Northside Study Area

Major Transportation Investment Analysis

FINAL EVALUATION REPORT

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S.O EXECUTIVE SUMMARY

S.1 INTRODUCTION

This report summarizes the results of the East-West Gateway Coordinating Council's (EWGCC) Major Transportation Investment Analysis (MTIA) for the Northside Study Area. The EWGCC, in cooperation with the Missouri Department of Transportation (MoDOT) and Bi-State Development Agency (BSDA), conducted this study. The MTIA is a planning process designed to provide local decision-makers and the public with the information necessary to determine the locally preferred transportation investment alternative for the Study Area. The Northside study is one of three MTIAs that the EWGCC carried out concurrently. Figure S.1-1 illustrates the location of the Northside Study Area within the region and its relationship to the other two Study Areas for which MTIAs were also conducted.

At the completion of the MTIA process, the EWGCC Board of Directors adopted a Locally Preferred Alternative (LPA) for the Northside Study Area for provisional inclusion into the region's long-range transportation plan. It also will adopt a financing strategy for the project(s). When the agencies determine that the project(s) is ready to move forward from a financial perspective, the next step is to complete the required federal environmental documentation including the National Environmental Policy Act (NEPA) for the LPA. These documents present, in detail, the physical and operational characteristics of the LPA, and its associated environmental and community impacts and benefits. In concert with these documents, additional preliminary engineering is performed to refine the designs and associated cost estimates developed conceptually in the MTIA.

Once the sponsoring federal agency [either Federal Highway Administration (FHWA) or Federal Transit Administration (FTA)] has certified the Final EIS, the project can move into final engineering design, acquisition of right-of-way as required for the project, and ultimately construction and implementation of operations.

S.2 PURPOSE AND NEED

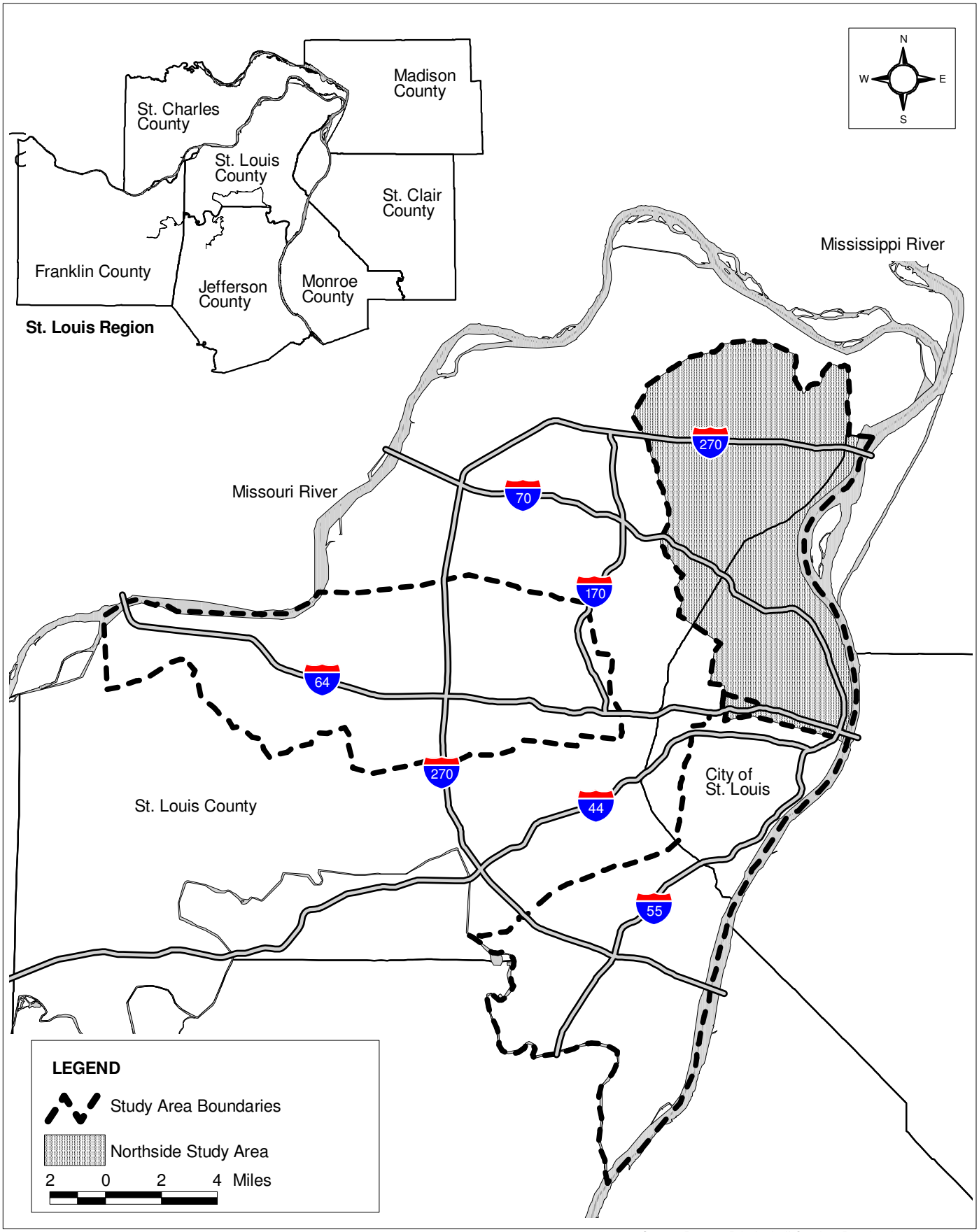
A component of a MTIA is the identification of the purpose and need for surface transportation improvements. The following are the purposes and needs for the Northside Study Area:

Access to Opportunity: Improve access for travel within the Northside Study Area as well as travel to other areas within the region. Opportunity includes, but is not limited to, jobs, medical care, shopping, and education. It means getting to opportunities in a reasonable amount of time.

Safety: Use transportation improvements on roadways to reduce the existing accident rate. Also direct transportation improvements to enhance neighborhood vitality, thereby improving personal safety.

Neighborhood Revitalization/Sustainable Development: Use new transportation infrastructure to maintain and/or enhance quality of life in neighborhoods, with a focus on areas of declining population and employment.

Connectivity of the Transportation System: Build on the existing transportation system by seeking opportunities to improve connections between roadways and/or transit in the existing system.



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

Figure S.1-1

Northside Study Area
Major Transportation Investment Analysis

Northside Study Area

S.3 INITIAL SET OF ALTERNATIVES

From the information collected and analyzed through this process, a range of preliminary alternatives were developed by sponsoring agencies and consultant staff for the Northside Study Area. The planning horizon year for the Northside MTIA is the Year 2020. Twelve initial alternatives, as well as the future No Build alternative, were developed to respond to the Purpose and Need for the Study Area. These included:

- Transportation Systems Management (TSM) Alternative
- 8 Light Rail Transit (LRT) Alternatives
- 1 Bus Rapid Transit (BRT) Alternatives
- 2 Roadway Alternatives

This reflected the broadest range of alternatives considered in the Northside MTIA as a result of both technical study and public input. This initial set of alternatives was then subjected to a screening phase of analysis where they were reduced and/or combined into a final set of six alternatives for more detailed analysis during the remainder of the MTIA.

S.4 SCREENING PROCESS AND FINAL SET OF ALTERNATIVES

During alternatives screening, the Initial Set of Alternatives underwent a preliminary evaluation to identify those alternatives that were most competitive in addressing the Purpose and Need and Goals and Objectives in the Study Area and that should, therefore, be carried forward for further study and evaluation in the MTIA. Alternatives that were determined to have little or no chance of becoming the locally preferred alternative were screened out during this process.

The screening criteria and related measures used in the Northside MTIA to narrow the range of alternatives are listed as follows:

- Ability to serve major travel markets within the Northside Study Area
- Accessibility to concentrations of population and employment
  - population within one-half mile
  - employment within one-half mile
- Accessibility to people without cars
  - zero-car households within one-half mile
- Relative ease of transportation system connectivity
- Potential to foster sustainable economic development opportunities
  - Potential for large infill and redevelopment
  - revitalization opportunity sites/incremental fill opportunity (concentrations of smaller parcels)
- Right-of-Way impacts
  - relative neighborhood disruption due to property takes and other indirect effects
  - additional right-of-way requirements/property takes
- Physical feasibility
  - probability of grades in excess of 6% for in-street light rail
- Capital Costs
  - estimated capital cost
  - per mile cost

The recommended alternatives were presented to state and federal agencies, representatives of local jurisdictions, and the general public throughout the months of June and early July 1999. At that stage, study participants were asked which of the initial alternatives they would like to see eliminated and which ones should be recommended for further study. Public and agency input on the recommended alternatives was then factored back into the screening process, which resulted in additional refinements to

the recommended alternatives. In some cases, certain elements of some transportation alternatives were combined with others to form a new transportation alternative that did a better job of addressing the Purpose and Need of the Northside Study Area. In other cases, specific transportation improvements associated with some alternatives were eliminated due to technical factors or because of public concerns.

The recommended alternatives for the Northside Study Area were reviewed and approved for further technical analysis and conceptual engineering by the East-West Gateway Coordinating Council Board of Directors on July 28, 1999.

As a result of the screening analysis and community input, six alternatives were identified for further study in the Northside Study Area and seven were eliminated. In some cases, the best transportation elements of some of the alternatives were recombined to form the recommended set of six alternatives.

Alternative 1 – No Build Alternative

The No Build Alternative is an accumulation of planned and committed transportation improvements that the study assumes to be in place by the year 2020, the planning horizon year for the study. This alternative represents the future year transportation condition if no further action is taken in the Study Area beyond what is already planned. The No Build Alternative is required by federal planning guidelines to provide a baseline with which to compare the effectiveness of the build alternatives.

Alternative 2 – Transportation Systems Management (TSM) Alternative

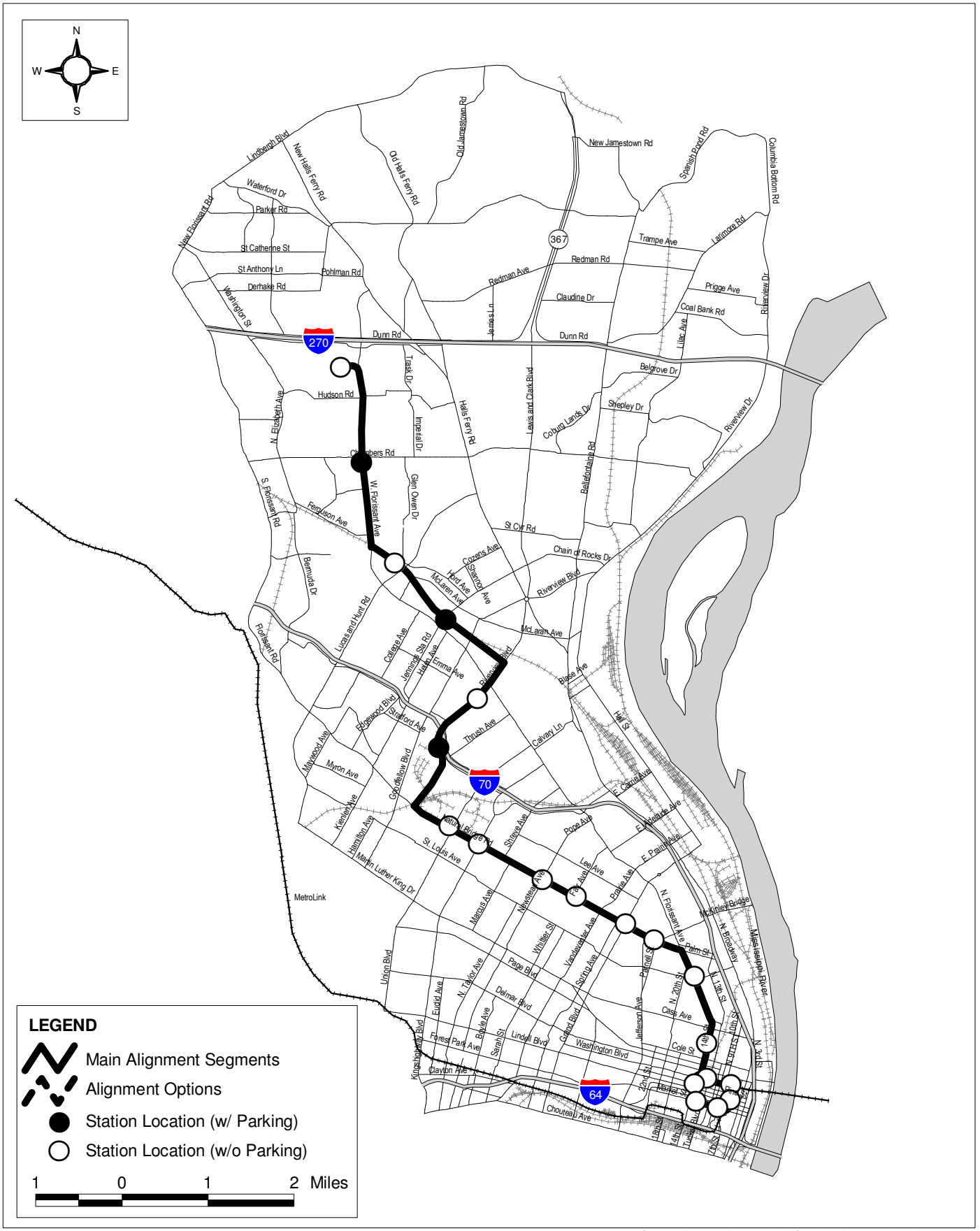
The TSM/Enhanced Bus Service Alternative consists of an integrated package of low cost or operational transportation projects for the Study Area, such as increased bus service, traffic signal coordination and access management along arterial roadways, and intelligent transportation system improvements. In addition, this alternative has a strong set of bus enhancements. These include exclusive and/or semi-exclusive bus lanes along Lewis and Clark Boulevard to Jennings Station Road, then continuing south to I-70 allowing buses to achieve travel time savings and then use the reversible lanes (perhaps with new, bus only ramps) on I-70 into Downtown. Exclusive and/or semi-exclusive bus lanes would also begin at I-270 on West Florissant Avenue and continue to Jennings Station Road and, again, connect with I-70. There would be bus route restructuring to compliment the enhanced bus service improvements.

A full list of additional TSM/Enhanced Bus Service Alternative operational improvements and/or low cost capital improvements designed to make the best use of the existing transportation infrastructure can be found in Section 4 of this document. All the improvements listed in the No Build Alternative are assumed to be in place with the TSM/Enhanced Bus Service Alternative.

Alternative 3 – Light Rail Transit (LRT)

LRT Alternative 3 (see Figure S.4-1) would connect the Downtown St. Louis area to I-270 in the vicinity of Florissant Valley Community College and would be primarily double track and at-grade. In addition, some sections of the alignment may need to be elevated where dictated by design considerations.

Following the alignment from south to north, Alternative 3 would connect into downtown St. Louis via a loop. The alignment would follow a proposed one-way loop from 14th Street south to Market Street, east on Market Street to 7th Street, then north on 7th Street to Washington Avenue, then west on Washington Avenue to 14th Street, then north on 14th Street back to North Florissant Avenue. The trains would run on a single track placed in-street along the Downtown "loop" in a curb lane, with the exception of 14th Street north of Washington Avenue, where there would be two tracks (see Figure S.4-2). This concept for serving Downtown has the advantages of allowing LRT to serve many downtown locations, allows for convenient transfers between LRT Alternative 3 and the existing MetroLink line (e.g. Kiel Station, 7th and Pine Station), and provides for a potential interface with Southside Study Area LRT alternatives. For more details, see the Northside and Southside Study Areas Downtown Alignment Option: Development and

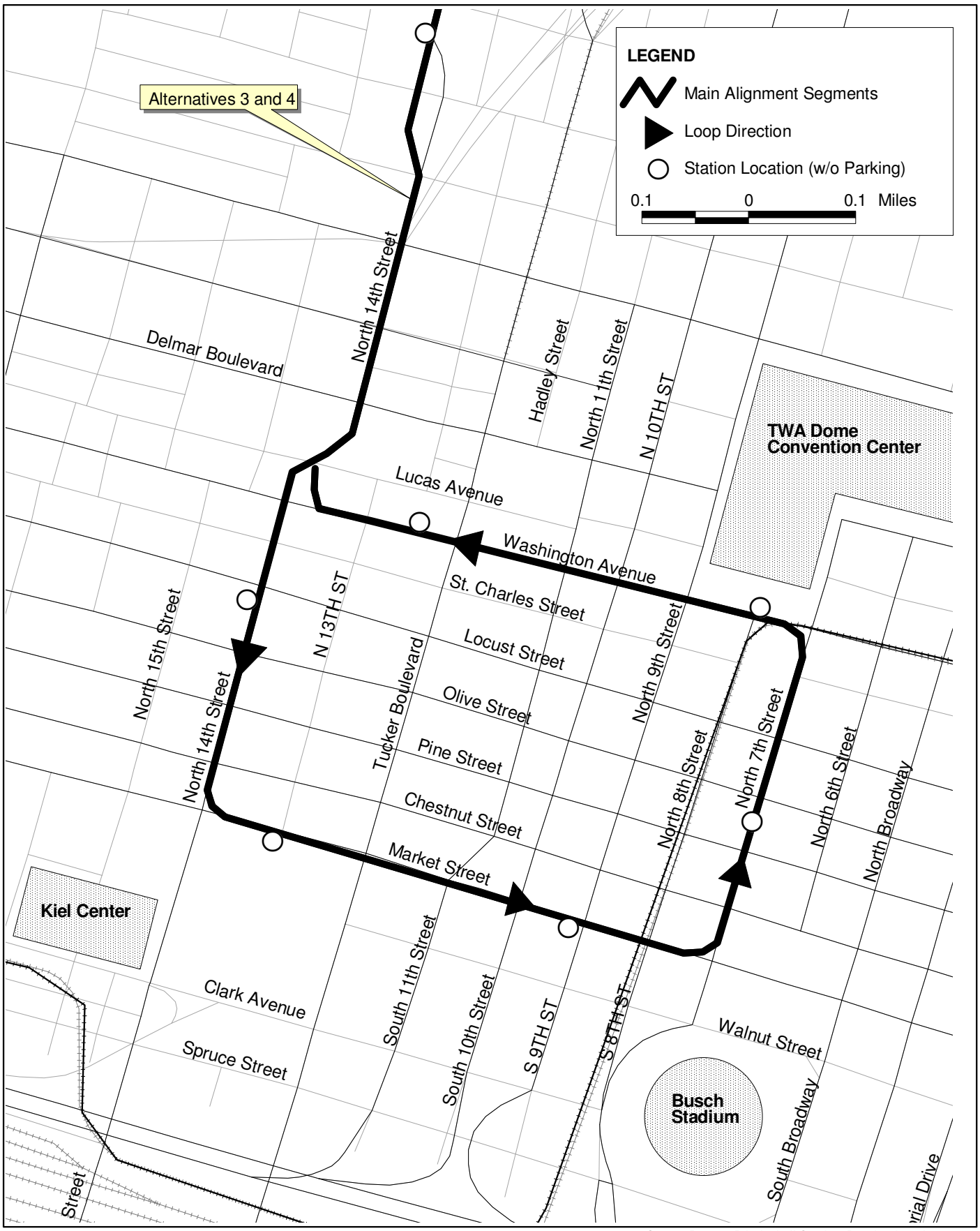


Source: Parsons Brinckerhoff Quade & Douglas, Inc., June 2000.

Figure S.4-1

Northside Study Area
Major Transportation Investment Analysis

Alternative 3 - Light Rail Transit



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

Figure 4.3-2

Northside Study Area
Major Transportation Investment Analysis

Alternative 3 and 4 - Downtown Loop

Screening Report (February 2000). If this alternative is chosen for future development, this concept for serving Downtown would be studied in more detail than permitted in this MTIA, and significant changes to this concept may result.

The alignment would then follow 14th Street north to North Florissant Avenue, then head north in the median of North Florissant Avenue to Natural Bridge Road. The alignment would then continue northwest in the median of Natural Bridge to the where the Terminal Railroad passes under, the alignment would then elevate and cross out of the Natural Bridge right-of-way to the industrial area north of the Terminal Railroad. The alignment would follow this industrial area to where Riverview Boulevard passes under I-70. The alignment then follows the median of Riverview Boulevard to North Florissant Avenue where it transitions out of the median and onto the east side of Riverview. Paralleling Riverview along Cavalry Cemetery, the alignment then turns northwest and runs parallel to the Norfolk Southern Railroad to West Florissant Avenue. Following West Florissant Avenue in the median, the alignment turns west before reaching I-70 into a commercial parking lot to terminate south of Florissant Valley Community College.

Alternative 3 would be primarily double track and at-grade. In addition, some sections of the alignment would need to be elevated where dictated by design considerations.

The light rail line would include rail stations spaced approximately one-half to one mile apart at locations near employment and activity centers along the alignment. Beginning from downtown, stations are proposed at: 14th Street and Locust, Market and 13th Street, Market and 10th Street, 7th Street and Pine Street, the Convention Center, Washington Avenue (Tucker Boulevard), 14th Street (near Cole Street), North Florissant Avenue (near 20th Street), along Natural Bridge Road at Parnell Street, Grand Boulevard, Fair Avenue, Newstead Avenue, Kingshighway Boulevard and Union Boulevard, along Riverview Boulevard at I-70 and near the intersection of West Florissant Avenue, along West Florissant Avenue at Jennings Station Road, Northland (near Lucas and Hunt Road) and Chambers Road, and Florissant Valley Community College.

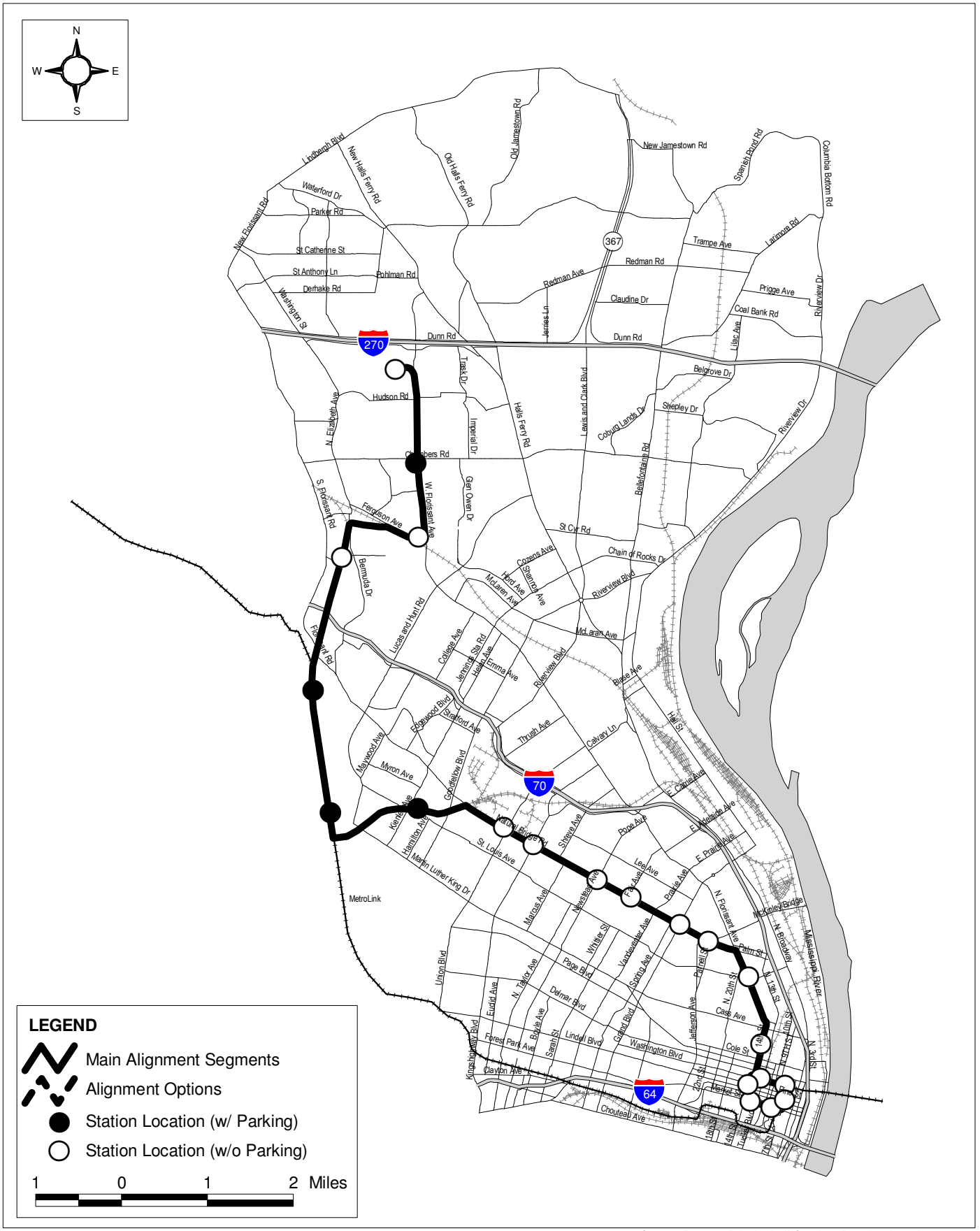
Bus feeder and circulation services also are proposed to provide connections between rail stations and major destination points not within walking distance of the rail line. See the Northside Study Area Transit Operating Plans (MPA, January 2000) for specific feeder bus assumptions. Trains would operate approximately every 7.5 minutes during peak periods and every 10 minutes in the off-peak, depending upon future demand and ridership.

Alternative 4 – Light Rail Transit (LRT)

Alternative 4 (see Figure S.4-3) has many of the same features as the Alternative 3 and also would connect Downtown with North County. In addition, some sections of the alignment may need to be elevated where dictated by design considerations.

The alignment begins in downtown St. Louis along the loop described in Alternative 3, above. Alternative 4 also enters and leaves the "loop" on 14th Street.

The alignment would then follow 14th Street north to North Florissant Avenue, then head north in the median of North Florissant Avenue to Natural Bridge Road. The alignment would then continue northwest in the median of Natural Bridge to the where the Terminal Railroad passes under, then would elevate and cross out of the Natural Bridge right-of-way to the Terminal right-of-way. Following the Terminal Railroad west, the alignment would parallel the existing tracks to the existing MetroLink right-of-way. The alignment would then turn north and parallel the existing tracks to the vicinity of Florissant Road. The alignment would then share TrailNet Bike Trail right-of-way under across I-70 to Bermuda Drive. Turning east through commercial and industrial properties, the alignment would parallel the Norfolk Southern Railroad to West Florissant Avenue. Turning north and following the median of West Florissant, the alignment turns west before reaching I-70 into a commercial parking terminates south of Florissant Valley Community College, similar to Alternative 3.



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

Figure S.4-2

Northside Study Area
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Alternative 4 - Light Rail Transit

Alternative 4 would be primarily double track and at-grade. In addition, some sections of the alignment would need to be elevated where dictated by design considerations.

The light rail line would include rail stations spaced approximately one-half to one mile apart at locations near employment and activity centers along the alignment. Beginning from downtown, stations are proposed at: 14th Street and Locust, Market and 13th Street, Market and 10th Street, 7th Street and Pine Street, the Convention Center, Washington Avenue (Tucker Boulevard), 14th Street (near Cole Street), North Florissant Avenue (near 20th Street), along Natural Bridge Road at Parnell Street, Grand Boulevard, Fair Avenue, Newstead Avenue, Kingshighway Boulevard, Union Boulevard, and just east of Goodfellow Road, along the existing MetroLink TRRA line at St. Charles Rock Road and UMSL South, Woodstock Road, Ferguson Avenue at West Florissant Avenue, Chambers Road at West Florissant Avenue, and terminating at Florissant Valley Community College.

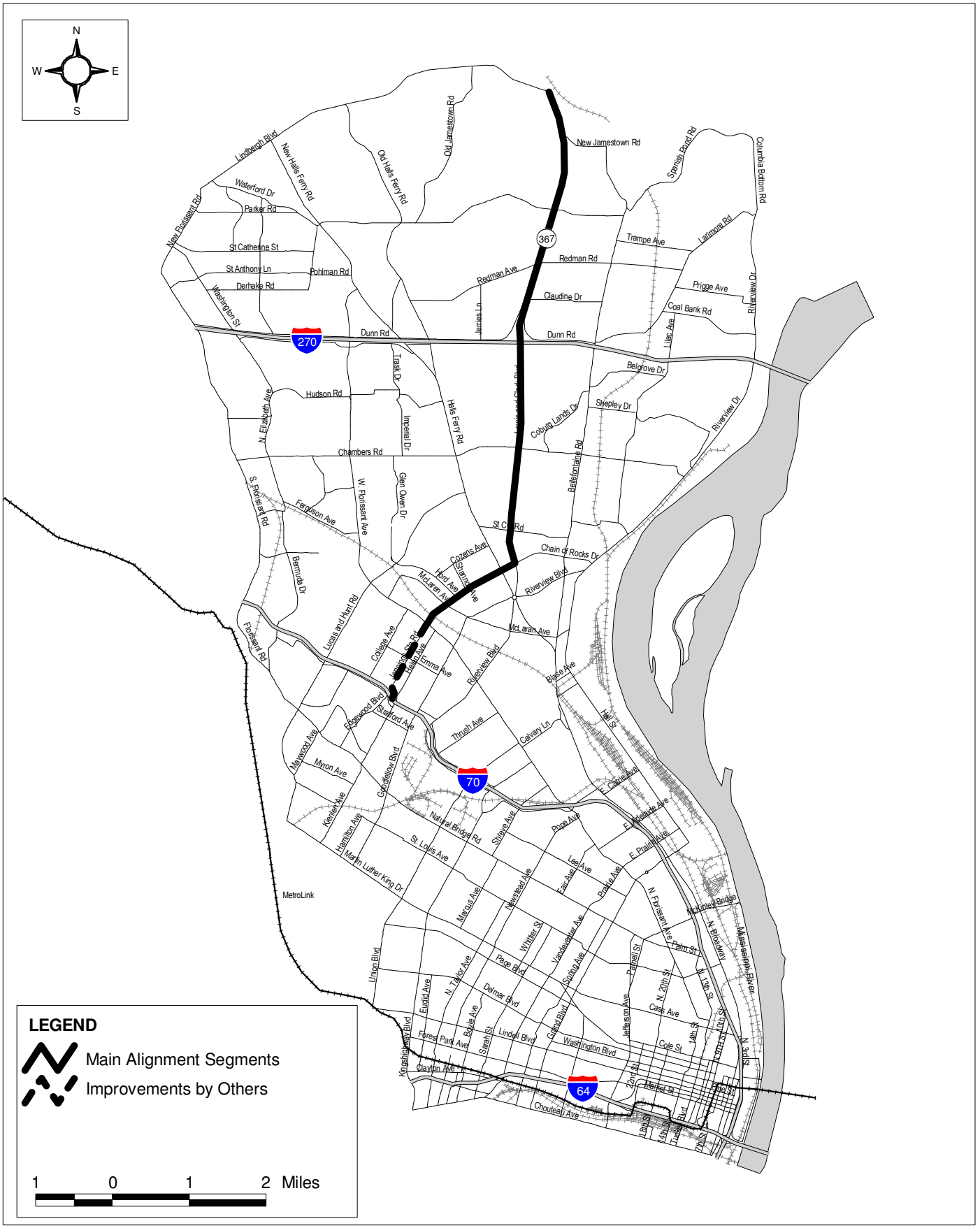
Bus feeder and circulation services are also proposed to provide connections between rail stations and major destination points outside of walking distance of the rail line. Trains would operate approximately 7.5 minutes during peak periods and every 10 minutes in the off-peak, depending upon future demand and ridership.

Alternative 5 - Roadway

Alternative 5 (see Figure S.4-4) would provide improvements to Route 367 that would include significant roadway widening and alignment adjustments with intersection changes and enhancements, including potential grade-separations between Lindbergh Boulevard and I-270 similar to an expressway. An expressway is an arterial highway with at least partial control of access, which may or may not be divided or have grade separations at intersections. Major improvements on Lewis and Clark Boulevard south of I-270 to Jennings Station Road would be similar to a parkway. Also included in this alternative are improvements to Jennings Station Road between West Florissant Avenue and Lewis and Clark Boulevard to upgrade it to a four lane urban boulevard. (Improvements on Jennings Station Road between West Florissant Boulevard and I-70 are included in the No Build alternative.) A parkway generally serves as an arterial highway for non-commercial traffic, with full or partial control of access, and may include a landscaped median or other features to offer a more park-like setting. In the case of the freeway and the parkway, both offer potential decrease in accident rates and increase the level of service.

Alternative 6 - Roadway

Alternative 6 (see Figure S.4-5) would provide improvements that would be identical to Alternative 5 north of I-270; however, the improvements south of I-270 would be more modest and include upgrades to Lewis and Clark Boulevard, Halls Ferry Circle, Riverview Boulevard and West Florissant Avenue to I-70. In addition, Riverview Drive would be upgraded to a parkway, connecting Downtown (via Hall Street, Grand Boulevard and I-70) and I-270. Hall Street and Grand Boulevard would also be improved in this alternative.



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

Figure 4.3-4

Northside Study Area
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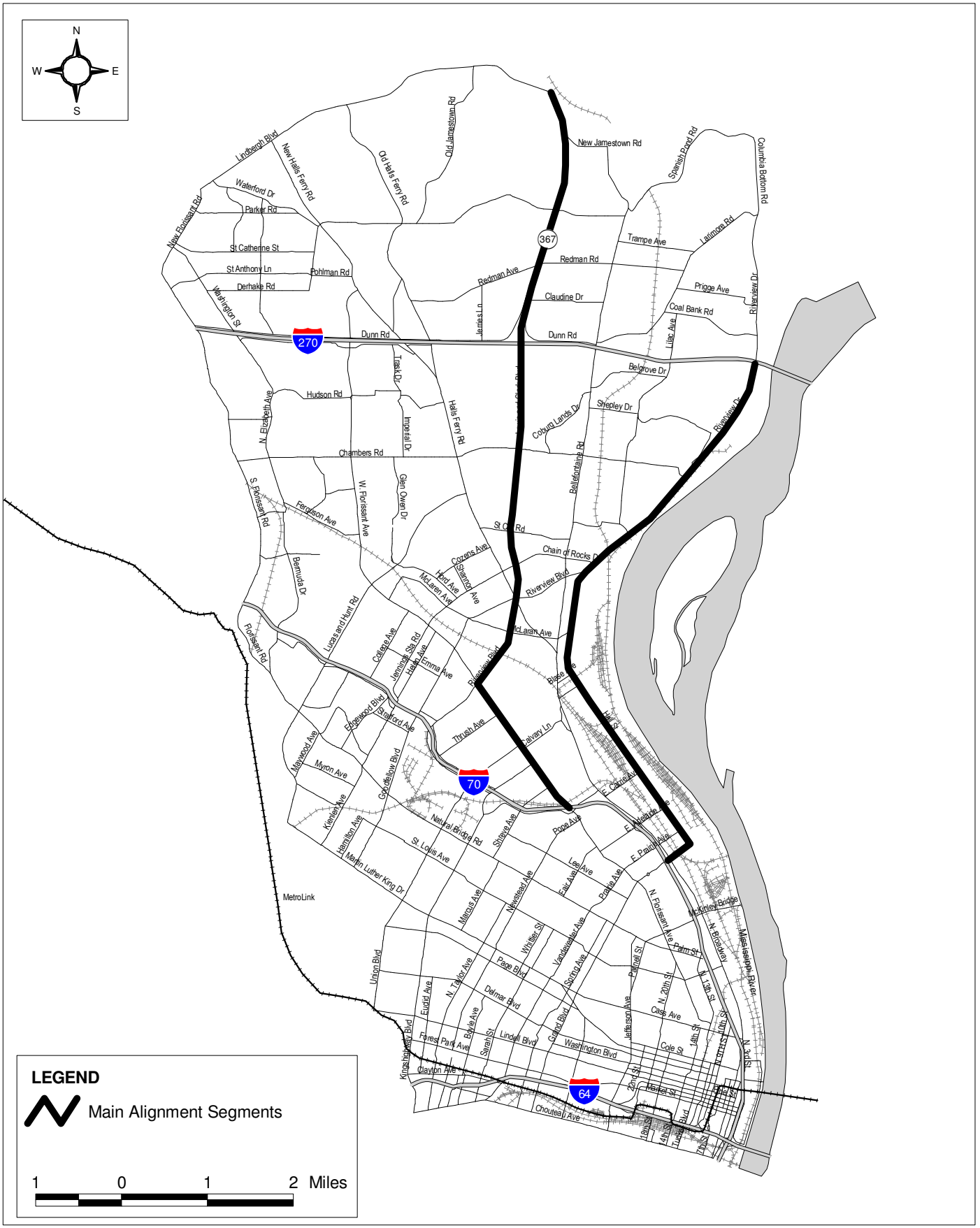
Alternative 5 - Roadway



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

Figure S.4-4

Northside Study Area
Major Transportation Investment Analysis

Alternative 6 - Roadway

S.5 EVALUATION OF ALTERNATIVES

The alternatives were assessed using a variety of evaluation measures directly related to the Purpose and Need for the Northside Study Area. These measures include travel demand, travel benefits, environmental impacts and capital and operating costs. The following sections summarize the evaluation of the alternatives for these evaluation measures.

Travel Demand

Transit Ridership

Table S.5-1 displays the forecast average weekday regional transit ridership for the six alternatives.

TABLE S.5-1
FORECAST YEAR 2020 AVERAGE WEEKDAY REGIONAL TRANSIT PERSON TRIPS

	No Build	TSM	Alt. 3 - LRT	Alt. 4 - LRT	Alt. 5 - Rdwy	Alt. 6 - Rdwy.
Regional Transit Trips (Bus and Rail)	162,500	166,100	168,800	169,300	166,000	166,000
as compared to No Build		3,600	6,300	6,800	3,500	3,500
as compared to TSM			2,700	3,200	-100	-100
% change as compared to No Build		2.2%	3.9%	4.2%	2.2%	2.2%
% change as compared to TSM			1.6%	1.9%	-0.1%	-0.1%

Source: KPMG, January 2000.

The TSM alternative attracts 3,600 daily transit person trips over the No Build Alternative, and the two roadway alternatives, which include the TSM transit improvements, attract 3,500 more daily transit trips each, slightly less due to roadway improvements making the auto slightly more attractive than transit in the TSM Alternative.

Alternative 4 is forecast to attract the highest number of regional transit person trips, 6,800 trips, 4.2 percent greater than the forecast 2020 No Build Alternative transit usage and 1.9 percent greater than the TSM Alternative. The ridership of Alternative 4 is closely followed by that of Alternative 3, only 0.3 percent less than Alternative 4. The two MetroLink alternatives increase MetroLink riders by adding total transit riders as well as shifting existing transit riders from bus to LRT.

The two LRT alternatives, 3 and 4, are forecast to attract almost identical average weekday daily boardings along their lines, 17,400 versus 17,200. This is due to the fact that the two alternatives are identical along a significant portion of their alignments, including many proposed station locations. These daily boardings can be put in perspective by comparing them to today's existing MetroLink line between Lambert Field and 5th and Main in East St. Louis, which attracts approximately 44,000 boardings per average weekday.

While the two Northside rail alternatives would serve a highly transit dependent section of the City and County, their forecast ridership levels are lower than might be otherwise expected for two reasons. First the two LRT alternatives would have a significant portion of their alignments in-street, which results in slower rail speeds which makes LRT relatively less attractive to bus or auto users than the existing line,

which runs at higher average speeds on its fully grade separated right of way. Second, there is already a significant amount of bus service in the Study Area and the addition of either of the LRT alternatives would be a smaller incremental improvement in overall transit service in the Northside Study Area as compared with other parts of the region.

Note that slightly more than 55 percent of the ridership for both LRT alternatives are forecast to originate in stations within the City of St. Louis, with the remainder boarding in St. Louis County.

Travel Benefits

Accessibility

The No Build Alternative would allow less than 15,000 Northside households to be able to access downtown St. Louis within a 30 minute trip via transit, out of over 122,000 households forecast to reside in the Study Area in 2020. This increases to over 45,000 households with the bus service improvements included in the TSM Alternative. Alternative 3 would increase the number of Northside households within 30 minutes of downtown to over 55,000, while Alternative 4 would have less than 40,000 households within 30 minutes of downtown. Alternative 4 is forecast to offer less transit accessibility to downtown than Alternative 3, as its routing from the County portion of its alignment is somewhat more circuitous than the routing of Alternative 3.

Another measure of accessibility for the two rail alternatives is the number of households within a half-mile of the proposed LRT stations of the two alternatives. Both LRT alternatives would have essentially the same number of households within walking distance, approximately 23,000. The number of zero car owning households that would be within one half mile of proposed rail stations for the two alternatives was also considered, based upon 1990 Census data of auto ownership, the most recent data available. Alternative 3 would have slightly more zero auto owning households within one half mile of its proposed stations than Alternative 4, with the difference occurring within the alignment segments of the alternatives that vary between the two.

Travel Times

Based on analysis, driving to access transit is forecast to be generally quicker than walking to access transit for the same set of trip origins and destinations. Also note that the two LRT alternatives generally offer the quickest transit travel times when compared to the No Build, TSM or roadway alternatives

Safety

The Cross-County MetroLink Extension-Segment I Conceptual Design Study Socio-Economic and Environmental Analysis Final Technical Report (August, 1999) assessed the safety risk of semi-exclusive LRT operations along that proposed extension to MetroLink. It references national data on LRT safety, which indicates an average accident rate of 3.7 accidents per track-mile per year for sections of track, which are not fully separated and protected from vehicular and pedestrian traffic. The reported range of accident rates was 0.5 to 6.2 accidents per track-mile per year. Applying these rates to the number of track-miles not fully protected in Alternatives 3 and 4 yields the following estimates of potential annual accidents involving LRT trains and vehicles or pedestrians:

- Alternative 3: 5 to 66 additional accidents per year, with an average of 39 accidents per year
- Alternative 4: 5 to 59 additional accidents per year, with an average of 35 accidents per year

These potential accidents would be off-set, to a certain degree, by a reduction in transit bus related vehicular and pedestrian accidents due to a reduction in bus-miles for those routes where the LRT service would replace the bus service.

Environmental Impacts

Land Use/Displacements

All of the build alternatives provide some support for redevelopment and, therefore, have the potential to induce land use or zoning changes, but also could function in accordance with existing land use and zoning designations.

The No Build and TSM alternatives would not require commercial or residential displacements. For LRT Alternatives 3 and 4, there would be approximately 22 displacements each. The displacements would be the result of rail right-of-way encroachment and development of stations, associated park-and-ride facilities, and yard and shop locations. The alignments for Alternatives 3 and 4 would be located within or adjacent to existing rail or roadway right-of-way, minimizing displacement impacts.

The construction of Roadway Alternative 5 would require 4 displacements due to construction of a bridge at Claudine Drive over Route 367. Roadway Alternative 6 would require also require 4 displacements.

Environmental Justice

No minority or low-income population would experience disproportionately high or adverse impacts as a result of any of the build alternatives. Adverse impacts were avoided by developing alternatives that do not construct visual or social barriers through the community and that minimize residential or commercial disruptions or relocations. The build alternatives result in transportation mobility benefits within the Study Area by producing travel time savings for both transit and auto users, by reducing roadway congestion, and by improving or maintaining transit access to Downtown employment centers. New transportation infrastructure also could enhance neighborhood revitalization and encourage sustainable development in the Study Area.

Traffic and Parking

Local Traffic Circulation

The TSM Alternative is specifically oriented to low-cost improvements that benefit Study Area travel. Improvements under this alternative would include access management, spot median improvements, and Intelligent Transportation Systems (ITS) improvements, which would benefit both traffic circulation and safety by reducing the number of conflicting turning movements and by incorporating spot median improvements.

Roadway improvements (Alternatives 5 and 6) would have a positive impact on circulation. New roadways, additional lanes, and interstate capacity improvements all would benefit vehicle circulation by giving motorists improved roadway conditions.

LRT Alternatives 3 and 4 would affect local traffic circulation in the area of their alignments, much of which would be in the median of existing streets. The median operation calls for the removal of the center turn lane except in vicinity of major intersections. Alternatives 3 and 4 would have a moderate impact on circulation in the vicinity of transit stations, particularly those that are near major roadway intersections.

Intersection Approach Volumes

In general, Alternative 4 would result in the greatest decrease in forecast No Build Study Area approach volumes. This is partially a result of the alternative's use of light rail to ease congestion on Natural Bridge Road, West Florissant Avenue, and the Downtown loop.

Roadway Alternatives 5 and 6 would result in the lowest amount of volume reductions to the existing conditions on Northside roadways. This is attributed partially to redistribution of traffic volumes to the improved arterials. In some instances of reduced volume, however, the change is very minor or negligible.

Goods Movement

The movement of goods, particularly by roadway transport, would benefit from the implementation of any of the build alternatives to the same degree general traffic is affected. In addition, Roadway Alternative 6 would improve truck access between I-270 and industrial and commercial uses along the Mississippi River by making improvements to Riverview Drive, Hall Street and Grand Boulevard.

Parking

The potential impacts of the build alternatives on parking vary widely in the Northside Study Area. On-street or metered parking is prevalent where LRT lines are proposed in the Downtown area; however, the majority of the roadway alternatives would not affect existing parking.

LRT Alternative 3 would take the greatest number of parking spaces, mostly along Natural Bridge Road. LRT Alternative 4 takes a similar amount of metered parking spaces but reduction of on-street parking spaces is less due to the alignment splitting off and joining the existing MetroLink lines and not traveling down Riverview Boulevard as in Alternative 3.

Northside parking is not significantly impacted by either roadway alternative (Alternatives 5 and 6). It is anticipated that no parking spaces – metered or on-street – would be removed for either roadway alternative.

Traffic Accident Locations

A number of high accident roadway segments would experience a decrease in daily traffic volumes as a result of the build alternatives, which will tend to reduce the accident rate for those segments.

Bicycle/Pedestrian

Opportunities for additional pedestrian and bicycle facilities were provided with the inclusion of sidewalks or bikeways in the roadway alternatives, and in some instances, a bike lane on the outside of the roadway travel lanes.

Natural Resources

Wetland Resources

LRT Alternative 4 would result in impacts to approximately 3.2 acres of wetlands. Roadway Alternative 5 would result in minor impacts totaling approximately 3.3 acres of wetlands. Some minor floodplain encroachments are anticipated to occur with Alternatives 3, 4, 5 and 6.

No impacts to threatened or endangered species are anticipated.

LRT Alternative 3 would have an impact on one woodland location near the northern terminus of its alignment. LRT Alternative 4 would have an impact on approximately six woodland locations along the length of the alignment. No significant impacts to wildlife are anticipated with the implementation of either of these alternatives. Localized removal of trees also would be required at several locations along the each of the alignments.

Air Quality

The proposed alternatives are expected to change travel patterns in the region and alter traffic conditions along major arterial and freeway corridors, resulting in changes in daily emissions generated by automobiles and buses. In summary, the proposed alternatives are expected to reduce the amount of pollutants generated by:

- Providing a mass transit option to commuters who currently drive; and
- Reducing the number of vehicles at many of the heavily congested locations along the corridor during peak travel periods.

Noise

Estimated noise levels resulting from light rail transit (Alternatives 3 and 4) would range from 72 dBA to 95 dBA at 15 meters (50 feet) depending whether the tracks are elevated, at grade or below grade. Vehicle traffic would result in levels ranging from 70 dBA to 100 dBA depending on the vehicle type, volume and speed of traffic. Many of the build alternatives extend along existing transportation corridors or are located in developed industrial areas; therefore, increases to existing noise levels are anticipated to be minimal.

Roadway Alternatives 5 and 6 were evaluated to determine if they would bring highway facilities closer to residences, significantly increasing noise levels. At most locations, the difference between the existing roadway and modified alignment would result in minimal increases in noise levels.

Visual Quality

The No Build and TSM Alternatives would not have any negative impact on the visual quality or views in the Study Area. These alternatives would add features that are at a similar scale to the existing roadway and transit infrastructure.

Alternatives 3 and 4, the LRT alternatives, would introduce new elements into the visual environment. The LRT introduces at-grade vehicles and track as well as the supporting overhead wires and poles of the catenary system. In some areas, the original streetscape had overhead wiring, however, the reintroduction of the overhead wiring may be perceived as a negative change. The degree to which the overhead wiring is noticeable is often a function of the degree of visual distraction by other elements. In areas where there is denser development and a variety of other overhead features such as poles, wiring or signage already exists; the catenary may be less noticeable.

Alternatives 5 and 6, the roadway alternatives, would introduce new features. In most cases, the urban boulevard concept would introduce new visual improvements that enhance the view of the corridor as well as improve traffic flow. Improvements to Riverview Drive also would improve and enhance the visual environment along the riverfront.

Historic and Cultural Resources

There are no historic structures, historic districts or identified archaeological sites associated with the No Build or Roadway Alternatives 5 and 6. LRT Alternatives 3 and 4 are located adjacent to or in 5 National Register of Historic Places (NRHP) historic districts, one local inventory historic district, 13 NRHP properties and one local inventory property. The implementation of Alternative 3 could result in visual impacts to these properties.

Parklands

This environmental screening found that there are no significant parkland impacts anticipated for any of the alternatives under consideration in the Northside corridor. Roadway Alternative 6 would be aligned on Riverview Drive adjacent to North Riverfront Park and could require acquisition of minor amounts of the park in conjunction with improvement of these roadways.

Hazardous Materials

There is a potential for encountering hazardous materials or contaminated soil and groundwater during excavation in industrialized areas or along railroad rights-of-way. The extent of potential impacts for each proposed alternative would vary depending on several factors, including the identification of a release on the property, the nature and extent of such a release, the proximity of the potential source to each alternative, property acquisition requirements, the specific groundwater flow direction and depth, and the nature of project design and construction activities planned for a given area.

Transit-Oriented Development

The future performance of light rail facilities, and transportation systems as a whole, is influenced by a number of factors relating to land use. Likewise, in combination with appropriate policy initiatives, transit systems and station areas can act as catalysts for transit-oriented development and/or redevelopment that enables neighborhood revitalization in a sustainable manner.

While it is impossible to predict precisely where new land development will occur or in what manner, the extent of vacant and underutilized lands still represent important indicators. Once wetlands and floodplains have been accounted for, remaining vacant lands are likely to be the focus of new development.

In the Northside Study Area, both LRT alternatives present opportunities for TOD in the locations surrounding their station areas. Both alternatives share the same alignment from the downtown area of the City of St. Louis to Natural Bridge Avenue, where urban neighborhoods with high concentrations of vacant and underutilized land surround the proposed "in-street" LRT alignments along 14th Street, North Florissant Avenue, and Natural Bridge Avenue. These in-street light rail alignments would offer excellent pedestrian accessibility between new housing and development and LRT service. In addition, some of the historic fabric of multi-story mixed-use development remains from the days of the historic trolleys, which could potentially house convenient retail and services.

In general, the suburban locations that are shared by the alternatives have strong potential for TOD. Based on the background data available and visual assessment, it is anticipated that redevelopment of Northland Shopping Center is likely to occur within the planning horizon of this study. Its location, at the geographic center of the Northside Study Area and at the confluence of major roads, makes it a reasonable prospect for future high-intensity uses, which have been assumed for this analysis. Both alternatives terminate at the Florissant Valley Community College. The presence of the college and the probable redevelopment of adjacent retail suggest a strong possibility of transit-oriented uses in the future. Large parcels also appear to be available for new residential development within 0.5 miles of the station.

Viewed along their entire lengths, there is a more consistent presence of transit-oriented development opportunities along the alignment of Alternative 3 compared with Alternative 4, particularly in light of the opportunity for this alternative to serve the areas in the vicinity of the Riverview/I-70, Riverview/Lucille and Jennings stations and as a centralized corridor within the Northside Study Area.

Costs

The cost estimates assume that all the transportation improvements associated with each alternative have been constructed and are fully operational. All costs are shown in current year (2000) dollars.

Capital Costs

Table S.5-2 summarizes the total capital cost for each alternative. As expected, Alternative 2, the Transportation Systems Management (TSM) Alternative, has the lowest total capital cost at $38.1 million, as it was designed to be a multi-modal combination of relatively low cost roadway and transit service improvements. LRT Alternative 4 is estimated to be the most costly alternative, slightly over $500 million, while Roadway Alternative 5 has the lowest capital cost of the Build alternatives at $156 million.

TABLE S.5-2
SUMMARY OF TOTAL CAPITAL COSTS
(MILLIONS 2000 $'s)

ALT 2. TSM	ALT 3. LRT	ALT 4. LRT	ALT 5. Roadway	ALT 6. Roadway
$38.1	$485.5	$504.1	$156.0	$230.5

Notes: Represents estimate of project capital costs beyond what is already planned for Year 2020. Costs are rounded to the nearest tenth of a million dollars.
Source: Parsons Brinckerhoff Quade & Douglas, Inc., March 2000.

Operations and Maintenance Costs

Table S.5-3 presents the annual Operations and Maintenance (O&M) Costs for each of the alternatives. These represent the incremental O&M costs over the 2020 No Build Alternative. They are broken down into transit O&M costs and roadway O&M costs.

TABLE S.5-3
ANNUAL OPERATIONS AND MAINTENANCE COSTS BY ALTERNATIVE
(INCREASE OVER NO BUILD)
(MILLIONS 2000 $'s)

O&M Cost	ALT 2. TSM	ALT 3. LRT	ALT 4. LRT	ALT 5. Roadway	ALT 6. Roadway
Bus Transit	$8.1	$1.5	$2.7	$8.1	$8.1
LRT	-	$15.7	$16.4	-	-
Roadway	$0.7	$0.7	$0.7	0.8	$0.9
TOTAL	**$8.8**	**$17.9**	**$19.8**	**$8.9**	**$9.0**

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

As can be seen in the table, transit operating and maintenance costs are on an order of magnitude larger than roadway maintenance costs, as operations of transit services (both rail and bus) are labor intensive whereas roadway maintenance requires much less annual labor hours. LRT Alternative 4 would require about $2 million more per year to operate and maintain compared to LRT Alternative 3, due to its longer length and slightly higher feeder bus requirements. Roadway alternatives 5 and 6 are essentially identical in annual O&M costs, based upon their identical levels of bus service and almost identical levels of highway maintenance requirements.

1. 0 INTRODUCTION

This report summarizes the results of the East-West Gateway Coordinating Council's (EWGCC) Major Transportation Investment Analysis (MTIA) for the Northside Study Area. The EWGCC, in cooperation with the Missouri Department of Transportation (MoDOT) and Bi-State Development Agency (BSDA), conducted this MTIA. The MTIA is a planning process designed to provide local decision makers and the public with the information necessary to determine the locally preferred transportation investment alternative for the Study Area. The Northside study was one of three MTIAs that the EWGCC carried out concurrently.

A MTIA follows a logical order of technical analysis and complementary public engagement activities to develop and assess major transportation investment alternatives in the Study Area. Figure 1.0-1 illustrates these steps and their interaction. In summary, this process included the collection of existing and future conditions which, in turn, were used to formulate the Purpose and Need and Goals and Objectives for the Study Area. These documents formed the framework for developing and comparing the initial set of alternatives. Coupled with other evaluation criteria, which included items such as magnitude of cost and impacts, a reasonable set of alternatives was derived. These alternatives were deemed to meet the needs and goals previously determined for the Study Area, as well as appear to be competitive when compared to the other alternatives. For comparison, these alternatives included No Build and TSM Alternatives. To eventually arrive at a locally preferred alternative (LPA), a detailed analysis of the reasonable set of alternatives was conducted. This process included conceptual design and costing and travel forecasting, among other analyses.

The Northside Study Area (Figure 1.0-2) was originally defined in the St. Louis Systems Analysis for Major Transit Capital Investments (amended June 1991). The need to conduct a MTIA and to consider alternative investment strategies was first identified in the subsequent Long Range Transportation Plan for the St. Louis metropolitan area, Transportation Redefined. Transportation Redefined identifies this Study Area as having priority for implementation of transportation improvements in the mid-term.

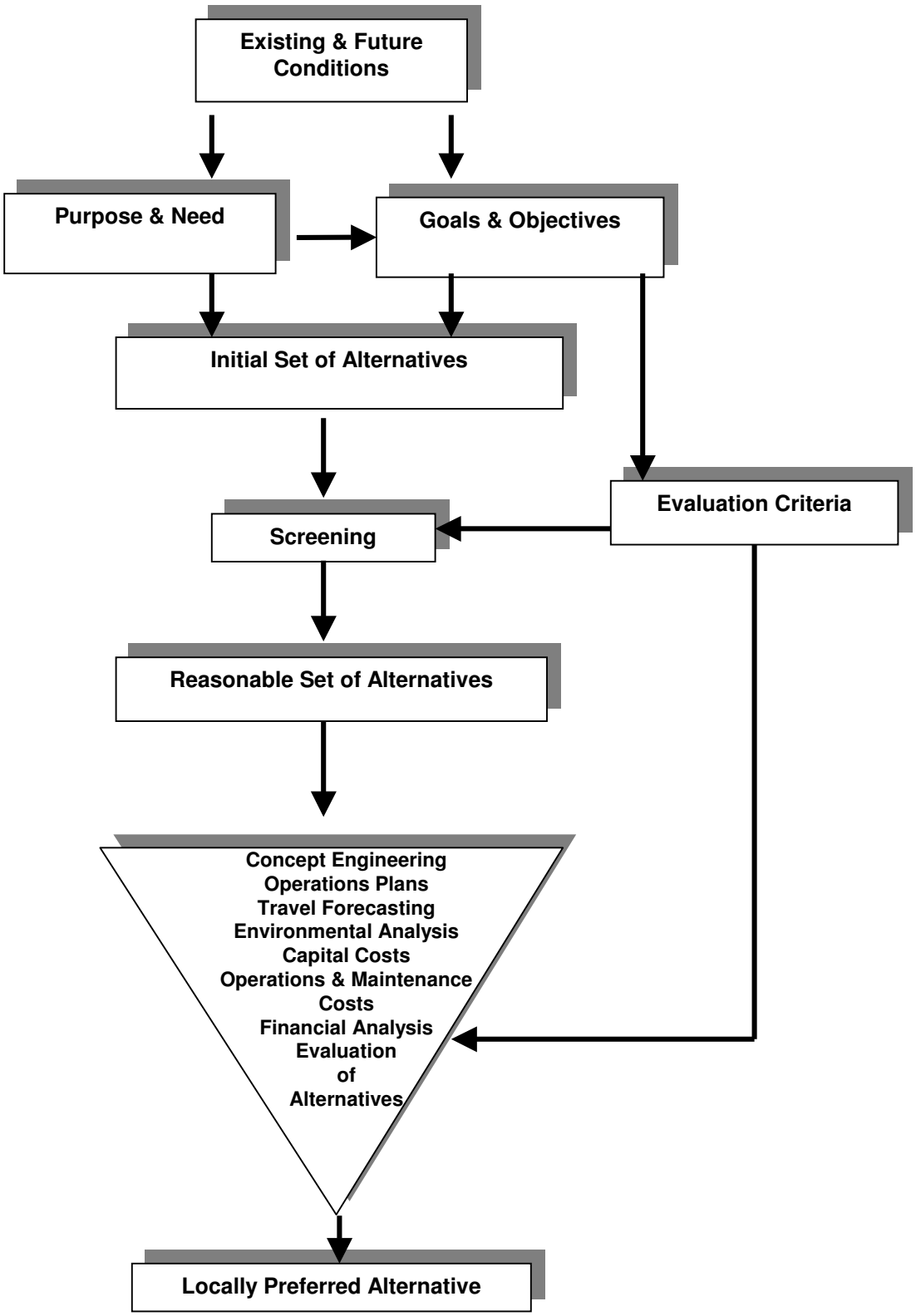
EWGCC has responsibility to carry out a regional transportation planning process for the St. Louis metropolitan area. The process has six major integrated components:

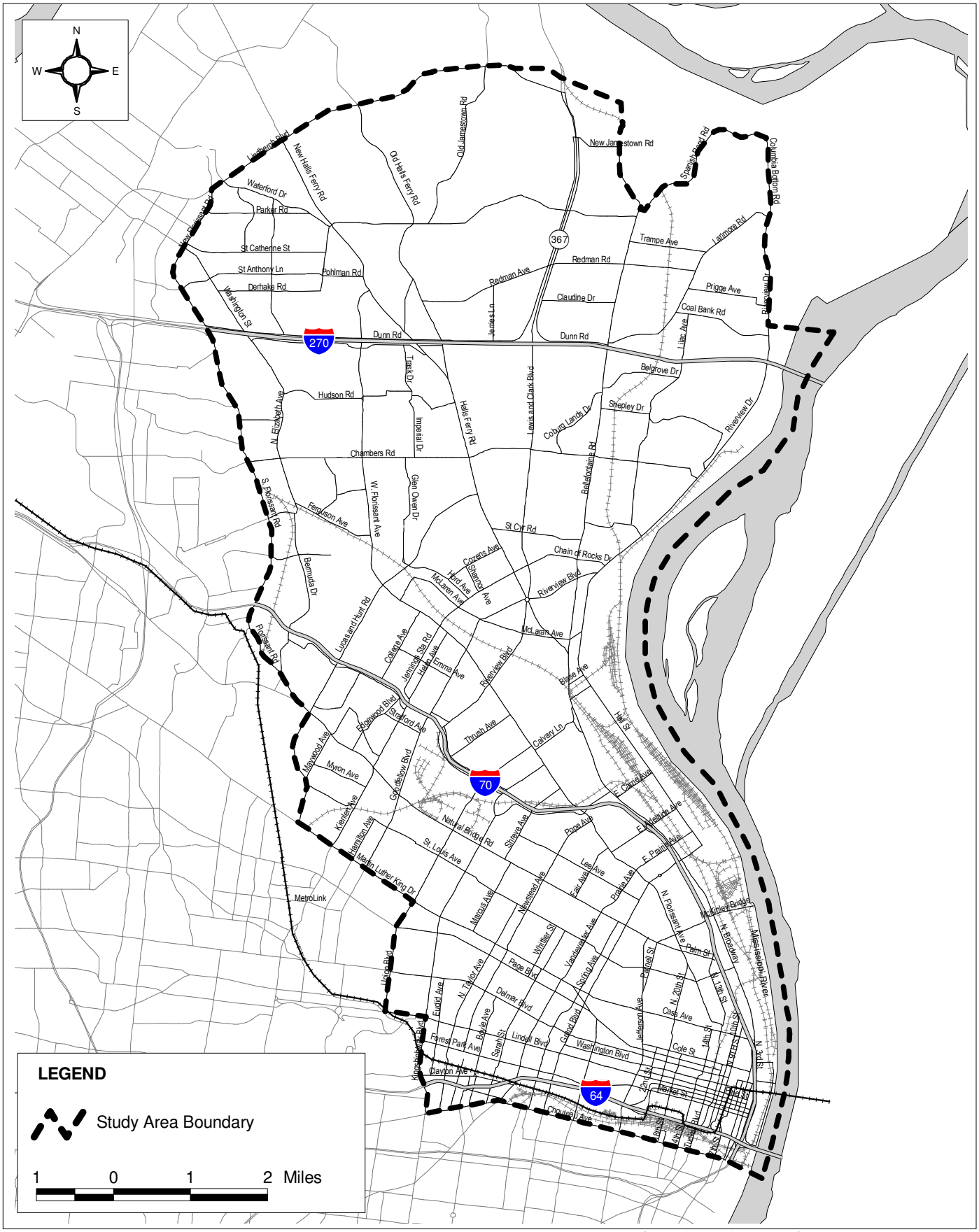
- Regional Transportation Plan
- Transportation Project Planning
- Regional Project Selection
- Project Implementation
- Project Monitoring and Evaluation
- Community Engagement

The current Regional Transportation Plan, Transportation Redefined II, identifies a set of transportation-related goals and objectives and the policies, services, and facilities needed to meet them over the next 20 years. The plan is fiscally constrained, and sets forth a funding strategy to show where the funds will come from to implement needed transportation improvements while continuing to operate and maintain the existing system. Projects identified in the plan can be selected for advancement and implementation using Federal funds.

At the conclusion of the MTIA process, the EWGCC Board of Directors in May 2000 adopted a Locally Preferred Alternative (LPA) for the Northside Study Area for provisional inclusion into the region's long-range transportation plan. It also will adopt a financing strategy for the project(s). When the agencies determine that the project(s) is ready to move forward from a financial perspective, the next step is to complete the required federal environmental documentation including the National Environmental Policy Act (NEPA) process for the LPA. These documents will present, in detail, the physical and operational characteristics of the LPA, and its associated environmental and community impacts and benefits. In concert with these documents, additional preliminary engineering will be performed to refine the designs and associated cost estimates developed conceptually in the MTIA. Once the sponsoring federal agency [either Federal Highway Administration (FHWA) or Federal Transit Administration (FTA)] has accepted the

FIGURE 1.0-1
MTIA PROCESS





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

Figure 1.0-2

Northside Study Area
Major Transportation Investment Analysis

Northside Study Area

completed environmental documentation, the project can move into final engineering design, acquisition of right-of-way as required by the project, and ultimately construction and implementation of operations.

This report presents the technical findings for the Northside Study Area MTIA and complementary community engagement activities. Section 2.0 of this report describes the Purpose and Need and Goals and Objectives. Section 3.0 details the initial set of alternatives. Section 4.0 discusses the screening process and final set of alternatives, while Section 5.0 describes the evaluation of those alternatives.

2.O PURPOSE AND NEED

A component of a Major Transportation Investment Analysis (MTIA) (see Figure 1.0-1) is the identification of the purpose and need for surface transportation improvements. The first step in this process was the compilation of information about the Study Area and the metropolitan region. This was done through both the community engagement process and the technical analysis. The community engagement process included open houses, focus groups, community forums, small group meetings, and individual interviews. Available technical data on demographics and the surface transportation system was obtained and summarized in the Northside Study Area Existing and Future Conditions Report (May 1999).

This information led to the identification of the transportation problems and needs within the Study Area. These issues were presented in the Northside Study Area Purpose and Need Statement (July 1999). More specific goals and objectives were identified and used in the development and evaluation of potential multi-modal transportation alternatives.

These alternatives were evaluated in their effectiveness in addressing the purpose and need identified and with respect to a detailed set of evaluation criteria. This process followed the framework identified in Transportation Redefined (1995) and Transportation Redefined II (1999) adopted by the East-West Gateway Coordinating Council's Board of Directors.

2.1 PURPOSE AND NEED STATEMENT

Based on the identified need in the Study Area, the following purposes were identified for the study.

Access to Opportunity: Improve access for travel within the Northside Study Area as well as travel to other areas within the region. Opportunity includes, but is not limited to, jobs, medical care, shopping, and education. It means getting to opportunities in a reasonable amount of time.

Safety: Use transportation improvements on roadways to reduce the existing accident rate. Also direct transportation improvements to enhance neighborhood vitality, thereby improving personal safety.

Neighborhood Revitalization/Sustainable Development: Use new transportation infrastructure to maintain and/or enhance quality of life in neighborhoods, with a focus on areas of declining population and employment.

Connectivity of the Transportation System: Build on the existing transportation system by seeking opportunities to improve connections between roadways and/or transit in the existing system.

2.2 GOALS AND OBJECTIVES

Using the Purpose and Need Statement as a foundation, more specific goals and objectives were defined. These formed the foundation for the evaluation of alternatives.

Goal: Improve access to opportunities for Northside Study Area residents and businesses.

Objectives:

- Reduce total travel time by transit to neighborhood, Study Area and regional opportunities, including jobs, medical care, shopping, and education.
- Reduce travel times for the northern portion of the Study Area to downtown St. Louis

Goal: Improve the safety of the transportation system in the Northside Study Area.

Objectives:

- Reduce the existing accident rate on Study Area roadways through physical and operational improvements.

Goal: Maintain and/or enhance Northside Study Area neighborhoods.

Objectives:

- Invest in new transportation services and infrastructure that contribute to maintaining and/or enhancing quality of life and personal safety in stagnating or declining neighborhoods.
- Integrate transportation infrastructure investments and land development in ways that are economically sustainable and consistent with community values and historic preservation.

Goal: Improve the movements of goods/freight within and through the Northside Study Area.

Objectives:

- Improve the travel of truck traffic within and through the Study Area by reducing conflicts between trucks and autos.

3.0 INITIAL SET OF ALTERNATIVES

3.1 RATIONALE FOR DEVELOPMENT OF FULL RANGE OF ALTERNATIVES

In developing transportation alternatives for the Northside Study Area, input from several sources was considered. Previous studies, such as the St. Louis Systems Analysis for Major Transit Capital Investments (1991), Cross-County Corridor Major Transportation Investment Analysis (1997), and Transit Center Hub Restructuring Study (Bi-State Development Agency, 1998), which analyzed and proposed transportation improvements in the Northside Study Area, were reviewed. Technical information on travel patterns, future growth, and transportation system performance provided in the Northside Study Area Existing and Future Conditions Report (May 1999) as well as conclusions from the Northside Study Area Purpose and Need Statement (September 1999) also were used. In addition, public comments and suggestions, as documented in the Community Engagement Baseline Analysis (December 1998), "Focus Group Notes" (February 1999), and "Community Forum Notes" (April 1999), were examined and incorporated into the baseline analysis for alternatives development. The development and screening of alternatives is further detailed in the Northside Study Area Alternatives Development and Screening Report (December 1999).

From the information collected and analyzed through this process, a range of preliminary alternatives were developed by sponsoring agencies and consultant staff for the Northside Study Area. These alternatives represented potential transportation solutions to the problems and related issues noted in the Study Area. The planning horizon year for the Northside MTIA was the Year 2020. For consistency with federal planning practices and requirements, the following guidelines were applied during alternatives development:

- Alternatives are conceptual in scope.
- Alternatives should respond to the specific needs and opportunities of the Study Area.
- Alternatives should be multi-modal, including all alignments and options that had a reasonable chance of becoming the LPA.
- Each alternative should be significantly different from the other alternatives. The preliminary alternatives are structured to address different aspects of the MTIA Study Goals and Objectives.
- Alternatives should encompass an appropriate range of options, without major gaps in the likely costs of alternatives.
- The number of alternatives must be manageable.
- The preliminary alternatives must include both the No Build (Year 2020 Future Baseline Condition) and the Transportation Systems Management (TSM) Alternatives.

The preliminary alternatives were then discussed with representatives from local jurisdictions, community leaders, and members of the public over a period of several weeks through a series of workshops, open houses, and briefings. During this phase of the MTIA study process, the planning effort was geared towards adding new solutions and on broadening the range of alternatives. Study participants were asked to consider the purpose and need for transportation improvements within the Northside Study Area and make suggestions on what alternatives they would add to the list. Changes to the preliminary alternatives also were discussed and examined. These activities resulted in the Initial Set of Alternatives, which numbered thirteen alternatives for the Northside Study Area.

The Initial Set of Alternatives includes both capital improvements and operational strategies and emphasizes different transportation modes and potential alignments. The Initial Set of Alternatives was established to provide the full range of options so that their respective trade-offs in terms of costs, transportation benefits, and impacts could be understood during the Screening Phase (see Figure 1.0-1) of this MTIA and in subsequent evaluations.

Several factors led to the consideration of specific transportation improvements in the Northside Study Area. Most of these factors related directly to the purpose and need for improvements in the Study Area. Others emanated from the need to take into account the full regional transportation system as well as regional goals and objectives. And yet other considerations arose from discussions with members of the public and representatives of different interests within the Study Area.

3.2 DESCRIPTION OF INITIAL SET OF ALTERNATIVES

The following section provides a summary description of the Initial Set of Alternatives developed for the Northside Study Area. This reflects the broadest range of alternatives considered in the Northside MTIA as a result of both technical study and public input.

3.2.1 No Build (Baseline) Alternative

The No Build Alternative was a compilation of planned and committed transportation improvements that the study assumes to be in place by the year 2020, the planning horizon year for the study. This alternative represented the future year transportation condition if no further action is taken in the Study Area beyond what is already planned. The No Build Alternative is required by federal planning guidelines to provide a baseline with which to compare the effectiveness of the build alternatives.

3.2.2 Transportation System Management (TSM) Alternative

The TSM Alternative consisted of an integrated package of relatively low cost and operational transportation projects for the Northside Study Area, such as added bus service and traffic signal coordination. These improvements were structured to derive additional benefit from the existing transportation infrastructure in lieu of a major capital investment. As with the No Build Alternative, the TSM Alternative is a requirement of the federal planning guidelines as it provides a basis of comparison for the major investment alternatives.

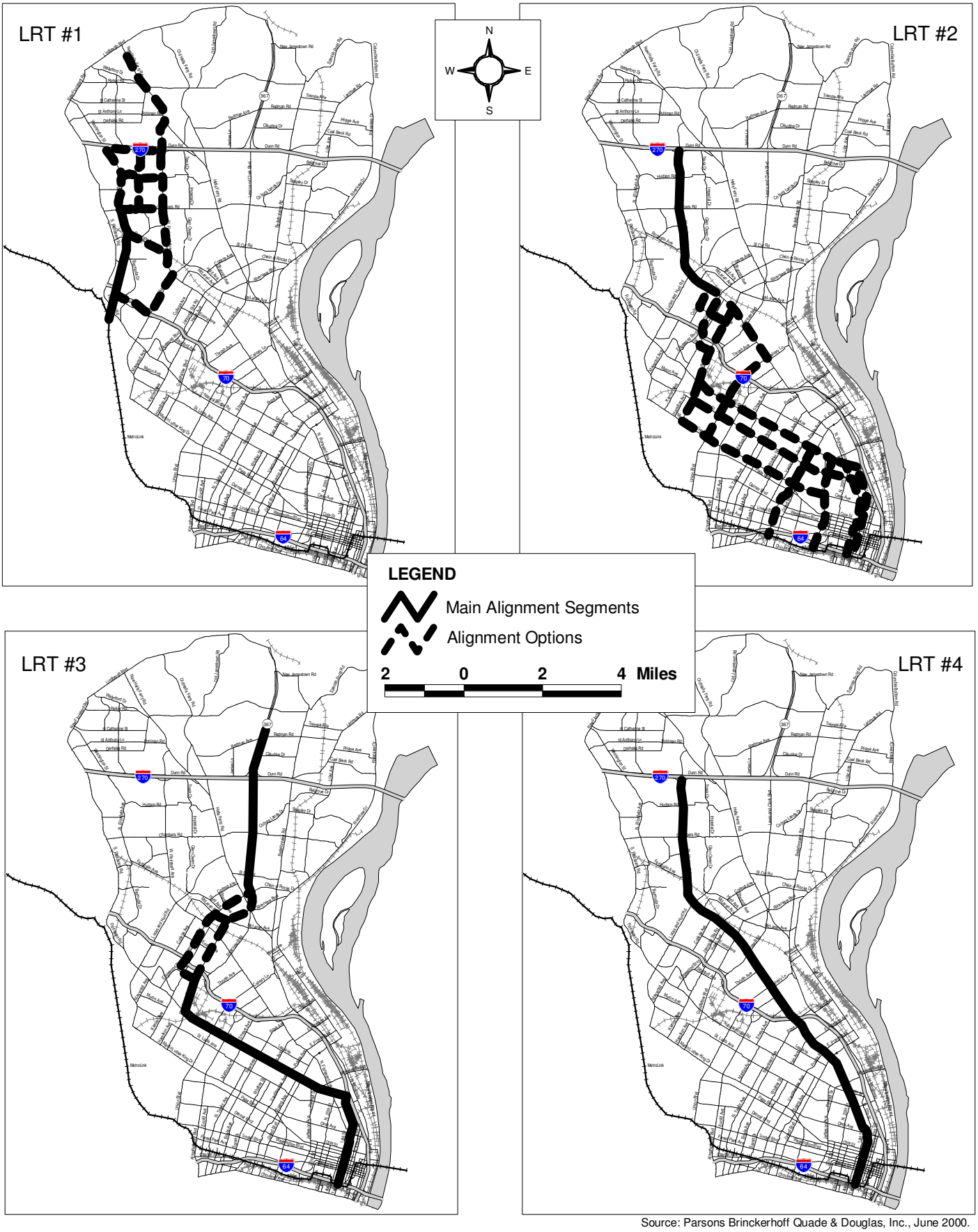
3.2.3 Light Rail Transit (LRT) Alternatives

All Light Rail Transit (LRT) options would include construction of a light rail transit facility (MetroLink) along one of the following alignment options either at-grade or elevated, or a combination of both. The LRT lines would include stations spaced approximately one-half to one mile apart at locations near employment and activity centers along the alignment, with the exact locations to be determined in later phases of the planning process. Park and ride lots would be included at several stations, convenient to major roadways and/or interstates. Bus feeder and circulator services also would be provided to provide connections between stations and major destination points not within walking distance (generally greater than one-half mile). Trains would operate approximately every 7 to 10 minutes during peak periods and every 15 to 20 minutes during off-peak periods, depending on future demand and ridership (see Figures 3.2-1 and 3.2-2)

LRT Option 1

This facility would connect existing MetroLink line to I-270 and Florissant Valley Community College along the following alignment:

- From the existing MetroLink line just north of Natural Bridge Road north along the Norfolk Southern Railroad to Chambers Road;
- From Chambers Road either north to Florissant Valley Community College or east along Chambers Road to West Florissant Avenue;
- From Chambers Road north along West Florissant Avenue to I-270;
- Along I-270 (in existing right-of-way) west to Florissant Valley Community College.
- Approximate length - 6 miles

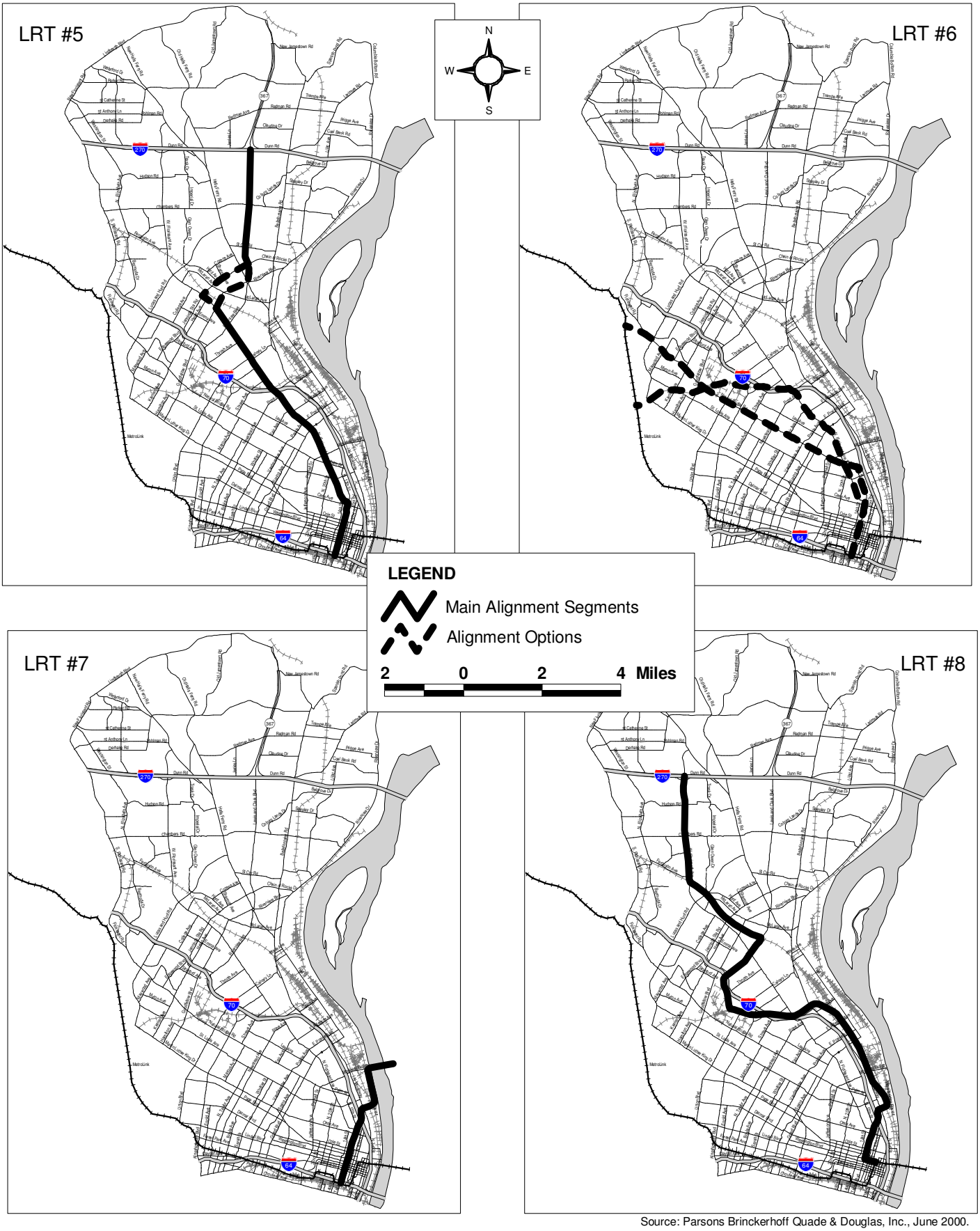


Source: Parsons Brinckerhoff Quade & Douglas, Inc., June 2000.

Figure 3.2-1

Northside Study Area
Major Transportation Investment Analysis

Initial Set of Alternatives



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

Figure 3.2-2

Initial Set of Alternatives

Northside Study Area
Major Transportation Investment Analysis

LRT Option 2

This facility would connect the existing MetroLink line with a location near the interchange of West Florissant Avenue and I-270 along the following alignment:

- From the existing MetroLink line north along either Jefferson Avenue or Tucker Boulevard to St. Louis Avenue;
- From St. Louis Avenue near Jefferson Avenue northwest to the intersection of St. Louis Avenue and Goodfellow Boulevard;
- From St. Louis Avenue along Goodfellow Boulevard north to either I-70 or West Florissant Avenue;
- From West Florissant Avenue north to I-270.
- Approximate length – 13 miles

LRT Option 3

This alignment would connect the existing MetroLink line with a location near the interchange of Route 367 and Redman Avenue along the following alignment:

- From the existing MetroLink line north along either Jefferson Avenue or Tucker Boulevard to St. Louis Avenue;
- From St. Louis Avenue near Jefferson Avenue northwest to the intersection of St. Louis Avenue and Goodfellow Boulevard;
- From St. Louis Avenue north along Goodfellow Boulevard to the traffic circle intersection of Riverview Boulevard and Goodfellow Boulevard;
- From the traffic circle north along Lewis and Clark Boulevard (Route 367) to the interchange of Route 367 and Redman Road.
- Approximate length – 14 miles

LRT Option 4

This alignment would connect the existing MetroLink line with a point near the interchange of WEST Florissant Avenue and I-270 along the following alignment:

- From the existing MetroLink line north along either Jefferson Avenue or Tucker Boulevard to North Florissant Avenue;
- From North Florissant Avenue at Salisbury Street along North Florissant Avenue and West Florissant Avenue to I-270.
- Approximate length – 12 miles

LRT Option 5

This facility would connect the existing MetroLink line with a point near the interchange of Route 367 and Redman Avenue along the following alignment:

- From the existing MetroLink line north along either Jefferson Avenue or Tucker Boulevard to North Florissant Avenue;
- From North Florissant Avenue at Salisbury Street along North Florissant Avenue and West Florissant Avenue to Goodfellow Boulevard;
- From West Florissant Avenue along Goodfellow Boulevard north to the traffic circle intersection of Goodfellow Boulevard and Riverview Boulevard;

- From the traffic circle north along Lewis and Clark Boulevard (Route 367) to the interchange of Route 367 and Redman Road.
- Approximate length – 13 miles

LRT Option 6

This alignment would connect the existing MetroLink line near the City of St. Louis central business district with the existing MetroLink line north of Page Avenue and then west St. Louis County along the following alignment:

- From the existing MetroLink line north along either Jefferson Avenue or Tucker Boulevard to North Florissant Avenue;
- From North Florissant Avenue at Salisbury Street along North Florissant Avenue to the intersection of the Terminal Railroad branch and North Florissant Avenue;
- From North Florissant Avenue along the Terminal Railroad west to the existing MetroLink line north of Page Avenue;
- From the existing MetroLink line west along the Rock Island Railroad to a point to be determined in later planning.
- Approximate length – 9 miles plus westward extension

LRT Option 7

This facility would connect the existing MetroLink line near the City of St. Louis central business district with destinations in Madison County along the following alignment:

- From the existing MetroLink line north along BSDA Railroad alignment to the Mississippi River rail crossing into Madison County near the McKinley Bridge;
- From the rail crossing into Madison County to a location in Madison County to be determined in later planning.
- Approximate length – 4 miles plus Madison County extension

LRT Option 8

This alignment would connect the existing MetroLink line with a location near the interchange of Route 367 and Redman Avenue and the existing MetroLink line north of Page Avenue and then west St. Louis County along the following alignment:

- From the existing MetroLink line north along either Jefferson Avenue or Tucker Boulevard to North Florissant Avenue;
- From North Florissant Avenue at Salisbury Street along North Florissant Avenue and West Florissant Avenue to Goodfellow Boulevard;
- From West Florissant Avenue along Goodfellow Boulevard north to the traffic circle intersection of Goodfellow Boulevard and Riverview Boulevard;
- From the traffic circle north along Lewis and Clark Boulevard (Route 367) to the interchange of Route 367 and Redman Road.
- Provide a spur from the intersection of North Florissant Avenue and the Terminal Railroad line west along the Terminal Railroad to the existing MetroLink line north of Page Avenue and to points west of the existing MetroLink line to a location to be determined in later planning.
- Approximate length – 17 miles plus westward extension

Bus Rapid Transit Alternative 9

The bus rapid transit (BRT) option would include construction of an at-grade Bus Rapid Transit facility that would provide transit line haul bus service on a dedicated (bus-only) thoroughfare. The facility would include stations spaced approximately one mile apart at locations near employment and activity centers along the alignment, with the exact locations to be determined in later phases of the planning process.

Park and ride lots would be included at several stations, convenient to major roadways and/or interstates. Bus feeder and circulator services also would be provided to provide connections between stations and major destination points not within walking distance (generally greater than one-half mile), or buses could circulate through neighborhoods and then enter bus facility for rest of route. Buses would operate at frequent intervals, every 7 to 10 minutes during peak periods and every 15 to 20 minutes during off-peak periods, depending on future demand and ridership (see Figure 3.2-3).

The bus facility would connect the existing MetroLink line near the City of St. Louis central business district with the existing MetroLink line north of Page Avenue and then west St. Louis County along the following alignment:

- From the existing MetroLink line north along either Jefferson Avenue or Tucker Boulevard to North Florissant Avenue;
- From North Florissant Avenue at Salisbury Street along North Florissant Avenue to the intersection of the Terminal Railroad branch and North Florissant Avenue;
- From North Florissant Avenue along the Terminal Railroad west to the existing MetroLink line north of Page Avenue;
- From the existing MetroLink line west along the Rock Island Railroad to a location to be determined in later planning.
- Approximate length – 9 miles plus westward extension

3.2.4 Roadway Alternatives

The following combinations of roadway improvements/segments (see Figure 3.2-3) were considered for screening.

Roadway Option 10

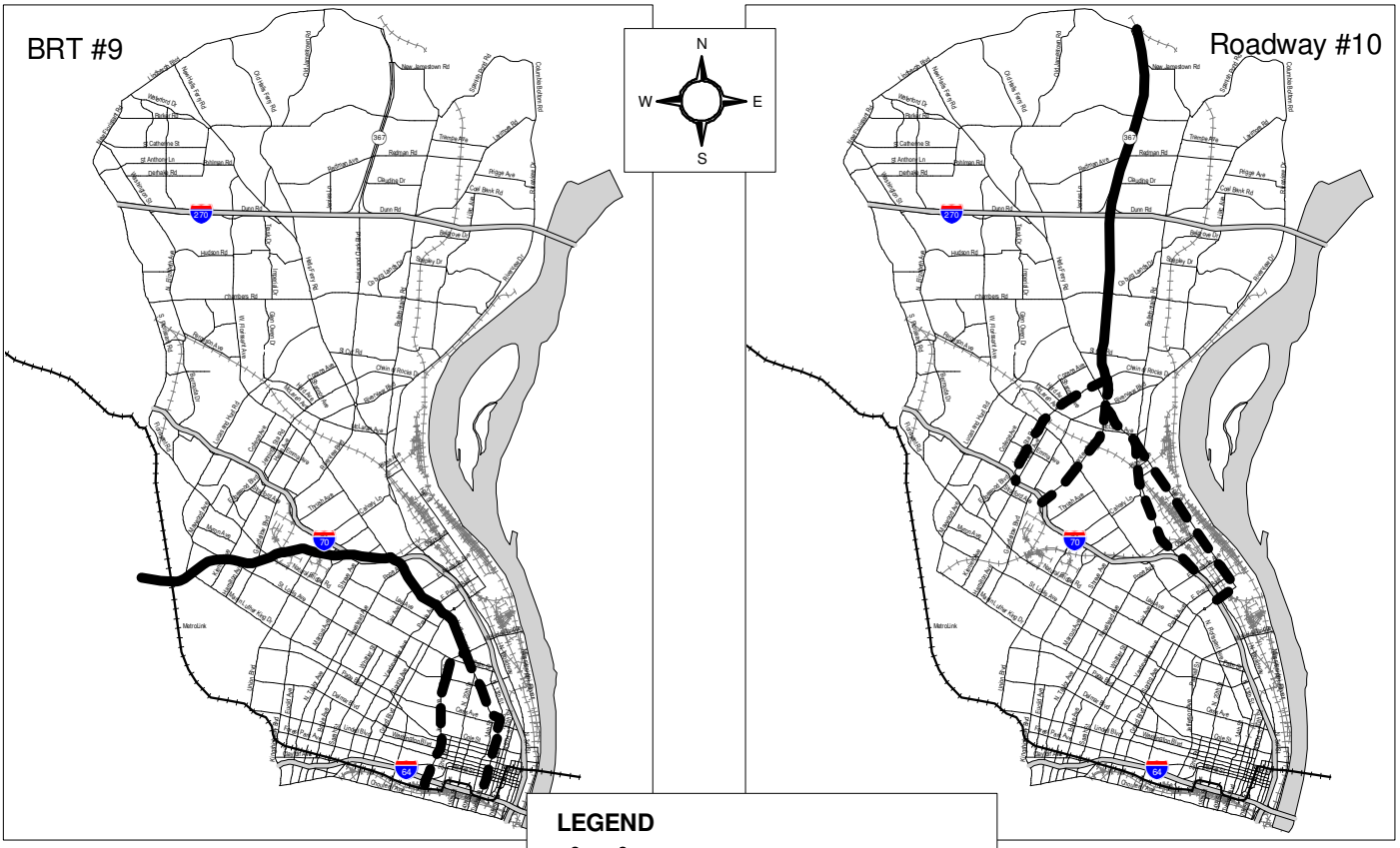
Roadway Option 10 would provide capacity improvements and intersection upgrades to the following segments of roadway:

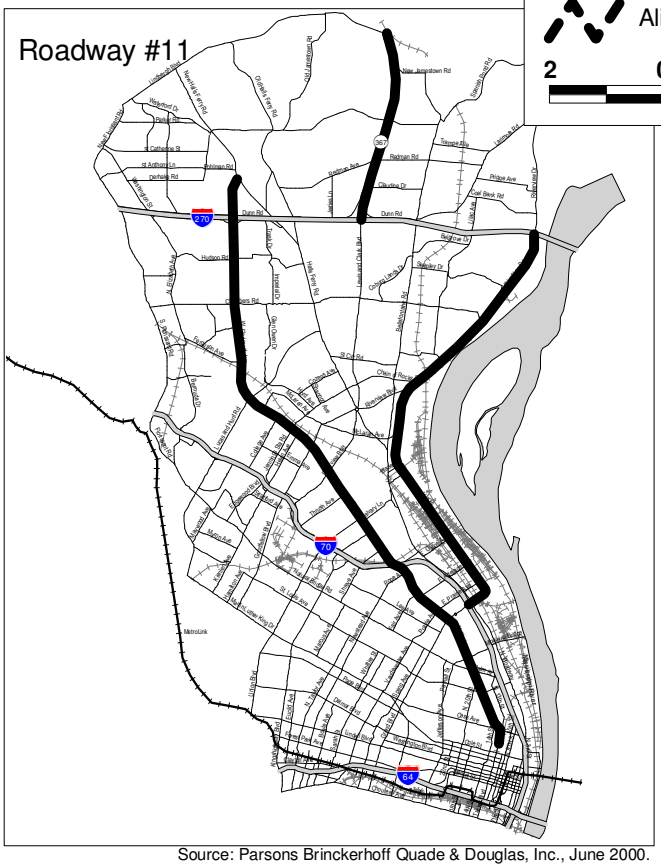
- West Florissant Avenue from New Halls Ferry Road to I-70
- North Florissant Avenue from I-70 to Washington Boulevard
- Riverview Boulevard from I-270 to Hall Street
- Hall Street from Riverview Boulevard to East Grand Avenue
- East Grand Avenue from Hall Street to I-70
- Route 367 from Lindbergh Boulevard to I-270

Roadway Option 11

Roadway Option 11 would provide significant capacity improvements and intersection upgrades to the following segment of roadway:

- Route 367 from Lindbergh Boulevard to I-270; upgrade to 4-lane freeway
- Route 367 from I-270 to Riverview Boulevard and I-270; upgrade to 4-lane parkway
- Riverview Boulevard at I-70; upgrade interchange





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

Figure 3.2-3

Northside Study Area
Major Transportation Investment Analysis

Initial Set of Alternatives

4.0 SCREENING PROCESS AND FINAL SET OF ALTERNATIVES

4.1 METHOD OF SCREENING

During alternatives screening, the Initial Set of Alternatives (refer to Section 3.2) underwent a preliminary evaluation. The purpose of the preliminary evaluation was to identify those alternatives that were most competitive in addressing the Purpose and Need and Goals and Objectives in the Study Area and that should, therefore, be carried forward for further study and evaluation in the MTIA. Alternatives that were determined to have little or no chance of becoming the LPA were screened out during this process.

An array of screening criteria was developed to gauge the performance of the alternatives in light of the Study Goals and Objectives described in Section 2.2. Both qualitative and quantitative measures were used to elicit comparative information on the different transportation modes and improvements that comprised the Initial Set of Alternatives. The screening criteria and related measures used in the Northside MTIA to narrow the range of alternatives are listed as follows:

Ability to serve major travel markets within the Northside Study Area
Accessibility to concentrations of population and employment
- population within one-half mile
- employment within one-half mile

Accessibility to people without cars
- zero-car households within one-half mile

Relative ease of transportation system connectivity
Potential to foster sustainable economic development opportunities
- Potential for large infill and redevelopment
- revitalization opportunity sites/incremental fill opportunity (concentrations of smaller parcels)

Right-of-Way impacts
- relative neighborhood disruption due to property takes and other indirect effects
- additional right-of-way requirements/property takes

Physical feasibility
- probability of grades in excess of 6 percent for in-street light rail

Capital Costs
- estimated capital cost
- per mile cost

The screening evaluation focused on the build alternatives, as both the No Build and TSM Alternatives are required to be included in the detailed MTIA evaluation as part of the federal planning process. The technical screening evaluation led to a preliminary round of recommendations on what alternatives should be carried forward for detailed study. The process is documented in detail in the Northside Study Area Evaluation Methodology Report (December 1999) and the Northside Study Area Alternatives Development and Screening Report (December 1999).

The recommended alternatives were presented to state and federal agencies, representatives of local jurisdictions, and the general public throughout the months of June and early July 1999. At this stage, study participants were asked which of the initial alternatives they would like to see eliminated and which ones should be recommended for further study. Public and agency input on the recommended alternatives was then factored back into the screening process, which resulted in additional refinements to the recommended alternatives. In some cases, certain elements of some transportation alternatives were combined with others to form a new transportation alternative that did a better job of addressing the Purpose and Need of the Northside Study Area. In other cases, specific transportation improvements associated with some alternatives were eliminated due to technical factors or because of public concerns.

The recommended alternatives for the Northside Study Area were reviewed and approved for further technical analysis and conceptual engineering by the East-West Gateway Coordinating Council Board of Directors on July 28, 1999.

4.2 RATIONALE FOR SELECTION OF RECOMMENDED SET OF ALTERNATIVES

In the technical screening process, the screening criteria were applied to the build alternatives included in the Initial Set of Alternatives. The objective of this task was to assess the relative performance of the alternatives based on a uniform set of measures in order to provide an "apples to apples" comparison. The technical screening analysis was structured to produce evaluative information necessary to choose among alternatives or among certain transportation elements of the alternatives rather than to predict the future benefits, costs, or impacts of any given alternative. Where possible, screening measures were selected that allowed for the comparison of different transportation modes. In some cases, the screening factors were mode specific in that they were used to distinguish among different alignments of a particular transportation mode. For example, level of improvement in roadway congestion was most applicable to the roadway alternatives, whereas significant changes in elevation (i.e., grades greater than 6 percent) directly affects the operational feasibility of in-street light rail transit and was therefore pertinent to the evaluation of the light rail alternatives.

Table 4.2-1 summarizes the findings of the technical screening process. The technical screening was somewhat complicated by the number of alignment options inherent to some of the alternatives. Screening information was developed for each potential combination. Consequently, the alternatives, including each option combination, are listed down the rows of Table 4.2-1. Screening measures are listed across the columns. The screening measures are generally clustered in categories that apply to the overall goals of the Northside MTIA: Congestion Management, Access to Opportunity and Sustainable Development. However some of the screening criteria (i.e., estimated wetlands, floodplains, or right-of-way impacts) relate directly to specific MTIA objectives such as quality of life issues and community preservation.

The screening information provided in Table 4.2-1 includes an assessment of each alternative or option (high, moderate or low) for some of the screening measures. A summary of the supporting technical data for each assessment also is provided. The assessment rating is comparative in that the alternatives are evaluated against one another rather than against a predetermined or absolute threshold. In addition, each assessment relates directly to each screening measure. For example, a "high" amount of population within walking distance of a light rail alternative would be considered a favorable rating, whereas a "high" right-of-way impact would be considered an unfavorable rating.

As a result of the screening analysis and community input, six alternatives were identified for further study in the Northside Study Area and seven were eliminated. In some cases, the best transportation elements of some of the alternatives were recombined to form the recommended set of six alternatives.

In general, alternatives that were judged to have limited redevelopment potential, have less right-of-way, not penetrate areas of greatest employment, or to have limited population were eliminated. This eliminated segments or portions of options west of 14th Street in downtown St. Louis, St. Louis Avenue, Martin Luther King Drive, a segment between Ferguson Avenue and I-270, North Elizabeth Avenue and Hudson Road. A combination of limited right-of-way, potential displacements and grade considerations also eliminated an alignment on Lucas and Hunt Road. A segment on Halls Ferry Road was eliminated in favor of Riverview Boulevard due to limited right-of-way, cost considerations, and potential for community disruption.

TABLE 4.2-1
TECHNICAL SCREENING RESULTS

OPTIONS/ SUB-OPTIONS	Length in miles	ACCESS TO OPPORTUNITY: Relative ability to serve major travel markets	Population within ½ mile of centerline of alignment of transit alternative (total population in Study Area 284,480)	Percentage population within ½ mile of centerline of alignment of transit alternative	Average per mile population within ½ mile of centerline of alignment of transit alternative	Employment within ½ mile of centerline of alignment of transit alternative (total employment in Study Area 218,133)	Percentage of employment within ½ mile of centerline of alignment of transit alternative	Per mile employment within ½ mile of centerline of alignment of transit alternative	Zero car households within ½ mile of centerline of alignment of transit alternative (total zero car households in Study Area 30,079)	Percentage of zero car households within ½ mile of centerline of alignment of transit alternative	Per mile zero car households within ½ mile of centerline of alignment of transit alternative	Relative ease of system connectivity	SUSTAINABLE DEVELOPMENT: Relative potential for redevelopment/ large infill opportunity	Relative potential for revitalization/ incremental infill opportunity	RIGHT-OF-WAY IMPACTS: Additional right-of-way requirements/ property takes	Relative neighborhood disruption due to property takes and/or restrictions to access to adjacent properties	PHYSICAL FEASIBILITY: Grades possible in excess of 6% along proposed in-street LRT rights-of-way	CAPITAL COSTS: Total order of magnitude capital cost estimates (in millions) (1999)	Per mile cost (in millions) (1999)
LRT Option 1																			
Base	2.9	NA	8,176	2.9%	2,869	2,792	3.0%	1,007	368	1.2%	129	NA	low - Northland area	low - none identified at this time	low in RR ROW, moderate balance	low in RR ROW, moderate balance	low	$90	$31.6
A segment	3.2	NA	11,735	4.1%	3,690	5,647	2.6%	1,160	357	1.2%	112	NA			moderate	moderate	high	$140	$44.0
B segment	1.8	NA	5,525	1.9%	3,157	2,423	1.1%	1,804	149	0.5%	85	NA			high	high	moderate	$100	$56.0
C segment	2.7	NA	7,403	2.6%	2,742	3,789	1.7%	1,016	265	0.9%	98	NA			high	high	moderate	$150	$55.6
D segment	3.3	NA	9,285	3.3%	2,831	5,094	2.3%	863	226	0.7%	69	NA			high	high	moderate	$190	$57.9
E segment	3.1	NA	11,507	4.0%	3,748	5,569	2.6%	1,221	237	0.8%	77	NA			moderate	moderate	moderate	$160	$52.1
A+Base	6.1	moderate-serves FLCC, west connection	19,911	7.0%	3,264	8,439	2.4%	535	725	2.4%	119	moderate-connect with MetroLink to west			low in RR ROW, moderate balance	low in RR ROW, moderate balance	high	$240	$39.3
B+Base	4.3	moderate-serves FLCC, west connection	13,701	4.8%	3,186	5,215	4.1%	741	517	1.7%	120	moderate-connect with MetroLink to west			low in RR ROW, some high	low in RR ROW, some high	moderate	$190	$44.2
C+Base	5.6	moderate-serves FLCC, west connection	15,579	5.5%	2,807	6,581	4.7%	506	633	2.1%	114	moderate-connect with MetroLink to west			low in RR ROW, moderate balance	low in RR ROW, moderate balance	moderate	$240	$43.2
D+Base	6.2	moderate-serves FLCC, west connection	17,461	6.2%	2,825	7,883	5.3%	457	594	1.9%	96	moderate-connect with MetroLink to west			low in RR ROW, some high	low in RR ROW, some high	moderate	$280	$45.3
F	4.3	moderate-serves FLCC, west connection	14,345	5.0%	3,344	10,202	4.7%	779	651	2.2%	152	moderate-connect with MetroLink to west			moderate	moderate	high	$230	$53.6
G	6.0	moderate-serves FLCC, west connection	21,520	7.6%	3,611	10,430	4.8%	606	1,223	4.1%	205	moderate-connect with MetroLink to west			high-southwest	high-southwest	high	$290	$48.7
A+Base+E	9.2	moderate-serves FLCC, west connection	31,418	9.9%	3,415	14,008	5.0%	371	962	3.6%	105	moderate-connect with MetroLink to west	low - Northland area	low - none identified at this time	low in RR ROW, moderate balance	low in RR ROW, moderate balance	high	$390	$42.4
C+Base+E	8.7	moderate-serves FLCC, west connection	27,086	9.5%	3,113	12,150	7.3%	358	870	3.3%	100	moderate-connect with MetroLink to west			low in RR ROW, high balance	low in RR ROW, high balance	moderate	$390	$44.8
G+E	9.1	moderate-serves FLCC, west connection	33,027	11.6%	3,629	15,999	7.4%	399	1,460	4.9%	160	moderate-connect with MetroLink to west			high-southwest, balance moderate	high-southwest, balance moderate	high	$440	$48.4

OPTIONS/ SUB-OPTIONS	Length in miles	ACCESS TO OPPORTUNITY: Relative ability to serve major travel markets	Population within ½ mile of centerline of alignment of transit alternative (total population in Study Area 284,480)	Percentage population within ½ mile of centerline of alignment of transit alternative	Average per mile population within ½ mile of centerline of alignment of transit alternative	Employment within ½ mile of centerline of alignment of transit alternative (total employment in Study Area 218,133)	Percentage of employment within ½ mile of centerline of alignment of transit alternative	Per mile employment within ½ mile of centerline of alignment of transit alternative	Zero car households within ½ mile of centerline of alignment of transit alternative (total zero car households in Study Area 30,079)	Percentage of zero car households within ½ mile of centerline of alignment of transit alternative	Per mile zero car households within ½ mile of centerline of alignment of transit alternative	Relative ease of system connectivity	SUSTAINABLE DEVELOPMENT: Relative potential for redevelopment/ large infill opportunity	Relative potential for revitalization/ incremental infill opportunity	RIGHT-OF-WAY IMPACTS: Additional right-of-way requirements/ property takes	Relative neighborhood disruption due to property takes and/or restrictions to access to adjacent properties	PHYSICAL FEASIBILITY: Grades possible in excess of 6% along proposed in-street LRT rights-of-way	CAPITAL COSTS: Total order of magnitude capital cost estimates (in millions) (1999)	Per mile cost (in millions) (1999)

LRT Option 2

TABLE 4.2-1
TECHNICAL SCREENING RESULTS

Base	3.8	NA	16,022	5.6%	4,250	9,794	4.5%	1,127	857	2.8%	227	NA	low - Northland area	very high - south of I-70 for entire length	moderate	moderate	high	$170	$45.1
A segment	4.2	NA	30,590	10.8%	7,283	10,066	4.6%	1,734	5,394	17.8%	1,284	NA	good - vicinity Union and Natural Bridge		moderate	moderate	moderate	$190	$45.2
B segment	4.4	NA	33,898	11.9%	7,793	9,268	4.2%	1,791	6,659	21.9%	1,531	NA			moderate	moderate	moderate	$200	$46.0
C segment	4.7	NA	33,418	11.7%	7,125	8,268	3.8%	1,519	7,100	23.4%	1,514	NA	low - A and B closer to area		moderate	moderate	low	$210	$44.8
D segment	2.7	NA	13,618	4.8%	5,120	74,196	34.0%	1,925	3,440	11.3%	1,293	NA	low - none identified at this time	high - north above Washington Avenue	high	high in north, moderate	low	$150	$56.4
E segment	2.8	NA	16,231	5.7%	5,860	63,675	29.2%	2,115	3,955	13.0%	1,428	NA			high	high in north, moderate	low	$160	$57.8
F segment	2.0	NA	8,359	2.9%	4,222	18,672	8.6%	2,132	5,154	17.0%	2,603	NA			moderate	moderate	low	$100	$50.5
G segment	2.5	NA	17,243	6.1%	6,953	12,880	5.9%	2,804	3,732	12.3%	1,505	NA			high/ moderate	high/ moderate	moderate	$140	$56.5
H segment	2.9	NA	18,973	6.7%	6,453	9,351	4.3%	2,195	1,826	6.0%	621	NA	low - none identified at this time	low - none identified at this time	high/ moderate	high	moderate	$180	$61.2
I segment	2.8	NA	17,052	6.0%	6,025	9,234	4.2%	2,129	1,524	5.0%	539	NA			high/ moderate	high	moderate	$140	$49.5
J segment	2.9	NA	20,144	7.1%	7,019	9,773	4.5%	2,446	1,771	5.8%	617	NA			moderate	high	high	$150	$52.3
K segment	4.9	NA	30,768	10.8%	6,344	9,465	4.3%	1,308	3,819	12.6%	787	NA			moderate	moderate	high	$230	$47.4
A+D+H+Base	13.6		79,203	22.3%	5,837	103,407	47.4%	430	11,517	37.9%	849	moderate-connect with MetroLink Downtown	high - at Goodfellow/ Natural Bridge	very high - south of I-70			high	$700	$51.6
B+G+I+Base	13.5	moderate-serves FLCC, Downtown	84,215	29.6%	6,238	41,176	27.9%	462	12,772	42.0%	946						high	$650	$48.1
A(part)+E+K+Base	15.6		88,021	29.1%	5,642	107,934	35.7%	362	33,631	37.4%	2,156				moderate/ high	high/moderate	high	$730	$46.8
LRT Option 3																			
Base	11.9	NA	57,708	20.3%	4,845	91,143	41.8%	407	9,072	29.9%	762	NA	high - at Goodfellow/ Natural Bridge	high - along Natural Bridge	moderate/ high	moderate/ high	high-north low-south	$540	$45.3
A segment	2.8	NA	19,990	7.0%	7,165	6,650	3.0%	2,568	1,514	5.0%	543	NA	low - none identified at this time	low - none identified at this time	moderate	high	high	$160	$57.3
B segment	3.3	NA	19,990	7.0%	6,132	6,650	3.0%	1,881	1,514	5.0%	464	NA			moderate	high	moderate	$190	$58.3
C segment	3.1	NA	19,892	7.0%	6,438	6,894	3.2%	2,083	1,501	4.9%	486	NA			moderate	high	low	$180	$58.3
A+Base	15.0		77,698	27.3%	5,180	97,793	44.8%	345	10,586	34.9%	706		high - at Goodfellow/ Natural Bridge and north of Halls Ferry Circle	high - along Natural Bridge	moderate/ high	moderate/ high	high	$700	$46.7
B+Base	15.5		77,698	27.3%	5,013	97,793	44.8%	323	10,586	34.9%	683	moderate-connect with MetroLink Downtown					high/moderate	$720	$46.5
C+Base	15.0	low-serves Downtown	77,600	27.3%	5,173	98,037	45.0%	345	10,573	34.8%	705						high/low	$710	$47.3
LRT Option 4																			
Base	11.9	moderate-serves FLCC, Downtown	59,121	20.8%	4,985	87,993	40.3%	420	8,296	27.3%	699	moderate-connect with MetroLink Downtown	low - Northland area	high - south of I-70	moderate/ high-southeast	moderate/ high-southeast	high-north, moderate-middle, low-south	$600	$50.6
LRT Option 5																			
Base	10.3	NA	53,383	18.8%	5,193	82,929	38.0%	8,067	7,918	26.1%	770	NA	high - north of Halls Ferry Circle	high - south of I-70	moderate/ high-southeast/ low-north	moderate/ high-southeast/ low-north	high-north/middle, low-south	$530	$51.6
A segment	1.5	NA	12,815	4.5%	8,321	2,675	1.2%	1,737	852	2.8%	553	NA	low - none identified at this	low - none identified at	moderate/ low	high	high	$70	$45.5
B segment	1.9	NA	13,517	4.8%	7,114	3,115	1.4%	1,639	897	3.0%	472	NA			moderate/ low	high	moderate	$90	$47.4
A+Base	11.8	low-serves	66,198	23.3%	5,610	85,604	39.2%	7,255	8,770	28.9%	743	moderate-	high - north of	high - south of I-	moderate/ high-	moderate/ high-	high	$590	$50.0
B+Base	12.2	Downtown	66,900	23.6%	5,484	86,044	39.4%	7,053	8,815	29.1%	723	connect with	Halls Ferry	70	southeast/ low-	southeast/ low-	moderate	$610	$50.0

		ACCESS TO OPPORTUNITY										SUSTAINABLE DEVELOPMENT		RIGHT-OF-WAY IMPACTS		PHYSICAL FEASIBILITY	CAPITAL COSTS	
OPTIONS/ SUB-OPTIONS	**Length in miles**	Relative ability to serve major travel markets	Population within ½ mile of centerline of alignment of transit alternative (total population in Study Area 284,480)	Percentage population within ½ mile of centerline of alignment of transit alternative	Average per mile population within ½ mile of centerline of alignment of transit alternative	Employment within ½ mile of centerline of alignment of transit alternative (total employment in Study Area 218,133)	Percentage of employment within ½ mile of centerline of alignment of transit alternative	Per mile employment within ½ mile of centerline of alignment of transit alternative	Zero car households within ½ mile of centerline of alignment of transit alternative (total zero car households in Study Area 30,079)	Percentage of zero car households within ½ mile of centerline of alignment of transit alternative	Per mile zero car households within ½ mile of centerline of alignment of transit alternative	Relative ease of system connectivity	Relative potential for redevelopment/ large infill opportunity	Relative potential for revitalization/ incremental infill opportunity	Additional right-of-way requirements/ property takes	Relative neighborhood disruption due to property takes and/or restrictions to access to adjacent properties	Grades possible in excess of 6% along proposed in-street LRT rights-of-way	Total order of magnitude capital cost estimates (in millions) (1999)	Per mile cost (in millions) (1999)
LRT Option 6																			
A	9.0	high-serves Downtown, west	45,170	15.9%	5,030	86,140	39.5%	560	7,991	26.3%	890	high-connect with MetroLink Downtown and west	low - none identified at this time	high - between Natural Bridge and Washington	moderate/ low-existing RR ROW/high-southeast	moderate/ low-existing RR ROW/high-southeast	low	$270	$30.1

TABLE 4.2-1
TECHNICAL SCREENING RESULTS

B	9.3	high-serves Downtown, west	50,067	17.9%	5,395	83,656	38.4%	581	8,672	28.5%	934	high-connect with MetroLink Downtown and West	low - none identified at this time	very high - south of I-70 for entire length	moderate/ high-southeast	moderate/ high-southeast	high-northwest, low southeast	$460	$49.6
LRT Option 7																			
Base	3.9	low-serves Downtown	9,026	3.2%	2,314	75,165	34.5%	593	2,627	8.6%	674	low-connect with MetroLink Downtown	low - none identified at this time	low - none identified at this time	moderate/ moderate	low	low	$160 but does not account for termini	$41.0
LRT Option 8																			
Base	14.7	high-serves Downtown, west	55,948	19.7%	3,806	100,631	46.1%	259	7,113	23.4%	484	high-connect with MetroLink Downtown and West	moderate - Northland area, Union 76	moderate - Goodfellow/ Natural Bridge	moderate/ low existing RR ROW	moderate	low	$600	$40.8
BRT																			
Base		high-serves Downtown, west										high-connect with MetroLink Downtown and West	high - at Goodfellow/ Natural Bridge	very high - south of I-70 for entire length	low	low	NA		
Roadway Option 1																			
Base	6.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	moderate	low	NA	$50.0	$7.9
A segment	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	moderate	high	NA	$20.0	$8.0
B segment	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	moderate	high	NA	$20.0	$9.5
C segment	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	high	high	NA	$30.0	$7.7
A+Base	8.8	moderate-serves Downtown	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	moderate	low base/high	NA	$70.0	$8.0
B+Base	8.4	moderate-serves Downtown	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	moderate	low base/high	NA	$70.0	$8.3
C+Base	10.2	moderate-serves Downtown	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	high	low base/high	NA	$80.0	$7.8
Roadway Option 2																			
A	8		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	moderate	low	NA	$20.0	$2.5
B	11.6		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	moderate	low	NA	$30.0	$2.6
C	3.4		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	moderate	moderate	NA	$20.0	$5.9

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

Transit alternatives, both bus and rail, also were evaluated on their ability to attract transit ridership based on factors such as residential density, walk access, proximity of zero-car households, and existing transit ridership levels. As a result, transit alternatives that directly served residential, commercial and educational cores of the Study Area, such as those that followed West Florissant Avenue to Florissant Valley Community College, were selected over those alternatives that did not.

Roadway alternatives were examined based upon their ability to address existing and projected traffic congestion and how well they served major travel movements within the Study Area. Estimated travel benefits associated with the different roadway links were viewed in light of their potential for neighborhood disruption and physical impacts to sensitive properties. As a result of the screening, some roadway segments were dropped. Yet other roadway improvements (primarily access management and spot capacity improvements) were added to the TSM Alternative. The remaining roadway segments were combined into two roadway alternatives and these segments carried forward for further analysis.

Finally, where the anticipated benefits among alternatives were generally similar, less costly alternatives were favored over more costly options. Through this process, six alternatives were identified for further study in the Northside Study Area. These alternatives address different aspects of the purpose and need for improvements in the Northside Study Area and encompass a range of transportation modes and investments.

4.3 DETAILED DESCRIPTION OF FINAL SET OF ALTERNATIVES

Selection of reasonable alternatives for more detailed analysis, the fifth step in the MTIA process (see Figure 1.0-1), defined the alternatives to be carried forward while noting that these could be further refined as the technical studies in the remainder of the MTIA are completed.

As a result of the screening analysis, six alternatives were selected and in July 1999 by the EWGCC Board of Directors for detailed evaluation in the Northside MTIA. The Set of Reasonable Alternatives incorporated the refinements that resulted during the screening process. These alternatives address different aspects of the purpose and need for improvements in the Northside and encompass a range of transportation modes and investments. The LPA, selected at the conclusion of this MTIA, combined one or more of these reasonable alternatives. For example, the LPA included features of the TSM Alternative, a roadway alternative and an LRT alternative. The year 2020 is assumed as the year of analysis for all of the alternatives. For clarity, the six remaining alternatives were renumbered “1” through “6” as follows:

Alternative 1 - No Build
Alternative 2 - Transportation Systems Management (TSM)
Alternative 3 - Light Rail Transit: Natural Bridge Road/West Florissant Avenue
Alternative 4 - Light Rail Transit: Natural Bridge Road/TRRA Right-of-Way (ROW)/MetroLink
Alternative 5 - Roadway: Route 367/Jennings Station Road/I-70
Alternative 6 - Roadway: Route 367/West Florissant Avenue/I-70 and Riverview Drive/Hall Street

These six alternatives were conceptual in scope. The physical characteristics are detailed in the Northside Light Rail Alignments and Roadway Alternatives Plan and Profile Drawings (April 2000). The operational characteristics are described in the Northside Study Area Operating Plan (October 1999).

4.3.1 Alternative 1 – No Build

The No Build Alternative consists of planned and committed transportation projects that are anticipated to be in place by the year 2020, the planning horizon year for the Northside MTIA. The No Build Alternative represents the future year transportation condition if no further action is taken in the Study Area beyond what is already planned. All the No Build Alternative improvements are assumed to be in place in all of the other alternatives. This alternative is required by federal planning guidelines to provide a basis of comparison against which to measure the effects of the other alternatives.

The following lists the planned and committed transportation projects included in the No Build Alternative.

Light Rail Transit (LRT)/Bus Transit

Cross County MetroLink extension (all three segments: Forest Park to Clayton and Shrewsbury; Shrewsbury south to Butler Hill Road in South St. Louis County; Clayton north to Florissant in the vicinity of the I-270/I-170 interchange)
Proposed bus transfer centers
Transition to transit center design for bus service
Flexible routing and demand response bus service
Downtown multimodal center at 14th Street and Spruce Street

Highway/Roadway

New Mississippi River Bridge (8-lane) and I-70 relocation from Madison Avenue to Illinois state line. New ramps from 14th Street and Tucker Boulevard to new I-70 bridge
Close ramps on I-70 at Poplar Street Bridge and Memorial Drive
22nd Street Parkway between I-64 and Martin Luther King Boulevard
New ramps at Spruce Street and I-64 for Northbound and Southbound I-70
Auxiliary lanes and interchange improvements on I-64 from Kingshighway Boulevard to Tower Grove Road
Central Corridor signal synchronization – Kiel Center, Busch Stadium and Convention Center (controlled signals, closed loop detection, fiber optics, major event traffic handling)
Signal synchronization – West Florissant Avenue – Sunbury Avenue to Seven Hills Drive and Lucas-Hunt Road – West Florissant Avenue to Hord Avenue
Bellefontaine Road – Sierra Vista Road to Horizon Village Drive – Widen from 2 to 3 lanes
Signal coordination and TSM improvements along Grand Avenue, Kingshighway Boulevard and Natural Bridge Road within City Limits
Jennings Station Road – I-70 to West Florissant Avenue – widen from 2 to 5 lanes
West Florissant Avenue – Jennings Station Road to Lucas-Hunt Road – widen from 4 to 5 lanes
Old Halls Ferry Road – Dunn Road to Parker Road – widen from 2 to 3 lanes
Reconstruction of I-170/I-270 interchange west of Northside Study Area
Spruce Street extension at downtown multimodal center

Intelligent Transportation Systems (ITS)

Transit ITS strategies
ITS Improvements, district-wide, such as freeway on-ramp signals, changeable message boards, vehicle detection on the mainlines
Automated Vehicle Location (AVL) technology, including signal preemption for transit vehicles

4.3.2 Alternative 2 – Transportation Systems Management (TSM)

The TSM Alternative consists of an integrated package of low cost or operational transportation projects for the Study Area, such as increased bus service, traffic signal coordination and access management along arterial roadways, and intelligent transportation system improvements. In addition, this alternative has a strong set of bus enhancements. These include exclusive and/or semi-exclusive bus lanes along Lewis and Clark Boulevard to Jennings Station Road, then continuing south to I-70 and using the reversible lanes (perhaps with new, bus only ramps) on I-70 into Downtown. Exclusive and/or semi-exclusive bus lanes would begin at I-270 on West Florissant Avenue and continue to Jennings Station Road and, again, connect with I-70. There would be bus route restructuring to compliment the enhanced bus service improvements. The TSM Alternative is required, along with the No Build Alternative, by federal

planning guidelines to provide a basis of comparison to the higher cost, high capital investment alternatives.

The following lists additional TSM Alternative operational improvements and/or low cost capital improvements designed to make the best use of the existing transportation infrastructure. All the improvements listed in the No Build Alternative are assumed to be in place with the TSM Alternative.

Transit

Continue development of transit centers and route restructuring to provide connectivity to jobs in Daniel Boone (West St. Louis County) Study Area
Continue transit corridor improvements/amenities including signal preemption, curb cuts, and so forth. Altogether would represent about a 20 percent increase in transit service compared to existing conditions
Develop bus rapid transit (BRT) service from North St. Louis County via exclusive or semi-exclusive bus lanes on New Halls Ferry Road and Highway 367 (Lewis and Clark Boulevard) feeding into the I-70 reversible lanes either at Jennings Station Road or West Florissant Avenue

Highway/Roadway

Operational improvements on Route 367 north of I-270
Access management and/or signal coordination along key arterials: Forest Park Parkway (Grand Avenue to City limits), New Halls Ferry Road, Lindbergh Boulevard, Natural Bridge Road, St. Charles Rock Road, and Page Avenue to improve traffic flow

Bikeway/Pedestrian

Support pedestrian movements
Support bike trails/paths

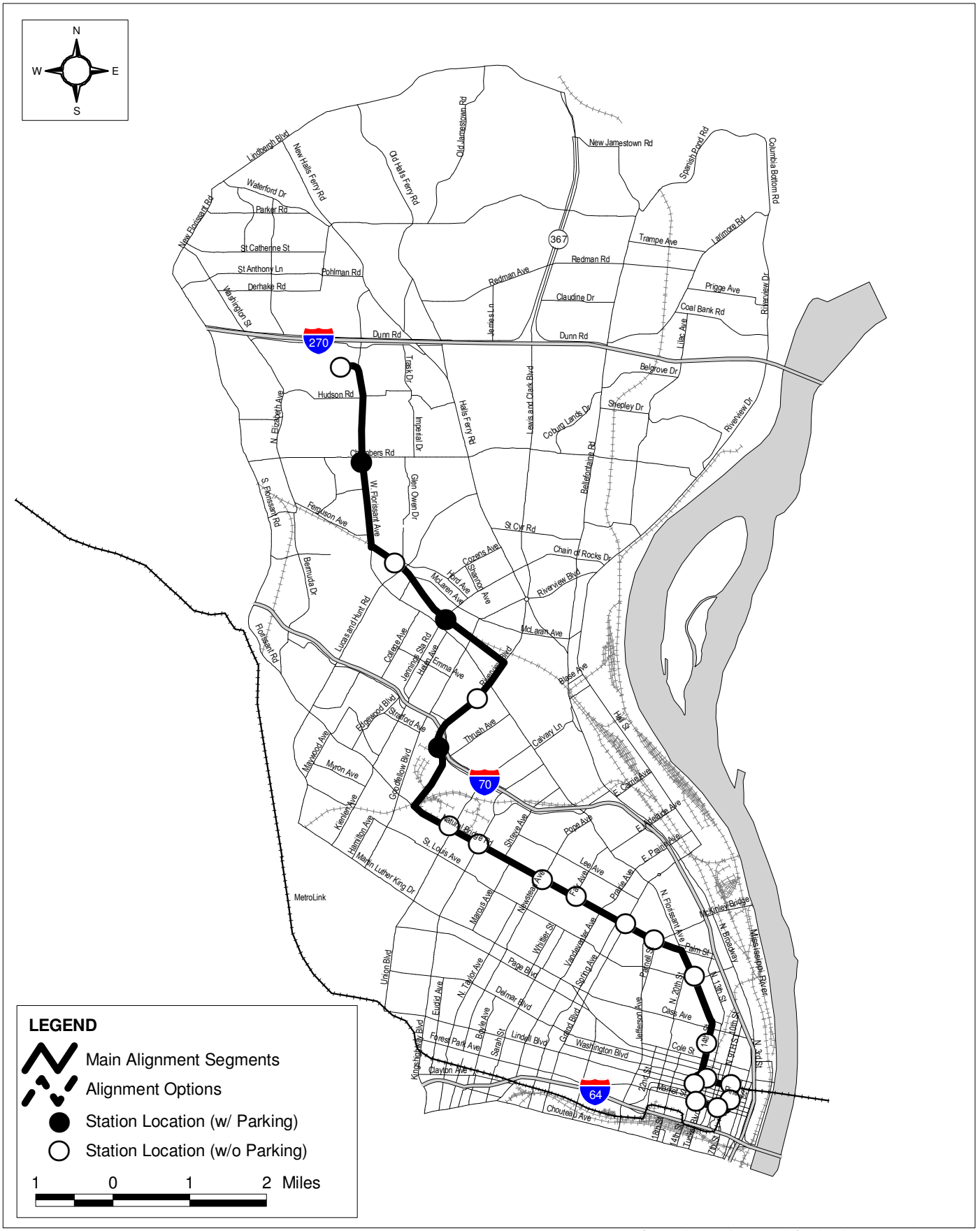
Intelligent Transportation Systems (ITS)

"Regional" diversionary routing (in other words, use of variable message signs before major decision points, information systems)
Freeway on-ramp, ramp signals/queue bypass at on-ramps that are near or that serve transit centers
Extend implementation of ITS improvements (approximately 60 percent increase). Possibilities include accident investigation, glare screens, truck channelization strategies, and so forth.

4.3.3 Alternative 3 - Light Rail Transit (LRT)

LRT Alternative 3 (see Figure 4.3-1) would connect the Downtown St. Louis area to I-270 in the vicinity of Florissant Valley Community College and would be primarily double track and at-grade. In addition, some sections of the alignment may need to be elevated where dictated by design considerations.

Following the alignment from south to north, Alternative 3 would connect into downtown St. Louis via a loop. The alignment would follow a proposed one-way loop from 14th Street south to Market Street, east on Market Street to 7th Street, then north on 7th Street to Washington Avenue, then west on Washington Avenue to 14th Street, then north on 14th Street back to North Florissant Avenue. The trains would run on a single track placed in-street along the Downtown "loop" in a curb lane, with the exception of 14th Street north of Washington Avenue, where there would be two tracks (see Figure 4.3-2). This concept for serving Downtown has the advantages of allowing LRT to serve many downtown locations, allows for convenient transfers between LRT Alternative 3 and the existing MetroLink line (e.g. Kiel Station, 7th and Pine Station), and provides for a potential interface with Southside Study Area LRT alternatives. For more details, see the Northside and Southside Study Areas Downtown Alignment Option: Development and

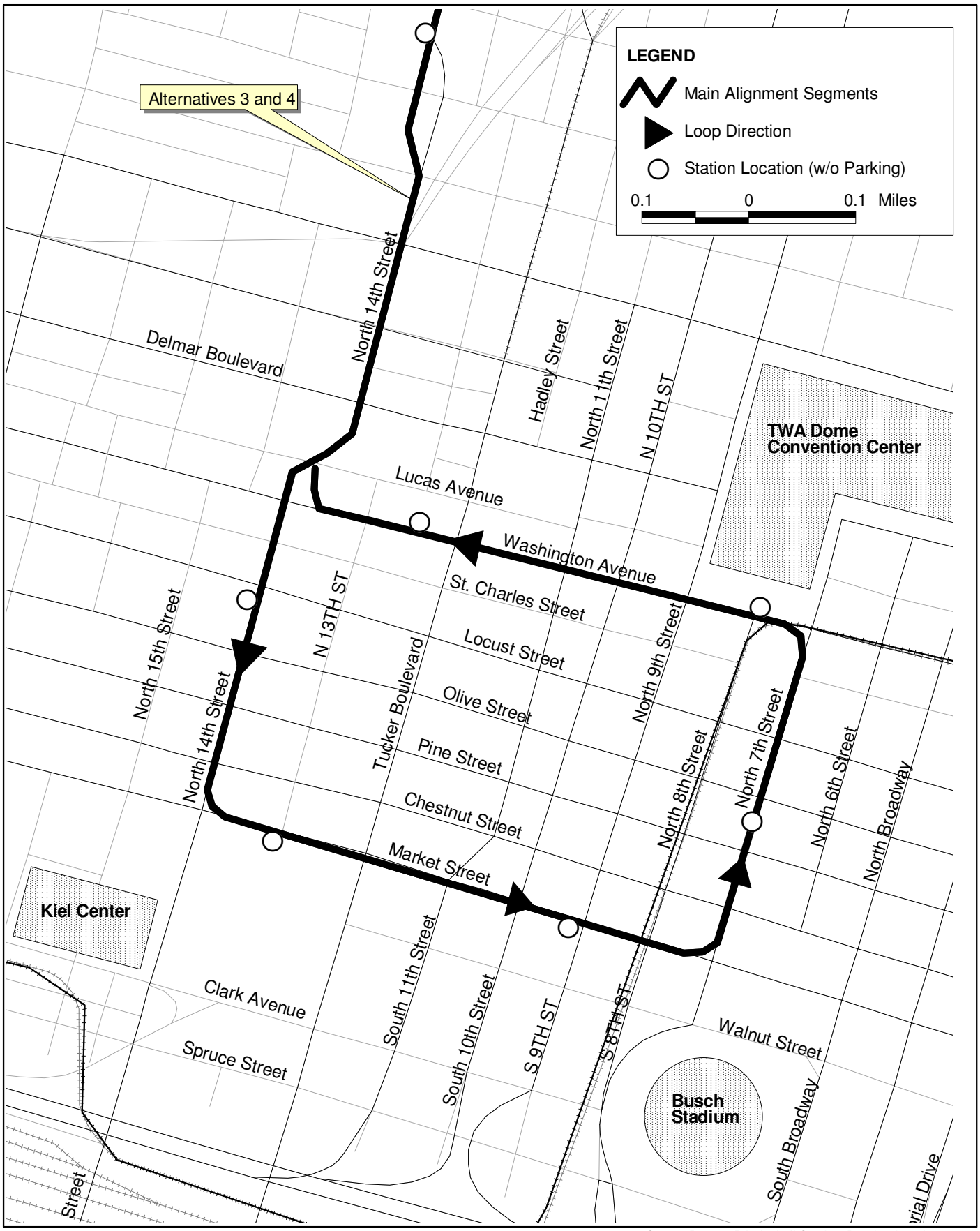


Source: Parsons Brinckerhoff Quade & Douglas, Inc., June 2000.

Figure 4.3-1

Northside Study Area
Major Transportation Investment Analysis

Alternative 3 - Light Rail Transit



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

Figure 4.3-2

Northside Study Area
Major Transportation Investment Analysis

Alternative 3 and 4 - Downtown Loop

Screening Report (February 2000). If this alternative is chosen for future development, this concept for serving Downtown would be studied in more detail than permitted in this MTIA, and significant changes to this concept may result.

The alignment would then follow 14th Street north to North Florissant Avenue, then head north in the median of North Florissant Avenue to Natural Bridge Road. The alignment would then continue northwest in the median of Natural Bridge to the where the Terminal Railroad passes under, the alignment would then elevate and cross out of the Natural Bridge right-of-way to the industrial area north of the Terminal Railroad. The alignment would follow this industrial area to where Riverview Boulevard passes under I-70. The alignment then follows the median of Riverview Boulevard to North Florissant Avenue where it transitions out of the median and onto the east side of Riverview. Paralleling Riverview along Cavalry Cemetery, the alignment then turns northwest and runs parallel to the Norfolk Southern Railroad to West Florissant Avenue. Following West Florissant Avenue in the median, the alignment turns west before reaching I-70 into a commercial parking lot to terminate south of Florissant Valley Community College.

Alternative 3 would be primarily double track and at-grade. In addition, some sections of the alignment would need to be elevated where dictated by design considerations.

The light rail line would include rail stations spaced approximately one-half to one mile apart at locations near employment and activity centers along the alignment. Beginning from downtown, stations are proposed at: 14th Street and Locust, Market and 13th Street, Market and 10th Street, 7th Street and Pine Street, the Convention Center, Washington Avenue (Tucker Boulevard), 14th Street (near Cole Street), North Florissant Avenue (near 20th Street), along Natural Bridge Road at Parnell Street, Grand Boulevard, Fair Avenue, Newstead Avenue, Kingshighway Boulevard and Union Boulevard, along Riverview Boulevard at I-70 and near the intersection of West Florissant Avenue, along West Florissant Avenue at Jennings Station Road, Northland (near Lucas and Hunt Road) and Chambers Road, and Florissant Valley Community College.

Bus feeder and circulation services also are proposed to provide connections between rail stations and major destination points not within walking distance of the rail line. See the Northside Study Area Transit Operating Plans (MPA, January 2000) for specific feeder bus assumptions. Trains would operate approximately every 7.5 minutes during peak periods and every 10 minutes in the off-peak, depending upon future demand and ridership.

LRT Alternative 3 was recommended for more detailed study since it uses existing in-street rights-of-way where sufficient rights-of-way exist, which minimizes property takes and costs. LRT Alternative 3 also would provide service to the areas in the Northside with the greatest population, employment and concentration of zero-car owning households. It offers the potential for transit-oriented development and neighborhood revitalization and redevelopment in the vicinity of the LRT stations. This alternative provides connectivity with the existing MetroLink system in Downtown as well as potential Southside light rail alternatives.

During the conceptual engineering task, several modifications to this alternative's original alignment were made. The original Alternative 3, as described in the Northside Study Area Alternatives Development and Screening Report (December 1999), had three optional segments for the area between Natural Bridge Road and West Florissant Avenue. The alignment through this area was modified in two significant ways. First, the alignment options traveling north along Jennings Station Road, Goodfellow Boulevard and Union Boulevard were all deemed infeasible due to significant right-of-way constraints and grade issues. Second, the section of alignment along West Florissant Road to the south and east of Lucas and Hunt Road was replaced by an alignment following the Norfolk Southern Railroad right-of-way from Riverview Boulevard to where the railroad right-of-way intersects West Florissant Boulevard. This particular section was also modified due to right-of-way constraints and impacts to commercial and residential structures.

4.3.4 Alternative 4 - Light Rail Transit (LRT)

Alternative 4 (see Figure 4.3-3) has many of the same features as the Alternative 3 and also would connect Downtown with North County. In addition, some sections of the alignment may need to be elevated where dictated by design considerations.

The alignment begins in downtown St. Louis along the loop described in Alternative 3, above. Alternative 4 also enters and leaves the "loop" on 14th Street.

The alignment would then follow 14th Street north to North Florissant Avenue, then head north in the median of North Florissant Avenue to Natural Bridge Road. The alignment would then continue northwest in the median of Natural Bridge to the where the Terminal Railroad passes under, then would elevate and cross out of the Natural Bridge right-of-way to the Terminal Railroad right-of-way. Following the Terminal Railroad west, the alignment would parallel the existing tracks to the existing MetroLink right-of-way. The alignment would then turn north and parallel the existing tracks to the vicinity of Florissant Road. The alignment would then share TrailNet Bike Trail right-of-way under across I-70 to Bermuda Drive. Turning east through commercial and industrial properties, the alignment would parallel the Norfolk Southern Railroad to West Florissant Avenue. Turning north and following the median of West Florissant, the alignment turns west before reaching I-70 into a commercial parking terminates south of Florissant Valley Community College, similar to Alternative 3.

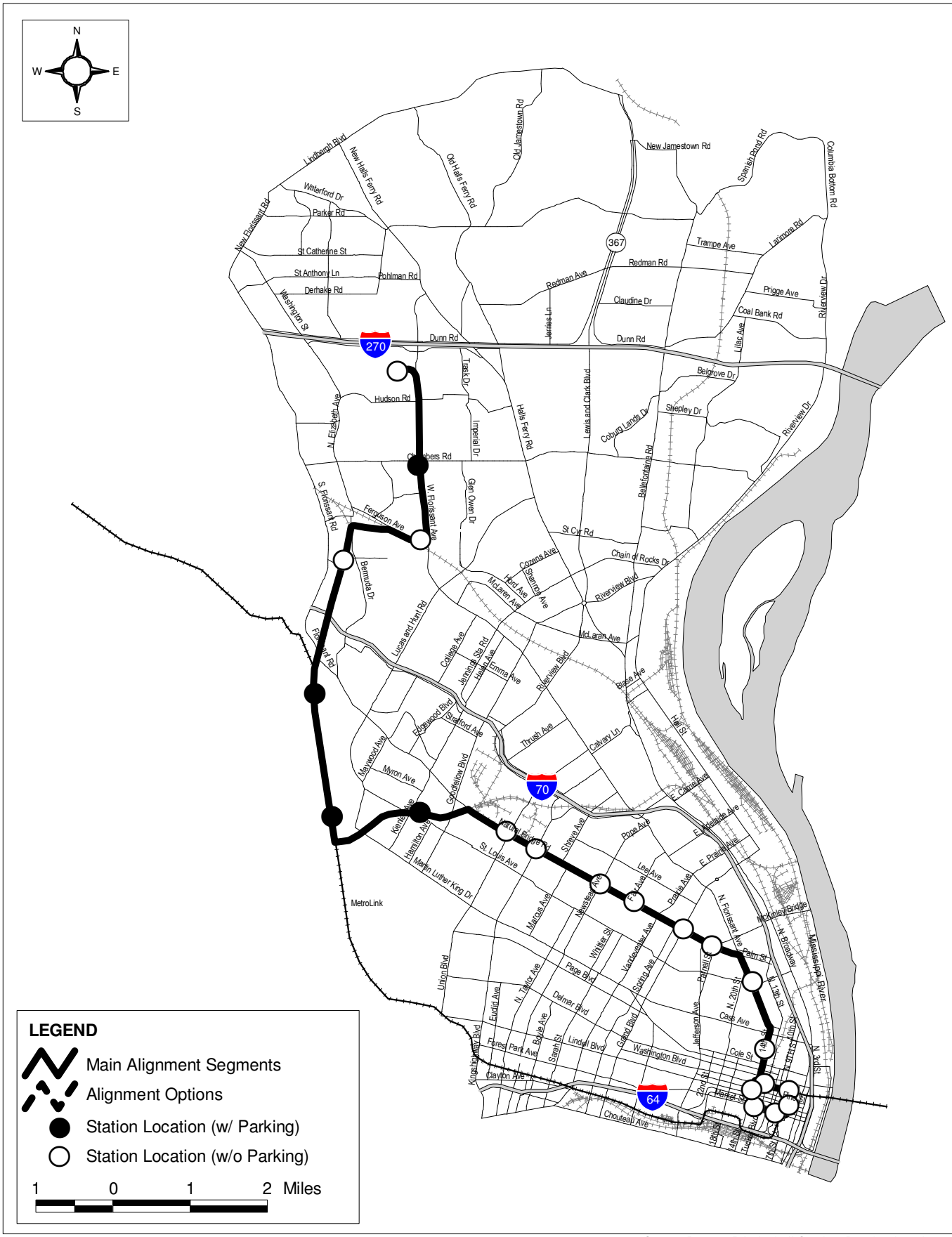
Alternative 4 would be primarily double track and at-grade. In addition, some sections of the alignment would need to be elevated where dictated by design considerations.

The light rail line would include rail stations spaced approximately one-half to one mile apart at locations near employment and activity centers along the alignment. Beginning from downtown, stations are proposed at: 14th Street and Locust, Market and 13th Street, Market and 10th Street, 7th Street and Pine Street, the Convention Center, Washington Avenue (Tucker Boulevard), 14th Street (near Cole Street), North Florissant Avenue (near 20th Street), along Natural Bridge Road at Parnell Street, Grand Boulevard, Fair Avenue, Newstead Avenue, Kingshighway Boulevard, Union Boulevard, and just east of Goodfellow Road, along the existing MetroLink TRRA line at St. Charles Rock Road and UMSL South, Woodstock Road, Ferguson Avenue at West Florissant Avenue, Chambers Road at West Florissant Avenue, and terminating at Florissant Valley Community College.

Bus feeder and circulation services are also proposed to provide connections between rail stations and major destination points outside of walking distance of the rail line. Trains would operate approximately 7.5 minutes during peak periods and every 10 minutes in the off-peak, depending upon future demand and ridership.

Alternative 4 was recommended for more detailed study for many of the same reasons as the Alternative 3. Alternative 4 also would use in-street as well as railroad rights-of-way, which potentially minimizes property takes and costs, and would provide service to the areas in the Northside with the greatest population, employment and concentration of zero-car owning households. It offers the potential for transit-oriented development and neighborhood revitalization and redevelopment. This alternative provides an opportunity to connect to future Cross-County, Southside and West County (Daniel Boone) MetroLink extensions. It also is a more direct transit connection between the University of Missouri-St. Louis (UMSL) and Florissant Valley Community College.

This alternative had several minor modifications from its original conception in the Northside Study Area Alternatives Development and Screening Report (December 1999). In the vicinity of West Florissant Avenue at the Norfolk Southern Railroad, it was recommended during the conceptual engineering task to bring the LRT alignment along the Norfolk Southern Railroad right of way to Ferguson Road instead of crossing over the Norfolk Southern tracks and bypassing this intersection. A creek crossing in the area, right-of-way constraints and the opportunity for a transit station at Ferguson Road were all contributing factors for this decision.



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

Figure 4.3-3

Northside Study Area
Major Transportation Investment Analysis

Alternative 4 - Light Rail Transit

4.3.5 Alternative 5 – Roadway

Roadway Alternative 5 (see Figure 4.3-4) would provide improvements to Route 367 that would include significant widening and alignment adjustments with intersection changes and enhancements, including potential grade-separations north of I-270 similar to an expressway. An expressway is an arterial highway with at least partial control of access, which may or may not be divided or have grade separations at intersections. Major improvements on Lewis and Clark Boulevard south of I-270 to Jennings Station Road would be similar to a parkway. A parkway generally serves as an arterial highway for non-commercial traffic, with full or partial control of access, and may include a landscaped median or other features to offer a more park-like setting. In the case of the freeway and the parkway, both offer potential decrease in accident rates and increase the level of service.

This alternative was recommended for more detailed study since it connects Downtown St. Louis with North County more directly and improves traffic safety on Route 367. It also would make use of existing and planned roadway improvements (such as the Jennings Station Road widening) and existing roadway rights-of-way.

The following more specifically describes roadways that would have improvements as part of Roadway Alternative 5. In addition, all the improvements listed in the No Build Alternative are assumed to be in place with Roadway Alternative 5.

- Begins in downtown at I-70 and uses the reversible lanes now under re-construction
- Continues northwest to Jennings Station Road and heads north on Jennings Station Road as a 4-lane parkway (improvements are already planned south of West Florissant Avenue)
- At Route 367 the improvements would head north, crossing I-270 and continuing to Lindbergh Boulevard

This alternative has remained unchanged from its original description in the Northside Study Area Alternatives Development and Screening Report (December 1999).

4.3.6 Alternative 6 - Roadway

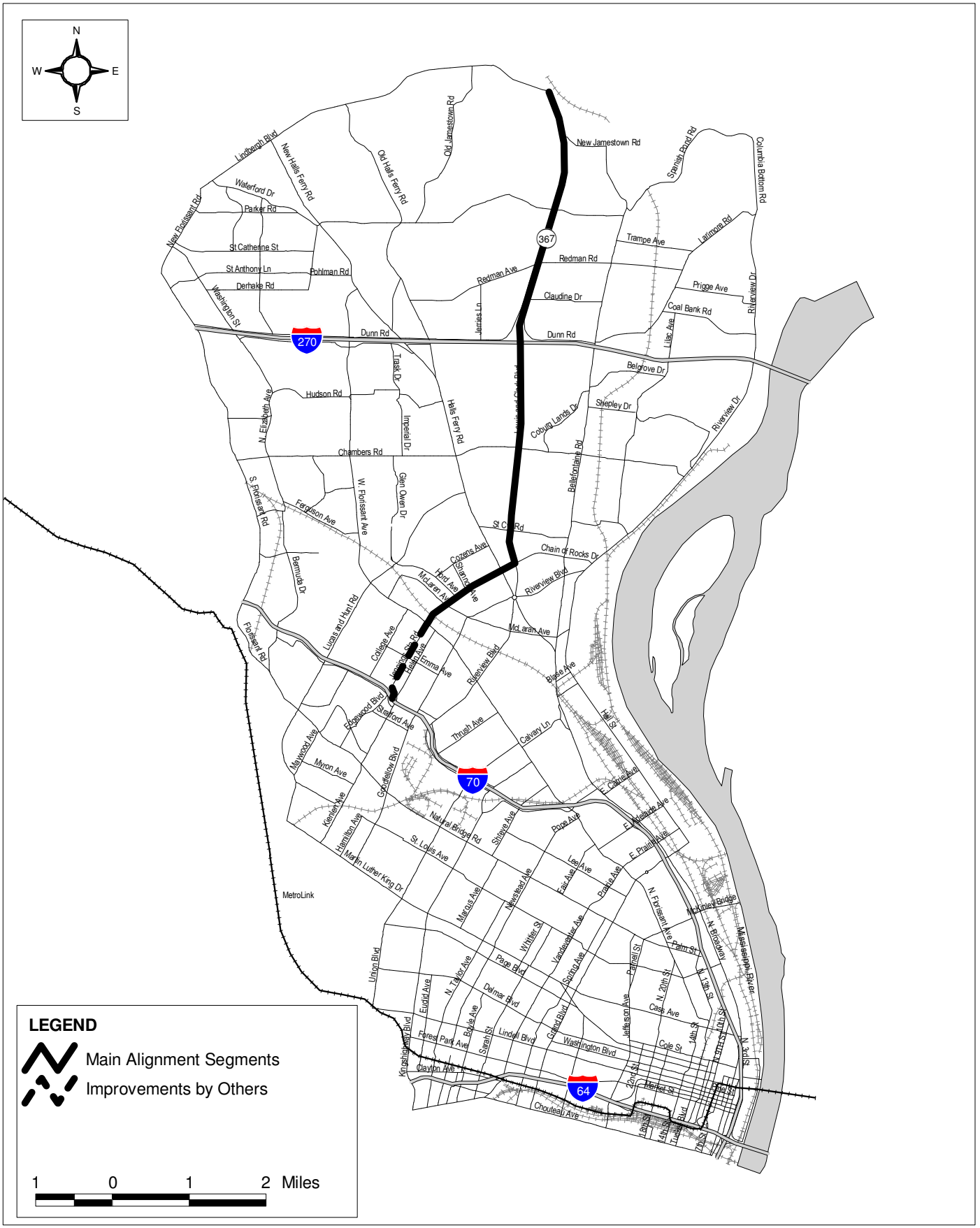
Alternative 6 (see Figure 4.3-5) would provide improvements that would be similar to Roadway Alternative 5 north of I-270. In addition, Riverview Drive would be upgraded to a parkway, connecting Downtown (via Hall Street, Grand Boulevard and I-70) and I-270.

Alternative 6 was recommended for more detailed study since it improves safety on Route 367 north of I-270. It also would make use of existing roadway improvements (such as those under construction on I-70) and existing roadway rights-of-way. The route also serves the industrial (trucking) area along the riverfront and enhances the existing scenic route.

The following more specifically describes the roadways that would have improvements for Alternative 6. All the improvements listed in the No Build Alternative are assumed to be in place with Roadway Alternative 6.

Roadway Alternative 6 improvements to Route 367/Lewis and Clark Boulevard/Riverview Boulevard/West Florissant Avenue/I-70:

- Begin in downtown at I-70 and use the reversible lanes now under re-construction
- Continue northwest to West Florissant Avenue
- Continue northwest on West Florissant Avenue to Riverview Boulevard
- At Riverview Boulevard, the improvements would continue north through Halls Ferry Circle to Route 367

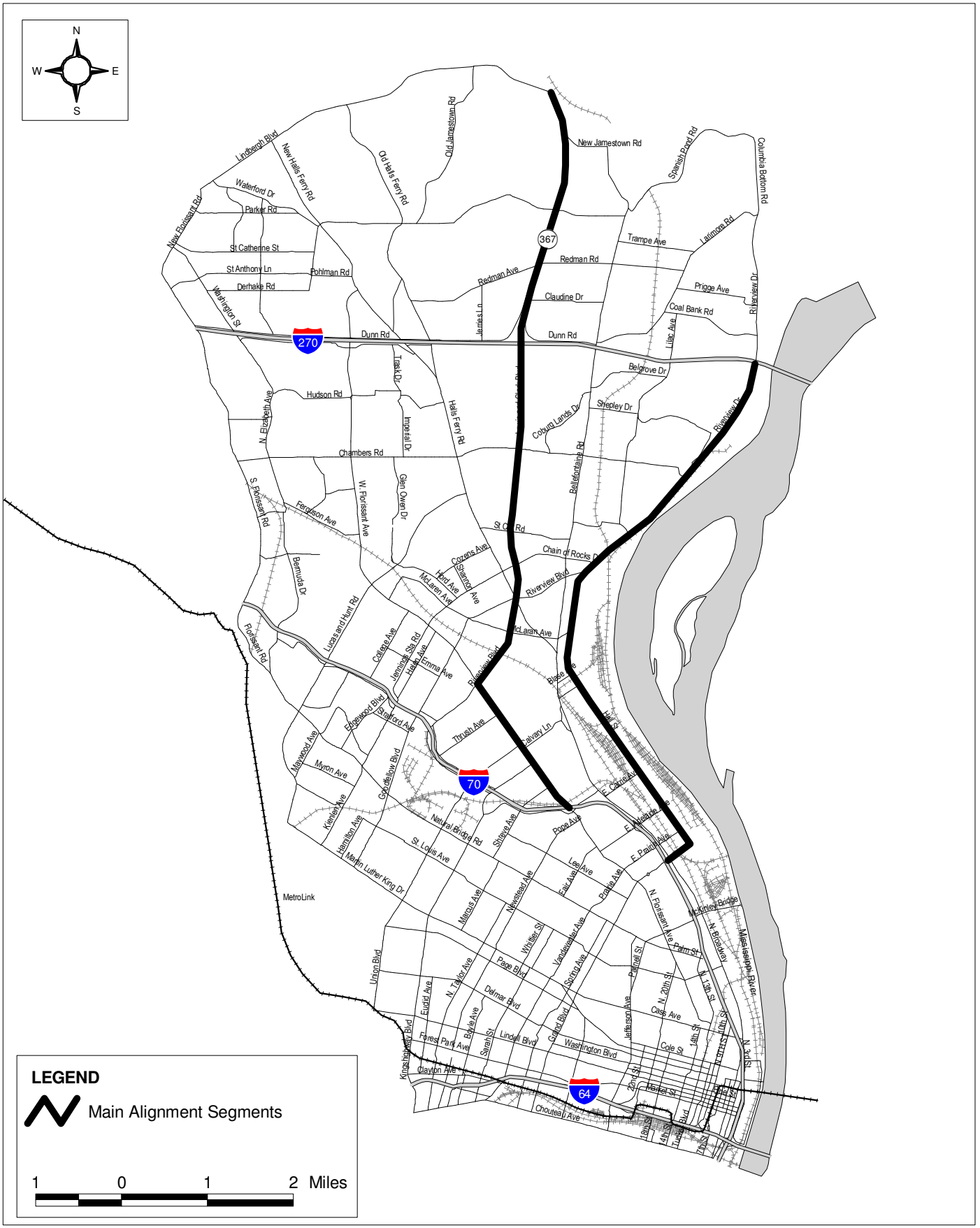


Source: Parsons Brinckerhoff Quade & Douglas, Inc., June 2000.

Figure 4.3-4

Northside Study Area
Major Transportation Investment Analysis

Alternative 5 - Roadway



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

Figure 4.3-5

Northside Study Area
Major Transportation Investment Analysis

Alternative 6 - Roadway

At Route 367, the improvements would head north, crossing I-270 and continuing to Lindbergh Boulevard

Roadway Alternative 6 improvements to Riverview Drive/Hall Street:

- Begin in Downtown at I-70 and East Grand Boulevard
- Continue northeast and turns northwest onto Hall Street
- Head northwest on Hall Street
- Continue north on Hall Street, tuning northeast as it becomes Riverview Drive
- Continue northeast on Riverview Drive to I-270

This alternative has remained unchanged from its original description in the Northside Study Area Alternatives Development and Screening Report (December 1999).

5.0 EVALUATION OF ALTERNATIVES

5.1 TRAVEL DEMAND

This section describes the forecast travel demand for the Northside Study Area for each of the alternatives. These forecasts, for the year 2020, were developed with the use of EWGCC's regional travel demand forecasting models. They are consistent with the future year assumptions regarding Study Area and regional population and employment contained in the most recent regional transportation plan update, Transportation Redefined II. The following section presents the forecast transit ridership attracted by each of the six alternatives studied in the Northside MTIA.

5.1.1 Transit Ridership

Table 5.1-1 displays the year 2020 forecast average weekday transit person trips in the St. Louis region by Northside Study Area alternatives. The table displays estimated transit person trips for those trips which use MetroLink for at least a portion of their trip, those transit trips made only using buses and the total of the two transit modes. A transit person trip is a single trip by one individual via transit between one origin and a single destination. It does not account for the number of transit vehicles boarded to travel from the trip origin to its destination, so a trip that might take both a bus and MetroLink train would be counted as one transit person trip.

Alternative 4, the proposed MetroLink extension from downtown St. Louis to Florissant Valley Community College via Natural Bridge Avenue, the existing MetroLink tracks, the Trailnet bike trail and West Florissant Avenue is forecast to attract the highest number of regional transit person trips, at 169,300 per day. This is 6,800 trips (4.2 percent) greater than the forecast 2020 No Build Alternative regional transit usage and 3,200 trips (1.9 percent) greater than the TSM Alternative. The ridership of Alternative 4 is closely followed by that of Alternative 3, the proposed MetroLink extension that follows Natural Bridge Avenue, Riverview Boulevard, the Norfolk Southern Railroad right of way and West Florissant Avenue. Its forecast Study Area transit person trips are 168,800 per average weekday, only 0.3 percent less than Alternative 4. The two MetroLink alternatives increase MetroLink riders by adding total transit riders as well as shifting existing transit riders from bus to LRT. Alternative 4 gains 13,600 regional rail transit trips but loses 6,800 regional bus trips compared with the 2020 No Build Alternative, a net increase of 6,800. Alternative 3 attracts more rail riders, 14,400, but loses more bus riders, 8,100 compared with the No Build Alternative for a net increase of 6,300 daily transit person trips.

The TSM Alternative attracts 3,600 daily transit person trips over the No Build Alternative, and the two Roadway Alternatives, which include the TSM transit improvements, attract 3.500 more daily transit trips each, slightly less due to roadway improvements making the auto slightly more attractive than transit in the TSM Alternative.

Table 5.1-2 displays year 2020 forecast average weekday transit boardings in the St. Louis region among the Northside Study Area alternatives. Regional transit boardings are disaggregated into rail boardings (MetroLink), bus boardings and total boardings. Transit boardings count each time a person making a trip from an origin to a destination boards a separate transit vehicle. If a person makes a trip from A to B by first boarding a bus and then transferring to a MetroLink train, two transit boardings would be tallied, one bus boarding and one rail boarding. However, this would still be counted as one transit person trip, as previously displayed in Table 5.1-1. The pattern of forecast transit boardings displayed in Table 5.1-2 parallels the pattern of transit person trips displayed in Table 5.1-1. Alternative 4 is forecast to have the highest average weekday regional transit boardings, 255,400, followed closed by Alternative 3 at 253,500. These boarding totals represent a 5.9 percent and 5.1 percent increase, respectively, over the future No Build Alternative. The TSM and two Roadway Alternatives, as in Table 5.1-1, generate similar changes in regional transit boardings as their transit elements are identical.

Table 5.1-1
REGIONAL PERSON TRANSIT TRIPS (Year 2020, Average Weekday)

	No Build Alternative	TSM Alternative	Alt. 3 - LRT I-70 / Rvrvw.	Alt. 4 - LRT MetroLink	Alt. 5 - Rdwy. Jennings Stn.	Alt. 6 - Rdwy. Hall's Cir.+Riv.
Regional Rail Trips (MetroLink)	94,900	93,800	109,300	108,500	93,600	93,600
as compared to No Build		-1,100	14,400	13,600	-1,300	-1,300
as compared to TSM			15,500	14,700	-200	-200
% change as compared to No Build		-1.2%	15.2%	14.3%	-1.4%	-1.4%
% change as compared to TSM			16.5%	15.7%	-0.2%	-0.2%
Regional Bus-Only Trips	67,600	72,300	59,500	60,800	72,400	72,400
as compared to No Build		4,700	-8,100	-6,800	4,800	4,800
as compared to TSM			-12,800	-11,500	100	100
% change as compared to No Build		7.0%	-12.0%	-10.1%	7.1%	7.1%
% change as compared to TSM			-17.7%	-15.9%	0.1%	0.1%
Regional Transit Trips (Bus and Rail)	162,500	166,100	168,800	169,300	166,000	166,000
as compared to No Build		3,600	6,300	6,800	3,500	3,500
as compared to TSM			2,700	3,200	-100	-100
% change as compared to No Build		2.2%	3.9%	4.2%	2.2%	2.2%
% change as compared to TSM			1.6%	1.9%	-0.1%	-0.1%

Note: Rounded to the nearest hundred.
Source: Parsons Brinckerhoff Quade & Douglas, Inc., March 2000.

Table 5.2-1
TRAVEL TIMES, KEY TRAVEL MARKETS (Year 2020, Peak Hour Travel Conditions, in Minutes)

	No Build Alternative	TSM Alternative	Alt. 3 - LRT I-70 / Rvrvw.	Alt. 4 - LRT MetroLink	Alt. 5 - Rdwy. Jennings Stn.	Alt. 6 - Rdwy. Hall's Cir.+Riv.
Walk to Transit (Bus or Rail)						
Spanish Lake to CBD	54	52	47	47	52	52
Florissant Valley CC to CBD	63	63	60	59	62	62
Natural Bridge & Grand to Clayton	45	45	44	44	45	45
Drive to Transit (Bus or Rail)						
Spanish Lake to CBD	55	37	35	39	37	37
Florissant Valley CC to CBD	48	33	48	47	33	34
Drive Only						
Spanish Lake to CBD	28	27	26	26	26	26
Florissant Valley CC to CBD	23	23	22	23	22	22

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

Figure 5.1-1 displays forecast year 2020 average weekday rail boardings for the two Northside Study Area rail alternatives. The two alternatives are forecast to attract almost identical boardings along their lines, 17,400 versus 17,200. This is due to the fact that the two alternatives are identical along a significant portion of their alignments, including many proposed station locations. These daily boardings can be put in perspective by comparing them to today's existing MetroLink line between Lambert Field and 5th and Main in East St. Louis, which attracts approximately 44,000 boardings per average weekday.

While the two Northside rail alternatives would serve a highly transit dependent section of the City and County, their forecast ridership levels are lower than might be otherwise expected for two reasons. First the two LRT alternatives would have a significant portion of their alignments in-street, which results in slower rail speeds which makes LRT relatively less attractive to bus or auto users than the existing line, which runs at higher average speeds on its fully grade separated right of way. Second, there is already a significant amount of bus service in the Study Area and the addition of either of the LRT alternatives would be a smaller incremental improvement in overall transit service in the Northside as compared with other parts of the region.

Note that slightly more than 55 percent of the ridership for both LRT alternatives are forecast to originate in stations within the City of St. Louis, with the remainder boarding in St. Louis County.

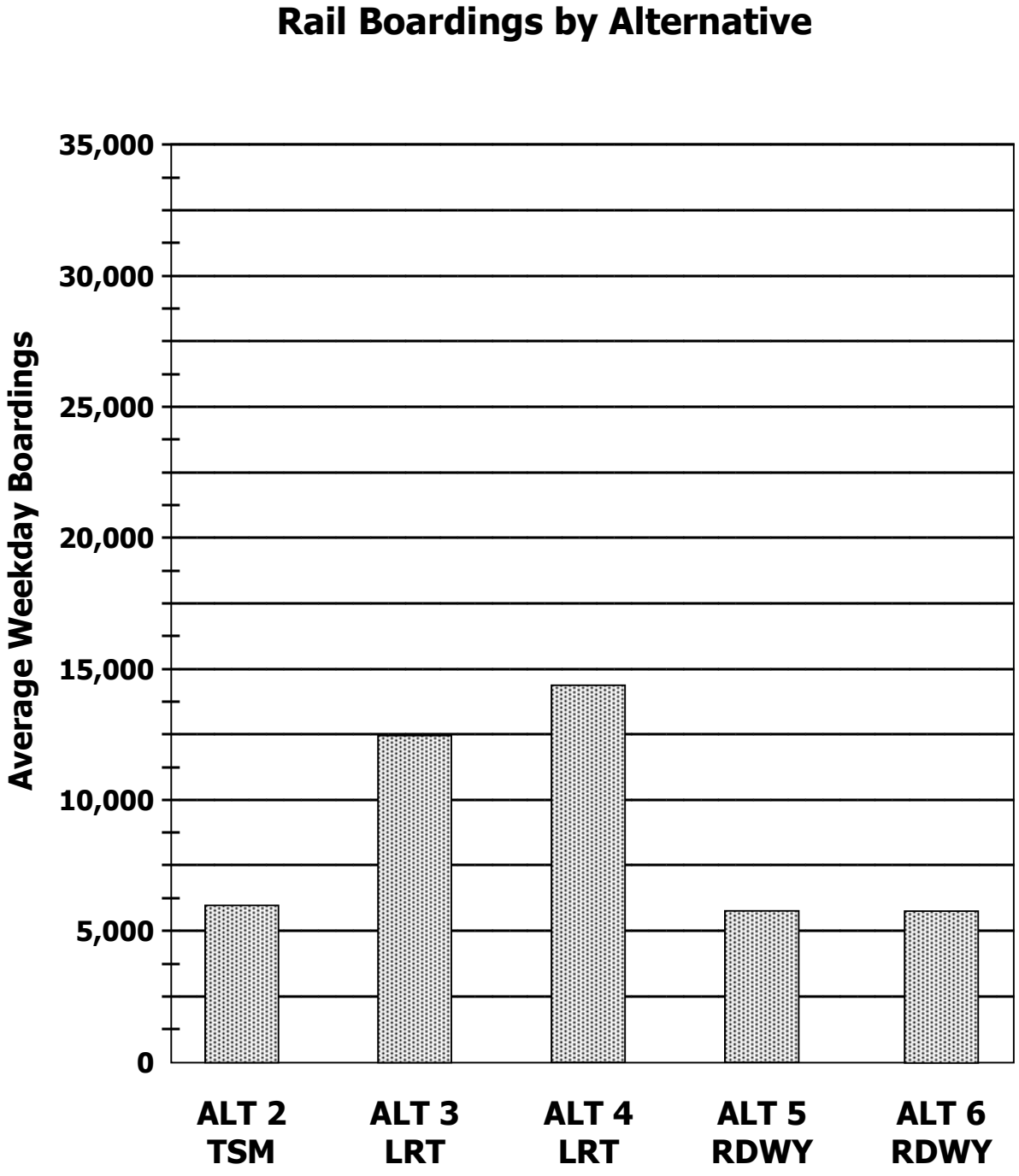
5.2 TRAVEL BENEFITS

A major transportation investment in the Northside Study Area would generate several travel benefits to travelers and residents within the Study Area and region. These are improvements in accessibility, reduction in travel times, and improvements in safety. Each of these is discussed in more detail below.

5.2.1 Accessibility

One of the Purpose and Need objectives for the Northside Study Area is Access to Opportunity. Figure 5.2-1 displays the year 2020 forecast accessibility of households in the Northside Study Area for the No Build, TSM and two LRT alternatives. The future No Build would allow less than 15,000 Northside households to be able to access downtown St. Louis within a 30 minute trip via transit, out of over 122,000 households forecast to reside in the Study Area in 2020. This increases to over 45,000 households with the bus service improvements included in the TSM Alternative. Alternative 3 would increase the number of Northside households within 30 minutes of downtown to over 55,000, while Alternative 4 would have less than 40,000 households within 30 minutes of downtown. Alternative 4 is forecast to offer less transit accessibility to downtown than Alternative 3 as its routing from the County portion of its alignment is somewhat more circuitous than the routing of Alternative 3.

Figure 5.2-2 displays another measure of accessibility for the two rail alternatives, the number of households within a half-mile of the proposed LRT stations of the two alternatives. One-half mile has been established nationally as the maximum reasonable distance people can be expected to walk to a rail station to board a train. At average walking speed, it represents a ten minute walking distance. As the figure shows, both LRT alternatives would have essentially the same number of households within walking distance, approximately 23,000. Figure 5.2-2 also displays the number of zero car owning households that would be within one half mile of proposed rail stations for Alternatives 3 and 4, based upon 1990 census data of auto ownership, the most recent data available. Alternative 3 would have slightly more zero auto owning households within one half mile of its proposed stations than Alternative 4, with the difference occurring within the segment of the Alternatives that vary between the two.

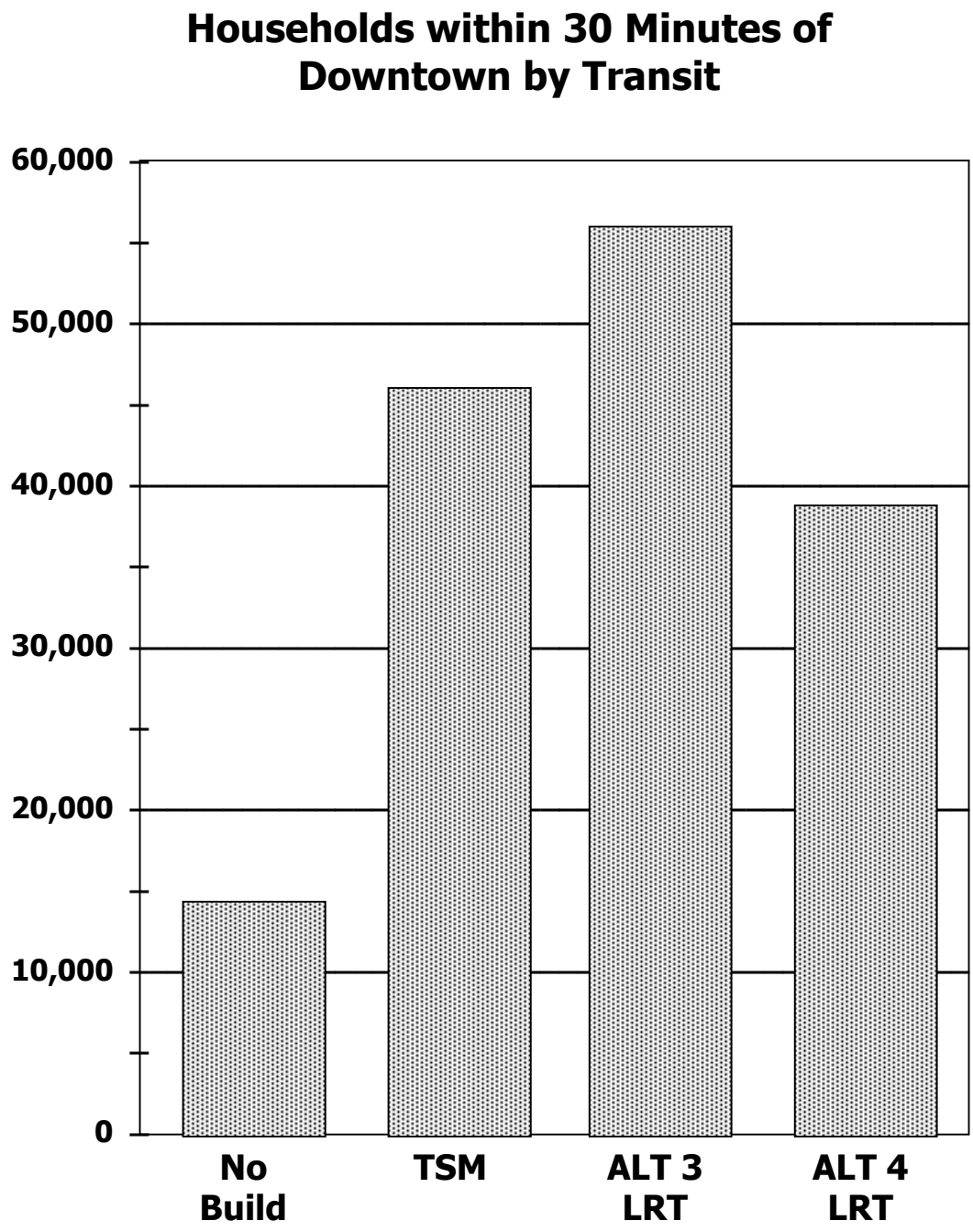


Source: Parsons Brinckerhoff Quade & Douglas, Inc., June 2000.

Figure 5.1-1

Rail Boardings by Alternative

Northside Study Area
Major Transportation Investment Analysis

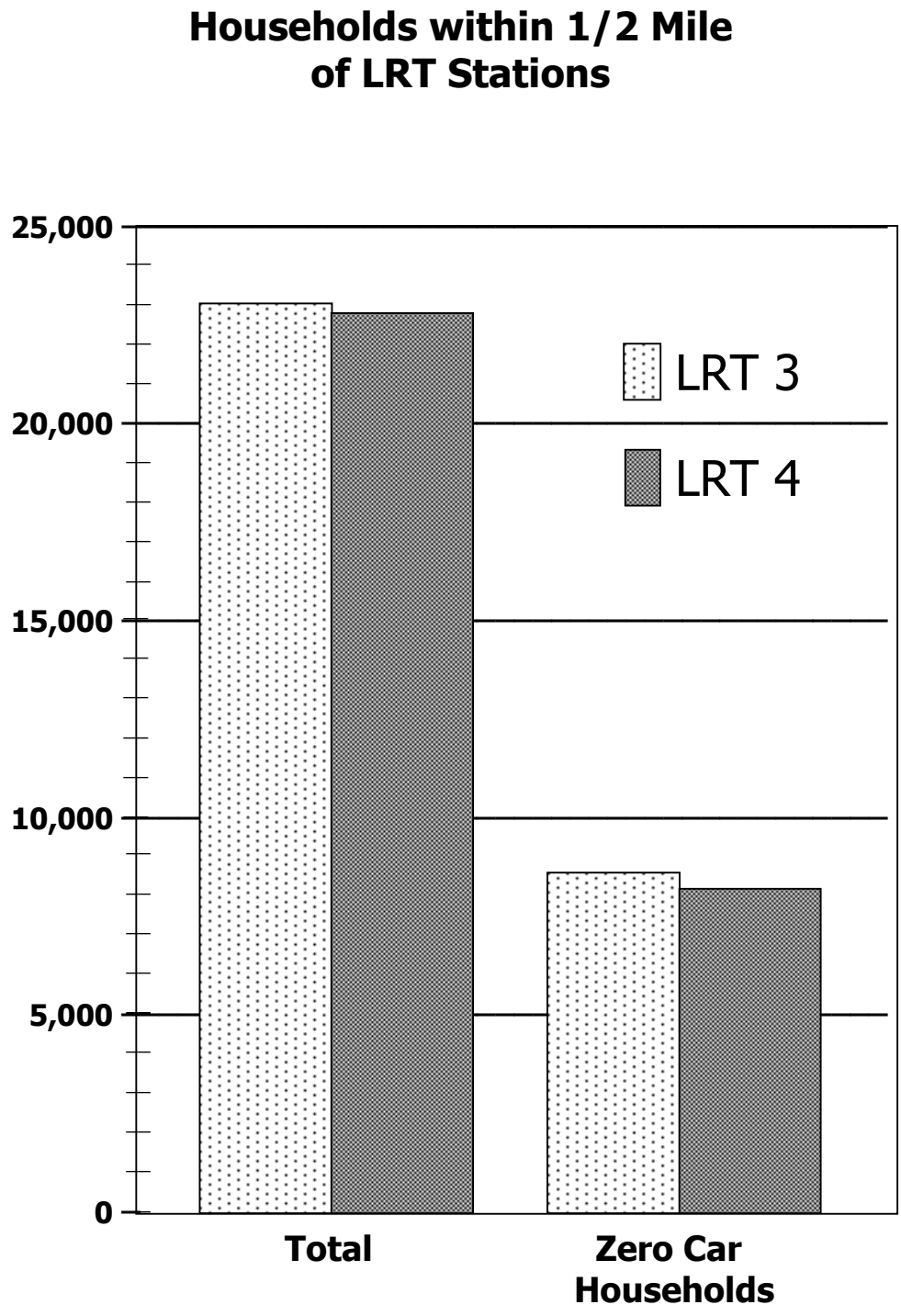


Source: Parsons Brinckerhoff Quade & Douglas, Inc., June 2000.

Figure 5.2-1

Northside Study Area
Major Transportation Investment Analysis

Accessibility to Downtown Via Transit



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

Figure 5.2-2

Households within 1/2 Mile of Rail Stations

Northside Study Area
Major Transportation Investment Analysis

5.2.2 Travel Times

Travel time benefits, if any, accruing to the traveling public as a result of a major transportation investment in the Northside Study Area can be analyzed in several ways. One way is to estimate the travel time for specific trips between a variety of trip origins and destinations. This measure would give an indication to travelers how the investment alternatives might affect their specific travel situations. This measure of travel time is most consistent with the goals and objectives for transportation investments in the Northside Study Area, where congestion reduction is not a high priority goal.

Table 5.2-1 displays estimated peak hour travel times for the year 2020 between a sample of origin and destination locations in the Northside Study Area and other locations in the region for each of the six alternatives. The travel times are estimated for three modes of travel: walk to transit, drive to transit, and driving an auto without using transit. These estimates are derived from EWGCC's travel demand forecasting models, which approximate travel conditions in the future based upon assumptions about future traffic congestion, associated travel speeds, and estimated transit schedule times and frequencies of service. These estimates can be best interpreted as providing estimates of the relative performance of the alternatives compared with each other, rather than estimates of the real world travel times that would occur.

Note that driving to access transit is forecast to be generally quicker than walking to access transit for the same set of trip origins and destinations. Also note that the two LRT alternatives generally offer the quickest transit travel times when compared to the No Build, TSM or roadway alternatives. Also note that making the trip by driving is forecast to be quicker than any of the trips via transit for the same trip origins and destinations, even accounting for future traffic congestion. However, the two rail alternatives and TSM Alternative do have some trips for which transit travel times are forecast to come within 10 minutes of the same trip via auto.

5.2.3 Safety

There are several aspects of safety related to the major transportation investment alternatives considered in the Northside Study Area. These include vehicular safety, pedestrian safety, and personal safety.

Effects of the alternatives on motorized vehicle safety, pedestrian safety and bicycle safety are discussed in Section 5.3.2. This section will discuss rail transit safety, in the context of the two light rail transit alternatives, Alternative 3 and Alternative 4.

Alternatives 3 and 4 are both proposed to be constructed and operated primarily in semi-exclusive right-of-way within existing streets. This would include the entire Downtown loop portion of both alternatives, as well as the North Florissant Avenue, West Palm Avenue, and Natural Bridge Avenue segments of both Alternatives 3 and 4. It would also include the Riverview Boulevard and West Florissant Avenue segments of Alternative 3 and the West Florissant Avenue segment of Alternative 4.

The Cross-County MetroLink Extension-Segment I Conceptual Design Study Socio-Economic and Environmental Analysis Final Technical Report (August, 1999) assessed the safety risk of semi-exclusive LRT operations along that proposed extension to MetroLink. It references national data on LRT safety, which indicates an average accident rate of 3.7 accidents per track-mile per year for sections of track which are not fully separated and protected from vehicular and pedestrian traffic. The reported range of accident rates was 0.5 to 6.2 accidents per track-mile per year. Applying these rates to the number of track-miles not fully protected in Alternatives 3 and 4 yields the following estimates of potential annual accidents involving LRT trains and vehicles or pedestrians:

Table 5.2-1
TRAVEL TIMES, KEY TRAVEL MARKETS (Year 2020, Peak Hour Travel Conditions, in Minutes)

	No Build Alternative	TSM Alternative	Alt. 3 - LRT I-70 / Rvrvw.	Alt. 4 - LRT MetroLink	Alt. 5 - Rdwy. Jennings Stn.	Alt. 6 - Rdwy. Hall's Cir.+Riv.
Walk to Transit (Bus or Rail)						
Spanish Lake to CBD	54	52	47	47	52	52
Florissant Valley CC to CBD	63	63	60	59	62	62
Natural Bridge & Grand to Clayton	45	45	44	44	45	45
Drive to Transit (Bus or Rail)						
Spanish Lake to CBD	55	37	35	39	37	37
Florissant Valley CC to CBD	48	33	48	47	33	34
Drive Only						
Spanish Lake to CBD	28	27	26	26	26	26
Florissant Valley CC to CBD	23	23	22	23	22	22

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

- Alternative 3: 5 to 66 additional accidents per year, with an average of 39 accidents per year
- Alternative 4: 5 to 59 additional accidents per year, with an average of 35 accidents per year

These potential accidents would be off-set, to a certain degree, by a reduction in transit bus related vehicular and pedestrian accidents due to a reduction in bus-miles for those routes where the LRT service would replace the bus service.

5.3 ENVIRONMENTAL IMPACTS

This section outlines the environment screening criteria used to evaluate the alternatives in the Northside Study Area. Under each element of the environment, the existing conditions are briefly described and potential impacts delineated. Should any build alternative proceed forward, a more detailed environmental study would be done and the alternatives further refined to minimize any environmental impacts.

5.3.1 Land Use and Socioeconomic Impacts

Land Use

Existing Conditions

The Northside Study Area encompasses almost all of the northern half of the City of St. Louis and a large portion of north St. Louis County. Office and hotel uses are concentrated in downtown St. Louis; expansion of these uses is expected in the future. Retail land use is scattered throughout the Study Area with the largest developments located at the northern border of the Study Area, downtown, and in the I-270 corridor. For additional information, refer to the Northside Study Area Existing and Future Conditions Report (May 1999).

Potential Impacts

The potential for land use impacts resulting from project alternatives was assessed by comparing alignments to existing land use plans. All of the build alternatives provide some support for redevelopment and, therefore, have the potential to induce land use or zoning changes, but also could function in accordance with existing land use and zoning designations. Alternative 1 would not result in any changes.

Alternative 2 (TSM) would be compatible with existing land uses and zoning. The alignments for both LRT alternatives (Alternatives 3 and 4) would be located within or adjacent to existing roadway or rail right-of-way in corridors that are currently developed with mixed urban residential and commercial uses and would therefore not be incompatible with existing land use patterns. Their stations and park-and-ride lots would be located in areas that are zoned for either commercial or industrial use, resulting in development that would be consistent with existing zoning patterns. The alignments for Alternatives 5 and 6 (Roadways 5 and 6) are located within existing major arterials and would, therefore, be compatible with existing land uses.

Community Cohesion

Because no significant construction of structures or other facilities would be required to implement Alternative 2 (TSM), this alternative would not create a physical barrier within neighborhoods, nor would it limit access to community facilities. Likewise, the construction of Alternatives 3 through 6, which would take place within or adjacent to existing rail and street rights-of-way for a majority of their lengths, would minimize their impact as physical barriers.

Displacements

Displacements have been estimated using conceptual alignment drawings. If an alternative were carried forward, additional studies would further refine and reduce the displacements. Displacements for all alternatives are summarized in Table 5.3-1.

Alternative 2 would not require commercial or residential displacements. The alignments for Alternatives 3 and 4 generally would be located within or adjacent to existing rail or roadway right-of-way to minimize displacements. Therefore, displacements would be the result of rail right-of-way encroachment and development of stations, associated park-and-ride facilities, and yard and shop locations.

The construction of Alternative 5 would require some displacements due to construction of a bridge at Claudine Drive over Route 367. Alternative 6 would require 4 displacements, including 3 residential single-family units and 1 MoDOT maintenance facility.

Direct property acquisition would require implementation of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended and the Civil Rights Act of 1964, providing for relocation assistance services to homeowners and renters affected. In addition, the Act requires that residential and commercial property owners be paid fair market value for any property acquired as a result of the project.

Environmental Justice

Existing Conditions

The Northside Study Area is predominantly African-American, with white being the second largest ethnic group in the Study Area. The income levels in the City portion of the Study Area are significantly below those in the County portion of the Study Area. Almost 60 percent of households in the City portion earn less than $20,000 per year in 1990 compared with 28.5 percent in the County portion. The City portion of the Study Area has measurably higher transit dependency than the County portion due to the greater lack of access to automobiles. For additional information, please refer to the Northside Study Area Existing and Future Conditions Report (May 1999).

Potential Impacts

No minority or low-income population would experience disproportionately high or adverse impacts as a result of Alternatives 2 through 6. Adverse impacts were avoided by developing alternatives that do not construct visual or social barriers through the community and that minimize residential or commercial disruptions or relocations. The build alternatives result in transportation mobility benefits within the Study Area by incurring travel time savings for both transit and auto users, by reducing roadway congestion, and by improving or maintaining transit access to Downtown employment centers. New transportation infrastructure also would enhance neighborhood revitalization and encourage sustainable development in the Study Area.

5.3.2 Traffic and Parking

Local Traffic Circulation

The TSM Alternative is specifically oriented to low-cost improvements that benefit Study Area travel. Improvements under this alternative would include access management, spot median improvements, and Intelligent Transportation Systems (ITS) improvements, which would benefit both traffic circulation and safety by reducing the number of conflicting turning movements and by incorporating spot median improvements.

TABLE 5.3-1
ENVIRONMENTAL SCREENING

ELEMENT	IMPACTS					
	ALTERNATIVE 1 NO-BUILD	**ALTERNATIVE 2 TSM**	**ALTERNATIVE 3 LRT**	**ALTERNATIVE 4 LRT**	**ALTERNATIVE 5 ROADWAY**	**ALTERNATIVE 6 ROADWAY**
Socioeconomics						
Land Use	No Impacts.	Minimal or no impacts.	Improved access to central core. Located within existing transportation corridor. Compatible with and supportive of existing and planned land uses. Stations would be designed to be compatible with existing neighborhoods. Minimal or no impacts.	Similar to Alternative 3. Minimal or no impacts.	Improved access to central core. Located within existing transportation corridor. Compatible with and supportive of existing and planned land uses. Minimal or no impacts.	Similar to Alternative 5. Minimal or no impacts.
Community Cohesion and Quality of Life	No Impacts.	Minimal or no impacts.	Located within existing transportation corridors; therefore, will not divide or disrupt existing communities or neighborhoods. Minimal or no impacts.	Similar to Alternative 3. Minimal or no impacts.	Similar to Alternative 3. Minimal or no impacts.	Similar to Alternative 3. Minimal or no impacts.
Compatibility with Community Plans	No Impacts.	Minimal or no impacts.	Supports planning objectives.	Supports planning objectives.	Supports planning objectives.	Supports planning objectives.
Displacements	None.	None.	Approximately 22 displacements: 1 residential single-family unit, 1 multifamily building (4 units), 11 commercial units, 5 warehouse/industrial units, 1 church. Residents and commercial property owners will be compensated in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 and the Civil Rights Act of 1964.	Similar to Alternative 3. Approximately 22 displacements: 1 residential single-family unit, 1 multifamily building (4 units), 12 commercial units, 4 warehouse/industrial units, 1 church. Residents and commercial property owners will be compensated in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 and the Civil Rights Act of 1964.	Approximately 4 displacements: 3 residential single-family units, 1 MoDOT maintenance facility. Residents and commercial property owners will be compensated in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 and the Civil Rights Act of 1964.	Similar to Alternative 5. Approximately 4 displacements: 3 residential single-family units, 1 MoDOT maintenance facility. Residents and commercial property owners will be compensated in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 and the Civil Rights Act of 1964.
Aesthetics	No Impacts.	Minimal or no impacts.	Introduction of new visual elements: catenary and station/park-and-ride lots. During design care would be taken to integrate the facilities into the surrounding environment.	Similar to Alternative 3. Introduction of new visual elements: catenary and station/park-and ride lots. During design care would be taken to integrate the facilities into the surrounding environment.	Introduction of new visual elements: 367 north of 270 new overpasses and expanded roadway; south of 270 parkway facilities with introduction of median and landscaping.	Similar to Alternative 5. Introduction of new visual elements: 367 north of 270 overpass and expanded roadway; south of 270 parkway facilities with introduction of median and landscaping.
Historic and Cultural Resources	No Impacts.	No impacts.	No direct impact. Within 6 historic districts. Adjacent to 14 historic properties. During design, context of historic district/structures would be considered and coordination would occur with the State and local historic preservation agencies.	Similar to Alternative 3. No direct impact.	No impacts.	No Impacts.
Parklands/4(f) 6(f)	No Impacts.	Minimal or no impacts.	Minimal or no impacts.	Minimal or no impacts.	Minimal or no impacts.	Small portion of Riverfront Park could be required for roadway improvements. Minimal impacts; however, would receive Sections 4(f)/6(f) review.

TABLE 5.3-1
ENVIRONMENTAL SCREENING

ELEMENT	IMPACTS					
	ALTERNATIVE 1 NO-BUILD	**ALTERNATIVE 2 TSM**	**ALTERNATIVE 3 LRT**	**ALTERNATIVE 4 LRT**	**ALTERNATIVE 5 ROADWAY**	**ALTERNATIVE 6 ROADWAY**
Traffic	Total Vehicles Hours of Delay (regional daily) (% change as compared to No Build) = NA Vehicles Miles Traveled (% change as compared to TSM regionally) = NA	Total Vehicles Hours of Delay (regional daily) (% change as compared to No Build) = -0.5% Vehicles Miles Traveled (% change as compared to TSM regionally) = NA	Total Vehicles Hours of Delay (regional daily) (% change as compared to No Build) = -2.9% Vehicles Miles Traveled (% change as compared to TSM regionally) = -0.5% Local traffic increase in vicinity of stations.	Total Vehicles Hours of Delay (regional daily) (% change as compared to No Build) = -1.9% Vehicles Miles Traveled (% change as compared to TSM regionally) = -0.4% Local traffic increase in vicinity of stations.	Total Vehicles Hours of Delay (regional daily) (% change as compared to No Build) = -6.3% Vehicles Miles Traveled (% change as compared to TSM regionally) = 3.8% Local traffic increase in vicinity of stations.	Total Vehicles Hours of Delay (regional daily) (% change as compared to No Build) = -2.4% Vehicles Miles Traveled (% change as compared to TSM regionally) = 2.8% Local traffic increase in vicinity of stations.
Bicycle/Pedestrian	No impacts.	Minimal or no impacts.	New bikeways = 5 miles (parallel to tracks in Chesterfield Valley.	Minimal or no impacts.	New bikeways and sidewalks = 12 miles	Minimal or no impacts.
Safety	Number of high accident roadway segments with lower traffic volumes/ lower predicted accident rates = 0	Number of high accident roadway segments with lower traffic volumes/ lower predicted accident rates = 0	Number of high accident roadway segments with lower traffic volumes/ lower predicted accident rates = 7	Number of high accident roadway segments with lower traffic volumes/ lower predicted accident rates = 6	Number of high accident roadway segments with lower traffic volumes/ lower predicted accident rates = 8	Number of high accident roadway segments with lower traffic volumes/ lower predicted accident rates = 7
Parking	Loss of parking = 0	Loss of parking = 0	Loss of parking = 420 metered spaces, 2440 free spaces	Loss of parking = 420 metered spaces, 1640 free spaces	Loss of parking = 0	Loss of parking = 0
Noise	No Impacts.	Minimal or no impacts.	Minimal impacts depending on distance from receptor. Location in existing transportation corridors. Detailed noise sites would be conducted during design. Noise mitigation would be implementation as necessary.	Similar to Alternative 3. Minimal impacts depending on distance from receptor. Location in existing transportation corridors. Detailed noise sites would be conducted during design. Noise mitigation would be implementation as necessary.	Similar to Alternative 3. Minimal impacts depending on distance from receptor. Location in existing transportation corridors. Detailed noise sites would be conducted during design. Noise mitigation would be implementation as necessary.	Similar to Alternative 3. Minimal impacts depending on distance from receptor. Location in existing transportation corridors. Detailed noise sites would be conducted during design. Noise mitigation would be implementation as necessary.
Natural Resources						
Surface Water	No Impacts.	Minimal or no impacts.	Perpendicular stream crossing between West Florissant/ Ferguson Avenues to FVCC at-grade terminus. Mitigation would be incorporated into the design and meet the appropriate permit application requirements.	Culvert extension between the Terminal Railroad/MetroLink intersection with Trailnet right-of-way. Potential impact for crossing of Maline Creek in the vicinity of Ferguson Avenue. Perpendicular stream crossing near Canfield Drive. Mitigation would be incorporated into the design and meet the appropriate permit application requirements.	Potential stream channel impacts near ramp to Claudine Drive and a perpendicular stream crossing between Marquis and Sunbeam Drives. Mitigation would be incorporated into the design and meet the appropriate permit application requirements.	Stream channel impacts near ramp to Claudine Drive and a perpendicular stream crossing between Marquis and Sunbeam Drives. Perpendicular crossing of small tributary near Carrie Road. Mitigation would be incorporated into the design and meet the appropriate permit application requirements.
Wetlands	No Impacts.	Minimal or no impacts.	Minimal or no impacts.	Potential impacts to wetlands include: 1 site containing approximately 0.2 acres of palustrine forested wetlands. Mitigation, as necessary, would be incorporated per the requirements of Section 404.	Potential impacts to wetlands include: 2 sites totaling approximately 2.1 acres of palustrine forested wetlands and 1 site totaling approximately 1.1 acres of palustrine scrub-shrub wetlands. Total potential wetlands impacts = approximately 3.2 acres. Mitigation, as necessary, would be incorporated per the requirements of Section 404.	Minimal or no impacts.

TABLE 5.3-1
ENVIRONMENTAL SCREENING

ELEMENT	IMPACTS					
	ALTERNATIVE 1 NO-BUILD	**ALTERNATIVE 2 TSM**	**ALTERNATIVE 3 LRT**	**ALTERNATIVE 4 LRT**	**ALTERNATIVE 5 ROADWAY**	**ALTERNATIVE 6 ROADWAY**
Flood Plains	No Impacts.	Minimal or no impacts.	Encroachment on flood plain of Maline Creek from West Florissant to FVCC terminus. Mitigation would be incorporated into the design and meet the appropriate permit application requirements.	Encroachment along edge of flood plain of Maline Creek. Mitigation would be incorporated into the design and meet the appropriate permit application requirements.	Encroachment on flood plain of Maline Creek. Mitigation would be incorporated into the design and meet the appropriate permit application requirements.	Encroachment on flood plain of Maline Creek and Mississippi River. Mitigation would be incorporated into the design and meet the appropriate permit application requirements.
Woodland/Wildlife Habitat	No Impacts.	Minimal or no impacts.	Potential woodland impacts to anticipated in the vicinity of the northern terminus of the alignment. Mitigation would be incorporated into the design and meet the appropriate permit application requirements.	Potential woodland impacts between Bethany Cemetery and Terminal Railroad right-of-way, between intersection of Terminal Railroad and MetroLink intersection with Trailnet right-of-way in the vicinity of Bermuda Drive, between intersection with Trailnet and West Florissant Avenue and in the vicinity of the northern alignment terminus. Mitigation would be incorporated into the design and meet the appropriate permit application requirements.	Minimal or no impacts.	Minimal or no impacts.
Threatened and Endangered Species	No Impacts.	No Impacts.	No Impacts.	No Impacts.	No Impacts.	No Impacts.
Air Quality	No Impacts.	Some minimal air quality improvements expected with some transit and roadway improvements.	Potential to improve air quality by offering commuters an improved mass transit alternative. Detailed air quality analysis would be conducted during design and conformity determined before project could proceed.	Similar to Alternative 3. Potential to improve air quality by offering commuters an improved mass transit alternative. Detailed air quality analysis would be conducted during design and conformity determined before project could proceed.	Travel flow improvements at congested areas could improve air quality. Detailed air quality analysis would be conducted during design and conformity determined before project could proceed.	Similar to Alternative 5. Travel flow improvements at congested areas could improve air quality. Detailed air quality analysis would be conducted during design and conformity determined before project could proceed.
Hazardous Materials	No Impacts.	No areas containing potential hazardous materials identified.	Minimal or no impacts. No areas containing potential hazardous materials identified.	Minimal or no impacts. 1 regulated site within 200 feet of alignment.	Minimal or no impacts. 2 regulated sites within 200 feet of alignment.	Minimal or no impacts. 3 regulated sites within 200 feet of alignment.

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

Roadway improvements (Alternatives 2, 5, and 6) would have a positive impact on circulation. New roadways, additional lanes, and interstate capacity improvements all would benefit vehicle circulation by giving motorists improved roadway conditions.

Alternatives 3 and 4 would affect local traffic circulation in the area of the alignments and would have a moderate impact on circulation in the vicinity of transit stations, particularly those that are near major roadway intersections.

Volume-to-Capacity Ratio

The build alternatives indicate a mixture of higher and lower v/c ratios as compared to the No Build Alternative, which are outlined in Table 5.3-1.

In general, Alternative 6 would have the greatest improvement on traffic. Alternative 6 adds needed capacity to the major north-south arterials such as Route 367, Riverview Boulevard, and West Florissant Avenue. By adding capacity to these roadways, Lindbergh, Halls Ferry Road, and Interstate I-270 would have a decrease in v/c ratios due to a redistribution of trips throughout the Study Area.

Intersection Approach Volumes

For this analysis, the approach volume for each major intersection's leg was totaled to a single number. Approach volumes for the build alternatives are similar to the No Build Alternative and sometimes lower than the 1998 volumes. This is partially explained by the projected declines in employment and population in portions of the Study Area. In general, Alternative 4 would result in the greatest decrease in existing Study Area approach volumes. This is partially a result of the alternative's use of light rail to ease congestion on Natural Bridge Road, West Florissant Avenue, and the Downtown loop.

Alternatives 5 and 6 would result in the lowest amount of volume reductions to the existing conditions on Northside roadways. This is attributed partially to redistribution of traffic volumes to the improved arterials. In some instances of reduced volume, however, the change is very minor or negligible.

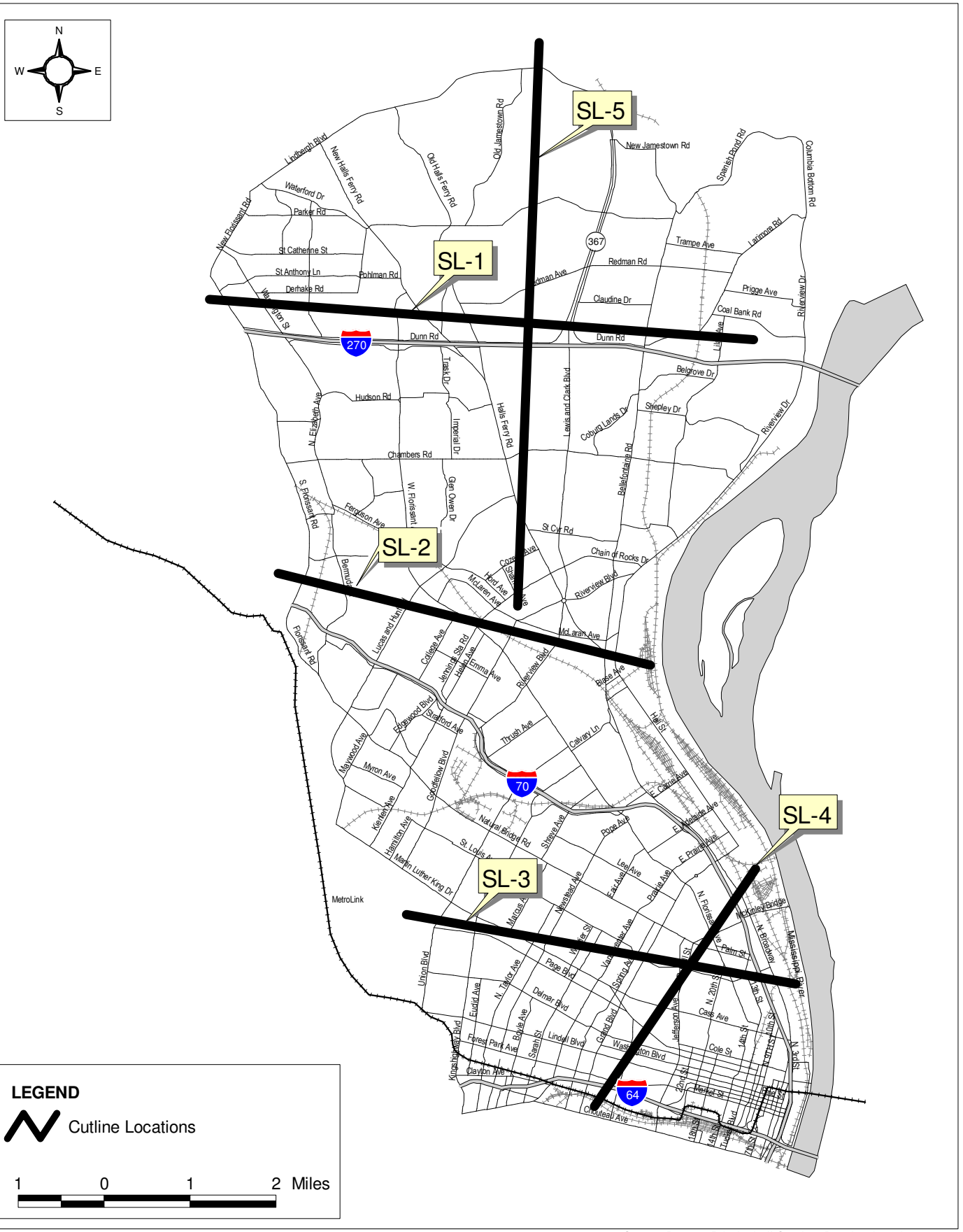
Cutline Volumes

Cutline volumes are another vehicular measure determined by the regional traffic model. A cutline is an imaginary line along which all traffic on major roadways crossing the line is summarized to present a picture of total movements at that location. See Figure 5.3-1 for the Northside cutline locations.

Among the three north-south cutlines, cutline SL-3 has the highest total volume of traffic for the No Build Alternative and build alternatives. The increase in capacity is because Alternatives 5 and 6 would have the effect of increasing the total volume across this and the other north-south cutlines. Cutline SL-4 summarizes east-west movements in the southern part of the Study Area, just to the north of downtown. The most notable impact on this cutline is caused by roadway Alternative 6, in which roadway growth is estimated to reach 3.8 percent. In general, the east-west cutline experiences very modest growth due to few east-west capacity enhancements, and projected declines in population and employment in the North City.

Goods Movement

The movement of goods, particularly by roadway transport, would benefit from the implementation of any of the build alternatives to the same degree general traffic is affected.



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

Figure 5.3-1

Northside Study Area
Major Transportation Investment Analysis

Cutline Locations

Parking

The potential impacts of the build alternatives on parking vary widely in the Northside Study Area. On-street or metered parking is prevalent where LRT lines are proposed in the Downtown area; however, the majority of the roadway alternatives would not affect existing parking. Impacts to parking are summarized in Table 5.3-1.

Alternative 3 would take the greatest number of parking spaces, taking 420 metered parking spaces and 2,440 on-street spaces, mostly along Natural Bridge Road. Alternative 4 takes a similar amount of metered parking spaces (420) but on-street parking spaces are reduced to 1,640 spaces, due to the route splitting off and joining the existing MetroLink lines and not traveling down Riverview Boulevard. Additional land for parking would be required to mitigate these takings and to offset these losses. The land required for this mitigation would generally be acquired in the vicinity of the takings.

Alternatives 5 and 6 would not have an impact on parking. It is anticipated that no parking spaces – metered or on-street – would be taken for either roadway alternative.

Accident Locations

A number of high accident roadway segments would experience a decrease in daily traffic volumes as a result of the build alternatives. Impacts to safety at these accident locations are summarized in Table 5.3-1.

Bicycle/Pedestrian

Opportunities for additional pedestrian and bicycle facilities were included in the build alternatives for the Northside Study Area. Opportunities were provided with the inclusion of sidewalks or bikeways in the build alternatives, and in some instances, a bike lane on the outside of the roadway travel lanes. Pedestrian and bicycle facilities along the light rail alternatives are predominantly provided through existing sidewalks. Major portions of these alignments are in-street, running along existing roadways; therefore, existing facilities could be utilized. These opportunities are summarized in Table 5.3-1. The addition of sidewalks and bikeways would increase the safety of pedestrians and bicyclists by providing for their physical separation from adjacent vehicular traffic. To the extent that the alternatives provide additional facilities for these uses, they increase the safety of bicyclists and pedestrians.

5.3.3 Natural Resources

Wetland Resources

Existing Conditions

Wetland resources within the Northside Study Area consist of forested, emergent and open water systems that differ in vegetation community, water permanence, size, function and quality. Many wetlands within the Study Area are associated with stream channels and depressional areas. A Level 1 wetland investigation was conducted in accordance with the 1987 United States Army Corps of Engineers Wetland Delineation Manual and the National Flood Security Act Manual – Third Edition.

Potential Impacts

Aligning proposed LRT or roadway alternatives with existing transportation corridors minimized potential wetland and water quality impacts. These impacts are summarized in Table 5.3-1.

Alternative 4 would result in impacts to approximately 0.2 acres of palustrine forested wetlands at Maline Creek at Lewis and Clark Boulevard. Approximately 1.9 acres of palustrine emergent and approximately 1.1 acres of palustrine scrub-shrub wetlands would be affected at Hall Street and Carrie Street.

Alternative 5 would result in minor impacts totaling approximately 0.3 acres of palustrine forested wetlands at Maline Creek along Lewis and Clark Boulevard. Approximately 1.9 acres of palustrine emergent wetlands and approximately 1.1 acres of palustrine scrub-shrub wetlands would be affected at Hall Street and Carrie Street. These two sites are surrounded by industrial land uses and soils are highly disturbed.

Future Actions

Implementation of best management practices (erosion and sedimentation controls, etc.) would minimize long-term impacts to these resources. In the event avoidance is not possible, wetland impacts would be mitigated.

Surface Water

Existing Conditions

Surface water resources potentially affected by the proposed alternatives within the Northside Corridor largely consist of crossings of Mill Creek, Coldwater Creek, Watkins Creek and Maline Creek.

Potential Impacts

Alternatives 3 through 6 would result in minimal impacts to surface water resources. These impacts are outlined in Table 5.3-1.

Future Actions

Implementation of best management practices (erosion and sedimentation controls, and so forth) would minimize long-term impacts to these resources. Several longitudinal or skewed crossings, however, would occur with several alternatives.

Floodplains

Existing Conditions

All cities within the Study Area participate in the Federal Emergency Management Agency (FEMA) program. The 100-year year and 500-year flood plains have been identified by FEMA as being associated with Mill Creek, Coldwater Creek, Watkins Creek, Maline Creek, the Missouri River and the Mississippi River.

Potential Impacts

Potential flood plain impacts are anticipated to occur with Alternatives 3, 4, 5 and 6. Impacts would be associated with the placement of fill material in the designated 100-year flood plain and are summarized in Table 5.3-1.

Future Actions

Detailed design of any build alternative would be in compliance with all Federal, State and local regulations regarding the regulatory floodway, floodway fringe and the floodplain of any stream crossings within the Study Area, or would be mitigated in accordance with applicable regulations.

Threatened and Endangered Species

Potential Impacts

No impacts to threatened or endangered species are anticipated. Due to the highly urbanized nature of the Study Area, the potential for encountering threatened and endangered species within the Study Area is extremely limited. Natural habitats, where they occur, are typically low quality, degraded systems that are characterized by common, invasive species and/or noxious alien species (vegetation).

Future Actions

Efforts to avoid or minimize effects to sensitive species would be conducted regardless of the alternative selected. Best management and engineering practices would be employed in an effort to maintain the quality of terrestrial and aquatic habitats in the Study Area. Prior to implementing the proposed project, the Missouri Department of Conservation (MDOC) and the U. S. Fish and Wildlife Service (USFWS) would determine if additional threatened and endangered species biological assessments and/or special mitigation measures would be required.

Woodland/Wildlife Habitat

Potential Impacts

Alternative 3 would potentially have an impact on one location near the northern terminus of its alignment. Alternative 4 would potentially have an impact on six locations along the length of the alignment. No significant impacts to wildlife are anticipated with the implementation of either of these alternatives. Localized removal of trees also would be required at several locations along the each of the alignments.

Effects to the upland vegetation habitat would be directly proportional to the amount of vegetation cleared during construction of any of the alternatives. All construction activities should be designed to minimize the amount of clearing required. Impacts to upland vegetation habitat would be greatest in area of new right-of-way. The Missouri Department of Natural Resources (MoDNR) and MoDOT have established tree replacement requirements. Depending on the selected alternative, the appropriate tree replacement policy would be implemented.

Air Quality

Existing Conditions

The study area is designated as a moderate non-attainment area for ozone.

Potential Impacts

The proposed alternatives are expected to change travel patterns in the region and alter traffic conditions along major arterial and freeway corridors, resulting in changes total regional in daily emissions generated by automobiles and buses.

In general, any alternative resulting in a reduction of total regional auto vehicle miles traveled (VMT) would result in a reduction of emissions. The two LRT alternatives, Alternatives 3 and 4, would reduce traffic slightly over the TSM Alternative, whose roadway components were included in the two LRT alternatives, but show an increase in traffic volumes over the No Build Alternative, due to the TSM roadway components' augmentation of study area roadway capacity.

Alternative 5 would generate the greatest increase in traffic volumes across all six cutlines, as it adds the most roadway capacity of any of the build alternatives, followed by Alternative 6, which would include more modest overall capacity. The additional roadway capacity would attract traffic from not only the Study Area, but from other roadways adjacent to the Study Area that are forecast to be more congested than the roadways improved by these alternatives.

Therefore (see also Table 5.3-1), the proposed alternatives are expected to have a negative impact on regional air quality. However, the TSM and LRT Alternatives would only have a modest negative impact as compared to the No Build Alternative since the capacity increases also are modest. The LRT Alternatives better than the TSM Alternatives by offering a mass transit option to commuters who currently drive.

Future Actions

Once a preferred alternative moves toward implementation, it would be subject to a detailed air quality analysis and conformity determination. A determination would be made whether the preferred alternative conforms to the applicable State Implementation Plan (SIP). Of particular interest would be any violation of the National Ambient Air Quality Standards (NAAQS) for carbon monoxide at any affected intersection or parking area.

Noise

Existing Conditions

Transit Noise. The Federal Transit Administration (FTA) has developed criteria for assessing noise impacts related to transit projects. The standards outlined in Transit Noise and Vibration Impact Assessment (FTA, 1995) are based on community reaction to noise. The standards evaluate changes in existing noise conditions using a sliding scale. The higher the level of existing noise, the less transit projects are allowed to contribute additional noise.

The basic unit of measurement for noise is the decibel. To better account for human sensitivity to noise, decibels are measured on the "A-scale," abbreviated dBA. Noise that occurs at night (between 10:00 p.m. and 7:00 a.m.) is given a ten dBA penalty. This adjusted noise measurement unit is known as a Day Night Equivalent Level (Ldn). A rural area with no major roads nearby would average around 50 dBA (Ldn); a noisy residential area close to a major arterial would average around 70 dBA. Most of the residential areas in the study corridor fall within this range.

Some land use activities are more sensitive to noise than others (parks, churches, and residences are more noise sensitive than industrial and commercial areas). The FTA Noise Impact Criteria group sensitive land uses into the following three categories:

- Category 1: Buildings or parks where quiet is an essential element of their purpose.
- Category 2: Residences and buildings where people normally sleep. This includes residences, hospitals and hotels where nighttime sensitivity is assumed to be of utmost importance.
- Category 3: Institutional land uses with primarily daytime uses that depend on quiet as an important part of operations, including schools, libraries and churches.

Highway Noise. For improvements associated with an existing or newly-constructed highway, such as HOV lanes, the determination of noise impact is based on existing FHWA noise prediction procedures and impact criteria (Highway Traffic Noise Analysis and Abatement, 1995). The FHWA criteria are used to maintain consistency with established noise impact assessment methods for projects that involve modifications to existing roadways or the construction of new roadways.

The FHWA groups noise sensitive land uses into the following exterior and interior categories:

- Category A: Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
- Category B: Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, and hospitals.
- Category C: Developed lands, properties, or activities not included in Categories A or B.
- Category D: Undeveloped lands.
- Category E: Indoor activities at receptors where no exterior noise sensitive land use or activities have been identified; and situations where the exterior activities are either remote from the highway or shielded, so that while the exterior activities remain undisturbed, noise nevertheless affects interior activities. These land uses include residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Existing noise levels vary widely along the various alignments, which reflects the variety of current land uses and noise sources within the study area.

Potential Impacts

Generally, rail transit would noise levels would be expected to range for 50 to 70 dBA range; however, should a rail alternative (Alternaitves 3 and 4) be selected for more detailed study and implementation noise measurements would be taken at sensitive receptors along the alignment.

Alternatives 5 and 6 were evaluated to determine if they would bring highway facilities closer to residences, significantly increasing noise levels. At most locations, the difference between the existing roadway and modified alignment would result in minimal increases in noise levels. Additional studies, should a roadway alternative be considered for implementation, would measure increases in the areas of sensitive receptors and mitigation could be incorporated into any project to minimize the impacts.

Future Actions

If a locally preferred alternative moves towards implementation, a detailed noise analysis would be completed as part of future studies. Additional analysis would identify any significant noise impacts, and mitigation measures would be defined at that time.

Aesthetics

There are two distinct categories of viewer response associated with a major transportation facility: views from the transportation improvement (e.g., from the transit vehicle or automobile) and views of the facility and surrounding environment from other vantage points. For purposes of this study, the assessment of visual quality focuses on the views of the transportation improvements from other vantage points and how visual change would affect viewer perceptions.

Existing Conditions

The Northside Study Area has diverse visual features ranging from more open views in the North County area, waterfront and industrial zones, to residential neighborhoods and a more densely developed

downtown area. Particularly in the North St. Louis City area, the historic elements add a strong visual component.

Potential Impacts

The No Build and TSM Alternatives would not have any negative impact on the visual quality or views in the Study Area. These alternatives would add features that are at a similar scale to the existing roadway and transit infrastructure.

Alternatives 3 and 4, the LRT alternatives, would introduce new elements into the visual environment. The LRT introduces at-grade vehicles and track as well as the supporting overhead wires and poles of the catenary system. In some areas, the original streetscape had overhead wiring, however, the reintroduction of the overhead wiring may be perceived as a negative change. The degree to which the overhead wiring is noticeable is often a function of the degree of visual distraction by other elements. In areas where there is denser development and a variety of other overhead features such as poles, wiring or signage already exists; the catenary may be less noticeable. These areas would include Downtown and portions of 14th and Natural Bridge. In other areas, such as West Florissant, the overhead wiring may be more noticeable. The transition of the rail, for Alternative 3, from Riverview to the existing rail line also would introduction an elevated structure to make the transition. This structure would be placed as close to the existing rail bridge as possible to minimize the visual change in this area. Along existing rail corridors the catenary would have a minimal impact.

The LRT station areas would provide an opportunity to develop a focal point for the neighborhoods and could be enhanced through landscaping and other design features during later phases of project development in cooperation with adjacent neighborhoods.

Alternatives 5 and 6, the roadway alternatives, would introduce new features. In most cases, the boulevard concept would introduce new visual improvements that enhance the view of the corridor as well as improve traffic flow. Improvement so to Riverview Drive also would improve and enhance the visual environment along the riverfront.

Future Actions

If an alternative were considered for more detailed study and implementation, the more detailed design phase would be an opportunity to development and refine features that would enhance the visual setting. Coordination with the State Historic Presentation Office would continue in areas of historic districts of any changes to the visual features where to be introduced.

Historic and Cultural Resources

Regulatory Background

Section 106 of the National Historic Preservation Act (NHPA) 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, or eligible for, the National Register of Historic Places (NRHP). The Criteria of Effect and Adverse Effect were established in 36 Code of Federal Regulations (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 qualification 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; and 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.

Existing Conditions

There are 17 historical districts and over 90 structures/sites within St. Louis County that are listed on the National Register. There are 42 historic districts and over 200 structures/sites within the City of St. Louis that are listed on the National Register and/or designated as a St. Louis City Landmark. There are approximately 27 neighborhoods of historical significance in the City of St. Louis. For additional information, please refer to Northside Study Area Existing and Future Conditions Report (May 1999).

Potential Impacts

There are no historic structures, historic districts or identified archaeological sites associated with Alternatives 1, 5 and 6. A more detailed evaluation would be required of individual elements of the TSM Alternative (Alternative 2) prior to construction in order to determine specific impacts. There are no direct takings associated with any of the alternatives. The indirect effects of any of the alternatives are primarily related to visual intrusion and the potential for additional noise impacts resulting from wheels on rails for Alternatives 3 and 4.

Alternatives 3 and 4 are located adjacent to or in 5 National Register of Historic Places (NRHP) historic districts, one local inventory historic district, 13 NRHP properties and one local inventory property. The implementation of Alternative 3 could result in visual impacts to these properties.

Future Actions

As a preferred alternative moves toward implementation, a full cultural, historic and archaeological resource evaluation and all required consultations would be completed in accordance with NEPA, Section 106 and Section 4(f) requirements prior to the final design of a selected alternative.

Parklands

Existing Conditions

Various public parks are located within the Northside Study Area. For additional information, refer to Northside Study Area Existing and Future Conditions Report (May 1999).

Potential Impacts

This environmental screening found that there are no significant parkland impacts anticipated for any of the alternatives under consideration in the Northside corridor. Alternative 6 (Roadway 6) would be aligned along North Riverfront Park and could require acquisition of minor amounts of the park in conjunction with improvement of these roadways. Encroachment of the park, however, could be minimized or eliminated during the detailed design phase.

Future Actions

During the more detailed design phase of engineering, every effort would be made to avoid impacts to parklands. In the event that parklands (4[f]) and/or lands that have received monies from the Federal

Land and Water Conservation Fund (6[f]) are not avoidable, a Section 4(f) or Section 6(f) evaluation would be conducted.

Hazardous Materials

Potential Impacts

The identification of sites where hazardous materials are handled or have been released is based on searches of standard government databases. For this analysis, The US Environmental Protection Agency (EPA) and Missouri Department of Natural Resources (MoDNR) databases were searched for regulated sites. The search boundary encompassed sites within 200 feet of proposed improvements.

The findings of this screening evaluation identified potential contaminant sources that could be affected by the alternatives. However, there do not appear to be any potential contaminant sources that would be a "fatal flaw" or make the project not feasible (i.e. National Priority List [NPL] or other highly contaminated sites where construction would be prohibited). Superfund, National Priority List (NPL) and Resource Conservation and Recovery Information System (RCRIS-LQG) sites typically have the most significant impacts; however, no sites with these designations were identified within the Study Area as part of the screening process. Table 5.3-2 lists the regulated sites.

TABLE 5.3-2
REGULATED SITES WITHIN 200 FEET OF ALTERNATIVES

Site Name	Site Address	Regulation	Alternative	Source
Multi-Tech	3400 Goodfellow Boulevard	RCRA	4	EPA
ABF Freight	8630 Hall Street	LUST	6	MoDNR
Mobil Service	6999 Parker Road	LUST	6	MoDNR
Amoco Oil SS #15833	9102 Halls Ferry Road	LUST	6	MoDNR

Source: U.S. Environmental Protection Agency, Missouri Department of Natural Resources, 2000.
Notes: LUST=Leaking Underground Storage Tanks.
RCRA=Resource Conservation and Recovery Act sites.

There is a high potential for encountering hazardous materials or contaminated soil and groundwater during excavation in industrialized areas or along railroad rights-of-way. The extent of potential impacts for each proposed alternative would vary depending on several factors, including the identification of a release on the property, the nature and extent of such a release, the proximity of the potential source to each alternative, property acquisition requirements, the specific groundwater flow direction and depth, and the nature of project design and construction activities planned for a given area.

Additionally, any structure potentially affected or demolished as part of any improvement must be evaluated for the presence of asbestos and lead based paint, the presence of which would require special handling and disposal.

Future Actions

An investigation (Phase 1) of hazardous material sites would be completed, as appropriate, during the engineering design phase on the preferred alternative if it moves toward implementation.

5.4 TRANSIT ORIENTED DEVELOPMENT

5.4.1 Transit-Oriented Development: The Relationship between Transportation and Land Use

The future performance of light rail facilities, and transportation systems as a whole, is influenced by a number of factors relating to land use. Likewise, in combination with appropriate policy initiatives, transit systems and station areas can act as catalysts for transit-oriented development and/or redevelopment that enables neighborhood revitalization in a sustainable manner. This is particularly true of rail transit alternatives (LRT Alternatives 3 and 4), and may also relate to bus rapid transit systems as well (Alternative 5), though the national research on the influence of bus rapid transit on land use has yet to be conclusive. Therefore, transit oriented development analysis for this study has focused on the two LRT alternatives.

For this analysis, critical land use factors within a reasonable walking distance (0.5 miles) of the light rail stations were considered. Important factors include existing transit-oriented uses and destinations as well as the potential for new transit-oriented uses. There was a focus on uses within 0.5 miles of station locations because studies have shown that the vast majority of transit riders are not willing to walk more than 0.5 miles to access rail transit, therefore land uses within 0.5 miles of rail stations are those that would be most influenced by transit investments.

It is important to note that repositioning light rail station locations will alter the land use profile of the area within 0.5 mile of the station. While adjustments in light rail alignments and station locations were made to reflect land use concerns, many light rail locations depicted reflect trade-offs with other important factors, such as transit operations, travel speed, and available land. As planning for those alternatives selected as the locally preferred alternative (LPA) proceed into more detailed project development phases, a comprehensive station-by-station assessment of alternative station locations should be undertaken to better understand the costs and benefits of station siting in general.

2020 Residential and Employment Densities

Moderate-to-high densities are strongly correlated with the potential for additional transit ridership. Consequently, residential and employment densities play a central role in modeling and evaluating transit options. "Base case" modeling performed for the Northside Study Area used 2020 population projections developed by the East-West Gateway Coordinating Council (EWGCC). Year 2020 projections indicated a continued decline in residential population from the City of Saint Louis portions of the study areas and a continued increase in residential population in County locations. Transportation Analysis Zones (TAZs) were used to measure 2020 residential and employment densities. Generally, TAZs circumscribe areas that are broader than areas that are within a 0.5 miles of proposed LRT stations, where walking to transit and a higher proportion of transit use can be expected. Consequently, a qualitative assessment of existing uses within 0.5 miles of proposed LRT stations was performed and is based on available land use information (the limits of which are discussed below).

Institutions, Activity Centers and Retail

Hospitals, education institutions, and tourist attractions are among uses that incur significant levels of transit ridership, when transit service is convenient. Transit use to such destinations is likely to increase when such destinations are within 0.5 miles of an LRT station and walking is convenient. The presence of major institutions and activity centers within 0.5 miles of proposed LRT stations has been noted in the land use assessment for each LRT alternative that follows.

While having a low density of employees, retail uses can encourage transit use by permitting residents and workers to run errands without using their car. Once in a car, transit use is less likely to occur. When located near transit stations, retail uses are also especially convenient to commuters' daily routines. Existing retail uses that are proximate to proposed LRT stations have also been considered in the land use assessment for each LRT alternative.

Future Transit-Supportive Uses

The transit alternatives considered also vary in their potential for future development, which can boost transit ridership. New development and intensification within walking distance of light rail stations can encourage additional ridership, if it occurs at moderate-to-high intensities and is designed to make walking to transit convenient. Meanwhile, the station areas, themselves can serve to act as catalysts for development and/or redevelopment to enable neighborhood revitalization, particularly in the Northside Study Area.

While it is impossible to predict precisely where new land development will occur or in what manner, the extent of vacant and underutilized lands still represent important indicators. Once wetlands and floodplains have been accounted for, remaining vacant lands are likely to be the focus of new development.

Underutilized lands also represent likely locations for new development and future intensification. For this assessment, underutilized parcels have been defined as those parcels with a ratio of improvement value to land value of less than 1.25. Because the total value of the land plus improvements on the land is barely more than the value of the land alone, these parcels are nearly as available as vacant land for new investment.

Along the various light rail alignments assessed in the Northside Study Area, several residential neighborhoods and commercial districts are characterized by a high proportion of vacant and underutilized parcels. A high proportion of vacant and underutilized lots indicate economic decline and a need for revitalization. Policy initiatives are underway for these areas, which are consistent with this study's assumptions for new development and redevelopment.

5.4.2 Assessment Methodology

To assess the potential for transit-oriented development, vacant and underutilized lands were identified using land use data compiled in GIS by Parsons Brinckerhoff from City and County sources as provided by the East-West Gateway Coordinating Council (November 1998). This GIS database was modified by the addition of missing data, correction of erroneous data, and identification of parcels with tax abatement status. For example, public parks and recreation areas, golf courses, cemeteries, and primary and secondary schools had to be eliminated from the "underutilized" category. Changes in land use have also occurred since the database was created, and were updated where relevant to this analysis.

To evaluate the light rail alternatives, the intensity of future uses in transit-oriented locations was been based on the broad assumptions described below. It is important to stress that this assessment is not a plan directing future action, but rather an assessment of the potential for transit-oriented development as a choice and an opportunity. The ultimate use and intensity of parcels is a jurisdictional matter, and will depend on future policy decisions and coordinated actions. The land uses depicted in this analysis merely illustrate reasonable transit-oriented development/redevelopment scenarios, which could come to fruition if one of the light rail alternatives in each of the study areas were subsequently implemented.

For this assessment, transit-oriented uses were applied to vacant and underutilized parcels within 0.5 miles of the proposed light rail stations being considered. The "palette" for future uses consists of employment and residential uses, each at moderate- or high-densities. Low-intensities have not been assumed for this analysis, as they do not support transit investments.

For vacant and underutilized parcels, the following assumptions and guidelines were used to determine which transit-oriented use should be assumed.

Employment density was measured using Floor Area Ratios, or FARs, which are the ratio of total floor area over its associated site area (inclusive of the building footprint, parking, and landscaping).

Residential density was measured as the number of dwelling units (du) over the net site area (exclusive of streets and non-residential uses).

- Moderate-density residential (12 du/net acre) can be achieved with relative ease by a mix of townhouses, duplexes and single-family homes on small lots -- development "building blocks" that can be found in most communities. Moderate-density residential is assumed where parcels abut residential uses, and where higher-density uses do not seem likely. In other words, moderate-density residential uses has been assumed, except where a parcel is within a commercial area or higher-densities are reasonable to assume within a 20-year planning horizon.
- High-density residential (25 du/net acre) assumes an average density that can be achieved with a mix of garden apartments, townhouses, and duplexes, even when a modest number of single-family homes are part of the mix. High-density residential is assumed where parcels abut existing residential uses, and where parcels are:
  - in or abutting the Downtown area;
  - within 1-2 blocks of major streets that could become mixed-use boulevards; or
  - in suburban locations where a future "edge city" is conceivable.
- Moderate-density employment (0.35 FAR) corresponds with 1-3 story office buildings or employee intensive industries, and can rely fully on surface parking and transit service to accommodate employee travel. Moderate-density employment is assumed only where parcels are surrounded primarily by existing commercial uses, and where higher-density employment is not justified.
- High-density employment (0.7 FAR) assumes an average density roughly equivalent to 3-5 story office buildings in urban settings or within compact office parks. It generally relies on some parking garages, which suggests high future land values or public investment. High-density employment is assumed only where parcels are surrounded primarily by existing commercial uses, and where parcels are:
  - in or abutting the Downtown area;
  - within 1-2 blocks of major streets that can become mixed-use boulevards; or
  - in suburban locations where a future "edge city" is conceivable.
- Retail conveniences, such as dry cleaners, day care centers, coffee shops, and banking establishments, are assumed to be adjacent to transit stations in order to make transit use more convenient and to reduce reliance on the car for as many trips as possible. A small amount of retail is assumed as part of new development: 5 percent of the floor area of new development where high densities are justified and 2 percent where moderate densities are justified.

Station Area Assessments

For the LRT Alternatives within the Northside Study Area, the location of LRT stations can influence the extent to which residents, employees and other patrons can walk to and use transit. Transit-supportive land use factors were evaluated for 0.5 mile around each proposed LRT station. Criteria included the extent to which existing uses may support transit, as well as the prospect for future transit-oriented developments (TODs). These findings are summarized in the following discussions for the Study Area. It is important to note that these conclusions are based on available information, and without the benefit of detailed site surveys. No claim is made regarding the accuracy of GIS database, on which much of this effort is based. Nor has this effort considered local economic and policy factors that might influence the ability of LRT station areas to become transit supportive.

Still, this land use assessment offer "snap-shots" of transit-supportive land uses that are reasonable to assume in the future, if LRT investments are made. For the MTIA, this assessment facilitates evaluation of the relative benefits of LRT Alternatives and station locations. Furthermore, reasonable assumptions for future transit-supportive uses also form a useful input for modeling and evaluating the performance of the LRT Alternatives if land use is shaped to take advantage of transit. Finally, future LRT station locations and the land uses that surround them will be the subject of future local and regional land use and community design decisions. Therefore, this MTIA offers an informative tool for these important decisions.

5.4.3 Results

In the Northside Study Area, both LRT alternatives present opportunities for TOD in the locations surrounding their station areas. Both alternatives share the same alignment from the downtown area of the City of St. Louis to Natural Bridge Avenue, where urban neighborhoods with high concentrations of vacant and underutilized land surround the proposed "in-street" LRT alignments along 14th Street, North Florissant Avenue, and Natural Bridge Avenue. These in-street light rail alignments would offer excellent pedestrian accessibility between new housing and development and LRT service. In addition, some of the historic fabric of multi-story mixed-use development remains from the days of the historic trolleys, which could potentially house convenient retail and services.

Fairgrounds Park interrupts what is an otherwise dense fabric; consequently, the transit-oriented development potential for stations abutting the park is somewhat less than at other urban stations, although they would provide convenient access to this recreational opportunity. It should be noted that for either alternative, future LRT would need to be paired with aggressive public initiatives to revitalize these areas and optimize ridership.

Both alternatives would also serve the Union Business Park area, where redevelopment and job growth is underway. New employment could also be generated by development on sizable vacant and underutilized parcels in this area. Alternative 3 is best able to capitalize on available land near the Union Business Park by having a station location adjacent to a sizable area with military barracks that have been vacated, and may be excised by the federal government.

The two Northside Study Area alternatives diverge between the Union Business Park and Northland Shopping Center. While Alternative 4 shares stations with the existing Cross County MetroLink, enabling some regional transit connections, the potential for transit-oriented uses is low around these stations and the other station unique to this alignment. On the other hand, Alternative 3 not only enables the development potential associated with the vacant military barracks (Riverview/I-70 station), but also serves neighborhoods of moderate densities and revitalization potential (Riverview/Lucille and Jennings stations).

In general, the remaining suburban locations that are shared by the alternatives have strong potential for TOD. Based on the background data available and visual assessment, it is anticipated that redevelopment of Northland Shopping Center is likely to occur within the planning horizon of this study. Its location, at the geographic center of the Northside Study Area and at the confluence of major roads, makes it a reasonable prospect for future high-intensity uses, which have been assumed for this analysis. Both alternatives terminate at the Florissant Valley Community College. The presence of the college and the probable redevelopment of adjacent retail suggest a strong possibility of transit-oriented uses in the future. Large parcels also appear to be available for new residential development within 0.5 miles of the station.

Viewed along their entire lengths, there is a more consistent presence of transit-oriented development opportunities along the alignment of Alternative 3 compared with Alternative 4, particularly in light of the opportunity for this alternative to serve the areas in the vicinity of the Riverview/I-70, Riverview/Lucille and Jennings stations and as a centralized corridor within the Northside Study Area.

5.5 COSTS

In this section, conceptual capital costs as well as operations and maintenance (O&M) costs are summarized and described for the Final Set of Northside Alternatives. The cost estimates assume that all the transportation improvements associated with each alternative have been constructed and are fully operational. All costs are shown in current year dollars (2000).

These cost estimates were prepared to support decision-making for the Northside MTIA. Their purpose was to provide comparative information on the transportation alternatives so that study participants

understood the financial implications of selecting one alternative over another. The conceptual cost estimates developed in the Northside MTIA will be further refined in preliminary engineering and during final project design, for those alternatives (or components of alternatives) that continue to advance through the project development process.

At this early stage in the project development process, a great deal of uncertainty exists on precisely how the transportation improvements will be constructed and eventually implemented. Consequently, several assumptions were established to provide the necessary level of definition for the proposed alternatives. For those transportation improvements where uncertainty was especially high, liberal contingencies were added to account for future, unanticipated costs. These assumptions, including the methodologies and unit costs used to develop the cost estimates, are detailed in the Cost Methodology Report (March 2000) prepared for the Northside, Southside and Daniel Boone MTIAs. Physical improvements are defined in the conceptual engineering studies performed for the highway and transit elements of the proposed alternatives. Operational improvements, such as intelligent transportation systems and added bus service are described in the operations plans established for each of these transportation modes. The conceptual operating plans were developed in tandem with the travel demand forecasting activities conducted during the study to balance service levels with anticipated travel demand.

5.5.1 Capital Costs

In the Northside MTIA, capital costs largely represent a major investment in transportation infrastructure. Examples of these investments include roadway widenings, interchange improvements, and MetroLink light rail extensions. In some instances, capital costs reflect physical improvements such as systems hardware or signal controllers for intelligent transportation systems. In other cases, the capital costs denote physical assets with a life of five years or more, such as bus or rail vehicles. In the Northside MTIA, efforts were made to account for the major expenses that would illustrate or highlight significant cost differences among the transportation options. Smaller or detailed capital expenses are accounted for in the contingency and "add on" cost categories for each alternative.

Further, costs are only shown for those transportation improvements that would entail an additional capital expense in public dollars beyond what is already planned and committed for the Northside Study Area. Since the No Build Alternative (Alternative 1) represents the "no action" option, this alternative would not result in any additional capital expense beyond what is already planned for the Year 2020. Thus, no costs are shown for Alternative 1. Cost estimates for the other five alternatives (Alternatives 2 – 6) reflect the capital expenses of these alternatives over and above the No Build Alternative. For purposes of consistency, total capital costs are shown in millions, in year 2000 dollars. Exceptions to this rule are clearly called out in the following tables, where applicable.

Capital Cost Summary

In the Northside MTIA, the alternatives range from TSM improvements to light rail transit (LRT) extensions, to roadway widenings and associated improvements. See Section 4 for a detailed description of the Final Set of Alternatives.

Table 5.5-1 summarizes the total capital cost for each alternative. As expected, Alternative 2, the Transportation Systems Management (TSM) Alternative, has the lowest total capital cost at $38.1 million, as it was designed to be a multi-modal combination of relatively low cost roadway and transit service improvements. LRT Alternative 4 is estimated to be the most costly alternative, slightly over $500 million, while Roadway Alternative 5 has the lowest capital cost of the Build alternatives at $156 million.

TABLE 5.5-1
SUMMARY OF TOTAL CAPITAL COSTS
(MILLIONS 2000 $'s)

ALT 2. TSM	ALT 3. LRT	ALT 4. LRT	ALT 5. Roadway	ALT 6. Roadway
$38.1	$485.5	$504.1	$156.0	$230.5

Notes: Represents estimate of project capital costs beyond what is already planned for Year 2020. Costs are rounded to the nearest tenth of a million dollars.
Source: Parsons Brinckerhoff Quade & Douglas, Inc., March 2000.

Capital cost estimates for each project element that make up the transportation alternatives are detailed and described in the following sections. Where appropriate, information is provided on cost methodologies as well as on the various physical characteristics of the alternatives that lead to major differences in costs.

Light Rail Transit Capital Costs

Table 5.5-2 provides the breakdown of costs associated with construction of proposed light rail transit (MetroLink) alternatives 3 and 4. These costs are broken down into the major physical components of a light rail system as described in detail in the Cost Methodology Report (March 2000).

TABLE 5.5-2
LIGHT RAIL TRANSIT CAPITAL COSTS BY COST CATEGORY
(MILLIONS 2000 $'s)

Cost Component	LRT Alternative 3	LRT Alternative 4
Guideway Cost	$37.9	$49.7
Trackwork Cost	$46.7	$45.5
Site Modification Cost	$6.2	$9.3
Utility Relocation Cost	$50.7	$44.9
Stations Cost	$24.0	$25.9
Support Facilities Cost	$15.9	$15.9
Systems Cost	$36.2	$41.0
Additional Items Cost	$4.9	$2.1
Environmental Mitigation	$5.6	$6.6
Subtotal Construction Costs	**$228.1**	**$240.8**
Right of Way Costs	$4.9	$5.1
Design Contingency	$122.6	$129.0
Vehicles	$99.7	$99.7
TSM Improvements	$28.6	$28.6
TOTAL	**$485.5**	**$504.1**

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

Alternative 3 is estimated to be somewhat less costly than Alternative 4, primarily due to the fact that its length is 14.9 miles versus 17.0 miles for Alternative 4. On a capital cost per mile basis, Alternative 4 is less costly than Alternative 3, at $29.7 million per mile versus $32.6 million per mile. Since the two alternatives have a large portion of their alignments in common, the cost differences are contained in the sections of alignment that vary between the two alternatives. These sections are Riverview Blvd. and Norfolk Southern Railroad right of way in Alternative 3 as compared to the Terminal Railroad right of way, Trailnet right of way and creek alignment in Alternative 4.

Table 5.5-3 compares the costs of the two Northside LRT alternatives on a segment by segment basis. This table illustrates where the cost differences occur geographically.

TABLE 5.5-3
LIGHT RAIL TRANSIT CAPITAL COSTS BY SEGMENT
(MILLIONS 2000 $'s)

Segment	LRT 3 Cost	LRT 4 Cost
Downtown Loop	$45.8	$45.8
Loop to Newstead/Natural Bridge	$85.5	$85.5
Newstead/Natural Bridge to Terminal RR/Natural Bridge	$40.7	$40.7
Terminal RR/Natural Bridge to Riverview/Lucille	$40.0	N/A
Riverview/Lucille to W. Florissant/Ferguson	$57.6	N/A
W. Florissant/Ferguson to Florissant Valley CC	$58.9	$58.9
Terminal RR/Natural Bridge to Existing MetroLink Line	N/A	$25.2
Terminal RR/Existing MetroLink to Trailnet ROW	N/A	$26.8
Existing MetroLink/Trailnet ROW to W. Florissant/Ferguson	N/A	$64.6
Vehicles and Facilities	$128.4	$128.0
TSM Improvements	$28.6	$28.6
TOTAL	**$485.5**	**$504.1**

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

Roadway Capital Costs

Table 5.5-4 presents the estimated capital costs by project for Roadway Alternative 5 and Table 5.5-5 presents the costs by project for Roadway Alternative 6.

TABLE 5.5-4
ROADWAY ALTERNATIVE 5 CAPITAL COSTS BY SEGMENT
(MILLIONS 2000 $'s)

Segment	Cost
Route 367 (Lindbergh Blvd to I-270)	$87.8
Lewis and Clark Blvd. (I-270 to Jennings Station Rd.)	$24.0
Jennings Station Road	$9.7
TSM Roadway Improvements	$25.0
TSM Transit Improvements	$9.5
TOTAL	**$156.0**

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

TABLE 5.5-5
ROADWAY ALTERNATIVE 6 CAPITAL COSTS BY SEGMENT
(MILLIONS 2000 $'s)

Segment	Cost
Route 367 (Lindbergh Blvd to I-270)	$87.8
Lewis and Clark Blvd. (I-270 to Jennings Station Rd.)	$24.0
Lewis and Clark Blvd. (Jennings Station Rd. to Halls Ferry Circle	$3.5
Riverview Blvd. (Halls Ferry Circle to W. Florissant Ave.)	$2.0
W. Florissant Ave. (Riverview Blvd. to I-70)	$10.9
Riverview Drive (I-270 to Hall St.)	$26.8
Hall St./Grand Ave.	$45.4
TSM Roadway Improvements	$20.3
TSM Transit Improvements	$9.5
TOTAL	**$230.5**

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

Roadway Alternative 6 is $74.5 million more costly than Alternative 5, however it contains more proposed improvements, principally improvements to Riverview Drive, Hall Street and Grand Ave. in addition to those improvements along the Highway 367 corridor common to both alternatives. Comparing the costs of the two roadway alternatives exclusive of the Riverview Drive/Hall Street components results in an estimated difference in cost between the two of only $2.3 million. The more expensive roadway segments (e.g. Route 367 north of I-270) are a result of more significant levels of proposed improvements, such as lane additions and interchange construction.

5.5.2 Operations and Maintenance Costs

Table 5.5-6 presents the annual Operations and Maintenance (O&M) Costs for each of the alternatives. These represent the incremental O&M costs over the 2020 No Build Alternative. They are broken down into transit O&M costs and roadway O&M costs.

TABLE 5.5-6
ANNUAL OPERATIONS AND MAINTENANCE COSTS BY ALTERNATIVE
(INCREASE OVER NO BUILD)
(MILLIONS 2000 $'s)

O&M Cost	ALT 2. TSM	ALT 3. LRT	ALT 4. LRT	ALT 5. Roadway	ALT 6. Roadway
Bus Transit	$8.1	$1.5	$2.7	$8.1	$8.1
LRT	-	$15.7	$16.4	-	-
Roadway	$0.7	$0.7	$0.7	0.8	$0.9
TOTAL	**$8.8**	**$17.9**	**$19.8**	**$8.9**	**$9.0**

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

As can be seen in the table, transit operating and maintenance costs are an order of magnitude larger than roadway maintenance costs, as operations of transit services are labor intensive whereas roadway maintenance requires much less annual labor hours. LRT Alternative 4 would require about $2 million more per year to operate and maintain compare to LRT Alternative 3, due to its longer length and slightly higher feeder bus requirements. Roadway Alternatives 5 and 6 are essentially identical in annual O&M costs, based upon their identical levels of bus service and almost identical levels of highway maintenance requirements.

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APPENDIX A
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