Chapter Six: Environmental Impacts

Do the Alternatives Result in Any Social or Environmental Impacts?

In order to assess the social or environmental impacts a high-level red flag analysis was conducted. This

consisted of examining the impacts that the alternatives may have on neighborhoods, land use, natural resources, parks, cultural resources, hazardous materials, visual quality, and noise. The red flag analysis was used to see if any of the alternatives were fatally flawed. Data was collected at the study area level and then narrowed down to the alternatives. The potential social and environmental Briarcliff/Claymont

- Crestview
- Riverview
- Harlem
- River Market
- Columbus Park

Environmental Impacts

This chapter describes the potential environmental impacts of the alternatives. The analysis in this chapter was conducted using the area of maximum impact to assess the environmental impacts on neighborhoods, land use, natural resources, parks, cultural resources, hazardous materials, visual quality, and noise.

- Central Business District (CBD)\Downtown
- Crossroads
- Crown Center
- Union Hill
- Broadway Gillham
 - Hanover Place
- Southmoreland
- Old Westport
- Country Club Plaza
- Rockhill
- Squier Park
- Park Central Research Park
- Ivanhoe Southwest
- Ivanhoe Southeast
- Oak Park Southwest
- Blue Hills
- North Town Fork Creek
- South Town Fork Creek
- Swope Park Campus
- Blenheim Square Research Hospital

constraints for the alternatives can be reviewed on the plan plates, which are included in the LRT Conceptual Design Sheets report dated February 2009.

How Would the Alternatives Affect Surrounding Neighborhoods?

The Kansas City North/South Corridor contains at least 30 distinct and recognized neighborhoods within the cities of North Kansas City and Kansas City, Missouri. The City of North Kansas City contains three neighborhoods within or adjacent to the North/South Corridor. Those neighborhoods are Northgate Village, Downtown, and the Old Industrial Area.

The City of Kansas City, Missouri contains 27 distinct neighborhoods. Those within or adjacent to the North/ South Corridor include: Potential adverse impacts to neighborhoods created by the proposed transit alternatives in the North/South Corridor are centered upon potential disruptions to community cohesion. Community cohesion impacts could include direct impacts to community facilities, physical and psychological barriers to access, and displacements of residences and key businesses resulting from property acquisitions.

No Build Alternative

The No Build Alternative would not have adverse impacts upon neighborhoods and the community at large. This alternative would maintain the existing levels of community cohesion and would not displace businesses, residences, have direct adverse impacts to any of the community facilities in the North/South Corridor, and would not create any additional barriers to access.

MAX Alternative

The MAX Alternative would not have adverse impacts to neighborhoods in the North/South Corridor. The implementation of this alternative would occur entirely within existing publicly-owned street right-of-way and therefore would not require the acquisition of residences, businesses, or have a direct impact upon identified community facilities.

LRT Alternative and Phasing Options

Implementation of the LRT Alternative and any of its phasing options along the proposed alignment could have potentially adverse neighborhood impacts. During the conceptual design process every attempt was made to limit the construction of track, stations, power supply and transmission infrastructure to existing right of way (ROW). The maintenance and support facilities could include limited acquisition of property.

Light rail stations and track are within existing ROW and none of the potential of property acquisitions include residential areas or known community facilities. It is not anticipated that any areas of potential property acquisitions would have an impact upon neighborhoods and their existing social fabric through residential displacements or the acquisition of community facilities. There is a possibility for commercial business displacements associated with the configuration of a north terminus on Vivion Road.

Although populations of minority and low-income residents are found in the North/South Corridor, none of the identified areas where property acquisitions could occur are located in neighborhoods where concentrations of minority and low-income populations reside. As a result, it is not anticipated that potential property acquisitions associated with the LRT Alternative or its phasing options would have a disproportionate adverse impact upon minority or low-income populations.

Construction of the LRT Alternative could create physical or psychological barriers to community or neighborhood cohesion. While LRT would utilize a center median that would require reconfiguration of local vehicular travel patterns to accommodate the elimination of many leftturns, access to individual neighborhoods would not be eliminated. Changes in traffic patterns along the LRT Alternative route could impact internal circulation inside neighborhoods because turn movements would be limited to right-in/right-out movements only, and increased U-turns at signalized intersections. These changes in travel patterns may cause drivers to increase the use of other local streets within neighborhoods.

Pedestrian access across the proposed LRT Alternative alignment would be provided primarily at existing pedestrian end-of-block crosswalks at existing intersections. Alternatively, some mid-block pedestrian crossings would be provided for access to station platforms located in the median.

What Are the Mitigation and Legal Requirements for Potential Neighborhood Impacts?

At this time, there are no known residential housing units that would be acquired with implementation of the LRT Alternative. However, if changes in alignment necessitate the acquisition of housing units, replacement housing units, per 49 CFR Part 24, Department of Transportation implementing regulations for: The "Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970," as amended would be provided.

What Are the Potential Impacts to Land Use and Development?

The Kansas City North/South Corridor includes the historical and present urban core of the Kansas City metropolitan region and existing land uses reflect the historical intensity of development. Residential development densities in the Corridor range from less than 12,000 persons per square mile (considered low density) to greater than 19,000 persons per square

mile (high density). Residential areas with densities between 12,000 and 19,000 persons per square mile are considered areas of medium density. Employment densities in the Corridor also range from low to high, with primarily residential areas having low employment densities. Employment densities greater than 30,000 jobs per square mile are considered high, while areas with 15,000 jobs per square mile or less have low employment densities. Land uses in the Corridor vary in intensity from lower-density residential uses north of the Missouri River to high-density commercial, retail, and office developments in the downtown CBD and the Country Club Plaza.

Corridor-specific plans, for example, the North Oak Corridor Plan and the Main Street Corridor Land Use Plan¹, have been recently completed to provide guidance for redevelopment efforts in two major transportation corridors within the North/South Corridor. The North Oak Corridor Plan recommended locating mixed-use developments at high-visibility locations with good access for pedestrians, bicyclists, and transit riders. It recommends new and redeveloped medium-density residential uses close to commercial and mixed-use areas along transit lines. The Main Street Corridor Land Use Plan discourages traditional strip type development in favor of mixed-use developments designed to support pedestrian orientated activities and increased transit use.

In addition to these two corridor plans, Kansas City, Missouri, has prepared a new zoning ordinance that updates a code that had not been modified and revised over the past 40 years. The City anticipates adopting this new code in early 2009. The new development code will enable:

- Special purpose zoning districts that could be used to create Transit Oriented Development (TOD);
- Overlay districts that could be used to created TOD; and

• Major site plan reviews in TOD or overlay districts.

Figure 6-1 shows the existing land use within the study area for the project.

No Build Alternative

The No Build Alternative would not induce new land use or development-related impacts in the North/South Corridor. Land use and development would continue to be guided by existing land use plans, adopted zoning ordinances, and development review processes.

MAX Alternative

The MAX Alternative is based upon the concept of bus-rapid transit (BRT). The intensity and density of development spurred by implementation of BRT systems ranges widely and is dependent upon many factors, including but not limited to, perception and effectiveness of the BRT system and the level of public sector investment. Generally, the level of investment and development associated with BRT station areas has less of an impact compared to rail transit systems. It is anticipated that the new zoning ordinance and development code regulations would be applied via zoning district overlays at proposed station locations to enable transit-oriented development at those sites. As a result, it could be reasonably expected that land use changes ranging from higher development densities to a wider range of uses could be enabled in the vicinity of most, if not all MAX Alternative station locations.

LRT Alternative and Phasing Options

Light rail transit investments have been associated with new development in some cities that have developed LRT, particularly the systems developed in the last decade. While it is nearly impossible to isolate the catalytic effect of the transit investment, new development has occurred around station areas when effective transit oriented development (TOD) supportive policies have been put into place. These policies include favorable

1



Figure 6-1: Existing Land Use

zoning that allows mixed-use development, zoning and development codes for higher density and development incentives such as value capture and direct subsidies to developers.

The transit and development communities have less experience with investments in bus rapid transit, although experience in communities such as Cleveland and Ottawa suggests that BRT investment, combined with the proper policies, can also help spur development.

The cities of Kansas City and North Kansas City have expressed their preference to encourage development and redevelopment in the North/South Corridor and have considered policies and development codes that will support TOD, at certain station areas. In their current conditions, none of the market areas in the Corridor provide a strong case for benefiting greatly from, or supporting, a light rail line. However, many of the market areas are in flux, or could easily be redeveloped to become more transit-supportive, or transit-oriented. Analyses conducted during the Alternatives Analysis concluded that there is potential for new development, if the proper policies are made effective².

- Most of the station areas were historically developed in an urban pattern with zero-setback buildings, a grid street network, and a general availability of pedestrian facilities. This provides a solid framework for future redevelopment.
- All of the station areas contain considerable opportunities for redevelopment, in the form of vacant parcels, surface parking lots, and vacant or underutilized buildings. While this detracts from the pedestrian environment it also provides the potential for significant future development if market forces are supportive.
- **O** Positive transit-supportive land use examples are

seen in the redeveloping River Market area, the new Power and Light District downtown, market-driven adaptive reuse in the Crossroads, older mixeduse neighborhoods in the Midtown district, and the Country Club Plaza.

An indirect impact of an investment in either light rail or bus rapid transit could be land use impacts ranging from increased densities to a greater mix of land uses.

What Are the Mitigation Impacts to Land Use and Development?

Through their comprehensive planning processes, the cities of Kansas City and North Kansas City have recognized the Kansas City North/South Corridor as an area positioned for future development consistent with transit-oriented development densities, land uses, and other transit supportive policies. Construction of the proposed MAX Alternative or LRT Alternative and its phasing options would promote development in an orderly fashion consistent with the transit-development focus of the North/South Corridor found in the existing comprehensive plans, corridor-specific plans, and future updates of the zoning ordinance and development code. Future development induced by implementation of either the MAX or LRT Alternative would have to occur in accordance with the adopted policies in place at the time of development.

Kansas City officials have assured residents that existing neighborhoods will be protected through zoning overlays or other means to reduce the likelihood of adverse development-related impacts.

What Are the Potential Impacts to the Natural Resources?

A preliminary inventory of existing natural resources within the Kansas City North/South Corridor utilized data gathered from USGS quadrangle maps, United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps, aerial photography, field obser-

² Land Use Assessment – Revised, Kansas City North/South Corridor Alternatives Analysis, May 6, 2009.

vations from public right-of-way, and coordination with various state and federal agencies with jurisdictions over some aspect of natural resources in the corridor. Natural resources discussed in this section include water resources (rivers, streams, ponds, and wetlands), floodplains, and ecosystems and wildlife (rare, threatened, and endangered species).

USGS quadrangle maps, USFWS National Wetlands Inventory maps, aerial photography, field observations from public right-of-way, and coordination with various state and federal agencies with jurisdictions over some aspect of natural resources in the Corridor. Natural resources discussed in this section include water resources (rivers, streams, ponds, and wetlands), floodplains, and ecosystems and wildlife (rare, threatened, and endangered species).

Rivers, Streams, and Ponds

Rivers and streams within the North/South Corridor include the Missouri River, a small tributary of Rock Creek in North Kansas City, Brush Creek near the Country Club Plaza, and Mill Creek, a south bank tributary of Brush Creek near Swope and Blue Parkways. There are no lakes or ponds in or near the North/South Corridor with the exception of a few small stormwater detention basins and ornamental ponds.

The quality of water resources in the Corridor varies depending upon such factors as water permanence, type of shoreline/bank and surrounding vegetation, substrate, presence or absence of in-flowing streams, and surrounding land use. In this type of urban environment, major concerns include channelization or other alteration of natural stream channels, construction site erosion, and residential and commercial use of pesticides and fertilizers. All surface runoff within the Corridor eventually flows to the Missouri River.

In accordance with the federal Water Pollution Control Act, Section 303(d), the Environmental Protection Agency (EPA) has identified the Missouri River as a water body that does not meet the state's water quality standards. However, the reaches of the river that are on the list did not fall within the North/South Corridor. None of the other water bodies within the Corridor appeared on the list.

Groundwater levels may be very near the surface in the alluvium of the Missouri River and some of the major tributaries. The source and recharge of alluvial ground-water is almost entirely from the Missouri River. The groundwater table fluctuates directly with the river levels. The entire North/South Corridor relies on public water supplies.

Wetlands

Section 404 of the Clean Water Act regulates discharges of dredged or fill materials into "waters of the U.S." (streams, lakes, wetlands, and ponds that are connected to streams). The U.S. Army Corps of Engineers (USACE) is the regulatory agency responsible for administering the Section 404 permit program. A cursory review of existing wetlands within the North/South Corridor was conducted using USGS 7.5-minute quadrangle maps, the USFWS National Wetlands Inventory maps, and aerial photography. Identified wetlands were verified from existing public right of ways.

Vegetated wetlands within the Corridor are minimal since much of the Corridor is situated in urban built-up land. There is only one area located on the north side of the Missouri River (between the river and the USACE levee) that is classified on the NWI maps as a vegetated wetland. It should also be noted that there is a 16-acre area along the south side of the Missouri River that has recently been restored to wetland habitat.

Based on a review of aerial photographs, at this time it appears that there are no other additional wetland areas in the North/South Corridor north of the Missouri River to Vivion Road or south of the river to Brush Creek.

Floodplains

Several 100-year floodplains are found within the North/ South Corridor. Boundaries of these floodplains are defined by the flood elevation that has a one-percent chance of being equaled or exceeded each year. Thus, the 100-year flood could occur more than once in a relatively short period. The 100-year flood, which is the regulatory standard used by most federal and state agencies in natural resource and development planning, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance.

Floodplains provide natural and beneficial values to nature and society. For example, vegetation in the floodplain provides food, resting and nesting areas for wildlife. Floodplains can also provide water storage during floods, reducing peak discharges and act as filters to purify the floodwater that is temporarily stored there. Floodplains can also provide open areas or green spaces that provide aesthetic or recreational value to a community.

Streams located in the Corridor that have designated floodplains include the Missouri River, Brush Creek, and Town Fork Creek.

Missouri River

The Corridor crosses the Missouri River just east of the Heart of America Bridge near river mile 365. At this location, there is a levee on each side of the river. The 100-year floodplain is approximately 1,500 feet wide and the regulatory floodway is approximately 1,100 feet wide.

Brush Creek

The Brush Creek 100-year floodplain is approximately 170 feet wide and the regulatory floodway is approximately 130 feet wide north of the Main Street and Volker Boulevard intersection. South of the Prospect Avenue, the Brush Creek 100-year floodplain is approximately 350 feet wide and the regulatory floodway is approximately 180 feet wide. The North/South Corridor contains approximately 3,600 lineal feet of floodplain north of the creek from Troost Avenue to Prospect Avenue. The Corridor also contains approximately 1,900 lineal feet of floodplain south of the creek from Brookside Boulevard to approximately 100 feet east of the Flora Avenue.

Town Fork Creek

The Corridor crosses Town Fork Creek just south of Bruce R. Watkins Drive and 59th Street. The 100-year floodplain is approximately 500 feet wide and the regulatory floodway is approximately 300 feet wide at this location.

Pallid Sturgeon (Missouri River)



Peregrine Falcon



Figure 6-2 on the following page shows the 100-year and 500-year floodplain within the study area for the project.

How Would the Project Affect Ecosystems in the North/South Corridor?

The North/South Corridor contains relatively few natural areas. Former native ecosystems that supported substantial wildlife habitat have been replaced with mostly asphalt, buildings, and other types of urban development. Common wildlife species of birds, mammals and fish that have adapted to habitats in an urban environment can be found in Corridor. Information from the Missouri Department of Conservation (MDC) Natural Heritage Database was reviewed for records of rare species or rare natural communities that have been known to occur in or near the North/South Corridor. Although there were no known locations or recorded occurrences directly within the Corridor, an occurrence of the state and federally endangered Pallid Sturgeon (Scaphirhynchus albus) was recorded west of the North/South Corridor near the Broadway Bridge and a nest of the state endangered peregrine falcon (Falco peregrinus) was recorded on the Kansas City Power & Light (KCP&L) building in the downtown Kansas City area.

Forested areas in the North/South Corridor are isolated small tracts that are the result of previous fragmentation or alteration. According to the MDC, the Natural Heritage Database did not contain any significant natural communities in the North/South Corridor.

No Build Alternative

The No Build Alternative would not impact natural resources in the North/South Corridor.

Max Alternative

Construction activities associated with the MAX Alternative, including station construction, would occur entirely within existing public right-of-way and would not impact identified natural resources.

LRT Alternative and Phasing Options

The LRT Alternative and its phasing options could have natural resource impacts associated with two new crossings of the Missouri River and Brush Creek. New bridge crossings of both water resources would be constructed rather than utilizing existing bridge structures. A new Missouri River crossing would require that at least one bridge pier, downstream (east) of the existing Heart of America Bridge, be placed in the waterway. Additional piers would potentially be located within the floodplain both north and south of the waterway. Existing wetlands located north of the river and east of the existing Heart of America Bridge could be impacted by the placement of these piers. Due to the potential presence of habitat for the Pallid Sturgeon in the Missouri River, additional consultation with the US and Fish and Wildlife Service and Missouri Department of Conservation will be required if the LRT Alternative is selected as the preferred alternative. Similarly, a new crossing of Brush Creek would be required due to the cost of retrofitting existing bridge structures. However, it is not anticipated that any piers would have to be placed within Brush Creek. It could be necessary to alter the floodplain near Brush Creek in order to avoid placing piers or fill in the waterway itself.

Mitigation and Permitting Requirements for Natural Resources

Water Resources

Coordination with the USACE as well as the Missouri Department of Natural Resources would occur as design of transit alternatives progress to ensure that permitting and mitigation requirements of Section 404 of the Clean Water Act are met. Permits to conduct any dredge or fill activities would be submitted during the final design process as details and requirements become known. Construction can begin only after issuance of a permit.



Figure 6-2: 100-Year and 500-Year Floodplain

Floodplains

Executive Order (E.O.) 11988 requires all federal agencies to evaluate and, to the extent possible, avoid adverse impacts to floodplain areas, which may result from actions they administer, regulate, or fund. E.O. 11988 specifically requires floodplain impacts to be considered in the preparation of environmental impact statements for "major" federal actions.

In addition, the Federal Emergency Management Agency (FEMA) has mandated that projects can cause no rise in the regulatory floodway, and a one-foot cumulative rise for all projects in the base (100-year) floodplain. For projects that involve the state of Missouri, the State Emergency Management Agency (SEMA) issues floodplain development permits. In the case of projects proposed within regulatory floodways, a "no-rise" certification, if applicable, should be obtained prior to issuance of a permit.

Threatened and Endangered Species

Section 7 of the Endangered Species Act (ESA) regulates the taking of listed species and alteration of critical habitat of listed species. If a species or its critical habitat were found to be potentially impacted in the North/South Corridor, a Section 7 informal consultation with the US Fish and Wildlife Service and Missouri Department of Conservation would be initiated. Depending on the outcome of informal consultation, which could include mitigation measures to avoid impacts, a formal consultation between agencies may then occur.

Are There Cultural or Historic Resources in the Study Area?

In order to determine if potential cultural resource impacts could occur from implementation of any of the proposed transit alternatives in the North/South Corridor, previously recorded cultural resources were identified through a cultural resource survey, literature search, and windshield survey. Likewise, these methods were also used to help identify previously unknown cultural resources, including architectural properties, structures, districts, cemeteries, bridges, archaeological sites, and cultural landscapes within the Corridor.

An archival review of previous cultural resource investigations, surveys, and projects near the North/South Corridor was performed to gain an understanding of the historical background of the area and to identify any previously recorded cultural resources. These previously recorded cultural resources included National Historic Landmarks; National Register of Historic Places (NRHP) eligible and listed properties, sites and districts; and local historic sites and districts. The investigation included a search of the records of the Landmarks Commission of Kansas City, the Archaeological Survey of Missouri, State Historic Preservation Office (SHPO), and the Missouri Department of Natural Resources (MDNR) files for information on known sites and their significance. A review of Jackson and Clay County tax assessment records was also conducted to assist in identifying properties within the Area of Potential Effects (APE) that are over 40 years old. Approximately 2,700 parcels were identified within the APE of which 1,400 had standing structures greater than 40-years old. MoDOT's Historical Bridge Coordinator was contacted in order to obtain bridge data. Appropriate historic maps and atlases were also obtained. This information provided a context for evaluating archaeological sites and historic properties identified during the surveys.

The project team met with the Missouri State Historic Preservation Office (SHPO) on June 18, 2008 to discuss the project. As a result of these consultations, the APE was defined as follows:

- All construction areas where ROW or property will be acquired.
- All parcels directly adjacent to a proposed alignment, station, maintenance area, or construction area.
- In areas where the directly adjacent parcel is vacant, the APE will extend to first visible property within the view shed.

• At proposed station locations the APE will extend perpendicular to the alignment along the cross street for one block or 500 feet (whichever is less) in each direction.

An archeological survey was not performed as part of this project. A separate APE for archeological resources would have to be defined and an archaeological survey would have to be conducted in later phases of this project.

Existing Architectural Resources

A background records search identified one National Historic Landmark, approximately 70 NRHP listed properties, and 14 NRHP Districts that are located within the North/South Corridor and have the potential to be impacted by the proposed project. The research also identified 12 properties and 5 districts listed on the Kansas City Register. However, there is some overlap and duplication of these properties and districts with the NRHP.

NRHP Listed and Eligible Districts

In addition to the NRHP listed and eligible properties in the North/South Corridor, several historic districts are located within the Corridor. They include:

- O Old Town District
- O The Wholesale District
- O West 9th Street/Baltimore Avenue District
- O District I (Downtown Hotels in Kansas City)
- O Walnut Street Warehouse & Commercial District
- O Cross Roads & Historic Freight District
- O Union Station District
- O Liberty Memorial District
- O Hyde Park West, East, & South Districts
- O Rockhill Neighborhood District

Kansas City Register of Historic Places

The Kansas City Register of Historic Places lists 12 properties that are located within the North/South Cor-

ridor. A number of the properties are also listed on the NRHP. They include:

- O Former Public Library
- O Land Bank Building
- Phillips House Hotel
- W.R. Shelley Residence
- O Harris-Kearney House
- O Scarritt Building & Scarritt Arcade
- Bryant Building
- Thomas J. Pendergast Headquarters
- Louis Curtiss Studio
- Union Station
- O Westminster Congregational Church Sophian Plaza

The Kansas City Register of Historic Places also lists five districts that are located within the North/South Corridor. A number of the districts have corresponding NRHP districts; however, there may be some variation in boundaries and included properties.

- O Janssen Place Historic District
- O Longmeadow Historic District
- O North Hyde Park Historic District
- O Old Hyde Park Historic District
- Rockhill Historic District

Existing Archaeological Resources

A background records search identified 16 previous Phase I or Phase II archeological surveys and 17 previously recorded archaeological sites within the project



Phillips House Hotel

area; however none of the 17 sites are currently listed on or eligible for the NRHP.

How Would the Project Affect Cultural and Historic Resources?

The construction of any of the proposed transit alternatives within the North/South Corridor may result in unavoidable impacts to cultural resources and existing NRHP properties and Districts. It is not anticipated that construction of any of the proposed transit alternatives would result in the demolition or loss of any cultural resource. However, implementation of any of the transit alternatives may result in minimal physical property takings and the majority of the proposed project alternatives would be constructed using existing public right-of-way (ROW). Therefore, the most likely impacts associated with this project will be visual in nature resulting from the construction of stations and/or cantenary lines (electrical transmission) associated with the LRT Alternative and its phasing options.

No Build Alternative

The No Build Alternative would not require the acquisition of additional right-of-way or the installation of support infrastructure that could visually impact existing cultural resources.

MAX Alternative

Similar to the No Build Alternative, the MAX Alternative would not require the acquisition of right-of-way or the installation of additional infrastructure. However, in order to implement the MAX Alternative, installation of stations would occur within the existing public ROW. The installation of stations could introduce visual impacts, both adverse and positive, into existing historic districts and near individual historic resources. It is possible that individual stations could be designed and integrated into the existing visual historic character so that adverse visual impacts would be mitigated.

LRT Alternative and Phasing Options

The LRT Alternative and its phasing options would likely result in the acquisition of property for right-of-way. However, it is not anticipated that any property acquisition would occur near any NRHP-listed property, historic district, or Kansas City Landmark. The vast majority of listed historic properties in the North/South Corridor are located between the Missouri River and the Country Club Plaza. None of the areas where potential acquisitions could occur are located within this stretch of LRT Alternative alignment variations except for the area immediately adjacent to the Missouri River and the Heart of America Bridge. However, visual impacts associated with the LRT equipment may occur and will need to be assessed.

Mitigation and Regulatory Requirements for Cultural or Historic Resources

Section 106 of National Historic Preservation Act (NHPA) requires the Federal Transit Administration (FTA) to consider the effects of their actions on historic properties and provide the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on FTA projects prior to implementation. Section 106 review encourages, but does not mandate, preservation. Sometimes there is no way for a needed project to proceed without harming historic properties. Section 106 review does, however, ensure that preservation values are factored into FTA planning and decisions. Because of Section 106, FTA must assume responsibility for the consequences of their actions on historic properties and be publicly accountable for their decisions. While the State Historic Preservation Office (SHPO) participates in the Section 106 consultation process, the federal agency (in this case, FTA) bears the responsibility for initiating various steps in the process and remains legally responsible for all required findings and determinations. Section 106 is not complete and FTA and the Kansas City Area Transportation Authority (KCATA) will continue

Section 106 consultation on the preferred and other viable alternatives when the DEIS is prepared.

Are There Any Impacts to Section 4(f) Resources?

Section 4(f) resources are properties that qualify for protections under Section 4(f) of the United States Department of Transportation Code. These properties include National Register-listed historic properties, public parks, recreation areas, and wildlife refuges. Under Section 4(f), these properties are to be avoided and not impacted unless it is neither feasible nor prudent to do so.

The North/South Corridor contains hundreds of Section 4(f) eligible properties from which five parks have been identified as potentially incurring impacts from new bridge crossings of the Missouri River and Brush Creek. These five properties include; Richard L. Berkley Riverside Park along the Missouri River, and the Brush Creek Greenway along Brush Creek, which includes Thomas J. Kiely Park, Frank A. Thies Park and Martin Luther King Jr. Square. Figure 6-3 shows the parks and boulevards in the study area.

Implementation of the No Build and the MAX alternatives would not result in physical impacts to Section 4(f) properties. The LRT Alternative and Phasing Options would result in impacts to Section 4(f) properties because of required bridge crossings along the Brush Creek Greenway and Riverfront Park. Minor ROW encroachments would occur in Riverfront Park. Details on the potential impacts, avoidance measures and mitigation strategies will be further investigated as both the MAX and LRT alternatives are refined and evaluated in the DEIS.

Would the Project Affect the Physical Environment?

In order to determine the possibility of impacts to the physical environment in the North/South Corridor, several resource areas were examined. The examination

included a survey for the presence of known hazardous materials releases and generators and the identification of unique visual resources to check the possibility of visual impacts. Air and noise impacts will be evaluated over the length of the LRT Corridor in the later DEIS project phase, with greater detailed analysis to occur in areas more sensitive to such impacts such as residential areas.

Would the Project Affect Hazardous Materials or Waste Sites?

In an effort to identify and evaluate sites containing hazardous materials, petroleum products, or other sources of potential contamination in these areas; a government/ regulatory database search was conducted. In addition, the online MDNR Underground Storage Tank (UST) and Leaking Underground Storage Tank (LUST) database, the 2007 MDNR Annual Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri, and select 1931, 1949, 1963, and 1964 historical Sanborn Fire Insurance Maps were reviewed.

Each of the sites identified as a result of the database search was assigned a degree of priority for potential soil and/or groundwater impacts: "No", "Low", "Medium", or "High". Sites were initially assessed based on the suspected shallow groundwater flow direction. Groundwater flow was evaluated based on available USGS 7.5-minute Quadrangle topographic maps and information provided in the regulatory database report.

A total of 575 sites were identified as having the potential to impact the alignments of the proposed transit alternatives. These sites primarily contain hazardous materials, petroleum, or a combination of the two. Of these sites, 40 have been ranked as having a "High" potential for contamination, 16 ranked "Medium" and 519 ranked as "Low" potential for contamination. The DEIS will identify impacts associated with the preferred



Figure 6-3: Parks and Boulevards

alternative and potential measures to avoid, minimize or mitigate impacts.

The proposed maintenance facility locations were not specifically investigated. However, it is highly likely those sites would have the potential for hazardous materials on site due to their industrial character and location.

Would the Project Cause Noise or Vibration Issues?

In order to fully assess noise and vibration impacts of transit projects, the potential maximum impact or relative change in existing baseline noise and vibration levels must be determined. These levels are then compared to FTA noise and vibration criteria to determine their relative significance. Based on these criteria, mitigation measures may be identified to reduce any undesirable effects.

This analysis did not include the collection of quantifiable noise and vibration measurements, and therefore did not allow for a comparison existing and forecasted noise levels with FTA noise and vibration criteria. Instead, this analysis focused on a qualitative discussion of potential sources of noise and vibration impacts resulting from implementing transit alternatives.

Proposed transit alternative operational noise and vibration sources could include train movement (rolling wheels on rails), light rail and bus engine noise, and increased bus or auto traffic near proposed stations or along city streets. Noise sources are typically limited to the dynamics of the vehicle movement on rails and the passing noise effects of the propulsion engine (electric motor whine, cooling fans). Roadway traffic noise impacts result from increased traffic or changed traffic patterns due to the introduction of stations, altered roadways or intersections, and the redistribution of traffic due to reduced roadway capacities. Other factors that influence noise generation of both light rail and bus transit alternative operations include the track installation type, topography, and other physical additions. Due to the absorptive behavior of ballast-andtie rail installations, generated noise levels are typically lower than street-embedded track.

Light rail operations can potentially impact nearby areas with ground-borne vibration transmitted from the dynamics of the wheel/rail interface through the geologic strata. The magnitude of the vibration source is dependent on the smoothness of the wheel and track connection, the stiffness of the train suspension, and the speed of the train and track type.

Although no noise or vibration modeling activities were undertaken as a part of this report, areas along proposed transit alternative routes that would be sensitive to adverse changes in noise and vibration were identified. Those areas generally included residential areas, parks, historic sites and districts, and cemeteries. In general, areas that were primarily office or commercial in nature were not considered sensitive to moderate increases in noise or vibration.

What Are the Potential Impacts to the Physical Environment?

Potential physical impacts created by proposed transit alternatives in the North/South Corridor range from exposure to hazardous materials during construction to visual impacts created by installation of electrical transmission and catenary support structures and lines through historic districts and continuous viewsheds.

No Build Alternative

Hazardous materials - No impacts to identified hazardous material contamination sites are anticipated in association with the No Build Alternative because it utilizes the existing transportation network and would only involve minor traffic engineering work rather than large roadway capacity expansions. Visual environment – The No Build Alternative would not involve the installation or construction of visually intrusive catenary poles, electrical transmission lines, or stations. Therefore, no visual impacts would occur with this alternative.

Noise and vibration – No noise or vibration impacts to sensitive receptors in the Corridor would be experienced with this alternative because no rail transit would be constructed or wholesale changes in travel patterns would occur.

MAX Alternative

Hazardous materials – No impacts to hazardous materials sites would be expected with implementation of the MAX Alternative. This alternative requires no acquisition of additional ROW and additional construction activities would be limited to those areas where new stations would be located. Those areas are already within public ROW and would not impact identified hazardous materials sites.

Visual environment – The MAX Alternative would introduce stations into the existing visual environment. Depending on placement and design features of each station, the MAX alternative has the potential to enhance or detract from the existing visual environment. However, it is expected that most stations would be located in existing built-up areas that would be less susceptible to visual harm. The analysis of potential changes to visual or aesthetic qualities is highly subjective and changes that may be acceptable or one individual or group may not be pleasing or acceptable to others.

Noise and vibration – Adverse noise or vibration impacts to sensitive receptors in the Corridor would not likely to be experienced with implementation of the MAX Alternative. The MAX Alternative utilizes BRT technologies, including rubber-tire vehicles. Any roadway alignment that the proposed MAX Alternative would run on currently has rubber-tire transit bus vehicles running on it. Therefore, the implementation of MAX Alternative BRT vehicles would not introduce additional noise or vibration impacts not already being felt near the alignments.

LRT Alternative and Phasing Options

Hazardous materials – Although the acquisition of property could occur with the implementation of the LRT Alternative or any of its phasing options, it is not known at this time if hazardous materials impacts would occur with acquisitions necessary for construction of the actual LRT alignment. Evaluation of potential impacts would occur as a preferred alternative is fully defined in the DEIS. The three sites considered for a maintenance and operations center are all located on existing or former industrial sites. A Phase I environmental assessment will be conducted for the preferred alternative during the DEIS to identify properties with potential environmental hazards.

Visual environment - The LRT Alternative and its phasing options would introduce track, support poles, overhead catenary wires, stations, electrical substations, retaining walls, and transit vehicles into the North/South Corridor. As noted above, the analysis of potential changes to visual or aesthetic qualities is subjective and the introduction of LRT support features could adversely impact the existing visual character of portions of the corridor. Specifically, LRT design and support features introduced near parklands, identified historic buildings and districts, or other individual sensitive cultural and public facilities are those that could see the surrounding character and sight lines altered. A full evaluation of impacts of the preferred alternative will be prepared for the DEIS.

Noise and vibration - It is anticipated that the operations of the LRT Alternative would introduce additional noise and vibration throughout the length of its proposed alignment. The significance of the potential increase in noise and vibration has not been determined and noise and vibration analyses will not be completed until after design work and operational plans have been refined when the DEIS is prepared. In the North/South Corridor, there are a number of sensitive receivers that could be particularly impacted from additional noise and vibration generated from the LRT Alternative. These sensitive receivers include historic districts with homes and buildings with older foundations and other residential districts that fall directly along proposed LRT alignments. Likewise, parklands, schools, and cemeteries are other receptors that are sensitive to increases in noise. Not all sensitive receivers in the North/South Corridor have been identified at this time, however a sampling of known sensitive areas and receivers include:

- Numerous NRHP-listed buildings in the downtown CBD and Crossroads districts;
- Anita Gorman Park, Waterworks Park, Penn Valley Park, the Liberty Memorial, Berkley Riverfront Park, Mill Creek Park, and Brush Creek Greenway;
- Old Hyde Park East and West Historic Districts and the Rockhill Historic District; and
- O Union Cemetery.

Hazardous materials, visual, and noise and vibration impacts and potential avoidance, minimization and mitigation measures will be fully evaluated in the DEIS as the MAX and LRT Alternatives are refined.

Construction Impacts

Although the level of detail during the Alternatives Analysis was not such that specific construction impacts could be identified it was acknowledged that there would be impacts along the light rail route, particularly to commercial properties. Construction of a light rail line within city roadways, including related utility relocation work, would unavoidably disrupt both vehicular and pedestrian access to properties along the route. Construction-related impacts were acknowledged and discussed during public meetings.

Concerned residents were assured steps would be taken to mitigate construction impacts through measures such as staged construction activities, avoiding disruptive construction activities during peak periods and limiting construction to short segments so the construction could be completed quickly for individual segments. Experience in other cities that have constructed street-running LRT systems would be used to develop mitigation measures.

Construction impacts and possible mitigation strategies would be assessed in detail during the preliminary engineering phase of the project.

Environmental Conclusion

The preliminary environmental analysis conducted during the Alternatives Analysis did not identify any substantial adverse impacts that would preclude development of the proposed transit improvements or require costly mitigation. The area of greatest concern relates to historic and cultural resources. The Corridor includes many historic and cultural properties, and several historic districts. The proposed light rail alignment is adjacent to some of these properties and concern has been raised about the potential impact. For example, the Overhead Catenary System (OCS) supplying electrical power to the light rail system could have visual impacts on these properties. The Alternatives Analysis did not include a detailed assessment of these environmental impacts or possible mitigation requirements; this will be required in preparation of a DEIS. Techniques used in other communities that have developed light rail systems adjacent to historical properties are expected to provide effective mitigation steps.

The MAX Alternative would not impact the historic and cultural properties.