

EXISTING CONDITIONS

Physical Corridor

The physical corridor gives consideration to the existing “on the ground” elements of the roadway within its right-of-way. This includes the road’s typical section, the parameters associated with the horizontal and vertical alignment, the condition assessment of pavement and bridges, and mobility elements including public transit and non-motorized (bicycle and pedestrian) facilities.

Typical Section

A typical section includes the number and widths of travel lanes, shoulder width or curb and gutter, right-of-way width, drainage, open ditches, utility corridors, etc. Along Lee’s Summit Road the typical section varies with most deviations from the standard typical section occurring at intersections, not along a roadway segment.

The existing Lee’s Summit Road and Douglas Street typical sections include one approximately 10 foot wide travel lane in each direction, little or no shoulder, and an open ditch, typically very close to the road, to handle drainage. Due to the proximity and size of the drainage ditches along the roadway, as well as the roadway elevation, overtopping has also been known to occur in select locations. Along the majority of the roadway corridor utility poles and/or vegetation are located very close to the travel lanes, often visually confining the roadway.

The right-of-way varies throughout the corridor from as little as 45 feet (north of Lakewood Boulevard) to 90 feet (north of Phelps Road) to as wide as 120 feet (just south of US-40). The Lee’s Summit Road typical right-of-way significantly changes at 83rd Street. North of 83rd Street the typical right-of-way is approximately 50 to 60 feet, while south of 83rd Street the typical right-of-way width is approximately 75 to 80 feet. Douglas Street right-of-way within the City of Lee’s Summit is typically 80 feet.

Exhibit 2 – Typical Section

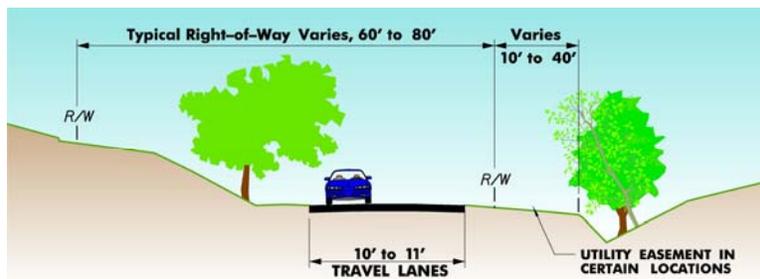


Exhibit 3 – Photographs of Existing Roadway Section



Physical Parameters

The physical parameters assessment focuses upon the roadway's horizontal and vertical existing alignments. Lee's Summit Road is currently posted 40 mph between US-40 and the Lee's Summit city limits. Within the City of Lee's Summit, Lee's Summit Road/Douglas Street is posted 45 mph. The City of Kansas City's Major Street Plan includes Lee's Summit Road as a secondary arterial facility, which would translate to a 40 mph design speed and maximum allowable grade of 7.0%. The City of Lee's Summit has expressed a preference for Douglas Street to retain its posted 45 mph speed limit, meaning a 50 mph design speed. Because of this difference in design speeds and to maintain the flexibility in reviewing an improved 2-lane "highway", the roadway has been assessed for both 40 mph and 50 mph. A comparison to the 85th percentile speed is shown later in the Transportation section.

Exhibit 4 graphically represents the horizontal and vertical curve deficiencies for Lee's Summit Road/Douglas Street. The exhibits include red and yellow dots to represent the assessment of horizontal and vertical curves with yellow representing curves meeting a 35 mph design speed (but not the desired 40 mph) and red illustrating those with a design speed less than 35 mph. Also found on the vertical alignment exhibit are longer bands of color which represent the assessment of profile grades. For a secondary arterial standard, Kansas City lists 7% as the maximum allowable grade. Therefore, grades exceeding 7% would be shown with a red band, however none exist in this assessment, and grades between 6 and 7% are represented with a yellow band.

Horizontal Alignment

The existing horizontal centerline was established using the best information available during the study which essentially involved tracing the roadway's centerline (the double yellow pavement marking) from the aerial mapping. The horizontal alignment of Lee's Summit Road/Douglas Street includes 39 horizontal curves. Twenty-five of these curves (64.1%) have a design speed, based on today's design standards, exceeding 50 mph. An additional eight curves (20.5%) have a design speed between 40 and 50 mph. Three curves (7.7%) meet a 35 mph design speed while the remaining three curves (7.7%) are deficient with a design speed below 35 mph. Many of these curves are posted with warning signs. It is assumed for this assessment that curves are without superelevation as City standards do not include superelevation on horizontal curves for a secondary arterial design.

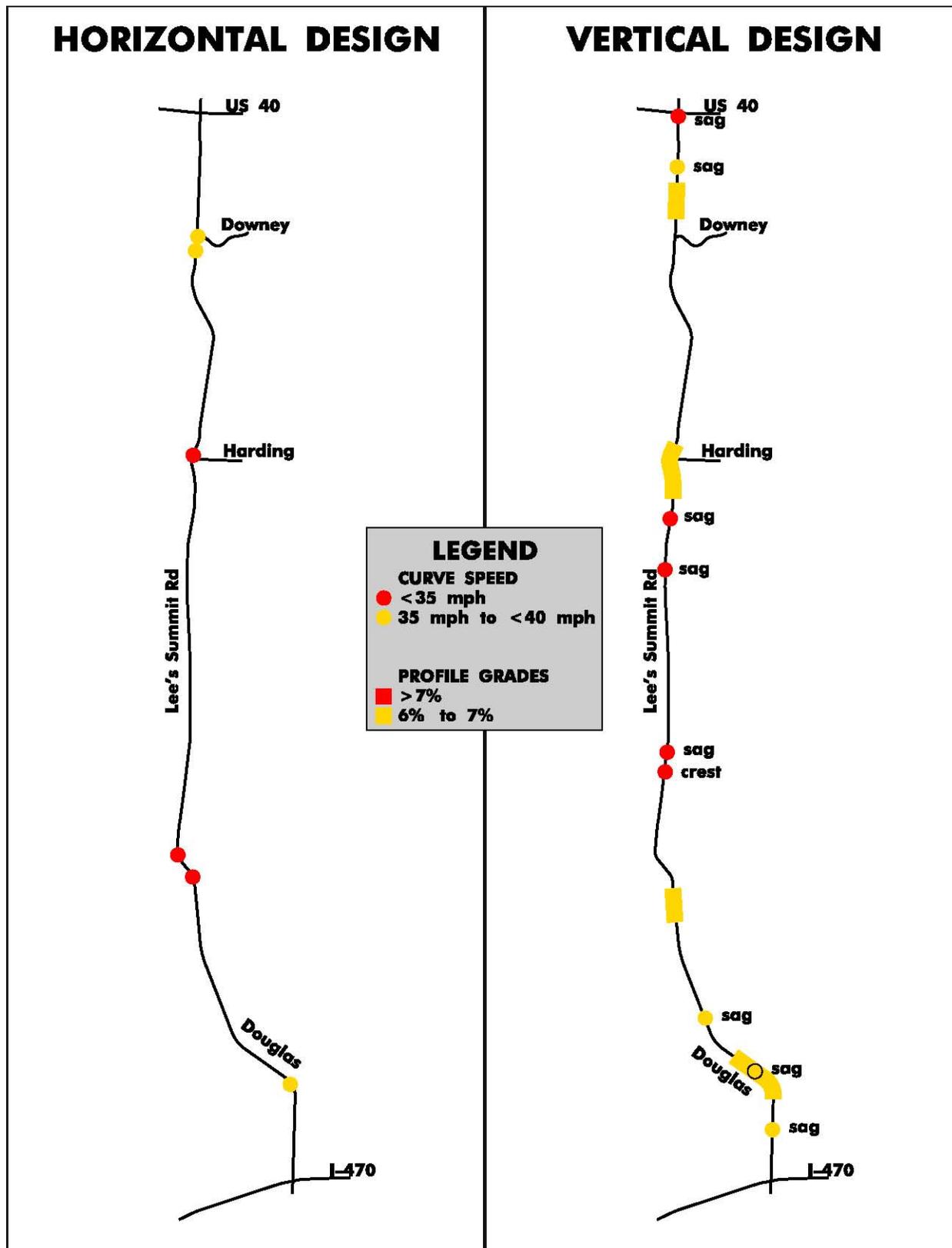
Vertical Alignment

The vertical alignment for Lee's Summit Road/Douglas Street includes 44 vertical curves, 22 crest curves and 22 sag curves, as well as 44 total grades. Of the vertical curves, only thirteen (30%) are of sufficient length to have a design speed of 50 mph or greater. Twenty-two (50%) however, have a design speed between 40 and 50 mph. Of the nine deficient curves (20%), four have a design speed of 35 mph, and all of these are sag curves. The remaining five curves (11%) have design speeds of less than 30 mph, with three of these even less than 25 mph. This group includes the lone deficient crest curve with a design speed of less than 25 mph found near the junction of E 77th Terrace.

As stated above, none of the 44 grades along the corridor exceed the maximum recommended 7%. In fact, thirty-nine (83%) of the existing grades are less than 6%. Only five grades between 6 and 7% are present today, with only one of these grades being at or near the maximum 7%. This stretch is approximately 1,000 feet in length and is between E 83rd Street and E 85th Street. The profile from the Little Blue River south to just beyond the Space Center Driveway is essentially flat and a low area. This area has been noted as having a problem with over topping, even occasionally requiring the closure of Lee's Summit Road. This is likely due to a number of contributing factors including, the flat profile, shallow ditches, a lack of and/or blocked drainage structures, and the roadway elevation.

Strip maps illustrating the existing plan and profile can be found in Exhibit 5.

Exhibit 4 – Horizontal and Vertical Design Assessment



Condition Assessment

A condition assessment gives consideration to the elements of the roadway that are often assessed on an annual basis. This assessment typically includes pavement and bridges. Pavement condition ratings were provided by the various governing agencies. A summary description of each agencies approach to pavement condition is provided. There are two bridges along the Lee's Summit Road/Douglas Street corridor. One bridge is over the Little Blue River while the other bridge is over Interstate 470.

Pavement Condition

The City of Kansas City, Missouri utilizes the RoadManager 2000 Pavement Notebook. Various condition ratings are provided including PCI as well as a Base Index and Surface Index. Additional information is provided on distress code which identifies specific pavement issues as well severity and extent of the issue. The distresses typically include alligator cracking, block cracking, and distortion as well as transverse and longitudinal cracking. In many case the severity is listed as low to moderate. In only one area were potholes identified as a high severity although the extent of the issue is considered very localized. In general, the corridor's pavement is in reasonable condition with eth exception of the section from Ess Road south to the City Limit line that is rated fair to poor.

The City of Lee's Summit does not maintain a formal pavement condition rating system, yet it does record the latest action on the roadways under investigation. Records indicate that Lee's Summit Road from Kansas City to Colbern Road was resurfaced in 2003 and that Colbern Road was resurfaced in 2004. Visual observation suggests that pavement condition is generally in good condition.

Missouri Department of Transportation (MoDOT) provides information on several pavement ratings including the IRI (International Roughness Index), PSR (Present Serviceability Rating) and Condition Index. Each of these has a different rating structure which is described below. Two locations are reviewed, US-40 Highway at the north end of the corridor and Interstate 470. Overall these indexes indicate that US-40 pavement condition is fair to poor, while Interstate 470 is in good to very good condition.

Bridge Condition

The 214 foot long bridge over the Little Blue River was built in 1955. It's most recent (March 2006) FHWA Sufficiency Rating is 62.8 of 100, which is an indication of reasonable condition. The bridge has three main spans (68'-78'-68') and carries a bridge deck width of 28 feet (roadway width is 26 feet). The superstructure has 4 rolled steel beams with rocker bearings. The substructure is concrete with stub wall abutments and web wall piers. The truck percentage is listed at 5% of an ADT of approximately 9,000 vpd. The bridge is posted for 68 tons on both approaches (load rating calculation done in 1998). Observations note a new deck and corral rail as well as some heavy surface rust on bottom flanges. Section loss is noted at less than 15%.

No clearance issues are present with a low structure to stream height of 30 feet. The overtopping frequency is considered remote for both the bridge and the approach roadways. The asphalt approach roadway's condition was rated good. Bridge rail, approach rail, transitions and end treatments all meet acceptable standards. The superstructure is rated at a minimal to moderate extent of deficiency. The substructure is rated at a minimal extent of deficiency. The deck and approaches have no deficiencies. In combination with the service rating factors yields a structural condition rating of 34.47. The type of repair work includes clean and paint structural steel with lead paint removal as well as repairs to cracked concrete abutment and pier. The cost of repair as presented in the 2006 Biennial review was estimated at just under \$120,000.

The 258 foot long bridge over Interstate 470 was built in 1979. Its deck, superstructure and substructure ratings are all 7 which are indicative of good condition. The general comments note that the pin areas are very rusty. The type of repair work includes clean and paint girder ends, diaphragms, and rockers. The bridge has four spans (39'-88'-88'-34') and carries a bridge deck (curb to curb) width of 70 feet. The ADT is listed at 3,574. The bridge has an approved posting category of 65 tons. The reinforced concrete approach pavement condition is rated an 8 or very good. Bridge rail and approach rail treatments meet acceptable standards.

Mobility Elements

The mobility elements include existing non-motorized, including pedestrian and bicycles, and transit facilities, as well as planned facilities along, adjacent to or crossing the Lee's Summit Road corridor.

Public Transit

Transit services are provided by the Kansas City Area Transit Authority (KCATA) via bus Route 251. This route traverses between Blue Ridge Mall and Truman Medical Center (TMC) – Lakewood. Its route is primarily US-40 Highway and Lee's Summit Road. Access to TMC – Lakewood is via Little Blue Road.

Several bus stops are located along Lee's Summit Road and include marked stops at the near side approaches at Woods Chapel Road and at US-40 Highway. Unfortunately both locations are not served by sidewalks. The bus stop locations at Woods Chapel Road are essentially in the drainage ditch along the side of the road. It is also worth noting that it is possible to flag down the bus anywhere along the route, this was observed happening at the Space Center entrance. Exhibit 6 illustrates the route and marked stops for the KCATA bus Route 251.

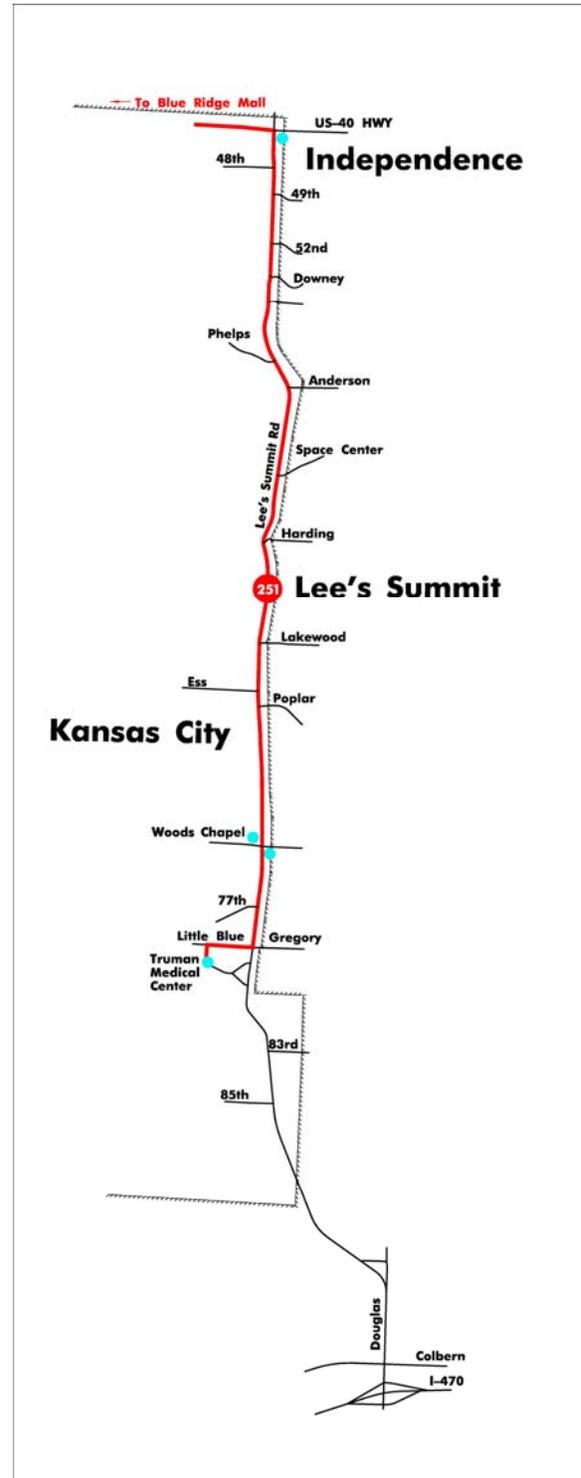
Non-motorized

The non-motorized section reviews bicycle and pedestrian facilities, both on and off road.

Bicycles – Lee's Summit Road is shown on the City's Bicycle Route map, albeit as a planned facility. Currently no bicycle facilities or signs are provided along or across Lee's Summit Road. With a lack of shoulder and high speeds (greater than 40 mph), a review through the Bicycle Compatibility Index (BCI) would show a high level of stress, independent of traffic volumes. Several other bicycle routes are also identified and include:

- US-40 Highway (from Noland Road to Lee's Summit Road)
- Little Blue Road (proposed) – opposite Lakewood Boulevard
- Gregory Boulevard Extension (proposed) – existing Little Blue Road
- Little Blue Trace Trail (proposed) – under development (Metro Green priority)

Exhibit 6 – Transit Bus Routes and Marked Stops



Multi-use Paths – The Little Blue Trace Trail is proposed by Jackson County Parks and Recreation. This trail would go from a trailhead near the junction of Phelps Road and Lee’s Summit Road and proceeds easterly beneath I-470/MO291 and would eventually cross underneath US-40 Highway. The trail would continue northerly connecting to the City of Independence’s Enhancement Grant Application and the existing trail at the Hartman Heritage Center. Coordination with this trail is necessary with regards to the Lee’s Summit Road bridge crossing as well as making connections to other proposed facilities.

Pedestrians – Only a small portion of sidewalk exists along Lee’s Summit Road, that being 200 feet on the east side, south of US-40 Highway. Side street sidewalks are also limited. The following list identifies those side streets with sidewalks that intersect with Lee’s Summit Road:

- 48th Terrace
- 49th Street
- Lakewood Boulevard
- 77th Terrace
- Gregory Boulevard

Even institutions like TMC – Lakewood and the ball fields do not have a sidewalk from their complex to a public street. In Lee’s Summit sidewalks are present along Douglas Street although they are located just outside the study area south of the I-470 interchange.

Under proposed secondary arterial standards, five foot wide sidewalks along both sides are included within the proposed right-of-way.

Exhibit 7 – Bicycle and Pedestrian Accommodations



The Environment

The study area is an approximately 4.63 square mile area which includes an environment that ranges between industrial to aquatic/drainage areas. The analysis approaches the study in terms of the typical environmental process of “avoid, minimize, or mitigate”. No impacts can be quantified during the existing conditions documentation; however, probable impacts will be evaluated during subsequent stages of the design concept development. Guidance pertaining to sensitive resources is included in this document to identify potential next steps. The following natural and man-made physical features were evaluated to determine existing conditions:

- socioeconomic factors;
- demographics;
- hazardous waste;
- public lands;
- cultural resources;
- water quality;
- floodplain;
- wetlands;
- soil erosion and sedimentation;
- geologic conditions; and
- threatened and endangered species.

Data was compiled from a variety of sources to examine existing conditions. The data used include publicly available GIS data for parks, U.S. Census 2000 block group data, Census 2000 TIGER/Line data, aerial photography, the Kansas City telephone directory, Archaeological Survey of Missouri Records, Missouri State Historic Society data, National Wetlands mapping, Natural Resources Conservation Service soil data, U.S. Geological Survey mapping, National Register of Historic Places data, FEMA Q3 Digital Flood Data, and Missouri Department of Conservation threatened and endangered species data.

Socioeconomic Factors

Available databases were researched to determine the existing socioeconomic factors in the study area, including environmental justice and demographics.

Environmental Justice

Executive Order 12898 requires that actions be taken to address environmental justice in minority and low-income populations, by identifying and addressing disproportionately high and adverse human health or environmental effects from potential actions of the project. Minority and low-income populations were identified within and adjacent to the study area. All of the 9 Census Block Groups within and adjacent to the study area were below the Jackson County averages for percent minority and the percent of people living below the poverty level. Exhibit 8 identifies Jackson County averages for percent minority, percent below poverty, and the total population of Jackson County.

Exhibit 8 – Jackson County Population Averages

Census Data 2000 Jackson County Missouri Averages	
Percent Minority	32.29%
Percent below Poverty	11.47%
Total Population	654,880

Exhibit 9 illustrates percent minority and percent below poverty for all block groups within and adjacent to the study area. All of the nine Census Block Groups within and adjacent to the study area are below the Jackson County averages for percent minority and the percent of people living below the poverty level.

Exhibit 9 – Study Area Minority and Poverty Block Groups

Block Group Number	Percent Minority	Percent Below Poverty
Block Group 1, Census Tract 137.01	9.10%	5.23%
Block Group 2, Census Tract 137.01	6.11%	2.19%
Block Group 1, Census Tract 142.03	10.30%	2.54%
Block Group 2, Census Tract 142.03	9.72%	4.2%
Block Group 2, Census Tract 142.04	5.58%	1.96%
Block Group 3, Census Tract 142.04	7.15%	2.54%
Block Group 2, Census Tract 143	7.82%	10.38%
Block Group 2, Census Tract 145.01	12.90%	3.49%
Block Group 1, Census Tract 145.02	4.14%	3.7%

Demographics

Gender, age, income and employment data within and adjacent to the study area were reviewed to compile a demographic profile of the area. Census block groups within and adjacent to the study area were examined to extrapolate the desired statistical data. Of the 14,810 people living in the block groups, 47.87% were male and 52.13% were female. The age of the population living in the block groups within and adjacent to the study area was examined and five age groups were identified to provide a demographic profile of age. The highest populous age group has persons in the 40-59 year age group, while the lowest populous has persons in the 80 and over age group. Exhibit 10 illustrates the demographic profile of age for block groups within and adjacent to the study area.

Exhibit 10 – Demographic Profile of Age for Study Area

Age group	Number of persons	Percent of total block group population within and adjacent to the study area
Total block group population within and adjacent to the study area	14,810	
Total under 18	3569	24.10%
Total 18 to 39	4192	28.31%
Total 40 to 59	4645	31.36%
Total 60 to 79	1985	13.40%
Total 80 and over	419	2.83%

Median income data was compiled for the block groups within and adjacent to the study area. Of the nine block groups, the average household median income was \$69,224. The highest household median income was \$114,055 and the lowest household median income was \$38,618. Unemployment data was compiled for the block groups within and adjacent to the study area. For the nine block groups included in the data compilation, the unemployment rate was 4.67%.

Data was compiled to determine the percentage of people living in the block groups within and adjacent to the study area that live and work within Jackson County. Of the nine block groups evaluated, 77.70% of the people live and work within the Jackson County area while 22.30% live within the Jackson County area, but work outside of the county.

Vehicle availability was identified for block groups within and adjacent to the study area. For the nine block groups included in the data compilation, the percentage of people with no vehicle available was 2.26%.

Hazardous Waste

As indicated in the Environmental Appendix, a series of federal, state, and local database searches was conducted within and adjacent to the study area. The following sources were searched for potential hazardous and solid waste concerns and for existing businesses and past businesses suspected of using or storing petroleum or hazardous substances. A Phase 1 Environmental Site Assessment, in accordance with American Society for Testing and Materials (ASTM E 1527), is not to be conducted for this stage of the environmental analysis.

Federal

- National Priority List
- Proposed National Priority List Sites
- National Priority List Deletions
- Federal Superfund Liens
- Comprehensive Environmental Response, Compensation, and Liability Information System Database (CERCLIS)
- CERC-NFRAP
- Corrective Action Report
- Resource Conservation and Recovery Act Information (RCRA-TSDF)
- Resource Conservation and Recovery Act Information (RCRA-LOG)
- Hazardous Materials Information Reporting System
- Engineering Control Sites List
- Sites with Institutional Control
- Department of Defense Sites
- Formerly Used Defense Sites
- A Listing of Brownfields Sites
- Superfund (CERCLA) Consent Decrees
- Records Of Decision
- Uranium Mill Tailings Sites
- Open Dump Inventory
- Toxic Chemical Release Inventory System
- Toxic Substances Control Act
- FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
- Section 7 Tracking Systems

- Integrated Compliance Information System
- PCB Activity Database System
- Material Licensing Tracking System
- Mines Master Index File
- RCRA Administrative Action Tracking System

State

- Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites
- Registry Sites Withdrawn or Deleted
- Permitted Facility List
- Solid Waste Facility Database List
- Leaking Aboveground Storage Tanks
- Sites with Controls
- Brownfields Site List
- Leaking Underground Storage Tanks
- Underground Storage Tanks
- Certified Hazardous Waste Resource Recovery Facilities

Tribal Records

- Indian Reservations
- Leaking Underground Storage Tanks on Indian Land
- Underground Storage Tanks on Indian Land

EDR Proprietary Records

- EDR Proprietary Manufactured Gas Plants

One site that treats, stores, disposes or transports hazardous waste or petroleum was found adjacent to the study area: Texaco Star Mart #3, 1601 Douglas, Lee's Summit, Missouri. However, there is no indication of a current environmental impairment at the location. A search of the Leaking Underground Storage Tank database showed one former leaking underground diesel tank, which has since been removed, at Truman Medical Center, 7900 Lee's Summit Road, Kansas City, Missouri. A No Further Action Letter from the Missouri Department of Natural Resources was noted on January 25, 2000.

Institutional

The following institutions listed in Exhibit 11 are located within the study area:

Exhibit 11 – Institutions

Name	Address
Churches	
MoKan Salvation Army Christian Camp and Conference Center	16200 E. 40 HWY
Pleasant Grove Bible Church	4916 Lee's Summit Rd
Country Meadows Baptist Church	4901 Lee's Summit Rd
Oakwood Baptist Church	7600 Lee's Summit Rd
Sanctuary of Faith	2305 NE Douglas St
Hospitals	
Truman Medical Center - Lakewood	7900 Lee's Summit Rd
Saint Luke's East - Lee's Summit	1600 NE Douglas St
Schools and Day Care Centers	
Lakeview Woods State School	351 NE Gregory
Senior Care Facilities	
Tiffany's Adult Day Care	16021 E. 40 HWY

Emergency Services

Police, fire, hospital, and other emergency services within and adjacent to the study area were identified. No police or fire station facilities were located within the study area; however, the two hospitals noted above would attract emergency vehicle traffic. Truman Medical Center - Lakewood is located at 7900 Lee's Summit Road within the study area; and Saint Luke's East – Lee's Summit is located at 1600 NE Douglas Street, adjacent to the southern boundary of the study area.

Public Lands

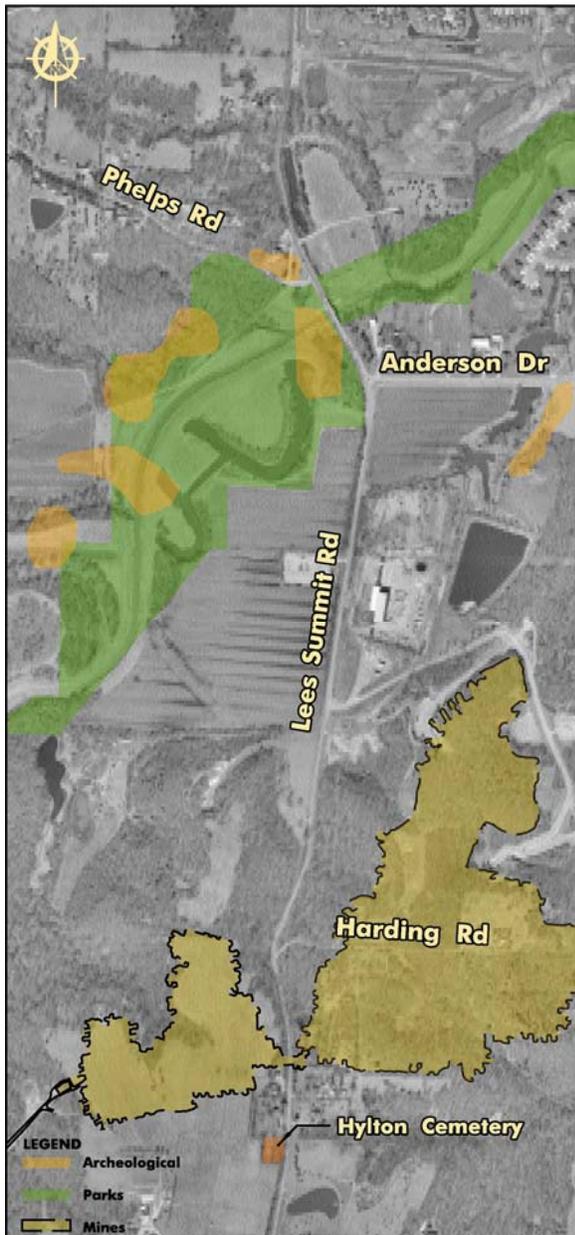
Public lands include properties used or reserved for use as park, recreation, wildlife or waterfowl areas and historic sites. Public park lands may be reserved for public recreational usage under a Section 4(f) or Section 6(f) designation. Section 4(f) is part of the Department of Transportation (DOT) Act of 1966 that was designed to preserve the natural beauty of the countryside. Property eligible for Section 4(f) must be publicly owned, except for historic sites, which can be either publicly or privately owned. Section 4(f) eligible sites may not be impacted by federally funded actions unless there is no feasible and prudent alternative to the proposed action.

Section 6(f) is part of the Land and Water Conservation Fund (LWCF) Act, which was designed to provide restrictions for public recreation facilities funded with LWCF funds. The LWCF Act provides funds for the acquisition and development of public outdoor recreation facilities that could include community, county, and state parks, trails, fairgrounds, conservation areas, boat ramps, shooting ranges, etc. Facilities that are LWCF-assisted must be maintained for outdoor recreation in perpetuity and therefore require mitigation that includes replacement land of at least equal value and recreation utility. As detailed below, Little Blue Trace Park has received LWCF funds.

The following park was identified within the study area and a portion is illustrated on Exhibit 12:

- Little Blue Trace Park is located along the Little Blue River, extending from Longview Lake north to Blue Mills Rd. The 1,856 acre preserve contains a 10 mile hiking and bicycle trail, 4 shelters, 30 picnic tables, a softball field, and 3 soccer fields.

**Exhibit 12 – Public Lands (Section 6(f)),
Archeological Resources and Subsurface Mines**



Cultural Resources

The Missouri Department of Natural Resources (MDNR) was contacted regarding historical structures and archaeological resources. MDNR letter dated September 05, 2006, included in the Environmental Appendix, indicates a moderate to high probability for archeological sites in the project area due to the presence of known archeological resources in the vicinity. Research was conducted using the cultural resource management reports, located in the MDNR Historic Preservation Program Library, and the Archeological Survey of Missouri (ASM) records. Search results of historic sites and historic districts indicated no sites or historic districts listed on the National Register of Historic Places (NRHP). Six previously recorded ASM sites were found within or adjacent to the study area, as shown on Exhibit 12, however site 23JA51 is currently located within a sewage disposal pond and therefore has likely been destroyed. Although no NRHP listed sites are located in the study corridor, a section of Lee’s Summit Road is designated as the historic Jefferson Highway which ran from New Orleans to Winnipeg.

Even though it was not found to be recorded as a cultural resource, Hylton Cemetery located south of Harding Road and along the west side of Lee’s Summit Road, is within in the study area. Cemeteries are seldom considered under section 106 and are usually dealt with under state sepulcher laws.

Environmental Factors

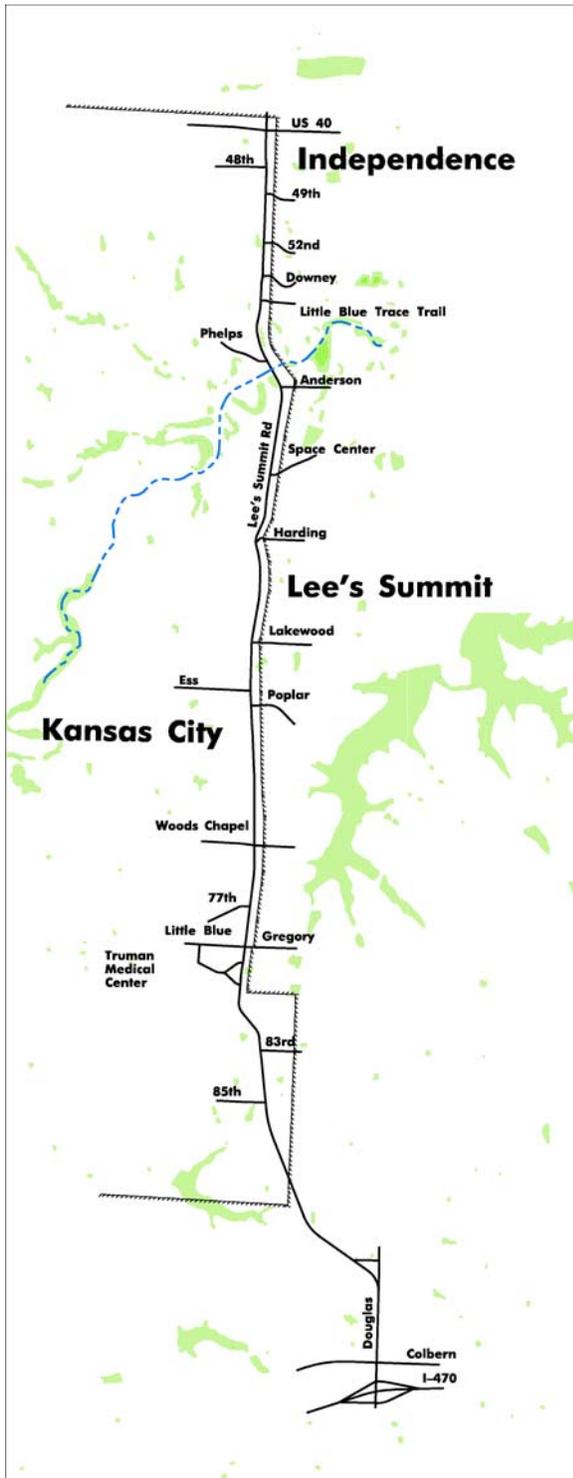
Wetlands

Wetlands are defined as “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 CFR 328.3 (b)). Wetlands are considered to be “Waters of the U.S.” and are regulated by the USACE under Section 404 of the Clean Water Act. Additionally, Executive Order 11990 requires all federal agencies to minimize impacts to wetlands when conducting specific activities and when federal permits are required.

Potential wetland areas and Waters of the U.S., within and adjacent to the study area, were identified. National Wetlands Inventory (NWI) data was reviewed to locate potential wetlands. Wetland

delineation was not to be performed for this study stage; however, a wetland delineation may need to be done prior to construction depending upon anticipated impacts. The locations of potential wetlands in the study area are indicated on Exhibit 13.

Exhibit 13 – NWI Wetlands



The most concentrated areas of wetland habitat lie along the Little Blue River floodway/ floodplain; these wetlands consist mainly of palustrine, emergent wetlands.

Information for hydric soils, a component of wetlands, was obtained from the NRCS. The only portion of the study area that consists of soil that may contain hydric inclusions is located around the Little Blue River and May Brook, as illustrated on Exhibit 14.

Depending upon the extent of impacts that are placed upon wetlands and Waters of the U.S., wetland mitigation may need to be performed in accordance with Clean Water Act Section 404 Compensatory Mitigation Requirements, including creation, restoration, enhancement, or preservation of aquatic resources. This would likely include the crossings of the floodway/ floodplain where Lee's Summit Road runs through Little Blue Trace Park.

Floodway/ Floodplain

The State of Missouri participates in the National Flood Insurance Program (NFIP). Any development that is within a special flood hazard area as identified by the Federal Emergency Management Agency (FEMA) must meet the requirements of the State of Missouri Executive Order 97-09. This would require obtaining a flood development permit for the project, which must be obtained from the State of Missouri Emergency Management Agency (SEMA) prior to the commencement of construction activity. All of the floodway within the study area is contained within the Little Blue River floodway and the Lakewood West floodway. The 100-year floodplain coincides with floodway locations of the Little Blue River floodway within the study area. The locations of potential floodway/ floodplain are indicated on Exhibit 14.

Section 60.3(d)(3) of the NFIP regulations states that a community shall *"prohibit encroachments, including fill, new construction, substantial improvements, and other developments within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance the standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base (100-year) flood discharge."*

These regulations would require that a “no-rise” certification be obtained before any development permits can be obtained if construction activities occur within the regulatory floodway (floodplain).

Exhibit 14 – Floodplain, Wetlands and Hydric Soils

Soil Erosion and Sedimentation

The Little Blue River floodway/ floodplain is located within the study area. Soil erosion and sedimentation are closely linked to Water Quality. Soil erosion and sedimentation would likely take place with any clearing for improvements. Storm water could then erode soil and convey sedimentation to the Little Blue River floodway/ floodplain. The potential improvements will require compliance with the provisions of the Missouri Department of Natural Resources (MDNR) storm water regulations found at 10 CSR 20-6.010. The regulations and permit procedures require utilization of erosion controls that limit the amount of pollutants that are allowed to leave a job site. Implementation of temporary erosion controls, best management practices, and compliance with permit limits will prevent adverse impacts to water quality

Water Quality

The only creeks, stream, and rivers located in the study area are the Little Blue River, and unnamed tributaries to May Brook and Unity Lake No. 2.

Geologic Resources

The composition of the subsurface geology under Lee’s Summit Road consists of a thin layer of limestone which is topped by layers of shale and coal. The Missouri Department of Natural Resources did not indicate any possibility of karst areas that could hinder construction of the proposed road improvements. However, there are subsurface mines located within the study area that are associated with the Space Center storage complex. A formerly mined area is being utilized as warehouse, office, and light manufacturing space; it is located east of Lee’s Summit Road and encompasses 1.3 million square feet. Wes Cowan, Vice President of Space Center Kansas City Inc., was contacted to obtain vertical data for the space center mines, but no such data was available. Exhibit 12 shows the location of subsurface mines associated with the Space Center, in particular where a tunnel crosses beneath Lee’s Summit Road and connects to a subsurface mine under Stephenson’s Peach Orchard.



Threatened and Endangered Species

The Missouri Department of Conservation (MDOC) and the U.S. Department of the Interior Fish and Wildlife Service (USFWS) were contacted regarding rare, threatened and endangered species within or adjacent to the study area. MDOC letter dated August 21, 2006, included in the Environmental Appendix, indicates that the *Heritage Review Report* found no records of species/ habitats with State or Federal restrictions. USFWS letter dated September 13, 2006, also included in the Environmental Appendix, indicates that there are no federally listed flora or fauna species currently within or adjacent to the study area, however, there is a historic record of the western prairie fringed orchid near the project area that was dated in 1865, but it is believed that suitable habitat for the species no longer exists. The exact location of the historic record for the western prairie fringed orchid was not stated in the USFWS letter.

In their letter, MDOC listed no threatened and endangered species constraints in their *Heritage Review Report*, but do include concerns and management recommendations based on site or proposed project details not specifically related to threatened and endangered species records. The MDOC concerns and management recommendations pertain to karst geology, streams, and populations of grassland birds, in particular, barn owls (state endangered), northern harriers (state endangered), Henslow's sparrows (imperiled in the state), and greater prairie chickens (state endangered). The management recommendations for karst geology, streams, and state endangered birds are listed in the Environmental Appendix and will be incorporated into environmental planning and construction.

Transportation

The transportation section provides information concerning the corridor under study as well as the surrounding transportation network. The data documents existing regulatory controls along the corridor and at intersections, provides summary information on existing traffic volumes as well as operational analyses of capacity and safety assessments.

Transportation Network

Lee's Summit Road is classified as a secondary arterial (minor arterial in Lee's Summit) which relates to certain design speeds and alignment criteria as identified in the Physical Corridor section. While the current roadway may not meet this description, any improvements to the roadway should (in order to be cost effective) lend them towards the progressive advancement of the defined classification. The corridor is also defined by the types of roads that intersect with it. The existing intersecting street classifications are listed as well as shown in Exhibit 15.

Exhibit 15 – Functional Classification

Primary (Principal or Major) Arterial

A multi-lane roadway often with a median,
with a posted speed of 45 mph

Lee's Summit Road/Douglas Street (within Lee's Summit)
US-40 Highway
Colbern Road

Secondary (Minor) Arterial

A multi-lane roadway,
with a posted speed of 35 mph

Lee's Summit Road (within Kansas City)
Gregory Boulevard

Collector

At a minimum a two-lane roadway, with a parking lane
and a posted speed of 25 to 30 mph

Lakewood Boulevard
Phelps Road
49th Street

Local

A two-lane roadway,
with a posted speed of 20 to 25 mph

Anderson Drive
Ess Road
Woods Chapel Road
Strother Road



The future transportation network and its classification is identified by the City's Major Street Plan and includes the new boulevard of Gregory Boulevard (west of Lee's Summit Road) which is currently named as Little Blue Road. Two other secondary arterials are shown and include a new Little Blue Road (which is currently an unnamed extension of Lakewood Boulevard) west of Lee's Summit Road and a new Velie Road that would run parallel along the Little Blue River. At this time it is anticipated that none of these proposed facilities will be in place by or before the future time frame of 2030, however consideration is given to allowing for such facilities in the future.

Traffic Control Devices and Signing

The corridor's junctions with primary arterials are the only intersections under traffic signal control. Gregory Boulevard, a secondary arterial, and Woods Chapel Road, a local road, both are under 4-way STOP control. All other remaining public street intersections with Lee's Summit Road are under side street STOP control. The exit drive from Truman Medical Center – Lakewood (as a major traffic generator) is also under STOP control.

Numerous signs are posted along the corridor and are described by their classifications as speed limits and warning signs. Within Kansas City the posted speed limit is 40 mph. Within Lee's Summit, the posted speed limit is 45 mph. Until 2001 and 2002, the posted speed limit in Kansas City had also been 45 mph. North of US-40 in the City of Independence, the posted speed limit is 35 mph. Several warning signs are posted along the corridor and include deer crossings, s-curves without and with supplemental speed advisory signs of 30- and 35-mph, slippery when wet, stop ahead for the two 4-way STOP controlled intersections, and T-intersection ahead for the junction with Lakewood Boulevard, and numerous chevron signs along five horizontal curves.

The location of the traffic control devices and signing is shown on Exhibit 5 with the existing conditions plan.

Traffic Volumes

Traffic volume data was collected in mid-September 2006 which included 24-hour counts at several locations along the corridor as well as turning movement counts during peak periods at critical intersections. It should be noted that there are two intersections along the corridor where existing traffic counts were conducted yet are not included within the LS TDM model; Woods Chapel Road and Ess Road. The intersection analysis utilizes these existing traffic volumes and an "off-line" estimate of future year traffic is made for these intersections. Only vehicular traffic data was collected as sidewalks are not provided, no pedestrian counts were conducted. Automatic vehicle classification counts in Independence and Lee's Summit indicate a consistent truck percentage of slightly less than 10%.

Existing AM and PM peak hour turning movement counts were collected. In general, the AM peak hour was from 7:30 to 8:30 AM and the PM peak hour was from 4:30 to 5:30 PM. These turning movements and existing lane configurations are shown in Exhibit 16. 24-hour machine counts were conducted and range between 5,500 and 9,300 vehicles per day (vpd) along Lee's Summit Road. Exhibit 17 shows the daily volumes along the corridor and major side streets. The traffic patterns of the corridor form a "dumb-bell" shape with heavier traffic volumes at the north and south ends and lesser volumes in the middle segment. In the AM period, traffic at the north end has a northbound directional peak while traffic at the south end in the AM period has a southbound directional peak.

This data indicates a range of daily traffic volumes along Lee's Summit Road between 5,500 and 9,300 vehicles per day (vpd). The highest volumes are at the north and south ends of the corridor under investigation. The lowest volume is in the middle, which is an indication of several traffic sheds. Review of traffic volumes by peak directional travel confirm the notion of traffic sheds. In the AM period, traffic at the north end has a northbound directional peak while traffic at the south end in the AM period has a southbound directional peak.

Exhibit 16 – Existing AM and PM Peak Hour Traffic Volumes and Lane Configurations

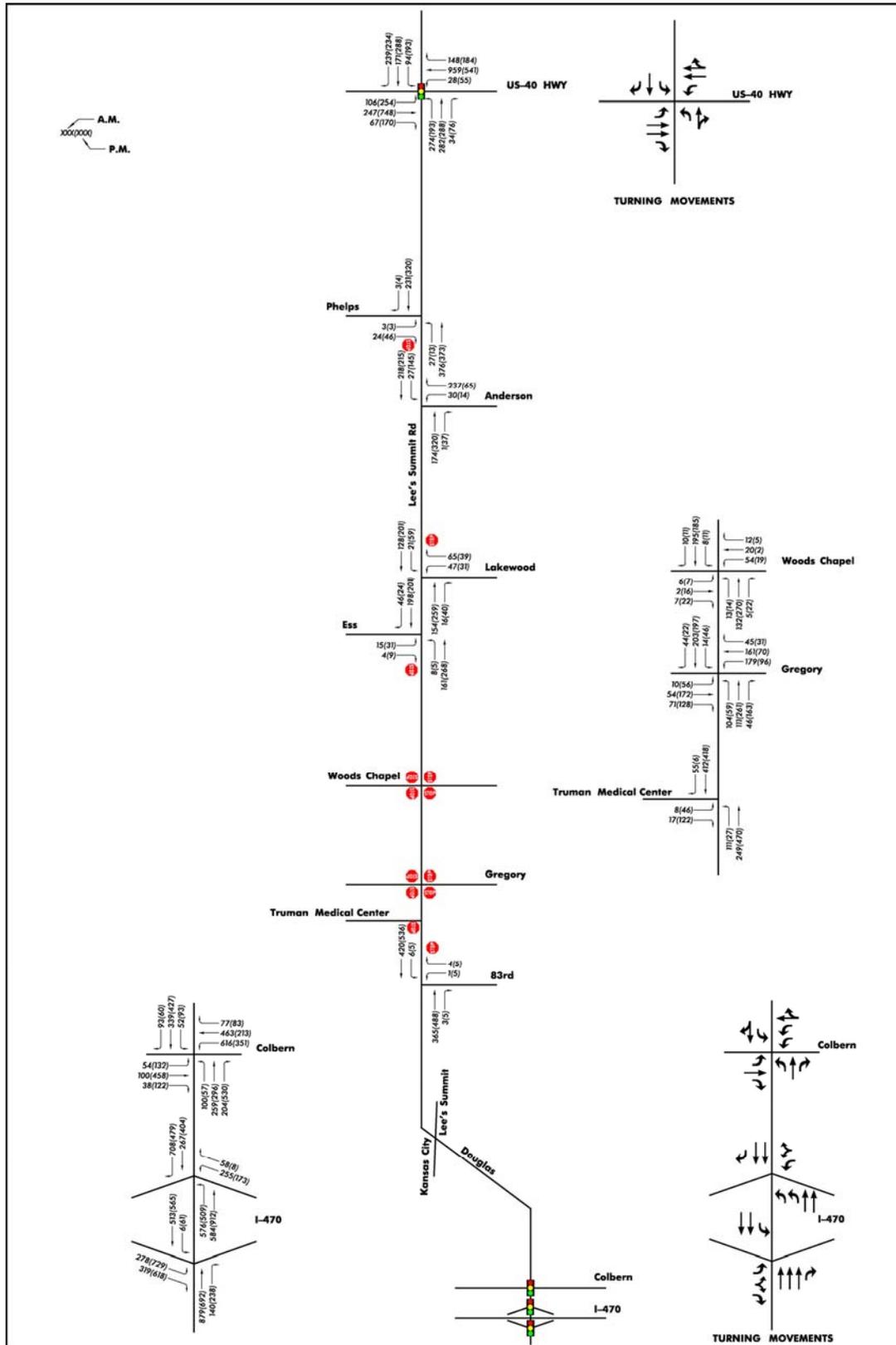
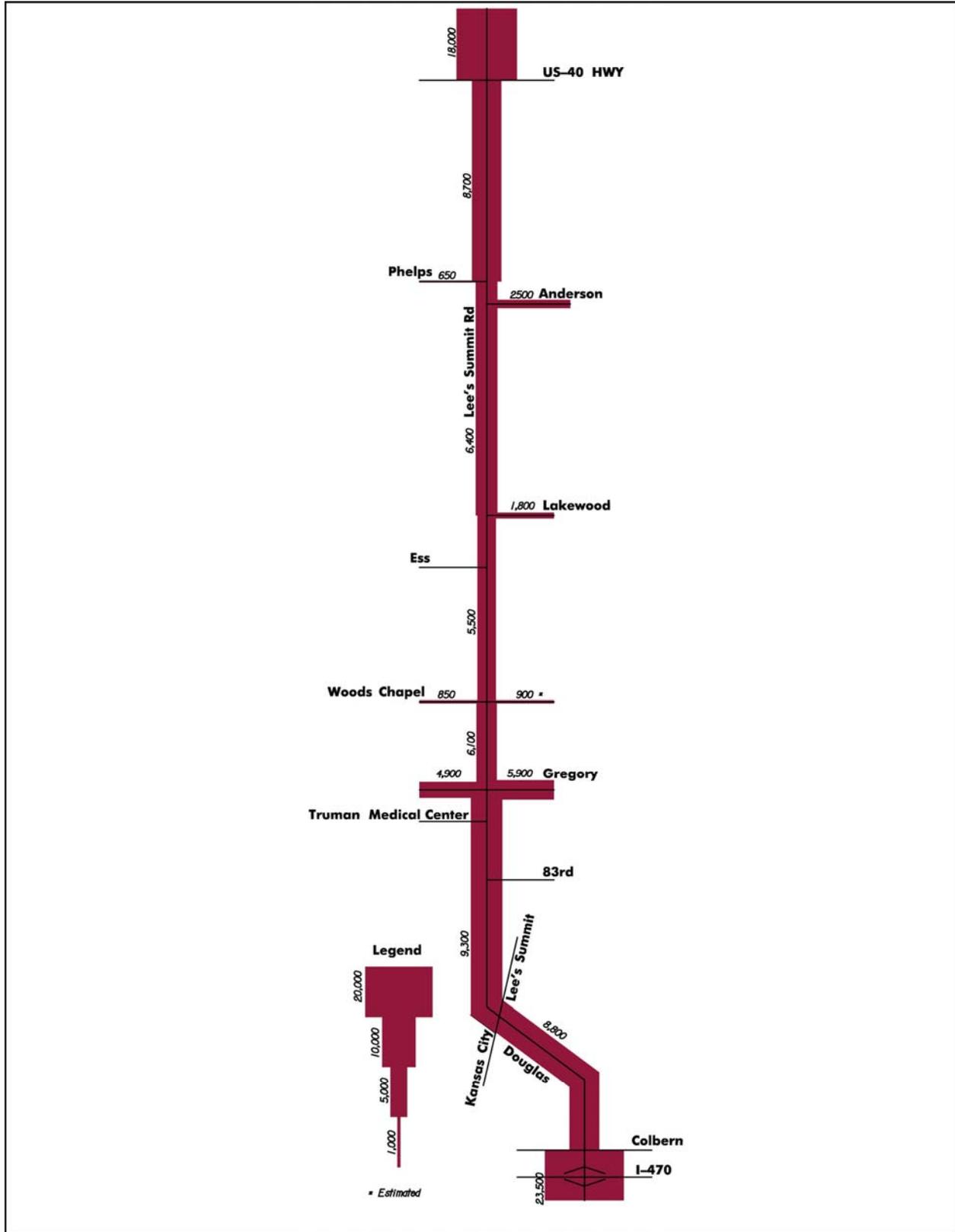


Exhibit 17 – Existing 24-Hour Traffic Volumes

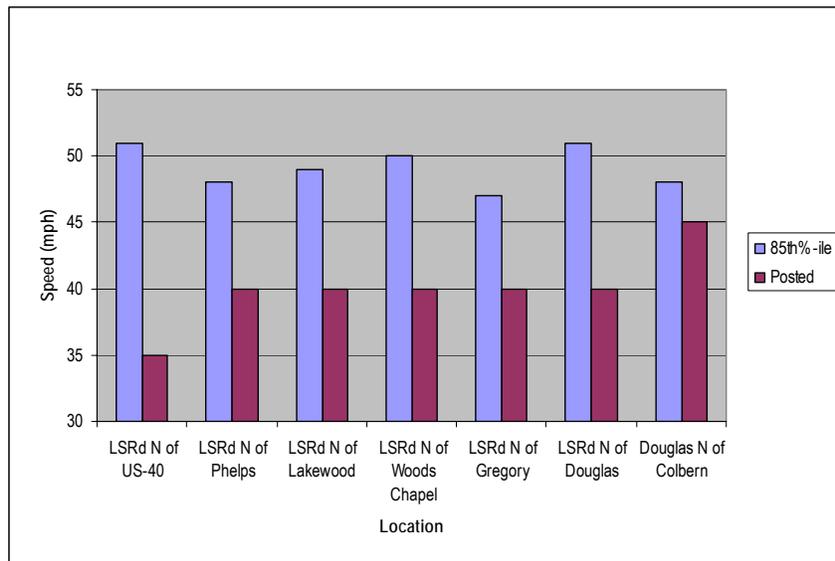


Traffic Speeds

In conjunction with the collection of vehicular count data, information was collected on the travel speeds of vehicles. Various charts and graphs have been prepared at the count locations to illustrate travel speeds. Information is shown in two categories. The first category is 85th %-ile speed, which is a term often used to set posted speed limits. The second category is related to the volume of traffic traveling greater than 55 mph and with a review of the time when those vehicles are traveling at speeds greater than 55 mph and in which direction.

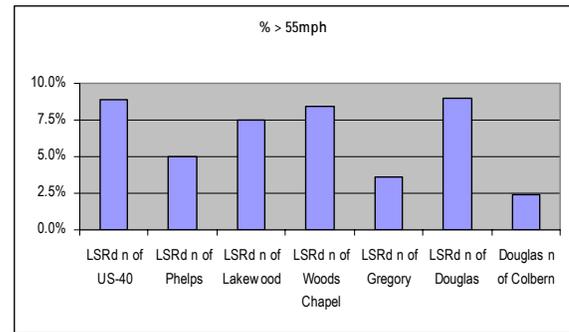
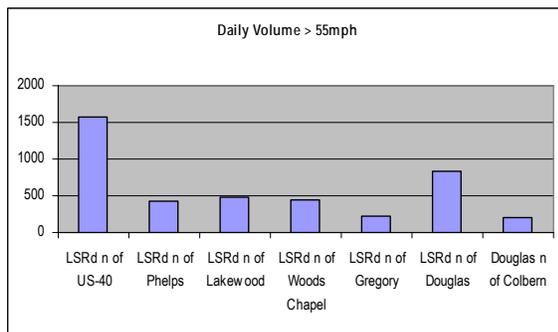
The count data collected does not calculate a direct 85th %-ile speed so a series of charts were developed to allow an estimate of the 85th percent to be determined. The range of 85th %-ile speeds range from a low of 47 mph to a high of 51 mph. It is worth noting that the posted speeds along the corridor are 35 mph north of US-40, 40 mph in Kansas City and 45 mph in Lee's Summit. Exhibit 18 lists the location of traffic counts and the 85th %-ile speed.

Exhibit 18 – 85th Percentile Speed



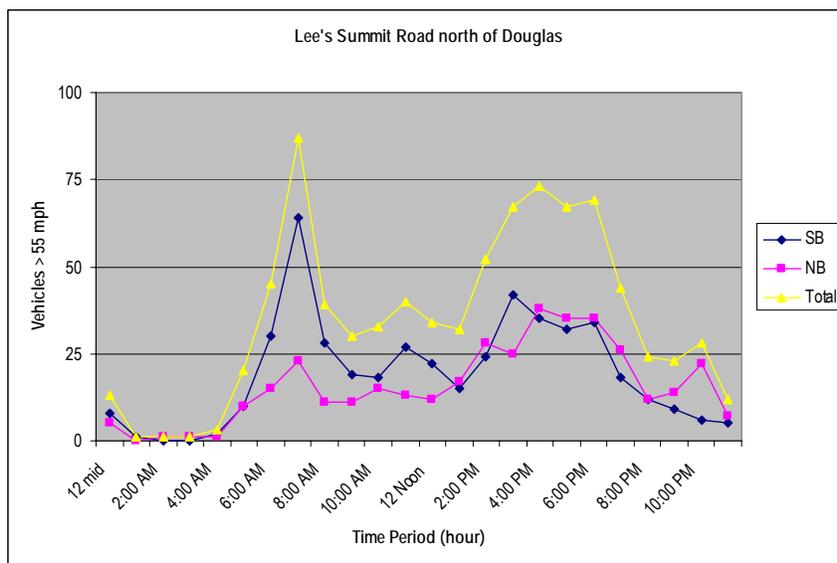
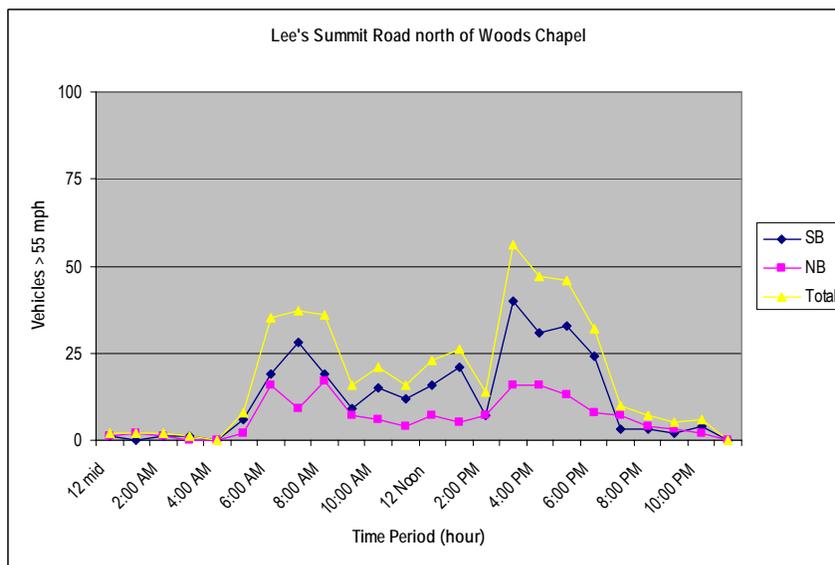
The highest number of vehicles traveling greater than 55 mph occurs north of US-40 at approximately 1,580 vehicles per day. The second highest is north of Douglas St at approximately 800 vehicles per day. However because traffic volumes change along the corridor, when the volumes are reviewed as a percentage, the top two locations are nearly equal at approximately 9% of the daily traffic and the location north of Woods Chapel Road is identified as a high percentage location even though its traffic volume is significantly less. This comparison is shown in Exhibit 19.

Exhibit 19 – Daily Volume and Percent > 55 mph



The two locations of north of Douglas Street and north of Woods Chapel Road were chosen for further review by hourly distribution of traffic greater than 55 mph as well as by direction. While traffic volumes are different in the two locations general patterns are similar. For example, a higher number of vehicle travel greater than 55 mph in the AM and PM peak periods. In a more detailed review the locations differ. For example, north of Douglas the highest traffic volume traveling greater than 55 mph occurs in the AM while north of Woods Chapel that occurs in the PM. Both locations show a higher volume of traffic traveling greater than 55 mph in the southbound direction in the AM, yet in the PM north of Douglas the distribution is equal, while north of Woods Chapel southbound remains the dominant direction. This may in part be due to the location of the traffic counters and the influence of the 4-way stop at Woods Chapel Road. Graphs of these two locations are shown in Exhibit 20.

Exhibit 20 – Hourly and Directional Variation > 55 mph (Selected Locations)



Capacity Analysis

Level of Service Methodology

The study intersections were evaluated based on the methodologies outlined in the *Highway Capacity Manual (HCM), 2000 Edition*, published by the Transportation Research Board. The operating conditions at an intersection are graded by the “level of service” experienced by drivers. Level of service (LOS) describes the quality of traffic operating conditions and is rated from “A” to “F”. LOS A represents the most desirable condition with free-flow movement of traffic with minimal delays. LOS F generally indicates severely congested conditions with excessive delays to motorists. Intermediate grades of B, C, D, and E reflect incremental increases in the average delay per stopped vehicle. Delay is measured in seconds per vehicle. Exhibit 21 shows the upper limit of delay associated with each level of service for signalized and unsignalized intersections.

Exhibit 21 – Level of Service (LOS) Delay Thresholds

Level of Service (LOS)	Unsignalized Intersection	Signalized Intersection	Two Lane Highways
	Delay	Delay	Percent-Time-Spent-Following
A	< 10 Seconds	< 10 Seconds	≤40
B	< 15 Seconds	< 20 Seconds	>40-55
C	< 25 Seconds	< 35 Seconds	>55-70
D	< 35 Seconds	< 55 Seconds	>70-85
E	< 50 Seconds	< 80 Seconds	>85
F	≥ 50 Seconds	≥ 80 Seconds	Flow rate > Capacity

Segment analysis for Lee’s Summit Road was performed using the Highway Capacity Manual’s two-lane highway analysis methodology. Lee’s Summit Road between 48th Terrace and Woods Chapel Road (approximately 4.25 miles) and between Gregory Boulevard and Colbern Road (approximately 2.25 miles) in some manner would appear to operate as a two-lane highway because there are traffic controls along the roadway. Traffic speeds along the roadway have an 85th percentile operating between 49 and 53 mph in various locations along the corridor. However, the roadway is truly not a “highway” because it has no shoulders, allows no passing and has several alignment characteristics that should limit its operating speed. Consequently while the HCM segment analysis is shown for existing and future no-build conditions, it must be acknowledged that the operational analysis has significant limitations.

The LOS rating deemed acceptable varies by community, facility type and traffic control device. At unsignalized intersections LOS E and F is often accepted for low to moderate traffic volumes where the installation of a traffic signal is not warranted by the conditions at the intersection or the location has been deemed undesirable for signalization for other reasons, e.g., the close proximity of an existing traffic signal or the presence of a convenient alternative path. For signalized intersections, level of service and average delay relate to all vehicles using the intersection. In Kansas City and Lee’s Summit, Missouri, LOS D and LOS C have been identified respectively, as the minimum desirable goal for signalized intersections. For MoDOT, the minimum is LOS E.

Study Area Segments and Intersections

The results of the segment analysis, unsignalized and signalized intersection analyses for weekday AM and PM peak hour conditions are summarized in Exhibit 22. The study intersections were evaluated with the existing lane configurations, traffic volumes and traffic controls. The Synchro and HCM analysis output files are included in the Appendix.

The analysis indicates that most of the intersections and segments are currently operating at acceptable levels of service (LOS D in Kansas City and LOS C in Lee’s Summit).

Exhibit 22 – Existing AM and PM Peak Hour Capacity Analysis

a. Segments	AM Peak Hour		PM Peak Hour	
	LOS	v/c	LOS	v/c
48 th Terrace to Woods Chapel Road	C	0.156	C	0.195
Gregory Boulevard to Colbern Road	C	0.265	D	0.336

b. Signalized Intersections	AM Peak Hour		PM Peak Hour	
	LOS	Delay	LOS	Delay
US-40 Highway	C	29.6	C	32.3
Colbern Road	D	36.1	D	45.0
I-470 Westbound Ramps	C	20.1	B	12.1
I-470 Eastbound Ramps	B	13.7	C	21.0

c. Unsignalized Intersections	AM Peak Hour		PM Peak Hour	
	LOS	Delay	LOS	Delay
Phelps Road	<i>Eastbound</i>	B 10.3	B 11.0	
	<i>Northbound</i>	A 0.7	A 0.4	
Anderson Drive	<i>Westbound Left-turn</i>	B 12.2	C 19.6	
	<i>Westbound Right-turn</i>	B 11.0	B 10.9	
	<i>Southbound Left-turn</i>	A 7.7	A 8.6	
Lakewood Boulevard	<i>Westbound Left-turn</i>	B 11.2	B 14.5	
	<i>Westbound Right-turn</i>	A 9.5	B 10.2	
	<i>Southbound</i>	A 1.2	A 2.2	
Ess Road	<i>Eastbound</i>	B 11.1	B 12.1	
	<i>Northbound</i>	A 0.4	A 0.2	
Woods Chapel Road	<i>All-way Stop Controlled</i>	A 8.8	A 9.8	
Gregory Boulevard	<i>All-way Stop Controlled</i>	C 17.7	E 45.2	
Truman Medical Center Entrance	<i>Eastbound Left-turn</i>	C 20.4	C 22.7	
	<i>Eastbound Right-turn</i>	B 11.3	B 12.6	
	<i>Northbound</i>	A 3.6	A 0.8	
Strother Road / 83rd Street	<i>Westbound</i>	B 11.7	C 16.7	
	<i>Southbound</i>	A 0.2	A 0.1	

LOS – Level of Service

Delay – Delay in Seconds per Vehicle

v/c – Volume to Capacity Ratio

While the LOS at the US-40 Highway intersection is acceptable, observation note extensive queues experienced by northbound left-turning traffic during the PM peak hour. This is likely associated with little protected signal time for this movement.

The analysis indicates that the northbound traffic at the intersection of Gregory Boulevard experiences delays and the overall intersection operates at LOS E during the PM peak hour. Currently, this intersection meets the Manual of Uniform Traffic Control Devices (MUTCD) the peak hour signal warrant during the PM peak hour. However, this intersection does not meet the MUTCD eight-hour vehicular volume signal warrants, which is often a standard required by the City of Kansas City before installing a traffic signal.

At the intersection of Colbern Road and Douglas Street, analysis during both peak hours indicates that the westbound left-turning traffic experiences long delays with overall intersection operations at LOS D. It is also noted that a large portion of the westbound left-turning traffic from Colbern Road turn immediately onto the I-470 WB on-ramp. Consequently queues are longer in the outside left-turn lane than second inside left-turn lane.

Safety Analysis

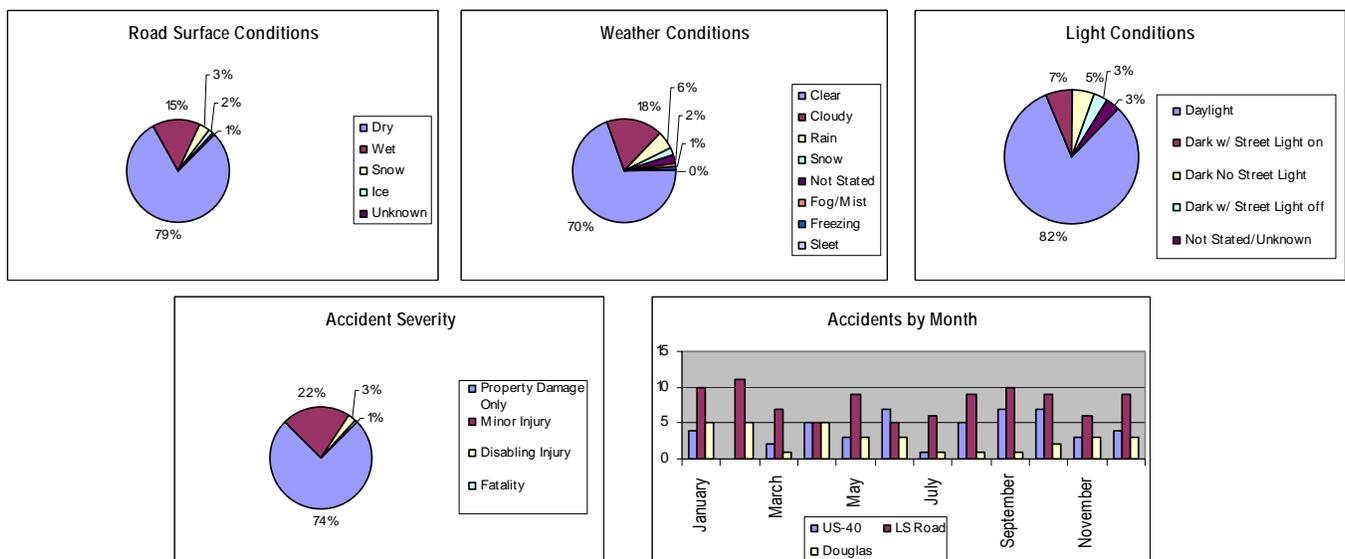
Crash data was obtained from the City of Kansas City, Missouri, Streets and Traffic Division, the City of Lee's Summit and the Missouri Department of Transportation for the most recent three year period from 2003 through 2005. 178 crashes were reported in the three year period. The number of crashes per year fluctuates with a peak in 2004 (71) and low in 2005 (49). Crashes were divided into three locations, the intersection of Lee's Summit Road and US-40, Lee's Summit Road and Douglas Street. Lee's Summit Road accounts for 55% of the reported crashes.

Crashes are classified into one of four categories; property damage only (PDO), minor injury, disabling injury or fatal. The most prevalent accident type is PDO with an overall injury rate of 26%.

- Road Surface – The majority of crashes (79%) occur in dry conditions. Wet road conditions account for 15% of crashes.
- Weather – The majority of crashes (70%) occur under clear weather conditions although rain represents 6% of the reported crashes.
- Light – The majority of crashes (82%) occur in daylight.

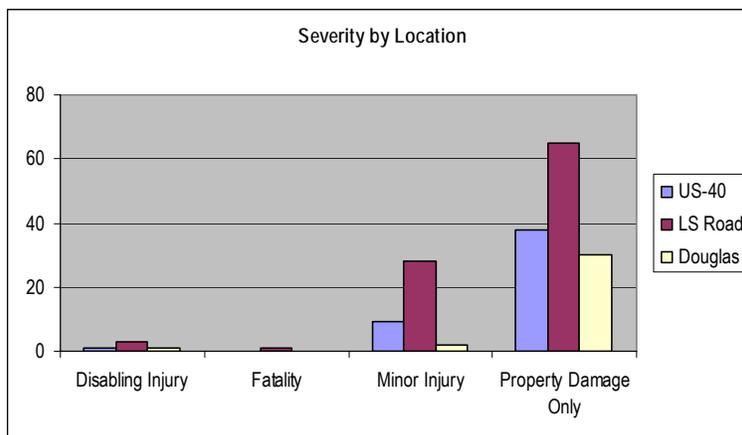
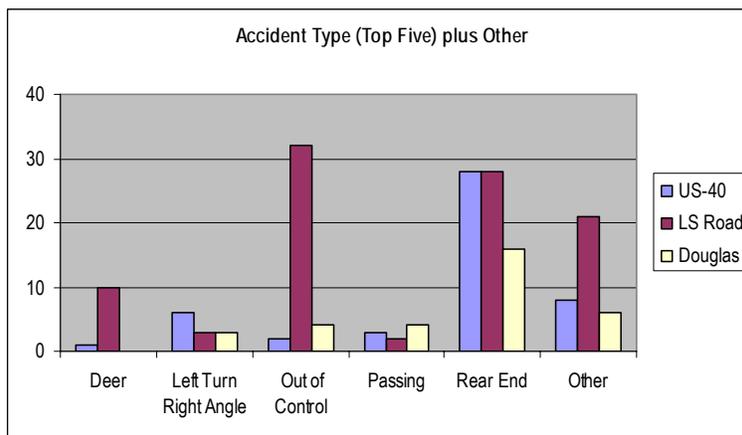
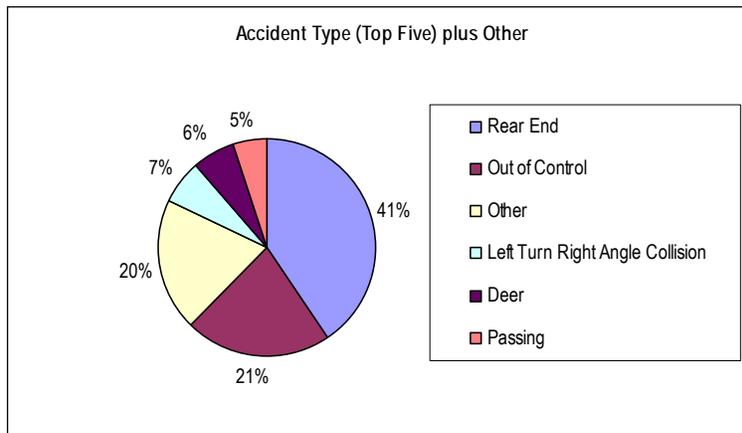
The most frequent months for crashes are January, September and October. When reviewed individually, patterns are less evident. Exhibit 23 summarizes this crash data.

Exhibit 23 – Crash Data Summaries



The top five types of crashes account for 80% of all crashes. Overall, rear end accidents are the most prevalent. Yet by location, out-of-control accidents are the most common along Lee's Summit Road. During the three year period (2002 through 2005) only one fatal accident occurred. Over the ten year period from 1996 through 2005, a total of four fatal accidents occurred. Three of these four fatal accidents were attributed to out-of-control. Exhibit 24 summarizes the crashes by type and severity.

Exhibit 24 – Crash Types and Severity



Summary of Guidance and Input

The documentation of existing conditions serves several purposes. First it provides a record of conditions that can be assessed and areas of improvement identified. The review of physical conditions can also predict when resources will need improvement in the future. The identification of existing environmental resources helps to determine which resources are present and will require review to determine the extent of impacts (if any) as well as providing guidance for a context sensitive approach. Combined, a series of projects can be defined to make physical and operational improvements over time. It should be noted that because of the complexities in managing physical, financial and political issues, a logical process is necessary to determine priorities and phasing.

The existing conditions identify several physical and operational areas for improvement. These include:

Alignment Improvements (Horizontal and Vertical) – As identified in physical corridor. Many of these locations go beyond the identification of physical improvements and can be associated with safety improvements to address the high number of run off the road accidents that have occurred at these locations.

Typical Section Improvements – The lack of shoulders, steep ditches, close over growth of vegetation, provide little room for recovery if needed, difficulty in recovering if one leaves the roadway and a claustrophobic sense when traveling the majority of the corridor. While widening of shoulders, construction of open ditches to modern design standards with a clear zone would make significant improvements, the determination of the typical section must be coordinated with the traffic volume forecasts.

Capacity Improvements – Many of the changes described above while making a physical improvement would make little if any improvement in terms of capacity along the roadway segment. This is because a change in the percent passing zones would be necessary to provide additional capacity. Additional capacity could be provided at several intersections to address operational needs. The extent of the intersection improvements may in part be determined by the degree of improvements proposed for the mainline roadway. And such improvements may also need to be phased over time. In review of future year conditions, other intersections may be added to the list to address anticipated development and traffic growth.

Safety Improvements – The identification of safety improvements is dependent upon location. The majority of injury crashes are associated with run off the road type accidents which are along the roadway segments which may benefit from alignment and typical section improvements. Intersection crashes are prevalent at the junction of US-40 Highway which in turn may benefit from capacity improvements although the most prevalent crash type is rear-end and is not considered a “correctable” crash.

The review of environmental resources has identified several factors where action is likely independent of the project definition because of regulatory requirements or the close proximity of the resources and the inability to “avoid” impacts. Of course when the project is defined, the degree of project specific impacts will then be determined. Exhibit 25 summarizes the socioeconomic and environmental factors where action is likely and even where action is unlikely, it is dependent upon project definition.

Action unlikely, yet dependent upon project definition – Architectural resources and the habitat of threatened and endangered species are identified resources that will require further coordination.

Action likely, independent of project definition – Hazardous waste, public lands, archeological resources, floodway/floodplain, wetlands, soil erosion and geologic resources are identified resources that will require further action and agency review either with permitting for construction activities or conducting more detailed investigations to determine the extent of impact (if any). It should be noted that environmental guidance is not limited to the “avoid, minimize, mitigate” approach. Environmental review also has the potential to construct enhancements, which could include the potential for detention basins as part of implementing APWA’s 5600 Best Management Practices.

Exhibit 25 – Environmental Matrix – Action Summary

Action Summary	Information Only	Action Unlikely		Action Likely		Approach (if required)	Comments
		Independent of project definition	Dependent on project definition	Independent of project definition	Dependent on project definition		
Socioeconomic Factors							
Environmental Justice		X				None	
Demographics	X					None	
Hazardous Waste			X			None	Phase 1 ESA to be conducted in later design phase(s) only if identified properties are affected
Institutional	X					None	
Emergency Services	X					None	
Public Lands				X		Mitigate and/or enhance	Lee's Summit Road intersects Little Blue Trace Park; any public land impacts should be replaced in kind, take opportunity to enhance connectivity.
Cultural Resources							
Archeologic				X		Avoid or minimize	Previously recorded sites adjacent to roadway near Little Blue River
Architectural			X			Avoid or minimize	Continue coordination with SHPO during future design phase(s)
Environmental Factors							
Water Quality	X						
Floodway/Floodplain				X		Minimize	Crossing of Little Blue River, permitting with construction activities
Wetlands				X		Minimize, mitigate and/or enhance	Adjacent to Little Blue River, potential mitigation or take opportunity to enhance per APWA 5600 Best Management Practices
Soil Erosion and Sedimentation				X		None	Crossing of Little Blue River, permitting with construction activities
Threatened and Endangered Species							
US			X			Avoid or minimize	Continue coordination on western prairie fringe orchid during future design phase(s)
State			X			None	MDOC expresses concerns and management recommendations
Geologic Resources				X		Avoid or minimize	Additional information on depth of mines to be collected during future design phase(s)