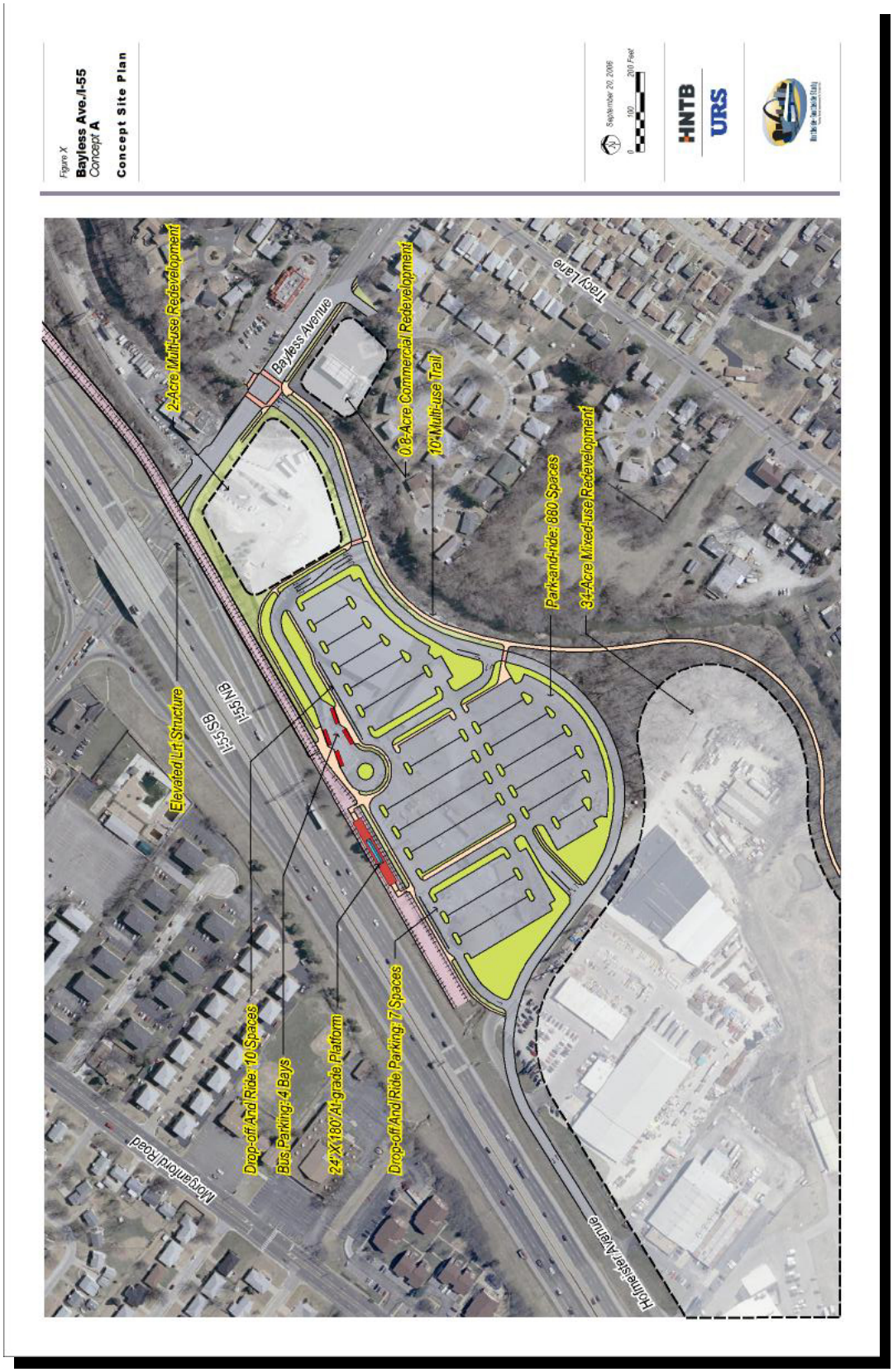


FIGURE 5.2-23: SOUTHSIDE, BROADWAY STATION

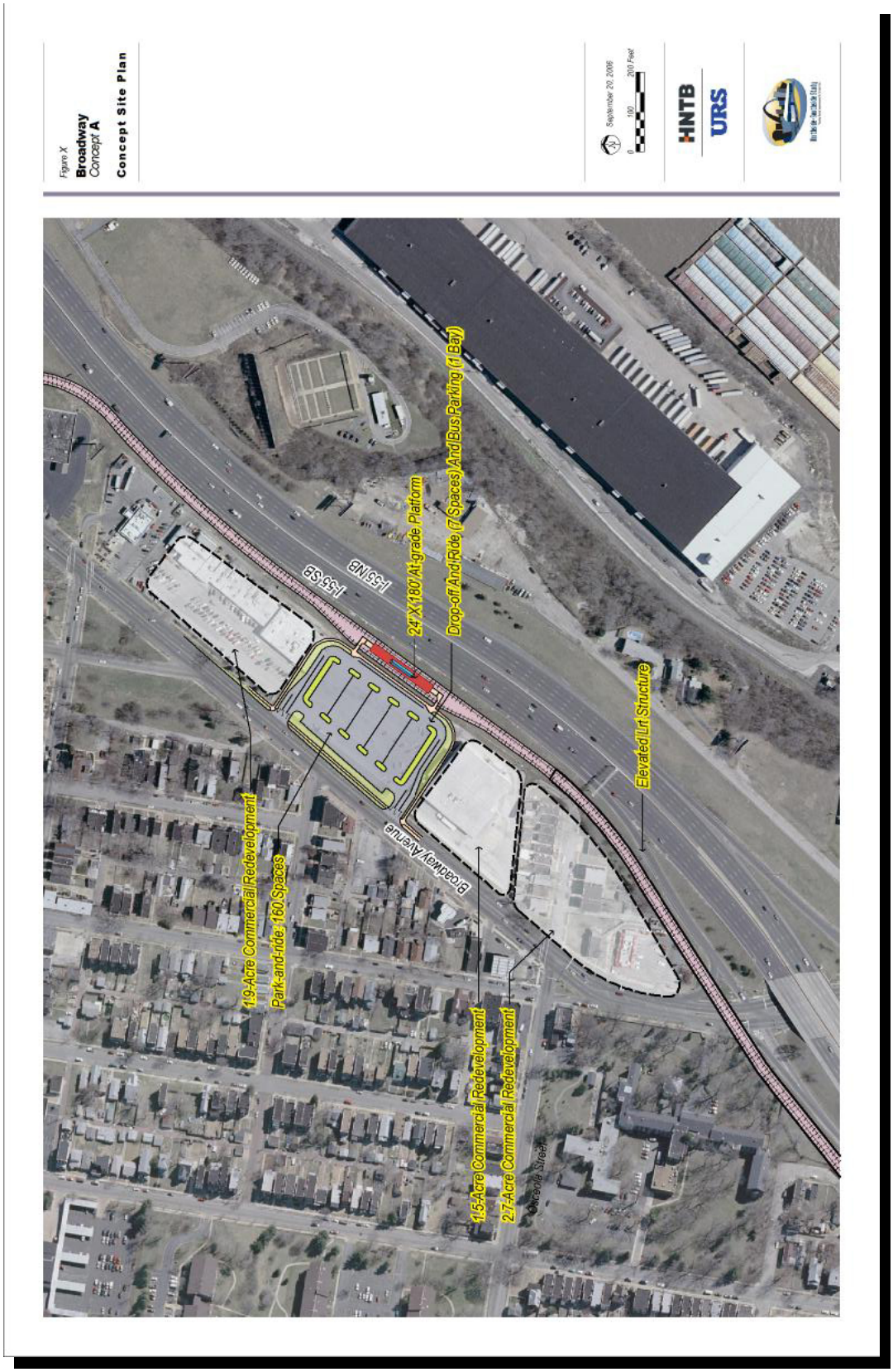
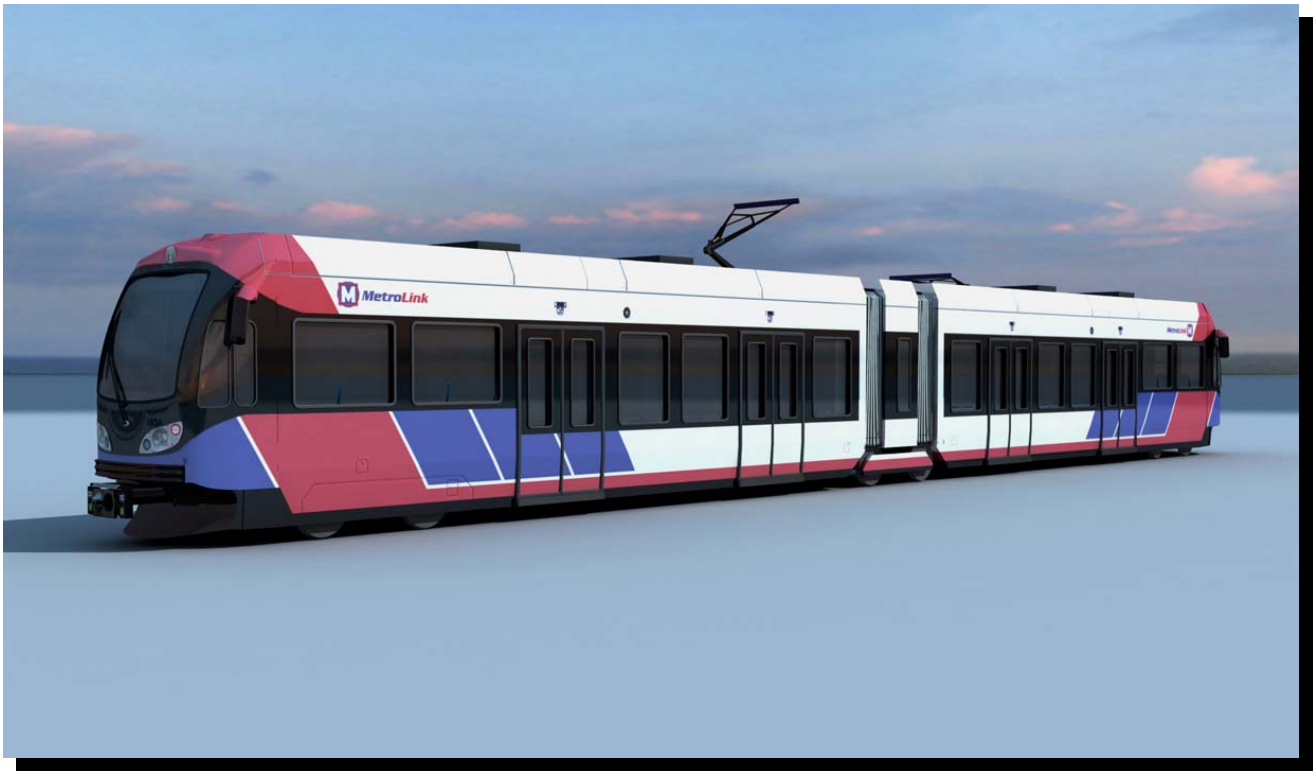


FIGURE 5.2-24: LOW-FLOOR LIGHT-RAIL VEHICLE



Detailed Definition of Alternatives

Chapter 6.0

Northside-Southside Study

Planning Transit Improvements for St. Louis City

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 Southside study area. 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.

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 Southside study area. One representative corridor within the Southside 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 corridor, as well as the station areas. Areas with TOD potential are thereby identified. Results of this process will inform choices of locally preferred alternatives (LPAs) 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 alternative, the Gravois alignment, 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 through 6.2-4), 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:

- Chouteau Avenue/Union Pacific Railroad – *Arsenal, Bayless at I-55*
- Gravois Avenue/Union Pacific Railroad – *Jefferson, Bates*
- Jefferson Avenue/Interstate-55 – *Mississippi (now Truman/Park), South Broadway*
- Bus Rapid Transit (BRT) – *no stations selected (not a light-rail alignment)*

FIGURE 6.2-1: SOUTHSIDE, CHOUTEAU/UPRR ALTERNATIVE

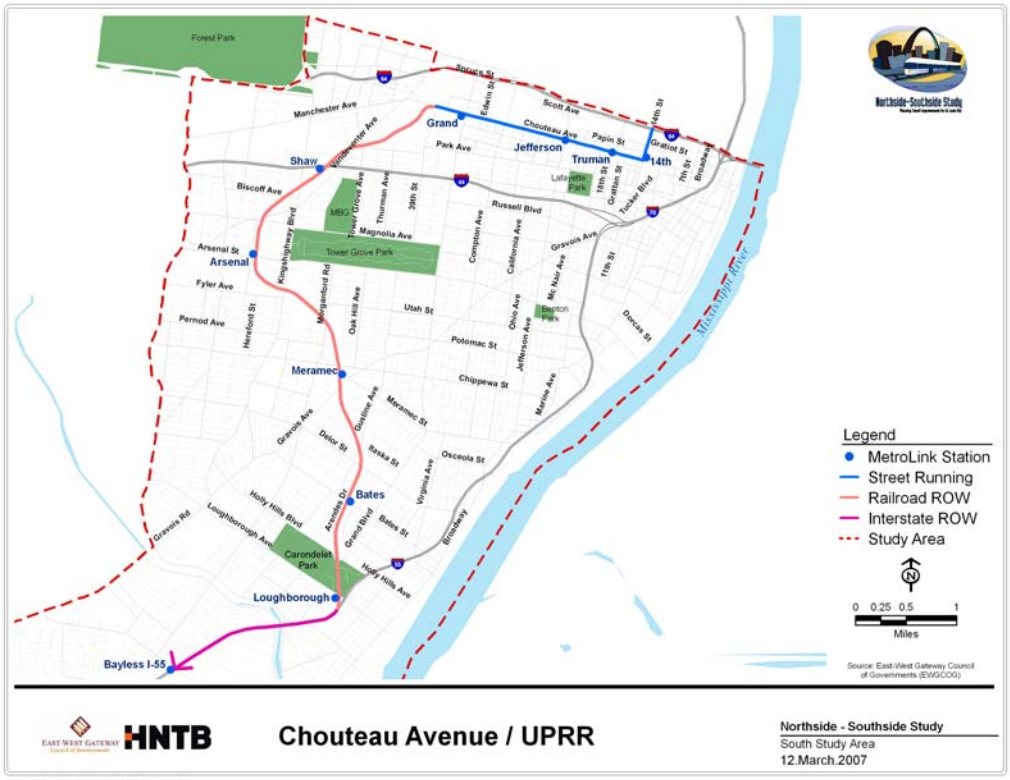


FIGURE 6.2-2: SOUTHSIDE, BUS RAPID TRANSIT ALTERNATIVE

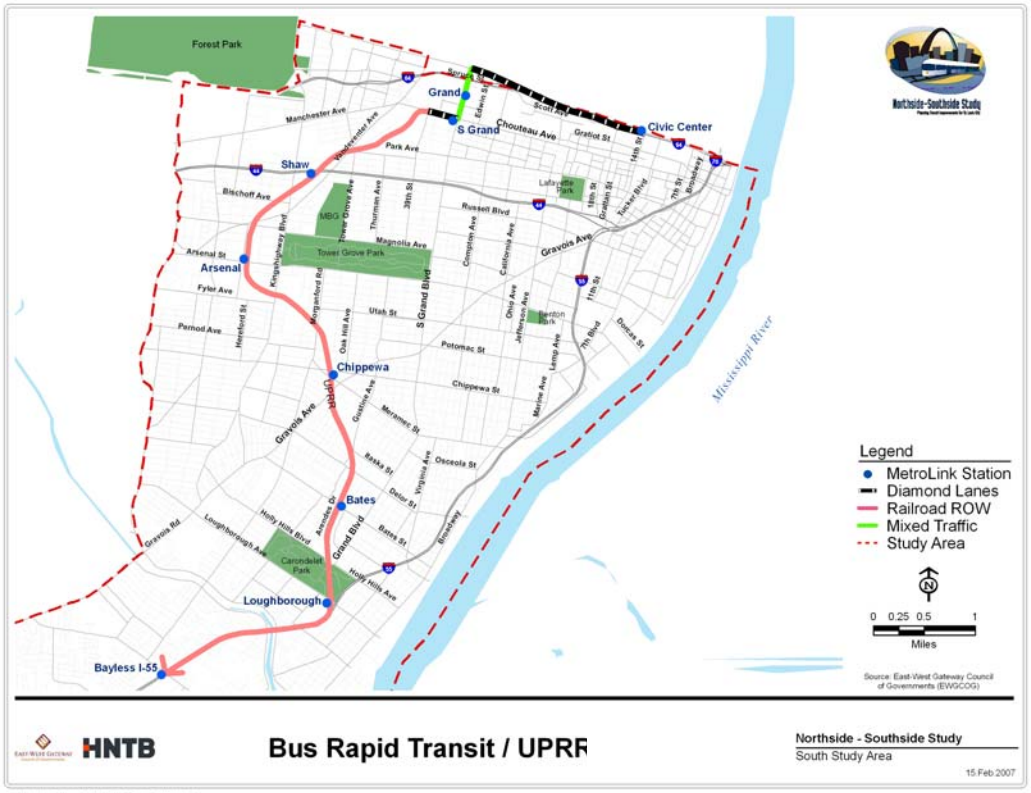


FIGURE 6.2-3: SOUTHSIDE, GRAVOIS/UPRR ALTERNATIVE

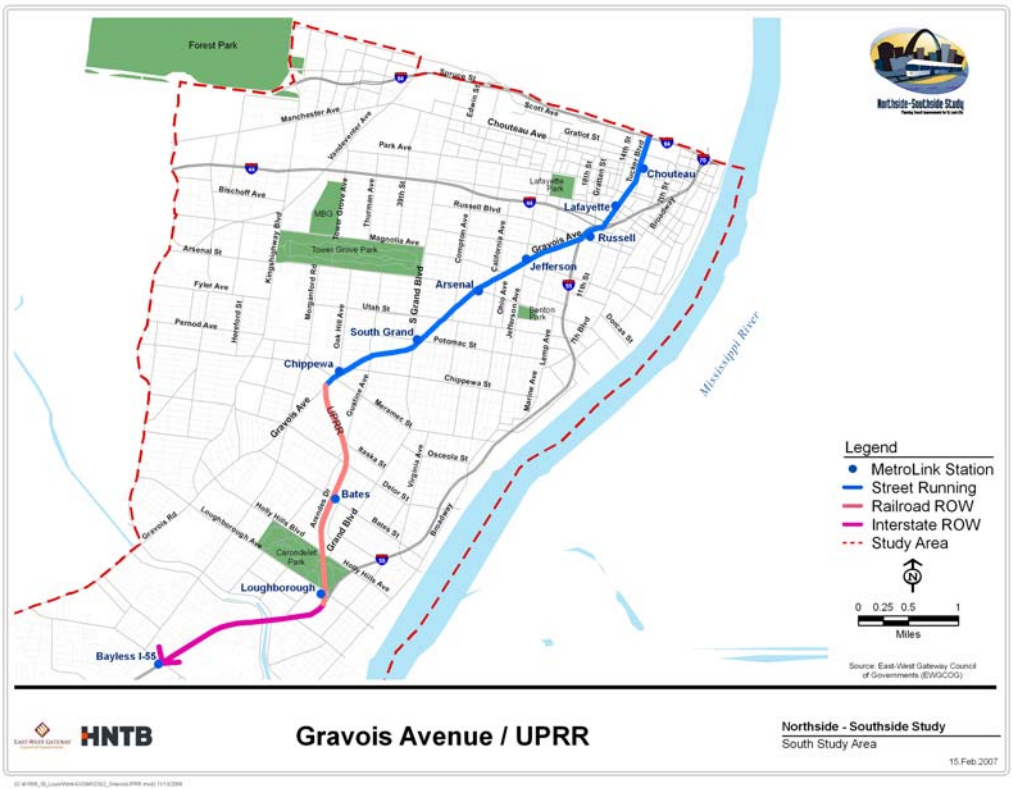
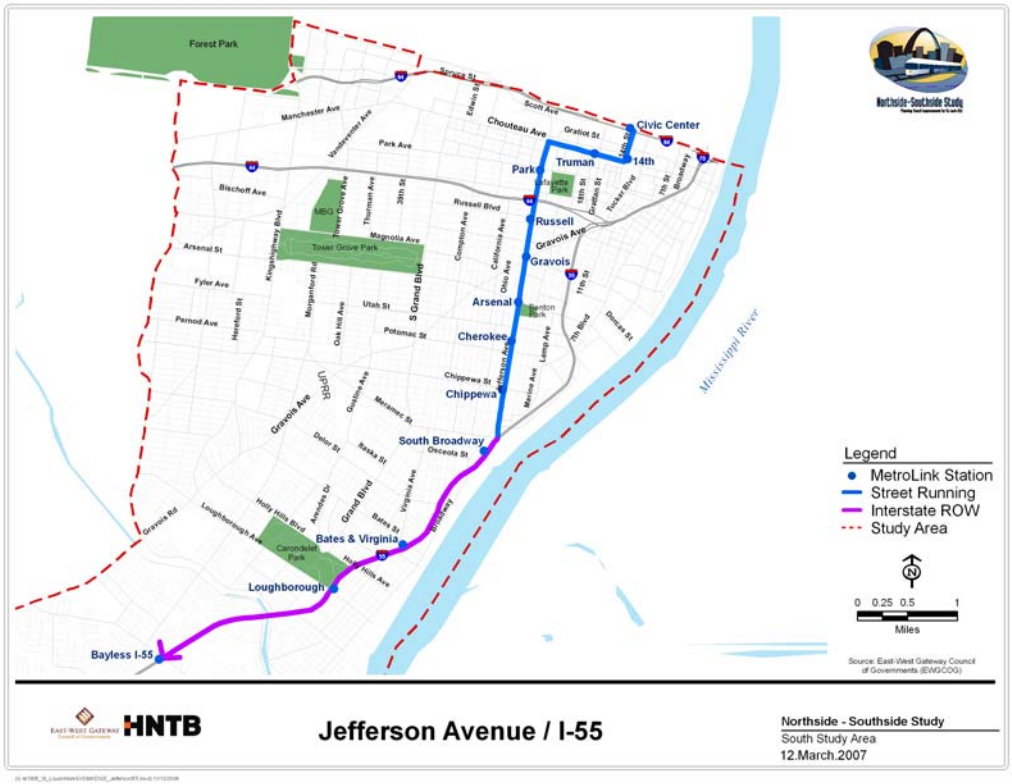


FIGURE 6.2-4: SOUTHSIDE, JEFFERSON/I-55 ALTERNATIVE



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 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.

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 Southside, assesses only the Southside study area corridor. See the parallel section of the Northside study for information on its respective corridor.

The 2006 Southside study area covers approximately 33 square miles, extending from Chouteau Avenue on the north to Reavis Barracks Road on the south, and from the Mississippi River on the east to Gravois Road and Hampton Avenue on the west. More than 200,000 residents, or 15% 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 Southside study area acreage:

- Residential – 44.67%
- Institutional – 9.27%
- Commercial – 11.28%
- Industrial/Utility – 14.77%
- Open Space – 15.98%
- Vacant/Undeveloped – 4.03%

Due to the size and diversity of the study area, selection of a representative corridor could have proved difficult. Among options for Southside LRT alignments, though, the 2000 MTIA Study resulted in selection of the Chouteau Avenue/Union Pacific Railroad route as its LPA. This LPA selection, as carried forward into the present study, highlights Chouteau Avenue as a good option for further study. Because a route along Jefferson/Interstate-55 is also under current consideration, as well as several others that were studied in earlier phases of this project including Gravois (see *Chapter 5: Alternatives Development and Screening*), any of those roads could also have been an informed corridor selection. Ultimately, though, the Chouteau corridor is assessed for reasons including its status as the 2000 LPA, its potential for redevelopment, and its right-of-way which, though narrow, provides accommodation for in-street running LRT. The corridor selected runs along and extends approximately a quarter-mile on either side of Chouteau from 18th Street to Grand Boulevard.

Existing conditions within the corridor include diverse land uses with destination centers, parks, and institutions (Figures 6.2-5 through 6.2-7), as well as considerable industry, residences, and some neighborhood and regional commerce. There are some underutilized properties, though the area is experiencing widespread new development, with additional prospective investments also planned. Access is good to major arterials, such as Jefferson Avenue and Grand Boulevard.

Property fronting Chouteau Avenue features mixed use with residential, institutional, commercial, industrial, and vacant parcels. The limited residential parcels are primarily multi-

family, such as lofts, apartments, and subsidized housing. Institutions are few, though much property is owned by development corporations and St. Louis University. Commercial uses range from gas stations and convenience stores to the wholesale and retail floral district to specialized retailers. Groceries and shops that would support a residential population are lacking. Industrial uses are many and widespread; this corridor has historically supported light and heavy industry and warehouses. These, as well as a major utility (Ameren Union Electric), still comprise a significant portion of the corridor. Vacant parcels, becoming quite limited, are dispersed along the road and are mostly closed businesses and/or warehouses, such as the abandoned Praxair facility.

Properties one or two parcels away from Chouteau also have mixed and diverse uses. Features include single- and multi-family residences, schools and university properties, small open spaces and parks, neighborhood commerce, several churches, and additional industry and warehouse facilities. Parcels on the north side of Chouteau feature a higher percentage of industrial and warehouse uses, to the near exclusion of other features. A higher concentration of properties are vacant there than along Chouteau itself, though infill development is gradually reducing these as well.

Examination and comparison of the Strategic Land Use Plan to the corridor's existing land use reveals multiple opportunities for redevelopment (Figure 6.2-8). Additionally, several other planned investments will contribute to reshaping the corridor. CORTEX, for example, intends to install facilities and incubator centers for nascent life sciences research and development companies; these will energize a current 353 Blighting Area around Grand Boulevard and Chouteau and constitute a core for St. Louis' growing role as a leader in the "BioBelt." The long-term vision of the Chouteau Greenway plans to create a connected corridor with parks, open space, bicycle and pedestrian routes, and access to residences and research and development centers. St. Louis University owns a significant amount of the property approaching Grand Boulevard and plans to expand its facilities into many parcels. Further, there are already planned residential developments at Mississippi Street Lofts and Mississippi Place.

Detailed development schemes are shown throughout the corridor and along Chouteau in the vicinity of proposed LRT stations. The plan also illustrates TOD potential within the greater neighborhoods surrounding the transit corridor, approximately one-half of a mile wide. Recommended land uses focus on areas of mixed-use development that could include retail, restaurants/food services, offices, research facilities, and higher-density residences along Chouteau and the proposed Chouteau Greenway. 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 are also vital to the corridor's redevelopment. Most of such investment could be assisted by the influence of TOD.

FIGURE 6.2-5: EXISTING CONDITIONS AERIAL

FIGURE 6.2-6: EXISTING CONDITIONS PHOTO KEY

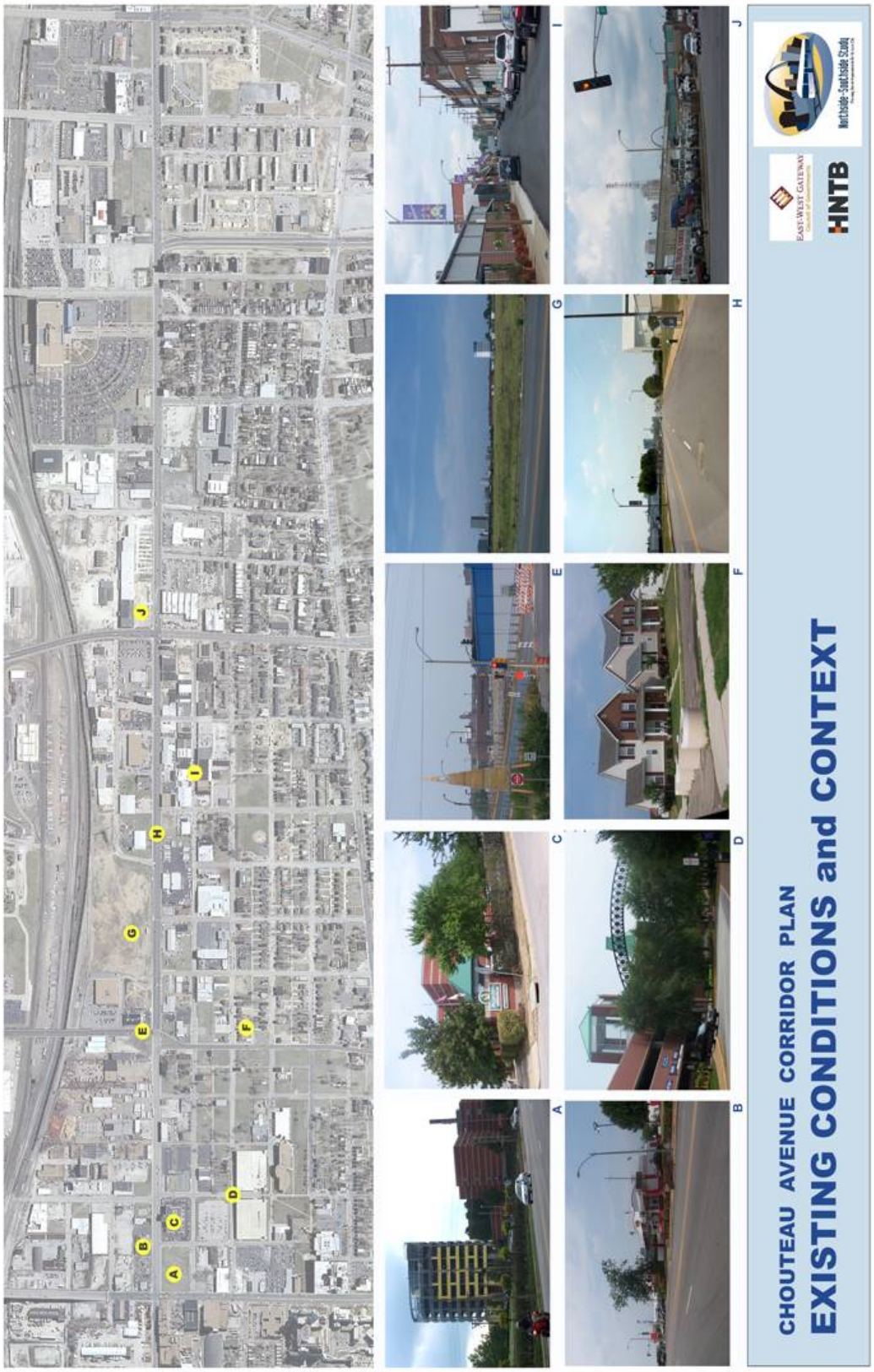


FIGURE 6.2-7: EXISTING CONDITIONS PHOTO KEY

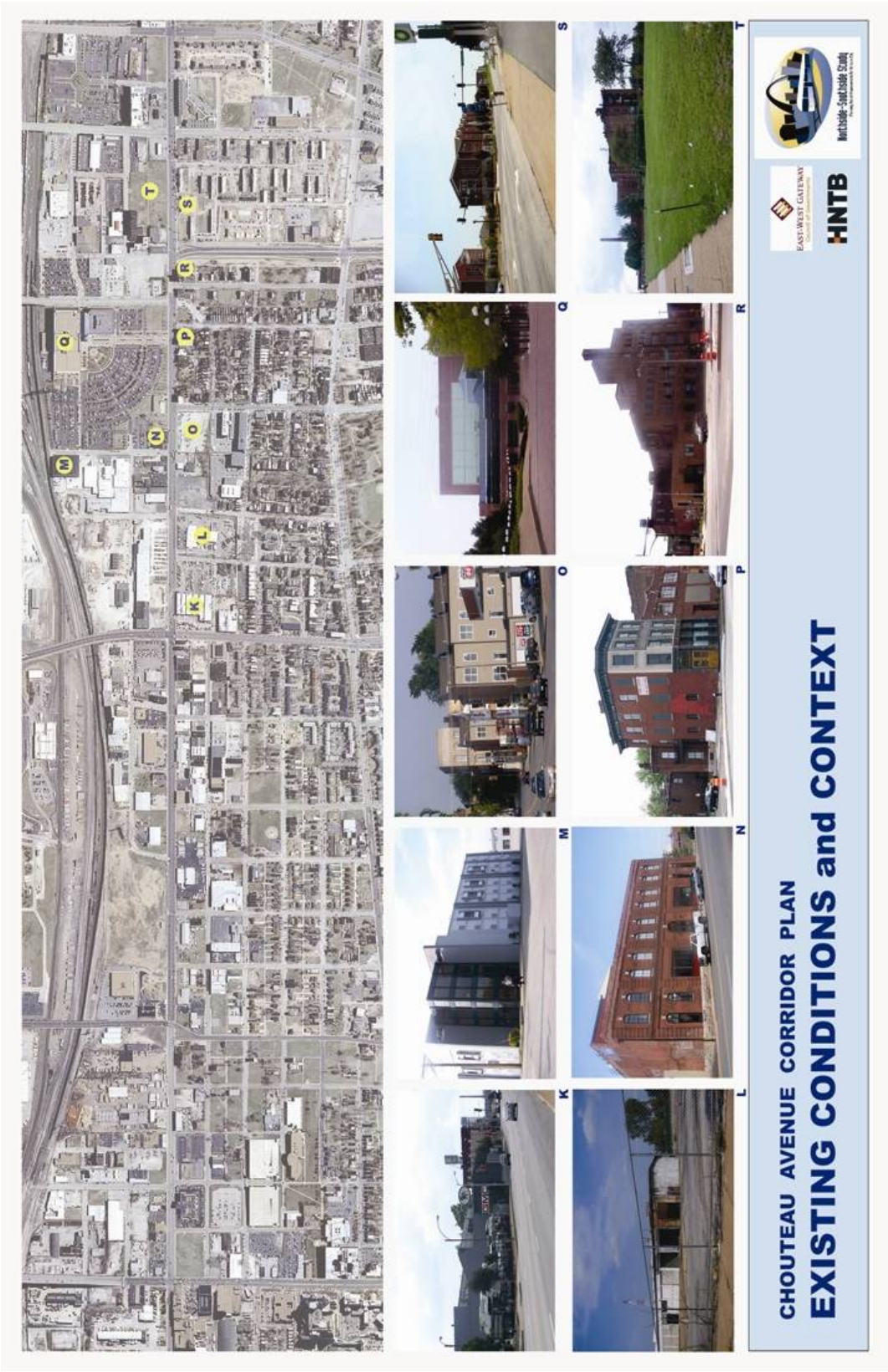


FIGURE 6.2-8: DEVELOPMENT OPPORTUNITIES

6.2.4 STATION AREA ANALYSIS

In addition to the 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 this section at the intersection of Mississippi and Chouteau, for example, has now shifted to Park as a result of advanced engineering analysis.

Station areas are examined with the 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.

Arsenal Station and Half-Mile Radius Area (Figures 6.2-9 through 6.2-11)

- **Key Issues.** Neighborhoods within the proposed station area have high density residential character. Kingshighway Boulevard is a major arterial for commercial and residential land uses. Destination centers are numerous. An important factor is the active Union Pacific Railroad and light industrial land use along the railroad right-of-way. There are also vibrant commercial areas.

- **Walkability and Urban Design Issues.** Overall walkability of this area is good, particularly within residential neighborhoods, though Kingshighway Boulevard creates a moderate pedestrian barrier, and Arsenal Street and Southwest Avenue are slight barriers. There is an established neighborhood sidewalk system within neighborhoods.

- **Key Public Features.** Community resources and destination centers include the Hill neighborhood, Tower Grove Park, Sublette Park, the State Psychiatric Hospital, a local branch of the St. Louis police department, a branch of the YMCA, Shaw Visual & Performing Arts School, a St. Louis Charter School/Psychiatric Rehabilitation Center/ Child Care center, and Community Access Job Training.

- **Development Potential.** The proposed station area offers proximity to both stable residential neighborhoods and local and regional parks. There is also proximity to Neighborhood and Regional Commercial Areas (NRCAs). The Strategic Land Use Plan projects 26.5 acres of Business/Industrial Development Area (BIDA).

  Recommended redevelopment includes approximately 125,000 square feet of multi-family residential land use, primarily in the form of higher-density apartments and condominiums. Nearly 48,000 square feet of multi-level neighborhood commercial land use will support the area's planned population growth.

Bayless Station and Half-Mile Radius Area (Figures 6.2-12 and 6.2-13)

- **Key Issues.** There is a predominance of single-family residential land use within the station area. The high number of residential cul-de-sacs causes area fragmentation.

The area is further fragmented and somewhat isolated by Interstate-55 and Gravois Creek. The station lies near a floodplain.

- **Walkability and Urban Design Issues.** Overall walkability and pedestrian accommodation within the station area are poor. Interstate-55 creates a major pedestrian barrier. There are only limited existing sidewalks. Residential cul-de-sacs create indirect pedestrian routes. Bayless Road lacks streetscape definition because of the relatively large setback of existing strip retail stores.

- **Key Public Features.** Community resources and destination centers within the proposed station area include G.J. Appel Park, Grant's Trail, a branch of the public library, St. Timothy Elementary School, and Bella Villa City Hall.

- **Development Potential.** Strategic land use information for land outside the City of St. Louis is currently unavailable. Existing land use includes neighborhood commercial and residential. Property to the southwest of the station offers the potential for increased residential land use. Because access to Interstate-55 is good, regional-level development is also possible. Long-term development goals for the station area may include mixed use along Bayless.

  Redevelopment recommendations for the station area feature a significant increase in residential land use: about 93 single-family houses, as well as approximately 523,000 square feet of multi-family structures, which includes apartments, condominiums, and nearly 130 townhomes. The development of approximately 65,000 square feet of neighborhood commercial land use will help support resident needs.

Jefferson Station and Half-Mile Radius Area

- **Key Issues.** Gravois Avenue and Jefferson Avenue are major arterial roadways bordered by numerous neighborhood commercial and institutional uses. Residential land use predominates, particularly in the area off Gravois. Both Gravois Avenue and Jefferson Boulevard are served by MetroBus, providing access to regional transit.

- **Walkability and Urban Design Issues.** Overall walkability within the station area is good. Gravois Avenue's wide right-of-way is conducive to LRT implementation. Gravois offers lower pedestrian accommodation, though, because of its limited crosswalks and high traffic flow. The area features numerous intersecting streets and good neighborhood sidewalk networks.

- **Key Public Features.** Community resources and destination centers in this area include Fox Park, Benton Park, Fremont Park, McKinley Junior Academy, and Sigel Elementary School.

- **Development Potential.** The Strategic Land Use Plan identifies approximately 23 acres of Opportunity Area (OA) land use, meaning there is projected to be tremendous opportunity for redevelopment. Existing investment in redevelopment is occurring in the Benton Park West and Fox Park neighborhoods. Because both Gravois and Jefferson carry high traffic loads and are along existing MetroBus routes, the area also holds great potential for TOD.

Specific redevelopment recommendations feature considerable residential land use: nearly 20 single-family homes and approximately 366,000 square feet of apartments and condominiums. About 162,000 square feet are projected mixed-use and neighborhood commercial areas. Nearly 30,000 square feet comprise institutional preservation and development areas. The area south of the St. Francis de Sales Church is reserved for the potential expansion of future parking.

Bates Station and Half-Mile Radius Area

- **Key Issues.** Residential land use predominates within the proposed station area. There are some under-utilized properties. An active Union Pacific Railroad line, flanked on both sides by light industrial land use, runs through the center of the station area and shares right-of-way with the proposed LRT alignment. There is opportunity for redevelopment of some existing multi-family residential and light industrial properties.

- **Walkability and Urban Design Issues.** Walkability and pedestrian accommodation within the station area is generally good. This is supported by the area's network of existing sidewalks. Also, Grand Avenue is at a residential scale, with wide sidewalks and smaller retail shops. The Union Pacific Railroad and its right-of-way create an east-west barrier, though.

- **Key Public Features**. Community resources and destination centers within the proposed station area include St. Mary's High School and Cleveland Naval Academy ROTC High School.

- **Development Potential.** The City's Strategic Land Use Plan identifies approximately 26.5 acres for Business/Industrial Redevelopment. Residential redevelopment could potentially build upon existing stable neighborhoods.

  Recommendations for redevelopment include some residential land use: 23 units of single-family houses, as well as approximately 95,000 square feet of apartments and condominiums. As mentioned, such residential redevelopment could build upon existing stable neighborhood patterns. Nearly 60,000 square feet of mixed-use and neighborhood commercial land use will support area residents. Approximately 73,000 square feet of business and industrial development (roughly the aforementioned 26.5 acres) will also supply an increasing employment base.

Mississippi Station and Half-Mile Radius Area (Figures 6.2-14 and 6.2-15)

- **Key Issues.** The station offers proximity to both the existing MetroLink system and the proposed Chouteau Greenway. Chouteau Avenue's wide right-of-way is conducive to LRT implementation. Lafayette Square and the Gate District neighborhoods are regional destination centers. Several of the area's extensive distribution, warehouse, and residential properties could provide opportunities for redevelopment.

- **Walkability and Urban Design Issues.** Walkability within the proposed station area is generally good. Pedestrian use is accommodated with the area's well-connected sidewalk system. Interstate-64 creates a major north-south barrier, though, and Tucker Road and Jefferson Avenue are moderate barriers.

- **Key Public Features.** Community resources and destination centers within the proposed station area include the Lafayette Square and Gate District neighborhoods,

Lafayette Park, Eads Square Park, Buder Playground, and a local fire station/engine house.

- **Development Potential.** This station holds the potential for multiple redevelopment and opportunity areas. Land use within the station area is generally shifting from industrial to mixed-use. An advantage is the area's proximity to employment centers.

  Redevelopment recommendations for the proposed station area feature a significant increase in residential land use, including the addition of approximately 725,000 square feet of multi-story apartments and condominiums. This higher-density residential development follows the pattern of existing residential areas south of the station; apartments and condos north of the station face proposed Chouteau Greenway. In addition to residential land use, redevelopment plans include approximately 405,000 square feet of mixed-use and commercial land use; these areas will support area residents, LRT commuters, and visitors to the region.

South Broadway Station and Half-Mile Radius Area (Figures 6.2-16 through 6.2-18)

- **Key Issues.** The proposed area has numerous neighborhood and regional commercial areas, as well as many institutions and employment centers. It also features a good urban street network.

- **Walkability and Urban Design Issues.** Walkability within the proposed station area is generally good. Pedestrian use is accommodated via the area's well-connected sidewalk system. Interstate-55 creates a barrier to the east and south, though.

- **Key Public Features.** The proposed station area's numerous community resources and destination centers include Laclede Park, Mount Pleasant Park, Marquette Park, Minnie Wood Memorial Square, Meramec Elementary School, Carnahan High School, St. Alexius Hospital, the Maryville Post Office, the City of St. Louis Police Practice Facility, the City of St. Louis Dog Pound, and the Charless Home.

- **Development Potential.** The South Broadway station area has approximately 15 acres of Neighborhood Commercial development areas, as identified in the City's Strategic Land Use Plan. The area offers good access to Interstate-55; visibility to the area is therefore good. Broadway itself carries high traffic volume. Redevelopment is presently underway in the nearby Dutch Town neighborhood on approximately 21 acres of neighborhood commercial area. Such large parcels offer favorable areas for potential redevelopment.

  Recommendations for station area redevelopment feature approximately 215,000 square feet of multi-family residential land use, primarily apartments and condominiums. Nearly 135,000 square feet of mixed-use, retail, and office space will support area residents, LRT commuters, and visitors to the region. Approximately 125,000 square feet, spread over an estimated three floors, of parking garage space will also serve residents, commuters, and visitors.

FIGURE 6.2-9: ARSENAL, EXISTING LAND USE

FIGURE 6.2-10: ARSENAL, DEVELOPMENT POTENTIAL

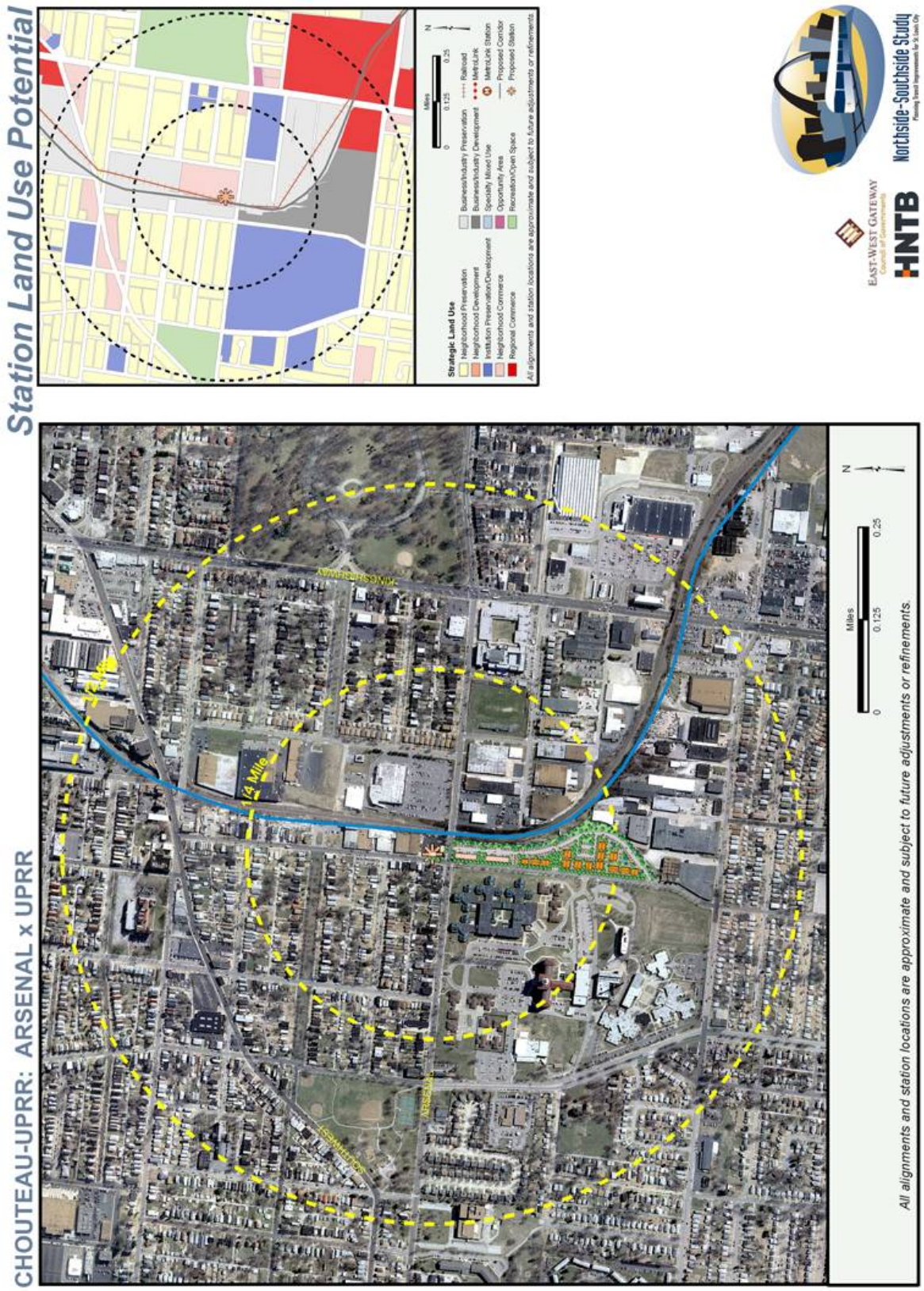


FIGURE 6.2-11: ARSENAL, POTENTIAL LAND USE DEVELOPMENT

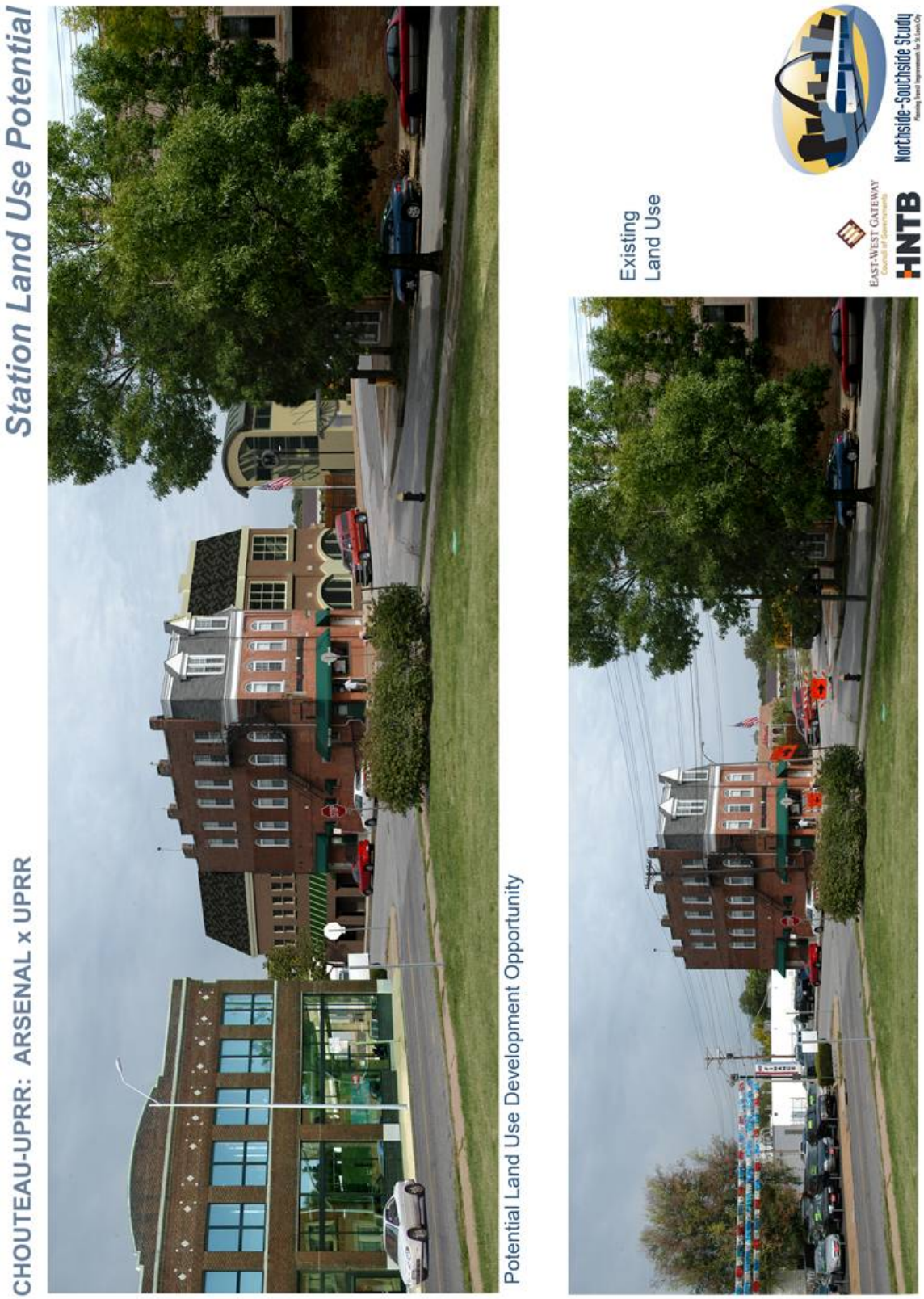


FIGURE 6.2-12: BAYLESS, EXISTING LAND USE

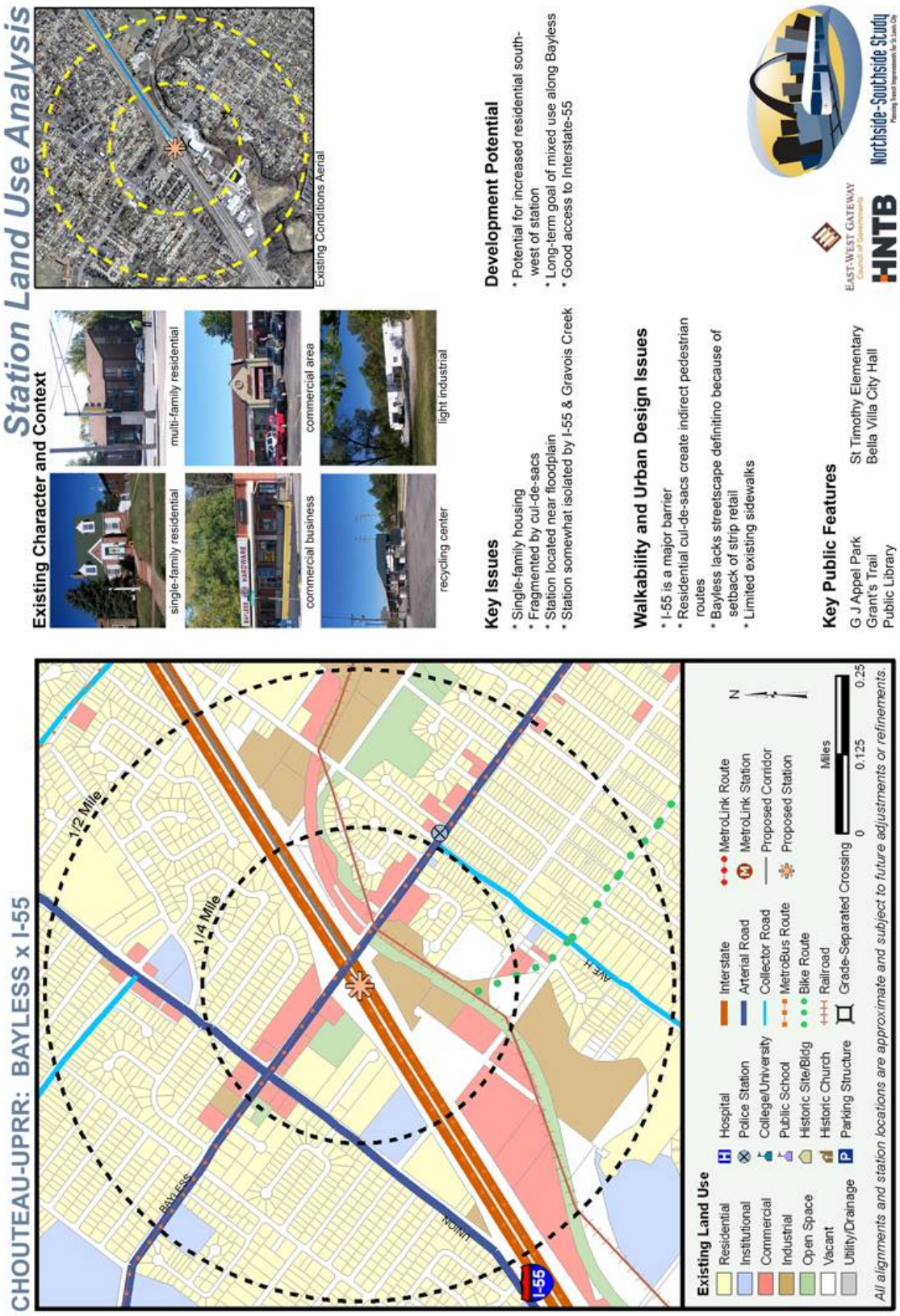


FIGURE 6.2-13: BAYLESS, DEVELOPMENT POTENTIAL

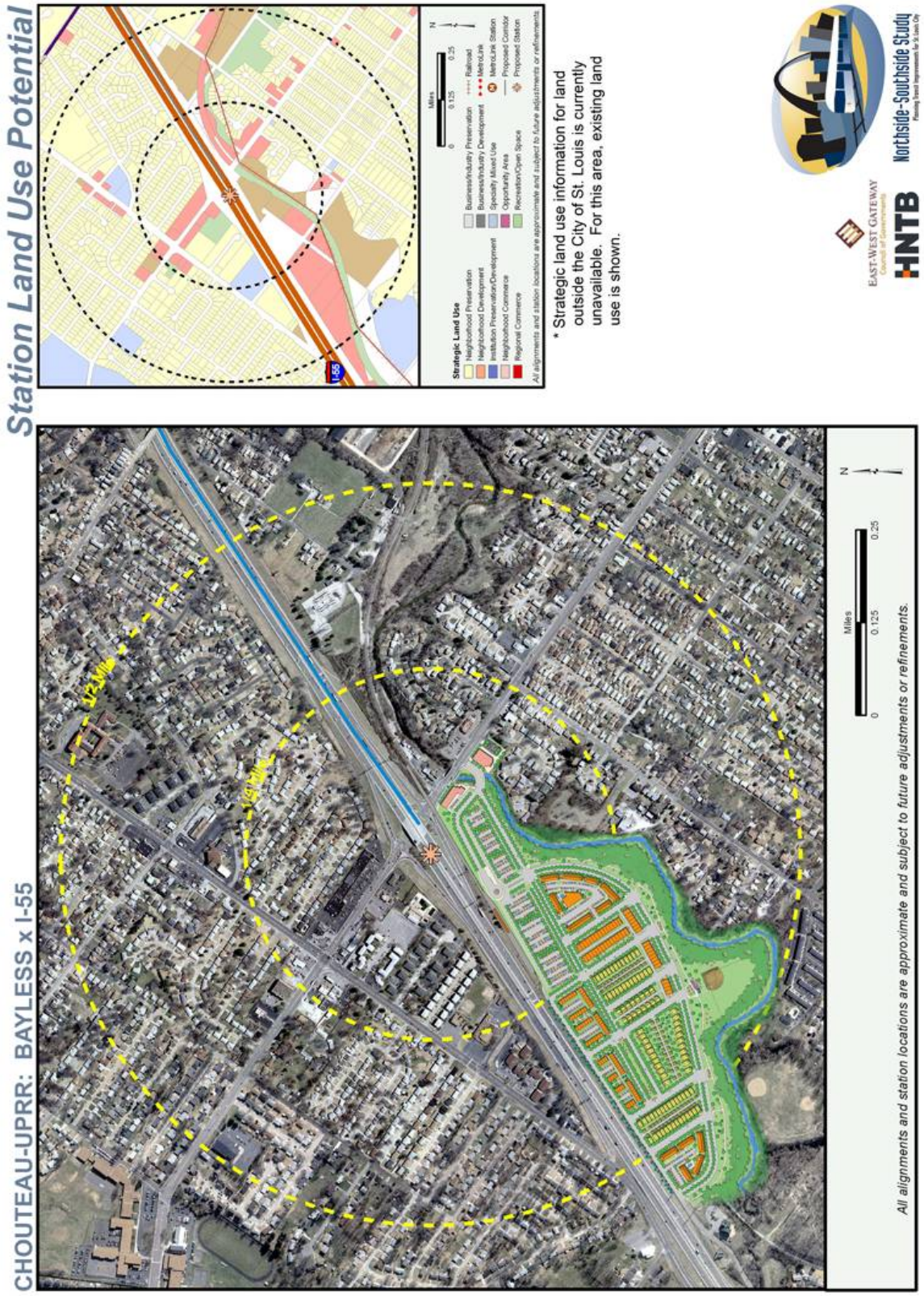


FIGURE 6.2-14: MISSISSIPPI, EXISTING LAND USE

FIGURE 6.2-15: MISSISSIPPI, DEVELOPMENT POTENTIAL

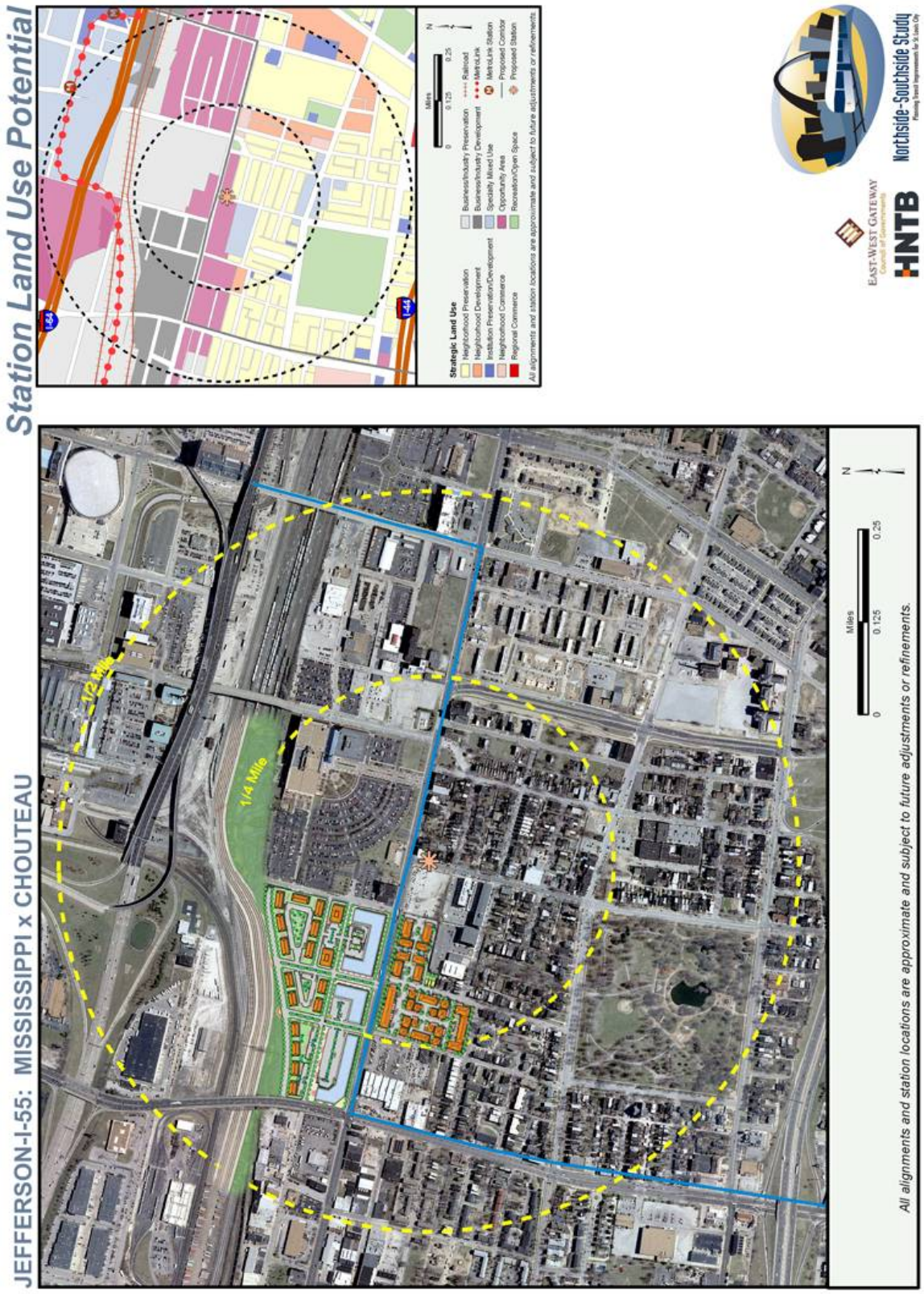


FIGURE 6.2-16: SOUTH BROADWAY, EXISTING LAND USE

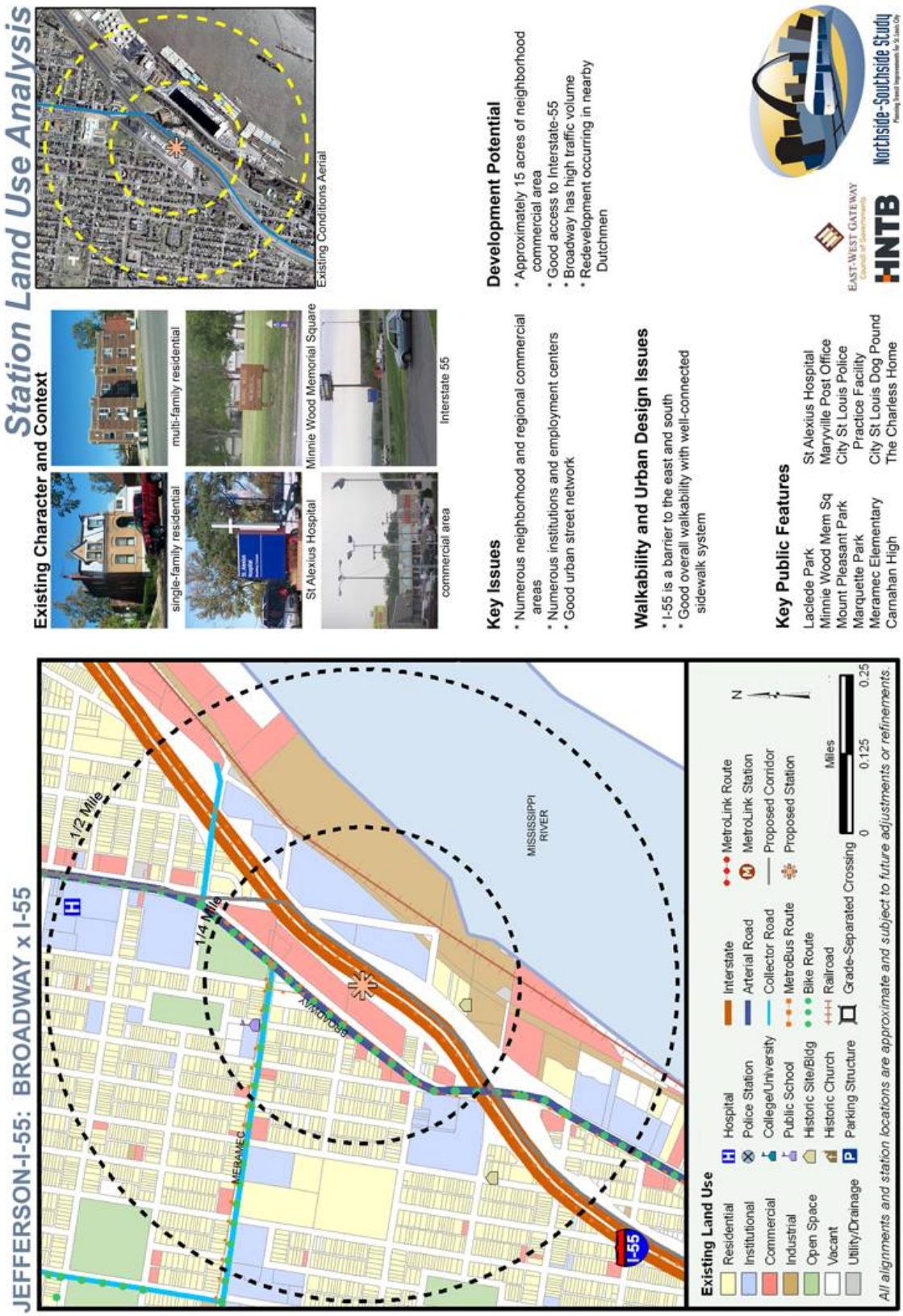


FIGURE 6.2-17: SOUTH BROADWAY, DEVELOPMENT POTENTIAL

FIGURE 6.2-18: SOUTH BROADWAY, POTENTIAL LAND USE DEVELOPMENT

6.2.5 CONCLUSION

This section of the chapter identifies TOD opportunities throughout the Southside study corridor along Chouteau Avenue, 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 Chouteau Avenue illustrates opportunity for redevelopment, while roads further from the alignments offer less. This corridor, along with Jefferson Avenue, has the infrastructure and mixture of land use to incorporate light rail transit as a catalyst for development.

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 of this report.

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 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 MTIAs that resulted in the selection of 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 FTA New Starts criteria to secure federal funding for project implementation.

6.3.1 NEW STARTS CRITERIA

The FTA applies its New Starts criteria 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 within 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 New Starts criteria 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 alignment alternatives and station areas in the Southside study area.

There are three alignments that are being considered within the Southside study area. The Chouteau Avenue/UPRR alternative is aligned from 14th Street along Chouteau Avenue, along the Union Pacific Railroad from Grand Boulevard to Loughborough Avenue, and along I-55 right-of-way from Loughborough Avenue to Bayless, St. Louis County. The Jefferson Avenue/I-55 alternative is aligned from 14th Street along Chouteau Avenue, along Jefferson Avenue to Broadway, and along I-55 right-of-way from Broadway to Bayless, St. Louis County. The final alternative is Gravois Avenue/UPRR, which is aligned from Tucker Boulevard to Gravois Avenue, along Gravois Avenue to Chippewa Street, along the Union Pacific Railroad from Chippewa Street to Loughborough Avenue, and along I-55 right-of-way from Broadway to Bayless, St. Louis County.

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 Southside alignments is illustrated in Figure 6.3-1, and briefly described below for each of the proposed one-half mile station areas.

1. <u>Chouteau Avenue/UPRR Alternative</u>

Mississippi Street
The station is proposed at Chouteau Avenue and Mississippi Street. The regional electric company, Ameren, has its headquarters at this street location. Chouteau Avenue contains some aging commercial and industrial properties that have potential for future redevelopment, especially as it relates to the Chouteau Greenway Plan (described briefly in Chapter 6.2.3). A new townhouse development, Lafayette Walk, and converted warehouse lofts, Lofts at Lafayette Square, are also adjacent to the proposed station. Nearby Lafayette Square is a community park that is surrounded by rehabilitated historic homes, and the adjacent Lafayette Square Business District is a traditional mixed-use commercial district with recent infill development.

South Grand Boulevard
The station is proposed at Chouteau Avenue and South Grand Boulevard. This location is the gateway area to St. Louis University Hospital, which owns a significant amount of property and is reinvesting within the station area. St. Louis University Hospital, as well as other institutions and private investors, is spearheading the development of a research center within the station area. The area north of Chouteau Avenue contains the CORTEX Site, the area for the research center, which is a strategic component of the Chouteau Greenway Plan. West of the proposed station, the light rail alignment would enter the below-grade right-of-way for Union Pacific Railroad.

Shaw Boulevard
The station is proposed for an at-grade crossing between Shaw Boulevard and the Union Pacific Railroad. The station location is adjacent to the Monsanto Center of the Missouri Botanical Garden, which is a significant horticultural institution. A Metro Bus park-n-ride lot is also adjacent to the proposed station. Vandeventer Avenue and Kingshighway Boulevard cross through the station area and contain traditional mixed uses and auto-oriented commercial uses. There are well-utilized heavy and light commercial and industrial uses, as well as some aging properties that may have future redevelopment potential.

Arsenal Street
The station is proposed at Arsenal Street and a below-grade crossing of the Union Pacific Railroad, west of Kingshighway Boulevard. A community-wide supermarket, Schnucks, is located near the proposed station. Nearby is the State Psychiatric Hospital, a prominent institutional use. The area also contains relatively stable single-family residential neighborhoods. Kingshighway Boulevard is the frontage of a large community open space, Tower Grove Park, as well as a regional commercial center with a Home Depot anchor. There are some additional commercial and industrial properties with future redevelopment potential.

Meramec Street
The station is proposed for an at-grade crossing between Meramec Street and the Union Pacific Railroad. Gravois Avenue traverses the station area and contains conventional auto-oriented commercial uses and automobile dealers. Gravois Avenue also contains the Bevo District, a traditional mixed-use commercial area with retail shops and restaurants. Stable single-family residential neighborhoods are also located in the station area.

Bates Street
The station is proposed for an at-grade crossing between Bates Street and the Union Pacific Railroad. The majority of the station area contains stable residential neighborhoods with well-maintained homes. There is a small mixed-use neighborhood commercial center at the intersection of Bates Street and South Grand Boulevard. Aging industrial uses contain future redevelopment potential along the railroad right-of-way.

Loughborough Avenue
The station is proposed at the intersection of Loughborough Avenue, the Union Pacific Railroad right-of-way, and an I-55 interchange. This intersection contains a regional commercial center that is anchored by a Lowe's home improvement store and a Schnucks supermarket. The station is also adjacent to Carondelet Park, a significant community open space amenity. Stable and well-maintained residential neighborhoods surround the Park.

Bayless/I-55
The station is proposed west of the Bayless Avenue interchange of I-55 and east of the Gravois Creek. North of I-55, the station area contains conventional single-family residential uses within a cul-de-sac street pattern. South of I-55, the station area contains single-family residential uses in a traditional street grid pattern. There are some multi-family residential uses and auto-oriented commercial uses on Bayless Avenue.

2. <u>Jefferson Avenue/I-55 Alternative</u>

Park Avenue:
The station is proposed at Jefferson and Park Avenues. This station area contains Lafayette Park and the adjacent Lafayette Park Business District, which are catalysts for residential

rehabilitation and infill development. There is a mix of newly renovated and older homes in the station area, as well as some vacant properties with infill potential. There is a small mixed-use area with redevelopment and infill potential at Jefferson and Lafayette Avenues.

Russell Boulevard
The station is proposed at Jefferson Avenue and Russell Boulevard. This station area overlaps the Park Avenue station area, and contains Lafayette Park and Lafayette Avenue. There is a mix of relatively stable residential uses and vacant residential lots with infill potential. Gravois Avenue traverses the station area, and contains an aging and underutilized mixed-use commercial area.

Arsenal Street
The station is proposed at Jefferson Avenue and Arsenal Street, which is the location of Benton Park. Newly-renovated historic homes are evident along the perimeter of Benton Park. There is a mix of stable residential uses and some vacant residential lots throughout the station area. Jefferson Avenue contains an aging and underutilized mixed-use commercial district between Arsenal Street and Gravois Avenue.

Cherokee Street
The station is proposed at Jefferson Avenue and Cherokee Street, which is a local east-west commercial corridor. West of Jefferson Avenue, Cherokee Street contains the Cherokee Station Shopping District, a traditional mixed-use commercial district with independent shops that serve the surrounding neighborhoods. East of Jefferson Avenue, Cherokee Street contains the Cherokee Lemp Historic District, a vibrant mixed-use district that serves as a regional antique goods district. Relatively stable residential neighborhoods surround these two business districts, and contain some infill development potential.

Chippewa Street
The station is proposed at Jefferson and Chippewa Street, which is a commercial intersection with new and aging businesses. The traditional mixed-use businesses along Jefferson Avenue have revitalization and reuse potential. Jefferson Avenue is the location of a major institution, St. Alexius Hospital, and other local institutional uses. Stately historic single-family homes are also located along Jefferson Avenue. The station area contains stable residential neighborhoods, with limited vacant residential lots.

Broadway
The station is proposed along Broadway, south of Meramec Street along the I-55 right-of-way. The proposed station location contains an aging commercial strip center with redevelopment potential. St. Alexius Hospital and Carnahan High School are two institutions within this station area. The surrounding residential neighborhoods are well-maintained and in stable condition. The station area includes a portion of the Mississippi River waterfront, which contains active industrial and shipping uses.

Bates and Virginia Streets
The station is proposed along the I-55 right-of-way at Bates and Virginia Streets. The entire station area primarily contains stable residential neighborhoods. There are newer residential and institutional uses on Broadway along the Mississippi River.

Loughborough Avenue
The station area covers virtually the same land area as previously described under the Chouteau/UPRR Alternative.

3. Gravois/UPRR Alternative

Chouteau Avenue
The station is proposed at Chouteau Avenue and Tucker Boulevard. Adjacent to the station location is the Clinton Homes public housing development, which was constructed within a traditional neighborhood framework. The historic Old City Hospital was recently converted to residential condominiums and re-named the Georgian. There is a significant amount of underutilized heavy commercial and industrial uses north of Chouteau Avenue, which are being considered for redevelopment as part of the Chouteau Greenway Plan.

Lafayette Avenue
The station is proposed at Lafayette Avenue and Tucker Boulevard. The Clinton Homes public housing development and the Georgian condominiums are also located within this station area. In addition, Lafayette Park and the Lafayette Park Business District are located along the station area's western perimeter. A major interchange area between I-44 and I-55 is located in the station area. This affects the cohesiveness of the residential neighborhoods.

Russell Boulevard
The station is proposed at Russell Boulevard and Gravois Avenue. The station area overlaps with the Lafayette Avenue station area and also contains the I-44/I-55 interchange area. East of the interstates, Russell Boulevard contains local shops, bars, and restaurants. The surrounding neighborhood contains a mix of stable homes and vacant residential lots. Gravois Avenue traverses the station area and contains an aging mixed-use commercial district with redevelopment and revitalization potential.

Gravois Avenue
The station is proposed at Jefferson and Gravois Avenues. Both Jefferson and Gravois Avenues contain viable and aging commercial uses within a traditional mixed-use pattern and a conventional auto-oriented pattern. Commercial properties with redevelopment potential are well-suited for traditional mixed-use infill development. There is a mix of stable residential use and vacant residential lots with infill potential.

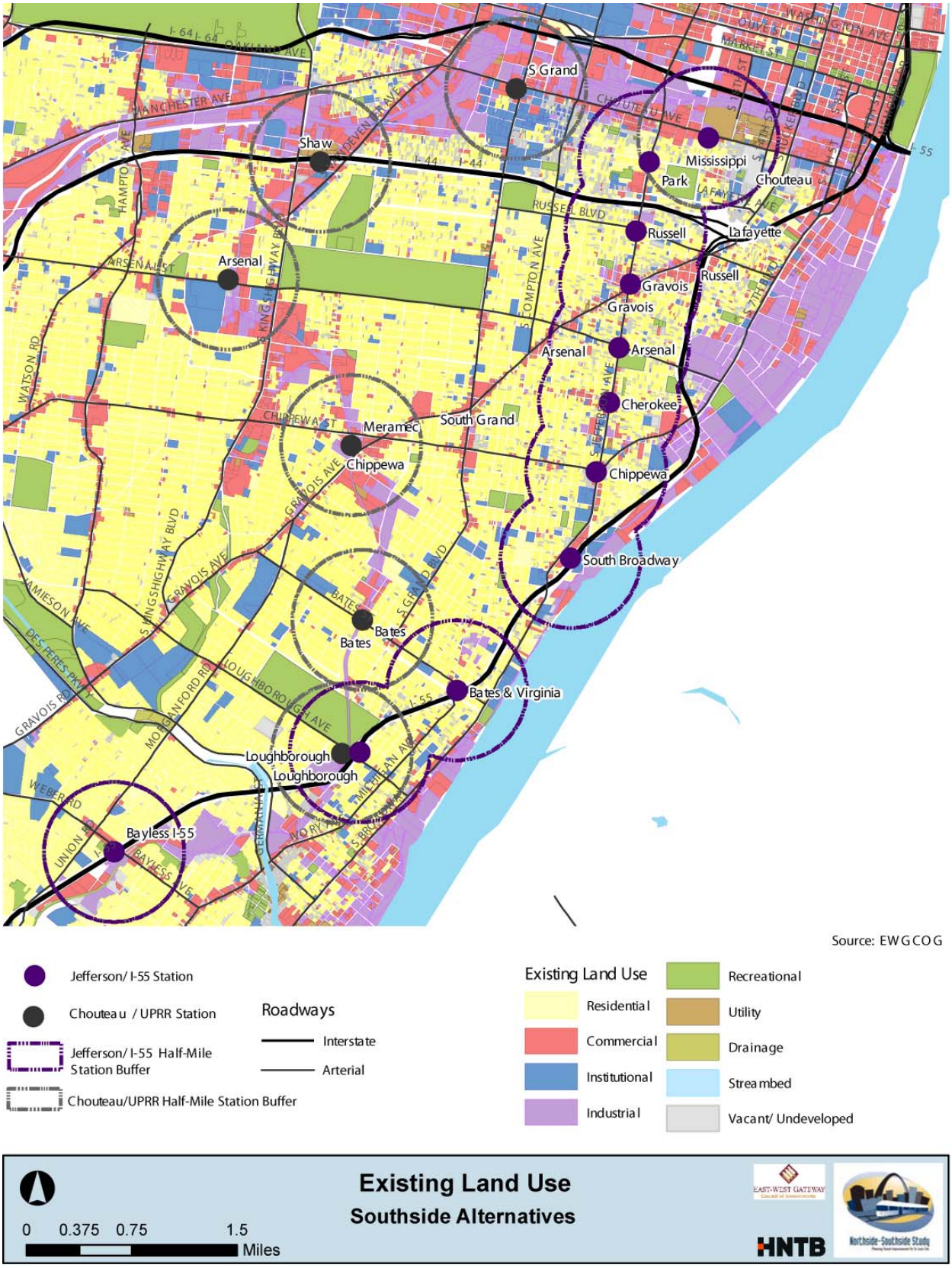
Arsenal Street
The station is proposed at Arsenal Street and Gravois Avenues. Gravois Avenue contains a mix of aging traditional mixed-uses and auto-oriented commercial uses, as well as some vacant properties. This commercial district has many redevelopment, reuse, and infill development opportunities. The residential neighborhoods contain stable homes and vacant lots, with infill development potential.

South Grand Boulevard
The station is proposed at South Grand Boulevard and Gravois Avenue, which is an intersection of commercial and mixed-uses. The architecturally significant Southside National Bank was recently converted to condominiums and should prove to be a catalyst for additional redevelopment and reuse along the commercial corridors. Gravois Avenue west of South Grand contains a small-scale traditional mixed-use business district. The surrounding residential neighborhoods are in good condition.

Chippewa Street
The station area covers virtually the same land area as previously described under the Meramec station area in the Chouteau/UPRR Alternative.

Bates Street, Loughborough Avenue, and Bayless/I-55
These station areas cover exactly the same land areas as previously described in the Chouteau/UPRR Alternative.

FIGURE 6.3-1: EXISTING LAND USE



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, and, 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 Southside study area.

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 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 Southside 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 EWGCOG completed 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 LRT along Natural Bridge Avenue and a downtown loop as the LPA for the Northside, and included either light rail transit or bus rapid transit utilizing the existing Union Pacific Railroad right-of-way from a downtown loop for the Southside.

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 Plan has a strong preservation and redevelopment focus. It identifies stable, vibrant areas that need to be preserved, as well as areas targeted for new development and redevelopment. The Plan aims at improving the overall quality of life within the City in order to attract continued investment in its existing neighborhoods.

Current Transit-Supportive Corridor Policies

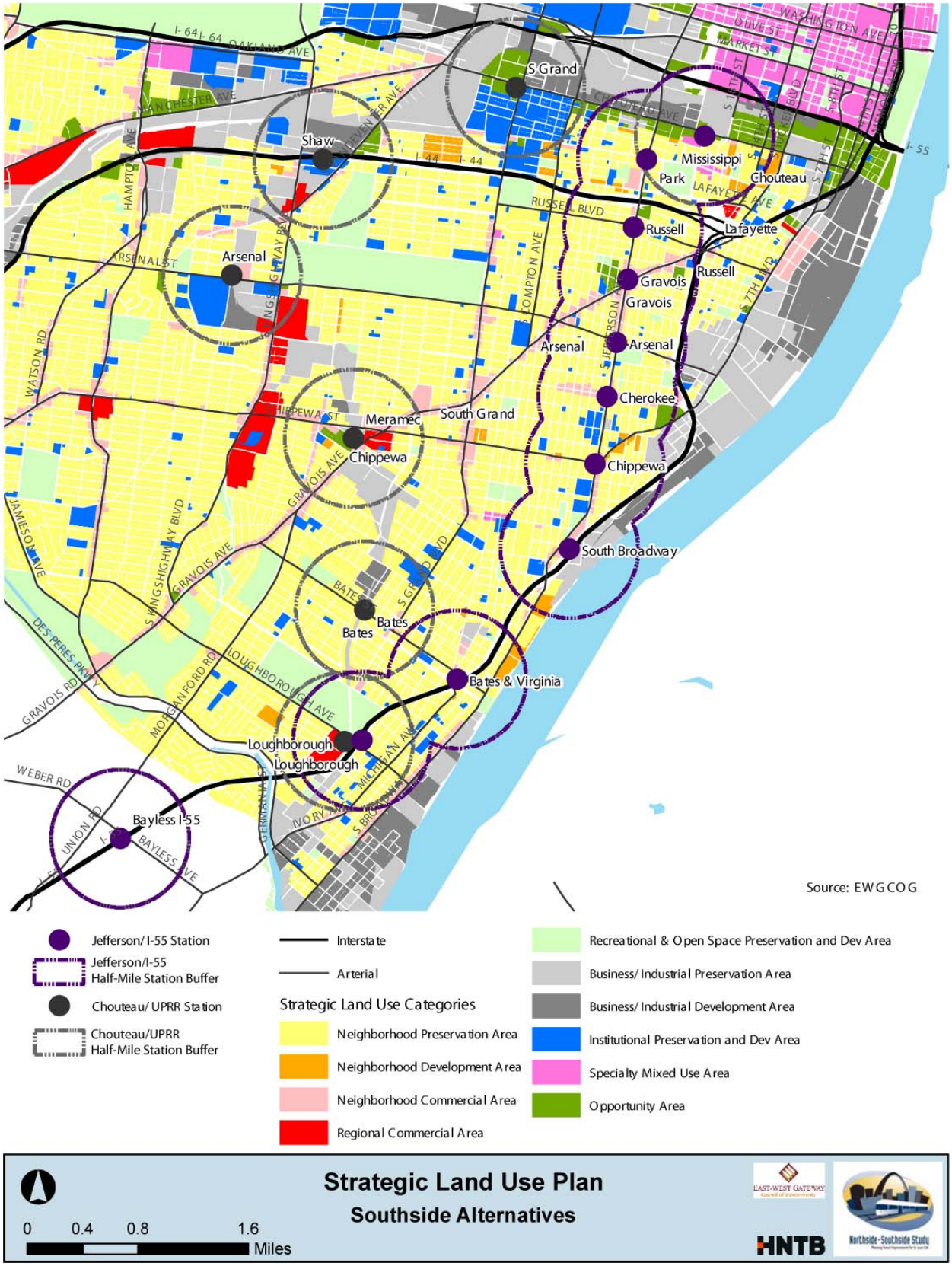
Local comprehensive and capital improvement plans should contain transit-supportive corridor policies that are aimed at increasing development within the proposed transit corridors and the station areas and improving their transit-friendly and pedestrian-friendly character. For the City of St. Louis, 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 Plan map reflect existing development and the future development potential of parcels throughout the City. Such development potential for the Southside study area is illustrated in Figure 6.3-2.

The proposed alignment alternatives on the Southside are characterized by relatively stable neighborhoods. Compared to the Northside LPA, the Strategic Land Use Plan recommendations for these corridors include substantially fewer redevelopment areas. The greatest potential for redevelopment exists in the station areas at the southern edge of downtown, along Chouteau Avenue. These areas include a mix of "Business/Industrial Development Areas" and "Opportunity Areas." Some of the station areas located along the Union Pacific Railroad including Shaw, Arsenal and Bates Street stations have large parcels designated for business/industrial development. Additionally, significant "Opportunity Areas" are present in the Gravois, Cherokee and Meramec station areas. These redevelopment areas present an opportunity to strengthen the development pattern in the Southside station areas and improve their overall transit-supportive character.

FIGURE 6.3-2: STRATEGIC LAND USE PLAN, SOUTHSIDE



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.

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, is regulated by the City of St. Louis's zoning code.

The Southside study area includes the entire range of residential, commercial, and industrial zones present in the City's zoning code. The station areas south of Interstate-44 and west of Jefferson Avenue include large areas of Zones A (Single-Family Residential Zone, which allows 10.89 dwelling units per acre) and B (Two-Family Dwelling District, which allows up to four-flat dwellings at a maximum density of 17.42 dwelling units per acre). Commercial uses or mixed-uses (except bed and breakfast inns) are not allowed in these zones. Station areas to the north and east include the higher density, multi-family residential zones (Zones D, E and F).

The residential zones generally allow for transit-supportive densities that meet at least the "medium" density threshold specified by FTA (refer to 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

	Corridor Policies and Station Area Zoning				
	Station Area Development			Parking Supply	
Rating	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 Jefferson, Vandeventer, and Gravois Avenues and Grand and Kingshighway Boulevards. Most of the corridors are zoned F, Neighborhood Commercial District. Gravois west of Jefferson is zoned Local Commercial (Zone G). 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.

Zones J (Industrial District) and K (Unrestricted District) are present extensively in the station areas along Chouteau Avenue and along the Union Pacific Railroad to the west. 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 (when possible), or provided at the rear or side of buildings.

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 three Southside alternatives 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."

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 alignment alternatives, The 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.

TABLE 6.3-2: DEVELOPMENT PROTOTYPES

Prototype	Southside Stations (without Gravois/UPRR Stations)	Characteristics		
		Land Use Mix	Density/FAR	Building Height
Neighborhood Residential Center	Bates & Virginia, Chippewa (Jefferson/I-55)	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	Cherokee, Arsenal (Jefferson/I-55), Gravois and Russell (Jefferson/I-55).	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 to 4 stories
Community Scale Mixed Use Center	Arsenal (Chouteau/UPRR) Park	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	Meramec, Bayless, South Broadway, Loughborough	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.

Future Corridor 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 (within the Northside study), which is classified as a "Neighborhood-Residential Center," an average residential density of 14 dwelling units/acre was used for the ¼ mile radius around the proposed station while an average density of 10 dwelling units/acre was used for the area between the ¼-mile and ½-mile radius.

Areas subject to change within the three Southside alternatives are highlighted in Figure 6.3-3. For the most part these alignments have a stable development pattern characterized by established residential and business areas. However, there are vacant and underutilized areas that can be potentially redeveloped enhancing the transit-supportive environment in the proposed station areas. As in the Northside area, the development quantities for the Southside alignments include new development and rehabilitation of existing deteriorated/underutilized properties. The long term development potential for the three Southside alternatives is presented in Table 6.3-3.

TABLE 6.3-3: FUTURE DEVELOPMENT POTENTIAL, SOUTHSIDE ALTERNATIVES

	Dwelling Units (number of units)	**Office** (square feet)	**Commercial*** (square feet)	**Industrial** (square feet)
Chouteau/UPRR	4,000	2,100,000	3,000,000	2,000,000
Jefferson/I-55	4,950	300,000	2,200,000	450,000

** Commercial includes retail and service uses*

The new development would generate additional population and employment within the station areas. The population and employment projections for each alternative alignment based on the future development potential are presented in Table 6.3-4.

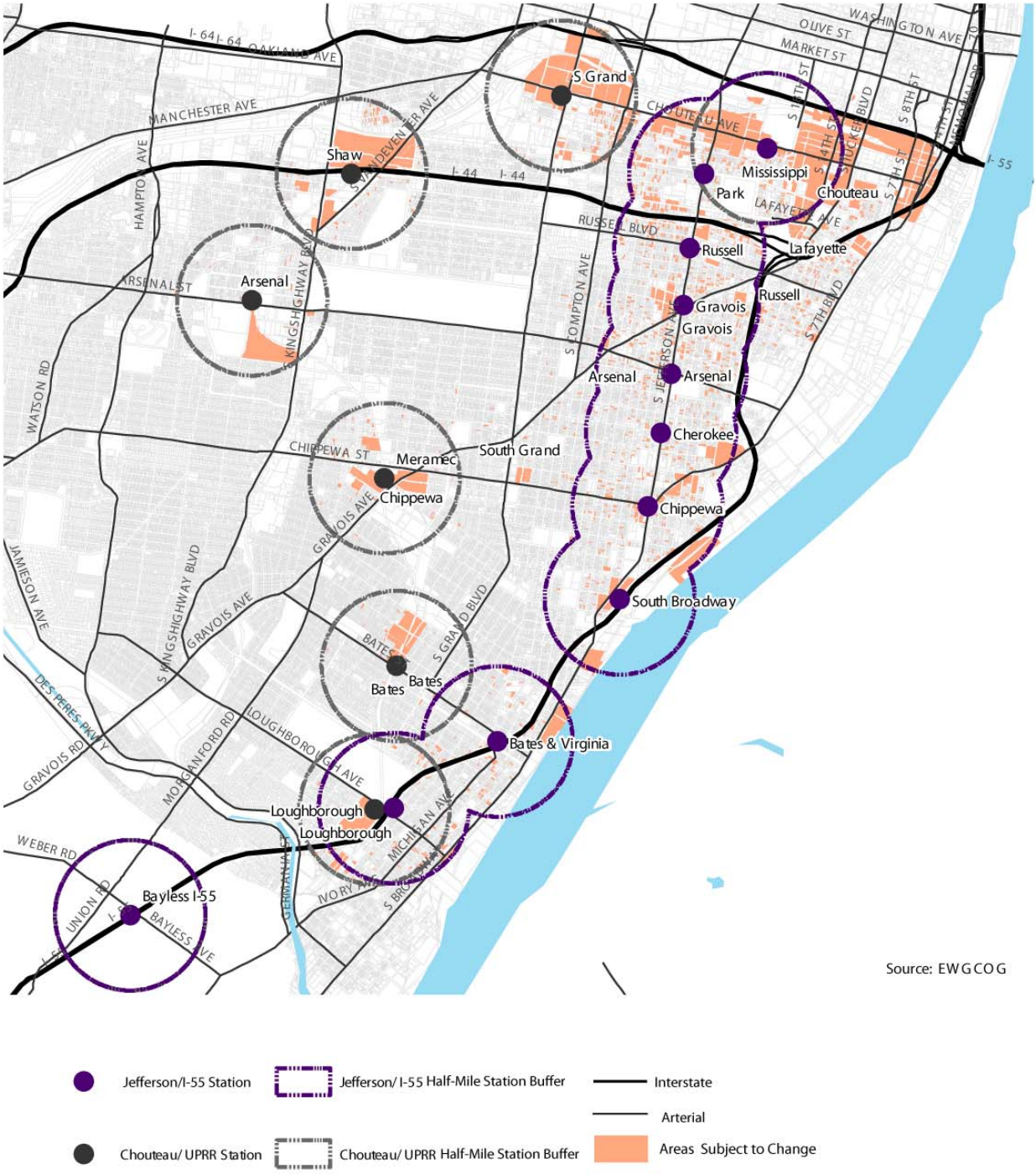
TABLE 6.3-4: FUTURE DEVELOPMENT POTENTIAL, SOUTHSIDE ALTERNATIVES

	Population	**Employment**
Chouteau/UPRR	9,450	14,850
Jefferson/I-55	11,700	6,350

The Southside alternatives offer lower development potential over the future as compared to the Northside LPA, primarily because they are occupied by mostly stable development with low vacancy levels limiting the amount of area available for redevelopment. However, the Southside alignments are currently within a stronger real estate market as compared to the Northside,

making it easier to attract private investment in the near term. It is important to realize that even with comparatively good market support, the City will have to play a proactive role in ensuring continued transit-supportive development of the Southside station areas. The policy recommendations presented later in section 6.3.6 of this chapter provide several such tools and strategies that the City can adopt to ensure the development of a transit-supportive environment within its station areas.

FIGURE 6.3-3: AREAS SUBJECT TO CHANGE, SOUTHSIDE



6.3.5 PRELIMINARY OBSERVATIONS

The Southside alternatives display varying land uses and development characteristics that influence and shape the transit-supportive framework. These alignments consist largely of stable neighborhoods. 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 on alternatives for the Southside study area based on their transit-supportive framework and potential for change.

The Southside alternatives offer varying levels of transit supportiveness in terms of existing land use and development pattern, as well as future development potential (Figure 6.3-4).

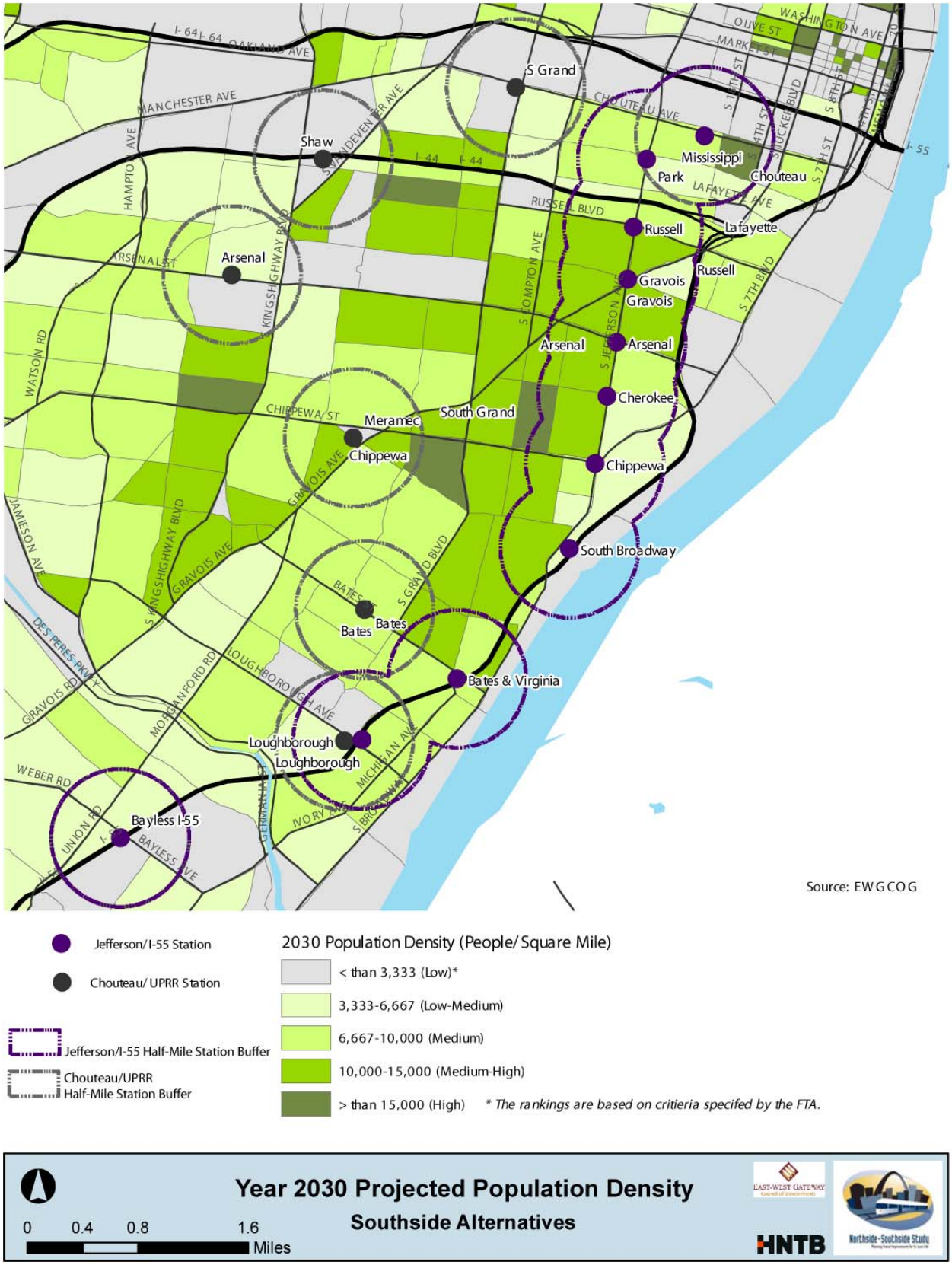
The Chouteau/UPRR alternative alignment, south of Chouteau Avenue, is oriented along the railroad and is dominated by industrial and auto-oriented commercial uses. Large parcels of land along this alignment are occupied by industrial uses interrupting the street network and limiting access to the immediate station areas from surrounding residential neighborhoods. Several of these industrial and commercial uses are underutilized and provide redevelopment opportunities. However, the access limitations created by the existing configuration of large single-use based parcels and limited street network near the railroad do not offer a pedestrian-friendly environment. The area along this alignment would have to undergo significant improvements over time to improve pedestrian accessibility and to create a transit-supportive environment. Based on the 2030 population projections, most of the alignment will have population densities in the “low” to “medium” ranking range due to industrial areas and railroad right-of-way that limit future residential development.

The Gravois/UPRR alternative alignment is primarily centered along Gravois Avenue until it merges with the Union Pacific Railroad south of Chippewa Street. Gravois Avenue is a wide, auto-oriented street from the Russell station area to the South Grand Avenue station area. Although the wide right-of-way allows ample room for accommodating track and related transit improvements, it creates a challenging environment for pedestrians and bicyclists. With multiple traffic lanes, Gravois Avenue becomes a barrier and would require significant traffic calming and urban design improvements to create a pedestrian-friendly environment. Due to its angular alignment, Gravois Avenue cuts across the typical grid structure of the City and creates trapezoidal blocks that may make redevelopment challenging by conventional standards. South of Chippewa Street, the alternative follows the Chouteau/UPRR alignment. Based on the 2030 population projections, most of the alignment will have population densities in the “low-medium” to “medium-high” ranking range mainly due to the existing densities and small residential lots within the alignment area.

The Jefferson/I-55 alternative is oriented along Jefferson Avenue to Broadway, and then along I-55 until it merges with the other alignments at the Loughborough station. Jefferson Avenue appears to be well-suited for transit service because it retains a more pedestrian-friendly character than the other Southside alternatives due to its existing land use and development. The majority of Jefferson Avenue contains a historic “street wall,” with multi-story buildings along the street right-of-way that creates an enclosed streetscape and more intimate development character. South of Chippewa Street, the alternative follows the I-55 right-of-way and encompasses portions of the industrial waterfront and the Mississippi River, which do not provide a transit-supportive framework. Based on the 2030 population projections, most of the alignment will have population densities in the “low-medium” to “medium-high” ranking range mainly due to the existing densities and development character.

Ultimately, the extent of new development and change along the Southside alignments depends on public policies to create more transit-supportive frameworks. Each alternative alignment has future development potential, so public policies could be altered to induce higher density development and mixed uses within proposed station areas. The Southside alignments offer different development characters. The Union Pacific alternative is least likely to offer a successful transition to transit-supportive land uses, and the Gravois alternative is highly automobile-oriented. Transit-supportive policies should be explored by the City as another means to test the suitability of the alternatives as well.

FIGURE 6.3-4: 2030 PROJECTED POPULATION DENSITY, SOUTHSIDE



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-n-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

planning staff for implementation purposes. This could be particularly important to leveraging investment in key locations on the Northside.

- 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 ensure 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

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.

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 Southside study area. (As in other chapters of this report, the downtown area is included in the Northside study.) 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.

All potential LRT alignments and stations within each alternative option are discussed, starting at the north end of the study area (along 14th Street and along Chouteau Avenue) and continuing south (to the park-and-ride terminus at Interstate-55 and Bayless Avenue).

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 Southside 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. Three key planning and design principles are considered in this first step of locating and configuring transit stations, as discussed below and illustrated in Figure 6.4-1.

FIGURE 6.4-1: KEY PRINCIPLES OF TRANSIT STATION 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, as well as all Americans with Disabilities Act (ADA) requirements.

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.

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 Southside 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 6.4-41, 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.

- **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 all 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 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 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.

FIGURE 6.4-2: LRT STATION EXAMPLES

Dallas, TX >

^
Houston, TX

^
San Francisco, CA

Minneapolis, MN >

FIGURE 6.4-3: LOCAL LRT FACILITY (METROLINK)

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

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

6.4.3 SOUTHSIDE 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 Southside 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 LRT alignment will be located in existing street right-of-way. The length of the Southside alignment located in existing street right-of-way will depend on whether the Chouteau/UPRR or Jefferson/I-55 alignment is selected. 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, 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 30' for the 14" rise and 20' for the 8" 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.

- 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 Southside alternatives, most stations would have a single ramp, with a rise of 14", for a total platform/ramp/landing length of 210'. 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.

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)

6.4.4 PROTOTYPICAL LRT STATION DESIGNS

Station location environments within the Southside study area include major roadway corridors and, potentially, railroad and highway corridors. 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 Southside 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) 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	**C**enter[1], **D**ouble-**S**ided platform, in a large park-and-ride station, along RR or freeway corridors, or in the medians of roadways.
2. C-VC	**C**enter[1], double-sided platform in grade-separated stations with **V**ertical **C**irculation.
3. C-SS-AI	**C**enter[1], **S**ingle-**S**ided platforms, **A**cross **I**ntersection.
4. C-SS-IL	**C**enter[1], **S**ingle-**S**ided, **I**n-**L**ine platforms between intersections.
S	**Side-Platform Stations**
5. S-FS	**S**ide[2], **F**ar-**S**ide[3] platforms, in median, in line with the left-turn lanes.
6. S-SbS	**S**ide[2], **S**ide-**b**y-**S**ide platforms.
7. S-SP	**S**ide[2], **S**ingle **P**latform, 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 LRT 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. The prototype illustrations show the LRT station in the middle of a roadway. Other applications of this prototype would be in the large, end-of-line park-and-ride station and in some of the stations along the UPRR and Interstate-55 corridors. There are six potential LRT stations within the Southside study area where this particular prototype could be used:

Chouteau / UPRR Alternative
- UPRR at Shaw Blvd.
- UPRR at Meramec St.
- UPRR at Bates St.

Chouteau / UPRR Alternative and Jefferson / I-55 Alternative
- Interstate-55 at Bayless Ave.

Jefferson / I-55 Alternative
- Jefferson Ave. at Park Ave.
- Interstate-55 at Broadway.

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. The prototype illustration shows the station in the UPRR corridor with a staircase and elevator at the end of the platform. Each application may require a variation of the example shown. Three potential LRT stations could utilize this prototype:

Chouteau / UPRR Alternative
- UPRR at Arsenal St.
- UPRR at Loughborough Ave.

Jefferson / I-55 Alternative
- Interstate-55 at Bates St.

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 the Chouteau Avenue alignment, where there is a limited right-of-way. Because the right-of-way width along Chouteau Avenue is only 80', and the program calls for accommodating four traffic lanes in peak traffic hours, this C-SS-AI prototype was developed; it requires the least width of all prototypes detailed here.

Even this compact configuration does not entirely fit within the 80' right-of-way, thereby requiring a sidewalk easement north of the existing right-of-way. The plan on the left side of Figure 3-8 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 actual applications of this prototype, though it may be required if 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. One LRT station requires application of this prototype:

Chouteau / UPRR Alternative
- Chouteau Ave. at Grand Blvd.

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 Southside 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. Eight LRT stations within the Southside study area could utilize this prototype:

Chouteau / UPRR Alternative
- Chouteau Ave. at Truman Pkwy.
- Chouteau Ave. at Jefferson Ave.

Jefferson / I-55 Alternative
- Jefferson Ave. at Russell Blvd.
- Jefferson Ave. at Gravois Ave.
- Jefferson Ave. at Arsenal St.
- Jefferson Ave. at Cherokee St.
- Jefferson Ave. at Keokuk St.
- Interstate-55 at Loughborough Ave.

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. No Southside LRT stations require application of this prototype.

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, rather than those within the Southside study area. The middle section of Figure 6.4-13 illustrates constrained conditions, with a station platform width at a minimum of 10'. 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. No Southside stations require use of this prototype.

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.

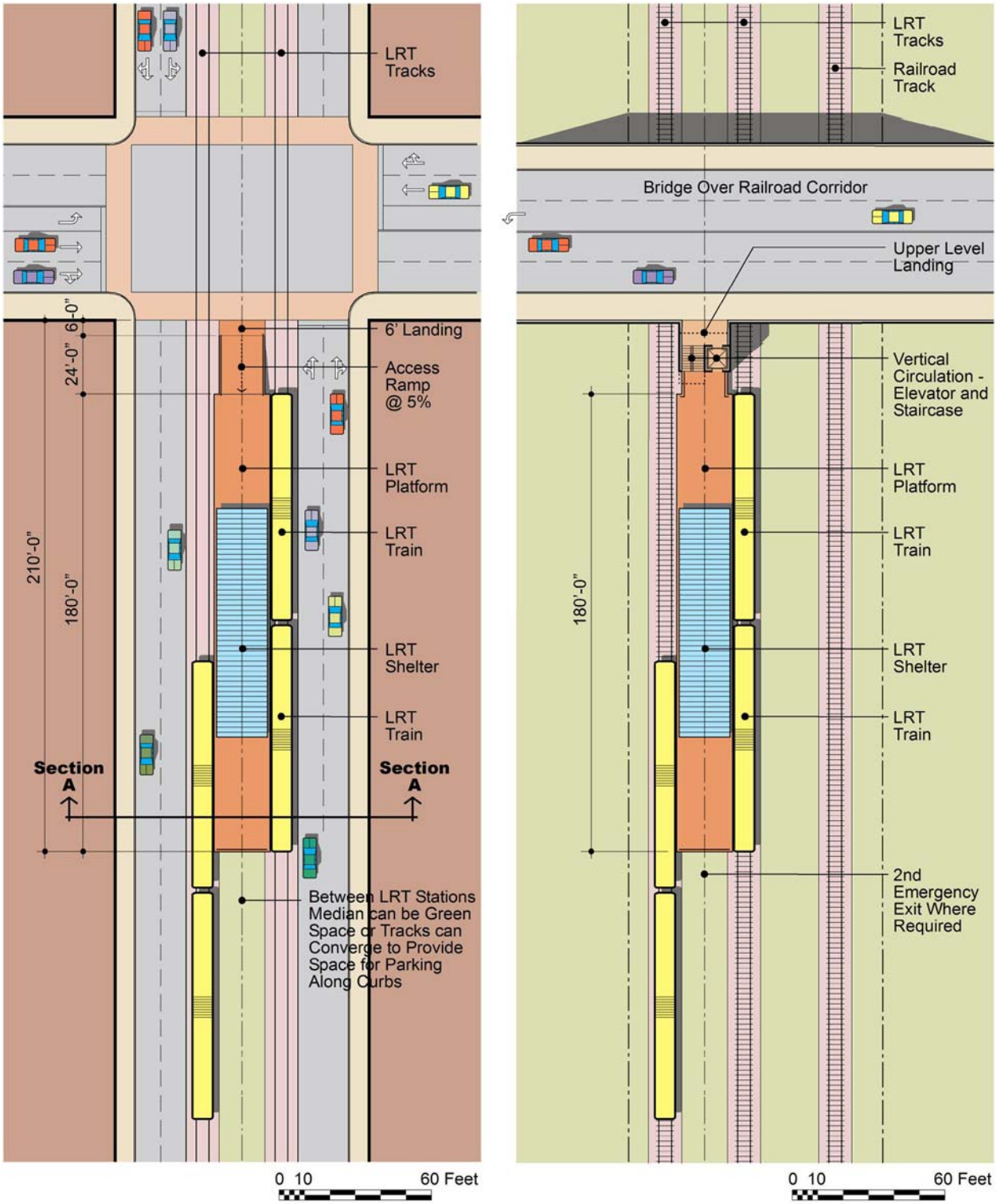
Aside from walking and riding a bicycle, feeder buses are the main mode by which transit users access transit stations. Although the overall feeder bus system is discussed elsewhere in this report, feeder bus accommodations need to be provided at the LRT stations. Feeder buses typically provide service 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' or 60'-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'-long buses (Figure 6.4-14c).

Bus stops should include, at a minimum:

- 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.

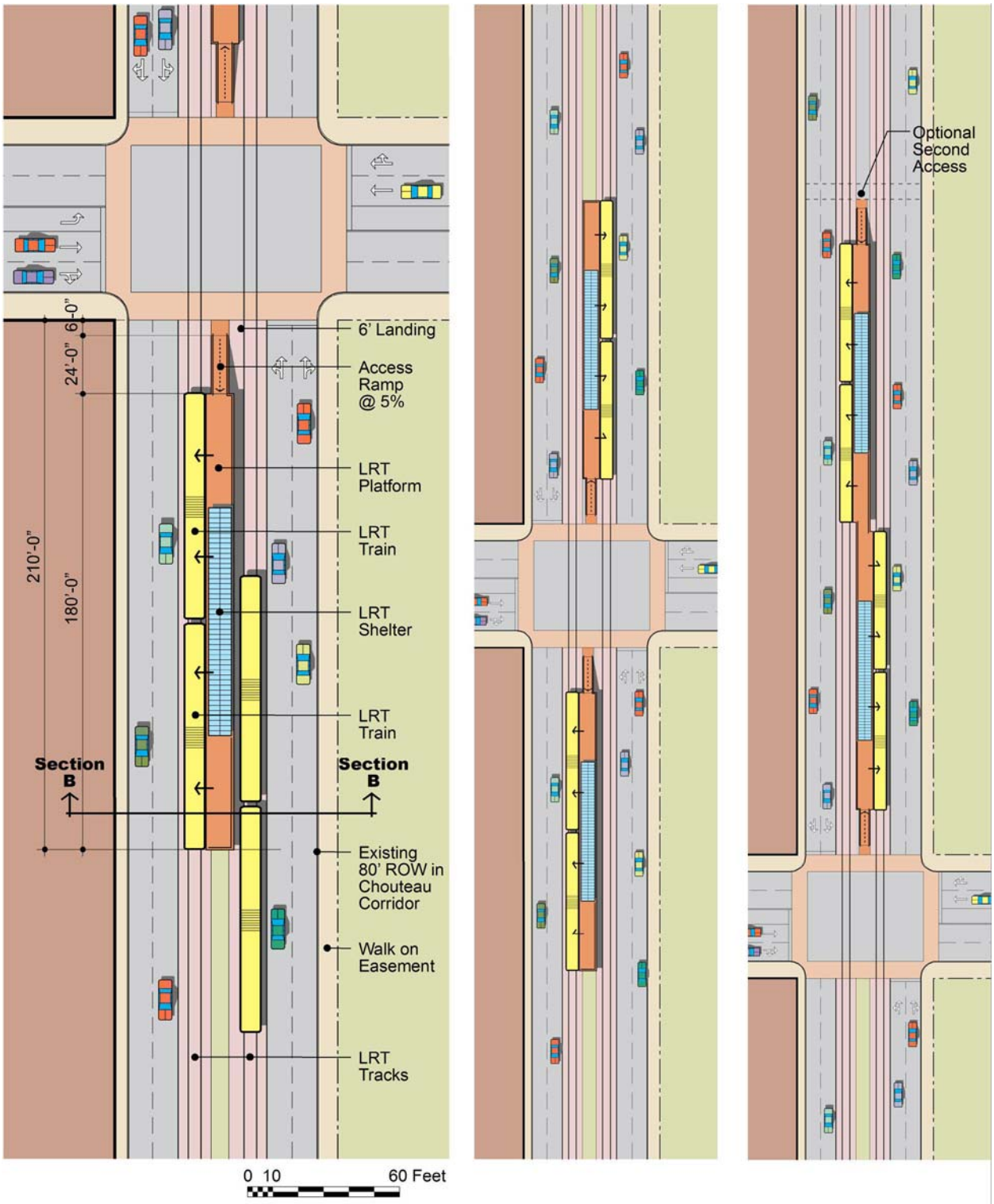
FIGURE 6.4-7: PROTOTYPES 1 AND 2 - PLANS
LRT Station Prototypes



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

FIGURE 6.4-8: PROTOTYPES 3 AND 4 - PLANS
LRT Station Prototypes

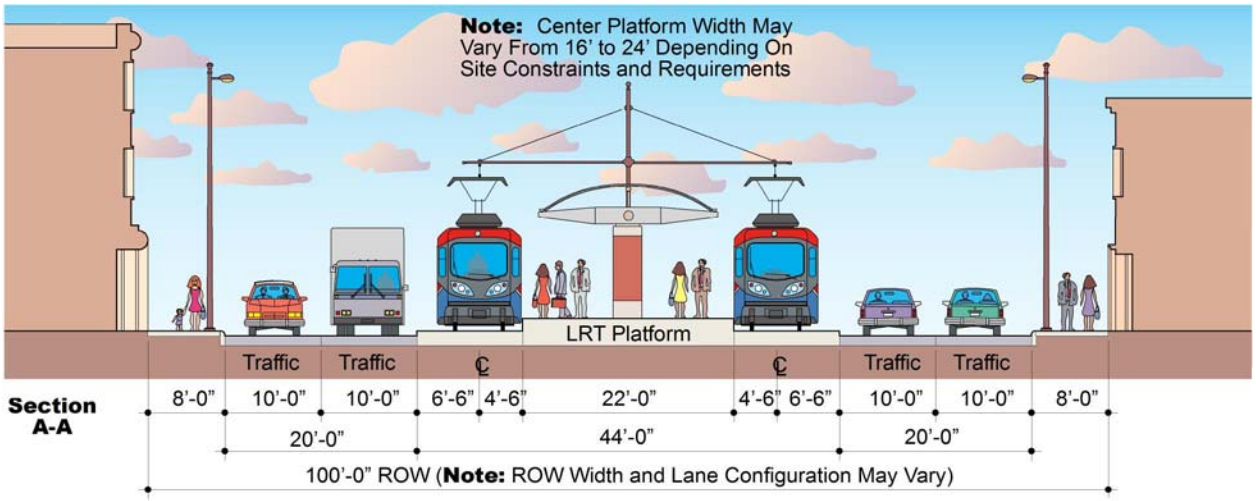


a. **Station Type 3 & 4 Plans**
Center, Single-Sided Platforms
Example Shown Across an Intersection

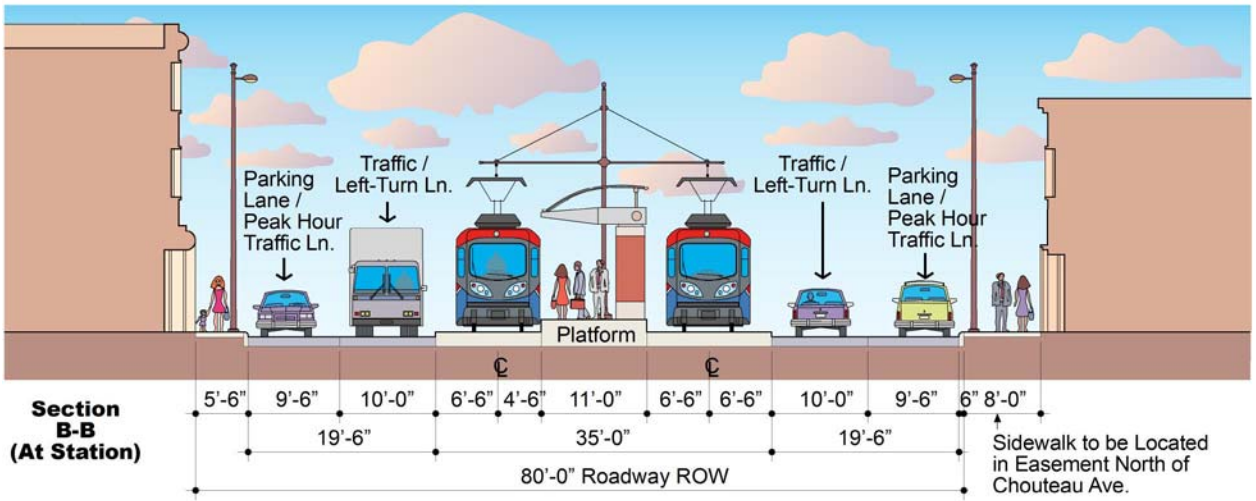
b. **Type 3. C-SS-AI**
Platforms Across an Intersection

c. **Type 4. C-SS-IL**
Platforms In-Line

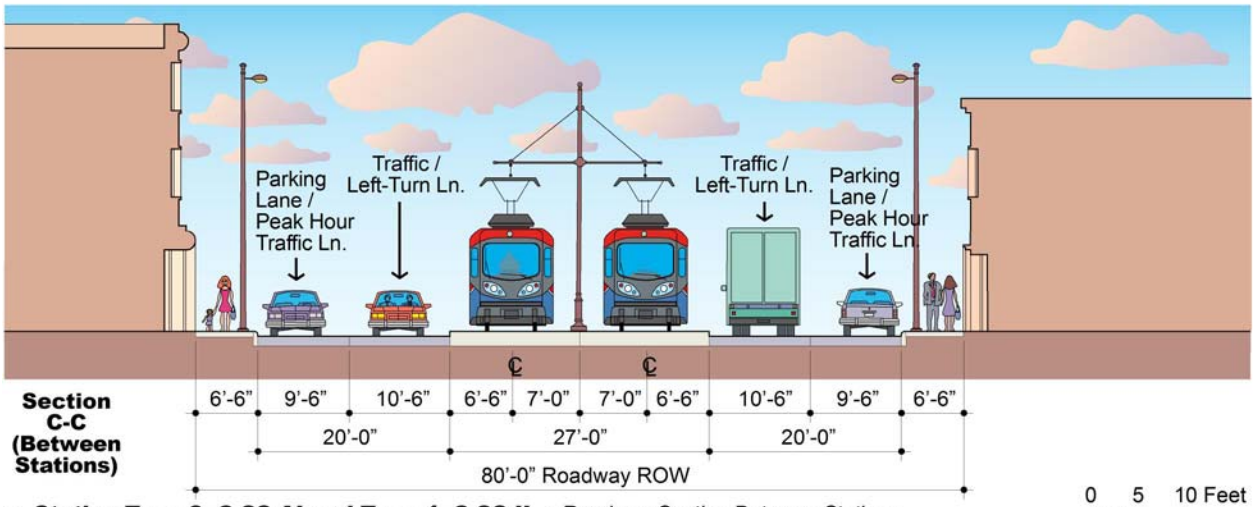
FIGURE 6.4-9: PROTOTYPES 1 THROUGH 4 - SECTIONS
LRT Station Prototypes



a. **Station Type 1. C-DS** - Center, Double-Sided Platform, Example Shown in Roadway with 4 Traffic Lanes

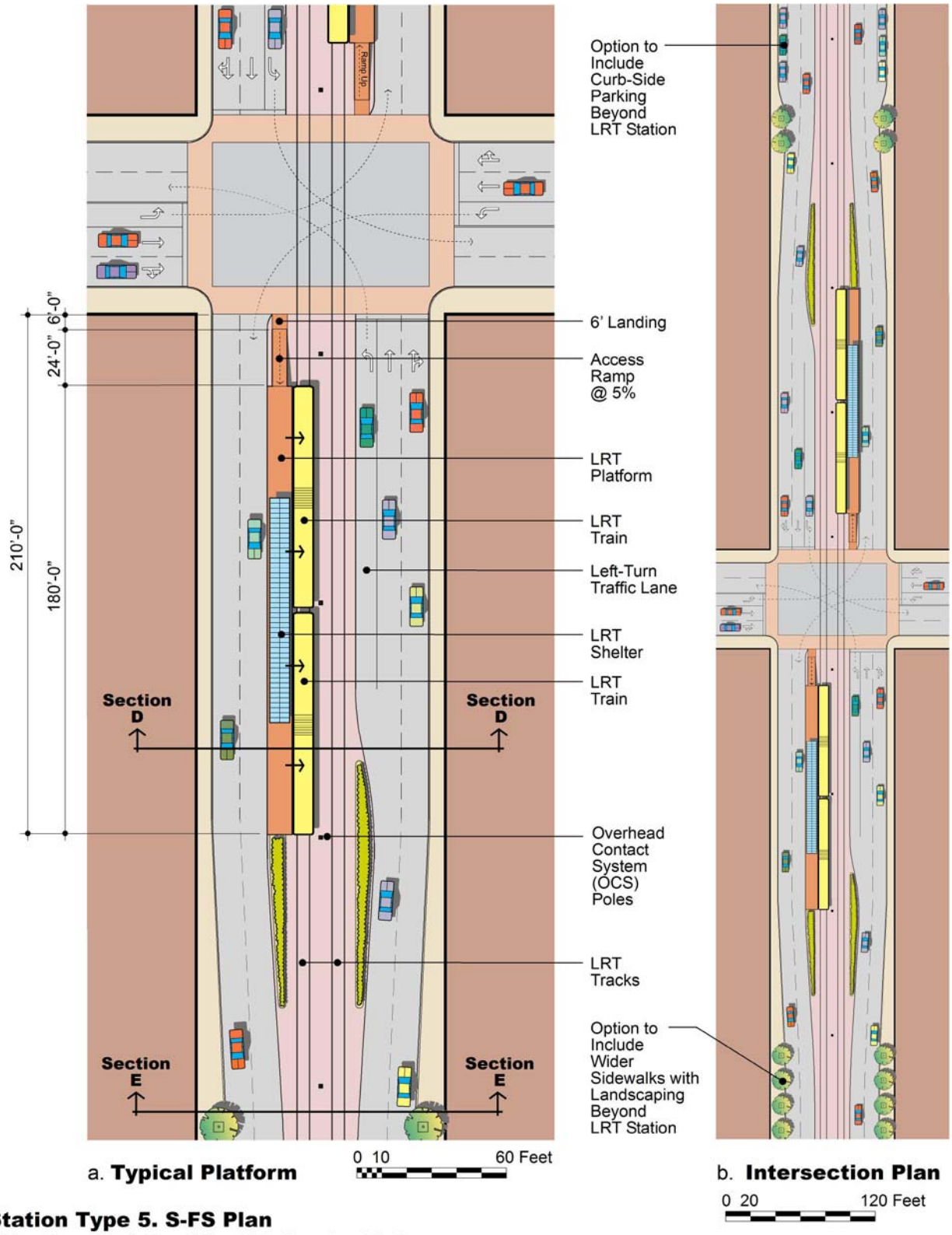


b. **Station Type 3. C-SS-AI and Type 4. C-SS-IL** - Center, Single-Sided Platform (Primarily Chouteau Avenue)



c. **Station Type 3. C-SS-AI and Type 4. C-SS-IL** - Roadway Section Between Stations

FIGURE 6.4-10: PROTOTYPE 5 – PLANS
LRT Station Prototypes

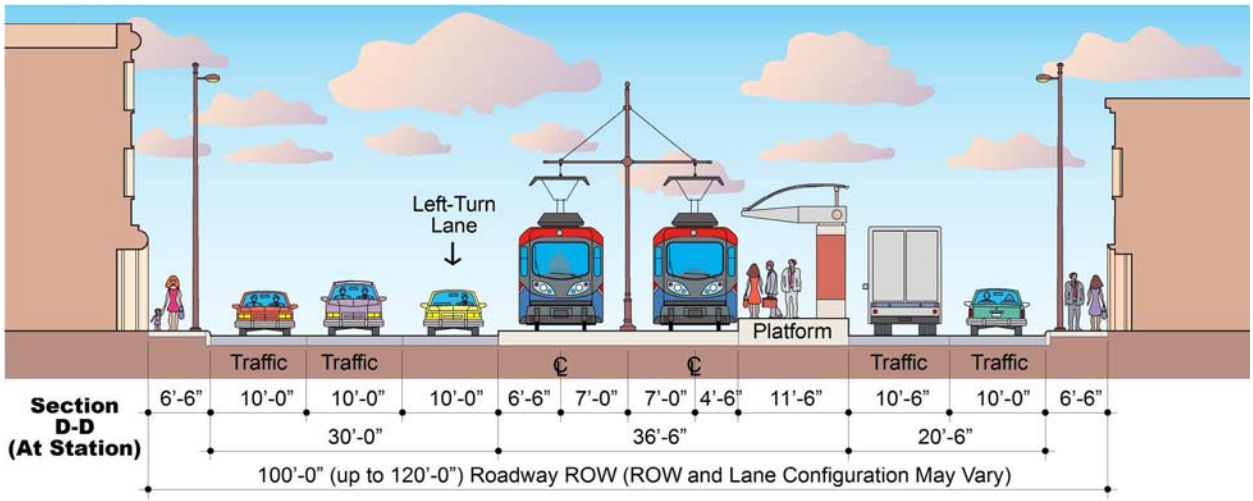


a. **Typical Platform**

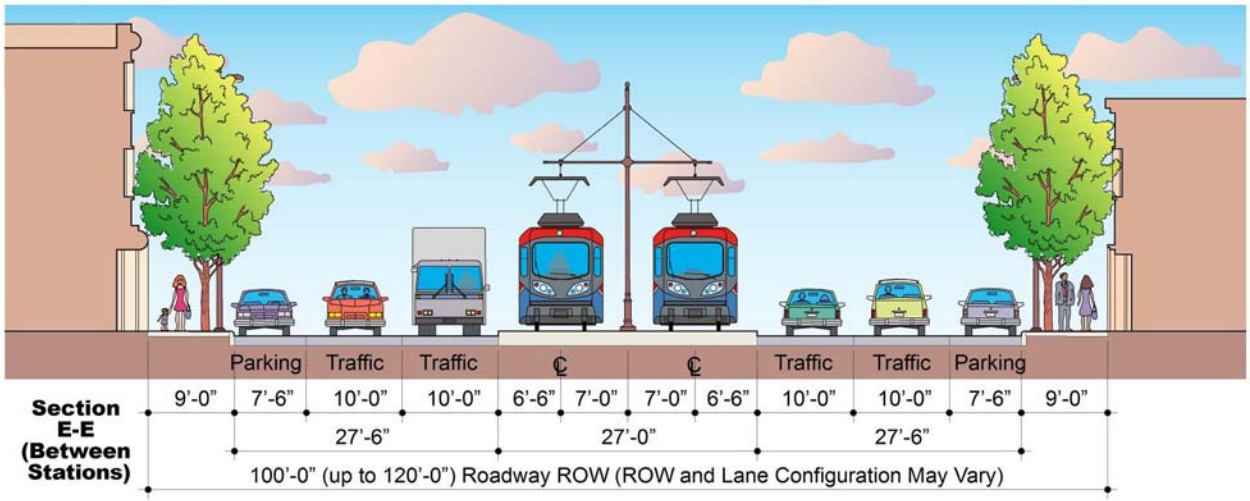
b. **Intersection Plan**

Station Type 5. S-FS Plan
Side, Staggered, Far-Side, Side-Loading Platforms

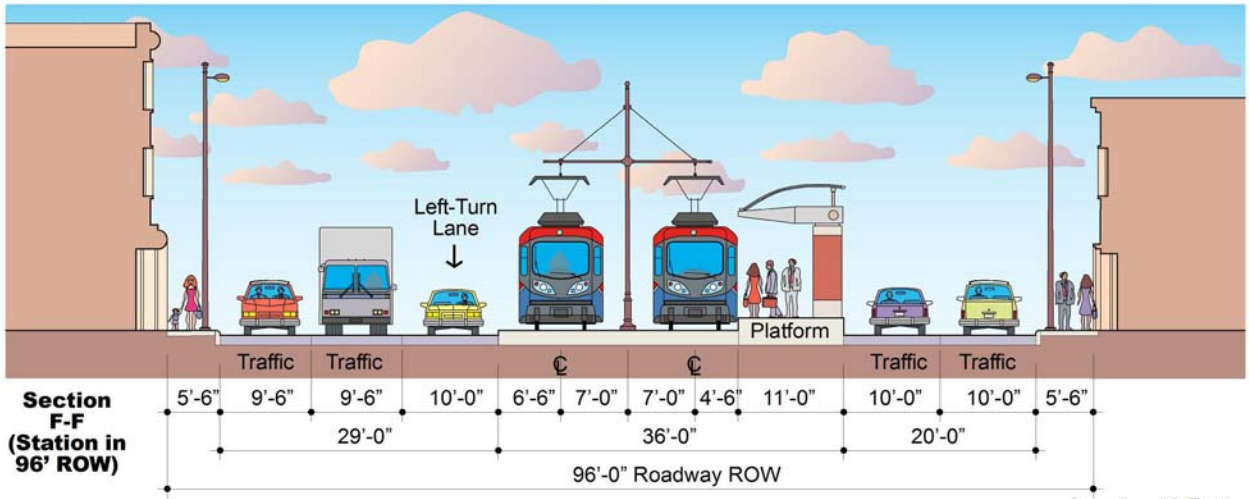
FIGURE 6.4-11: PROTOTYPE 5 - SECTIONS
LRT Station Prototypes



a. **Station Type 5. S-FS** - Side, Far-Side Platforms, with 4 Traffic Lanes and Left-Turn Lanes

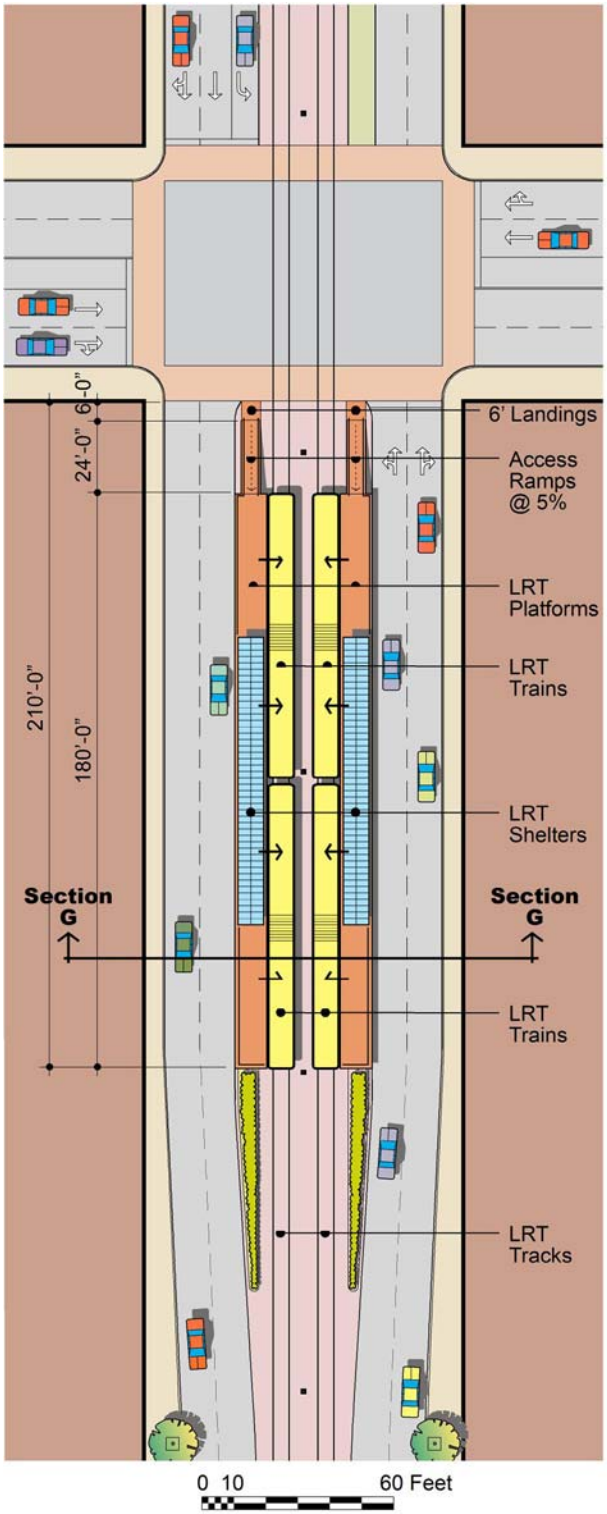


b. **Station Type 5. S-FS - Between LRT Stations** - 4 Traffic Lanes with Parking Lanes

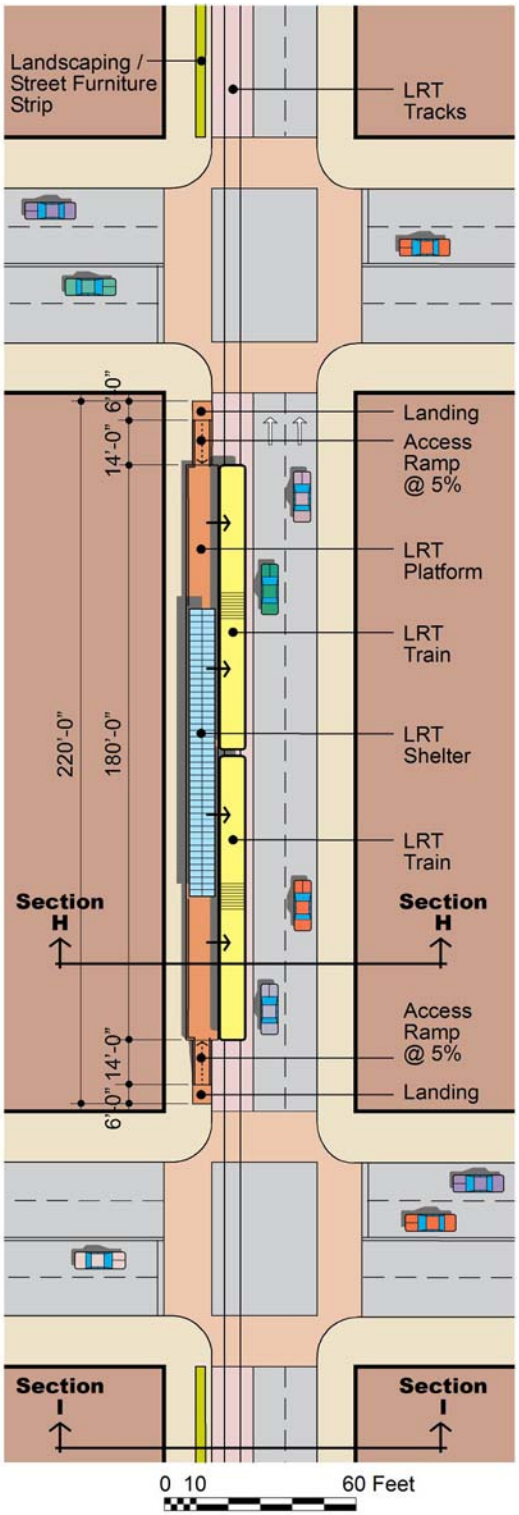


c. **Station Type 5. S-FS @ 96' ROW** - Side, Far-Side Platforms, with 4 Traffic Lanes and Left-Turn Lanes 0 5 10 Feet

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

FIGURE 6.4-13: PROTOTYPES 6 AND 7 - SECTIONS
LRT Station Prototypes

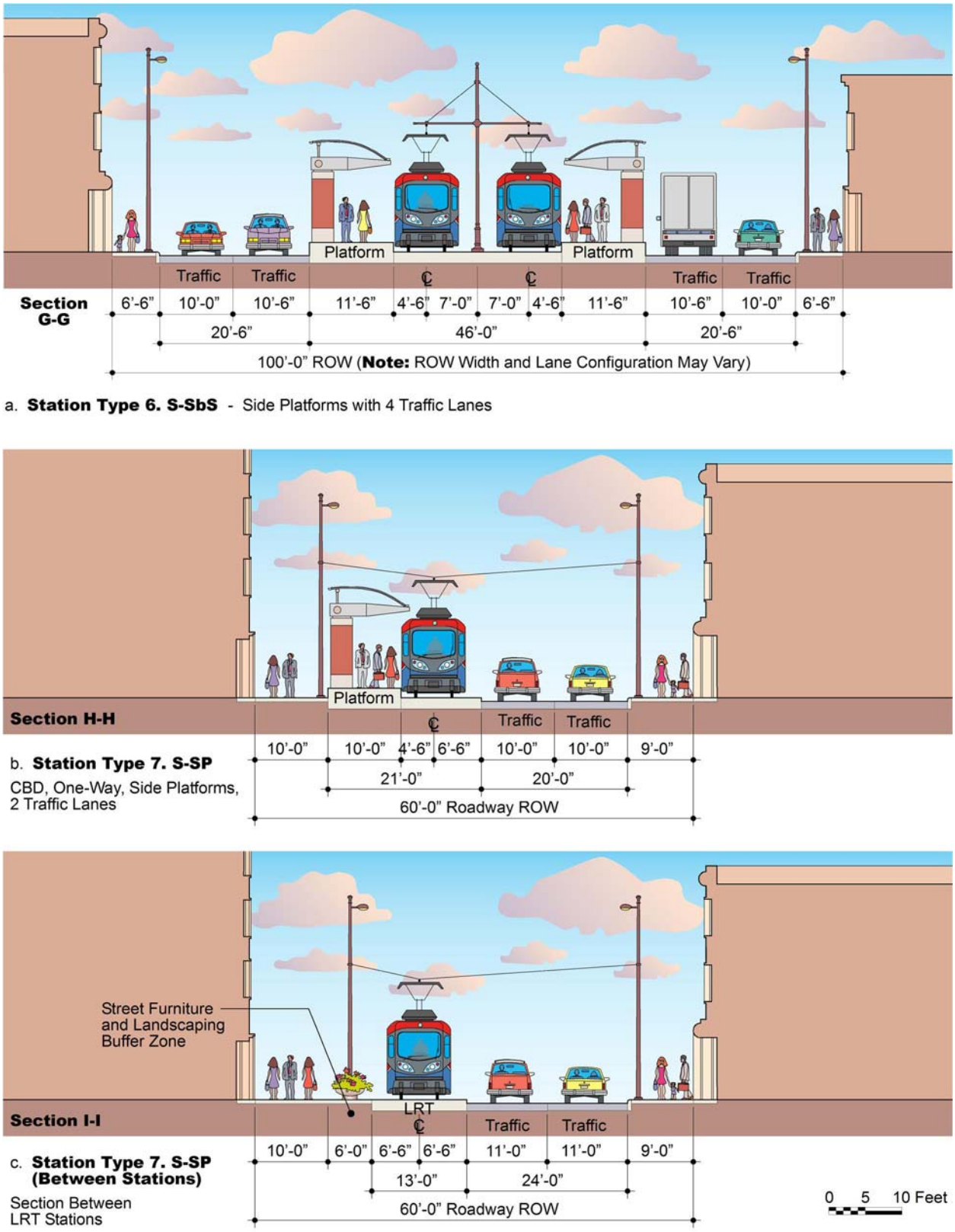
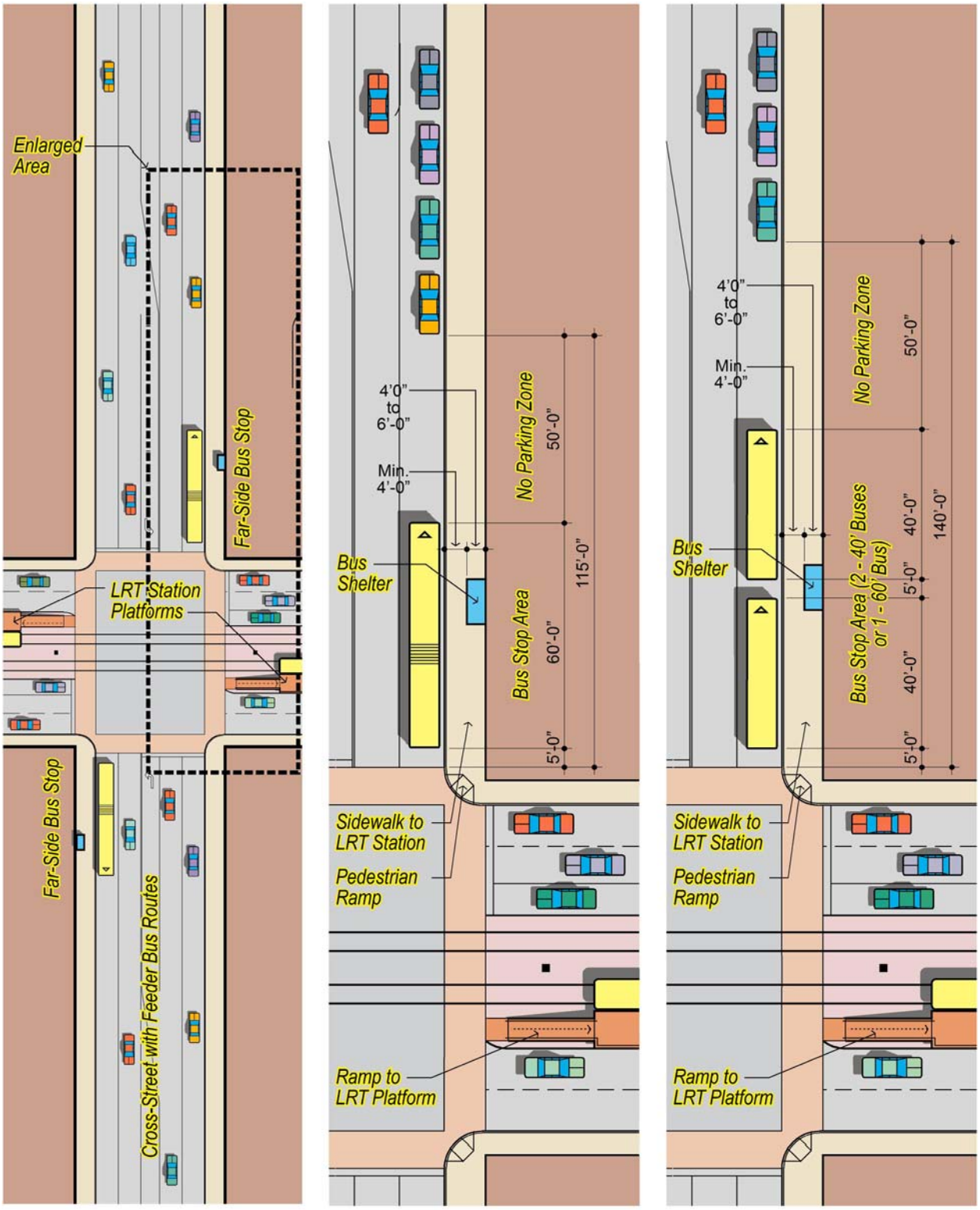


FIGURE 6.4-14: FEEDER BUS STOP DIAGRAMS



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

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 Southside study area are discussed starting at the north end of the study area and continuing south. When the same LRT station concept applies to two different alignments, such as with the Chouteau Ave. at Truman Pkwy. station and the Interstate-55 at Bayless Ave. station, it is included in both, so as to avoid confusion and to have a complete set of stations for each alternative.

Table 6.4-2 lists all potential LRT stations within the Southside study area and also includes the following information:

- Alignment 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 corridor 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.

Individual station graphics include:

- A thumbnail plan of the City indicating the location of the alignment segment.
- Ann 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.

TABLE 6.4-2: SUMMARY OF POTENTIAL LRT STATION DATA

	Alignment / Station Name	Station Type / Special Program Requirements
A.	Chouteau / UPRR – Figure 6.4-15	
1.	**Chouteau Ave. at Truman Pkwy. Station** Figure 6.4-16 ▪ The station would be located in the median of Chouteau Ave. ▪ Serves primarily the large office and industrial users to the north and the higher-density residential development to the south. ▪ Future plans call for a greenway and higher-density mixed-use developments north of Chouteau Ave.	**5. S-FS** **(Side, Far-Side Platforms)**
2.	**Chouteau Ave. at Jefferson Ave. Station** Figure 6.4-17 ▪ The station would be located in the median of Chouteau Ave. ▪ Serves primarily industrial and some commercial uses around the station site. ▪ Future plans call for a greenway and higher-density mixed-use developments north of Chouteau Ave.	**5. S-FS** **(Side, Far-Side Platforms)**
3.	**Chouteau Ave. at Grand Blvd. Station** Figures 6.4-18 and 6.4-19 ▪ The station would be located in the median of Chouteau Ave. ▪ Serves primarily the St. Louis University campus and related uses to the south and the industrial and commercial uses to the north. ▪ Future plans call for a greenway and higher-density mixed-use developments north of Chouteau Ave. ▪ Due to the relatively steep grades on the east side of Grand Blvd., the station platforms need to be located in-line on the west side of Grand Blvd. A secondary pedestrian access to the station platforms should be developed at the west end of the in-line stations, as shown in the Prototype 4: C-SS-IL plan in Figure 6.4-8. ▪ The computer image in Figure 6.4-19 represents a typical center platform station in this area.	**4. C-SS-IL** **(Center, Single-Sided, Platforms In-Line)**
4.	**UPRR at Shaw Blvd. Station** Figure 6.4-20 ▪ The station would be located in the UPRR corridor. ▪ Serves the industrial and office uses to the north and the Missouri Botanical Garden and residential neighborhoods to the south. ▪ The site already contains an existing Metro park-and-ride facility.	**1. C-DS** **(Center, Double-Sided Platform)** Existing Metro Park-and-Ride Facility
5.	**UPRR at Arsenal St. Station** Figure 6.4-21 ▪ The LRT station would be located in the UPRR corridor in an open trench that runs underneath Arsenal St. and would require vertical circulation, as illustrated in the Prototype 2: C-VC plan in Figure 6.4-7, for access to the street level. ▪ Serves the industrial, commercial, institutional, and residential uses in the vicinity of the station and along Brannon Ave. ▪ A small commercial center is located in the northeast quadrant. ▪ Some potential for TOD.	**2. C-VC** **(Center, Double-Sided Platform at Grade-Separated Station with Vertical Circulation)**

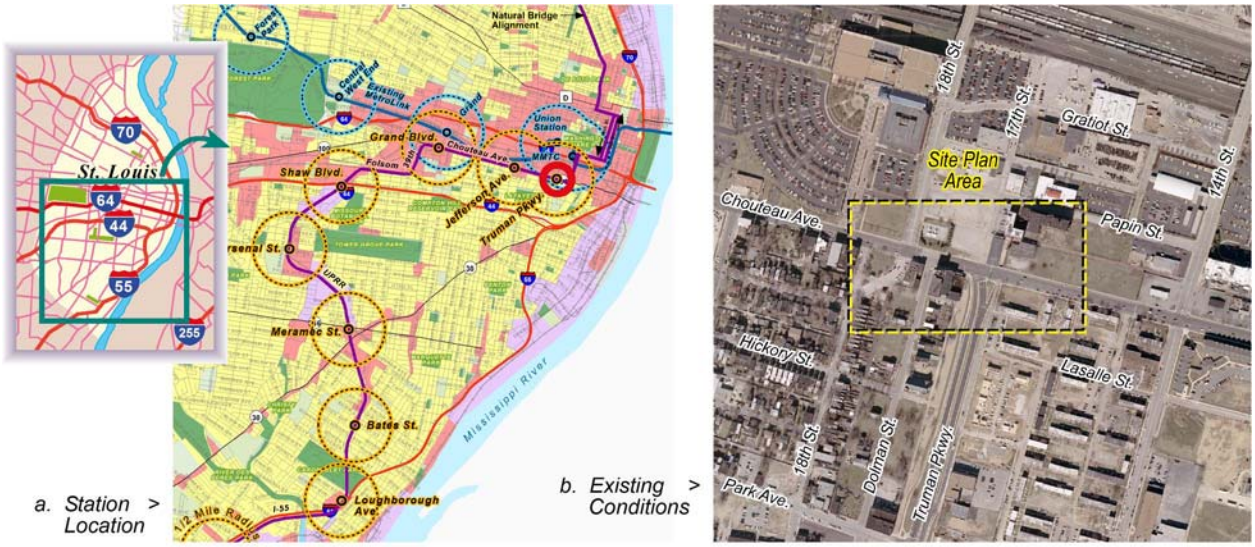
	Alignment / Station Name	Station Type / Special Program Requirements
6.	**UPRR at Meramec St. Station** Figures 6.4-22 and 6.4-23 ▪ The station would be located in the UPRR corridor and a small park-and-ride facility would be located in the triangle between the UPRR corridor, Meramec St., and Chippewa St. ▪ Serves a diverse mix of uses. ▪ Because of the Chippewa St. underpass at the UPRR corridor, buses would not be able to stop near the station on Chippewa St. Therefore, the recommendation is to divert the buses around the underpass, via Meramec St. and Gravois Rd., and provide on-street bus bays on Meramec St., adjacent to the station. ▪ Some potential for TOD. ▪ The image in Figure 6.4-23 illustrates the station concept.	**1. C-DS** **(Center, Double-Sided Platform)** Small Park-and-Ride Lot ▪ 90 Parking Spaces
7.	**UPRR at Bates St. Station** Figure 6.4-24 ▪ The station would be located in the UPRR corridor. ▪ Serves primarily a low-density residential neighborhood and a small industrial node north of the station. ▪ There is some potential for TOD if some of the industrial uses are redeveloped or the density is increased in the residential areas.	**1. C-DS** **(Center, Double-Sided Platform)**
8.	**UPRR at Loughborough Ave. Station** Figure 6.4-25 ▪ The station would be located in the UPRR corridor between a commercial node on the west and the I-55 corridor on the east. ▪ Serves the commercial node and the residential neighborhoods to the east and west. ▪ Because of the grade separation at Loughborough Ave., vertical circulation might need to be included in order to provide direct access to the LRT station for the residential neighborhoods located east of I-55.	**2. C-VC** **(Center, Double-Sided Platform at Grade-Separated Station with Vertical Circulation)**
9.	**I-55 at Bayless Ave. Station** Figures 6.4-26 and 6.4-27 ▪ The station would be located in the large park-and-ride site south of the I-55 corridor. ▪ Serves as an end-of-line station that is located close to I-55 for easy access, as well as the commercial node west of I-55 and the adjoining residential neighborhoods. ▪ This site, which consists of older industrial uses, would be an ideal location for more extensive TOD.	**1. C-DS** **(Center, Double-Sided Platform)** Large Park-and-Ride Lot ▪ 880+ Parking Spaces ▪ 4 Bus Bays ▪ Drop-Off Area
B.	Jefferson / I-55 – Figure 6.4-28	
1.	**Chouteau Ave. at Truman Pkwy. Station** Figure 6.4-29 ▪ The station would be located in the median of Chouteau Ave. ▪ Serves primarily the large office and industrial users to the north and the higher-density residential development to the south. ▪ Future plans call for a greenway and higher-density mixed-use developments north of Chouteau Ave.	**3. C-SS-AI** **(Center, Single-Sided Platforms Across Intersection)**

	Alignment / Station Name	Station Type / Special Program Requirements
2.	**Jefferson Ave. at Park Ave. Station** Figure 6.4-30 ▪ The station would be located in the median of Jefferson Ave. ▪ Serves the mixed low-density and higher-density residential neighborhoods. ▪ Due to the steeper grades on the north side of Park Ave., the double-sided, center station platform has been located on the south side of Park Ave. Even with the wider center platform, the wider 120' right-of-way south of Park Ave. still allows the inclusion of four traffic lanes and left-turn lanes.	**1. C-DS** **(Center, Double-Sided Platform)**
3.	**Jefferson Ave. at Russell Blvd. Station** Figures 6.4-31 and 6.4-32 ▪ The station would be located in the median of Jefferson Ave. ▪ Serves the commercial node at Russell Blvd. and the surrounding residential neighborhoods.	**5. S-FS** **(Side, Far-Side Platforms)**
4.	**Jefferson Ave. at Gravois Rd. Station** Figure 6.4-33 ▪ The station would be located in the median of Jefferson Ave. ▪ Serves the fairly extensive commercial district along Jefferson Ave. and Grand Blvd., as well as the surrounding residential neighborhoods.	**5. S-FS** **(Side, Far-Side Platforms)**
5.	**Jefferson Ave. at Arsenal St. Station** Figure 6.4-34 ▪ The station would be located in the median of Jefferson Ave. ▪ Serves the residential neighborhoods around the station.	**5. S-FS** **(Side, Far-Side Platforms)**
6.	**Jefferson Ave. at Cherokee St. Station** Figure 6.4-35 ▪ The station would be located in the median of Jefferson Ave. ▪ Serves the residential neighborhoods around the station.	**5. S-FS** **(Side, Far-Side Platforms)**
7.	**Jefferson Ave. at Keokuk St. Station** Figure 6.4-36 ▪ The station would be located in the median of Jefferson Ave. ▪ The original intent was to locate the station at the intersection of Jefferson Ave. and Broadway. However, due to steeper grades on the north side of the intersection and the complicated intersection configuration, the station was moved one block south to Keokuk St. ▪ Serves the commercial node at the intersection with Broadway, as well as the residential neighborhoods around the station.	**5. S-FS** **(Side, Far-Side Platforms)**
8.	**I-55 at Broadway Station** Figure 6.4-37 ▪ The station would be located along the west side of I-55, behind the commercial strip located east of Broadway. ▪ Serves the commercial node along Broadway and the residential neighborhoods to the west. ▪ This station would include a small park-and-ride lot and feeder bus	**1. C-DS** **(Center, Double-Sided Platform)** Small Park-and-Ride Lot ▪ 160 Parking Spaces

	Alignment / Station Name	Station Type / Special Program Requirements
	bays. ▪ There may be potential to redevelop the strip as higher-density, mixed-use TOD and to incorporate the parking and the bus bays into a parking structure for the new commercial node.	
9.	**I-55 at Bates St. Station** Figure 6.4-38 ▪ The station would be located along the I-55 corridor and would be elevated above the adjoining street network, which would require vertical circulation for access to the station. ▪ Serves the surrounding residential neighborhoods. ▪ Because of the grade separation at this location, vertical circulation might be necessary in order to provide direct access to the LRT station for the residential neighborhoods located around the station.	**2. C-VC** **(Center, Double-Sided Platform at Grade-Separated Station with Vertical Circulation)**
10.	**I-55 at Loughborough Ave. Station** Figure 6.4-39 ▪ The station would be located between I-55 and Idaho Ave. with the side, far-side platforms located on each side of Loughborough Ave. ▪ The station would serve the adjoining residential neighborhoods and the commercial node which is located in the southwest quadrant.	**5. S-FS** **(Side, Far-Side Platforms)**
11.	**I-55 at Bayless Ave. Station** Figures 6.4-40 and 6.4-41 ▪ The station would be located in the large park-and-ride site south of the I-55 corridor. ▪ Serves as an end-of-line station that is located close to I-55 for easy access, as well as the commercial node west of I-55 and the adjoining residential neighborhoods. ▪ This site, which consists of older industrial uses, would be an ideal location for more extensive TOD.	**1. C-DS** **(Center, Double-Sided Platform)** Large Park-and-Ride Lot ▪ 880+ Parking Spaces ▪ 4 Bus Bays ▪ Drop-Off Area

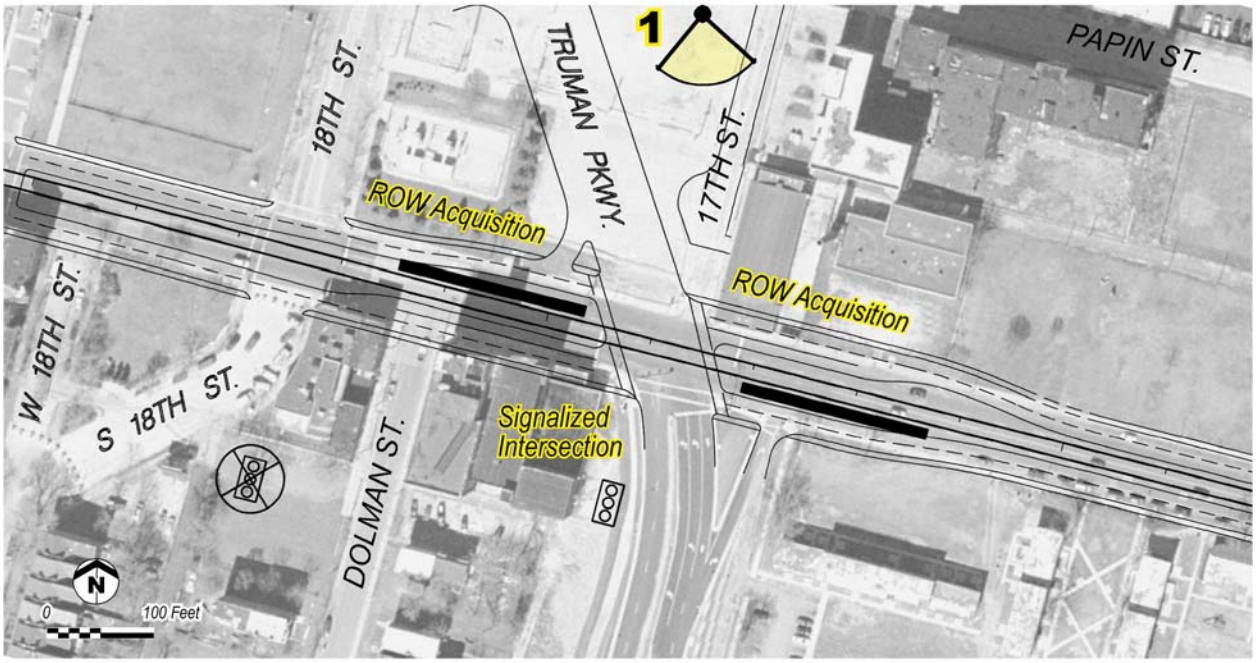
FIGURE 6.4-15: LRT ALIGNMENT AND STATION LOCATIONS
Chouteau / UPRR Alternative

FIGURE 6.4-16: CHOUTEAU AT TRUMAN STATION - PLAN
Chouteau / UPRR Alternative



a. Station Location >

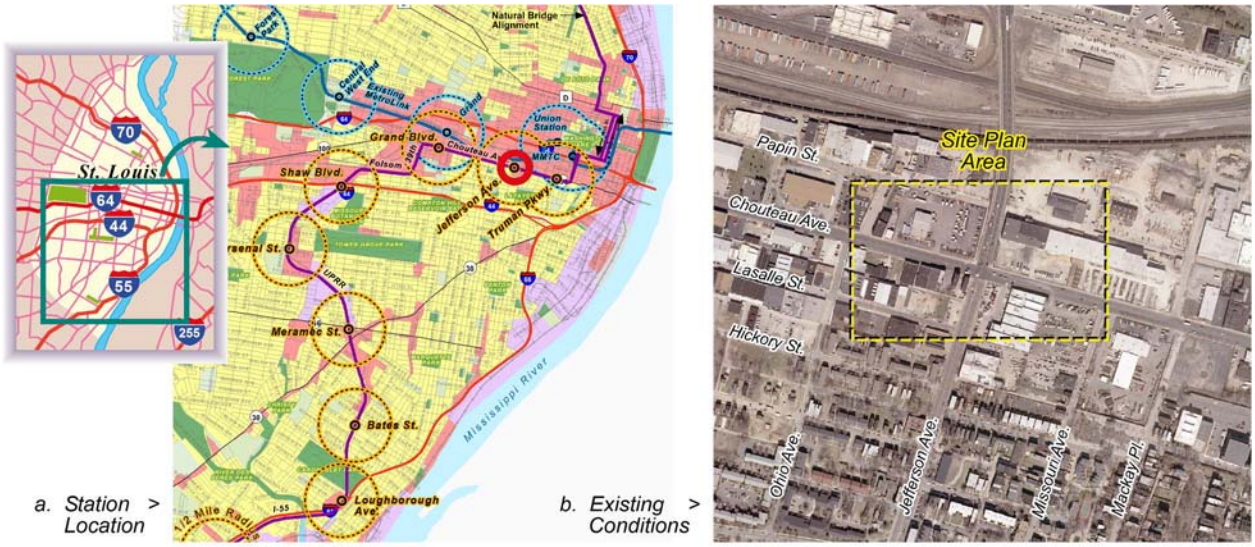
b. Existing Conditions >



^
d. Illustrative Station Site Plan

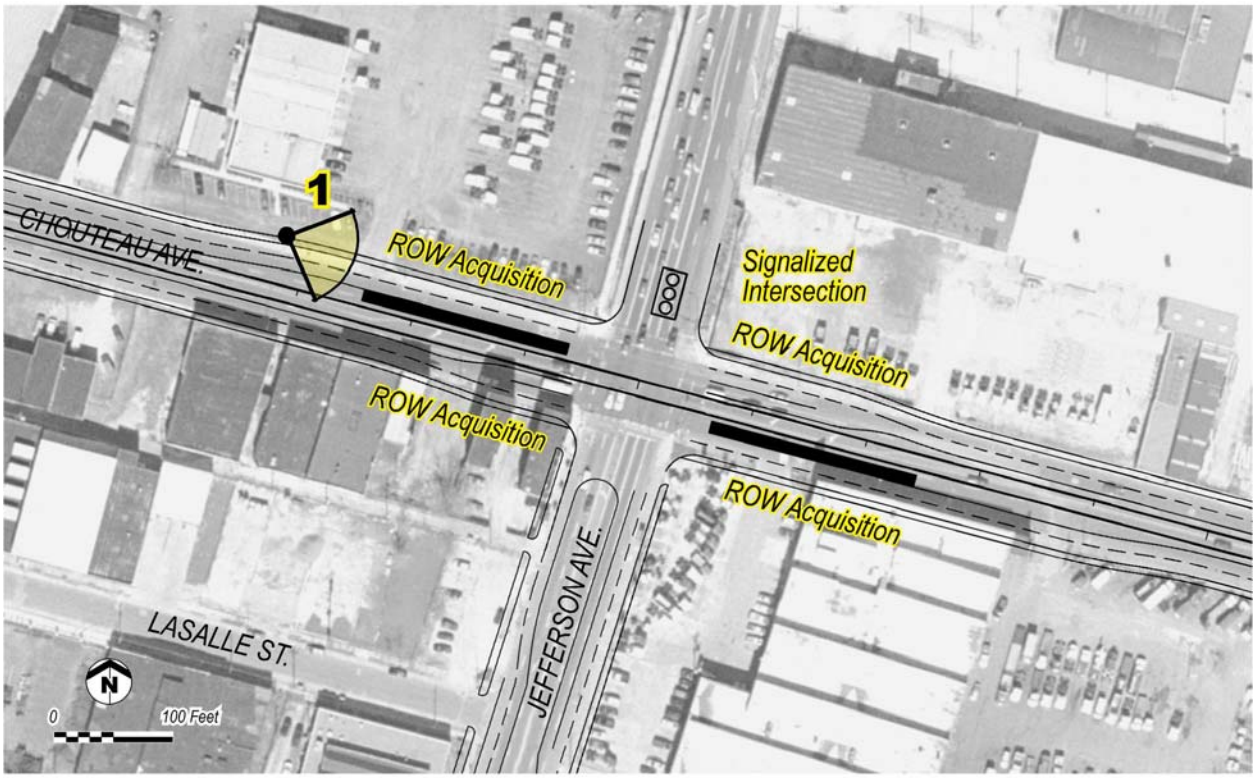
c. View 1: Aerial View > Station Area Looking South

FIGURE 6.4-17: CHOUTEAU AT JEFFERSON STATION - PLAN
Chouteau / UPRR Alternative



a. Station Location >

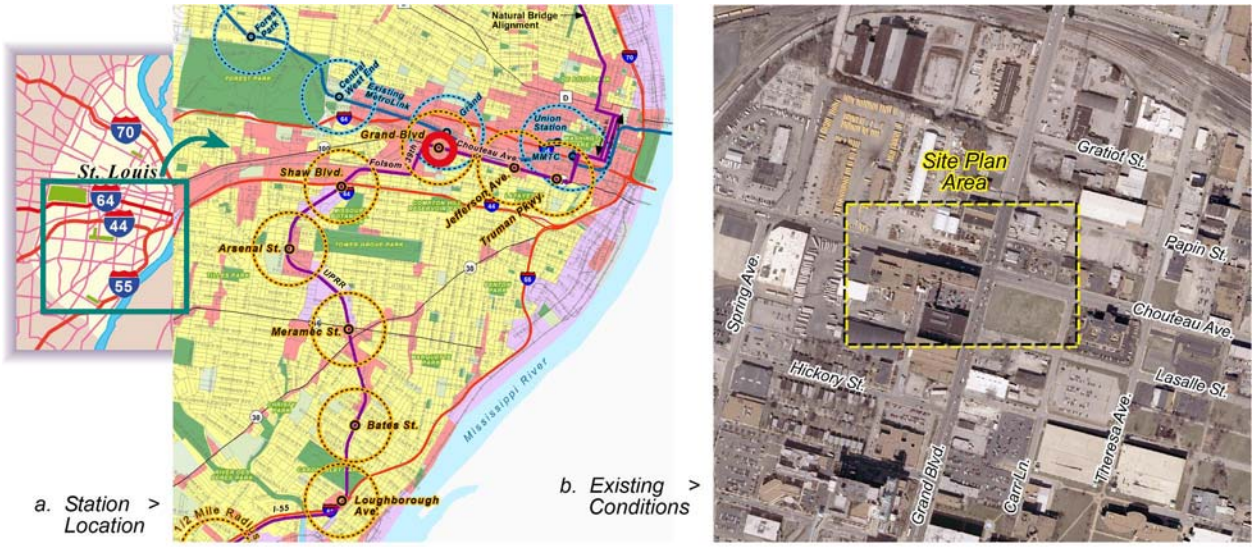
b. Existing Conditions >



^
d. Illustrative Station Site Plan

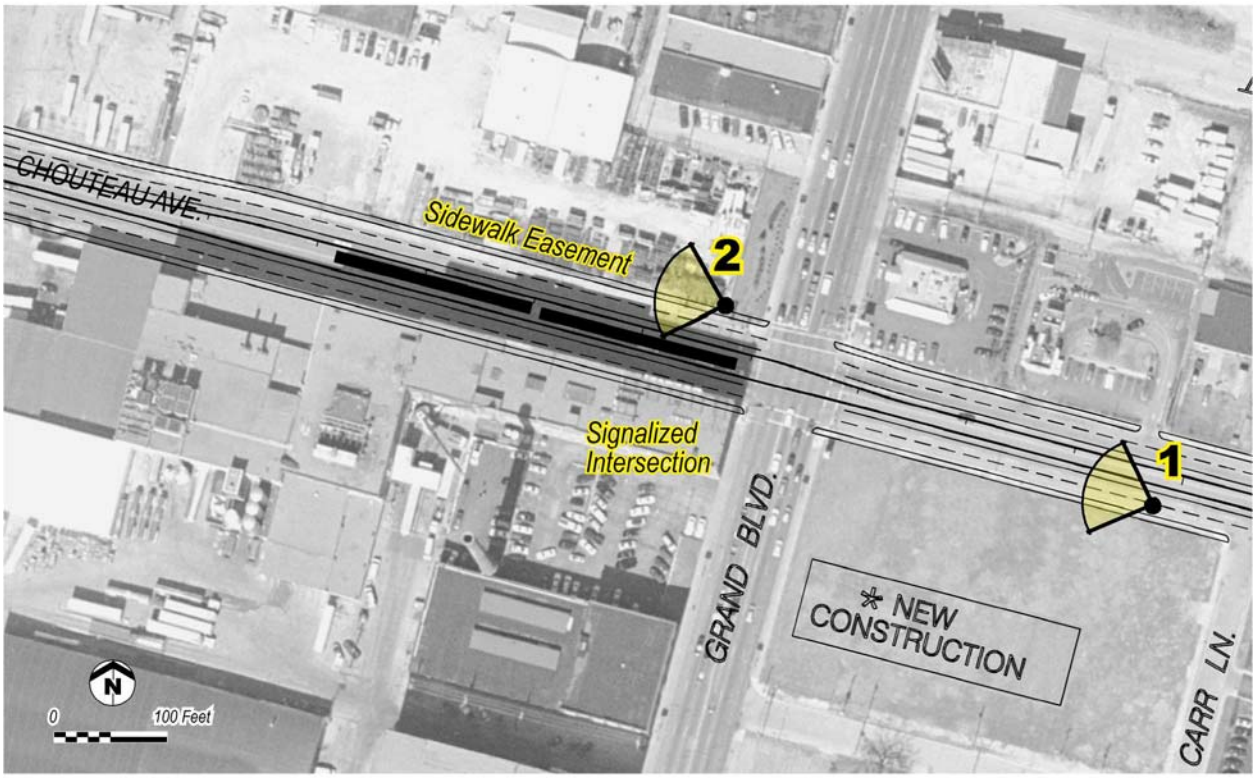
c. View 1: Station Area Looking Southeast >

FIGURE 6.4-18: CHOUTEAU AT GRAND STATION - PLAN
Chouteau / UPRR Alternative



a. Station Location >

b. Existing Conditions >



^
c. Illustrative Station Site Plan

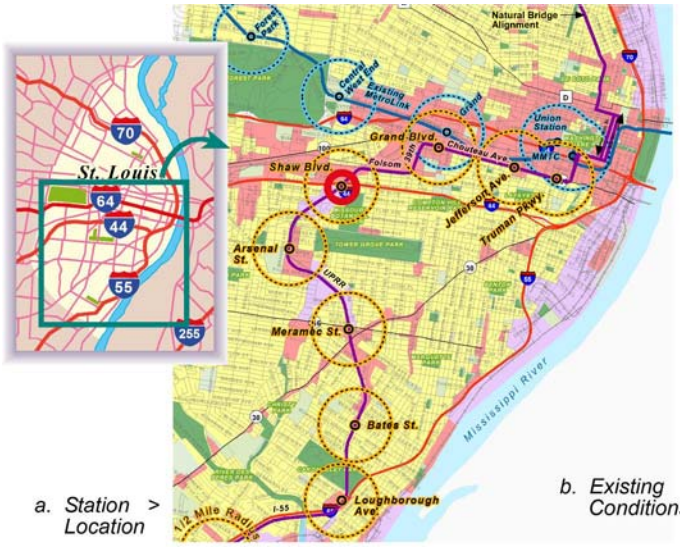
d. Views 1 & 2: > Station Area Looking Northwest

FIGURE 6.4-19: CHOUTEAU AT GRAND STATION - IMAGE
Chouteau / UPRR Alternative

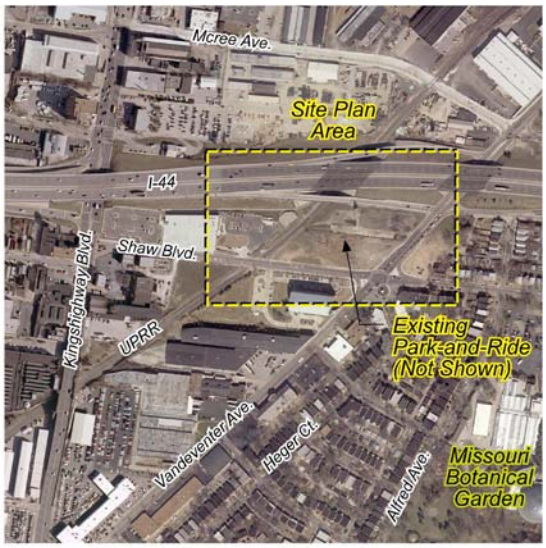
^
a. Existing Conditons Along Chouteau Ave.
(Example Area Shown at Jefferson Ave.)

^
b. Proposed LRT Station Illustrating Center, Single-Sided Platform Applicable to Grand Blvd. Station
(Example Image Shown at Jefferson Ave.)

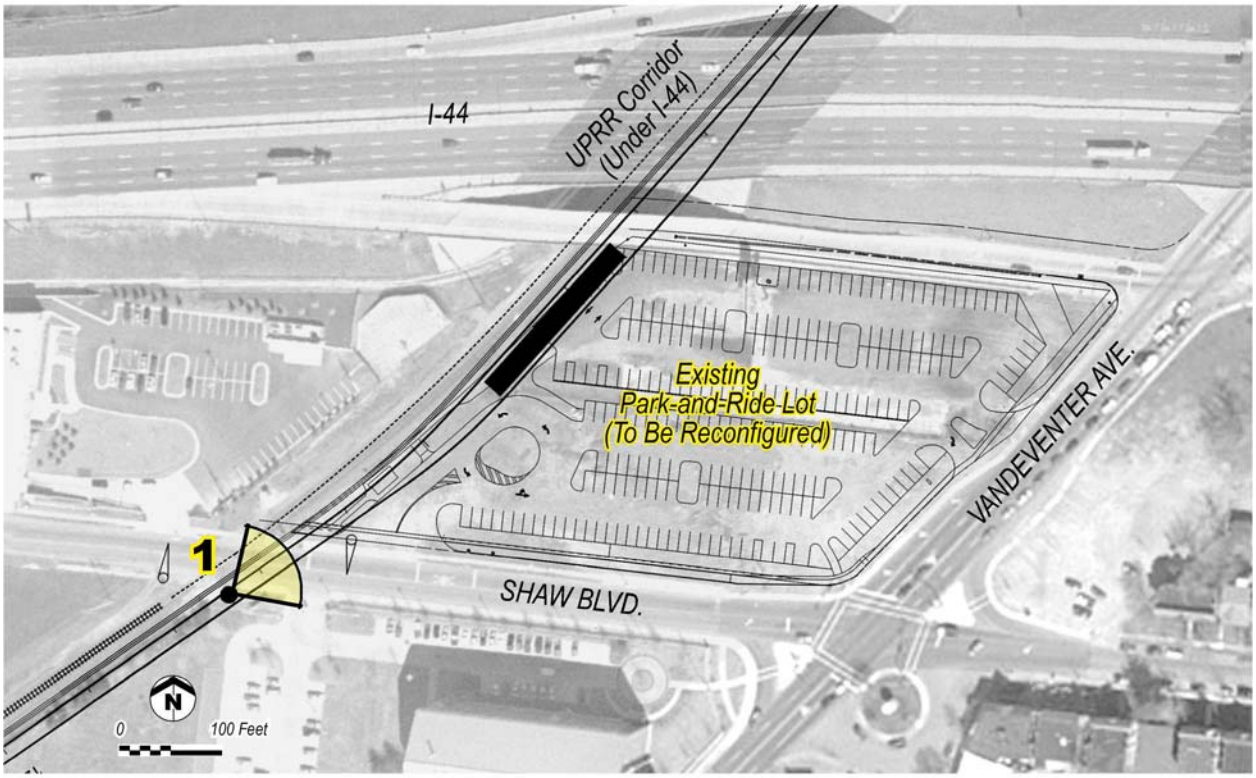
FIGURE 6.4-20: UPRR AT SHAW STATION - PLAN
Chouteau / UPRR Alternative



a. Station Location >



b. Existing Conditions >



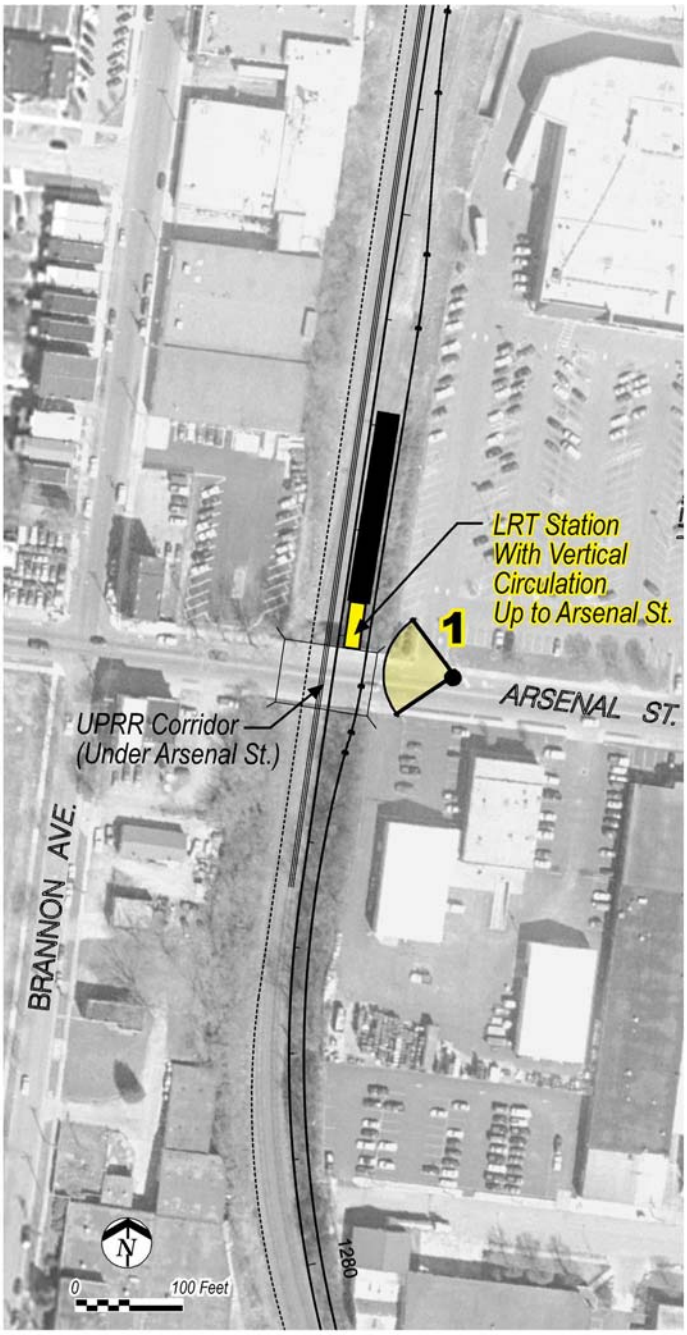
^
d. Illustrative Station Site Plan

c. View 1: Station Area Looking Northeast >

FIGURE 6.4-21: UPRR AT ARSENAL STATION - PLAN
Chouteau / UPRR Alternative

< a. Station Location

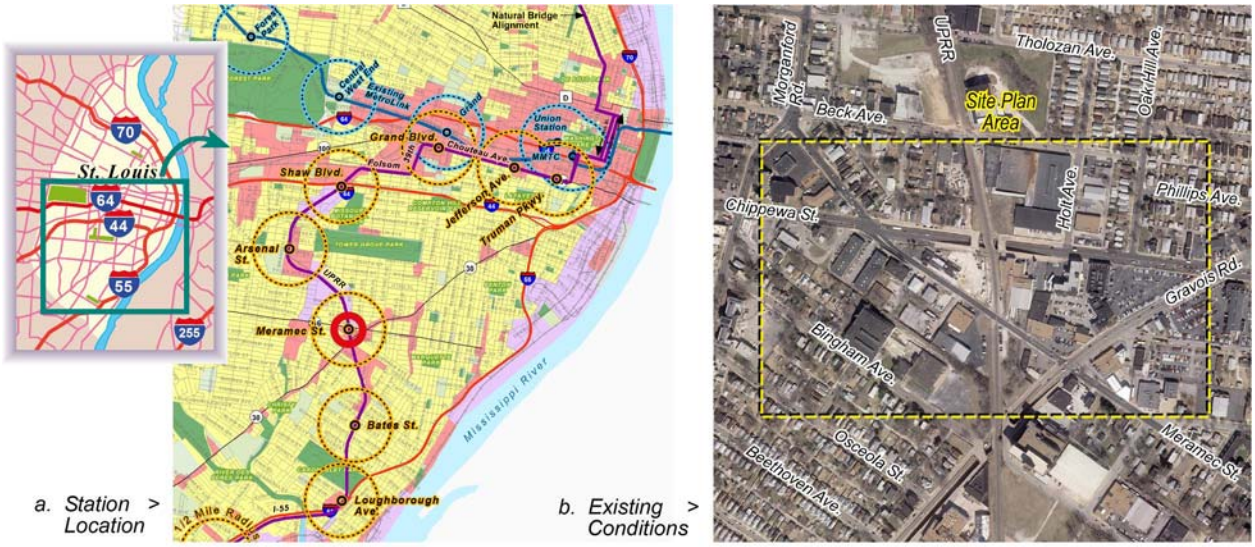
^
b. Existing Conditions

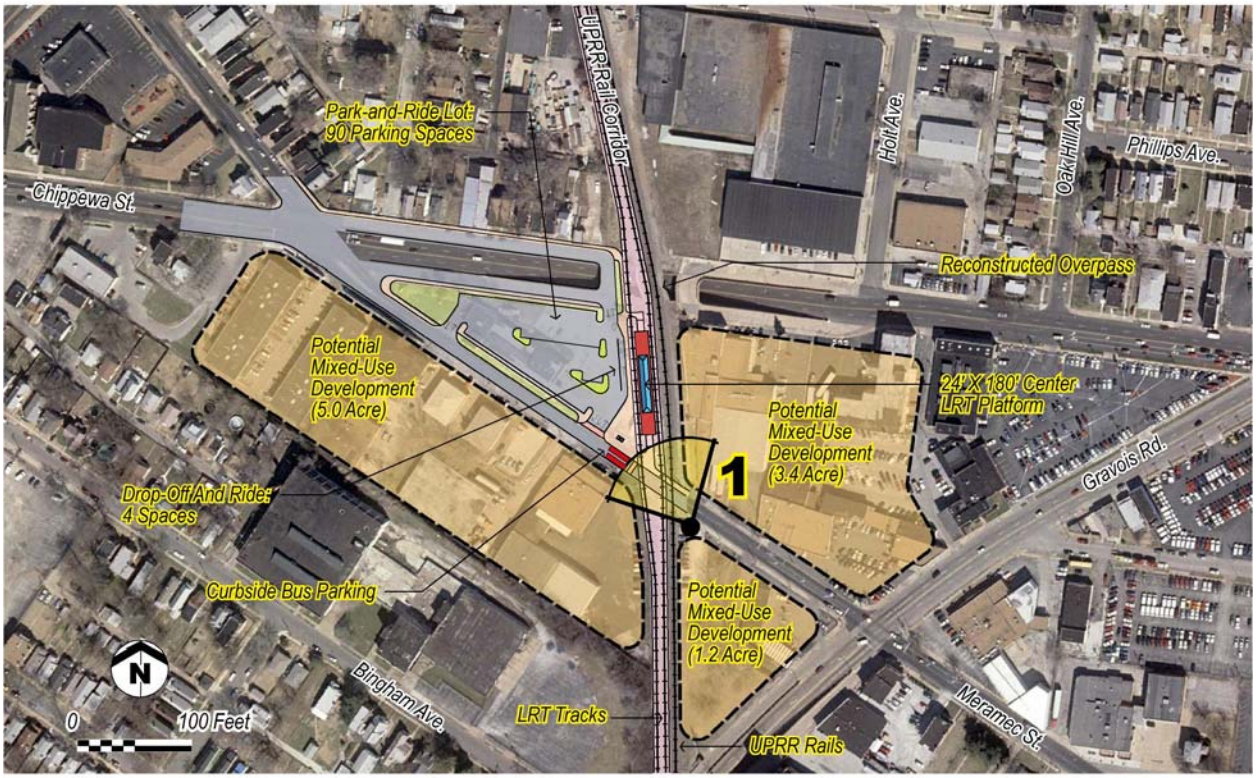


c. Illustrative Station Site Plan >

d. View 1: Station Area Looking West (Shows Arsenal St. Bridge Under Construction) >

FIGURE 6.4-22: UPRR AT MERAMEC STATION - PLAN
Chouteau / UPRR Alternative

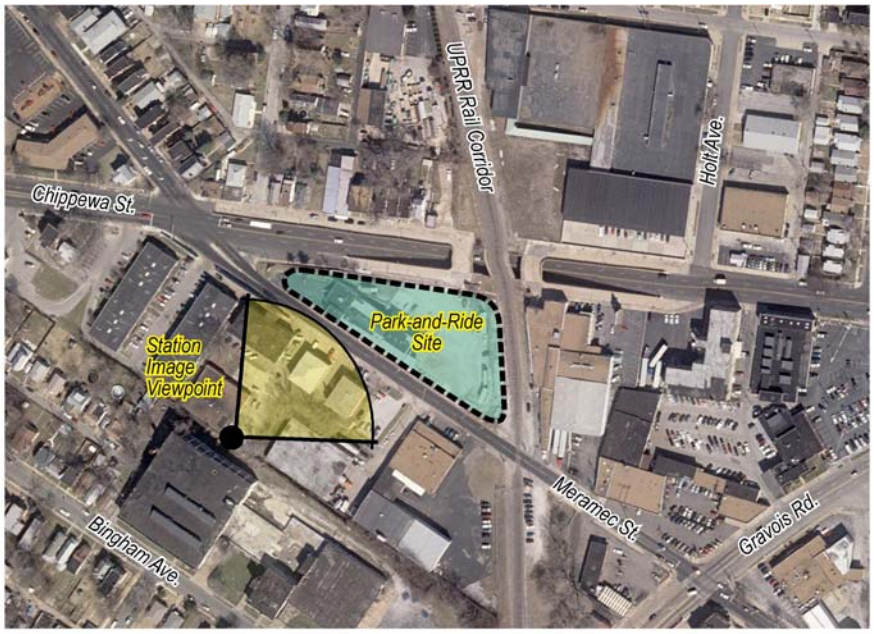




d. Illustrative Station Site Plan

c. View 1: Station Area Looking North

FIGURE 6.4-23: UPRR AT MERAMEC STATION - IMAGE
Chouteau / UPRR Alternative

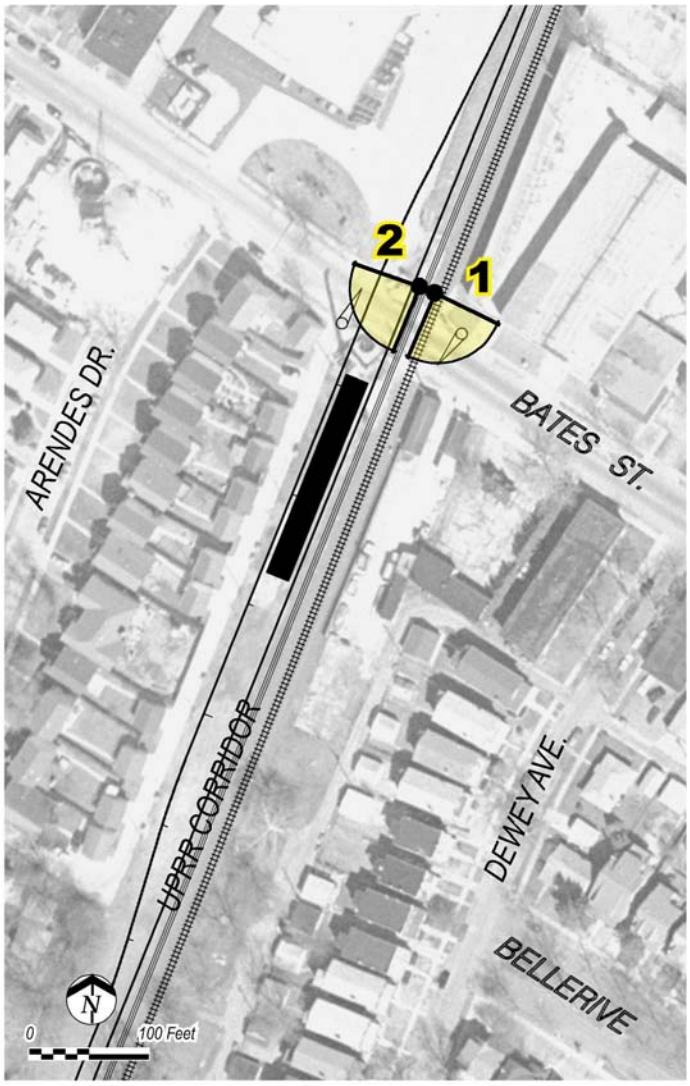


a. Existing Station Area Conditions and Image Viewpoint >

^
b. Proposed LRT Station Image Looking Northeast

FIGURE 6.4-24: UPRR AT BATES STATION - PLAN
Chouteau / UPRR Alternative

< a. Station Location



^ c. Illustrative Station Site Plan

^
b. Existing Conditions

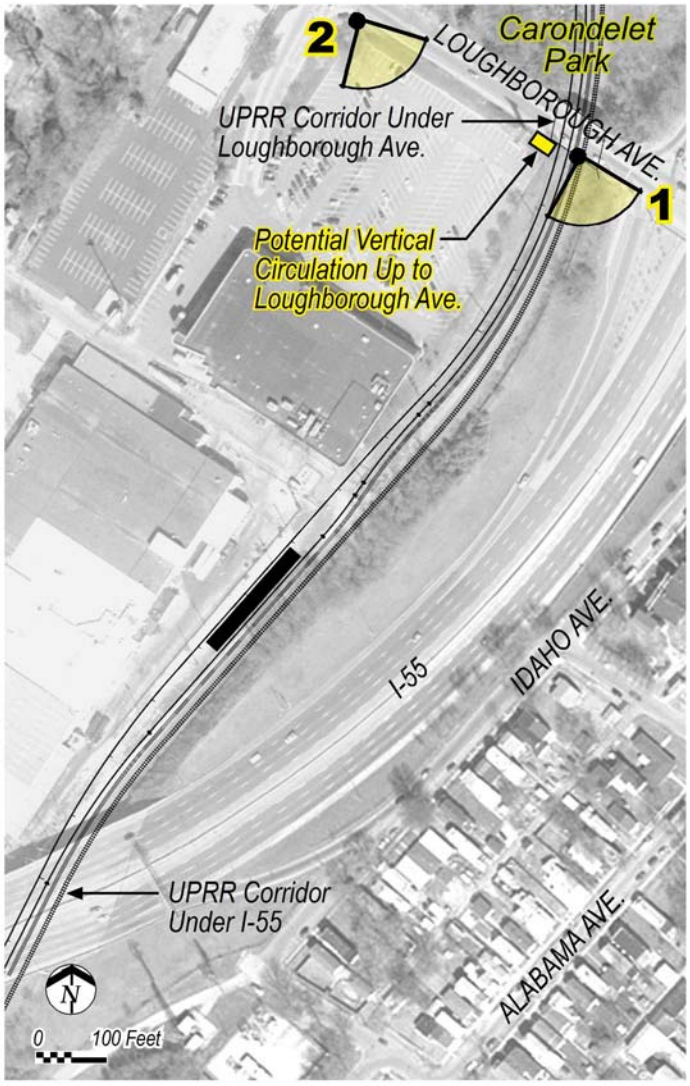
d. View 1: Station Area Looking South >

e. View 2: Station Area Looking Southwest >

FIGURE 6.4-25: UPRR AT LOUGHBOROUGH STATION - PLAN
Chouteau / UPRR Alternative

< a. Station Location

^ b. Existing Conditions

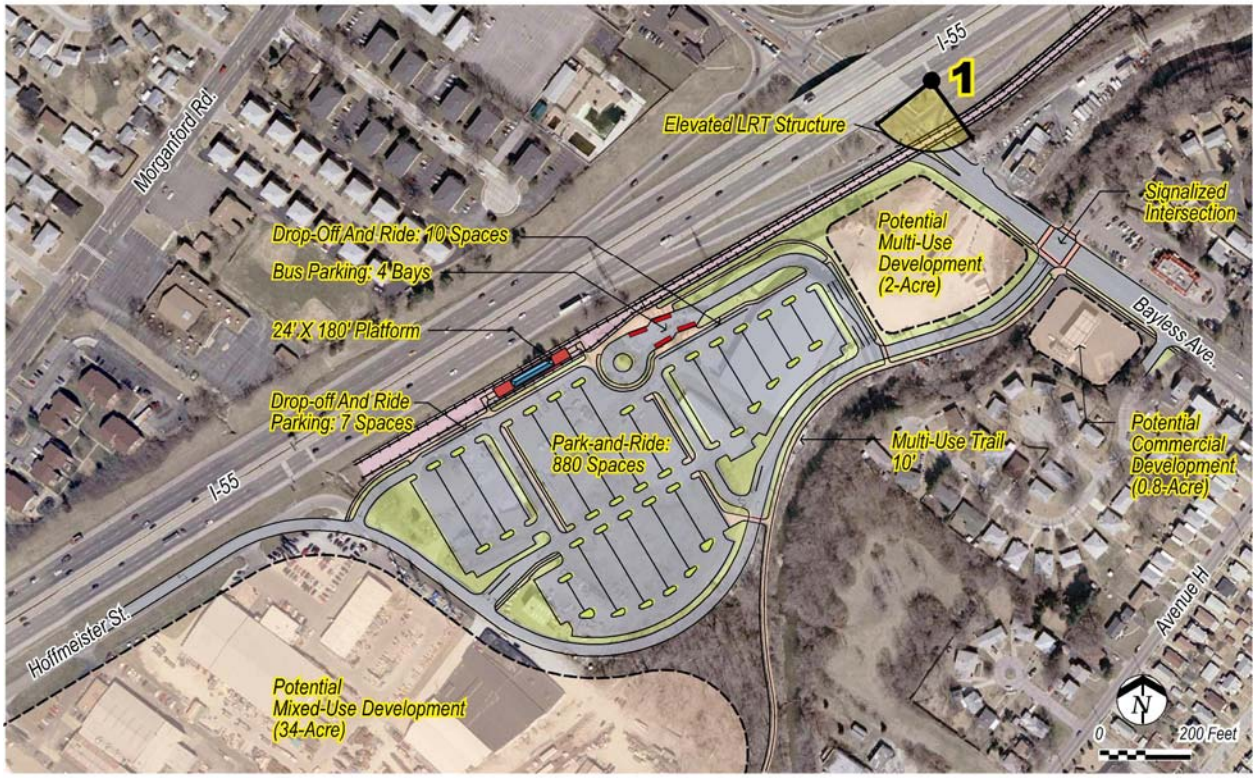


^ c. Illustrative Station Site Plan

d. View 1: Station Area Looking South >

e. View 2: Station Area Looking Southeast >

FIGURE 6.4-26: I-55 AT BAYLESS STATION - PLAN
Chouteau / UPRR Alternative



^
d. Illustrative Station Site Plan

c. View 1: Station Area Looking South >

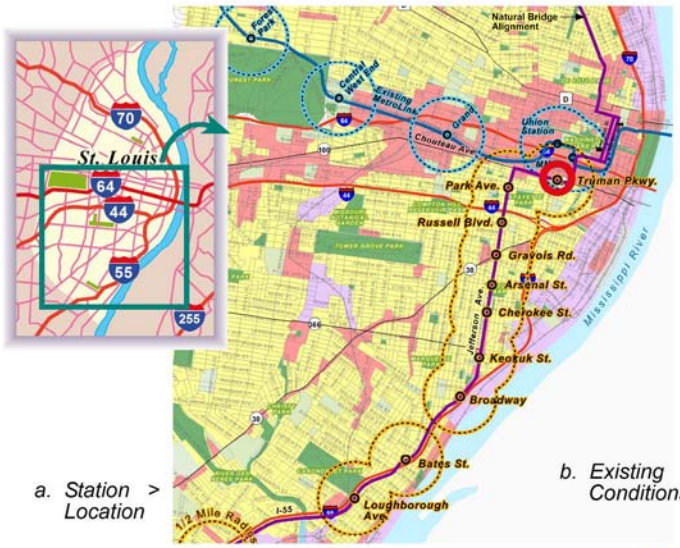
FIGURE 6.4-27: I-55 AT BAYLESS STATION - IMAGE
Chouteau / UPRR Alternative

a. Existing Station Area Conditions and Image Viewpoint >

^
b. Proposed LRT Station Image Looking North

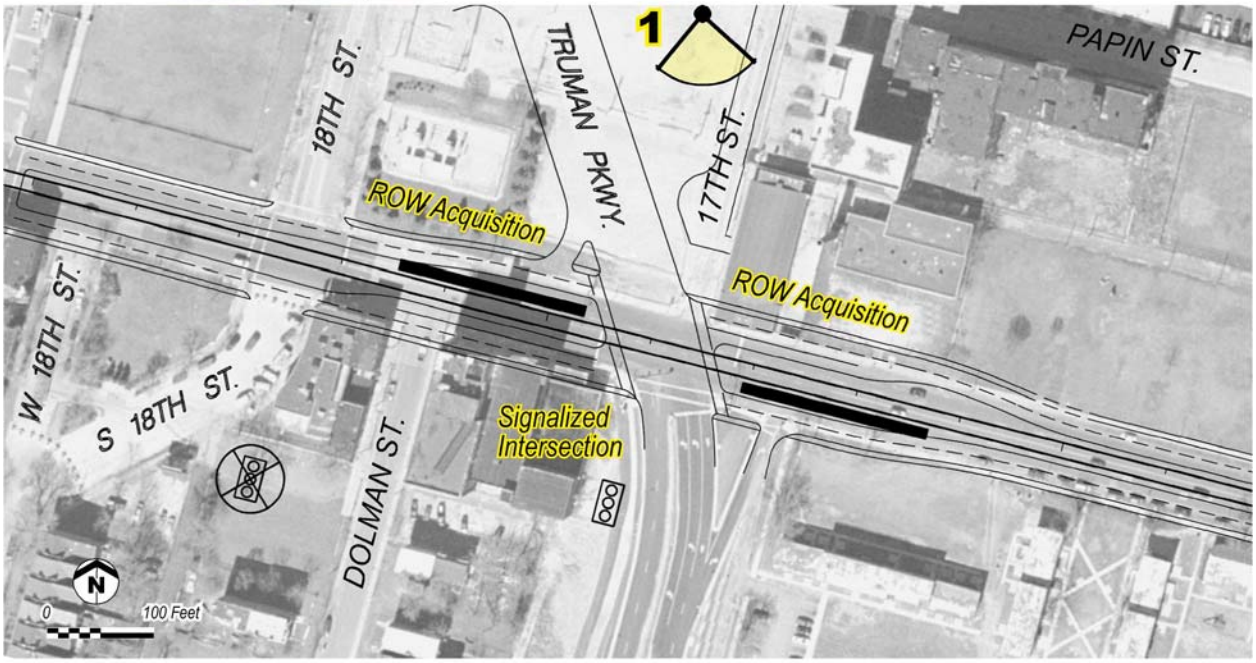
FIGURE 6.4-28: LRT ALIGNMENT AND STATION LOCATIONS
Jefferson / I-55 Alternatives

FIGURE 6.4-29: CHOUTEAU AT TRUMAN STATION - PLAN
Jefferson / I-55 Alternative



a. Station Location >

b. Existing Conditions >

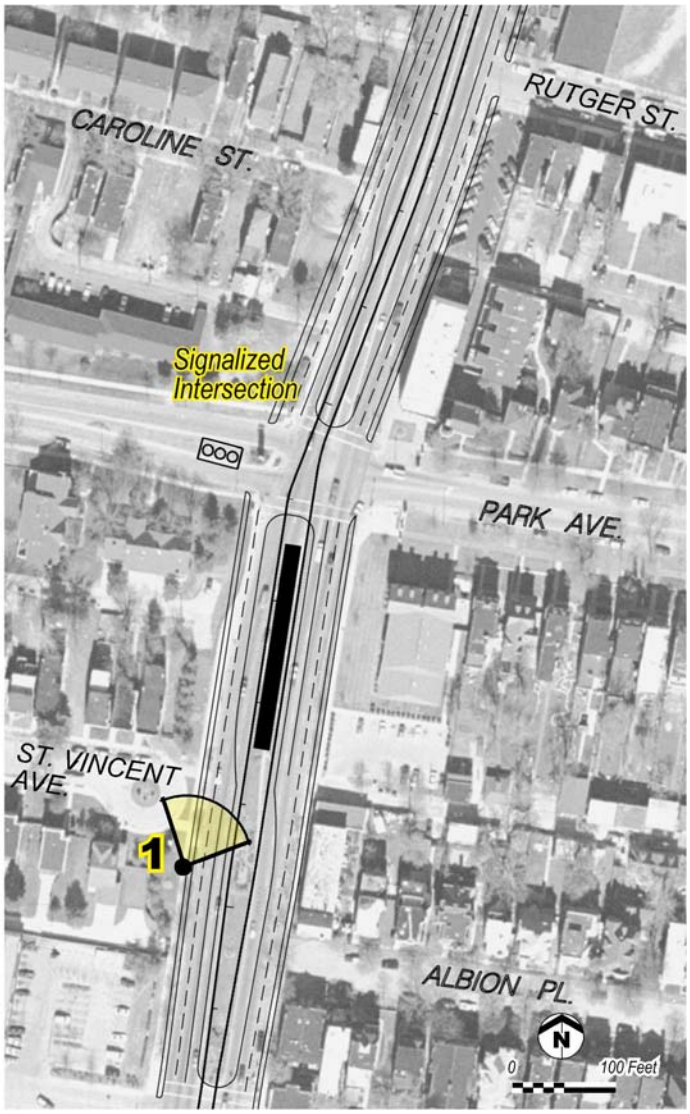


^
d. Illustrative Station Site Plan

c. View 1: Aerial View > Station Area Looking South

FIGURE 6.4-30: JEFFERSON AT PARK STATION - PLAN
Jefferson / I-55 Alternative

^
b. Existing Conditions

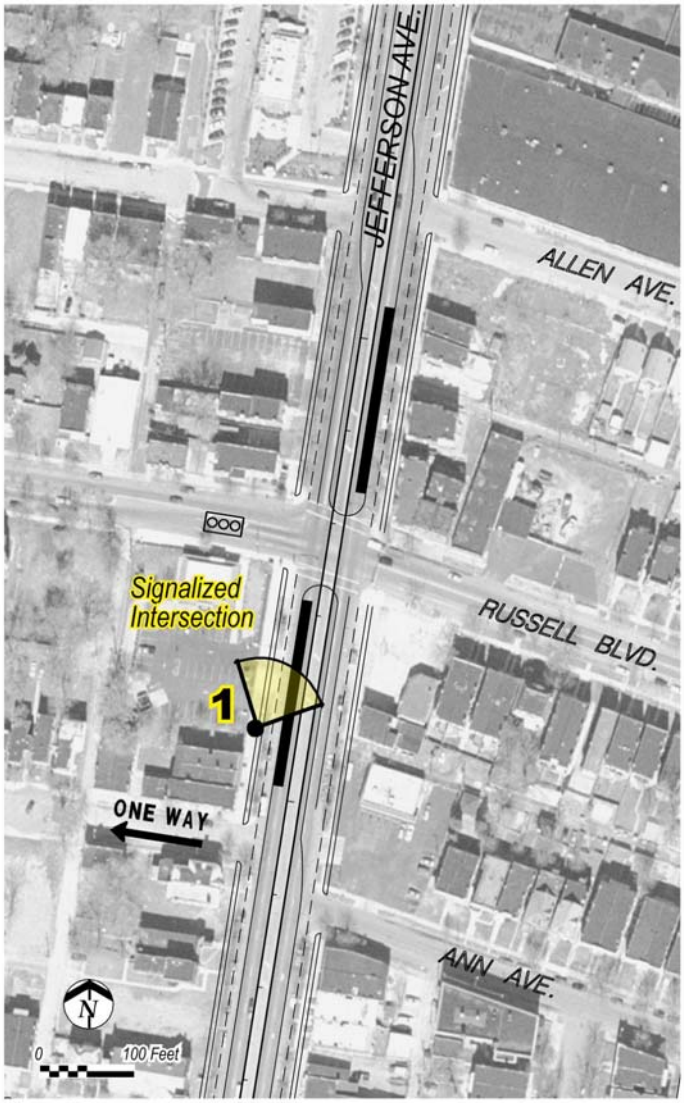


^
c. Illustrative Station Site Plan

^
d. View 1: Station Area Looking Northeast

FIGURE 6.4-31: JEFFERSON AT RUSSELL STATION - PLAN
Jefferson / I-55 Alternative

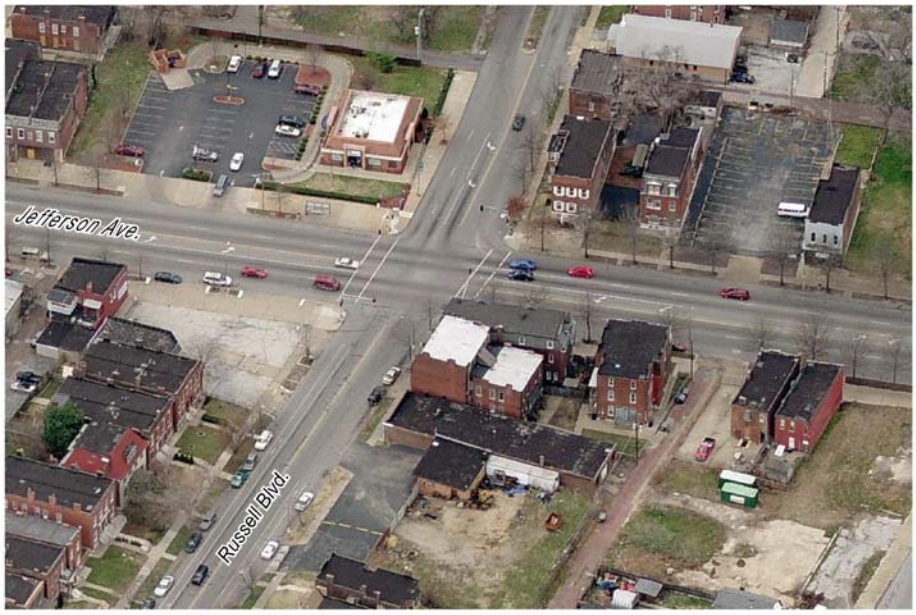
^ b. Existing Conditions



^ c. Illustrative Station Site Plan

^ d. View 1: Station Area Looking North

FIGURE 6.4-32: JEFFERSON AT RUSSELL STATION - IMAGE
Jefferson / I-55 Alternative



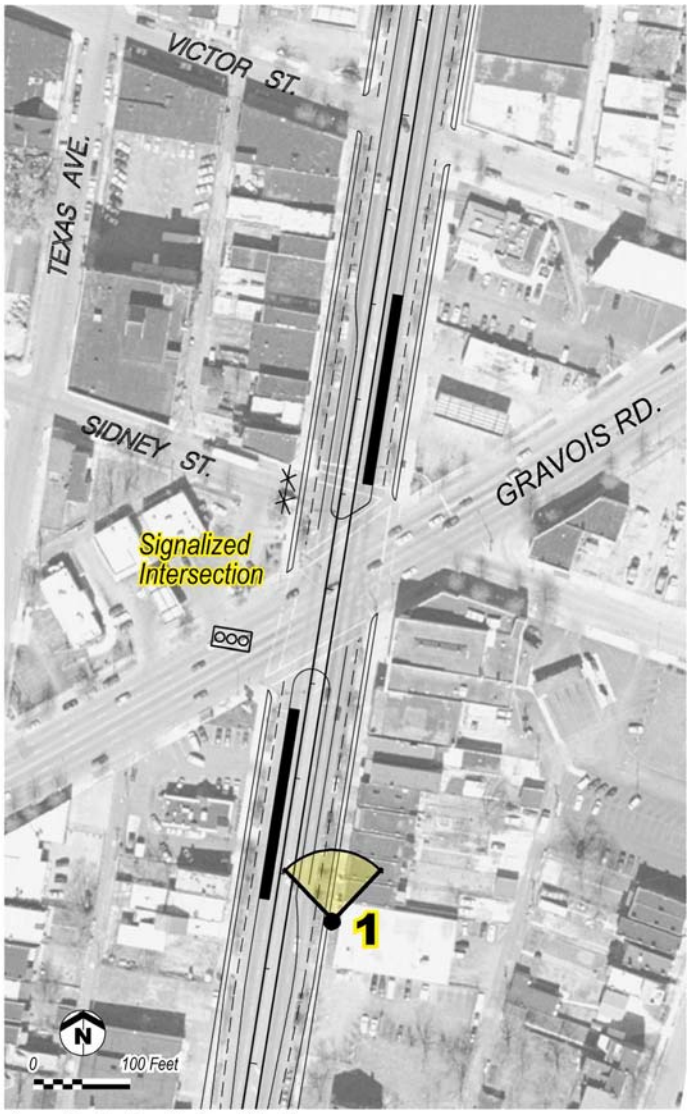
a. Existing Station Area Looking West >

^
b. Proposed LRT Station Image Looking West

FIGURE 6.4-33: JEFFERSON AT GRAVOIS STATION - PLAN
Jefferson / I-55 Alternative

< a. Station Location

^ b. Existing Conditions

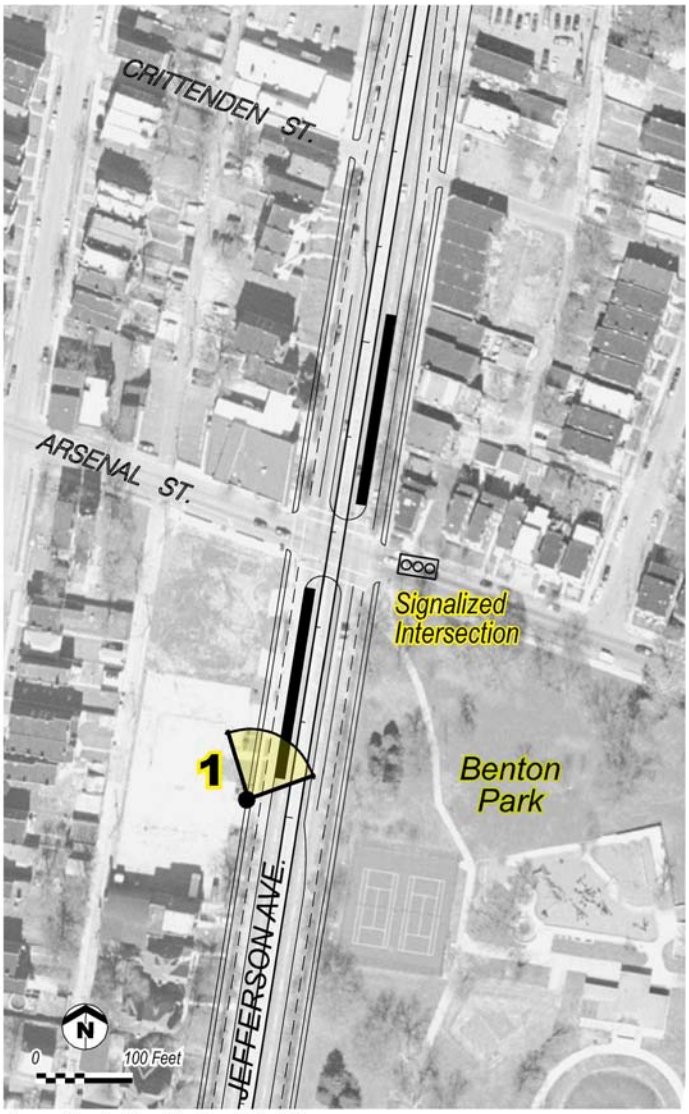


^ c. Illustrative Station Site Plan

d. View 1: Aerial View > of Station Area Looking North

FIGURE 6.4-34: JEFFERSON AT ARSENAL STATION - PLAN
Jefferson / I-55 Alternative

^ b. Existing Conditions

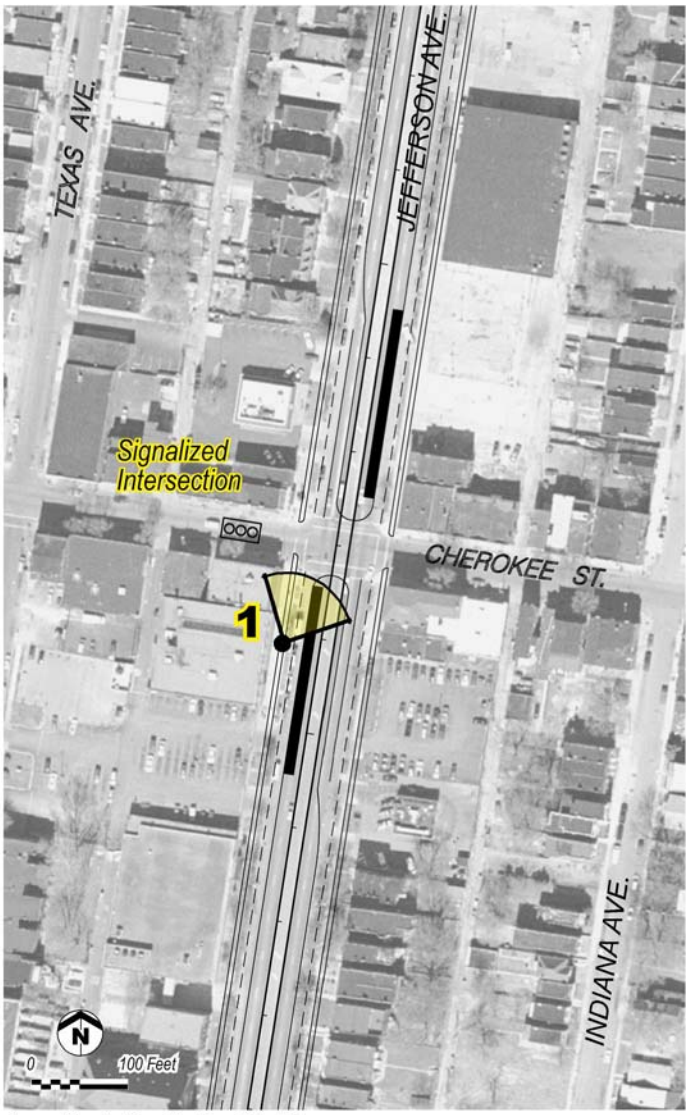


^ c. Illustrative Station Site Plan

^ d. View 1: Station Area Looking Northeast

FIGURE 6.4-35: JEFFERSON AT CHEROKEE STATION - PLAN
Jefferson / I-55 Alternative

^ b. Existing Conditions



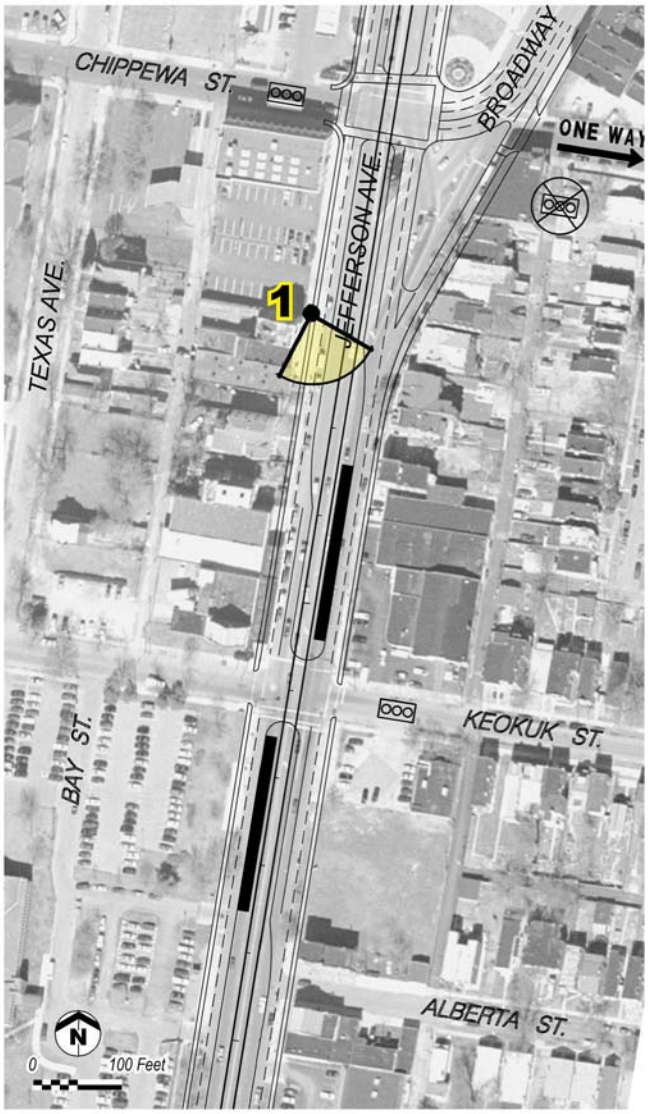
^ c. Illustrative Station Site Plan

^ d. View 1: Station Area Looking North

FIGURE 6.4-36: JEFFERSON AT KEOKUK STATION - PLAN
Jefferson / I-55 Alternative

< a. Station Location

^ b. Existing Conditions



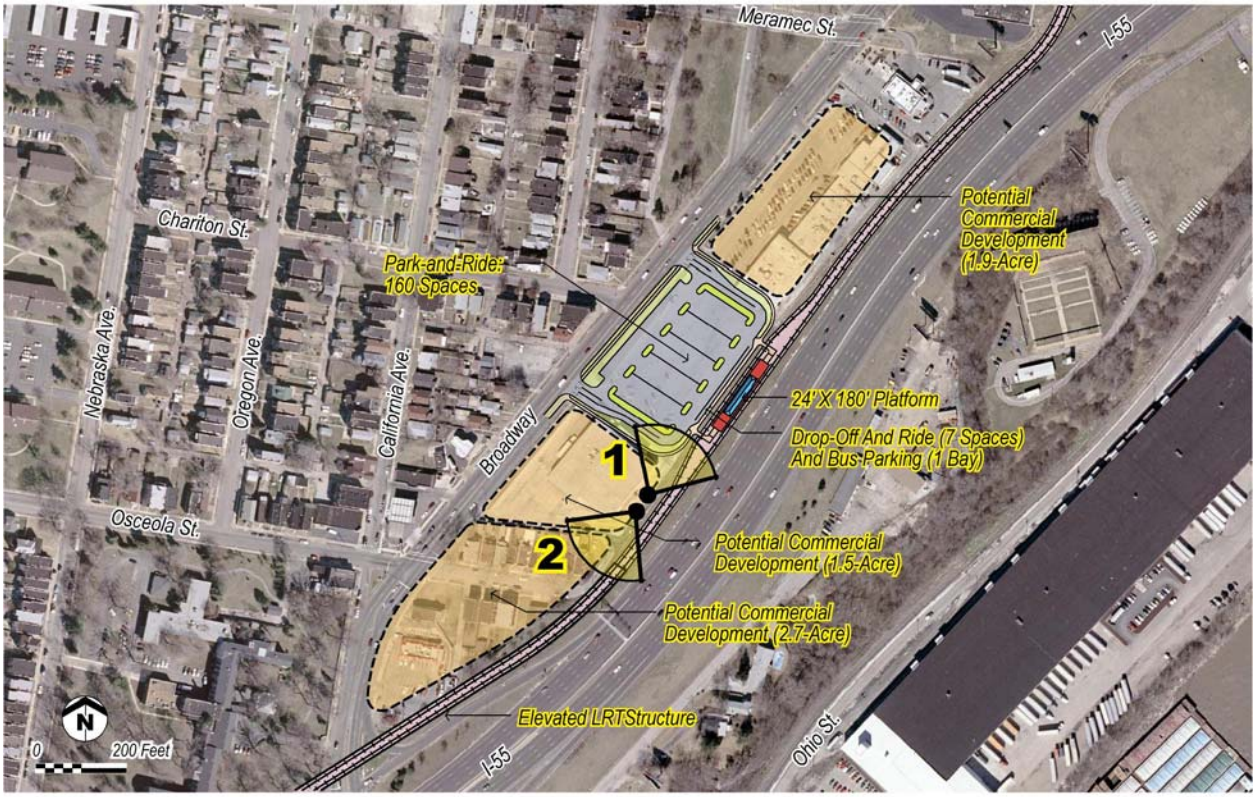
^ c. Illustrative Station Site Plan

^ d. View 1: Station Area Looking South

FIGURE 6.4-37: I-55 AT BROADWAY STATION - PLAN
Jefferson / I-55 Alternative

a. Station Location >

b. Existing Conditions >

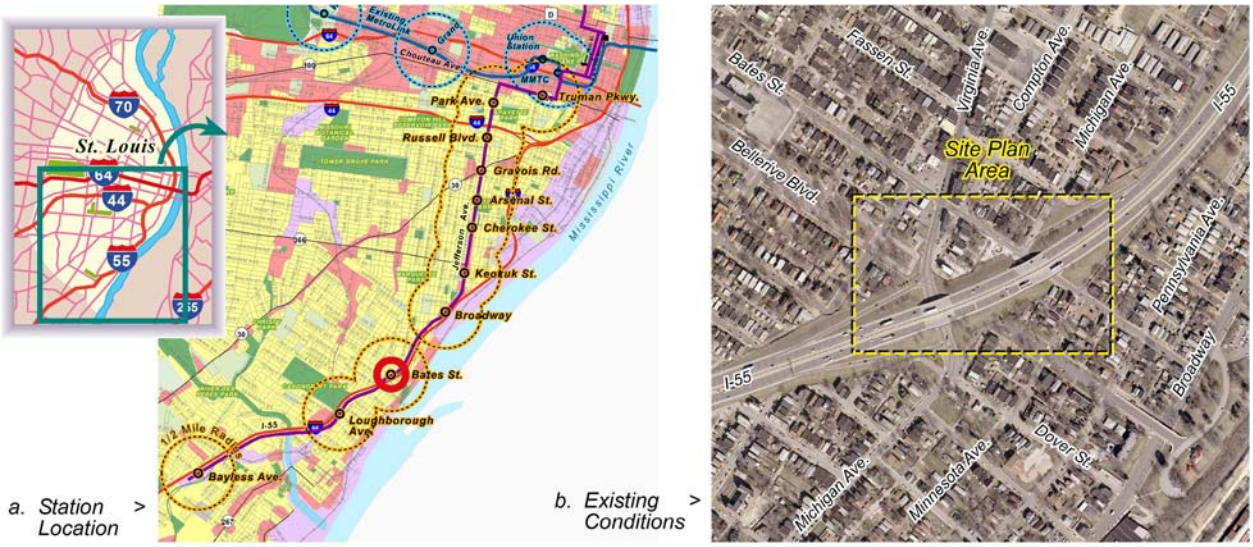


^ c. Illustrative Station Site Plan

^ d. View 1: Station Area Looking Northeast

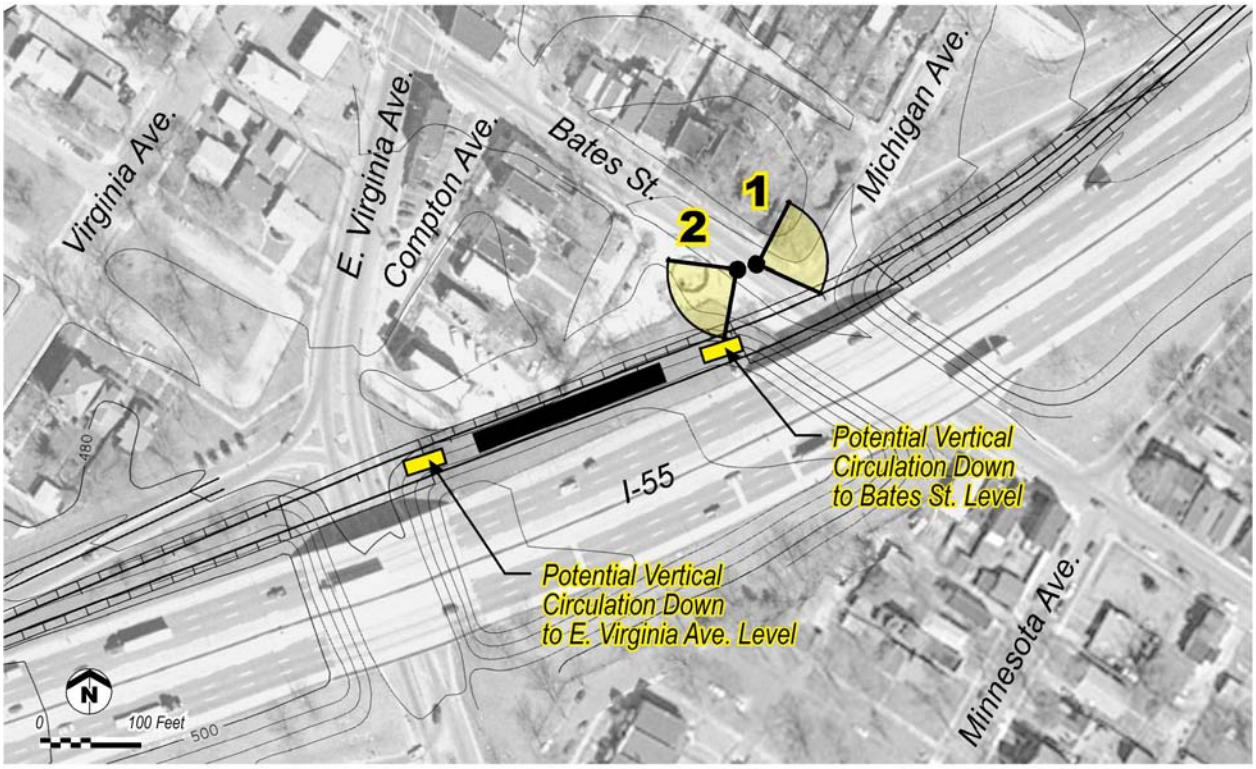
^ e. View 2: Station Area Looking Southwest

FIGURE 6.4-38: I-55 AT BATES STATION - PLAN
Jefferson / I-55 Alternative



a. Station Location >

b. Existing Conditions >

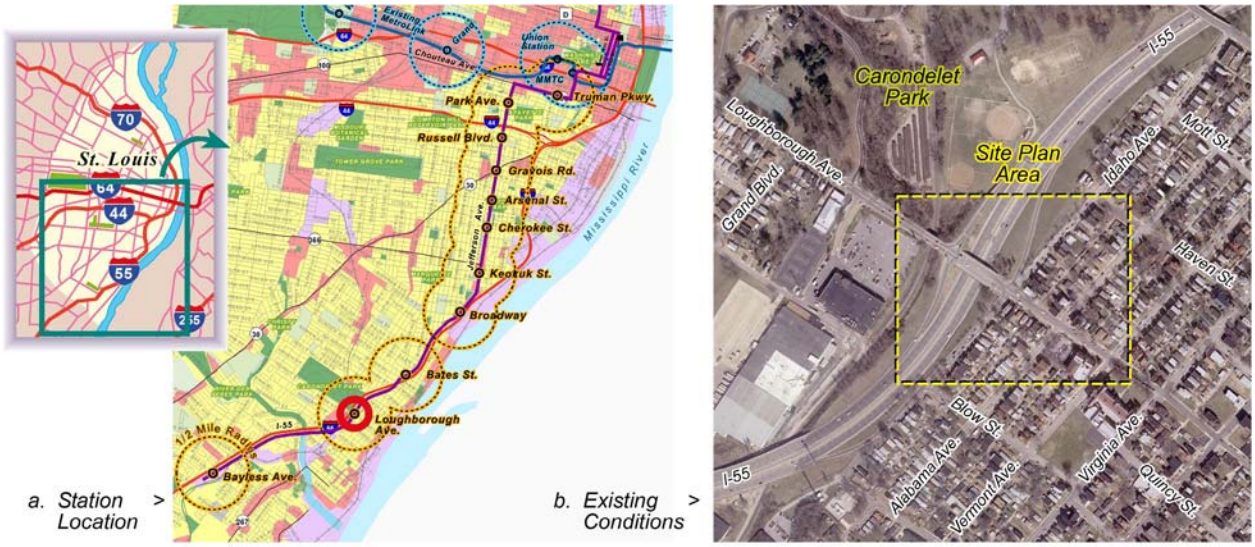


^ c. Illustrative Station Site Plan

^ d. View 1: Station Area Looking Northeast

^ e. View 2: Station Area Looking Southwest

FIGURE 6.4-39: I-55 AT LOUGHBOROUGH STATION - PLAN
Jefferson / I-55 Alternative

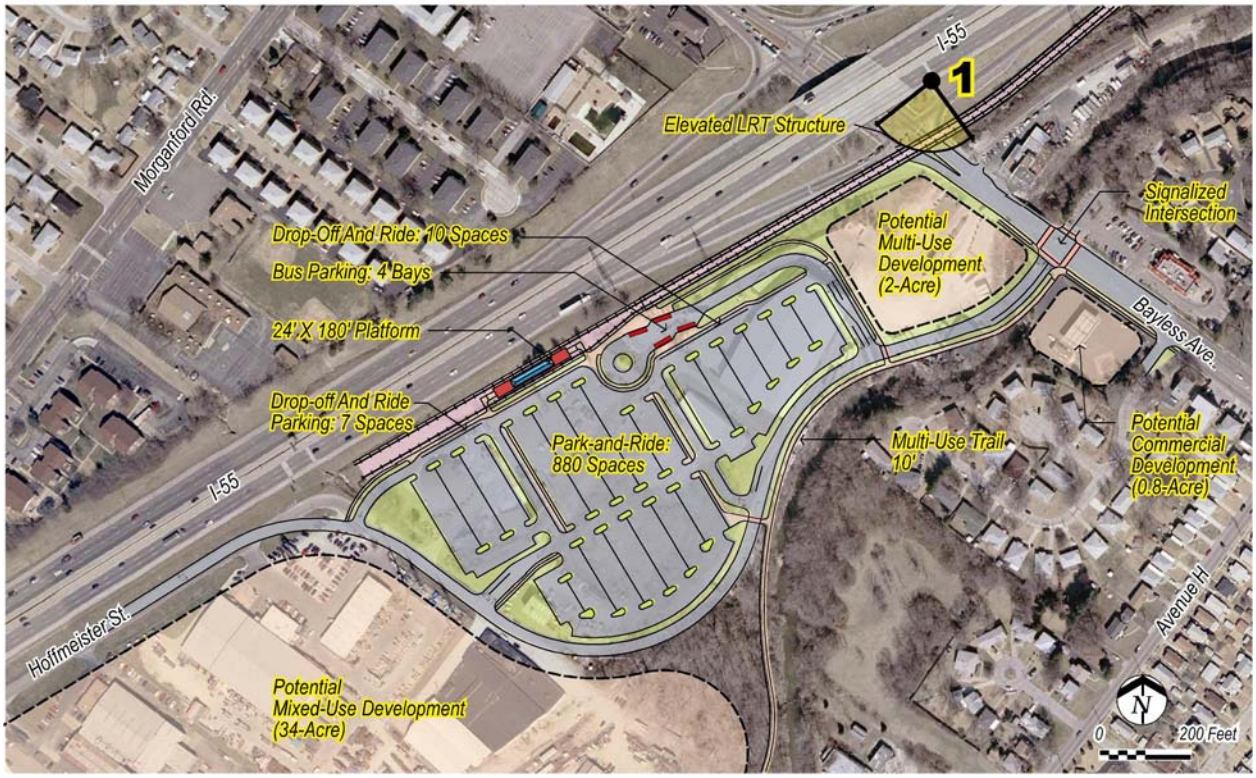


^ c. Illustrative Station Site Plan

FIGURE 6.4-40: I-55 AT BAYLESS STATION - PLAN
Jefferson / I-55 Alternative

< a. Station Location

b. Existing Conditions



^
d. Illustrative Station Site Plan

c. View 1: Station Area Looking South >

FIGURE 6.41-41: I-55 AT BAYLESS STATION - IMAGE
Jefferson / I-55 Alternative

a. Existing Station Area Conditions and Image Viewpoint >

^
b. Proposed LRT Station Image Looking North

Chapter 6.5: Conceptual Design Analysis

This section provides a design analysis of the two remaining Southside LRT alternative alignments developed over the course of this Southside 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 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.

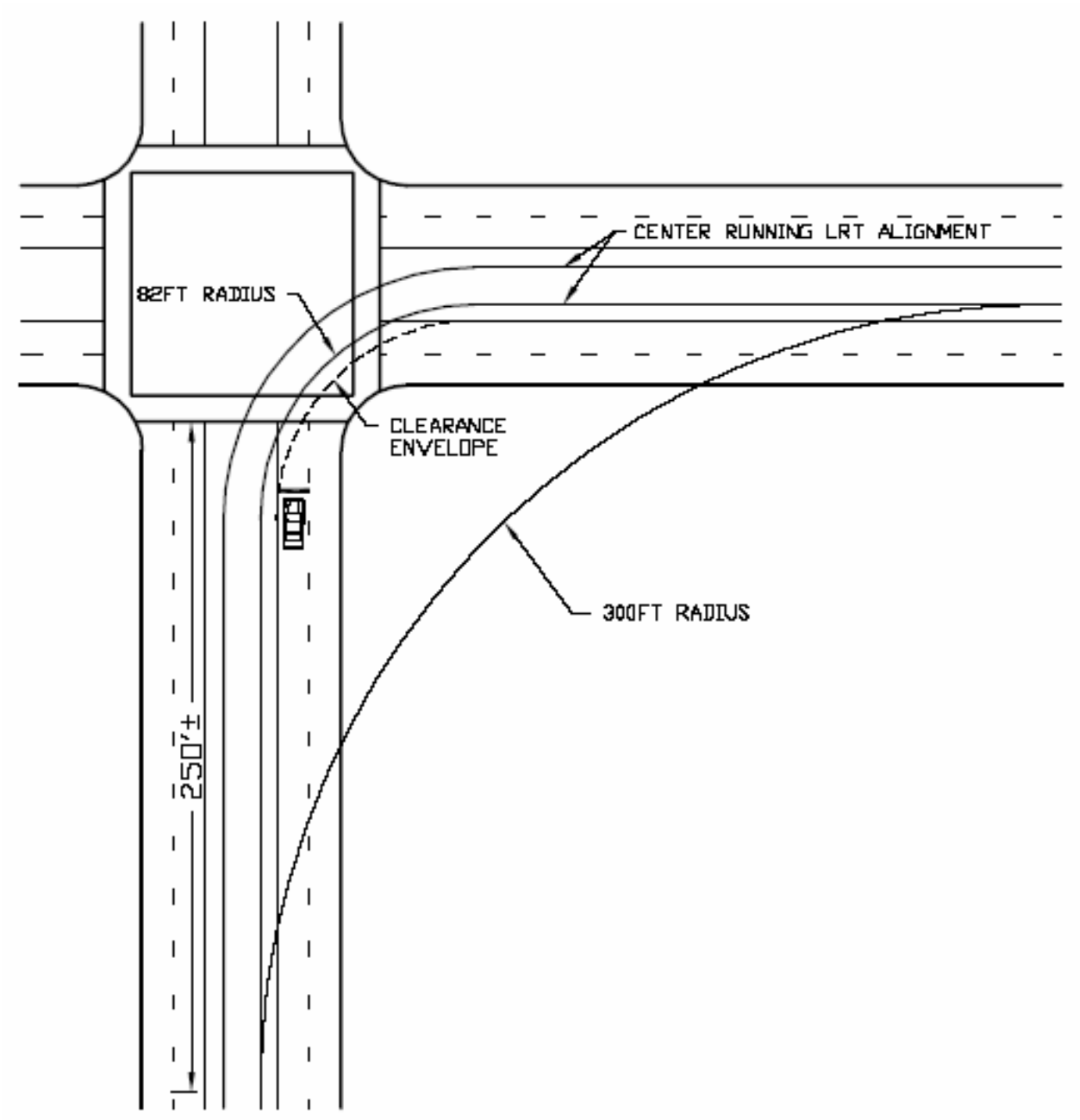
- **Station Platforms**. The existing MetroLink LRT system uses high platforms with level boarding. This study assumes that low platforms with level boarding would be used for LRT alternatives proposed here. Low platforms are more appropriate for street-running systems, as they better accommodate pedestrian 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 Southside LRT lines would utilize new, low-floor LRVs.

TABLE 6.5-1: DESIGN GUIDELINES AND ASSUMPTIONS FOR STREET-RUNNING LRT

* Metro's Design Guidelines are outlined in a memo to East-West Gateway dated 7/29/2003

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.

FIGURE 6.5-1: MINIMUM RADIUS AT INTERSECTION



Source: URS Corporation, 2007

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.

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.

All other alignment segments, including those along Interstate-55 and the UPRR corridor, will lie within exclusive right-of-way. These will use ballast walls and open tie and ballast track, with a minimum trackway width of 32 feet (Figure 6.5-3).

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.

In exclusive right-of-way with LRVs operating at speeds over 35 miles per hour, grade crossings will be protected by a grade crossing warning system that includes automatic gates and flashers.

FIGURE 6.5-2: TYPICAL EMBEDDED TRACK SECTION

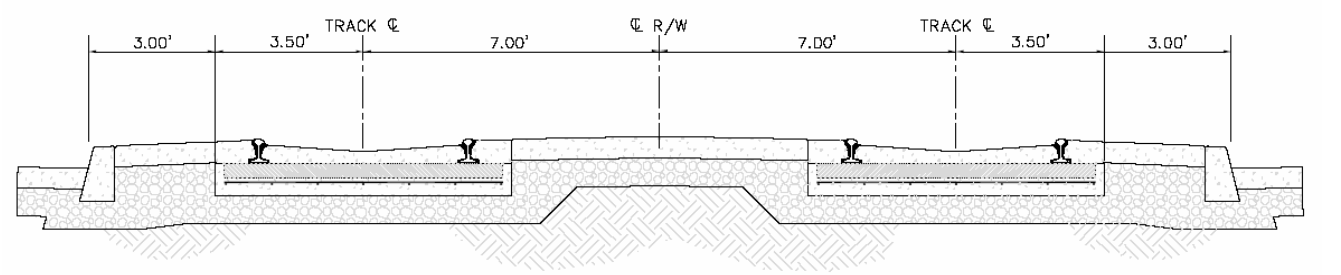
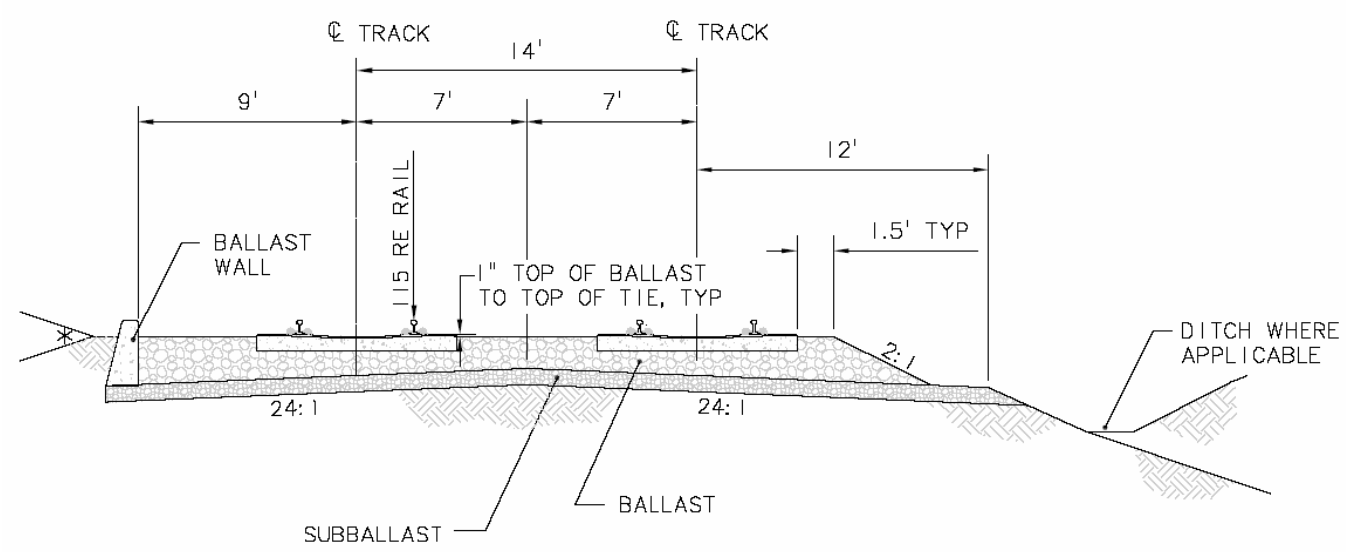


FIGURE 6.5-3: TYPICAL OPEN TIE AND BALLAST TRACK SECTION



Structures
The Southside alternatives will require construction of new LRT structures, retrofit or reconstruction of existing structures, and removal of existing structures. Tables 6.5-2 and 6.5-4 include summaries of proposed structures and existing structures that require modification.

For the purpose 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 structures 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.

Along the Interstate-55 segment of both Southside LRT alternatives, there are a number of existing structures that are intended to remain but require modifications to their abutments to accommodate the passage of an LRT alignment. For this study, it has been assumed that these modifications can be made but detailed analysis will be required during preliminary engineering to determine the extent of necessary modifications.

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 right-of-way, 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 the 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 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 operations costs, will be necessary during preliminary engineering to determine the most efficient and cost-effective solution.

Sections 6.5.2 and 6.5.3 provide a more specific discussion of the characteristics and project elements associated with the Southside alternatives.

6.5.2 SOUTHSIDE ALTERNATIVE: JEFFERSON AVENUE/INTERSTATE-55

The Jefferson Avenue alternative connects the Multimodal Transit Center MMTC to the Interstate-55 corridor just south of the Bayless Avenue interchange and is approximately 8.6 miles in length. This alignment will be a double track LRT system that begins at the MMTC and proceeds south on the west side of the 14th Street bridge to Chouteau Avenue. At Chouteau, the alignment turns west and proceeds in the center of Chouteau to Jefferson Avenue. At Jefferson, the alignment turns south and proceeds down the center of Jefferson to where it converges with Broadway. At the intersection of Broadway and Gasconade Streets, the alignment exits Broadway and enters the Interstate-55 right-of-way. The alignment then proceeds south along the west side of Interstate-55 to Virginia Avenue, where it elevates and crosses over Interstate-55, proceeding down the east side of Interstate-55 to its terminus at the proposed Bayless Avenue park-and-ride site.

Civil/Alignment Characteristics
Civil and alignment characteristics vary with location as follows:

- **14th Street.** In this segment, the alignment would utilize the existing bridge over the UPRR yard. The bridge is approximately 1300 feet in length and carries two lanes of traffic in each direction, with pedestrian walkways on both sides. The proposed alignment would have LRT tracks on the west side of the bridge and one lane of traffic in each direction, with a pedestrian walkway on the east side. After this bridge, the proposed alignment would continue on the west side of 14th Street and turn into the center median of Chouteau Avenue.

- **Chouteau Avenue.** The existing Chouteau Avenue right-of-way is approximately 80 feet wide, with two travel lanes in each direction, left turn pockets, and parking on both sides. The proposed alignment would include center-running LRT tracks and maintain two travel lanes in each direction. Existing on-street parking would be eliminated. At intersections where left-turn lanes and/or stations are provided, additional right-of-way would be required to accommodate improvements.

- **Jefferson Avenue.** The existing Jefferson Avenue right-of-way varies from 90 to 120 feet wide, with four to six travel lanes, left turn pockets, and parking lanes on both sides. The proposed alignment would include center-running LRT tracks and maintain two travel lanes in each direction. Existing on-street parking would be eliminated. The fire stations at the intersections of Jefferson Avenue and La Salle Street and Jefferson Avenue and Pestalozzi Street need to be relocated. As with other street-running segments, intersections and left-turn movements would be consolidated to major collector and arterial cross streets. With the exception of one station (Park Avenue), all stations along the Jefferson segment are

configured as split-side platforms. A new single point urban interchange (SPUI) is proposed for the Jefferson interchange with Interstate-44 to be constructed by the Missouri Department of Transportation in the future. The cost of this new interchange is not included in the total cost of this project.

- **Interstate-55.** In the Interstate-55 segment, the alignment generally parallels the freeway when possible. The available right-of-way varies widely. Additional right-of-way acquisition may be required in certain areas. Numerous retaining walls will be required to keep earthwork within the available right-of-way, and traffic barriers will be required between the LRT tracks and freeway shoulders. It will be necessary to maintain adequate clear zones along the freeway travel lanes. This is an important safety issue and will need to be analyzed in detail during preliminary engineering. Grade separations are proposed at most existing cross streets. An at-grade, gated crossing is proposed at Loughborough.

Structures

The Jefferson alternative will utilize an existing bridge structure over the UPRR yard. It is reasonable to assume that the structure can be modified if the bridge was designed for permit truck loads. Further analysis will be required during preliminary engineering to determine the structural capacity and modifications necessary to accommodate the LRT track system. A new structure may be considered if structural modifications are not possible or prohibitively expensive.

In the Interstate-55 corridor, a number of retaining walls would be necessary to maintain the LRT within right-of-way and to prevent or minimize impacts to the existing interstate. Proposed retaining wall locations are approximate. During preliminary engineering, retaining wall types, sizes, and locations should be identified more accurately.

Table 6.5-2 includes a summary of proposed structures and existing structures that require modification. Existing structures will require further structural analysis during preliminary engineering to establish the extent and feasibility of proposed modifications.

TABLE 6.5-2: BRIDGE SUMMARY, JEFFERSON/I-55

Location	Description	Length	Comments
*14th Street	Existing bridge	1,300’	Modify for LRT tracks.
I-44 and Jefferson Avenue	Proposed	N/A	Existing interchange to be replaced by others.
I-55 and Broadway	Proposed LRT structure	250’	Over Broadway.
Station 2197	Existing pedestrian bridge over I-55	N/A	Remove bridge.
Delor Street and I-55	Existing overpass	N/A	Modify existing abutment for LRT under-crossing.
I-55 and Bates Street	Proposed LRT structure	200’	Over off-ramp.
I-55 and Bates Street	Proposed LRT structure	175’	Over Bates Street.
I-55 and Bates Street	Proposed LRT structure	175’	Over Virginia Avenue.
I-55 and Bates Street Interchange	Proposed LRT structure	800’	Over I-55.
I-55 and Vermont Avenue	Existing pedestrian bridge over I-55	N/A	Remove bridge.
I-55 and Holly Hills Avenue	Existing overpass	N/A	Modify existing abutment for LRT under-crossing.
I-55 and UPRR Tracks	Proposed LRT structure	1,500’	Over off-ramp and UPRR tracks.
*I-55 and River Des Peres	Proposed LRT structure	600’	Over River Des Peres.
*I-55 and Weber Road Interchange	Proposed LRT structure	N/A	Two cut-and-cover boxes under proposed on-ramp.
*I-55 and Weber Road	Existing overpass	N/A	Modify existing abutment for LRT under-crossing.
*I-55 and Bayless Avenue	Proposed LRT structure	300’	Over Bayless Avenue.

* Part of both Chouteau/UPRR and Jefferson/I-55 alignment alternatives.

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, types, and details.

TABLE 6.5-3: STATION SUMMARY, JEFFERSON/I-55

Track Station	Cross Streets	Station Type	Comments
1035	Chouteau Avenue and Truman Parkway	Split side	Connects with bus #57.
2015	Jefferson Avenue and Park Street	Center	Connects with bus #58x, #410x, #80.
2040	Jefferson Avenue and Russell Boulevard	Split side	Connects with bus #80.
2065	Jefferson Avenue and Gravois Road	Split side	Connects with bus #10, #11x.
2085	Jefferson Avenue and Arsenal Street	Split side	Connects with bus #30.
2110	Jefferson Avenue and Cherokee Street	Split side	Connects with bus #73.
2140	Jefferson Avenue and Keokuk Street	Split side	Connects with bus #11, #40.
2170	I-55 corridor	Center	Connects with bus #40, #70 & proposed 160 stall Park-and-Ride.
2235	I-55 and Bates Street interchange	Center	Connects with bus #8, #40, #73.
2285	I-55 and Loughborough Street interchange	Split side	Connects with bus #8, #70. Gated crossing.
2395	I-55 and Bayless Avenue interchange	Center	Terminus. Connects with bus #10x, 40x, 13x, 890 and stall park-and-ride with 4-bay bus facility.

Right-of-Way
Additional right-of-way is anticipated at the following locations:

- **Chouteau Avenue and Truman Parkway.** To maintain four traffic lanes, a left-turn lane, and a platform.

- **Interstate-55 and UPRR.** A building and property will need to be acquired along the south side of Interstate55.

- **Jefferson Avenue and La Salle Street.** The fire station will need to be acquired and relocated.

- **Jefferson Avenue and Pestalozzi Street.** The fire station will need to be acquired and relocated.

6.5.3 SOUTHSIDE ALTERNATIVE: CHOUTEAU AVENUE/UPRR

The Chouteau/UPRR alternative connects the MMTC to the Interstate-55 corridor just south of the Bayless Avenue interchange and is approximately 11.2 miles in length. The alignment begins at the MMTC and proceeds south on the west side of the 14th Street bridge to Chouteau Avenue. At Chouteau, it turns west and proceeds in the center of Chouteau to Spring Street. At Spring, it turns southwest to the intersection of Hickory Street and 39th Street. The alignment then turns and proceeds south in the center of 39th to Folsom Street. It then turns and proceeds west in the center of Folsom to the UPRR right-of-way. Once within the UPRR right-of-way, the alignment parallels the freight track and continues south to the Interstate-55 corridor. At Interstate-55, it leaves the UPRR right-of-way and proceeds south along the eastern limits of the interstate corridor to the terminus at the proposed Bayless Avenue park-and-ride site.

Civil/Alignment Characteristics
Civil and alignment characteristics vary with location as follows:

- **14th Street.** This segment is identical to the Jefferson/I-55 alternative; see Section 6.5.2.

- **Chouteau Avenue.** This segment is identical to the Jefferson/I-55 alternative, except that it continues past Jefferson Avenue to Spring Street; see Section 6.5.2.

- **39th Street and Folsom Street.** The existing 39th Street and Folsom Street right-of-way is approximately 60 feet wide, with one travel lane in each direction and on-street parking. The proposed alignment would have center-running LRT tracks, with a travel lane in each direction and a sidewalk on one side. On-street parking would be eliminated.

- **Union Pacific Railroad.** Preliminary discussions with UPRR management indicate that the freight and LRT will have to be separated with a crash wall barrier. The barrier is assumed to be 25 feet from the freight alignment. Because of this requirement and right-of-way limitations, much of the existing freight alignment would have to be relocated within the right-of-way. Further constraints within the existing right-of-way include reserving space for a second freight track expected in the future. Most existing overpass structures on the alignment would also need to be rebuilt. Many active and inactive spur tracks exist along the corridor and should be considered for decommissioning.

- **Interstate-55.** See Section 6.5.2 for a detailed description of Interstate-55 corridor design considerations.

Structures
A number of retaining walls would be necessary to maintain LRT within existing UPRR right-of-way and to prevent or minimize impacts to the existing and future UPRR track alignments. Retaining walls have been approximated, and an allowance has been added to the cost comparison. The actual types, sizes, and locations of retaining walls cannot be accurately identified until a more precise survey and detailed design are completed.

Proposed LRT structures, overpasses, and existing structures must be built or retrofitted to accommodate the LRT. A summary of proposed structures and existing structures that will require modification to accommodate the LRT alignment are listed in Table 6.5-4. The existing structures listed will require structural analysis during preliminary engineering in order to determine feasibility, proposed modifications, and a more accurate cost estimate.

TABLE 6.5-4: BRIDGE SUMMARY, CHOUTEAU/UPRR

Structure location	Structure description	Approximate Length	Comments
*14th Street (I-64 to Chouteau Avenue)	Existing structure	1,300’	Modify for LRT tracks.
I-44 and UPRR	Existing overpass	N/A	Modify existing abutment for LRT under-crossing.
Kingshighway Boulevard and UPRR	Existing overpass	N/A	No modifications anticipated, verify bent locations during preliminary engineering.
Southwest Avenue and UPRR	Existing overpass	100’	Replace with new structure.
Arsenal Street and UPRR	Existing overpass	100’	Replace with new structure.
Station 1285	Proposed LRT structure	700’	Over UPRR.
Kingshighway Boulevard and UPRR	Proposed LRT structure	120’	Over Kingshighway adjacent to existing UPRR structure.
Morganford Road and UPRR	Existing overpass	100’	Replace with new structure.
Chippewa Street and UPRR	Proposed LRT structure	120’	Over Chippewa Street adjacent to existing UPRR structure.
Gravois Road and UPRR	Proposed LRT structure	170’	Over Gravois Road adjacent to existing UPRR structure.
Holly Hills Avenue and UPRR	Existing overpass	80’	Replace with new structure.
Grand Boulevard and UPRR	Existing overpass	80’	Replace with new structure.
Loughborough Street and UPRR	Existing overpass	100’	Replace with new structure.
I-55 and UPRR	Existing overpass	N/A	No modifications anticipated, verify bent locations during preliminary engineering.
*I-55 and River Des Peres	Proposed LRT structure	600’	Over River Des Peres.
*I-55 and Weber Road interchange	Proposed LRT structure	N/A	Two cut-and-cover boxes under proposed on-ramp.
*I-55 and Weber Road	Existing overpass	N/A	Modify existing abutment for LRT under-crossing.
*I-55 and Bayless Avenue	Proposed LRT structure	300’	Over Bayless Avenue.

* Part of both Chouteau/UPRR and Jefferson/I-55 alignment alternatives.

Stations
Preliminary station locations have been identified and are discussed in detail in *Chapter 6.4* of this report. Table 6.5-5 summarizes station locations, types, and details.

TABLE 6.5-5: STATION SUMMARY, CHOUTEAU/UPRR

Track Station	Cross Streets	Station Type	Comments
1035	Chouteau Avenue and Truman Parkway	Split side	Connects with bus #80.
1065	Chouteau Avenue and Jefferson Avenue	Split side	Connects with bus #11.
1120	Chouteau Avenue and Grand Boulevard	In-line Side	Connects with bus #57, #70.
1245	UPRR and Shaw Boulevard	Center	Connects with existing park-and-ride.
1275	UPRR and Arsenal Street	Center	
1355	UPRR and Chippewa Street	Center	
1425	UPRR and Bates Street	Center	
1485	UPRR and Loughborough Street	Center	
2395	I-55 and Bayless Avenue interchange	Center	Terminus. Connects with bus #10x, 40x, 13x and 890-stall park-and-ride site with 4-bay bus facility.

Right-of-Way
Additional right-of-way is anticipated at the following locations:

- **Chouteau Avenue at Truman Parkway and Jefferson Avenue.** In order to maintain the four through lanes, a left-turn lane, and a platform, it is anticipated that additional right-of-way will be required.

- **Chouteau Avenue and Spring Street.** Property acquisition will be required where the alignment crosses between Spring St. and 39th St.

- **UPRR Corridor.** Right-of-way width varies throughout the corridor from 50 to 100 feet. Despite relocating the UPRR track in many reaches, a significant amount of right-of-way will need to be acquired adjacent to the existing rail corridor.

- **Interstate-55 and UPRR.** A building and property will need to be acquired along the south side of Interstate-55.

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 New Starts criteria.

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 6.5-6. 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.
- Signal System.
- Communications.
- Vehicles.
- Right-of-Way.
- Professional Services.
- Contingency.

TABLE 6.5-6: CAPITAL COST SUMMARY

Segment	Order of Magnitude	Length	Cost/Mile (2007)
Chouteau/UPRR	$678.6 Mil	11.05 Route-Mile	$61.4 Mil/Mile
Jefferson/I-55	$537.4 Mil	8.60 Route-Mile	$58.0 Mil/Mile

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.

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 and 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 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.

- **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, 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 levels 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.

Chapter 6.6: Preliminary Ridership Modeling

This section discusses ridership estimates obtained through application of the FTA Aggregate Rail Ridership Forecasting (ARRF) sketch forecast tool.

Census 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 (ARRF)

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:

- 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-Kersee (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.

FIGURE 6.6-1: ALIGNMENTS RELATIVE TO EWGCOG MPO COUNTIES

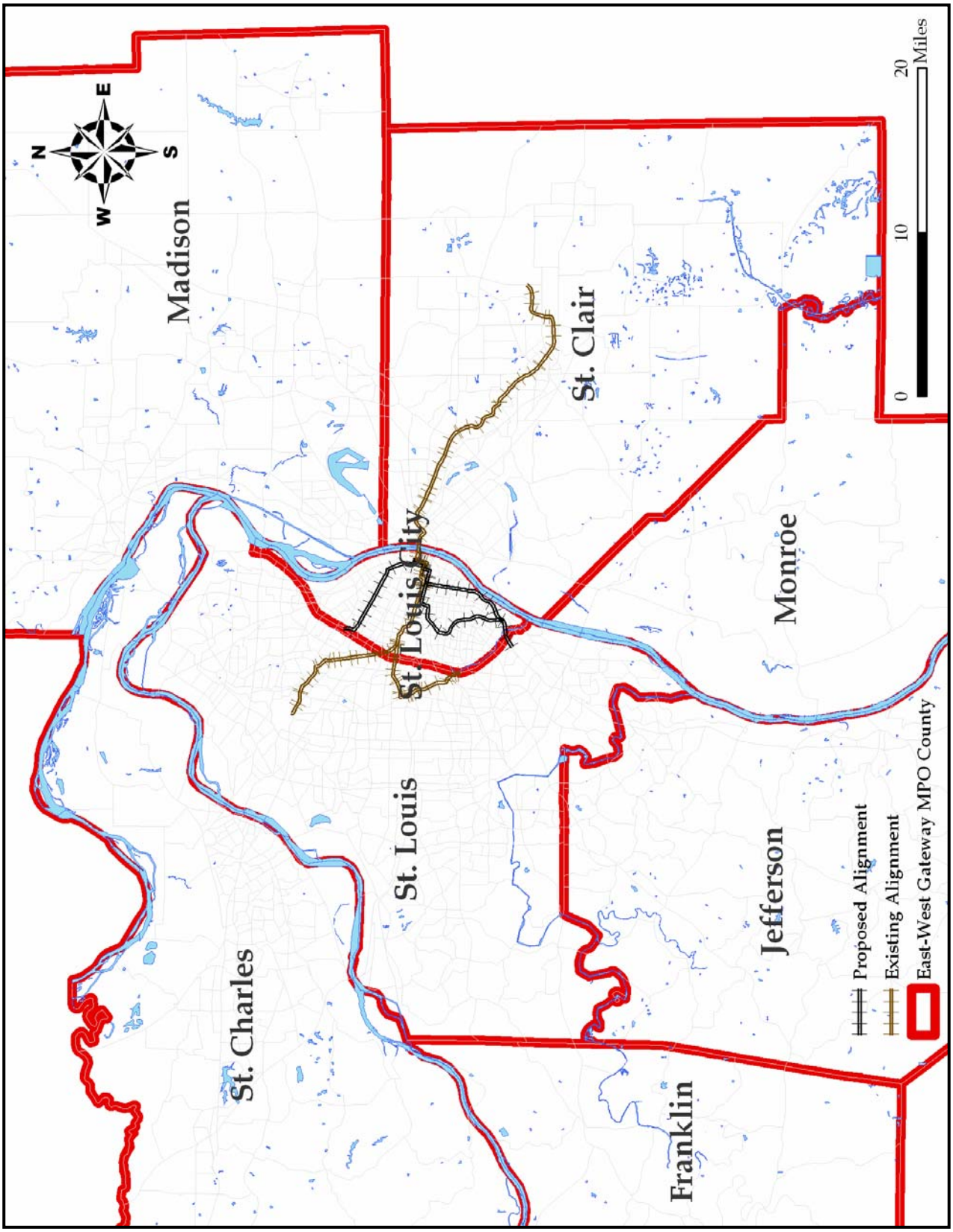


FIGURE 6.6-2: STUDY AREA

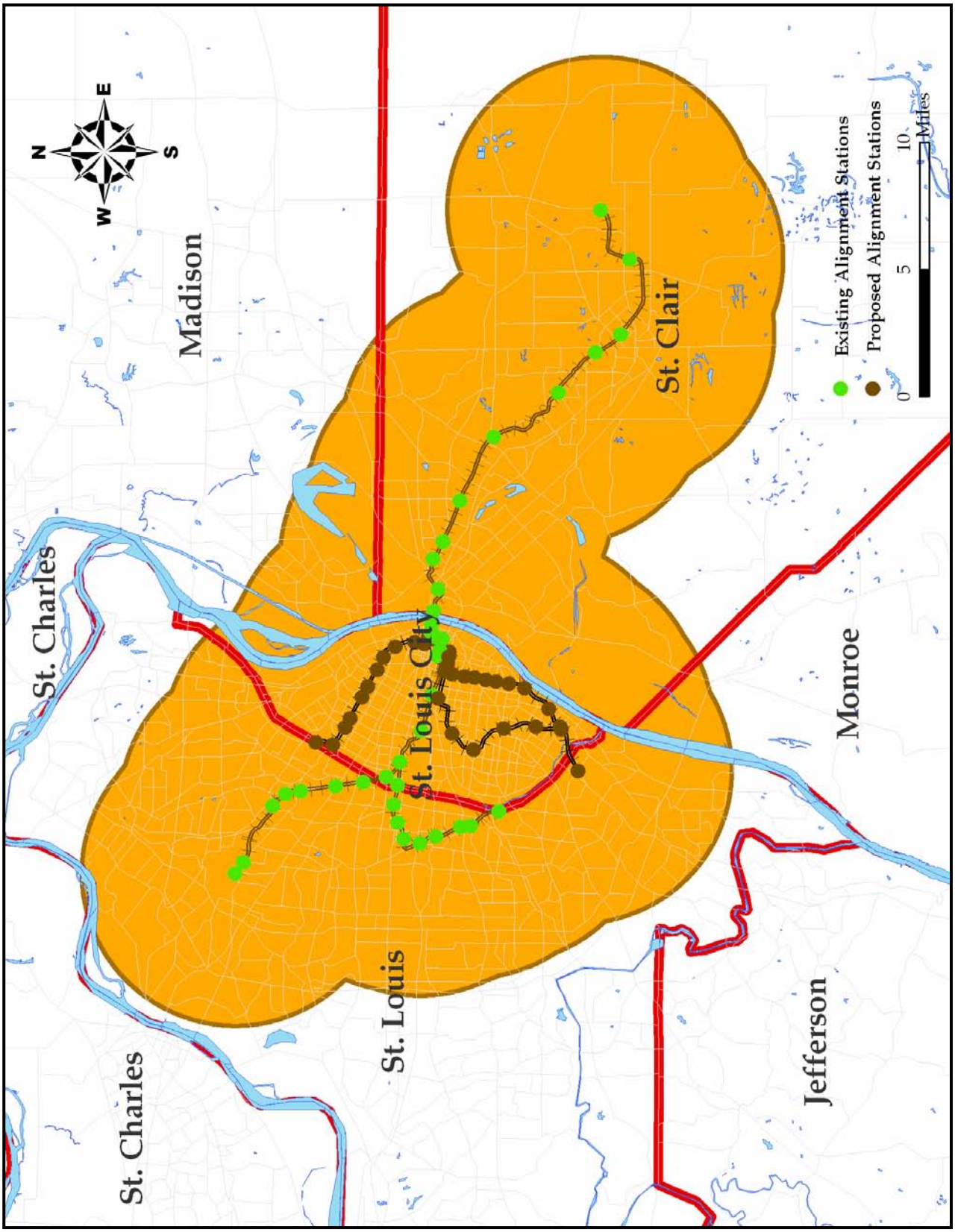


FIGURE 6.6-3: NORTHSIDE ALIGNMENT – NATURAL BRIDGE

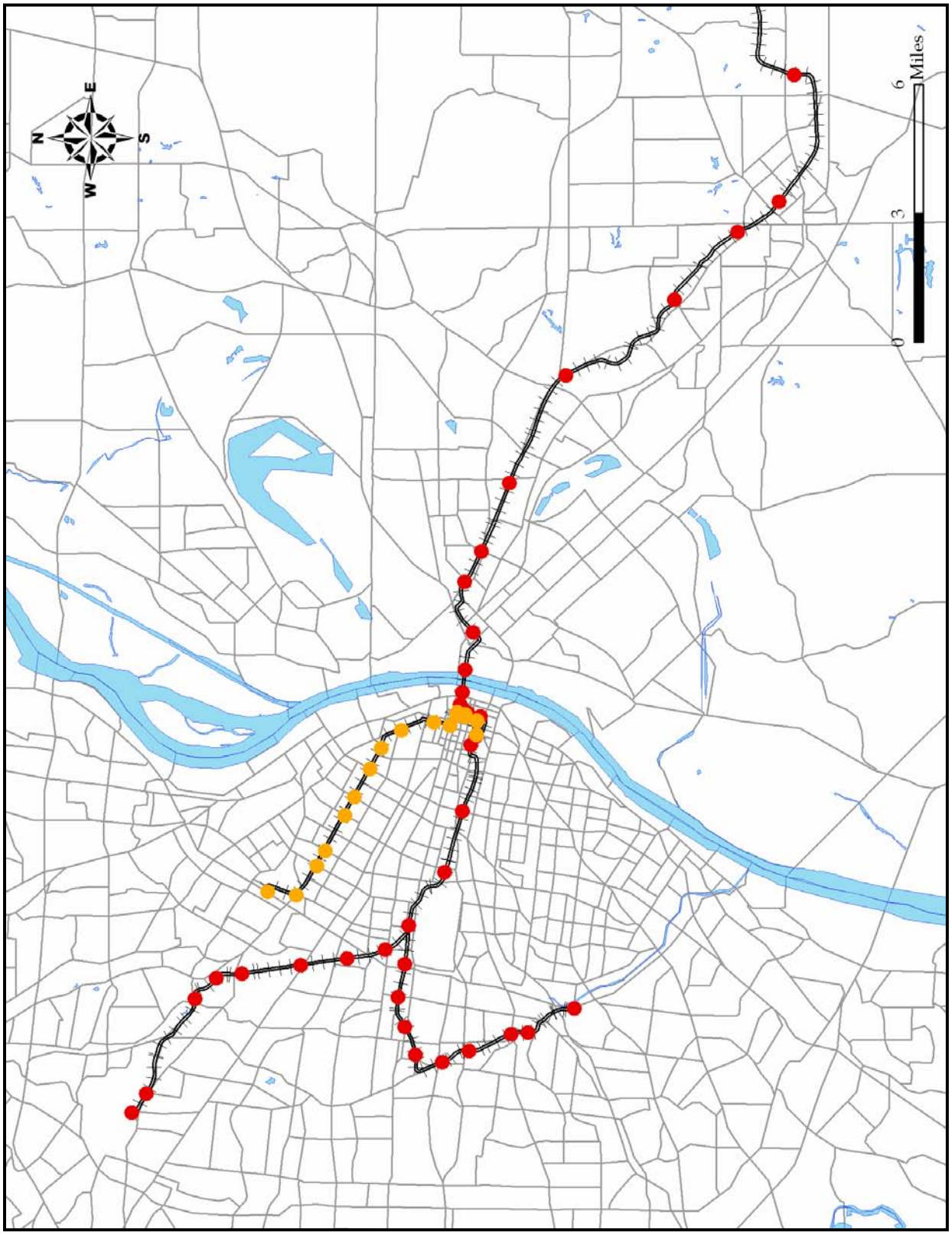


FIGURE 6.6-4: SOUTHSIDE ALIGNMENT – JEFFERSON/I-55

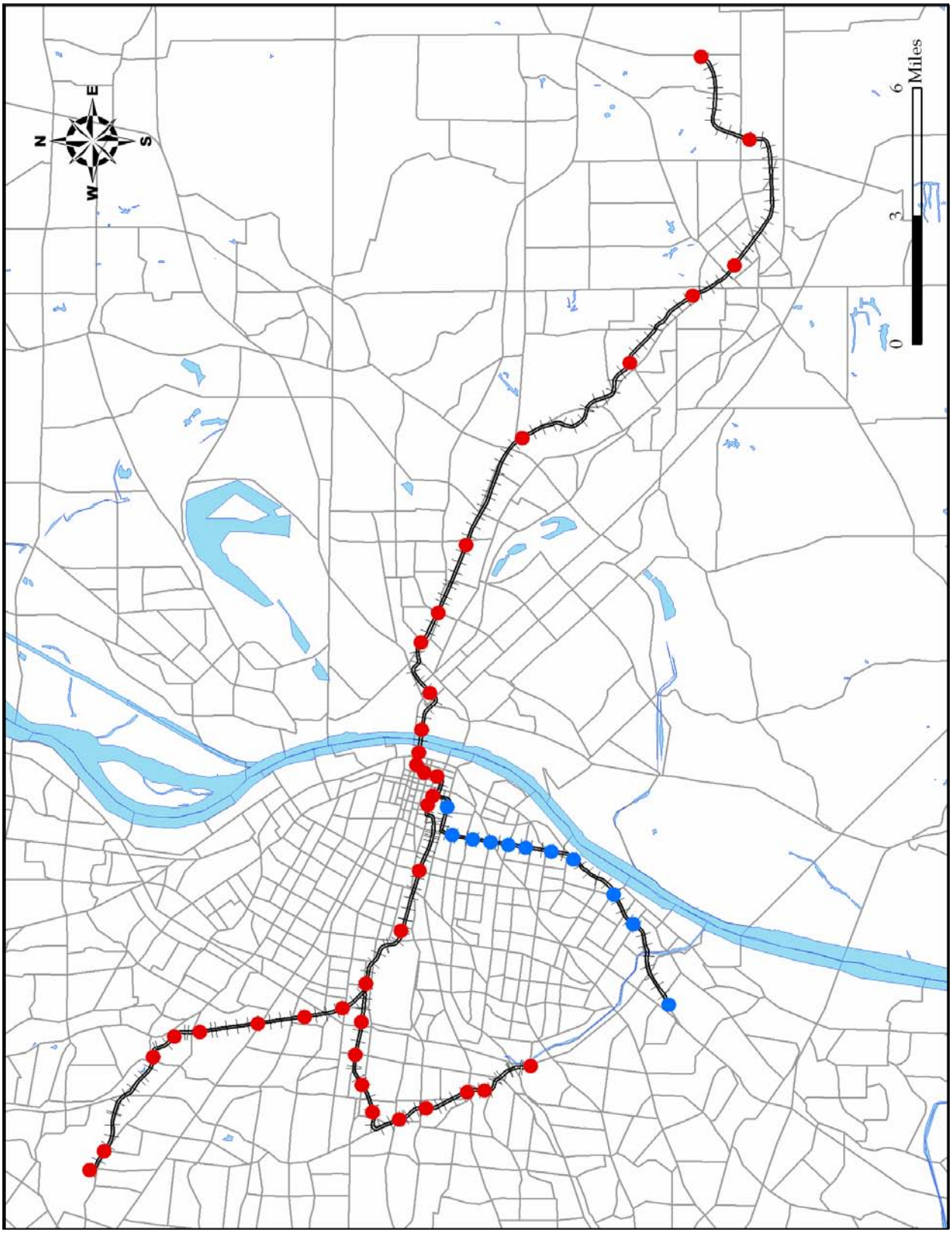
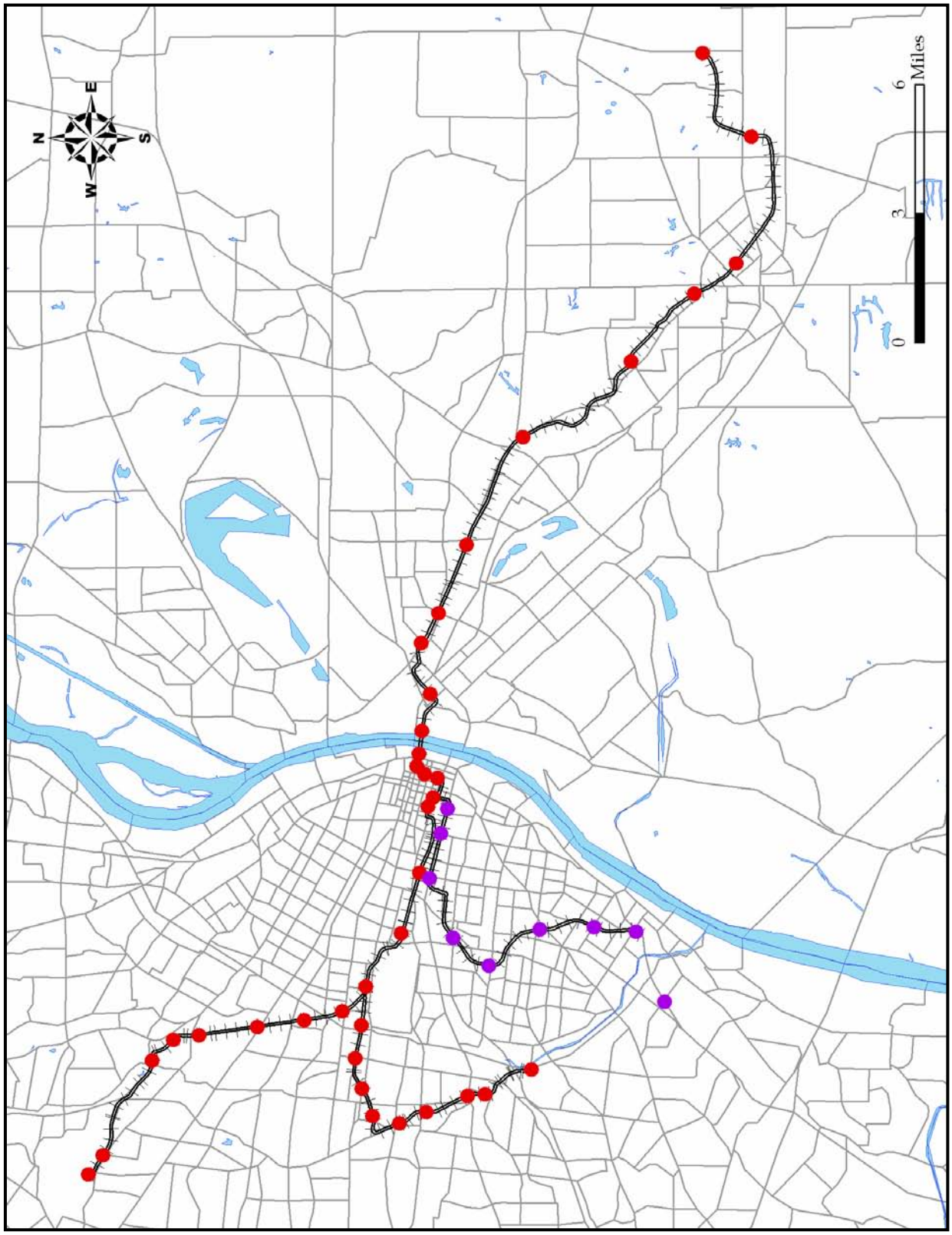


FIGURE 6.6-5: CHOUTEAU/UPRR SOUTHSIDE EXTENSION



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 * Directional Route Length
- Weekday Unlinked Home-Work Rail Trips = 461.41 * Directional Route Length

Model 2: JTW Walk Access Method
This method uses CTTP 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-to-1 Mile JTW Flows
- Model 2B: Weekday Unlinked Work-Purpose Trips = 0.32* 2-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* "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 * CTPP Park-and-Ride 6-to-1 Mile JTW Flows (<50K Density) +
  0.202 * 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.

- 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.

FIGURE 6.6-6: NORTHSIDE EXTENSION – WORKER FLOWS

Travel Areas within Gateway MPO	East-West	Workers	Percentage
6 mile – 6 mile buffer		422,830	100%
6 mile – 1 mile buffer		214,825	51%
2 mile – 1 mile buffer		129,234	31%

6-Mile Buffer
2-Mile Buffer
1-Mile Buffer

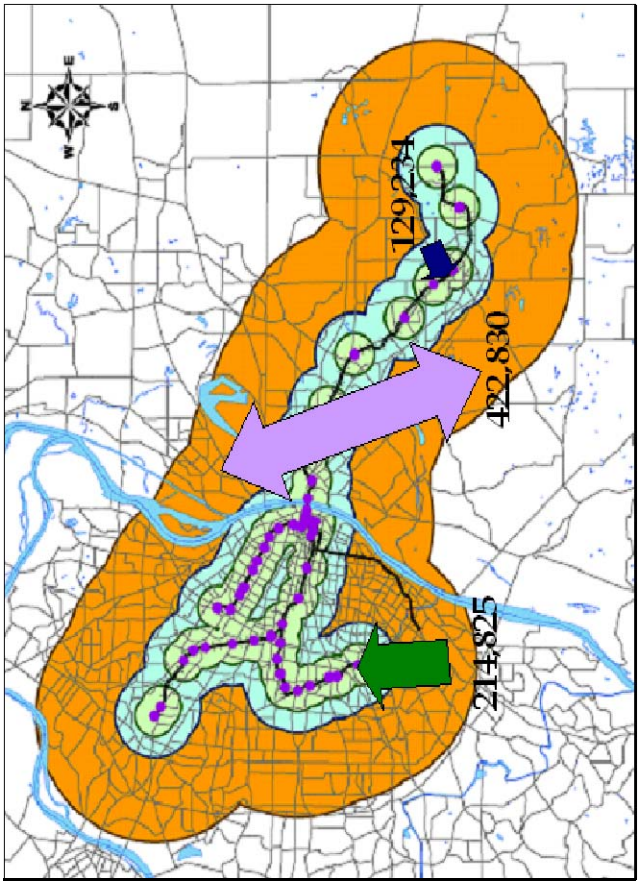


FIGURE 6.6-7: SOUTSHIDE JEFFERSON – WORKER FLOWS

Travel Areas within East-West Gateway MPO	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

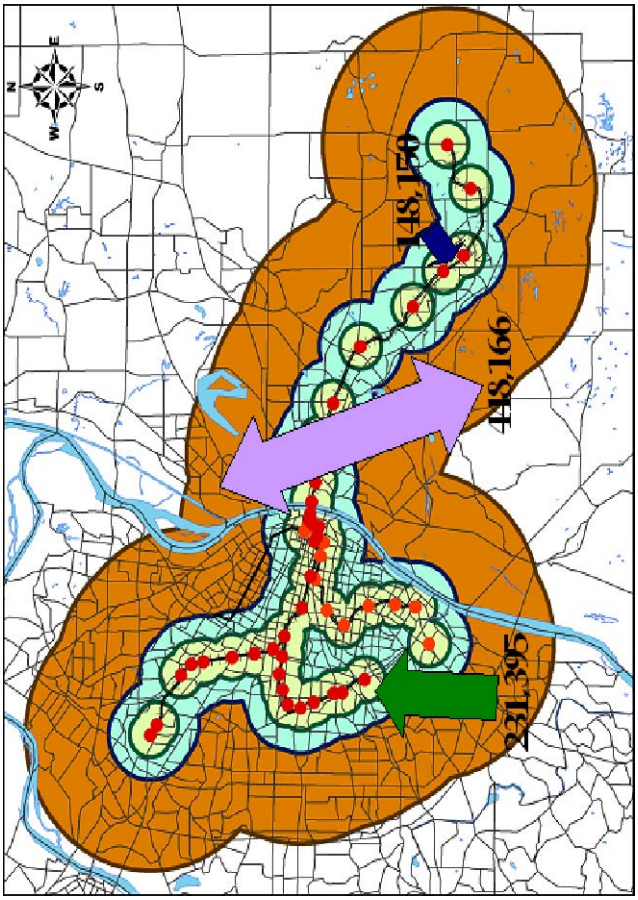


FIGURE 6.6-8: CHOUTEAU UPRR – WORKER FLOWS

Travel Areas within Gateway MPO	East-West	Workers	Percentage
6 mile - 6 mile buffer		448,166	100%
6 mile - 1 mile buffer		237,636	53%
2 mile - 1 mile buffer		157,300	35%

6-Mile Buffer
2-Mile Buffer
1-Mile Buffer

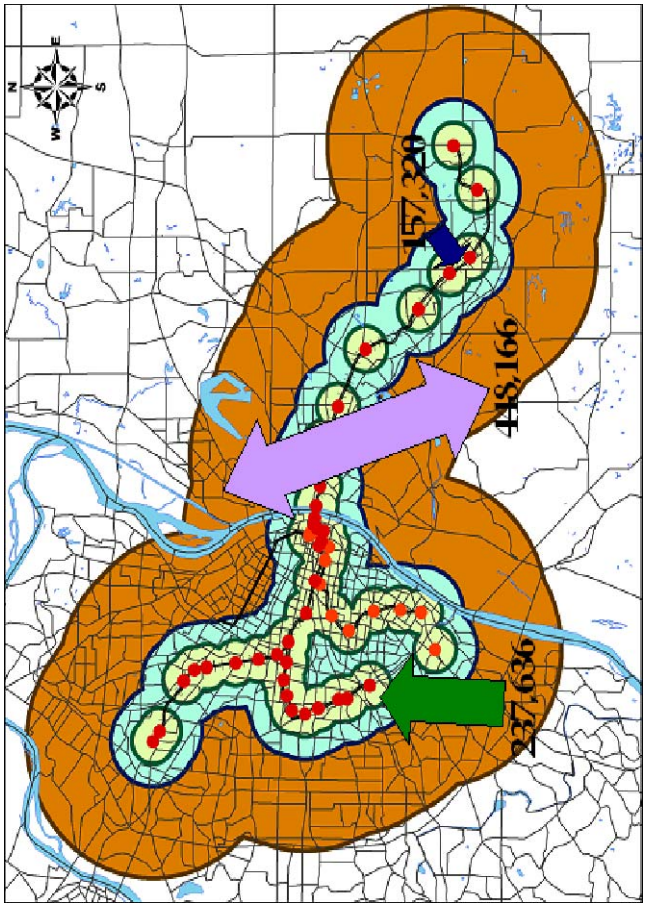
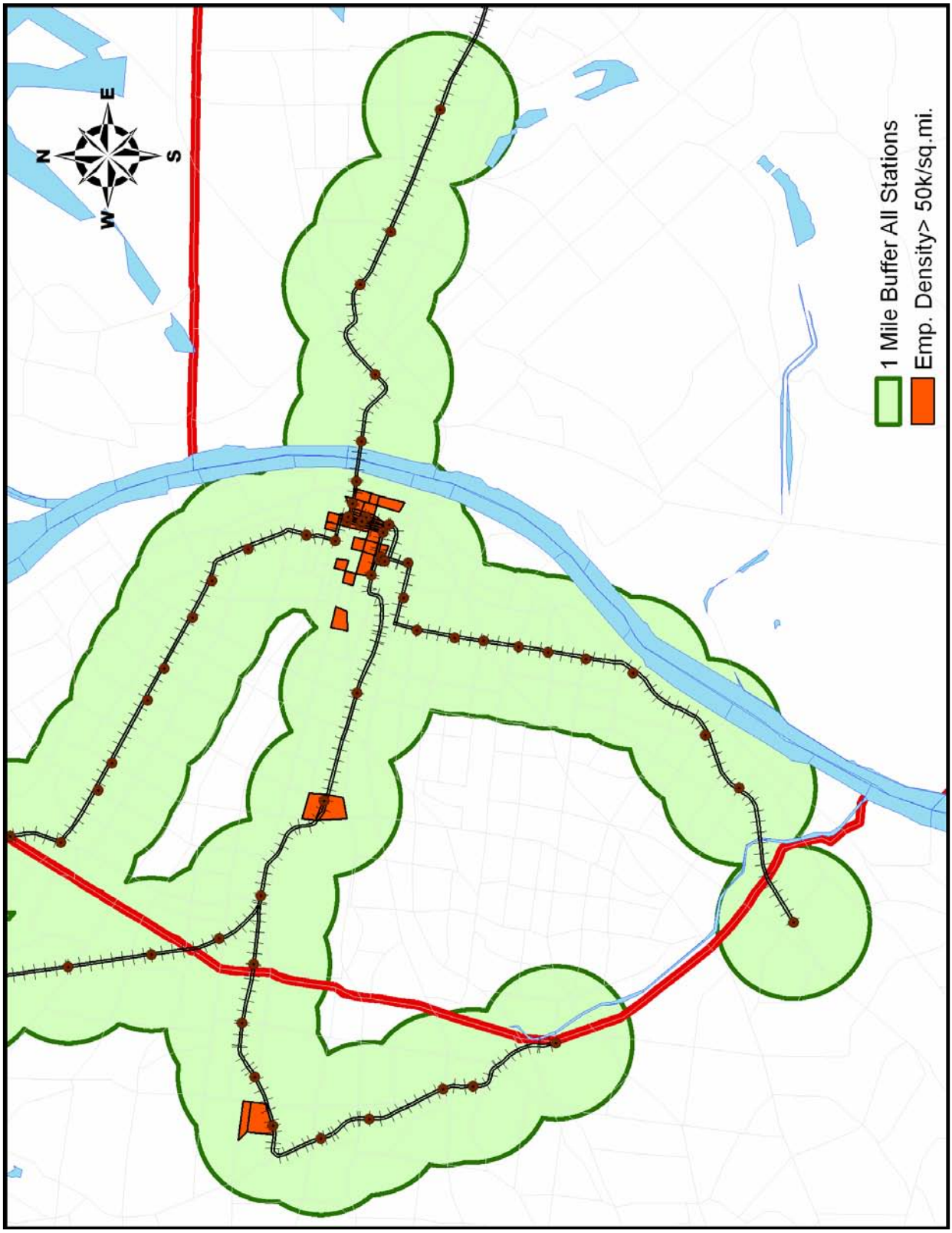


FIGURE 6.6-9: EMPLOYMENT DENSITY MAP



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.

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-Southside Study

Planning Transit Improvements for St. Louis City

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 Southside 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 *Southside Major Transportation Improvement Analysis* (MTIA) that recommended LPAs in 2000.

This chapter of the Southside 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 report 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 Southside study area (Figure 7.1-1), several alignments have been selected for further analysis. These include two Southside LPAs from the 2000 MTIA study: an LRT line along Chouteau Avenue to the Union Pacific Railroad right-of-way (Figure 7.1-2) and a bus rapid transit (BRT) line along a similar route (Figure 7.1-3). These LPAs, as well as an LRT route along Jefferson Avenue and Interstate 55 (Figure 7.1-4), have been carried forward from the alternatives development and screening process. Note that this chapter analyzes only the LRT alignments; the BRT route will be carried through a potential future EIS as a baseline alternative.

FIGURE 7.1-1: SOUTHSIDE STUDY AREA

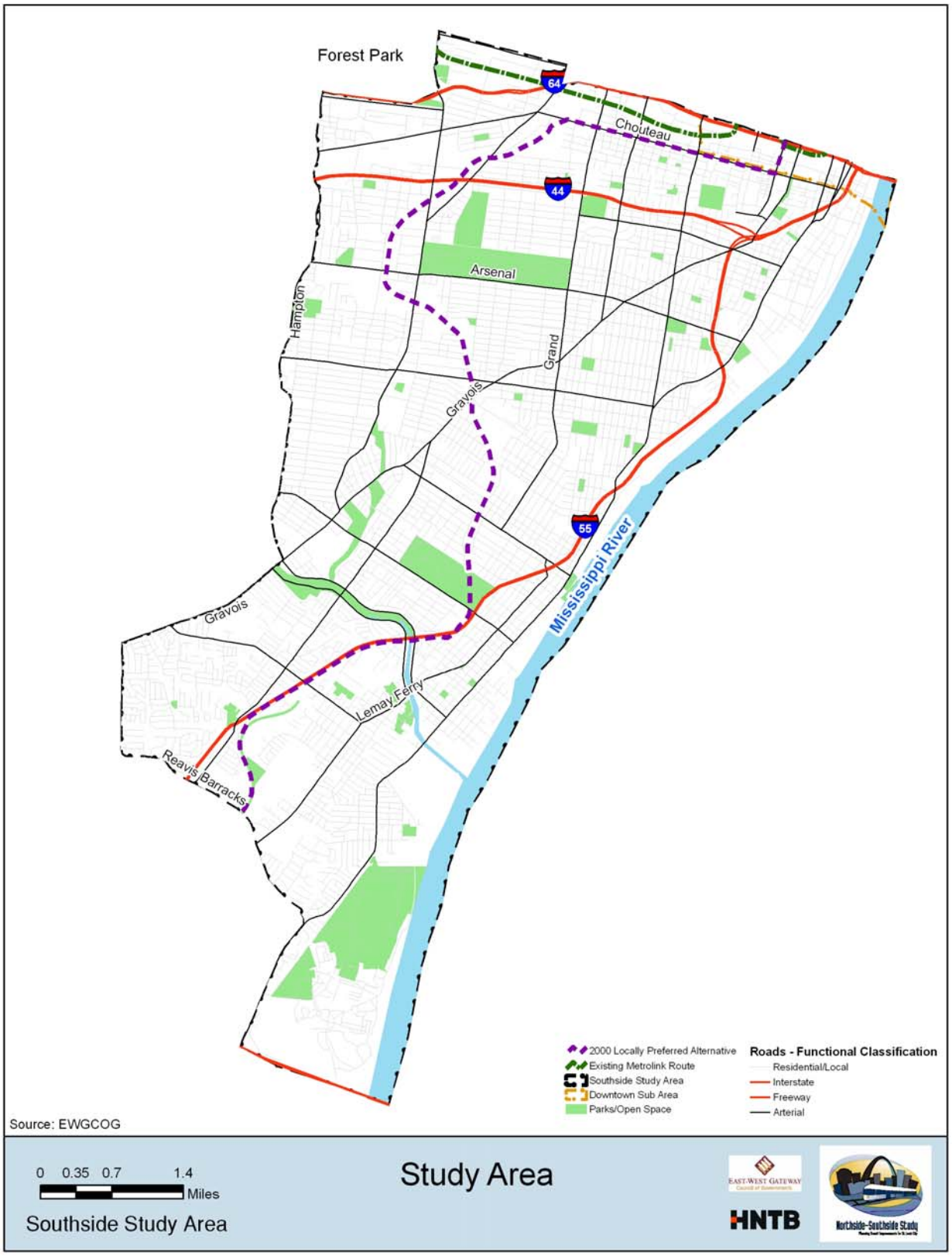


FIGURE 7.1-2: CHOUTEAU/UPRR

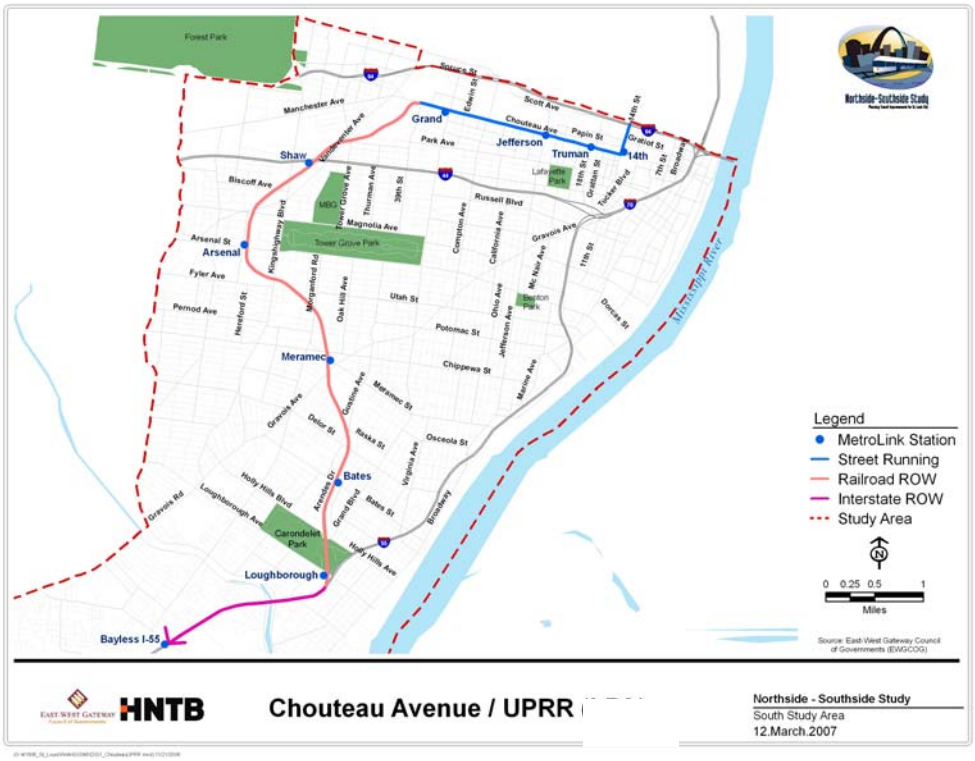


FIGURE 7.1-3: BUS RAPID TRANSIT

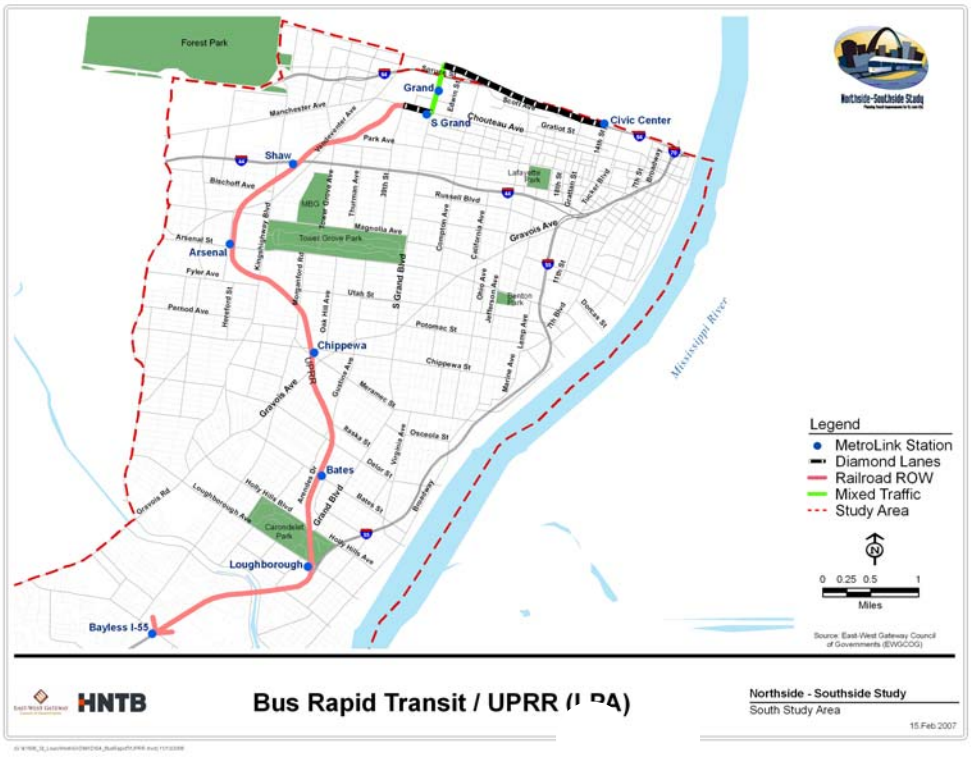
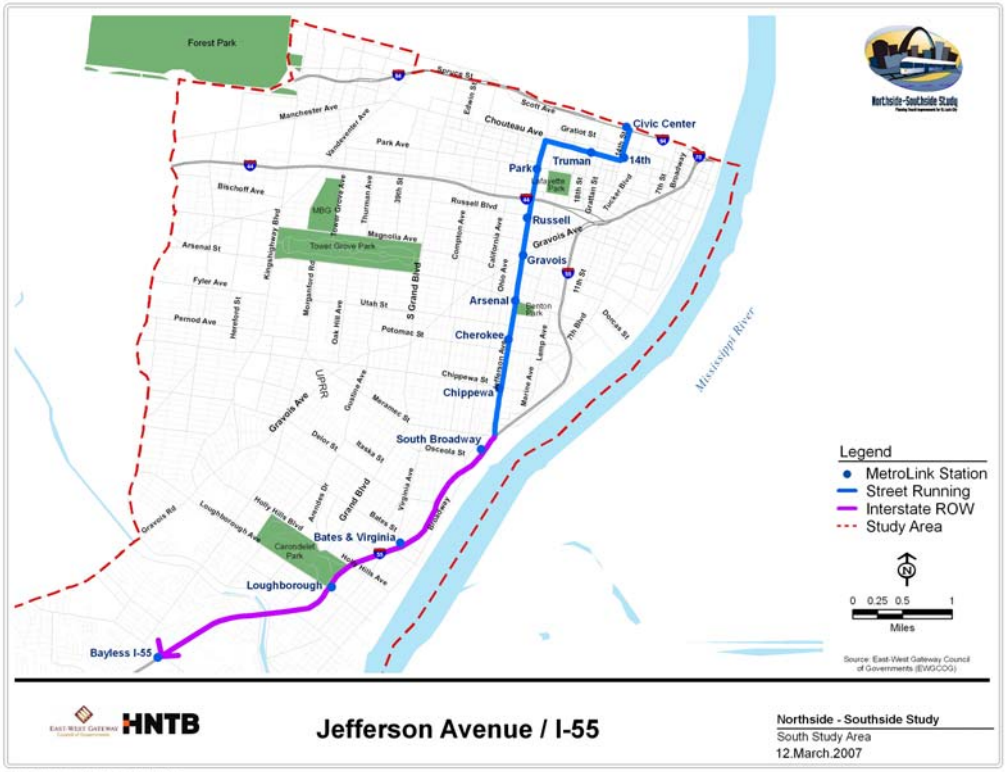


FIGURE 7.1-4: JEFFERSON/I-55



The proposed LRT alignments would be built and operated within street right-of-way. Railroad and interstate right-of-way would be utilized for remaining portions. No additional right-of-way acquisition 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 possible 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.

TABLE 7.1-1: POTENTIAL IMPACT SUMMARY

	Assessment	
Impact Category	**Jefferson Avenue/I-55**	**Chouteau/UPRR**
Land Use	Good potential for land use changes resulting from TOD and redevelopment especially around station locations such as Bayless Station, Jefferson Station, Mississippi Station and South Broadway station.	Good potential for land use changes resulting from TOD and redevelopment, especially around station locations such as Arsenal Station, Bates Station and Mississippi Station.
Demographics	Demographic changes could be realized through indirect land use changes that may be spurred by project.	Demographic changes could be realized through indirect land use changes that may be spurred by project.
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.	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.
Access to Activity Centers	Creates additional opportunities for transit access to jobs, recreation and cultural sites.	Creates additional opportunities for transit access to jobs, recreation and cultural sites.
Water/Wetlands	Lower potential for groundwater contamination related to karst geology.	Potential for impacts related to karst geology and risk of groundwater contamination.
Hazardous Materials and Waste	9 sites identified within a one-block radius of proposed stations. This alignment has the most potential issues related to hazardous materials.	7 sites identified within a one-block radius of proposed stations. Low significance ranking.
Threatened and Endangered Species	Potential to impact species is low due to urban character.	Potential to impact species is low due to urban character.
Air Quality	Impact likely low.	Impact likely low.
Noise and Vibration	Impacts likely due to proximity of LRT vehicles to residential land uses. Potential for impacts to historic structures given proximity of LRT vehicles and associated vibration.	Impacts likely due to proximity of LRT vehicles to residential land uses. Potential for impacts to historic structures given proximity of LRT vehicles and associated vibration. Greater number of sensitive receptors than the UPRR alternatives.
Geology and Landform	Low impact potential.	Potential for impacts primarily during construction stage due to presence of karst geology.
Historic and Archaeological	Located near historic districts. Impacts could be related to vibration or to aesthetics when catenary are introduced. Does not run through any historic districts, but adjacent to.	Highest impact potential due to location in and near historic districts, especially the Tiffany Neighborhood along Folsom Avenue.
Parks	Low impact potential.	Impact potential higher since it runs through Carondelet Park.

Chapter 7.2: Societal Impacts

The demographic and socio-economic character of the Southside study area 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. The Southside is denser than other parts of the City, but it is no exception to the City's population decline. It is important to note, though, that 2005 population estimates prepared by the City (and accepted by the U.S. Census Bureau) indicate that the St. Louis is, in fact, beginning to reverse its trend of population loss. Since 2000, St. Louis has been implementing programs to draw population back to the City. 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.

Employment in the Southside study area has been decreasing over the past decade, but is projected to remain relatively stable into 2030. Employment in St. Louis County is expected to continue to increase, but at a much slower rate than in previous decades.

As the entire Southside 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 to 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 and/or community cohesion. *Chapter 6: Detailed Definition of Alternatives, Section 2: Opportunities for Transit-Oriented Development* of this report identifies TOD opportunities throughout the Southside study area, as well as selected station areas. TOD will most influence areas in proximity to 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.

Examination and comparison of the City's Strategic Land Use Plan to existing land use along a representative corridor (along Chouteau Avenue), as described in Chapter 6.2, identifies multiple opportunities for redevelopment, many of which could be facilitated and supported by LRT. Several such opportunities are already being realized: multiple planned investments will contribute to reshaping the corridor. CORTEX, for example, intends to install facilities and incubator centers for nascent life sciences research and development companies; these will revitalize a current 353 Blighting Area around Grand Boulevard and Chouteau Avenue (Chouteau and BRT alignments) and constitute a core for St. Louis' growing role as a leader in the development and production of medical and agricultural chemicals and equipment.

The planned Chouteau Greenway is designed to create a connected corridor with parks, open space, and bicycle/pedestrian routes with access to residences and research and development centers. This will help direct changes and redevelopment throughout the corridor. St. Louis University owns a significant amount of the property approaching Grand Boulevard and plans to expand its facilities into many parcels. There are also planned residential developments at Mississippi Street Lofts and Mississippi Place (near the Chouteau, Jefferson, and Gravois alignments).

In addition to the corridor, *Chapter 6* also assesses several stations and the areas within a half-mile radius of them for future development potential. Areas exhibiting particular potential are illustrated with development plans; from these plans, TOD opportunities are identified. Representative areas with high TOD potential are also modeled for an idea of how redevelopment may affect them. Plans and recommendations reflect projected market needs and attempt to illustrate realistic goals for each area. A brief summary of station areas of interest follows:

Arsenal Station and Half-Mile Radius Area (Chouteau Avenue/UPRR, BRT)
The proposed station area offers proximity to both stable residential neighborhoods and local and regional parks. There is also proximity to Neighborhood and Regional Commercial Areas (NRCAs). The Strategic Land Use Plan projects 26.5 acres of Business/Industrial Development Area (BIDA).

Recommended redevelopment includes approximately 125,000 square feet of multi-family residential land use, primarily in the form of higher-density apartments and condominiums. Nearly 48,000 square feet of multi-level neighborhood commercial land use will support the area's planned population growth.

Bayless Station and Half-Mile Radius Area (Jefferson Avenue/I-55)
There is a predominance of single-family residential land use within the station area. The high number of residential cul-de-sacs causes area fragmentation. The area is further fragmented and somewhat isolated by Interstate-55 and Gravois Creek. The station lies near a floodplain. Overall walkability and pedestrian accommodation within the station area are poor. Interstate-55 creates a major pedestrian barrier. There are only limited existing sidewalks. Residential cul-de-sacs create indirect pedestrian routes. Bayless Road lacks streetscape definition because of the relatively large setback of existing strip retail stores. Property to the southwest of the station offers the potential for increased residential land use. Because access to Interstate-55 is good, regional-level development is also possible. Long-term development goals for the station area may include mixed use along Bayless.

Redevelopment recommendations for the station area feature a significant increase in residential land use: about 93 single-family houses, as well as approximately 523,000 square

feet of multi-family structures, which includes apartments, condominiums, and nearly 130 townhomes. The development of approximately 65,000 square feet of neighborhood commercial land use will help support resident needs.

Jefferson Station and Half-Mile Radius Area (Jefferson Avenue/I-55)
Overall walkability within the station area is good. Gravois Avenue's wide right-of-way is conducive to LRT implementation. Gravois offers lower pedestrian accommodation, though, because of its limited crosswalks and high traffic flow. The area features numerous intersecting streets and good neighborhood sidewalk networks.

The Strategic Land Use Plan identifies approximately 23 acres of Opportunity Area (OA) land use, meaning there is projected to be tremendous opportunity for redevelopment. Existing investment in redevelopment is occurring in the Benton Park West and Fox Park neighborhoods. Because both Gravois and Jefferson carry high traffic loads and are along existing MetroBus routes, the area also holds great potential for TOD.

Specific redevelopment recommendations feature considerable residential land use: nearly 20 single-family homes and approximately 366,000 square feet of apartments and condominiums. About 162,000 square feet are projected mixed-use and neighborhood commercial areas. Nearly 30,000 square feet comprise institutional preservation and development areas. The area south of the St. Francis de Sales Church is reserved for the potential expansion of future parking.

Bates Station and Half-Mile Radius Area (BRT, Chouteau Avenue/UPRR)
Residential land use predominates within the proposed station area. There are some under-utilized properties. An active Union Pacific Railroad line, flanked on both sides by light industrial land use, runs through the center of the station area and shares right-of-way with the proposed LRT alignment. There is opportunity for redevelopment of some existing multi-family residential and light industrial properties.

Walkability and pedestrian accommodation within the station area is generally good. This is supported by the area's network of existing sidewalks. Also, Grand Avenue is at a residential scale, with wide sidewalks and smaller retail shops. The Union Pacific Railroad and its right-of-way create an east-west barrier, though.

The City's Strategic Land Use Plan identifies approximately 26.5 acres for Business/Industrial Redevelopment. Residential redevelopment could potentially build upon existing stable neighborhoods.

Recommendations for redevelopment include some residential land use: 23 units of single-family houses, as well as approximately 95,000 square feet of apartments and condominiums. As mentioned, such residential redevelopment could build upon existing stable neighborhood patterns. Nearly 60,000 square feet of mixed-use and neighborhood commercial land use will support area residents. Approximately 73,000 square feet of business and industrial development (roughly the aforementioned 26.5 acres) will also supply an increasing employment base.

Mississippi Station and Half-Mile Radius Area (Chouteau Avenue/UPRR, Jefferson/I-55)
The station offers proximity to both the existing MetroLink system and the proposed Chouteau Greenway. Chouteau Avenue's wide right-of-way is conducive to LRT implementation. Lafayette Square and the Gate District neighborhoods are regional destination centers. Several of the

area's extensive distribution, warehouse, and residential properties could provide opportunities for redevelopment.

Walkability within the proposed station area is generally good. Pedestrian use is accommodated with the area's well-connected sidewalk system. Interstate-64 creates a major north-south barrier, though, and Tucker Road and Jefferson Avenue are moderate barriers.

This station holds the potential for multiple redevelopment and opportunity areas. Land use within the station area is generally shifting from industrial to mixed-use. An advantage is the area's proximity to employment centers.

Redevelopment recommendations for the proposed station area feature a significant increase in residential land use, including the addition of approximately 725,000 square feet of multi-story apartments and condominiums. This higher-density residential development follows the pattern of existing residential areas south of the station; apartments and condos north of the station face proposed Chouteau Greenway. In addition to residential land use, redevelopment plans include approximately 405,000 square feet of mixed-use and commercial land use; these areas will support area residents, LRT commuters, and visitors to the region.

South Broadway Station and Half-Mile Radius Area (Jefferson Avenue/I-55)
The proposed area has numerous neighborhood and regional commercial areas, as well as many institutions and employment centers. It also features a good urban street network.
Walkability within the proposed station area is generally good. Pedestrian use is accommodated via the area's well-connected sidewalk system. Interstate-55 creates a barrier to the east and south, though.

The proposed station area's numerous community resources and destination centers include Laclede Park, Mount Pleasant Park, Marquette Park, Minnie Wood Memorial Square, Meramec Elementary School, Carnahan High School, St. Alexius Hospital, the Maryville Post Office, the City of St. Louis Police Practice Facility, the City of St. Louis Dog Pound, and the Charless Home.

The South Broadway station area has approximately 15 acres of Neighborhood Commercial development areas, as identified in the City's Strategic Land Use Plan. The area offers good access to Interstate-55; visibility to the area is therefore good. Broadway itself carries high traffic volume. Redevelopment is presently underway in the nearby Dutch Town neighborhood on approximately 21 acres of neighborhood commercial area. Such large parcels offer favorable areas for potential redevelopment.

Recommendations for station area redevelopment feature approximately 215,000 square feet of multi-family residential land use, primarily apartments and condominiums. Nearly 135,000 square feet of mixed-use, retail, and office space will support area residents, LRT commuters, and visitors to the region. Approximately 125,000 square feet, spread over an estimated three floors, of parking garage space will also serve residents, commuters, and visitors.

Additional Notes on Development
Detailed development schemes are shown throughout the Chouteau corridor and in the vicinity of proposed LRT stations. The plan also illustrates TOD potential within the greater neighborhoods surrounding the transit alignment, approximately one-half of a mile wide. Recommended land uses focus on areas of mixed-use development that could include retail, restaurants/food services, offices, research facilities, and higher-density residences along Chouteau and the

proposed Chouteau Greenway. 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 are also vital to the corridor's redevelopment. TOD could influence and further most of these types of investments.

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 most potential effect along easily accessible main roads along the LRT lines. The corridor plan 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 Chouteau Avenue illustrates opportunity for redevelopment, while roads further from the alignments offer less. This corridor, along with Jefferson Avenue, has the infrastructure and mixture of land use to incorporate light rail transit as a catalyst for development.

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 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 on communities and neighborhoods have been avoided or minimized by the use of evaluation criteria consistent with plans for future redevelopment. These are analyzed in the TOD discussion in *Chapter 6*. 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

[1] EWGCOG *Legacy 2030: The Transportation Plan for the Gateway Region.* March 2005.

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.

7.2.3 ECONOMIC IMPACTS

A major transportation investment such as this proposed LRT addition will have many financial and economic implications. These 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 experienced 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 many of the proposed station areas. This assessment is based upon existing land use and the availability of developable or redevelopable sites. Station area design will also prove 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 boost the transit project's potential, 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 the 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. See Table 7.2-1.

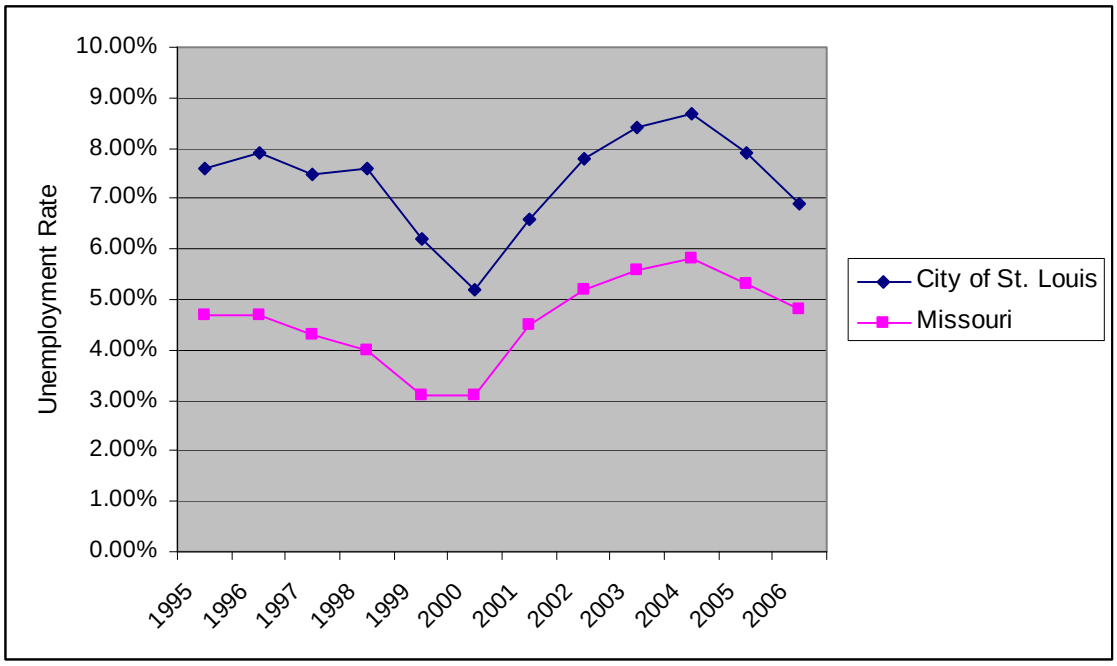
TABLE 7.2-1: MISSOURI LOCAL AREA UNEMPLOYMENT STATISTICS (LAUS)

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

7.2.4 CHANGES IN TRAVEL PATTERNS AND ACCESSIBILITY

Roadways
The Southside alternatives' transit vehicles would be placed in a new median within existing street right-of-way, as itemized:

- Chouteau/UPRR alignment – North 14th Street, Chouteau Avenue.
- Jefferson/I-55 alignment – North 14th Street, Chouteau Avenue, Jefferson Avenue.

Medians do not currently exist along the in-street running portion of the Chouteau/UPRR alternative. For the Jefferson/I-55 alternative, medians currently exist on South Jefferson Avenue between Park Avenue and Lafayette Avenue. 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 from an existing firehouse and a hospital on Jefferson Avenue may be slightly impacted, since they would no longer be able to make left turns from the site. Mitigation could be developed in cooperation with emergency service providers to ensure response times are not hindered.

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 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 will be examined more closely in a 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.

Tables 7.2-2 and 7.2-3 itemize 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 things 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, JEFFERSON/I-55

Location	Potential Changes
Judith Ct.	Close at Piedmont Ave. Open to Gasconade St.
I-44	Existing interchange will be reconfigured into a single-point urban interchange.
Wyoming St.	Eliminate signalization.
South Broadway St.	Reconfigure Intersection.
Piedmont Ave.	Vacate between South Broadway and I-55.
I-55 S. Broadway ramps.	Shift on-ramp to southbound I-55 closer to highway to keep the LRT within right of way.
Pennsylvania Ave. Pedestrian Bridge over I-55.	Bridge will need to be removed, rebuilt or relocated.
I-55 East Virginia Ave. ramps.	May require relocation.
Alabama Pedestrian Bridge over I-55.	Bridge will either need to be removed or rebuilt. If rebuilt the bridge would need to be raised by 15 to 20 feet so the track can cross underneath. Access to the raised bridge could be provided with a switchback ramp.
I-55 northbound on-ramp from Loughborough Ave.	Relocate ramp.
I-55 northbound on-ramp from Germania St.	Ramp may need to be relocated.
I-55 off ramp to Carondelet Blvd.	Relocate ramp.

TABLE 7.2-3: POTENTIAL CHANGES TO ROADWAYS AND ACCESS, CHOUTEAU/UPRR

Location	Potential Changes
I-55 northbound on-ramp from Germania St.	Ramp may need to be relocated.
I-55 off-ramp to Carondelet Blvd.	Relocate ramp.

FIGURE 7.2-1: POTENTIAL MEDIAN CONFIGURATION, CONCEPTUAL RENDERING

Transit

The intent of proposed MetroLink expansions, as examined in this study, is to enhance existing transit. 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 redistribute resources. 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.

Chouteau/Union Pacific Railroad Alternative

Table 7.2-4 lists bus routes intersecting the Chouteau/UPRR alignment 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 7.2-4: BUS ROUTES, CHOUTEAU/UPRR ALTERNATIVE

Route#	Name	Description of Change	Headway (in minutes)		LRT Stations & Transit Centers Served
			Peak	Off-Peak	
8	Bates	Connect to Bates station.	30	30	Loughborough, Bates, Lansdowne.
10	Gravois	Station stop.	8	20	Hampton Loop, Gravois/Chippewa.
10X	South County Express	*Terminate at Bayless station.*		x	Bayless.
11	Chippewa	Add station stop.	20	40	Gravois/Chippewa, CBD.
13	Union-Morganford	Link to stations.	30	30	Central West End, Shaw, Chippewa, Bayless.
30	Soulard	Add station stops.	30	30	CBD, Arsenal.
40	South Broadway	Connect to Loughborough station.	30	30	Loughborough, 14th transit center.
40X	I-55 Express	*Terminate at Bayless station.*		x	Bayless.
57	Manchester	Thru station Grand-Chouteau.	30	30	Chouteau/Grand, Jefferson, Truman.
59	Shaw Kirkwood	Add station stop.	30	30	Shaw.
70	Grand-Loughborough	Continue south via Grand, east on Loughborough.	7	12	Grand, Chouteau/Grand, Loughborough.
70	Grand-Meramec	Existing routing.	7	12	Grand, Chouteau/Grand.
80	Lafayette Square	Add station stops; re-route via Park, 39th, Lafayette, Vandeventer, Shaw.	30	30	Shaw, Truman.
92	Macklind	Add stop at Shaw station.	40	40	Central West End, Shaw, Hampton Loop.
93	Lindell	Add stop at Shaw station.	30	30	Shaw.
73	Carondelet	Deviate to Loughborough station; to CBD.	30	30	Loughborough, CBD, Shaw.
95	Kingshighway	Deviate via Shaw station.	10	15	Central West End, Shaw.

FIGURE 7.2-2: BUS PLAN, CHOUTEAU/UPRR

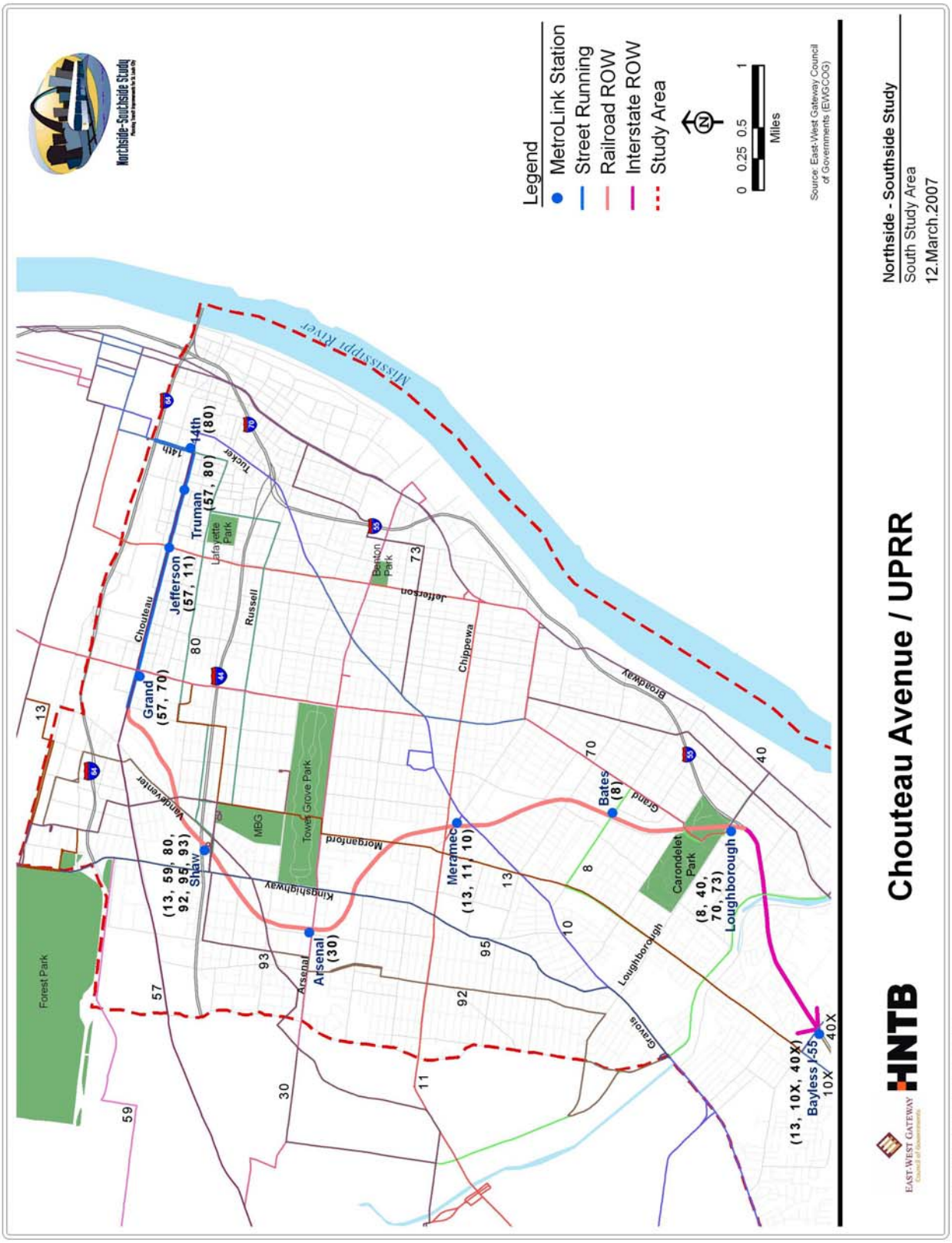


Table 7.2-5 lists proposed LRT stations and their potential connections to bus routes. The most significant service changes include:

- *Shaw Station.* Would be a connecting point for six routes (#13, #59, #80, #92, #93, and #95) to utilize the current park-and-ride lot in close proximity to the Missouri Botanical Garden.

- *Chippewa/Gravois Station.* Would serve three major routes and is a possible small transit center. It would be a connecting point for the Chippewa and Gravois (#11 and #10).

- *Bayless Station.* Several express routes (10X, 40X) to downtown would be converted to feeder routes since the rail line would provide replacement service. This station would have parking (800 to 1,000 spaces) and a transit center with 4 to 6 bus bays.

TABLE 7.2-5: CONNECTING STATIONS, CHOUTEAU/UPRR ALTERNATIVE

Station	Route		Terminate or thru	Notes
Truman Parkway	57	Manchester	thru	via Chouteau to 14th transit center.
	80	Lafayette Square	thru	to 14th transit center.
Chouteau/Jefferson	57	Manchester	thru	via Chouteau to 14th transit center.
	11	Chippewa	thru	via Jefferson.
Chouteau/Grand	57	Manchester	thru	via Chouteau to 14th transit center.
	70	Grand	thru	via Grand.
Shaw (Park-and-Ride)	13	Union-Morganford	thru	deviate via Shaw then south on Morganford.
	59	Shaw Kirkwood	thru	via Shaw.
	80	Lafayette Square	terminate	via Russell, Tower Grove, Shaw.
	92	Macklind	thru	via Vandeventer.
	95	Kingshighway	thru	deviate via Shaw.
	93	Lindell	thru	via Shaw.
Arsenal	30	Soulard	thru	via Arsenal.
Chippewa / Gravois	13	Union-Morganford	thru	via south on Morganford to Bayless.
Potential Transit Center	11	Chippewa	thru	via Chippewa.
	10	Gravois	thru	via Gravois.
Bates	8	Bates	thru	Shrewsbury, Hampton Loop, Bates.
Loughborough	8	Bates	thru	Shrewsbury, Hampton Loop, Loughborough.
	40	South Broadway	thru	deviate via Loughborough.
	70	Grand (branch)	terminate	
	73	Carondelet	thru	deviate via Loughborough.
Bayless/I-55	10X	South County	terminate	at station.
(Park-and-Ride)	40X	I-55 X	terminate	at station.
	13	Union-Morganford	terminate	via south on Morganford to Bayless.

JeffersonAvenue/I-55 Alternative

Table 7.2-6 lists bus routes intersecting the Jefferson/I-55 alignment 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 7.2-3.

TABLE 7.2-6: BUS ROUTES, JEFFERSON/I-55 ALTERNATIVE

Route #	Name	Description of Change	Headway (in minutes)		LRT Stations & Transit Centers Served
			Peak	Off-Peak	
8	Bates	Connect to Bates station; loop of neighborhood.	30	30	Loughborough, Bates,
10	Gravois	Extend from Hampton loop to Gravois station.	8	20	Hampton Loop, Gravois
10X	South County Express	Terminate at Bayless station.	20	x	Bayless
11	Chippewa	Terminate at station.	20	40	Chippewa,
11X	Shrewsbury Express	Via Gravois.		x	Gravois
13	Union - Bayless	Via Morganford to Bayless.	30	30	Bayless
30	Soulard	Add station stop.	30	30	CBD, Arsenal
40	South Broadway	Connect to South Broadway and Bates stations.	30	30	S. Broadway, Bates, Chippewa
57	Manchester	Via Chouteau to CBD.	30	30	Truman Parkway
70	Grand-Loughborough	Continue south via Grand, east on Loughborough.	7	12	Grand, Loughborough
70	Grand-Meramec	Existing routing.			Grand, S. Broadway
73	Carondelet	Deviate to Cherokee and Bates stations.	30	30	Cherokee, Bates
80	Lafayette Square	Reroute via 14th St., Park, Grand, Russell, 7th, Park.	30	30	Park, Russell
40X	I-55 X	Terminate at Bayless station.		x	Bayless
58 X	Twin Oaks X	Thru to CDB.		x	Park
410X	Eureka X	Thru to CDB.		x	Park

FIGURE 7.2-3: BUS PLAN, JEFFERSON/I-55

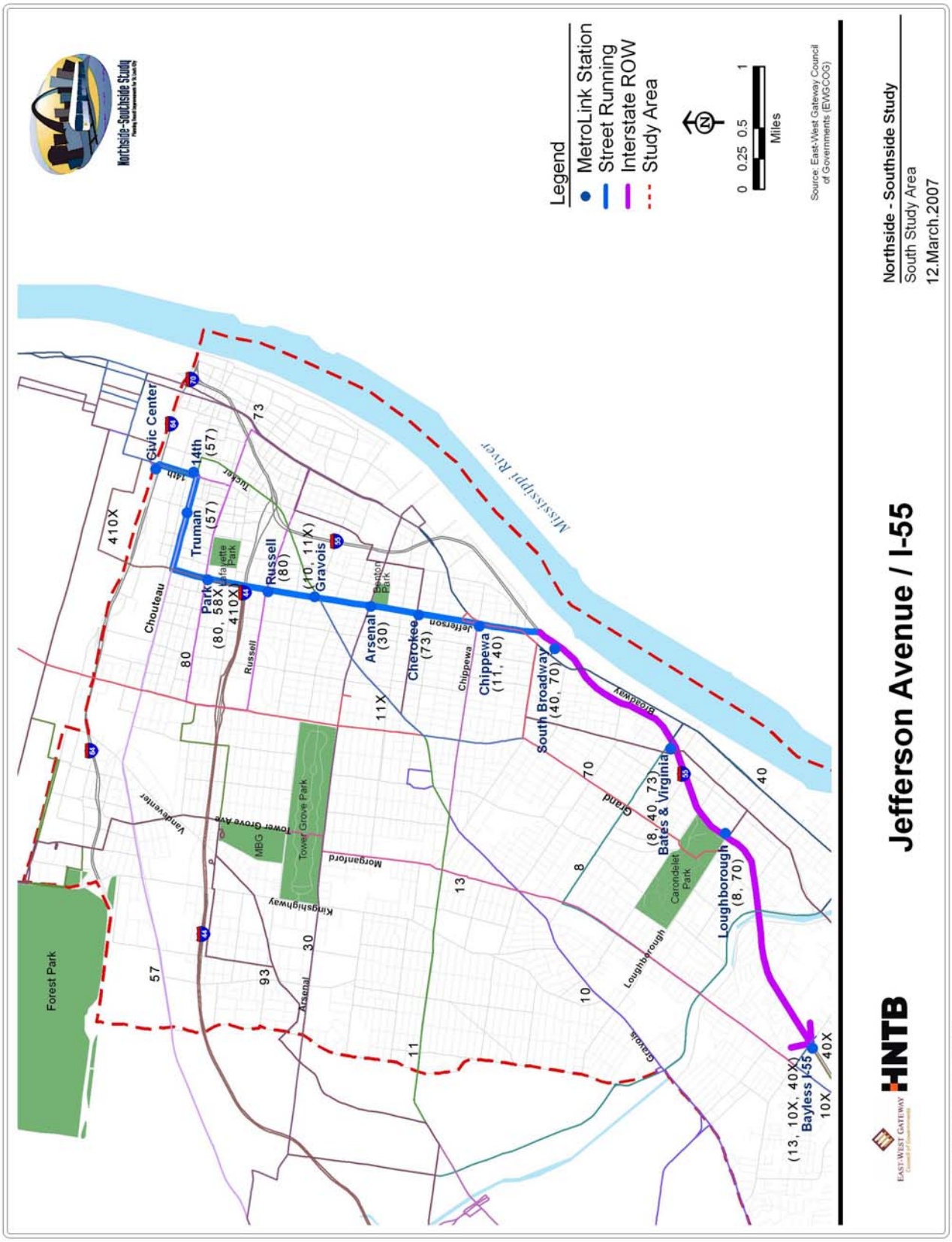


Table 7.2-7 lists proposed LRT stations and their potential connections to bus routes. The most significant service changes include:

- *Chippewa Station.* Would be served by two routes (#11, #40). The Chippewa route would terminate at the station since LRT service would be on Jefferson Avenue. The #40 would be a station stop and continue serve South Broadway.

- *South Broadway Station.* Would have parking and would be served by two routes (#40, #70).

- *Bayless Station.* It would be served by three routes. Several express routes (10X, 40X) to downtown would be converted to feeder routes since the rail line would provide replacement service. This station would have parking (800 to 1,000 spaces) and a transit center with 4 to 6 bus bays.

TABLE 7.2-7: CONNECTING STATIONS, JEFFERSON/I-55 ALTERNATIVE

Station	Route		Terminate or thru?	Notes
Truman Parkway	57	Manchester	thru	via Chouteau to 14th transit center.
Park	58 X	Twin Oaks X	thru	to CBD.
	410X	Eureka X	thru	to CBD.
	80	Lafayette Square	terminate	via Tucker & Park.
Russell	80	Lafayette Square	terminate	via Russell.
Gravois	10	Gravois	thru	via Gravois to CBD.
	11x	Shrewsbury X	thru	via Gravois.
Arsenal	30	Soulard	thru	via Arsenal.
Cherokee	73	Carondelet	thru	via Cherokee.
Chippewa	11	Chippewa	terminate	at station.
	40	South Broadway	thru	station stop continue south.
S. Broadway	40	South Broadway	thru	via Broadway.
Potential Park-Ride	70	Grand (branch)	terminate	via Meramec.
Bates & Virginia	8	Bates	thru	Shrewsbury, Hampton loop, Bates.
	40	South Broadway	thru	at station.
	73	Carondelet	thru	at station.
Loughborough	8	Bates	thru	at station.
	70	Grand (branch)	terminate	via Grand.
Bayless/I-55	10X	South County X	terminate	at station.
(Park-and-Ride)	40X	I-55 X	terminate	at station.
	13	Union Morganford	terminate	at station.

7.2.5 RELOCATION IMPACTS

Because the project is located within existing transportation corridors, very few displacements are expected. There are some buildings east of the intersection of Southwest Avenue and Marconi Street that are built up against the existing rail corridor. If the rail corridor needs widening, these buildings would likely be affected. As design is further refined, the exact properties that cannot be avoided will be fully understood.

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 in the Southside study area. 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.

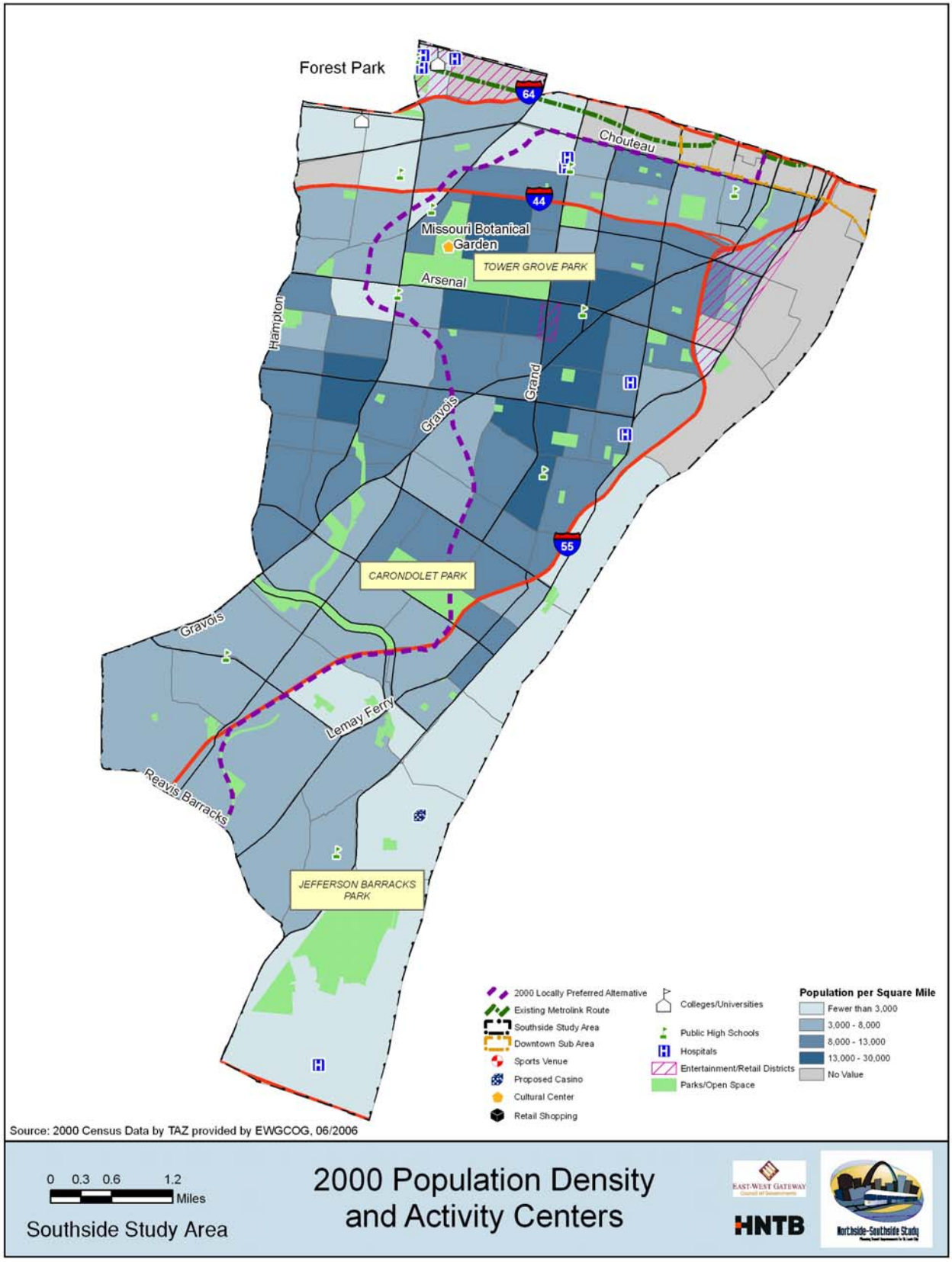
The Southside is a culturally diverse community, and there are many activity centers and neighborhoods that generate activity (Figure 7.2-4). Many are located along or near Grand Boulevard, including the SLU/Cardinal Glennon Hospital complex, the Grand/South Grand Area, Tower Grove Park, and the Missouri Botanical Garden. Other major activity centers are located downtown and in the central corridor, as well as in vibrant neighborhoods like Soulard.

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 include the hospital complex along Grand Boulevard, Anheuser-Busch, the Nooter Industrial Area, and the various industrial areas along the Union Pacific Railroad.

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 identified and investigated in consultation with neighborhood residents.

FIGURE 7.2-4: POPULATION DENSITY AND ACTIVITY CENTERS



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 Southside Study works to accomplish the goals of environmental justice and Title VI by involving the potentially affected public in the planning and development of the project.

The FTA encourages transit providers to offer mobility for 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 Southside study area is predominately White, with African-American making up the second largest racial group. There is also a higher percentage of Hispanics in the study area compared to the rest of the City. Thirty-six percent of the population is either under 16 or over 65, populations which are traditionally more transit-dependent, and 9% of households do not have access to any vehicle. Most two-car households are in the same general area as those with higher incomes. Many one-car households are located east of Grand Boulevard and southeast of Gravois Road in lower-income neighborhoods. There are many census tracts where more than 10% of workers use transit to commute to work, which is high compared to the national average of 5%. Not surprisingly, most of the areas characterized as "high" or "very high" transit need are located in these same areas. The highest needs are located near the intersection of Grand Boulevard and Gravois Road near the Jefferson/I-55 alignment.

While Southside 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 Southside study and to share input on the planning process (see *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 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/

Chapter 7.3: Environmental Impacts

Within the Southside 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 Gravois Creek and the River Des Peres, impacts to hazardous waste sites, noise and vibration impacts, the presence of karst topography and sinkholes (especially in the southern portion of the study area), impacts to historic properties, and Section 4(f) impacts to Carondelet Park, as it contains a portion of the Union Pacific Railroad alignment on which the 2000 LPA is located. 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 a 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 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.

- 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 Clean Water Act requires a state certification of water quality.

Some limited wetland and/or floodplain areas are present, particularly flanking the River Des Peres and Gravois Creek, as well as near the Mississippi River and in parks/open spaces. During the detailed alternatives phase, attention must be given to wetlands so as to avoid or minimize impacts, especially at the southern end of the study area where an LRT terminus would be located. Any impacts to wetlands would need to be mitigated according to federal and/or state regulations. Potential impacts to Gravois Creek and the River Des Peres will also need to be evaluated during the detailed alternatives phase. The presence of sinkholes is also of possible concern; 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.

FIGURE 7.3-1: ENVIRONMENTAL CONSIDERATIONS

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 Southside study area 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 15 potential hazardous material sites within an approximate one-block radius of proposed Southside MetroLink stations, as illustrated in Figures 7.3-2, 7.3-3, and 7.3-4. These 15 properties include one former manufactured gas plant, one brownfield/VCP, and 13 UST sites. 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 three types of sites is noted according to the following: high for former manufactured gas plants, medium for brownfields/VCP sites, and low for USTs. From a quantitative perspective, there are five potential hazardous material sites along the BRT alignment, seven within the Chouteau Avenue/UPRR alignment, and nine along the Jefferson Avenue/I-55 alignment.

Of the three alternatives, the Jefferson Avenue/I-55 alignment has both the highest qualitative and quantitative hazardous material rankings. The remaining two alternatives have fewer total hazardous materials sites, as well as sites with lower hazardous material significance rankings.

Potential hazardous materials impacts can be generally minimized by avoiding contaminated sites or portions of sites as often as practicality allows. Such avoidance will limit risk of exposure to construction workers and the public. It will also reduce construction costs and delays associated with site remediation efforts.

FIGURE 7.3-2: HAZARDOUS MATERIALS, CHOUTEAU/UPRR

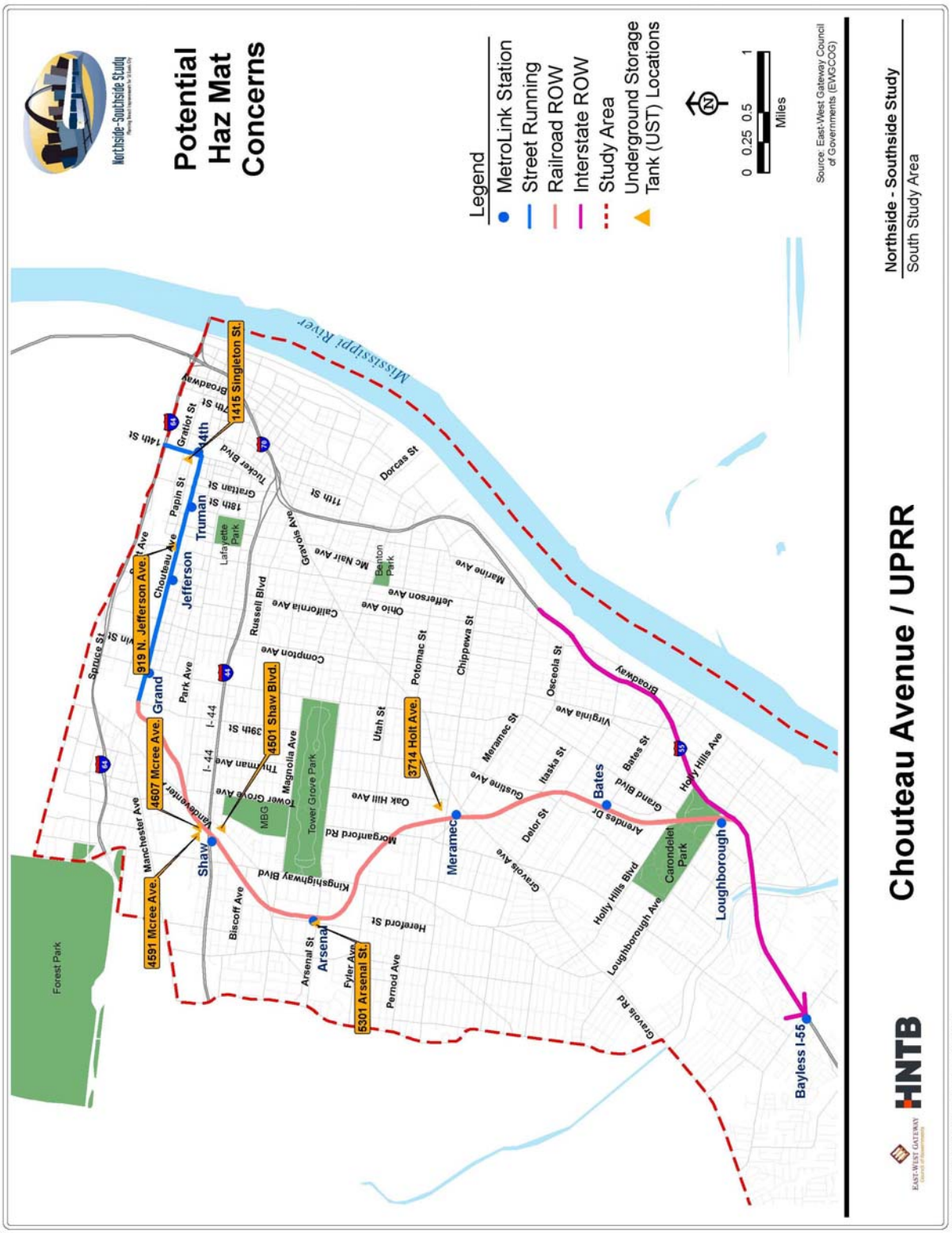


FIGURE 7.3-3: HAZARDOUS MATERIALS, CHOUTEAU/UPRR BRT

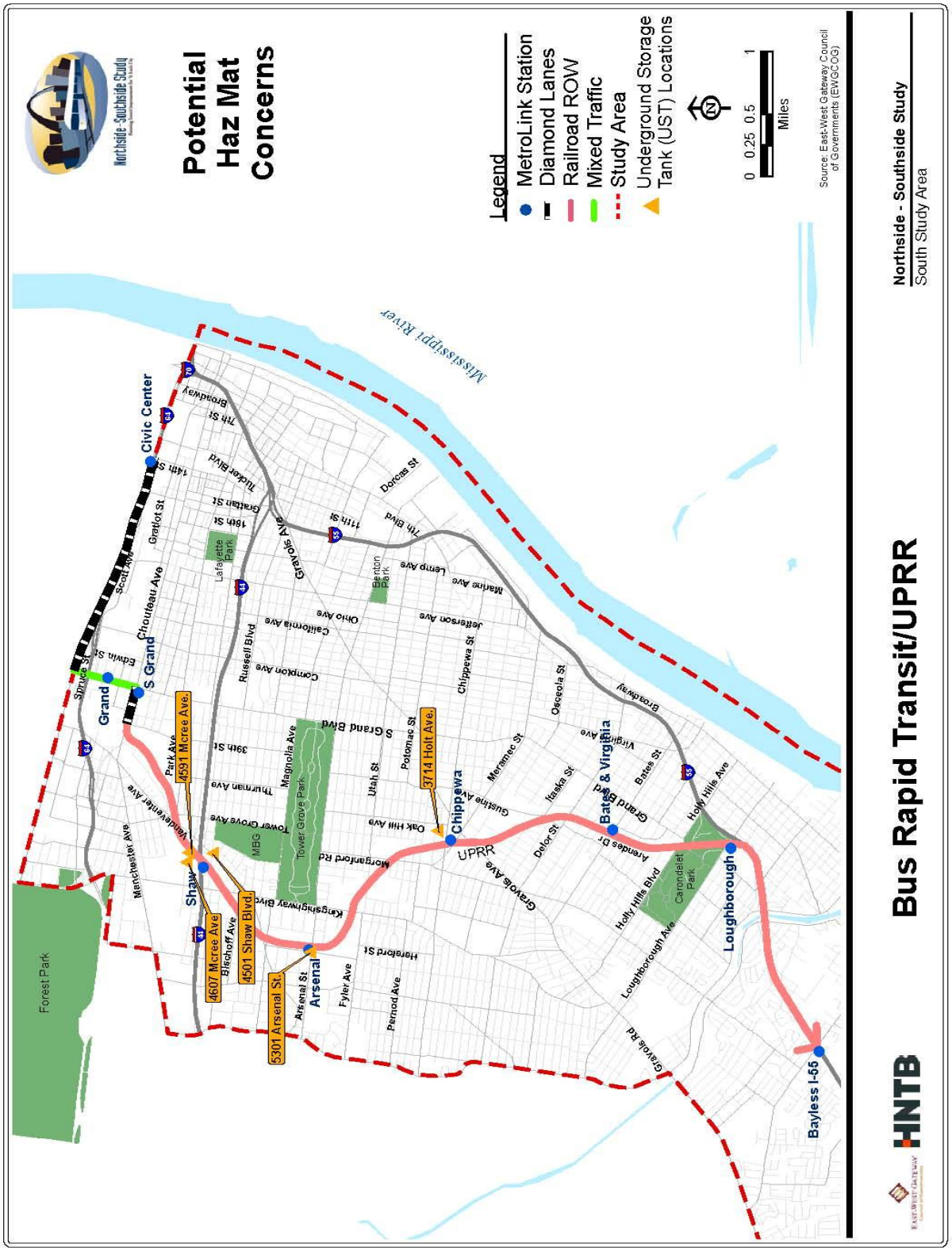


FIGURE 7.3-4: HAZARDOUS MATERIALS, JEFFERSON/I-55

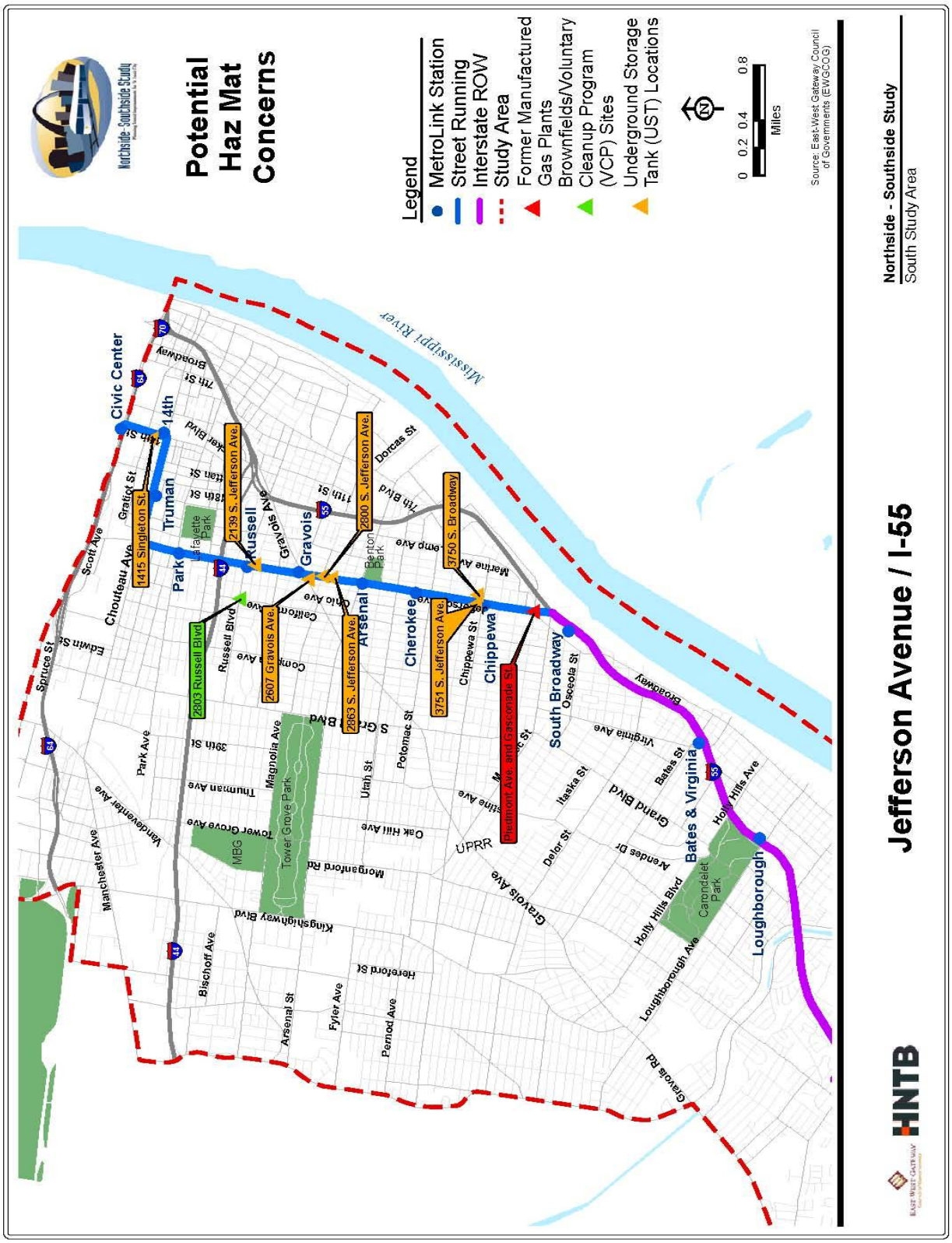


TABLE 7.3-1: POTENTIAL HAZARDOUS MATERIALS SITES

Site Name	*Site Address*	*Database*	*Site Detail Information Provided*
St. Louis FMGP #21	Piedmont Ave. and Gasconade St. St. Louis, MO	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.
Martin L. Basyle	2803 Russell Blvd. St. Louis, MO 63104	VCP	Former gas station site which had 5 USTs. The USTs were removed in January 2004 and the building has been demolished.
Pioneer Paving	3750 S. Broadway St. Louis, MO 63118	UST	Removed 2,000-gallon fiberglass UST. The date of removal and tank contents were unavailable.
Nader & Sons	2863 Jefferson Ave. St. Louis, MO 63118	UST	500-gallon UST containing used oil was "closed in place" in 1987.
John Ramming Machine Co.	4591 McCree Ave. St. Louis, MO 63110	UST	5,000 gallon UST containing gasoline was removed on 9/28/1990. Records indicated an excavation was conducted.
Ryder Truck Rental	1415 Singleton St. St. Louis, MO 63103	UST	2,000-gallon UST containing an unknown substance was removed in 1988.
Southern Products Co.	2800 Jefferson Ave. St. Louis, MO 63118	UST	8,000-gallon UST containing diesel fuel removed in 5/8/2002. Records indicated that the soils were impacted. A "no further action" letter was granted by MoDNR on 3/11/2003.
Herbert Crosby	5301 Arsenal St. St. Louis, MO 63139	UST	3,000-gallon UST containing used oil was "closed in place" in December 1989.
Area II Police Station	919 Jefferson Ave. St. Louis, MO 63103	UST	550-gallon UST containing diesel fuel is documented as "currently in use." The UST was installed on 7/12/1990.
QuikTrip #620	3751 Jefferson Ave. St. Louis, MO 63118	UST	12,000-gallon UST containing gasoline is listed as "currently in use." A notification of a petroleum release into the soil was reported on 5/6/1988.
Greg Reininger	3714 Holt Ave. St. Louis, MO 63116	UST	10,000-gallon UST containing diesel fuel was removed on 11/19/1993. A "no further action" letter was issued on 11/19/1993.
Missouri Botanical Garden Property	4501 Shaw Ave. St. Louis, MO 63110	UST	No tank documentation or closure information available. Remediation activities were documented. A notification of a petroleum release into soil and groundwater was reported on 5/15/2001.
7-Eleven #20883	2607 Gravois Ave. St. Louis, MO 63118	UST	10,000-gallon UST containing gasoline is listed as "currently in use." A petroleum release notification and remedial excavation were reported and conducted on 8/1/1991.
Willis Custom Cabinets	4607 McCree Ave. St. Louis, MO 63110	UST	UST containing diesel fuel was "closed in place."
Vacant Property	2139 Jefferson Ave. St. Louis, MO 63104	UST	UST containing gasoline was "closed in place."

Notes:

FMGP - Former Manufactured Gas Plant

UST - Underground Storage Tank

VCP - Brownfields/Voluntary Cleanup Program

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.

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, 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,[2] was prepared by EWGCOG in March 2005. The "Southside 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 National Ambient Air Quality Standards (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

[1] According to conversation with Mr. Mike Arduser, Missouri Department of Conservation, on 1/24/06.
[2] EWGCOG *Legacy 2030: The Transportation Plan for the Gateway Region.* March 2005.

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.

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 only performed for a single alternative. Site-specific impacts and mitigation measures will be delineated for the preferred alternative during preliminary engineering.

Vibration impacts to older buildings could be an issue for this project. Historic buildings adjacent to the 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 the 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 study 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 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.[3] According to the State Historic Preservation Office, remnants of mounds may still exist.

There are also numerous historic buildings in the City, many of which are being rehabilitated under the Missouri Historic Tax Credit program. Within the Southside study area, there are 21 historic districts, 36 historic buildings, one historic site, and one historic structure currently listed on the NRHP[4] (Figure 7.3-5 and Table 7.3-3). In addition, the City of St. Louis has designated five Certified Local Historic Districts, three local historic districts, and numerous city landmarks throughout the study area. Many are located along Grand Boulevard and in the neighborhoods of Lafayette Square, LaSalle, Carondelet, and Patch.

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

[3] "History of St. Louis Neighborhoods: Old St. Louis." City of St. Louis. www.stlouis.missouri.org
[4] National Register of Historic Places (NRHP) point file (8/6/02M); provided by East West Gateway Council of Governments, 2005.

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 Tiffany Neighborhood Historic District, which is near where the Chouteau line turns west from 39th to Folsom. Folsom is very narrow, and the buildings along it are close to the right-of-way. Another concern is the Mount Pleasant School on Nebraska Avenue, which is adjacent to the Interstate-55 on-ramp from South Broadway. The on-ramp would need to be shifted closer to the highway to keep the LRT within the right of way.

Along the alignments, few of the individual listed properties are directly adjacent to the roadway.

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 of this report.

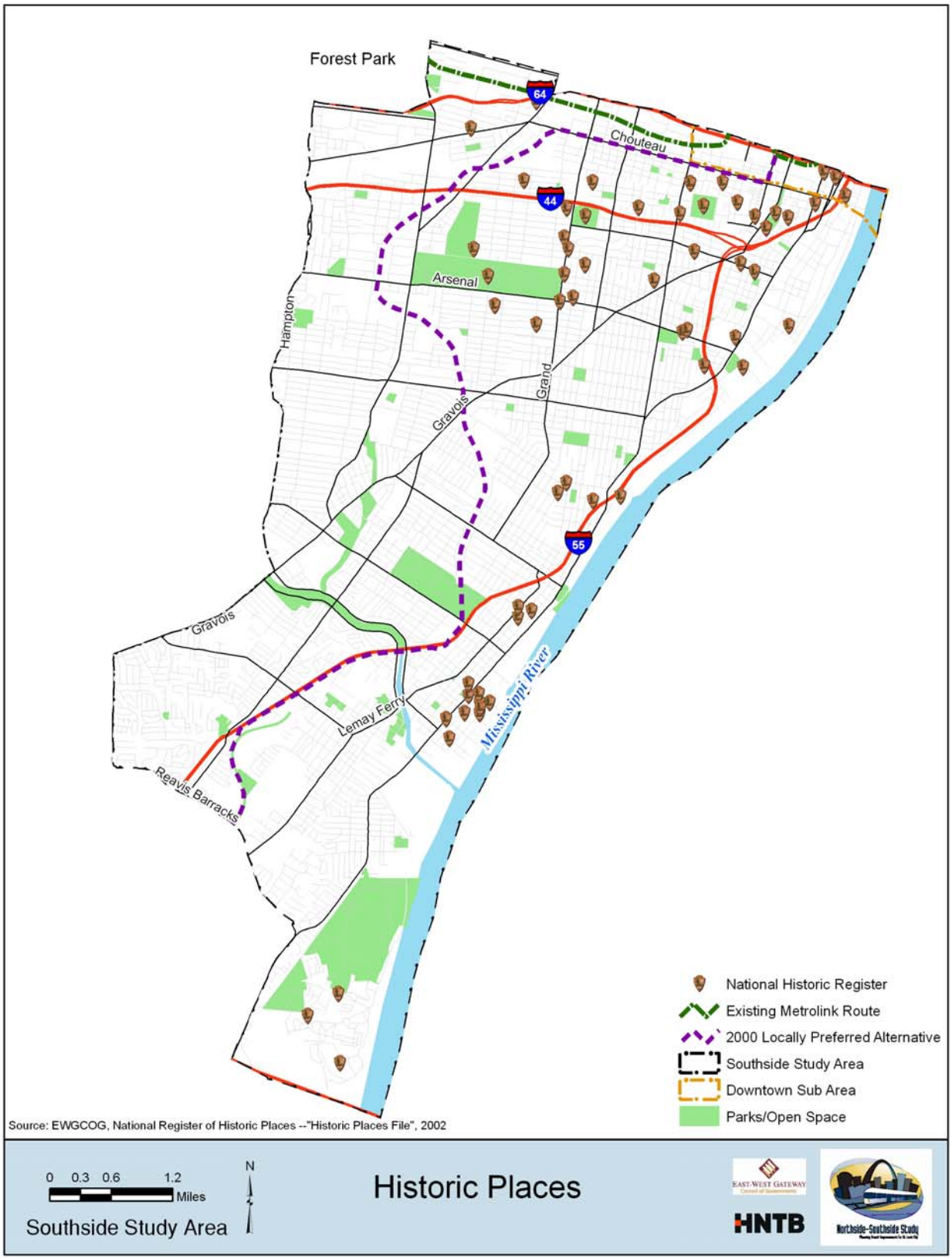
TABLE 7.3-3: SOUTHSIDE HISTORIC REGISTER SITES AND DISTRICTS

NAME	ADDRESS	AFFECTED AREA
Anheuser-Busch Brewery	721 Pestalozzi Street	None
Anton Schmitt House	7727 South Broadway Street	None
Barr Branch Library Historic District	2500-2630 Lafayette Avenue	Jefferson
Benton Park District	Bounded by Gravois Road, I-55, South Broadway and Jefferson Avenue	Jefferson
B'Nai el Temple	3666 Flad Avenue	None
Brown Shoe Company's Homes-Take Factory	1201 Russell Boulevard	None
Buildings at 2327-31 & 2333-35 Rutger Street	2327-31 and 2333-35 Rutger Street	Jefferson
C. Hager and Sons Hinge Co.	139 Victor Street	None
Carlin-Rathgeber House	122 Davis Street	None
Chatillon-Demenil House	3352 DeMenil Place	None
City Hospital Historic District	Bounded by Lafayette Avenue, Grattan, Carroll, Dillon, St. Ange, and 14th Streets	Jefferson and Chouteau
Compton Hill Water Tower (#3), Reservoir Park	Grand and Russell Boulevards and Lafayette Avenue	None
Convent of the Sisters of St. Joseph of Carondelet	6400 Minnesota Avenue	None
Crittenden Historic District	3401 Arsenal Avenue, 3400 & 3500 blocks of Crittenden Avenue	None
Des Peres School	6307 Michigan Avenue	None
Dickmann Building	3115 South Grand Boulevard	None
Dolman Row	1424-1434 Dolman Street	None
Edward Wyman School	1547 South Teresa Street	None
Eugene & Marianne Miltenberger House	3218 Osceola Street	None
Eugene Field House	634 South Broadway Street	None
Forest Park Southeast Historic District	Bounded by I-44, Kingshighway Boulevard, I-64 and Vandeventer Avenue	Chouteau
Fulton Bag Company Building	612-618 South 7th Street	Chouteau and Jefferson
Hickory Street District	Bounded roughly by LaSalle, Missouri, and Rutger Streets; Jefferson Avenue; and along Hickory Street	Chouteau and Jefferson
Horace Mann School	4047 Juniata Street	None
Immaculate Conception School	2912 Lafayette Street	None
Jacob Steins House	7600 Reilly Street	None
Lafayette Square Historic District	Area surrounding Lafayette Park	Jefferson
McKinley Fox District	Bounded roughly by 18th Street, I-44, Jefferson Avenue and Gravois Road	Jefferson
Missouri Botanical Garden	2345 Tower Grove Avenue	None
Moloney Electric Co. Building	1141-1151 South 7th Street	None
Mount Pleasant School	4528 Nebraska Avenue	Jefferson
Otzenberger House	7827 Reilly Street	None
Quinn Chapel A.M.E. Church	227 Bowen Street	None
Roberts, Johnson and Rand-International Shoe Co	Mississippi and Hickory Streets	Jefferson
Rock Spring School	3974 Sarpy Avenue	Chouteau

NAME	ADDRESS	AFFECTED AREA
S. John Nepomuch Parish Historic District	11th & 12th Streets between Carroll Street and Lafayette Avenue	None
Schlichtig House	8402 Vulcan Street	None
Schollmeyer Building	1976-1982 Arsenal Avenue	None
Seventh District Police Station, Former	2800 South Grand Boulevard	None
Shaw Avenue Place	Bounded roughly by DeTonty Street, South Spring Avenue, Shaw Avenue and South Grand Boulevard	None
Soulard Neighborhood Historic District	Bounded roughly by 7th, Soulard, Lynch and 12th Streets	None
Soulard-Page District	Bounded roughly by Soulard, 8th, 12th, and LaSalle Streets	None
Speck District	Bounded roughly by South 11th, Park, Rutger, and South 12th Streets	None
St. Boniface Neighborhood Historic District	Bounded by Broadway, Koeln Street, Tesson Street, and MOPAC Railroad	None
St. Francis de Sales Church	2653 Ohio Street	None
St. Louis Air Force Station	2nd Street and Arsenal Avenue	None
St. Mary of Victories Church	744 South Third Street	None
Steins Street District	Steins Street.	None
Stone Houses	200-204 Steins Street	None
Stork Inn	4526 Idaho Avenue	None
Strassberger's Conservatory	2302-2306 South Grand Boulevard	None
Sugar Loaf Mound	Ohio Street	Jefferson
Tiffany Neighborhood District	39th Street, Park Avenue, Grand Boulevard, and Lafayette Avenue and Vandeventer Avenue, Tower Grove Avenue, and Folsom Avenue	Chouteau
Tower Grove Heights Historic District	Bounded by Grand Boulevard, Arsenal Avenue, Gustine Avenue and McDonald Avenue	None
Tower Grove Park	Bounded by Magnolia Avenue, Grand Boulevard, Arsenal Avenue and Kingshighway Boulevard	None
William Buehler House	2610 Tennessee Avenue	None
Zeiss Houses	7707-7713 Vulcan Street	None

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

FIGURE 7.3-5: PARKS AND HISTORIC PLACES



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 area, 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 report.

The Chouteau/UPRR LRT and BRT alignments both travel through Carondelet Park on existing railroad right-of-way (Figure 7.3-6). According to the Carondelet Master Plan, there is a desire to create an internal one-way street system and functionally connect the eastern and western sections of the park. This will be achieved by creating a new one-way “Grand Drive Loop” road and bridge that connects the eastern and western sides of the park over the railroad tracks with both a road and dedicated pedestrian/bike path. The alignment is not expected to deter these plans, but close coordination with the City Parks division will be necessary during design and construction. Any temporary or permanent right-of-way acquisition within the park will be considered a Section 4(f) use (see Section 7.3.9 of this report). The Jefferson alignment runs within the Interstate-55 right-of-way on the southeastern border of the park, but on the opposite side of the freeway; it is not expected to impact the park.

Benton Park, which features walking paths, water features, a playground, and tennis courts, is located next to the proposed Arsenal Street station. Right-of-way acquisition may be required along the park’s Jefferson Avenue frontage. This also would be a Section 4(f) use (see Section 7.3.9 of this report). The type of changes needed is not expected to significantly affect the park or the ability of people to use it. The sidewalk may be moved, and a traffic signal is proposed for elimination at Wyoming Street and Jefferson Avenue. A pedestrian signal is proposed to be installed at Wyoming Street that will accommodate crossings for children and other pedestrian park users. This is important, since this park is largely accessed by people on foot. If right-of-way is required, it would also be considered a 4(f) use.

FIGURE 7.3-6: CARONDELET PARK MASTER PLAN

Source: H3 Studio Inc. Draft Carondelet Park Master Plan. February 2003.

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. The City of St. Louis has utilized LWCF funds for a number of City Park improvements. Further coordination with City Parks will be necessary to determine the extent of Section 6(f) property takes for right-of-way.

A number of parks and historic sites are located along the proposed alignments. These are summarized in Table 7.3-4.

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.

TABLE 7.3-4: POTENTIAL SECTION 4(f) USES

Property	Alternative	Potential Impacts	4(f) "use"
Carondelet Park	BRT, Gravois, Chouteau	Transit vehicles would run along existing rail right of way.	Section 4(f) use if either temporary or permanent right-of-way acquisition is necessary.
Benton Park	Jefferson	Transit vehicles would run in Jefferson Avenue which borders the park.	Widening of the right of way would be considered a 4(f) use.
Ray Leisure Park and Playground	Gravois	Transit vehicles would run in Gravois Avenue which borders the park.	Section 4(f) use.
Historic properties		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. The Jefferson alignment is routed along Interstate-55's right-of-way; in this case, highway traffic will likely be impacted during construction. 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

Northside-Southside Study

Planning Transit Improvements for St. Louis City

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.

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 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.

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.

- 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 exisitng 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

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:

- 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.

Southside Study

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 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.

FIGURE 8.2-1: NATURAL BRIDGE/ NORTH 14TH STREET ALIGNMENT ALTERNATIVE

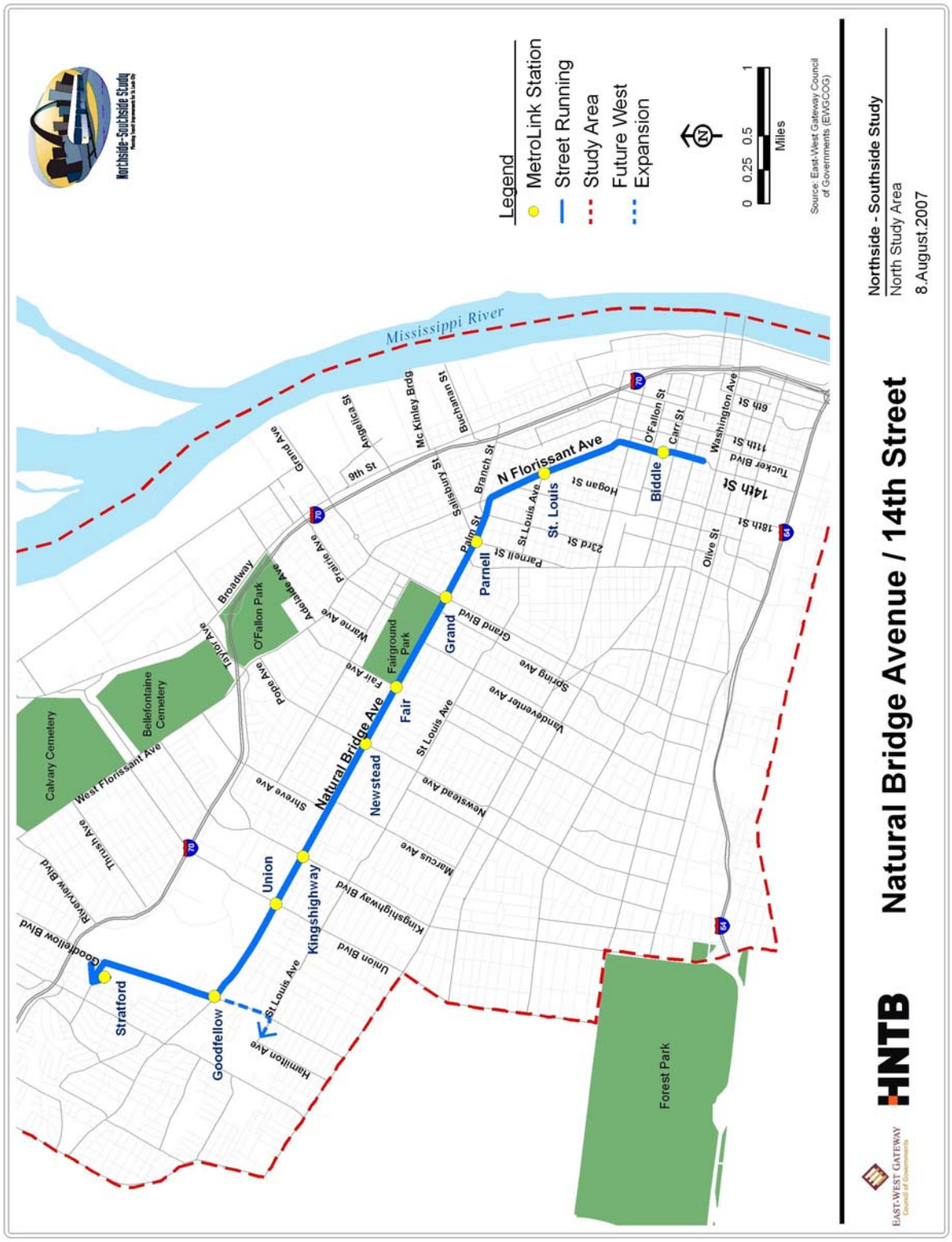


FIGURE 8.2-2: 9TH and 10TH STREETS COUPLET ALIGNMENT ALTERNATIVE

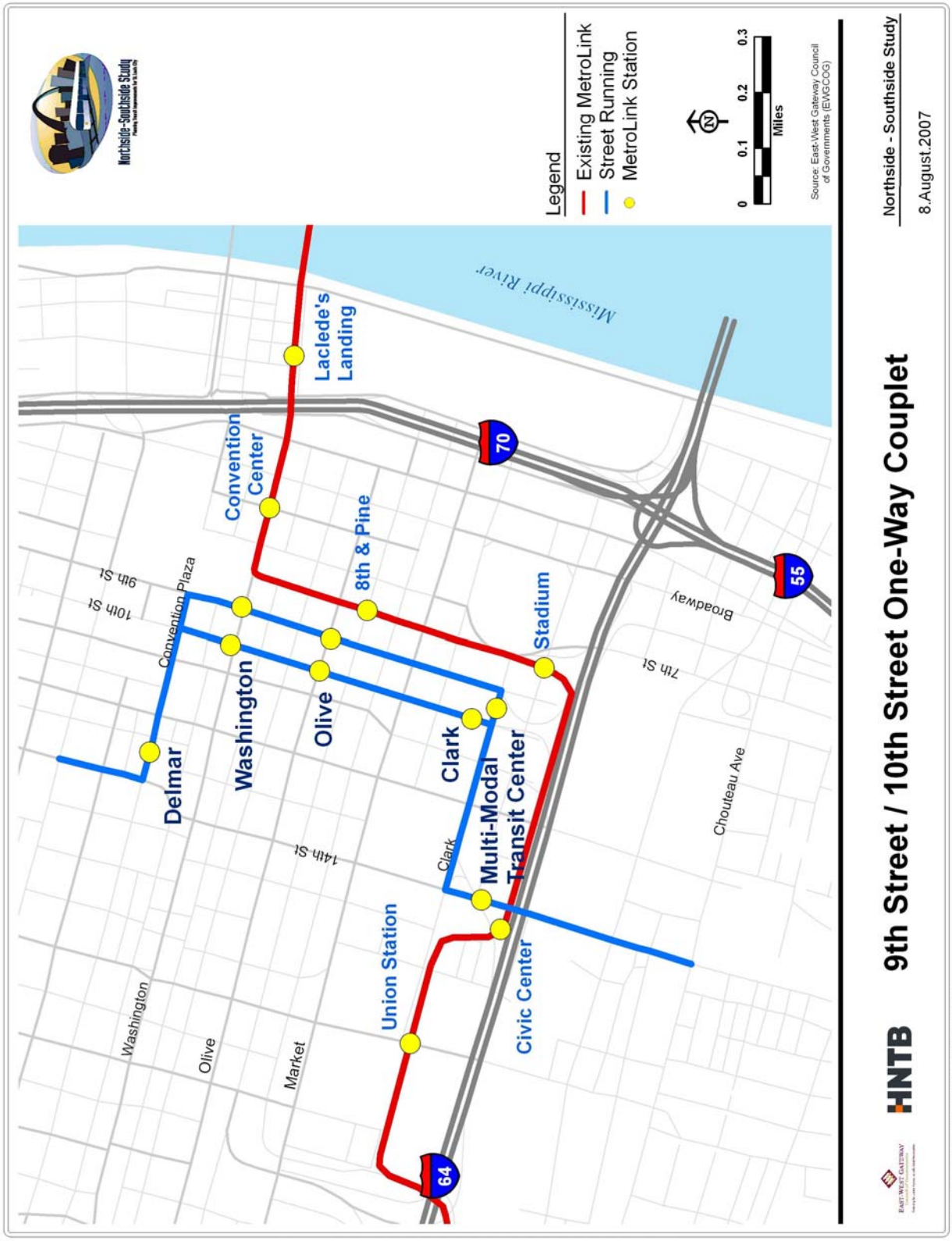


FIGURE 8.2-3: OLIVE/ CHESTNUT LOOP ALIGNMENT ALTERNATIVE

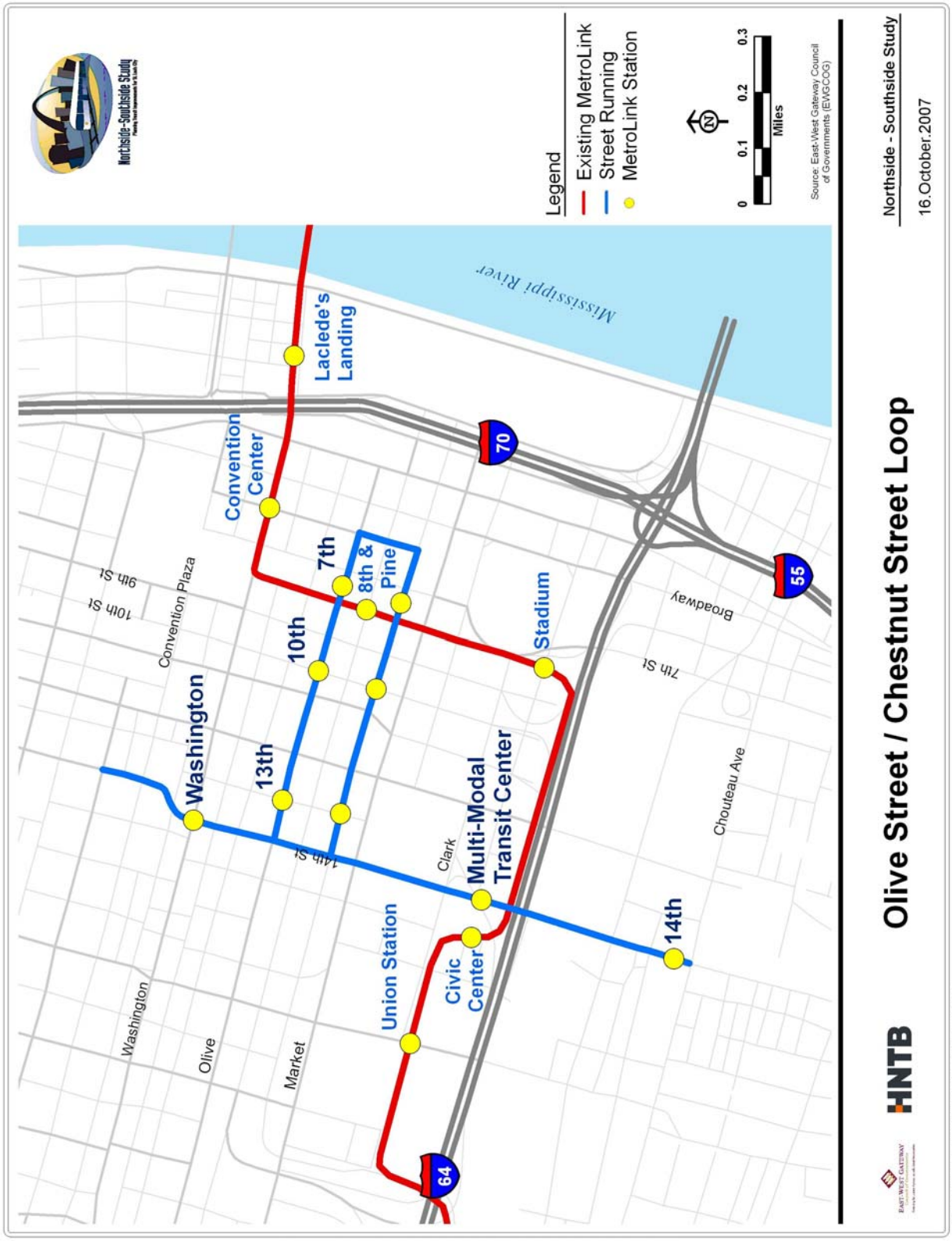


FIGURE 8.2-4: CHOUTEAU/ UPRR ALIGNMENT ALTERNATIVE

FIGURE 8.2-5: JEFFERSON/ I-55 ALIGNMENT ALTERNATIVE

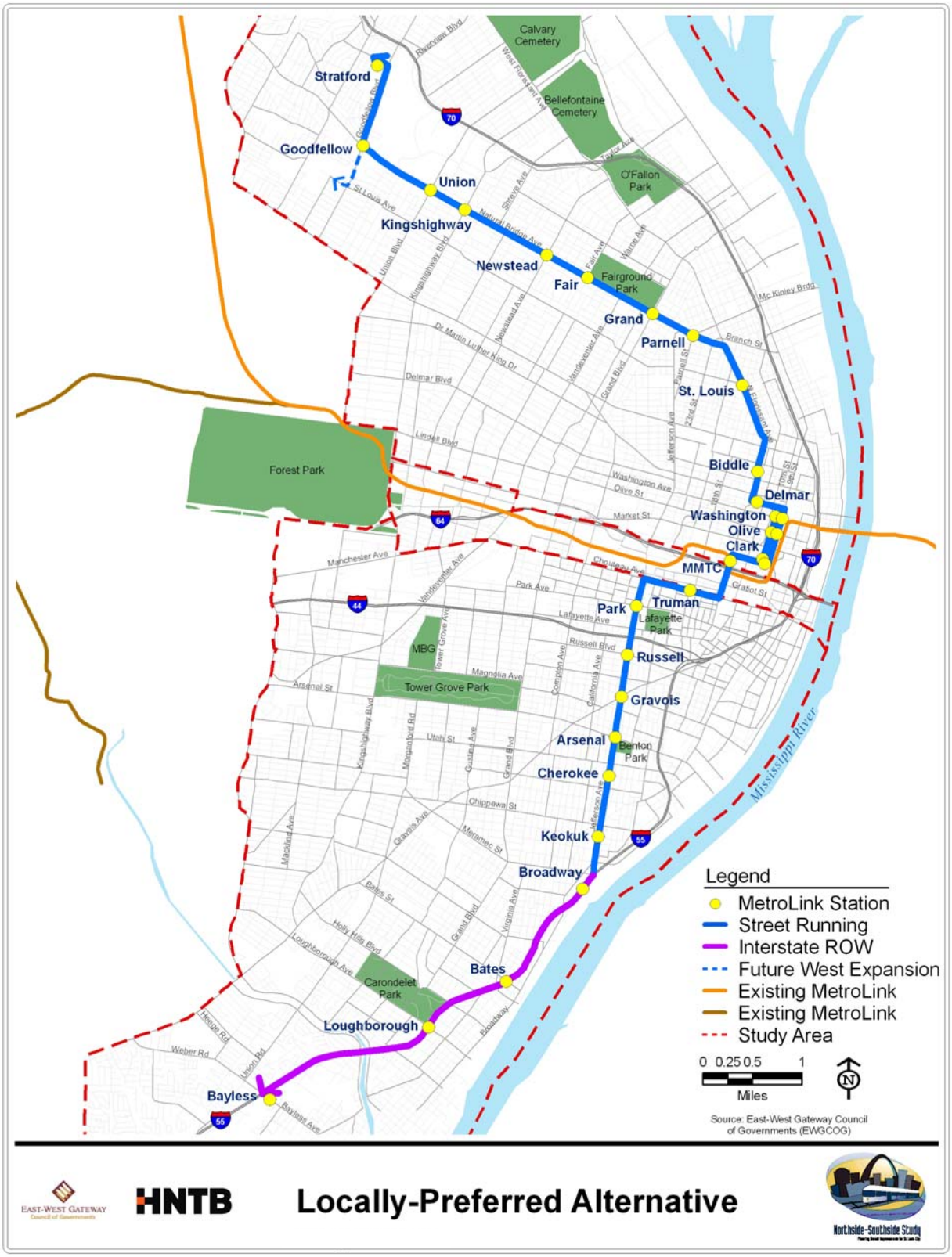



FIGURE 8.2-6: LOCALLY-PREFERRED ALTERNATIVE