

APPENDIX A - EXISTING CONDITIONS

Demographic Information

Demographic information was pulled from 2015 and 2017 American Community Survey and the 2010 Decennial Census to build tables 1,2,3,4, and 5. However, the area of interest is a smaller representation of the aggregated data, as seen in Figure 1. Data collected from the Johnson County Automated Information Mapping System (AIMS) provides insight to the study area footprint and estimates a population of 385,204 dwelling units, and a home average appraisal value of \$189,743.

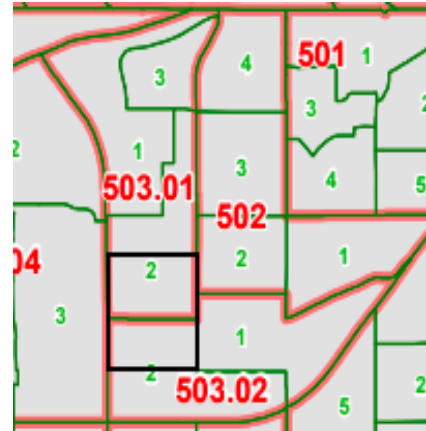


Figure 1. Study area with Census Block Groups 503.01.2 and 503.02.2

Table 1. Population				
YEAR	2010	2015	2017	Percent Change 2010-2017
Population Tract 503.01.2	936	920	758	-19 %
Population Tract 503.02.2	566	556	606	7%
Total Population	1,502	1,476	1,364	-9%
Johnson County	531,228	566,814	578,797	9%
Sources: 2010 Decennial Census, 2015 American Community Survey, 2017 American Community Survey				

The two census tracts block groups that make up the study area have seen an overall decrease in population of nine percent from 2010 to 2017. When analyzed at the block group level, block group 503.01.2 saw a decrease of 19 percent, whereas, block group 503.02.2 saw an increase of 7 percent. The overall decrease in population may be due to the numerous multi-family housing developments that have recently been introduced in the neighboring census tract block groups. Information from **Table 1** and **Table 4** show a decrease in population that coincides with a decrease in housing units. When comparing these two block groups against Johnson County's population over the same time period it shows that the study area is not keeping up with the rate of growth of the County. This may have to do with the increase in housing units available throughout Johnson County.

Table 2. Median Household Income				
<i>YEAR</i>	<i>2010</i>	<i>2015</i>	<i>2017</i>	<i>Percent Change 2010-2017</i>
<i>Median HH Income Tract 503.01.2</i>	\$51,563	\$73,462	\$92,841	80%
<i>Median HH Income Tract 503.02.2</i>	\$65,139	\$69,500	\$72,813	12%
<i>Average Median HH Income both Tracts</i>	\$58,351	\$71,481	\$82,827	42%
<i>Johnson County</i>	\$73,733	\$76,113	\$81,121	10%
Sources: 2010 Decennial Census, 2015 American Community Survey, 2017 American Community Survey				

From 2010 to 2017 both census tract block groups have seen an increase in household income. Block group 503.01.2 saw an increase of 80 percent, and while it started at a lower income level has outpaced the neighboring block group 503.02.2. Household income can be influenced by a variety of different variables including natural wage changes, changes to the housing stock, and demographic changes. Both census block groups that make up the study area started nearly 20 percent below the Johnson County average, but the two block groups have seen significant increases in median household income and are matching incomes throughout the county.

Table 3. Median Age				
<i>YEAR</i>	<i>2010</i>	<i>2015</i>	<i>2017</i>	<i>Percent Change</i>
<i>Median Age Tract 503.01.2</i>	39.2	44.7	45.1	15%
<i>Median Age Tract 503.02.2</i>	40.6	35	37.9	-7%
<i>Average Age of both Tracts</i>	39.9	39.9	41.5	4%
<i>Johnson County</i>	36.1	36.9	37.3	3%
Sources: 2010 Decennial Census, 2015 American Community Survey, 2017 American Community Survey				

Analyzing the median age of residents helps to explain what populations have moved in or out of areas. For instance, while the 15 percent change in census tract block group 503.01.2

changed similarly to the years that passed, a senior housing development in the block group may help to explain why the median age grew at a faster rate than the surrounding Johnson county.

Table 4. Housing Units				
YEAR	2010	2015	2017	Percent Change 2010-2017
Housing Units Tract 503.01.2	452	474	372	-18%
Housing Units Tract 503.02.2	269	261	273	1%
Total Units	721	735	645	-11%
Johnson County	222,167	231,029	235,821	6%
Sources: 2010 Decennial Census, 2015 American Community Survey, 2017 American Community Survey				

Housing units in the two census tract block groups that make up the study area have decreased over the eight-year period identified in the **Table 4**. While the two tracts saw a positive gain from 2010 to 2015, 90 units were removed from the housing stock after 2015. The large decrease likely comes from a multi-family development being removed from the housing stock. Furthermore, there have been number multi-family housing developments built in the neighboring census tract block groups. As more units became available in the neighboring areas, housing units were removed from the primarily commercial study area reducing the population. However, this shows that the surrounding Johnson County has continued to introduce housing units at a steady rate over the same period of time.

Table 5. Median Home Value				
<i>YEAR</i>	<i>2010</i>	<i>2015</i>	<i>2017</i>	<i>Percent Change 2010-2017</i>
<i>Median Home Value Tract 503.01.2</i>	\$109,900	\$148,700	\$157,000	43%
<i>Median Home Value Tract 503.02.2</i>	\$118,600	\$175,600	\$189,400	60%
<i>Average Median Home Value both Tracts</i>	\$114,250	\$162,150	\$173,200	52%
<i>Johnson County</i>	\$209,900	\$215,600	\$232,500	11%
Sources: 2010 Decennial Census, 2015 American Community Survey, 2017 American Community Survey				

From 2010 to 2017 the median home values for both tracts grew at a similar pace. When compared to the surrounding Johnson County home values are increasing at a much faster rate. However, median home values were nearly \$100,000 cheaper in 2010 in the two census tract block groups, and are roughly \$60,000 cheaper in 2017.

Land Use and Zoning

The Johnson Drive Corridor is located in the West Gateway District of Mission, Kansas. According to the City of Mission, Kansas *Comprehensive Plan*, adopted in 2007, redevelopment of the West District is focused on the integration of uses. This integration of uses will allow the boundaries between where people live, work, shop, relax, and interact to be blurred. To improve sustainability of the corridor, redevelopment will also focus on creating a pedestrian friendly environment, enhancing public transportation, and will employ new green technologies, such as green roofs, solar technology, and integrated stormwater management.

The current zoning for the Johnson Drive Corridor is primarily for single-family residences, commercial and office buildings, and industrial use (**Figure 2**). However, the current land use of the corridor consists primarily of single-family residential homes, general commercial business, government/public building, offices, and a recreational park (**Figure 3**). Retirement housing, or other housing, is also located within the corridor, in the southwest corner, where the land is zoned for industrial use. According to the *Comprehensive Plan*, higher density housing will be included in the redevelopment of the West District Gateway.

Johnson Drive is seen as the “spine” of the city and is a centralized location where commercial development is focused. Business that are located along Johnson Drive in the study area include, but are not limited to, McDonalds, Starbucks, QDOBA, Popeye’s, Natural Grocers, CVS, and Plato’s Closet. Other businesses within the corridor include Hy-Vee, Target, Planet Fitness, QuikTrip Division Offices, and VinSolutions. Government offices include Johnson County Department of Motor Vehicles and United States Postal Service.

Vacancies have been an issue within the corridor. Currently the United States Postal Service building is seen as underutilized space. The Cornerstone Commons, near Natural Grocers, has seen vacancies within its buildings. Other sites in the corridor, such as where Starbucks currently sits, has also experienced long periods of vacancy.

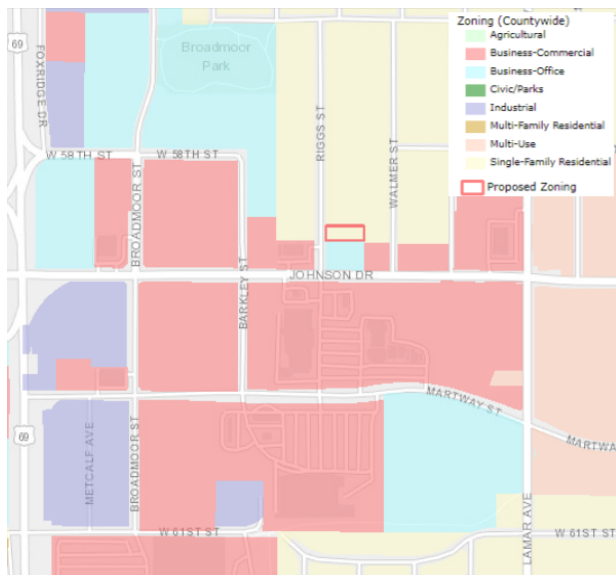


Figure 2. Zoning Map provided by Johnson County AIMS GIS & Mapping

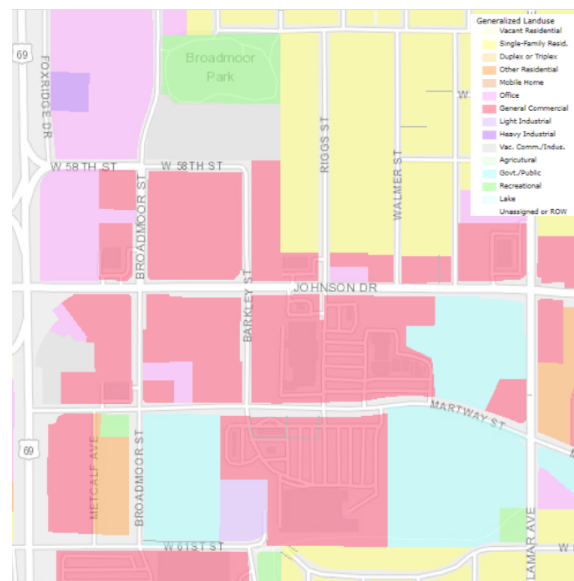


Figure 3. Current Land Use Map provided by Johnson County AIMS GIS & Mapping

Environmental Conditions

Stormwater and Flooding

The corridor is located at the top of the Brush Creek watershed, with the northern portion in the Turkey Creek watershed. A small area in the southeast corner of the corridor is located in Future Base Flood zone (**Figure 4**). The *Comprehensive Plan* mentions the City’s hope to utilize new green technologies, such as green roofs, solar technology and integrated stormwater management as part of the West Gateway. Most of the city has been developed leaving few areas with natural vegetation. Aerial maps confirm this showing large amounts of impervious surface within the study area which contribute to stormwater runoff. Further analysis is needed to calculate a more approximate area amount of impervious surface compared to pervious surface in the area.

Isolated parcels of natural vegetation remain in the city and are concentrated along the northwest edges of the city. These areas help provide stormwater management for stormwater runoff in the city, but are not located within the Johnson Drive study corridor.

Soil and Topography

The corridor is located on top of soil classified as Sharpsburg-Urban land complex, with 4 to 8 percent slopes. This type of soil is classified as farmland of statewide importance. It is considered moderately well drained and has a low flooding frequency. The capabilities of this type of soil are limited when it comes to dwellings with basements and septic tanks. This is because of soil properties that affect the soils capacity to support weight without movement and properties that impact excavation and construction costs.



Figure 4. Map illustrating the Future Base Flood zone and the existing pipe infrastructure network.

Transportation Conditions

Johnson Drive is utilized by automobiles and KCATA's fixed-route services, including the Johnson County Transit H route. This road is a four lane, two-way, minor arterial road which provides the primary means of transportation through the corridor. The posted speed limit is 30 miles per hour.

Bike and Pedestrian Infrastructure

The West Gateway Vision Plan had goals of becoming more "pedestrian friendly" and prioritizing the pedestrians over automobiles, however, Johnson Drive's current condition does not support this vision. According to 2018 AIMS data sidewalks along Johnson Dr. do not appear in the pedestrian network (**Figure 5**). This is due to Johnson Drive having an inconsistent streetscape, inconsistent or poorly maintained pedestrian sidewalks, and a disorganized/unidentified retail strategy. With the exception of a segment of sidewalk spanning the South side of Johnson Drive from Broadmoor to Barkley Street, the sidewalks along Johnson Dr. have significant cracks, vegetation, abrupt dead ends, and grades that create barriers for pedestrian traffic, especially among those with disabilities or mobility issues (**Figures 6 - 8**). Additionally, weak transitions in the northern area are problematic

for alternate modes of transportation. The southern portion of the area is heavily auto-centric and has an unclear street hierarchy.

Due to the sidewalks conditions, a study was conducted to assess the sidewalk infrastructure and accessibility of the sidewalks throughout the area. There were also goals to create trails within Johnson Drive Signature Park and Southern Broadmoor Urban Plaza to encourage use in the northern section of the area. However, as it stands, Johnson Drive does not currently have marked bike lanes. Pedestrians use a four foot mono-curb sidewalk with no offset from the street. The sidewalks are considered unfriendly due to the minimal clearance provided to bikers and pedestrians. Sidewalks were observed to be in fair to poor condition during a walking tour. There are many cracks and uneven sections that may discourage pedestrians from utilizing sidewalks especially when travelling with strollers due to the risk of accidents. Additionally, sidewalks are frequently cut abruptly at entrances to parking lots then continued past the parking lots exit. This also leads to reduced safety for pedestrians. Truncated domes are present at some crosswalks and parking lot entrances, but not all.

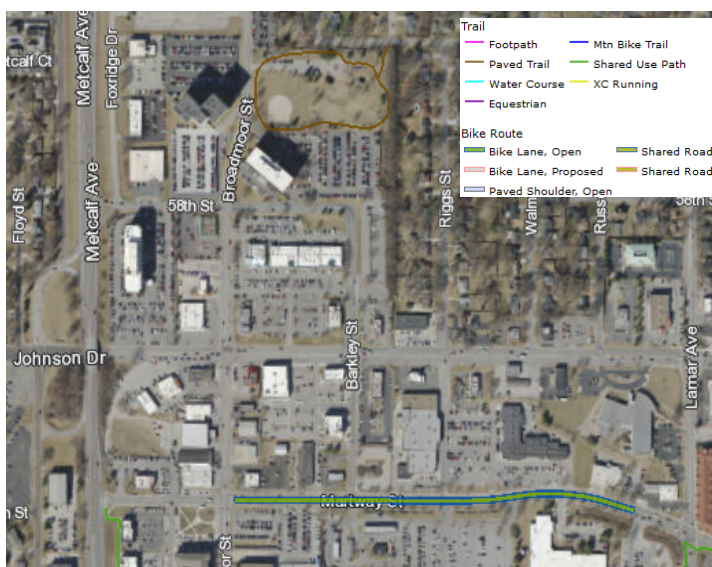


Figure 5. Map shows existing pedestrian amenities adjacent to the Johnson Dr corridor

Auto Infrastructure

There are over 20 parking lots that feed into Johnson Drive - creating numerous points of conflict for drivers exiting parking lots and those already on Johnson Drive. Likewise, the inconsistent and ambiguous curb cuts from these parking lots create a complicated transportation environment for pedestrians, bikers, and drivers alike. Cars exiting parking

lot feeders may have a difficult time entering Johnson Drive especially with some of the feeders forcing cars to enter a turn lane on Johnson Drive.

Metcalf Avenue to Barkley Street

The road bisects a heavily developed commercial district immediately to the east of Metcalf Avenue extending to Barkley Street. Metcalf Avenue, Broadmoor Street and Barkley Street act as feeder streets to this segment of Johnson Drive, with traffic signals at the Broadmoor Street and Barkley Street intersections to safely direct traffic onto the thoroughfare.

Barkley Street to Walmer Street

This section contains four left turn lanes, occupying a central lane throughout. There are traffic signals at the Barkley Street and Johnson Drive intersections. There are three feeder streets on the northside and six in the southside that lead to parking lots. The block pattern is .06 miles.

Walmer Street to Lamar Avenue

This portion of Johnson Drive. between Walmer Street and Lamar Avenue has four lanes of traffic that flow both east and west. There are four turn lanes that provide access to Walmer Street, Russell Street and Lamar Avenue. A traffic signal is located at the intersection of Johnson Drive. and Lamar Avenue.

Funding and Policy

There are three governmental fund types provided by the City of Mission. The first, the General Fund is the principle fund that accounts for the financial transactions, such as general operating expenditures, fixed changes and capital improvement costs that are not paid for through other funds, are financed through revenues received by this fund. The second, Capital Project Fund is used to account for financial resources separated for obtaining or constructing major facilities or infrastructure (Capital Improvement Fund). The third, is the Special Revenue Fund which is used to account for revenues derived from specific taxes, government grants or other sources to finance particular functions or activities in the city. These include: Storm Water Utility Fund, Transportation Utility Fund, Street Sales Tax Fund, Parks and Recreation Sales Tax Fund, Special Highway Fund, Special Parks and the Recreation Fund.

Funds are unrestricted as to the purpose of expenditures and are denied only for failure to comply with requirements. Licenses, permits, charges for services, fines and forfeiture revenues will be recorded as revenue due to inability to be measured until they are received.

As of 2017, the City of Mission's Recommended Budget is focused on the General Fund to further future public improvements and facilities. The General Fund is linked to capital

infrastructure investments such as the Capital Improvement Fund, the Stormwater Utility Fund, the Transportation Fund, the Street Sales Tax Fund, the Special Highway Fund, the Special Parks Fund, and the Parks and Recreation Sales Tax Fund.

Due to the size of the General Fund, it is broken down into programs (*Community Improvement Program*) to be more efficiently managed and budgeted. The programs are: *Street Program, Stormwater Program, and the Parks and Recreation Program.*

The city plans to integrate the *Community Improvement Programs* into the annual budget to provide a comprehensive financial plan.

Current Projects

The Broadmoor Street reconstruction has received approval for funding through the *Johnson County County Assistance Road System program*. The County agreed to fund transportation infrastructure improvements (improvement of pavement, curbs, sidewalks, and stormwater infrastructure) between Johnson Drive and Martway Street. The project will improve walkability and aesthetics throughout the community. Bids for the project will close on March 12th of this 2019, with construction scheduled to follow for approximately four months.

Various new and proposed developments are located outside of the target area and in the East Gateway boundary. These developments should be taken into consideration, so as not to overwhelm the West Gateway with residential/retail developments and maintain the vision provided in the *Comprehensive Plan*.

The developments that occurred in the East Gateway show promise for the development of the West Gateway. The value of the West Gateway has improved with the proposed development of residential space, retail, and parking areas. The focus for the West Gateway is to integrate multiple uses to the buildings already located in the area, prioritizing the pedestrian, and connectivity to Foxridge Drive at the northern end of the gateway.

Existing Plans

Citywide

City of Mission Comprehensive Plan 2007 oversees all the guidelines and lists detailed objectives to serve the Mission community.

- *Natural features and the environment* goals aim to abate recurring Rock Creek flooding conditions that create public safety and environmental problems for Mission and adjacent communities, most particularly Fairway.
- *Parks, recreation and public facilities* goals include maintaining and preserving existing open space and natural features to enhance the character of the built

environment; promote neighborhood stability, public health and safety; and provide for outdoor recreation and visual enjoyment.

- *Economic revitalization and redevelopments* are closely related to the Johnson Drive Corridor project.
- The corridor is the longstanding retail district of Mission and should be reinforced by future public projects and private redevelopment for the following purposes: to promote a mixture of office, retail, and residential uses (mixed land use); to promote a sustainable, diverse economy; to promote public use of large-scale land redevelopment to meet public facility needs and the public identity at City Gateways.
- *Transportation* aims to plan for multimodal transportation citywide in Mission and provide a citywide system to balance alternative travel modes with auto travel, allowing for safe, efficient and convenient bicycle travel within Mission and connecting to destinations within the city and region.
- *Housing and neighborhoods* aims to promote effective development and redevelopment of Residential Areas. Affordable housing, residential revitalization, positive citywide image of Mission are some main focus areas.

Local

West Gateway Vision Plan oversees all activities and developments in order to accomplish a positive community that people want to live, work and feel connected to. The vision plan depicts the city image in scale and the characters desired for the future. The vision plan highlights five key elements for redevelopment: a diverse range of building types organized by transect, interesting pedestrian-friendly streets, an innovative parking strategy, two signature parks, and a bus rapid transit system.

Mission Design Guidelines for Johnson Drive Corridor (2008) incorporates a historic introduction of Johnson Drive Corridor, the Design Guidelines, and the Building guidelines. The Design Guidelines intend to create vibrant shopping and commercial districts with a cohesive identity founded on the historic Mission style. To do so, appropriate and innovative architecture, buildings, pedestrian infrastructure, and landscape architecture are highly encouraged.

Form Based Code for the West Gateway Study Area provides detailed codes on steer future development projects toward a pedestrian-friendly, high quality urban place. The Form Based Code covers development guidelines, such as architectural guidelines, landscape guidelines, street layout guidelines, urban guidelines, process and implementation, and special study areas.

APPENDIX A SOURCES AS CITED

2010 Decennial Census

2015 American Community Survey

2017 American Community Survey

Johnson County Automated Information Mapping System (AIMS)

City of Mission Comprehensive Plan 2007

West Gateway Vision Plan

Mission Design Guidelines for Johnson Drive Corridor (2008)

Form Based Code for the West Gateway Study Area

APPENDIX B - LAND ORGANIZATION

Existing Conditions

The City of Mission expressed during the kick-off meeting on February 14, 2019 that they had a desire to replat parcels into standardized sizes as opportunities arise. When the Form Based Code was developed, it was said that:

“The abundance of smaller, adjacent properties signals that re-development and revitalization will not typically be of the larger, single-development type (like the Gateway project at the eastern end of Johnson Drive), but will more likely be redeveloped in smaller increments or over longer periods of time when assembly of multiple properties can occur.” (Chapter 1, Page 3)

Not only do the smaller parcels in the study area prove difficult to develop, but the larger parcels result in larger block sizes that detract from the walkability and compactness of the area.

Methodology

In order to understand the structure of the blocks and parcels in the West Gateway area, we first measured all the of the block lengths and determined the square footages of parcels. We then analyzed the current standards the City has for determining block and parcel sizes, particularly the Form Based Code. From this, we recommend a new approach to organizing lots, blocks, and density.

Data Limitations

The only data limitation we faced was there not being a lot of literature or good examples for implementing smaller lot sizes. Many resources simply said cities should implement smaller lot sizes based on context and what they would like to see.

Analysis

Lot Sizes

The existing lots were summarized by Zoning District, and Building Types. They were first summarized by Zoning District in **Table 1** to determine if there was an average square footage by Zoning District that could be used to create a standard.

Table 1. Summary Square Footage by Zoning District

	<i>R-1</i>	<i>C-O</i>	<i>C-1</i>	<i>C-2A</i>	<i>C-2B</i>	<i>C-2</i>	<i>M-P</i>	<i>M-1</i>	<i>MS2</i>
<i>Sum</i>	80,303	2,462,192	142,003	453,137	1,902,362	671,632	593,472	516,785	36,007
<i>Average</i>	20,076	136,788	23,667	75,523	44,241	167,908	59,347	28,710	18,004
<i>Median</i>	19,480	128,054	23,995	33,795	22,358	83,117	43,048	18,202	18,004
<i>Min</i>	10,501	15,075	10,499	15,058	2,876	59,121	2,583	4,899	12,368
<i>Max</i>	30,842	459,622	39,971	290,994	430,649	446,276	217,442	98,868	23,639

The lots were then assigned a Building Type according to the Form Based Code and summarized in **Table 2** to determine if there was an average square footage by Building Types that could be used to create a standard. Currently, Building Types are used to accomplish density.

Table 2. Summary Square Footage by Building Type

	<i>Low-Rise</i>	<i>Mid-Rise</i>	<i>High-Rise</i>	<i>Open Space</i>	<i>Parking</i>
<i>Sum</i>	3,512,907	1,330,664	1,063,177	572,528	378,616
<i>Average</i>	57,589	120,969	212,635	40,895	18,931
<i>Median</i>	31,890	88,734	202,863	17,147	14,705
<i>Min</i>	4,899	22,358	176,696	7,816	2,583
<i>Max</i>	459,622	446,276	263,284	216,942	77,367

It is difficult to derive a standardized lot size from either method of summarization. Both tables show that because of the unevenly shaped and sized lots, no uniform pattern exists in the current building landscape. The ranges between the smallest lot and the largest are large in every category, which skews the averages.

Block Sizes

Existing blocks were summarized in **Table 3** by their length and width, total square footage, and the amount of time it takes to walk the length and width of the block. Values are approximations and were found using the Google Maps measurement tool. Existing blocks were defined as parcels of land surrounded by streets or highways, with the exception of block L, whose southern edge is bordered by the Rock Creek walking trail. Block X also does not conform to the used definition, but was measured and identified in both the figure and table because it is part of the West Gateway District.

Table 3. Block Summary			
Block	Length (East to West)	Width (North to South)	Square Footage
A	419 ft	813 ft	340,647 sq ft
B	597 ft	1,118 ft	667,446 sq ft
C	563 ft	561 ft	315,843 sq ft
D	489 ft	610 ft	298,290 sq ft
E	514 ft	610 ft	316,540 sq ft
F	362 ft	603 ft	218,286 sq ft
G	489 ft	538 ft	263,082 sq ft
H	514 ft	538 ft	276,532 sq ft
I	347 ft	543 ft	188,421 sq ft
J	1,075 ft	583 ft	626,725 sq ft
K	538 ft	617 ft	331,946 sq ft
L	2,021 ft	617 ft	1,246,957 sq ft
M	500 ft	465 ft	496,705 sq ft
N	1,060 ft	706 ft	587,366 sq ft
X	1,073 ft	595 ft	203,588 sq ft

Similar to lot sizes, the summarization of existing block sizes doesn't result in a standardized block size. Rather, three general block sizes exist as seen in **Figure 1**:

- Small sized blocks (I, F)
- Medium sized blocks (A, C, D, E, G, H, K)
- Large sized blocks (B, J, L, M, N)

Even with the varying block lengths and widths, the time it takes to walk the length and width of each block didn't vary much between the different blocks, especially for blocks in the small and medium sized block groups. The largest block, block L, understandably had the greatest travel time for pedestrians to travel from the east edge to the west edge. The small variations in walking times for each block may be a result of the Google Maps tool and therefore may not be an accurate representation of the time it takes to walk the block. Especially since measuring these walking times did not take into consideration the presence or quality of pedestrian infrastructure, or the physical ability of the traveling pedestrian.

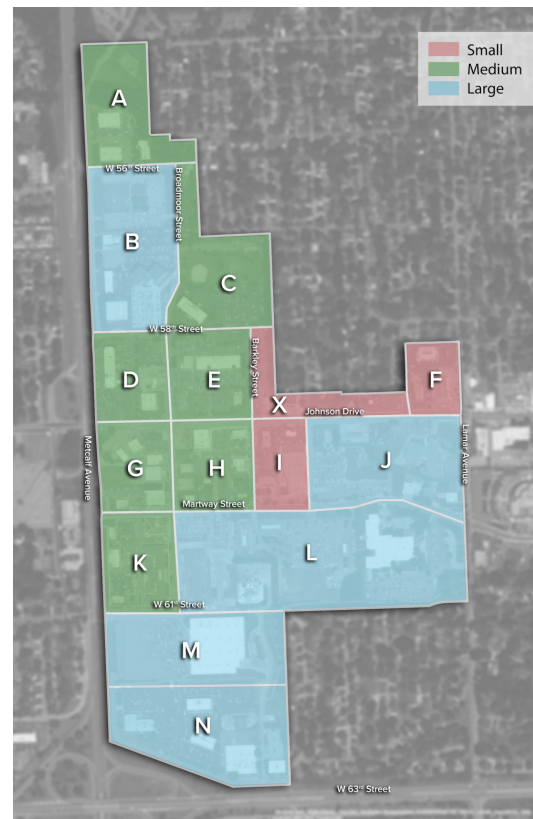


Figure 1. Map illustrating the existing block layout.

Lot Standards

Before making a recommendation on dimensional standards, we first needed to understand any current standards that exist.

The Form Based Code (amended July, 2014) identifies setbacks for each building type, but only includes building size standards for low-rise buildings:

- 100% of up to ½ acres
- 60% of the gross square feet of development of up to 3 acres
- 20,000 square feet of over 3 acres

Figure 2 shows how these standards for low-rise buildings would look, assuming a 300-foot block and the largest allowable building footprint. This demonstrates how existing standards, while targeting conformity in building style, decrease the level of walkability by allowing large parcels to follow suburban development.

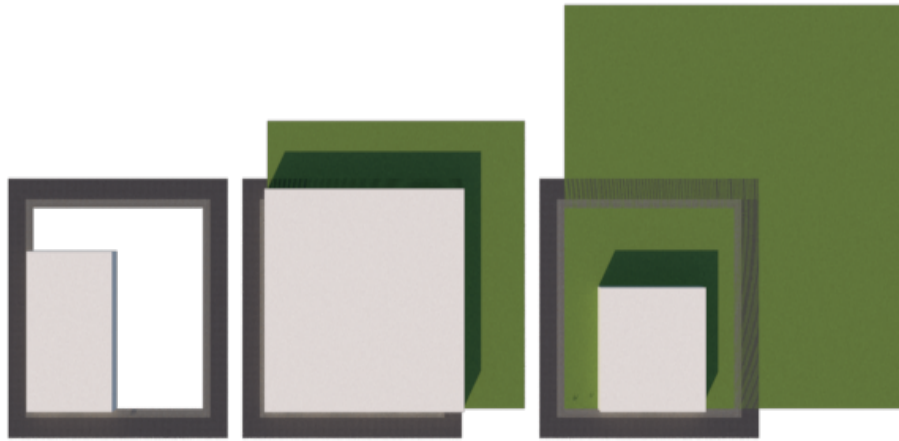


Figure 2. Illustration of the current standards for low-rise buildings.

For mid-rise buildings, it states the buildings are less than 100,000 gross square feet of conditioned space. High-rise is defined as more than 100,000 gross square feet of conditioned space. **Figure 3** demonstrates different heights of mid-rise buildings that contain the same amount of gross square feet of development. This exposes the need to consider maximum lot coverage ratios. This figure also shows that a standard of less than 100,000 gross square feet could potentially take up the whole block if allowed.

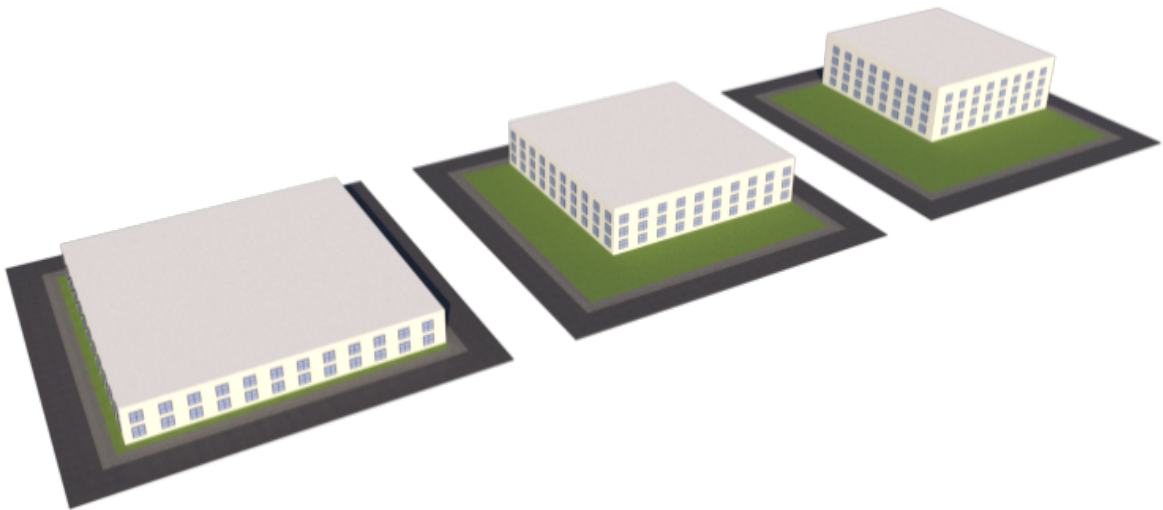


Figure 3. Illustration of the current standards for mid-rise buildings.

In the *Code of the City of Mission, Kansas* Sections 455.220 through 455.250 designate lot arrangement and size standards for residential lot patterns, but not commercial lots.

Section 455.250 provides little direction for planned districts. In fact, it enables developments to built for “one time use”.

“When development within a subdivision is to proceed under a planned district as set forth in Districts “RP-1” through “MP-1” in the Zoning Title, the normal pattern of lots and blocks need not be included on the plat but any parcels and tracts set aside for such planned development must be of shape and topographic contour to allow flexibility of design of the planned development.”

[Ord. No. 1007 §16-303.16, 1-24-2001; Ord. No. 1091 §§1 — 3(App. A §455.250), 9-24-2003]

Block Standards

The *Code of the City of Mission, Kansas* does not provide dimensional standards for block sizes except in Section 455.150 which states:

In general, intersecting streets determining block lengths shall be provided at such intervals as to serve cross traffic adequately and to meet existing or future streets. Where no existing plats control, the blocks shall not exceed one thousand five hundred (1,500) feet in length.

[Ord. No. 1007 §16-303.06, 1-24-2001; Ord. No. 1091 §§1 — 3(App. A §455.150), 9-24-2003]

While the *Code of the City of Mission, Kansas* does not provide dimensional standards for block sizes, the Form Based Code, does show that the City of Mission, Kansas wants to achieve smaller block sizes to improve walkability and development in the West Gateway District. To get these smaller block sizes, graphics within the Form Based Code have been used to illustrate the new placement of streets and access ways which cut through blocks that in this study would be classified as large blocks in **Table 2** (B, J, L, M, N).

Other Standards

The *Design Guidelines for the Johnson Drive Corridor* (amended May, 2008) and the *Comprehensive Plan* (amended March, 2011) do not include any dimensional standards.

Based on this review of key documents, existing lots, and existing blocks, it is clear that the City needs standards to help them achieve their vision. The standards that are provided in the Form Based Code do not promote walkability and are missing critical guidelines for the arrangement of buildings on lots, and the arrangement of lots within the larger context.

Recommendation

In order to promote walkability and create developable parcels, it is recommended that the City adopt dimensional standards and shorten the block length of existing blocks with shared use paths.

Figure 4 demonstrates how the study area can be split into smaller, more walkable blocks by extending Barkley from Martway to 61st, and Walmer from Johnson to Martway. Additionally, Riggs from Johnson to Martway should be reclaimed as a public street. Shared use paths built through the middle of the larger blocks will create more options for pedestrians and cyclists to travel off-street, and shorten their commute time.

It is also recommended that the Form Based Code be revised to organize land by lot size, rather than Building Type. Instead of achieving density by building up, the City can achieve it by building compactly. If standard lot sizes are enforced, more buildings and uses can be fit into spaces that are otherwise being taken up by parking lots and spread out low-rise buildings. **Table 4** provides the standard lot sizes recommended.

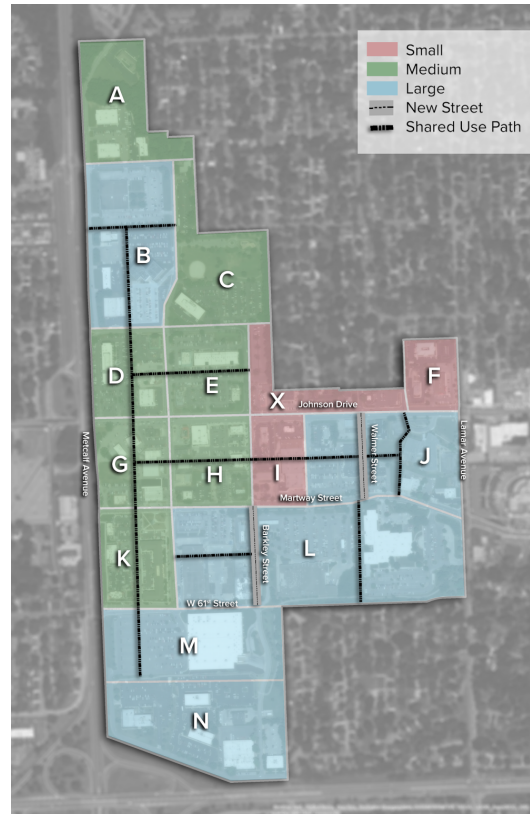


Figure 4. Map illustrating where new, smaller blocks can be created.

Table 4. Recommend Lot Standards

	Min. Frontage	Max. Frontage	Min. Side (Depth)	Max. Side (Depth)
Small Lot	30'	150'	80'	140'
Medium Lot	60'	200'	100'	200'
Large Lot	90'	250'	120'	300'

Using these new lot size standards, lot sizes can be recommended by sector, rather than block, as seen in **Figure 5**. This changes the regulating pattern of the Form Based Code, but it should make it simpler and make more attractive to develop. The lot sizes are not

attached to Building Type, because it is not realistic to have every building be mid- or high-rise given the suburban location, and general character and market demand for the area.

To determine these standards, we first characterized every building in the West Gateway by its existing Building Type. The majority of buildings are currently low-rise buildings. From our analysis on lot sizes, we were able to see the pattern of low-rise buildings having the smallest lots, mid-rise buildings having slightly larger lots, and high-rise buildings having the largest lots. Knowing this, we paid particular attention to the low-rise buildings along Johnson Drive in the transition area between the West Gateway and the Downtown District, and studied the lot sizes along this stretch. Majority of buildings fell in the range we recommended above for small lots, with a minimum frontage of 30' and a maximum of 150'. We followed the same processes for medium and large lots to determine our recommendations.

Using these new lot size standards, we can recommend location of them by sector, rather than block. This changes the regulating pattern of the Form Based Code, but it should make it simpler and make more attractive to develop. The lot sizes are not attached to Building Type, because we do not believe it is realistic to have every building be a mid- or high-rise and if a developer thinks it's appropriate to build a mid- or high-rise building on a small lot parcel, it will only increase density more.

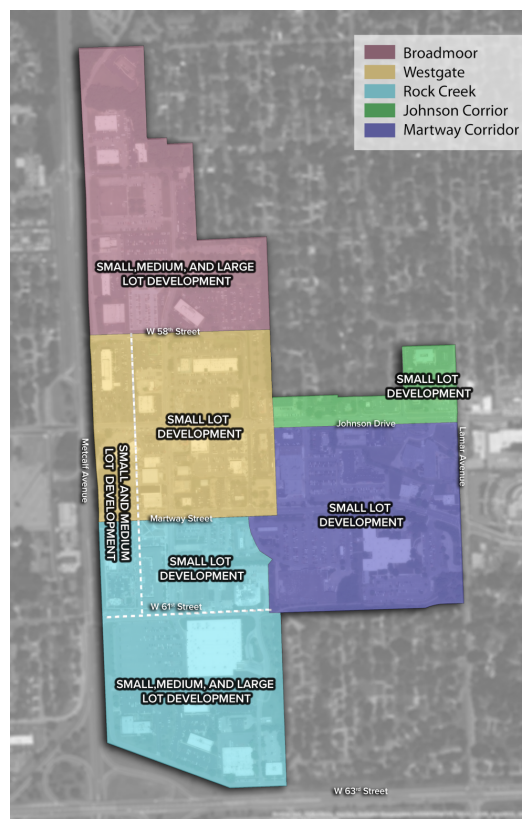


Figure 5. Map illustrating the new sector guideline.

APPENDIX C - ROADWAY NETWORK

Existing Conditions

Existing roadways within Mission handle traffic satisfactorily, according to the feedback from local officials. Further analysis of the available data, however, yielded a more in-depth understanding of the current state of traffic infrastructure, especially in terms of lane functions, counts, and widths. Traffic counts from the City of Mission as well as crash information from local law enforcement informed both existing condition analysis and later recommendations for form-based code. A lack of pedestrian information prompted an overestimation of sidewalk and trail utilization in order to promote multi-modal transport, per the City's vision.

Currently, Johnson Drive in the study area may be viewed in three sections: from Metcalf Avenue to Broadmoor Street; from Broadmoor Street to Barkley Street; and from Barkley Street to Lamar Avenue. The section as a whole is defined as a major arterial street which is a street used to connect many activity centers to one another and move local traffic to highways/expressways. However, due to the low volume of traffic observed via AIMS it could also be classified as a minor arterial street, the same principle as a major arterial street but more focused on accessing commercial areas. The tables below describe the existing conditions of the road sections from West to East (**Table 1**) and North to South (**Table 2**) that were analyzed in this study.

Road conditions were rated on a scale of one to five for intersections within the study area. Intersections or roads rated at one are typically well-maintained: few visible surface issues, line paint still quite visible, and so on. Intersections or roads rated at a two may have some issues with lane visibility or minor potholes. This area is unlikely to have roads at a four or five, which would indicate immediate fixes needed for useability. In general, the road condition rating is intended to provide a very preliminary and qualitative method for ranking implementation of repairs and redesign.

Table 1: Johnson Drive broken down into sections from West to East

Intersection	Number of Lanes	Road Conditions	Road Classification
Metcalfe Avenue to Broadmoor Street	Two lanes of travel in both directions Turn lane approaching Broadmoor	The section is ranked as a 2 due to lane lines becoming less visible traveling East	Minor Arterial
Broadmoor Street to Barkley Street	Two lanes of travel in both directions. Turn lane traveling West at intersection.	The section is ranked as a two due to lane lines not being visible.	Minor Arterial
Barkley Street to Lamar Avenue	Two lanes of travel in both directions. Turn lanes in both directions.	The section is ranked as a one due to well marked lanes and good road signage .	Minor Arterial
Martway Street	One lane of travel in both directions with a consistent center turn lane. East of Broadmoor Street bike lanes in both directions are present until Lamar Avenue.	The section is ranked as a one, the road is well marked and was recently updated.	Minor Arterial

Table 2: Collector streets off Johnson Drive traveling North to South

Intersection	Number of Lanes	Road Conditions	Road Classification
58th Street to Broadmoor Street	One lane of travel in both directions. Turn lanes South of Johnson Drive.	The section is ranked at a two due to lane lines needing repainting and a few large pot-holes.	Collector street
Barkley Street from 58th Street to Martway Street	South of Johnson Drive there is one lane of travel for both directions. North of Johnson Drive there is one lane of travel in both directions and a center turn lane for both directions.	The section is ranked as a two due to lane lines missing South of Johnson Drive. North of Johnson Drive could also use lane re-painting.	Collector Street
Walmer Street (North of Johnson Drive)	One lane of travel in both directions.	The section is ranked as a one since the road appears to be in good condition for its street classification.	Local Street
Russell Street (North of Johnson Drive)	One lane of travel in both directions.	The section is ranked as a one since the road appears to be in good condition for its street classification.	Local Street
Riggs Avenue	One lane of travel in both directions. South of Johnson Drive Riggs becomes a private access road.	The public portion of the road is a one. The private portion is a three since there are numerous visible potholes.	Local Street/Private Access Road

Analytical Methods

Traffic counts from both the City of Overland Park and AIMS were utilized to benchmark the capacity of the existing infrastructure. These counts were used to refine road classification using the City of Lenexa's classification system; otherwise, general classifications were used. Both a shortage of data throughout the study area as well as the age of existing data serve as points of concern in making design decisions for the study. A slight decrease in population in the city of Mission may cause for the dated traffic counts to be inflated in terms of local trips, although regional trips are most likely unaffected. No turning data was available from the available sources, and very limited crash data was found through the City of Mission and KDOT; these were not included in an analysis.

Several sources were used to justify recommended changes to the streets, including technical guidance from both the National Association for City Transportation Officials and the American Association for State Highway and Transportation Officials, as well as the Federal Highway Administration and the MARC Complete Streets Manual. Where possible, the existing data was used to inform choices appropriate for capacity and potential to turn.

Recommendations

Narrower lanes

In general, narrower lanes are proposed for the City of Mission to incorporate into their code moving forward. While the recommendation of the American Association for State Highway and Transportation Officials is for lanes of ten to twelve feet, especially on urban arterials such as Johnson drive, many studies have not found a strong correlation between narrower lane widths and a decrease in safety or increase in crashes. In fact, several note the natural slowing effect of narrower lanes on existing traffic, making the incorporation of narrower lanes in the area a natural complement to make the space appear safer to pedestrians (**Figure 1**).

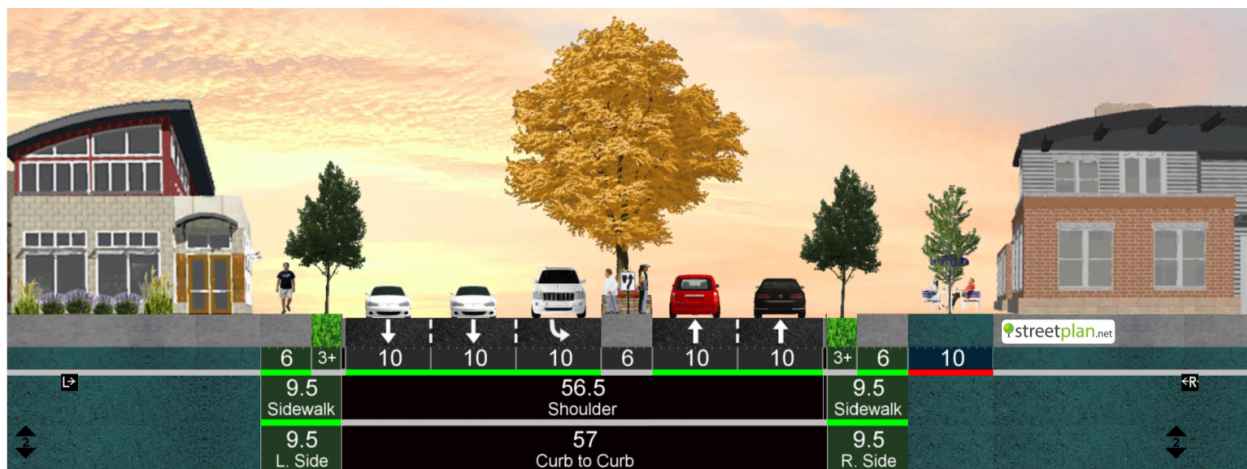


Figure 1: Narrower Lanes for Johnson Drive

connected to Johnson Drive or Metcalf Avenue may be reduced to nine feet if desired (**Figure 2 and 3**).

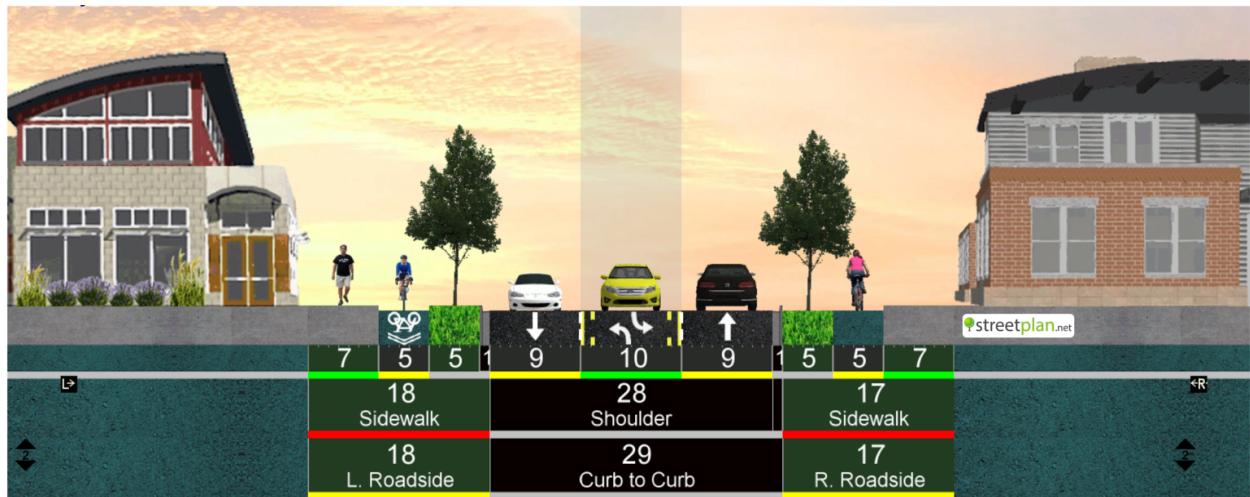


Figure 2: Narrower Lanes on Martway Street



Figure 3: Narrower Lanes on Barkley Avenue

Quadrant intersections

An additional measure in ensuring both ease of transportation and safe and enjoyable walking space is the incorporation of a quadrant roadway intersection. These intersections work to minimize left turns in busy areas or on major trafficways. It is proposed to restrict left turns on the intersection of Johnson Drive and Barkley Street. Westbound traffic

wishing to reach southern Barkley Street must turn left at Riggs Street; eastbound traffic wishing to reach northern Barkley Street must turn left at Broadmoor Street. The result of these changes is a safer intersection at Barkley Street, shorter traffic signal cycles, and more walkability ease and safety.

Further Traffic Counts

Data forms the basis for sound decision making. As discussed, the availability of data for this study was fairly lacking. More recent and comprehensive traffic counts would inform planners and designers as to problem areas and proper responses. Turning data would also support problem-solving efforts in the area. Thus, further traffic counts and turning data along Johnson Drive, the entrances and exits to Metcalf Avenue, and intersections along Broadmoor and Barkley Streets should be collected.

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APPENDIX D - METCALF AVENUE

Existing Conditions

The Interchange of Metcalf Avenue/Highway 69 and Johnson Drive currently serves thousands of drivers a day, ranging from regional to local users. It pulls southbound traffic from Metcalf onto Johnson Drive via two separate exits, one of which doubles as an entrance to the southbound highway. Northbound traffic must exit and enter on Martway Street to the south or 58th Street to the north to access Johnson Drive.

Traffic counts from 2014 for the intersection of Metcalf Lane and Johnson Drive yield useful information. A total of 1,900 vehicles enter north onto southbound Metcalf Avenue, originating from Johnson Drive or Metcalf Lane to the south, while 2,400 exit southbound Metcalf Avenue from the north. About 1,500 vehicles travel north from Metcalf Lane toward Johnson Drive, while 1,400 travel south. Prior to and following this intersection, westbound Johnson Drive carries 8,700 and 7,200 vehicles; eastbound Johnson Drive carries 7,000 and 9,300.

A lack of complaints in the Mission Directional Survey, 2015, suggest adequate capacity as of yet. Although turning counts are not available, it may be reasonable to assume that Johnson Drive must be able to carry at least 9,000 vehicles in each direction in a day, while the exits handle less than 2,500. Vehicle counts are not available for Metcalf Avenue adjacent to this intersection; however, Metcalf Avenue at 61st Street counts are available. Numbers to the north show 18,300 average daily trips (ADT) southbound and 16,100 ADT northbound.

Data Limitations

An obstacle in this endeavor is the limited availability of both traffic counts beyond daily travelers as well as turning counts for entrances and exits near the interchange. What data exists is a few years old, and may thus be subject to changes in regional traffic. Local traffic, while likely lessened by the slight decrease in population within the city of Mission, also likely impacts these counts to a lesser extent. Although more recent and more detailed data would assist in this evaluation, the relative magnitudes of vehicle counts should provide a reasonable estimate at this time for determining feasibility of an alternative to the existing interchange.

Methodology

Existing traffic counts were intended to inform the determination of both existing condition adequacy and proposed replacement of the interchange at Johnson Drive and Metcalf Avenue. At the behest of the City of Mission, the potential of bringing this interchange to grade was investigated, with two options evaluated based on the available space and

relative capacities of the road and highway at hand. The first of these options is simply to remove the exits on southbound Metcalf Avenue and lower the existing bridge, creating a four-way traffic signal. The second also removes the exits, and shifts Metcalf Avenue as necessary to introduce jughandle exits that would minimize left turns at the intersection.

Firstly, technical guidance from the Federal Highway Administration provides commentary on the feasibility of a signalized highway at the existing traffic counts. Other traffic counts at similar intersections of regional highways and minor arterial streets may also provide an idea to whether this area is an appropriate one for such an intersection. This approach will also be used to determine the feasibility of introducing a jughandle intersection--the comparison of existing traffic counts with those of other, successful jughandle intersections.

Proposed Conditions

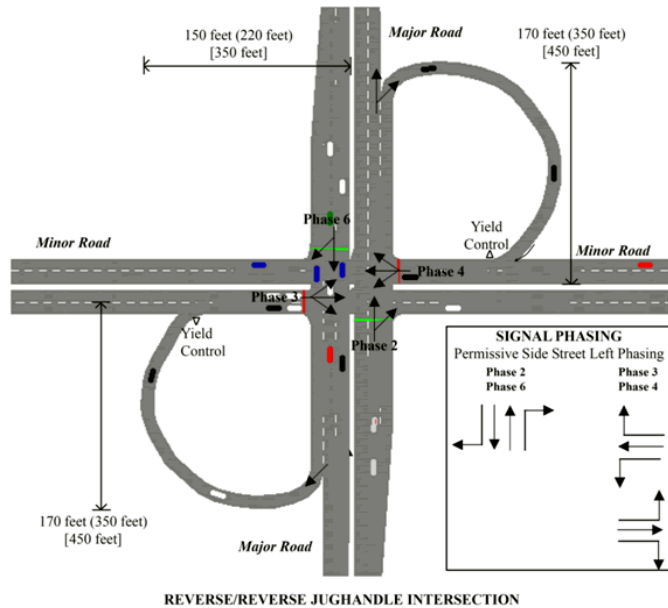
Bringing the Metcalf bridge to grade is advantageous for the city of Mission. Level access creates a more inviting entrance into the West Gateway area in comparison to the existing overpass. Two proposals allow for a more open and accessible West Gateway:

Option 1: Lower the existing bridge and introduce a signalized intersection.

A signalized intersection would reduce speeds along both Metcalf and Johnson Drive, presenting greater opportunity for commuters to recognize amenities on Mission's West side. This configuration also allows for more seamless travel to draw residents from Overland Park to the West Gateway area. However, this design is not without drawbacks. Reduction in speed and flow of traffic could divert drivers to more free flowing arterials away from Mission entirely.

Option 2: Lower existing bridge and introduce a Type A, reverse-reverse jughandle interchange.

Figure 1. A Type-A Reverse/Reverse jughandle intersection is found to perform better than a stoplighted intersection for intersections at high capacities. (Bared, 2016)



Jughandle interchanges are a signalized design which is able to accommodate large volumes of intersecting traffic while maintaining the option to turn left via a ramp that branches to the right of a road, where it intersects a cross street to the right of the main intersection (**Ref. Fig. 1**). This design achieves the desired access to the city, and has the potential to improve traffic flow for drivers exiting Metcalf to Johnson Dr. A jughandle shifts slower, exiting vehicles off Metcalf to the right lane where speeds are typically reduced. Therefore removing right and left-turn conflict points from Metcalf as compared to a standard four-leg intersection. Additionally, jughandles remove conflict between right-turning vehicles and pedestrians or bicyclists at the primary intersection (Metcalf) and transition those interactions to a thoroughfare with less volume (Johnson Drive).

A jughandle maintains existing travel speeds along Metcalf and reduces the amount of delay seen at a typical signalized intersection by increasing queuing space for left-turning vehicles. An obvious disadvantage to the design is driver confusion. Jughandles are an uncommon configuration outside of the northeastern United States, and without significant education and signage, could cause driver frustration. Issues may be compounded due to inconsistency between intersections, where some intersections may be jughandles and others may be standard, signalized intersections. Further analysis would have to be considered to determine if this type of construction would necessitate acquiring a larger right-of-way.

Despite improvements to access and congestion, the recommended course of action is no change to the built environment at Metcalf and Johnson Drive for the immediate future. Installing a signal at Johnson Drive and Metcalf requires significant coordination and costs for both KDOT and the City of Mission. Additionally, moving pedestrian walkways across the busy intersection increases risk along a corridor tasked with transporting large

volumes of automobile traffic; compounding what would already be a controversial decision. More analysis to judge community priorities regarding the project with focused efforts on data collection, building partnerships (OP, business owners, etc) and conducting a feasibility analysis of multiple designs would be beneficial to present KDOT with a robust package to make the strongest possible argument for any change to the intersection.

APPENDIX D SOURCES AS CITED

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APPENDIX E - TRANSIT

Existing Conditions

The Kansas City Area Transportation Authority (KCATA), operating under the collective brand, RideKC, is the principal public transportation agency operating within the study area. Currently, there are four routes that operate during the weekday that service the West Gateway area: 401, 402, 403 and 435. Route 401 is the only frequent service route, while Routes 402, 403 and 435 offer peak or midday services. These routes, shown in Figure 4, operate within the study area between 5 a.m. and 7 p.m. In addition, a temporary ride-hailing pilot program offers on-demand services Monday-Friday, 6 a.m. to 8 p.m. Route 107, not pictured, operates only on a limited weekday and weekend schedule, and does not travel within the West Gateway study area. However, Route 107 stops at the Mission Transit Center. The Mission Transit Center (MTC), shown in Figure 5, is located east of the West Gateway study area at 5251 Johnson Drive. It is a park-and-ride lot and transit transfer center for Johnson County.

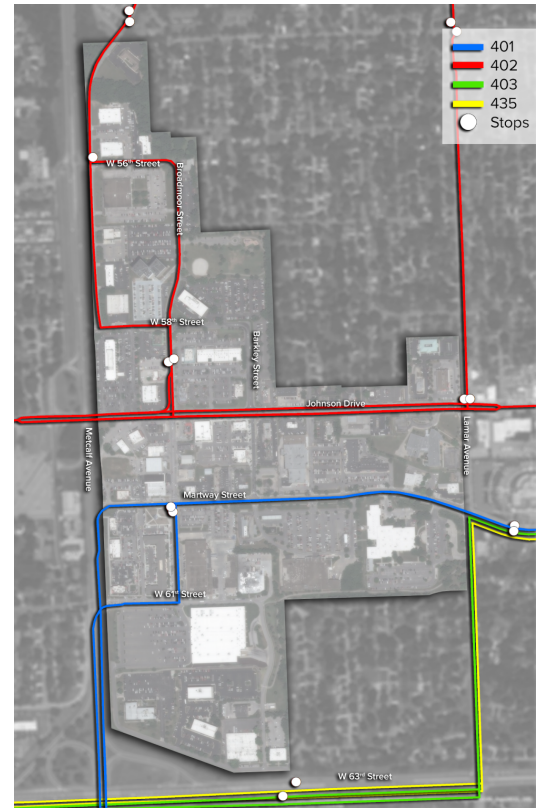


Figure 4. Existing transit routes.



Figure 5. Mission Transit Center in relation to the study area.

Data Limitations

KDOT's traffic counts were sourced from 2016. As a result, these traffic counts may not be the most current representation of traffic volumes within the corridor. RideKC is also in the process of altering its transit routes. Current routes within the service area may be reduced in the future.

Methodology

Current transit routes were analyzed from data available on KCATA's website and compared against methodologies outlined in Smart Moves 3.0, the Mid-America Regional Council's 20-year transit and mobility plan (LRTP). Traffic Count data was also analyzed to determine areas of most need. This data was sourced from KDOT.

Proposed Conditions

It is recommended that two docked bike share stations be added in the parking lots of the Mission Transit Center (MTC) and Hy-Vee parking lot (6655 Martway St.) This would better connect MTC to the West Gateway Outlined in Figure 12 is the current MTC, as well as where bike share could be added to existing transit infrastructure. The darker purple is the site of Hy-Vee, the second proposed bike share dock location where there is currently no transit infrastructure. These locations serve as representative boundaries of the East and West Gateways in the City of Mission. The proposed bike share operator is BCycle, a public bicycle company owned by Trek Bicycles who currently operates in downtown Kansas City, Missouri.

In addition to bike share, it is proposed that the City of Mission look at the possibility of expansion of RideKC transit lines to incorporate more frequent bus routes as population and demand increases in the City.

APPENDIX F - SIDEWALK REDESIGN

Existing Conditions



Figure 1: Sidewalks Along Johnson Drive

The most significant impediment to pedestrian usage of sidewalks in the study area is a low level of comfortability. The existing infrastructure in the West Gateway consists primarily of four foot, mono-curb, concrete sidewalks which are not offset from streets. These paths have abundant cracks, dead ends, ramps without warning strips, and crosswalks which create an intimidating environment, particularly among those with mobility issues (**Figure 1**).

The major deterrent to walking and safety along Johnson Drive is due to the large volume of vehicle traffic demanded by the arterial roadway. Short of overhauling the corridor to reduce volume, speed, and turning patterns, comfortability can be improved by wider sidewalks with additional buffer space between pedestrians and vehicles. The intersecting feeder sidewalks and parallel paths to the north and south of Johnson Drive suffer mainly from connectivity gaps, poor crosswalk conditions, and the Americans with Disabilities Act (ADA) compliance issues. Targeted facility maintenance and increased lighting are an opportunity to promote a more inviting walking environment.

“Walkability is strongly associated with higher housing values in nearly all metropolitan areas. Choice, convenience, and variety of walkable neighborhoods are reflected in housing markets and are the product of consumer demand for these attributes. The nation’s urban leaders should pay close attention to walkability as a key measure of urban vitality and as impetus for public policy that will increase overall property values.” - Joe Cortright, *Walking the Walk: How Walkability Raises Housing Values in U.S. Cities* (Chicago: CEOs for Cities, 2009).

Analysis

Improved connectivity and comfortability along pedestrian routes was identified as a community priority during the 2015 City of Mission Citizen Survey. In the survey, respondents were asked to pick three items from a list of 11 which they believed would have the greatest impact on improving the quality of the neighborhood. Maintenance of sidewalks was identified as the second most important service to emphasize behind street and curb maintenance, with 64% of residents answering they would like to see either more or better maintained sidewalks. Implementation of a sidewalk redesign offers an opportunity to align re-development programs with the will of the community. Considerable improvement to the quality of the supplied facilities and the addition of new facilities, influences the likelihood of residents using the resources provided.

The orientation of development density drives the recommended improvements to the public right-of-way. Considering the reduced traffic volumes in comparison to Johnson Drive, Martway Street is an opportune thoroughfare for bike and pedestrian activity. Positioning commuter and recreational sidewalks with access to attractions like businesses and transit is a net benefit for all residents, but particularly environmental justice populations. Finally, the City must establish and enforce codes to assist with the costs of construction and maintenance of pedestrian infrastructure. New and existing development with incompatible pavement that intersects the greater network will be responsible for bringing that infrastructure into compliance.

Recommendations

Existing Sidewalks

A prioritization schedule for existing sidewalks can be implemented to drive consistency in decision-making and form the basis of programmatic improvements to the pedestrian walkway. **Figure 2** details a proposed sidewalk network consistent with the vision of the West Gateway corridor and Form Based Code.

Improvements to sidewalk along the north side of Johnson Drive focuses on maintenance and ADA compliance. The recommended width of the path for existing and secondary sidewalks is 6 feet. A 10-foot-wide shared-use path spanning the south side of Johnson Drive encourages pedestrians via increased comfortability already evidenced by the pathway immediately north of Natural Grocers. The network include sidewalks feeding pedestrian traffic into Johnson Drive. The shared-shared use path connects recreational activity in the corridor by forming a connection from Broadmoor park to the Rock Creek Trail via the east side of Broadmoor Street. Continuing the shared use path on the north side of Martway to Lamar Avenue links the West Gateway towards downtown Mission.

Other notable features of the feeder network are an access connection between businesses on the north side of Johnson Drive to retail space and proposed “pocket parks” south of Johnson Drive and connections of gaps in the existing network.

Shared-Use paths offer substantial pedestrian comfortability and provide opportunities to encourage the use of those facilities with the option of different amenities introduced by zone as established by the National Association of City Transportation Officials (NACTO) recommendations. The frontage zone describes the section of the sidewalk that functions as an extension of the building, whether through entryways and doors or sidewalk cafes and sandwich boards. The frontage zone consists of both the structure and the facade of the building fronting the street, as well as the space immediately adjacent to the building. The pedestrian through zone is the primary, accessible pathway running parallel to the street. The through zone ensures that pedestrians have a safe and adequate place to walk with a width of five feet. Street furniture, trees, or bikeways make up the remaining section of the sidewalk between the curb and the through zone. Amenities, such as lighting, benches, newspaper kiosks, utility poles, tree pits, and bicycle parking are provided. The street furniture zone may also consist of green infrastructure elements, such as rain gardens or flow-through planters.

New Sidewalks

The following points should be kept in mind for non-existing sidewalks:

- Ensure development adequately addresses absent or non-compliant sidewalks and does not create new gaps by updating code to build in costs through site review or fees. In order to equitably address needs, the fee could be based on a combination of increased intensity of use and outstanding pedestrian infrastructure need in the area.
- Develop an ADA transition plan for the West Gateway corridor. Governments are obligated to conduct a self-assessment of their facilities, programs and services to determine if those operations are equitable for the public as a whole. Mission should program a schedule to identify and address impediments to accessing public facilities and activities. Appointing a full time staff position for an official to act as an ADA Coordinator, is preferred.
- Identify partnering opportunities with a special focus on enhancing safe pedestrian crossings, to implement projects that support shared goals or overlapping priorities through collaboration and shared resources.

- Split the two “superblocks”. In conjunction with recommendations from the Land Organization section, the large plats of land without intersecting sidewalks or roadways should be divided into uniform parcels. Segments should be added to the pedestrian walkway dividing the area bordered by Riggs, Johnson, Lamar, and Martway by adding sidewalk West of Shawnee Mission Horizons High. Connections from Martway to Rock Creek Trail, just West of the Johnson County Motor Vehicle building, and a sidewalk along a proposed street from 61st Street and Barkley Street adequately dividing the block bordered by Broadmoor, Martway, Lamar, and 61st Street.

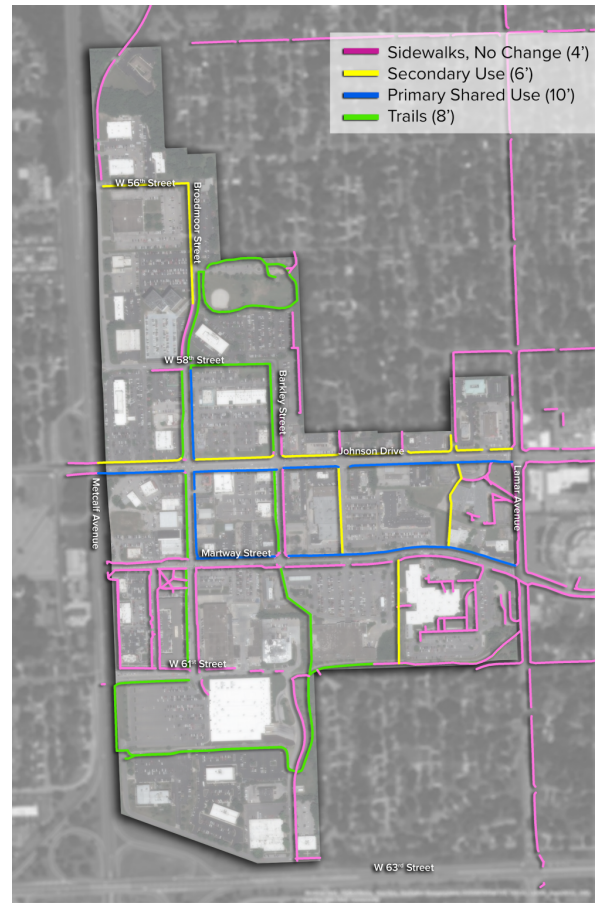


Figure 2: Proposed Pedestrian Network

APPENDIX F SOURCES AS CITED

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Transportation Advisory Group. 5.

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(Chicago: CEOs for Cities, 2009)

2015 City of Mission Citizen Survey

Form Based Code for the West Gateway Study Area

APPENDIX G - TRAILS

Background

Mission, Kansas is a small suburban town situated in the Northeast Kansas that maintains a post-war look, with small houses of different designs on large lots. Located just 7.5 miles southwest of Kansas, Missouri. As a result, many people traveling to and from Kansas City pass through Mission's downtown which features restaurants, business, and specialty shops. The existing trail update we are proposing will be utilized to develop a system of interconnected regional and community trails and pathways, known as multi-use trails. These trails and pathways are intended to address an established public need to provide recreation, health and quality of life benefits to Mission's diverse environments. Mission's Comprehensive Plan provides goals and objectives for the future use and development of trail corridors. The goal of future plans is to promote pedestrian and bicycle trail corridors. The proposed trail corridor development will connect the regional MetroGreen plan and the county Streamway Park.

The primary purposes of the city of Mission Trails plan are:

- To Provide a trail network connecting pedestrians to neighborhood parks and recreation, as well as to the Rock Creek regional trail network.
- To enable the blend of existing sidewalks and trails with proposed routes and improvements.
- To support the existing proposed trail network that is identified in the Mission, Kansas, Parks and Recreation Master Plan.
- To improve the quality of the pedestrian environment, increase pedestrian safety and encourage walking.
- Safe Environment: A safe environment that will ensure sustainability of trail systems by providing a safe trail environment.

Existing Conditions of the Trails in Mission, Kansas:

The trails system in the city of Mission is poorly connected and does not promote walkability and use. Trails end abruptly in industrial areas or cross through large parking lots. The trails are not usable by those with mobility issues; at times there are stairs or large step ups with no alternative route and little to no places to rest (as shown in figure 1). Improving the conditions of the trails and connectivity will provide more recreational space for the city of Mission.

The goal is to connect all the trails in the city and ensure a welcoming experience for all users. The city of Mission should focus on the trails south of Broadmoor Park because connecting Broadmoor Park and Rock Creek Trail is already a proposal. The focus should

begin with the trails south of Broadmoor Park to ensure funding be prioritized to transition the downtown feel throughout the area. The trails north of Broadmoor Park will require more funding because they require the city to buy parcels of land, fund large construction projects, are longer and length, and would require rezoning. The Master Plan of the City of Mission has a proposed trail to the east of Broadmoor Park that would be a great beginning project.

Methodology

Appendix 5 of the City of Mission Parks and Recreation Master Plan was analyzed to identify improvements that could be made to recreational programs to encourage trail usage within the focal area. The appendix focused on assessing the recreation programs available in the study area. Currently, there are 10 recreation programs listed and ranked. The programs were analyzed and categorized by strengths and opportunities. The programs with many opportunities were chosen as focal points for current projects.

Recommendations

Trail Connectivity

- Begin with proposed trail east of Broadmoor park
 - Connect Broadmoor with Rock Creek Trail along Mission's western municipal border along Broadmoor Street.
 - Connect Victor Anderson Park to Rock Creek Park
 - Will provide connection of Broadmoor Park via Martway Street.
- Create updates on sidewalks along the south side of Johnson Drive
 - Sidewalk maintenance, trail cleaning, and ramp instalment to ensure all trails are ADA compliant.
- Ensure all trails (areas with a vegetative buffer between street and trail, as seen below) are at least 6 feet wide
 - Begin planning for benches to be placed at regular intervals (no more than 4 per block, or as mentioned in the West Gateway Form Based Code), photos of approved benches and trash cans below.



Figure 1. Wall separating parking lot and park.



Figure 2. West Gateway Vision Plan for Vegetative Buffers Broadmoor Park and Trail Corridor (pg.35).

- Improve lighting along the trails to promote use and safety at all times of day.



Figure 3. West Gateway Form Based Code (Chp. 6 Page 4) Trail Amenity Recommendations:

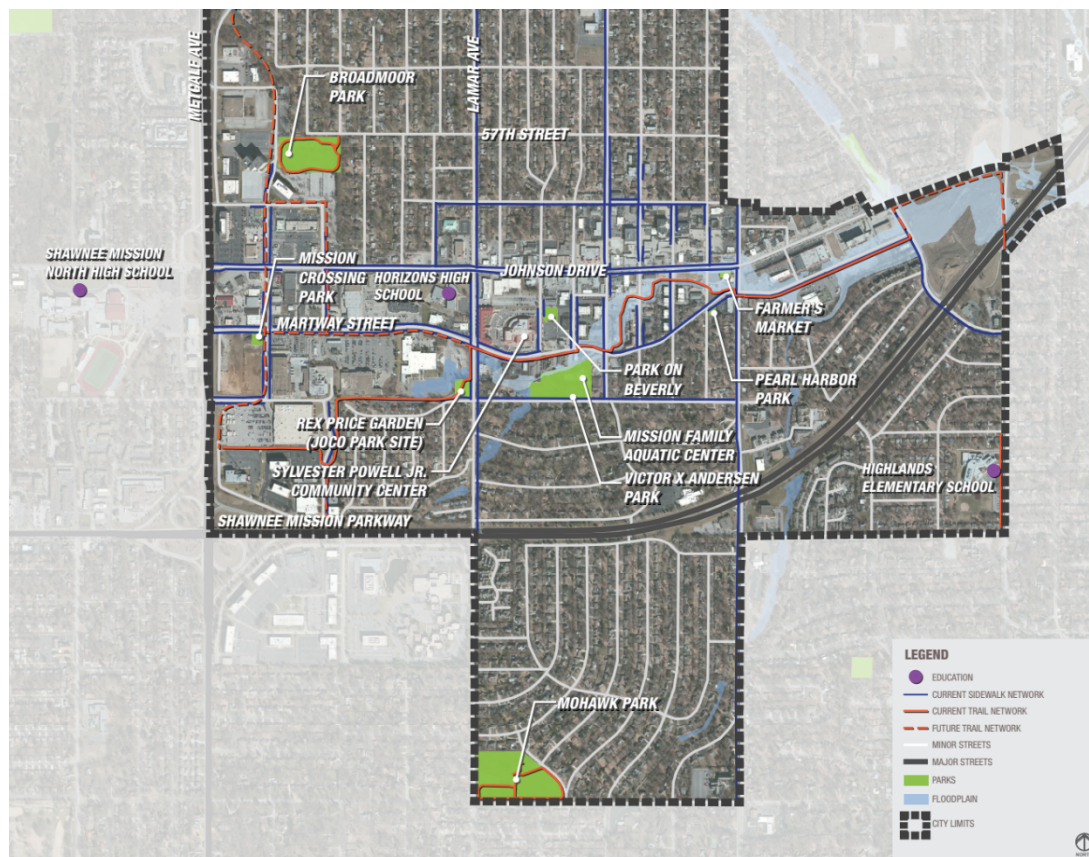


Figure 4. Proposed Future Trail from the Parks and Recreation Master Plan

APPENDIX H - NATURAL ENVIRONMENT

Climate Change Adaptation

Introduction

Impact of climate change in Kansas and the City of Mission

Kansas City is ranked as one of the hardest hit climate change areas from The Weather Channel analysis as of March 18, 2019 (ranked 5 out of 25 U.S. cities) (San Francisco Chronicle 2019, Bergen 2019). Possible climate change impact in the Kansas City metropolitan area would increase the intensity of extreme weather events, humidity rise, drought, temperature increase, and wildfire risk. These environmental changes lead to agricultural economic loss, flooding, heatwave-related deaths, and wildfire-related incidents (Table 1).

In the city of Mission, possible climate impact would be heatwave-related health impact and flooding impact because of temperature and precipitation increase. In Kansas, rising temperature affects tree or survival vegetation change. Additionally, the heatwave impact is severe to humans. Heat indices above 100 degrees were 68 days in 2013 and are estimated at 80 days in 2050. The days have doubled from 35 days in 2000. Vulnerable populations for the extreme heat in the Kansas area estimated to be more than 70,000 people. Flooding due to excessive weather such as snowstorms and precipitation events will affect over 130,000 people are under the risk of inland flooding in the future (EPA 2016, State At Risk n.d.). The goal of the City of Mission is to develop a city friendly to aging citizens and a safe, walkable shopping district in the downtown. From the aspect of a long-term sustainable city, it is useful to consider whether the city development is flexible and resilient to climate change impact to avoid health hazards of people living in the city and promise a reliable city for the future. In this chapter, possible climate change adaptation measures are introduced to the city of Mission.

	Table 1. Climate change impact in Kansas
Excessive heat	Heat index above 100 degrees was 68 days in 2013 and estimated at 80 days in 2050. The days have doubled from 35days in 2000. Vulnerable population for the extreme heat in Kansas is estimated to be more than 70,000 people.
Flooding	Severe rainfall is estimated to increase during the wettest days of the year. This will affect over 130,000 people are under the risk of inland flooding in the future.
Agriculture	Agricultural economic loss due to temperature rise and drought. Approximately 50% of the irrigated production decline was estimated. The longer growing season may be an advantage for soybeans and wheat productions.

General Adaptation

Development needs to start considering the climate impact for the future. It is important to estimate which area would likely to be the most vulnerable by flooding, heatwave, and cold wave. The important facilities such as hospitals, police offices, or emergency shelters are better to be located in areas that are not vulnerable. Also, for accessibility, these facilities should be able to be accessible to anyone without a car. Not only emergency facilities, but also public buildings need to avoid vulnerable areas. Thus, the first step is to identify vulnerable areas by predicting the impacts of climate change. It is also important to mainstream climate change adaptation to local municipalities and decides which department needs to be a lead role – management system (Susman 2017).

Methodology

Since climate change adaptation is a fairly new concept, varies greatly by local context and levels of vulnerability, there is no specific guide to modify home based code to adapt to changing environment. Nonetheless, EPA published a report that included best practices around the world to make suggestions for modifying codes. By utilizing this report as well as reviews of existing literature regarding adaptation to provide overall suggestions and adaptation measures, codes, and zonings suitable for the city of Mission.

Heatwave

By 2050, Kansas is estimated to have 4 times more days above 100 degrees than it does now (EPA 2016) (Figure 1). Vulnerable population is likely to be children, elder, poor, disability, and health deficit. Poor populations have less access to air conditioning system. The elder population are more sensitive to heat, do not use air conditioning and are more sensitive to dehydration. They also suffered more from cardiovascular strain and respiratory problems.

From Kansas City Star (2019) “A recent notice from Kansas City Power & Light said that this summer’s skyrocketing electric bills are due in part to the fact that “our region has experienced more than 50 days of 90-plus-degree heat this year — more than double the number to date in 2017.”

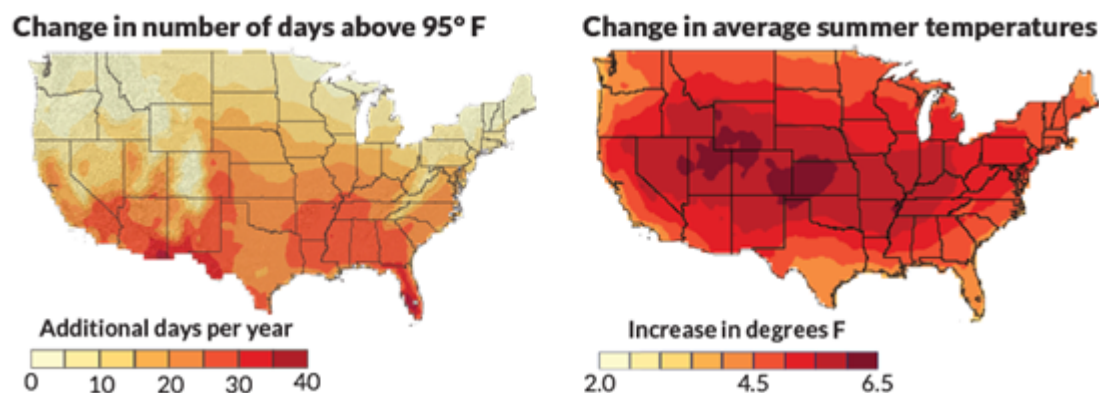


Figure 1. Numbers of hot days 95 degrees above per years (left) and summer temperature change (right) when compared with late 20th and mid-21st century. Image acquired from: Science News

Possible Impacts of the Heatwave in the City of Mission

Possible consequence of heatwave are directly related to the health of people. The City of Mission has an increased aging population and this portion will continue to increase in the future. By responding to these aging citizens, the city of Mission is trying to develop “walkable” downtown and elderly friendly city. Thus, considering heat impact into development might be useful for long-term development. The following section will list adaptation measures and suggested code modification based upon the adaptation measures plus providing example cities used the measures.

Common Adaptation Measures

- Infrastructure improvement: Enforcing sturdy infrastructure is the key because associated with extreme weather, a power failure may lead human death directly during the heatwave.
- Planting trees for shading

- Urban gardens to avoid excessive heat from asphalt and concrete
- Green roof
- Solar panel (mitigation)
- Community cooling center: The center should be accessible to the vulnerable population especially poor who do not have access
- Develop the system that neighbors can care and check each other
- Heat early warning system – propagate warning information such as staying at home and symptoms reminders
- Health hotline to ask when people feel unease
- Cooling roof mist system (**Figure 2**)
- Shading roof in downtown
- Transportation
- Expand healthcare services for the poor since they are the most vulnerable to climate change
- Structural improvement in housing



Figure 2. Roof mist system used in sidewalks for heat prevention. Image acquired from https://tshizuka.at.webry.info/201808/article_10.html

Approaches

- Bus:
 - Transportation customer communications: informing bus riders to bring water anywhere to avoid heat-related illness and sharing information about heat evacuation sites.
 - Use white roof bus design to avoid solar heat
- Cooling center:

- Determine the location through mapping hotspots of vulnerable neighborhoods - Data is needed to determine the heat vulnerability. (distribution of age (65yo older), unemployment, single-person households, structure age (Where is no air-conditioning in the house), household income by location (where are low-income people concentrate), People who receive healthcare, etc.) Useful article: Macnee, R. G., & Tokai, A. (2016). Heat wave vulnerability and exposure mapping for Osaka City, Japan. *Environment Systems and Decisions*, 36(4), 368-376.
- Cooling center does not necessary to be a new building, it can be libraries, community centers, public pools, or private business property (Figure 3.1).
- Location can be close to elderly apartment complex or next to a bus stop because accessibility is limited for vulnerable population.
- Local government can communicate with vulnerable communities to decide the location and disseminate the center location through ongoing outreach programs.
- The center could potentially work as evacuation site for other types of hazards- winds, flooding, etc. so strengthen building is important and avoid flooding area to locate.
- Passive survivability building code is used for new or reconstruction buildings which can work as an emergency shelter.

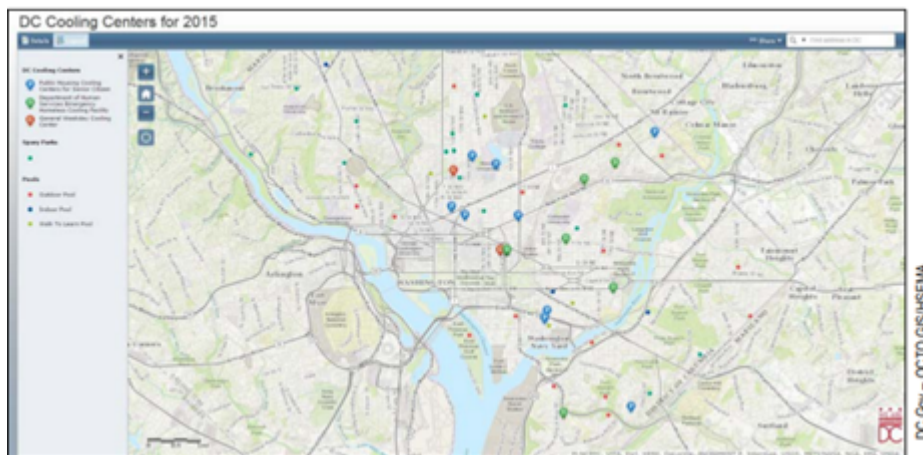


Figure 3.1 . Location of cooling centers, parks, and pools to inform residents cooling centers location through the city's website in Washington D.C.

Cooling Center Location in the City of Mission:

The bus stop closest to the Sylvester Powell Jr. Community Center is On Martway St at Lamar Ave. The bus routes going through the stop are 401, 402, 403, and 435. Figure 3.2 shows bus routes. It indicates the buses directly accessible to the community center are only available horizontally and not available vertically, in other words, the bus does not go

through the residentially rich area in the city of Mission. Maybe it is difficult for an elderly individual without a car to access the center. It would be needed to analysis considering vulnerability, but it might be useful to have a center accessible to people without a car.

To determine the location that needs to improve cooling center accessibility was analyzed through AHP and GIS techniques. Figure 3.3 shows vulnerable areas that are recommended to add a new cooling center. Vulnerable populations in this analysis was based on the U.S. census data: people living alone, 65 years older, 65 years older living alone, poverty rate, income level, community center location, bus stops. The result suggested that community center solely does not cover the entire city as a cooling center, so placing the new cooling center in the northwest corner of the city could possibly improve city service during the heat. The cooling center does not have to be a new facility or public facility. It could be laundry store, or church. Maybe, providing bus service to the cooling center could improve the community service. Additionally, cooling centers are sometimes better to be open on weekends if the weather is extremely hot.

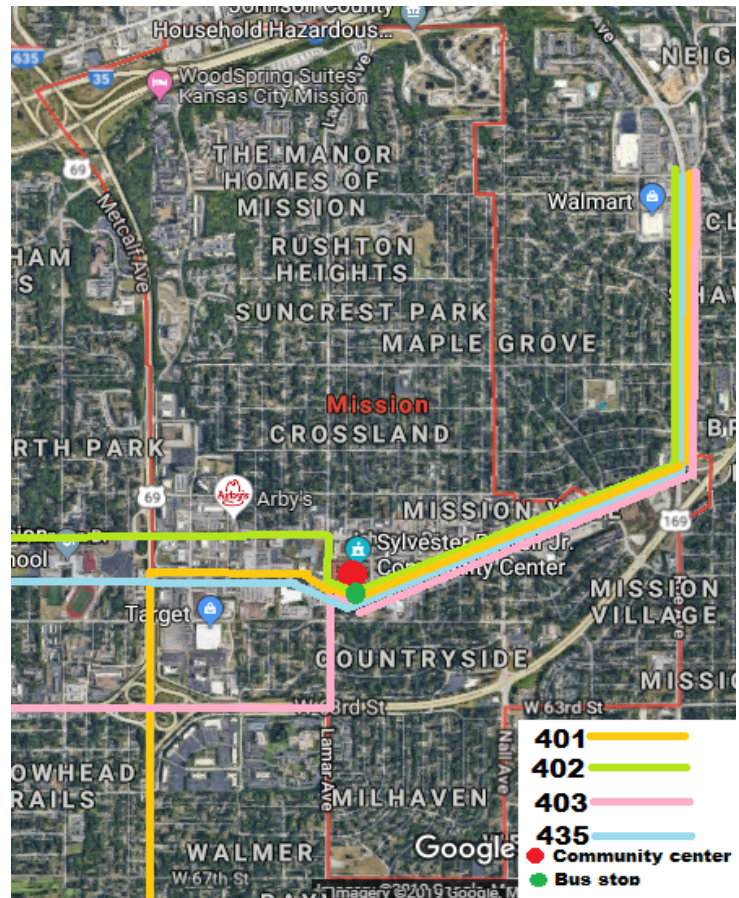


Figure 3.2 Bus routes closest to the community center

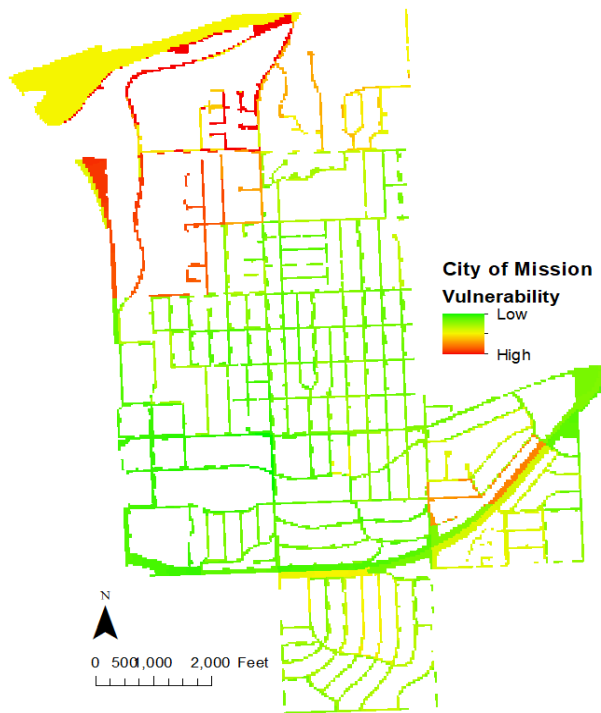


Figure 3.3 Vulnerability analysis considering vulnerable population and cooling center (community center) accessibility

- Outreach:
 - Develop outreach plan to communicate with vulnerable residents (elderly, chronic illness, pregnant women, children, no air conditioning, outdoor workers, and homeless)
 - In Baltimore, the city established “*Make a Plan, Build a Kit, Help Each Other*” campaign to educate residents about hazard by building an emergency kit and neighborhood reliance. Residents received a card written “Help” in orange and “Safe” in green on the other side (Figure 4). This card can be used to put the window to let neighbors know the situation.



Figure 4. Help Each Other card used in Baltimore

Pictures acquired from: <https://baltimorehazards.wordpress.com/get-prepared/help-each-other/>

- Provide incentives to plant and protect trees:
 - Johnson Drive's walkways can plant more trees close to walkways to avoid sun-light when people are walking. Also, trees can be planted around bus stops to provide shading to people waiting for the bus.
 - In *Amended Mission, Kansas design guideline for the Johnson drive corridor (2008)*, there is a recommendation of landscaping (site design guideline pg.3-5). From the recommendation, shade along the corridor is placed as a priority of the landscaping.
 - Identify the area most vulnerable people walk and use. Vulnerable community outreach can be targeted and offer higher incentives to plant and protect trees.
 - Local government partnering with NGOs and private companies to provide labor and free trees to low-income neighborhood.
 - "Tree-rebates" is used in Roseville, California to encourage residents to plant shading trees for a rebate of up to \$50.
 - City program partnering with local, state, federal governments, and NGOs called "TreeBaltimore" providing trees to plant on private properties.
 - Possibly develop rebates and a program to encourage tree planting partnering with other levels of governments, private, and NGOs. Also, include shade tree policy in the landscape manual.
 - The manual developed in Fayetteville, Arkansas provides clear guidance on how to submit a plan, what the required minimum tree canopy, and tree species. Developers are encouraged to meet with the city's urban forestry team before the submission.

- Tree canopy and species need to be considered by taking into account storm hazard because trees possibly block stormwater drainage by leaves and affect power line by failing trees from storm.
- Glenview, Illinois has clear guidance of trees and vegetation for parking lots including tree placement, species, and maintenance, etc.
- Materials to reduce heat:
 - Cool pavement strategies can be applied to avoid heat: permeable pavement in sidewalks and parking areas, use light colored materials.
 - Example of Boston: guidance for street trees, plants grow walls, light-colored pavement, plans
 - Example of California: California's Green Building Standards Code have green building codes, voluntary standards for sidewalks, driveways, and paved areas suggesting at least a 0.3 solar reflectance value. (0 = not reflective-darker color, 1 = 100% reflective-lighter color)
 - In the Form Based Code, sidewalk was mentioned: "Public Sidewalks shall be of one type and design, preferably concrete, unless in an area identified as a Project Opportunity where precast concrete or brick pavers are to be used. Corner details are to be determined by design and location. All sidewalks must comply with ADA standards. Special Area Paving: Rectangular 4" x 8" brick. Herringbone pattern running perpendicular to the path of travel. Concrete sidewalks to have a 3'x3' joint pattern. When needed, detectable warning strips should be chosen to be consistent with "special area paving." The color should be "cast iron", "red brick" or similar to provide sufficient color contrast with adjacent paving. Final selection to follow city code and/or standards."
 - Possibly include lighter-colored pavement and high permeable pavement in the form-based code. Also, offer incentives to promote the decision of using the above materials.
- Green or reflective roofs:
 - Example of Philadelphia: adapted low- slope roof building code to be highly reflective for existing and new buildings.
 - Example of Washington D.C.: any property that installed green roof receive rebates of up to \$15 per sq. ft. Water bill and stormwater fee could be discounted by installing green roofs.
 - The Form Based Code, it encouraged green roof installment to a newly constructed high-rise building and townhouse.
 - Possibly improve by providing incentives or rebates to promote the green roof installment.

Flooding

Impact of Flooding

Although drought and heat are likely to be observed in summer, flooding is a possible hazard due to the increase of rainfall intensity during the wettest days. From 50-year observation of precipitation, wettest 4 days increased its amount of rainfall by 15% within the Great Plain (EPA 2016). In fact, Manhattan, Kansas experienced severe flooding “500 year-event, perhaps 700, 800- year event” in 2018 resulted in 300 people evacuation and 750 houses without electricity (Adler 2018, KTEN 2018).

Possible Flood Impact in the City of Mission

From the FEMA Flood Map, City of Mission’s 100-year flood plain is located in and around Martway Street of Rock Creek (**Figure 5**). Nonetheless, 500-year flooding was not observed in the area. This might be due to the statistical method used to derive the flood plain map. According to USGS, 100 and 500-year flood map is developed based on the previous flooding records. Thus, if there were no floods occurred before, there would be no estimated flooding in the area. Nevertheless, unexpected floods are still possible to occur in the future. In addition, urban flooding is not considered in FEMA’s flood map. Urban flooding is the flooding occurred in an urban area due to the overflow from the blockage of storm water drainages or lack of stormwater drainages. This could happen because of the poor management of stormwater drainages and leaves accumulation in inlets from trees. There is also pluvial flooding that could occur frequently due to the high number of hot days from climate change effect in the future. Pluvial flood could possibly happen when there is less water absorbent capacity during localized thunderstorms (Jongman et al. 2018).



Figure 5. 100-year flood plain in the City of Mission Source from:

<http://fema.maps.arcgis.com/home/webmap/viewer.html?webmap=cbe088e7c8704464aa0fc34eb99e7f30&extent=-94.77454305322262,39.06046713504268,-94.6914589467774,39.08245686655745>

Adaptation Measures and Approaches

- Adopt 500-year floodplain boundary:
 - 500-year floodplain is not required and not affect insurance premium. However, Manhattan, KS just experienced an 800-year flood, it is possible to occur flooding beyond 100-year flood. Thus, locally regulated floodplain might prevent unexpected flood damage.
- Example of Cedar Falls, Iowa:
 - Cedar Falls adopted 500-year flood plain in their local regulation and prohibited to locate important facilities (hospitals, schools, government buildings, facilities for disability, etc.) within 500-year flood zone.
 - In the 500-year flood zone, structures need to be raised 1 foot above flood elevation and no new development is allowed.
- Restrict development activities in areas buffering water bodies
 - Kansas City's Wet Weather Solutions Program
 - Stormwater retention credits in Washington D.C. is that property owner installed green infrastructure can sell the credits to larger development sites. This can use to match half of the required regulatory stormwater reduction.
- City possibly develops regulation for 500-year floodplain and urban flooding area and stormwater fee based on the contribution to runoff to a property owner. The fee can be reduced by installing green infrastructure such as rain gardens, permeable paving, etc.

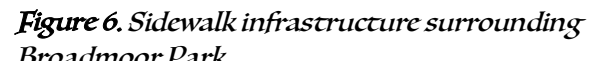
Overall Recommendations

- Identify hotspots of heat and vulnerable populations (elderly, people without a car, disabilities, low income) to determine the best location of cooling centers (public facilities, business facilities, etc.) that are accessible to and capture most of the vulnerable populations.- I recommend additional cooling center in the northwest part of the city.
- Disseminate the information about possible heatwave effects and its measures such as heatwave warning
- Develop a neighbor checking system and health hotline
- Possibly improve by providing incentives or rebates to promote the green roof installment.

- Possibly include lighter-colored pavement and high permeable pavement in the form-based code. Also, offer incentives to promote the decision of using the above materials.
- Possibly develop rebates and a program to encourage tree planting partnering with other levels of governments, private, and NGOs. Also, include shade tree policy in the landscape manual.
- City possibly develops regulation for 500-year floodplain and urban flooding area and stormwater fee based on the contribution to runoff to a property owner. The fee can be reduced by installing green infrastructure such as rain gardens, permeable paving, etc.

Existing Conditions

While this park does serve the nearby neighborhood with direct sidewalk access to the park on the northeast corner, **Figure 6**, visitors and those who work in the West Gateway district are not provided with adequate bike and pedestrian infrastructure to access the park.



To better understand park access in the study area, Google Maps was used to calculate travel times for bicyclists and pedestrians within the West Gateway District. While Broadmoor Park could be accessed by car, this study focused on the travel times of pedestrians and cyclists to learn how accessible the park is to visitors and workers within the West Gateway District. After travel times for the study area were determined and analyzed, recommendations were made to help improve bike and pedestrian access to the park, as well as recommendations for the installation of new parks within the West Gateway District.

Data Limitations

There were no data limitations to this study, however, if current sidewalk infrastructure is connected to the park, a GIS Network Analysis could have provided a more detailed and accurate service area for the park.

Analysis

According to Google Maps, all areas of the West Gateway District are between a 1- and 15-minute walking trip to Broadmoor Park. For Bicyclists, trips range from 1- to 4-minutes. However, these measurements did not take into account the safety conditions of current bike and pedestrian infrastructure, or the lack of crosswalks necessary to travel safely across roads. Walking and cycling times also didn't take into consideration the physical health, age, or ability of a pedestrian or cyclist.

Individuals with physical disabilities, the young, and the elderly may have more difficulty reaching the park under the current conditions of bike and pedestrian infrastructure, resulting in longer travel times. From this analysis, it can be assumed that the existing Broadmoor Park only adequately serves those within the West Gateway District who are of average, or above average, physical health or those who are within the immediate vicinity of the park. This leaves a majority of the corridor with poor access to natural open space.

Recommendations

After analyzing park accessibility within the West Gateway District, we recommend the following to improve visitor and worker access to natural open space:

Installation of two new parks

To improve park accessibility, it is recommended that the City plan to incorporate two new parks within the West Gateway District, **Figure 7**. The locations of these parks were determined based on the stormwater analysis and the park accessibility analysis. The locations are areas in which stormwater currently flows towards and collects, so adding parks in these locations will also assist in stormwater management. While these locations will not be as large as Broadmoor Park, installing benches, tables, and signage will allow visitors and workers within the southern half of the West Gateway District to travel shorter distances to spend time outdoors.

Adding these parks to the West Gateway District can be done in a couple different ways. Updates to the code can require that park space be dedicated as development or redevelopment occurs on the parcels of land containing the recommended parks, as well as other parcels of land within the West Gateway District. If development or redevelopment is not likely in the next 5 years, it is recommended that the City work with property owners to have these parks installed. The desired park space could be vacated by the current property owner or the City can pursue purchasing these small parcels of land.

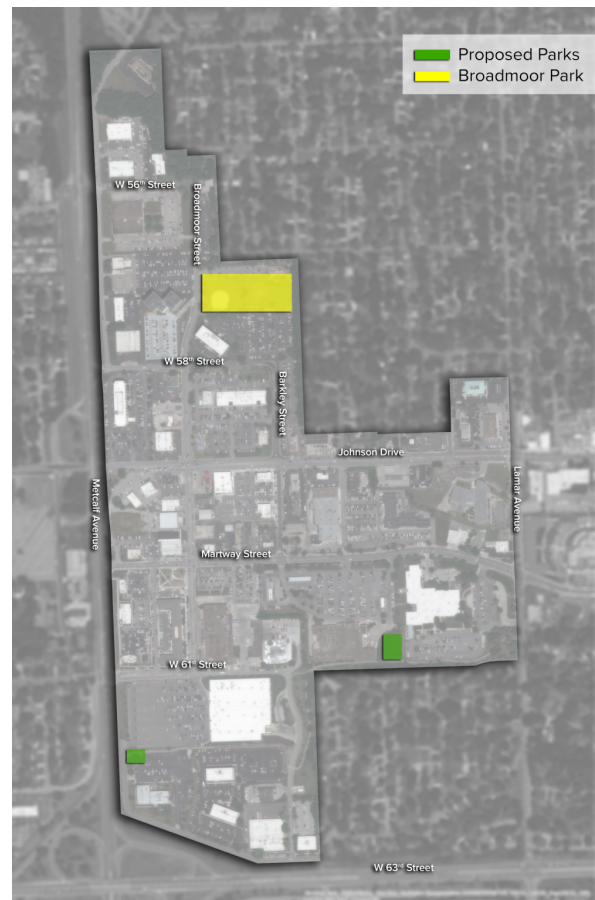


Figure 7. Proposed locations of new parks.

Improve and add bike and pedestrian Infrastructure

Bicycle and pedestrian infrastructure leading to Broadmoor Park, and the two new additional parks, should be added and/or improved. Currently, the only sidewalk that leads pedestrians and cyclists to Broadmoor Park is along Broadmoor Street, but while this sidewalk leads right to the park, no crosswalk is provided to allow for a safe way to cross and access the park.

Specifically, a crosswalk should be installed where the sidewalk ends along Broadmoor Street, just shy of reaching Broadmoor Park. Also, the sidewalk along Barkley Street should be extended all the way to Broadmoor Park, though this will require cutting through an existing office building parking lot.

As development and redevelopment occurs throughout the West Gateway District, the sidewalk network should continually be added upon and improved to allow for improved access to all current and future parks within the district. To ensure this happens, an update to the code should require the installation of sidewalks that connect to the larger existing sidewalk network along roads for any development or redevelopment project. The City should also consider implementing development standards that require crosswalks and bike lanes to be installed where feasible.

Stormwater

Existing Conditions

The existing conditions are shown in the **Figure 8**. to the right. The majority of the study area is located at the top of the Brush Creek watershed. Stormwater that falls in the corridor flows into Brush Creek, the Blue River, and finally the Missouri River. A small section northwest of Broadmoor Park is at the top of the Turkey Creek watershed, which also ultimately flows into the Missouri River. Since the area is at the top of two major watersheds in the region, there is significant opportunity to retain stormwater where it falls as redevelopment occurs, thereby reducing volume and flooding risk downstream.

A small area in the southeast corner of the corridor is located in Future Base Flood zone (X-1 PCT Future Conditions).

The existing stormwater infrastructure network south of Broadmoor Park collects stormwater into pipes and sends it to the intersection of Lamar Avenue and Martway Street. From here it enters a culvert and opens up into a channelized stream on the east side of Lamar Avenue.

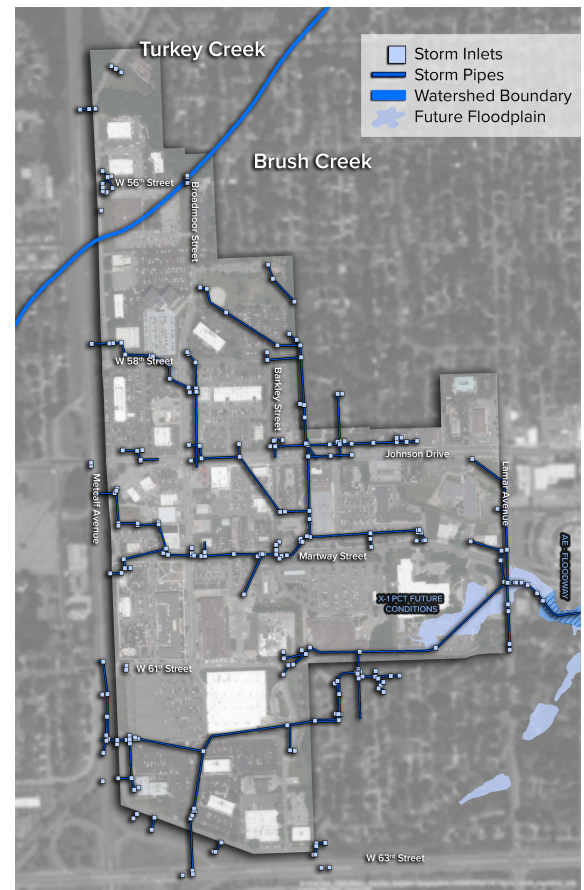


Figure 8. Existing Pipe Network

Methodology

To understand more about stormwater in the study area, the drainage area and amount of rainfall during the typical storm was calculated using the APWA/MARC BMP Manual (Section 6.2). A flow path analysis was also completed to understand how stormwater flows overland using ArcGIS hydrology tools. From the flow path analysis, recommendations for locations of green stormwater infrastructure were made.

Data Limitations

Data was not available for any private stormwater infrastructure in the area. This does not affect the final recommendations, however.

Analysis

Figure 9 shows the flow path analysis. For the most part, the overland flow paths follow the underground infrastructure. This should be what is observed, since the storm sewer system should be following the natural low points just like the overland flow paths do. This analysis indicates that Martway Street is a major drainage corridor for stormwater, as well as Broadmoor Street from W 58th Street to Martway Street, and Johnson Drive from Metcalf Avenue to Ridge Street. These areas should be targeted for improvements.

Table 1 below summarizes the amount of runoff for the typical 1.4" storm by sector, shown in cubic feet, acre-feet, and gallons. The Rock Creek Sector has the largest amount of runoff, largely due to its drainage area. The Westgate Sector has the next largest amount of runoff, where in this case the amount of impervious area is a significant contributor.

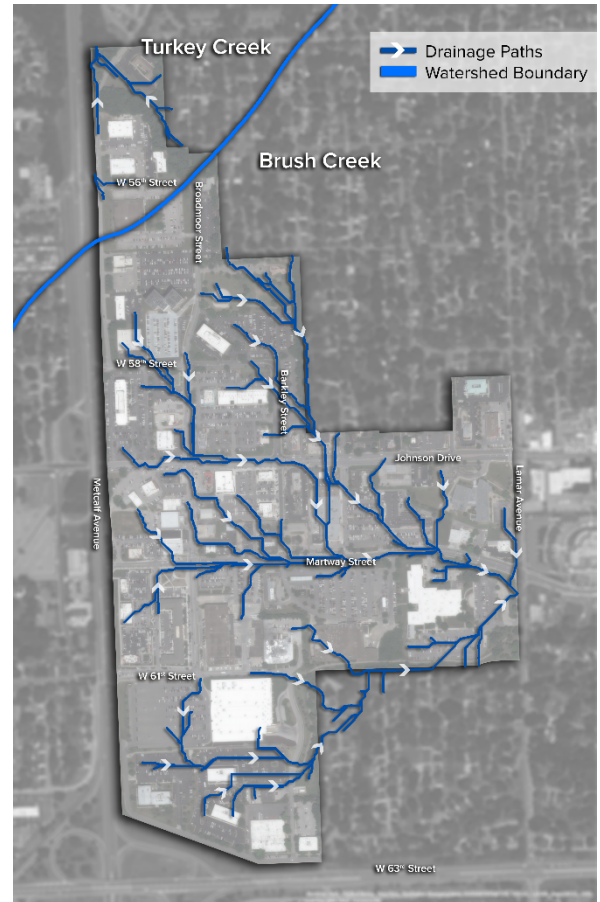


Figure 9. Drainage Paths

Table 1. Runoff by Sector						
Sector	Rock Creek	Johnson Corridor	Broadmoor	Martway Corridor	Westgate	Total
Drainage Area	49.4 ac	9.1 ac	38.1 ac	39.9 ac	37.8 ac	174.3 ac
Impervious Area	68%	73%	54%	63%	76%	66%
Rv Coefficient	0.67	0.71	0.53	0.61	0.73	0.64
Runoff 1.4"	167,089 cf	32,606 cf	103,539 cf	124,319 cf	140,663 cf	568,216 cf
	3.84 ac-ft	0.75 ac-ft	2.38 ac-ft	2.85 ac-ft	3.23 ac-ft	13.04 ac-ft
	1,249,827 gal	243,893 gal	774,473 gal	929,905 gal	1,052,158 gal	4,250,256 gal

Recommendations

The *Comprehensive Plan* mentions the City's hope to utilize new green technologies, such as green roofs, solar technology and integrated stormwater management as part of the West Gateway. After analyzing the overland flow paths and runoff for the typical storm, we recommend that green stormwater infrastructure be implemented either in conjunction with street improvements or as separate projects.

In **figure 3**, the areas identified of “green streets” are the major drainage paths that would most benefit from green stormwater infrastructure. This could be stormwater tree planters that take water from the street before it enters an inlet and infiltrates it through the planting bed. Permeable pavement could also be used for sidewalks or on-street parking.

Additionally, parking areas that intersect drainage paths have been identified for permeable parking. These projects would be either be constructed privately or as public-private partnerships.

Broadmoor Park currently has stormwater best management practices installed, but these could be improved further with native vegetation.



Figure 10. Green Stormwater Infrastructure Locations

Another recommendation is to consider adopting lot coverage percentages to reduce the amount of stormwater runoff. As seen in **Figure 11**, adopting an 80% lot coverage policy looks fairly standard. At 70% lot coverage, the parcel starts to look a little more green, and even more so at 60%. Another layer that could be added to this policy is allowing higher lot coverage percentages if the developer uses a certain amount of pervious pavement parking.

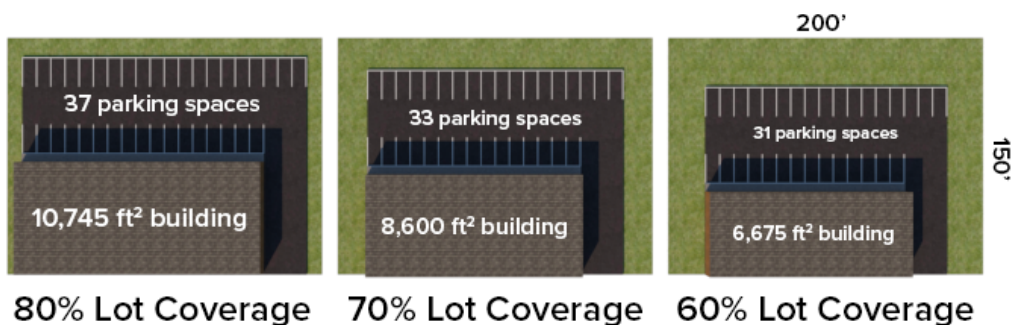


Figure 11. Lot Coverage Percentages

This lot coverage policy could work in tandem with a shared parking policy, by ensuring a business that it will have enough parking even if it is limited on how much impervious surface they can build.

APPENDIX H SOURCES AS CITED

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APPENDIX I - PARKING REDESIGN

Existing Conditions

The Form Based Code expresses the “opportunity to explore flexible parking solutions through design criteria and guidelines.” For this process the code identifies areas it deems appropriate for parking, with a heavy emphasis on the development of parking structures, and the reduction of visible surface parking lots.

Currently there is only one existing structured parking garage, located north of Johnson Drive in the Broadmoor Sector. Parking Garages are regulated by the block by block analysis and architectural guidelines. Specific blocks are identified, based upon their size, as appropriate for parking structures limiting potential locations. Additionally, architectural guidelines require new parking structures to have ground level commercial or retail uses along the primary and secondary frontages.

Surface parking lots are regulated by primary frontage standards, secondary frontage standards, and block by block evaluations, and building types. Shared parking is outlined in the block by block analysis but only identified for use within two blocks, O and T, because of their small scale.

The purpose of the interactive map is to visually depict the amount of parking spaces that has been dedicated by building type. Data included in the map are as follows, color coded by building type, total acres dedicated to private and public parking, estimated parking spots per parking lot, estimated square meters per parking lot, acres per parking lot, and estimated parking spaces dedicated to private and public parking lots.

All data was extracted by the Automated Information Mapping System (AIMS) which is a group in the Department of Technology & Innovation (DTI) within Johnson County government. The data was then inputted in ArcGIS. For the data to be visually friendly, the data was then transferred to Carto which uses Location Intelligence (LI), this turns location data into efficient delivery and service routes, optimized sales territories, streamlined city management, and strategic site planning. The significance of this research brings to attention that the city can plan and have a future vision of economic development while revitalizing the Johnson Corridor by utilizing the extra parking space that is currently in place.

Private parking accounts for 1.85 acres with an estimated 228 parking spots. Public parking accounts for 46.71 acres of land with an estimated 4,400 parking spots. In total starting from Metcalf ave. to Beverly Ave. there is approximately 46.71 acres of land just dedicated to parking. <https://jwf61.carto.com/builder/4482cb43-4a62-400c-821b-9fec7fd98a06/embed>

Methodology

Recommendations have been made from reviewing municipal and Form Based Codes, existing conditions, and Form Based Code site review.

Data Limitations

The city of Mission has not recently conducted a parking study. Without site specific data parking requirements associated with commercial and retail developments are not clearly defined.

Municipal codes reviewed include Mission, KS, Overland Park, KS, and Wyandotte County, KS. Municipal codes were reviewed based upon their relative location to Mission, KS. The local context ensures that the City of Mission uses similar land use policies, ensuring economic competitiveness. Form based codes were reviewed for the cities for West Gateway (Mission, KS), Downtown Overland Park, KS, Near Southside (Fort Worth, TX), Nashville's Downtown Code (Nashville, TN), and Boulder Junction (Boulder, CO). Form based codes were chosen for review based upon local fit, downtown focus, and density.

Existing conditions and conversations with city staff provided anecdotal evidence about parking needs within the City of Mission. Without site specific data, this information was used as evidence for a need to develop higher density parking North of Johnson Drive.

Using Johnson County AIMs Cornerstone Common's and Mission Crossing's developments were evaluated parcel by parcel. AIMs provides building square footage, and parking spaces were manually counted to develop parking spaces per 1,000 building sq. ft. These ratios were then compared against cities municipal and form based codes.

Cities with newly constructed downtown parking structures that supported first floor retail or restaurants uses were consulted to provide insight into successes and failures that other cities have had. St. Joseph, MO provided specific implementation notes and lessons learned from their newest parking structure.

Analysis

Shared Parking/Parking Garage

Shared Parking is identified in the City of Mission's West Gateway Form-Based Code as a tool to help provide parking relief. However, the municipal code and Form Based Code do little to outline define how much relief can be provided, and the Form Based Code limits the tools use.

Goal Shared Parking

1.0 Objective: Incorporate shared parking into the Johnson Drive corridor.

1.1 Action: Define shared parking under Section 425.010.

1.2 Action: Identify particular land uses that can collaborate for parking agreements.

1.3 Action: Define how much relief can be provided by shared parking.

1.4 Action: Reduce parking landscape standards for locations that utilize shared parking.

Form Based Code Parking Review

Table 1. Form Based Code Parking Review							
<i>Business</i>	Natural Grocery	Pie Five	Pepper Jax/ Five Guys	Culvers	Subway/ Toppers	Chick-fil-A	Welstone at Mission Crossing
<i>Parking Spaces</i>	72	26	62	53	63	57	73
<i>Square Feet</i>	16,330	4,881	6,341	4,479	9,118	5,190	40,617
<i>Spaces Per 1000 sq. ft.</i>	4.4	5.3	9.8	11.8	6.9	11	1.8

Goal Reduce vehicle space

2.0 Objective: Reduce vehicle space ratios per 1,000 square feet.

2.1 Action: Remove additional parking space requirements associated with drive throughs under section 425.020.

2.2 Action: Replace parking minimums with parking maximums.

Shared Parking

Municipal codes reviewed include Mission, KS, Overland Park, KS, and Wyandotte County, KS. Municipal codes were reviewed based upon their relative location to Mission, KS. The local context ensures that the City of Mission uses similar land use policies, ensuring economic competitiveness. Form based codes were reviewed for the cities for West Gateway (Mission, KS), Downtown Overland Park, KS, Near Southside (Fort Worth, TX),

Nashville's Downtown Code (Nashville, TN), and Boulder Junction (Boulder, CO). Form based codes were chosen for review based upon local fit, downtown focus, and density. Shared Parking is a tool in which businesses establish shared parking agreements to reduce the number of parking spots required by the municipal code. Shared parking often utilizes a mix of land uses that have differing peak demands to maximize parking stall use.

Parking

The City of Mission's West Gateway Form Based Code identifies "parking structures" as appropriate for most blocks throughout the West Gateway study area. The City representatives had noted that office users in this area of the Gateway had expressed concerns about parking availability and that it had escalated to a business retention problem.

Form Based Code

A review of the two developments utilizing the West Gateway Form Based Code was conducted to see how parking has been affected by implementation. Table 1 shows that restaurants with drive throughs create the highest number of parking spaces per 1,000 sq. feet. This is likely due to the additional ten parking spaces per drive through window required by Chapter 425 of the Municipal Code: Parking and Loading Requirements.

Recommendations

Shared Parking

The City of Mission can promote shared parking by defining and incentivizing its use. Utilization of shared parking would allow lot sizes to be reduced, creating more space available for development. Reduced parking requirements has the shared benefit of reducing surface parking along primary and secondary frontages.

Parking Garage

Reconstruction of the existing parking structure into a higher density structure with more parking that is shared amongst users could help to alleviate some of those concerns. Additionally, this location would be prime for restaurant uses in a walkable context due to its proximity to so many office jobs. Lunchtime foot traffic from surrounding high density office buildings could support first floor restaurant uses in a new parking garage.

However, the context of most blocks does not currently support the construction of parking structures due to a lack of density and walkability. The project team has identified two prime locations in the West Gateway study area that would be benefited by the construction of a parking garage reconstruction of the current garage at W. 58th St and Broadmoor St

Reconstruction of the existing parking garage at the intersection of W. 58th St and Broadmoor St as a 3-4 story parking structure with first floor retail or restaurant uses. The City representatives had noted that office users in this area of the Gateway had expressed concerns about parking availability and that it had escalated to a business retention problem. Reconstruction of the existing parking structure into a higher density structure with more parking that is shared amongst users could help to alleviate some of those concerns. Additionally, this location would be prime for restaurant uses in a walkable context due to its proximity to so many office jobs. Lunchtime foot traffic from surrounding high density office buildings could support first floor restaurant uses in a new parking garage.

New Construction at the Northeast Corner of Martway and Broadmoor

As a long-term recommendation, the northeast corner of Martway St and Broadmoor St would be ideal for a parking structure with first floor retail and restaurant uses and parking to support the local businesses utilizing the form-based code. The West Gateway Form Based Code highlighted this block for a parking structure and this corner makes the most sense in the context of recent redevelopment activity. This parking structure would reduce the required parking for local uses through shared parking agreements. The parking structures first floor uses would fill in the block, so to speak, so that the block provides a walkable experience with an appropriate density of shops to visit within walking distance.

Form Based Code Parking Review

The high parking ratios show a need to place parking maximums on certain land uses or remove the additional required parking associated with drive throughs. Cities like Overland Park, Kansas and Fort Worth, Texas have placed parking maximums. These Form Based Codes cap parking at 100 percent of the municipal code minimums to 2.25 spaces per 1,000 square feet.

Supplement

From City of St. Joseph, MO City Planner Nic Hutchison

From: Nicholas Hutchison <nhutchison@stjoemo.org>
To: Brad Stanton <bradstanton26@gmail.com>
Date: Mar 21, 2019, 12:55 PM
Subject: RE: Downtown Parking Garage Questions

Brad,

Thanks for reaching out. The new parking garage facility located at 9th & Felix is a private/public partnership. The city technically owns the facility, but the development was done by Mosaics for-profit development arm. The project is financed through Tax Increment Financing (TIF), and once the TIF has lapsed the for-profit developer will be out. I have provided a couple "lessons" below:

1. The new development replaced an existing dilapidated facility. Once the new facility was completed, the parking rates increased significantly due to the cost of the development. Users of the old structure (residents/business owners), complained saying they were not notified and that they couldn't afford the new monthly cost. The city council ending up reducing the parking rates to the what they were for the old facility for a specified time frame, and then they will gradually increase to the full amount. When developing a parking structure its critical that all parties understand the cost (typically \$20k per space).
2. The commercial component of the facility was constructed in order to attract a retail grocer downtown. However after it was developed, no retail grocer would locate there because the site configuration/ceiling heights. We now have a professional accounting firm located in part of the space, with the rest of it vacant. The issue with that is the an accounting firm does not produce any retail sales, meaning no sales tax being generated. If you are going with a TIF development, retail sales are critical.
3. The entrance to the parking facility is located off of 8th Street. In the interest of creating a walkable environment/streetscape, the entrance would have been better suited off of one of Felix or 9th Street.
4. I am not sure if Mission has a form based code, but I think the principles would be ideal for designing a garage that fits into the existing context.

Those are some things that come to mind off the top of my head. If I think of anything else I will pass it along, or if you have any questions please let me know. Thanks for reaching out.

Thanks,

Nic Hutchison – MUEP

City Planner | City of St. Joseph Missouri

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Email: NHutchison@stjoemo.org

APPENDIX J - MARKET ANALYSIS

Existing Conditions

Rent Prices

With the City of Mission's goal to make this Johnson Drive corridor a highlight of their city, it would be worthwhile to analyze the rent prices in the nearby blocks. For this analysis, we referenced American Fact Finder to explore the rent prices of the 503.01.2 and 503.02.2 block groups and compared them to Johnson County as a whole. Research is conducted for a five-year span from 2013-2017 of the rent prices. One of the goals that the city would like to achieve from this project is to make the area much more pedestrian friendly. The area has many commercial businesses ranging from food establishments to retail services. This area is ideal for attracting individuals due to the variety of goods and services. Steady and stable rent prices encourage renters to seek rent and continue lease agreements.

Market Analysis

Using Johnson County AIMS parcel data; we evaluated land and building values, as well as the property taxes. Specifically, the relationship between lot sizes and the percentage of coverage of parking lots is examined to find how this affected property taxes collected by the city.

Analysis

Rent Prices

Rent prices of the 503.01.2 and 503.02.2 block groups were analyzed from 2013 to 2017. To begin with 503.01.2 block group the number of units occupied through rent was only thirty-eight with the rent varying from \$800-\$999. By 2017 the number of units occupied by rentals had steadily increased and reached ninety-seven. The rent prices had also increased and became especially concentrated in the \$1,000-\$1,249 rent range. Eighty of the ninety-seven rentable units fell under the \$1,000-\$1,249 range with the other seventeen units falling under the \$800-\$899 range. In general, the rent prices tend to concentrate in one price range and do not have much variety in price. For block number 503.02.2 the number of rented units is lower, and the growth rate is sporadic. As compared to 503.01.2 the rent prices have a little more range of rent in 503.02.2. in 503.01.2 the rent prices never ranged more than \$200 but in block group 503.02.2 the range reaches \$2500 by 2017.

This large range in 2017 may be result of luxury housing. 2017 is the first year that this block group had rentable units for \$2500 and over. The peak number over the five-year period was 42 in 2014. By 2016 it had dropped to 24, the lowest over the five-year period. The rent prices over these five years also stayed quite consistent. From 2013-2015 a majority of the asked rent ranged from \$550-\$799. In 2016-2017 several rentable units

were established range from \$1,250-\$1,499 and \$2,500-\$2,999. When comparing the two block groups to Johnson County as a whole, it mirrors similar in rent price increases. In 2013 the range of rented units varied from greatly and did not concentrate in one price group. Similarly, to the two block groups, the rent prices began to concentrate as the years progressed.

Market Analysis

The total property values were divided by the area square footage of each parcel. These values could then be used to assess which building types, land uses, and zoning classifications garnered the highest per square foot values. Generally, what was found was that office buildings with greater than 5 stories had the highest value per square foot with an average of \$46.89 per square foot. Strip shopping centers had the second highest land value with an average of \$44.66 per square foot. Additionally, when examining lot sizes and property taxes, we divided the lot size, by the size of the parking area on the site. With the percentage of parking area, we were able to analyze their relationship to property taxes. To find the property taxes for each site, we used the assessed value, provided by AIMS, and multiplied it by the mil value for Mission. When examining similar lot sizes with variations of parking area, it was generally seen that sites with less parking had higher property taxes, although there were exceptions. Below, are tables attached to better understand the data. In **Table 1**, the highlighted values correspond to similar areas in area square footage and percentage of land covered by parking, but higher property taxes associated with lower rates of parking.

Table 1. Property Tax Assessment Based on Parking				
Address	% land Parking	AreaCSqFt	Assessed Value	Property Taxes
6500 JOHNSON DR	30.65%	18,220.2	\$103,250	\$3,059
6780 JOHNSON DR	41.77%	29,894.1	\$239,501	\$7,096
5800 BROADMOOR ST	41.00%	39,970.9	\$140,750	\$4,170
6500 MARTWAY ST	40.67%	290,993.9	\$1,973,750	\$58,478
5959 BARKLEY ST	37.98%	31,097.6	\$98,128	\$2,907
6665 MARTWAY ST	81.43%	57,110.9	\$341,253	\$10,111
6350 JOHNSON DR	66.61%	47,462.6	\$287,001	\$8,503
6821 JOHNSON DR	47.53%	22,640.5	\$142,500	\$4,222
6880 JOHNSON DR	76.42%	48,867.6	\$331,250	\$9,814
6402 JOHNSON DR	56.32%	18,817.9	\$145,750	\$4,318
5959 BROADMOOR ST	57.22%	15,377.5	\$135,750	\$4,022
5929 BROADMOOR ST	32.46%	14,472.5	\$55,751	\$1,652
5966 BARKLEY ST	75.49%	20,847.1	\$79,750	\$2,363
5850 BROADMOOR ST	62.97%	17,987.5	\$141,500	\$4,192

5922 BARKLEY ST	60.11%	43,886.5	\$508,251	\$15,058
5925 BROADMOOR ST	61.99%	15,333.6	\$113,501	\$3,363
6403 JOHNSON DR	32.15%	24,024.0	\$200,251	\$5,933
7000 JOHNSON DR	0.00%	34,395.2	\$263,251	\$7,800
6803 JOHNSON DR	74.84%	22,357.6	\$482,500	\$14,296
5837 RIGGS ST	30.00%	15,075.1	\$66,068	\$1,957
5843 RIGGS ST	23.90%	15,084.4	\$88,283	\$2,616
5651 BROADMOOR ST	10.97%	21,277.6	\$141,750	\$4,200
6700 SQUIBB RD	35.79%	52,531.5	\$399,501	\$11,836
5655 BROADMOOR ST	42.46%	46,505.3	\$73,758	\$2,185
5655 BROADMOOR ST	42.46%	46,505.3	\$73,758	\$2,185
6600 JOHNSON DR	33.00%	29,769.1	\$335,750	\$9,948
6870 JOHNSON DR	72.20%	60,981.0	\$241,751	\$7,163
6800 JOHNSON DR	72.82%	59,121.5	\$353,251	\$10,466
6840 JOHNSON DR	60.08%	105,253.4	\$785,000	\$23,258
5960 BARKLEY ST	48.27%	34,411.3	\$224,325	\$6,646
6501 JOHNSON DR	39.51%	33,322.5	\$143,493	\$4,251
7070 MARTWAY ST	49.47%	32,980.4	\$402,500	\$11,925
5725 FOXRIDGE DR	39.65%	51,337.0	\$196,250	\$5,814
7000 SQUIBB RD	32.54%	182,115.8	\$1,055,501	\$31,272
5800 FOXRIDGE DR	41.93%	176,696.0	\$2,073,500	\$61,434
5700 BROADMOOR ST	30.46%	217,470.7	\$3,070,250	\$90,965
5799 BROADMOOR ST	42.67%	202,863.5	\$3,159,500	\$93,610
6039 METCALF AVE	78.13%	49,756.3	\$423,001	\$12,533
6005 METCALF AVE	66.14%	45,242.1	\$390,500	\$11,570
7017 JOHNSON DR	67.14%	31,890.3	\$186,251	\$5,518
6909 JOHNSON DR	72.52%	24,682.6	\$140,751	\$4,170
6025 METCALF AVE	64.18%	49,338.2	\$483,750	\$14,333
5621 FOXRIDGE DR	24.89%	54,403.5	\$128,750	\$3,815
5665 FOXRIDGE DR	32.29%	217,441.7	\$319,168	\$9,456
5755 FOXRIDGE DR	37.24%	40,129.3	\$223,250	\$6,614
6800 SQUIBB RD	28.64%	82,447.0	\$423,250	\$12,540
6180 BARKLEY ST	30.76%	39,056.1	\$100,500	\$2,978
5940 LAMAR AVE	22.06%	12,368.1	\$59,788	\$1,771
5960 LAMAR AVE	31.02%	23,639.2	\$161,751	\$4,792

If the City of Mission is looking to make the Johnson Drive Corridor a pedestrian-friendly area, the city should not drive out rent-seekers. Rent-seekers prefer services nearby which additionally encourages walkability. The more expensive the rent, the more likely those individuals who can afford that rent will not utilize the nearby services because they can

pay for more services. Additionally, considering property taxes are key to Mission, it would be in the best interest of the city to preserve and enhance these values.

Recommendations

We would recommend that the City of Mission explore additional affordable housing opportunities and not price out rent-seekers. Additionally, to preserve and enhance property values, we recommend that parking be carefully considered, specifically the percentage of parking coverage of the lot. This can be accomplished by updating parking minimums/maximums, lot size characteristics, or other additional tools. These recommendations correspond with the parking recommendations.

APPENDIX J SOURCES AS CITED

Johnson County AIMS Maps

<https://maps.jocogov.org/ims/>

American Community Survey Census Data

<https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>

U.S. Economic Development Administration. *A Practitioner's Guide To Economic Development Tools for Regional Competitiveness in a Knowledge-Based Economy*. 2018, www.statsamerica.org/innovation/guide/practitioners_guide.pdf.

Lynch , Teresa. "Local Economic Assessment Package." *Edrgroup* , 2004, www.edrgroup.com/pdf/arc-ldda-leap-presentation.pdf.

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Scharnhorst, Eric. "Quantified Parking: Comprehensive Parking Inventories for Five U.S. Cities | Mortgage Bankers Association." *MBA*, 2018, www.mba.org/news-research-and-resources/research-and-economics/research-institute-for-housing-america/published-reports/2018/quantified-parking-comprehensive-parking-inventories-for-five-us-cities.

Social Explorer

<https://www.socialexplorer.com/a9676d974c/explore>

City of Mission

<https://www.missionks.org/pview.aspx?id=16296>

City of Mission Code

<https://ecode360.com/28334521>

APPENDIX K - FORM BASED CODE REVIEW (LAND USE)

FORM BASED CODE REVIEW (LAND USE)

Introduction

The form based code is developed and applied to assist reconfiguring the zoning code to retain auto-oriented communities, pedestrian-oriented communities, or a combination of both. With consideration of local architectural and environmental conditions, Form based codes are highly recommended for site developments and redevelopments to best meet the city's needs.

According to *Practice Form-Based Zoning of Zoning Practice* by American Planning Association (APA), the suggestion for form based code states that creating walkable communities is a core tenet of form-based codes. For a walkable community, the standards include: (1) proper street designs with a good combination of travel lanes and bike lanes, parking areas, and sidewalks; (2) well-established streetscape designs for better connectivity; and (3) good use of public space.

Current Conditions

Based on the study of current condition on Johnson Drive Corridor, a disconnection is found between commercial and single-family land uses. As a result, most commercial developments are highly self-motivated to create extra parking space to attract customers. As parking guidelines are not specifically laid out in the Form Based Code, unnecessary parking space has been established. Auto-oriented environments are therefore clustered in Mission. The purpose of the Form Based Code ought to be more focused on reducing the parking supply in order to provide more public space for improving the overall walkability.

American Planning Association emphasizes that form based codes should address land use issues and play a guiding role for developments. However, form based codes heavily relies on land use regulations. Past and current developments in Mission have focused on the integration of land use to achieve the more intense commercial and economic developments. Building on top of previous goals which accomplish development expansion, the City of Mission has strong desires to make the city more walkable. Therefore, a more welcoming environment will maximize the possibility to engage local residents and potential visitors. Without undermining the current conditions for developments by using the Form Based Code as the guideline, appropriate adjustments will be recommended for the Form Based Code based on studies conducted on Land use, Parking, Economic Development, Trails and Natural Environment.

Methodology

An examination of the West Gateway Form Based Code was conducted by applying it to the Cornerstone Commons site plan in order to examine the applicability of the current Form Based Code. Based on the knowledge that Cornerstone is one of a good examples whose developments closely conform with the Form Based Code, the following steps were taken:

(1) identify property location and note its sector; (2) determine Block and note permitted building types; (3) look up building types in building types matrix; (4) review urban and architectural guidelines for permitted building type.

A measure for the building type is conducted by comparing current buildings within certain parcels to those guided developments for specific lot sizes in the Form Based Code. The findings of research for current condition suggest that building types are mainly low-rise buildings. However, for those large parcels with recommended mid to high-rise buildings, there are certainly mid-rise to high-rise buildings in parcels respectively. More detailed studies and maps can be found in the **Appendix B** for Land Organization.

Parking designs have greatly contributed to the established auto-oriented environment. In order to reshape the transportation mode in Mission, proper sacrifices in parking space can be made to promote the public space developments for the better connectivity and walkability. The study on current the Form Based Code suggests shared parking is only applicable to block O and block T. Many of the current parking lots along Johnson Drive appear to be relatively empty. Detailed study can be found in the **Appendix I** for Parking. To investigate the parking guidelines for Mission, a comparison is made to Overland Park Form Based Code.

Analysis

The processes of utilizing the Form Based Code are relatively easy to follow. No outstanding issues are found when running the step-by-step process, which include major steps, such as, determine land sector, block number, building types, and architectural guidelines. Design guidelines are well established from big picture (land parcels) scales to building details, such as the architecture materials.

Based on the examination of Cornerstone site design, the landscape summary clearly lays out the design requirements and the actual counts provided by the developer. For instance, the design guideline requests to have 6 benches in each block. The Cornerstone development provides 9 benches, which means the Cornerstone not only meet the design guideline standards, but it even outcompetes the standards. Other design elements such as trash provision, light provision, and planters provision are well established beyond the minimum standards. Therefore, the development of Cornerstone has set up a great example of translating the Form Based Code to the reality.

The Form Based Code heavily concentrated on the development process, which has firmly set up the foundation for site design process. However, the Form Based Code is lacking in incentivizing pedestrian-oriented elements. For instance, benches are spotted along Johnson Drive adjacent to Cornerstone. However, the presence of similar street designs are not spotted elsewhere because of the lack in redevelopment standards for aging developments, such as, fast food restaurants and walk-in retail. The Form Based Code of Overland Park incorporates the idea of how to modify an existing building. This process sets up the standards for the additional or renovational redevelopments.

The low-rise building standards are introduced in the Form Based Code but are not spotted in any West Gateway blocks. The low-rise buildings are presumably designed for developments in smaller parcels. A disconformity between Form Based Code Building Types and current developments is found. Some buildings are low-rise with enormous amounts of parking space in large parcels, while the Form Based Code recommends mid-rise to high-rise buildings to be built in these parcels.

A brief demonstration of current parking condition can be found in **Figure 1**. The screenshot shows the amount of parking space implemented for retail stores and restaurants. More detailed study can be found at **Appendix I** for Parking.

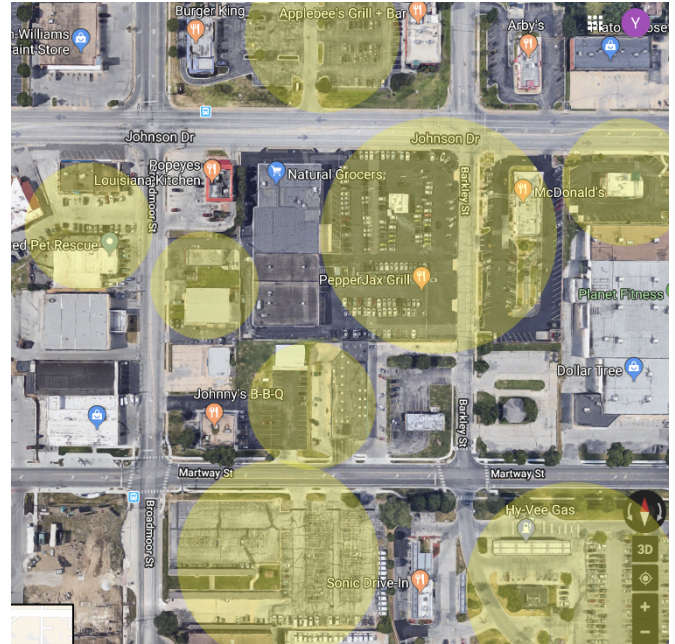


Figure 1. Current Parking.

The Form-Based Code sets up an easy-to-follow procedure for developers. To make Mission a more pedestrian-oriented city, more detailed parking guidance can be incorporated into the Form-Based Code as a complete section to standardize future parking developments. Improvements on building type conformity can be achieved by slightly shifting focus from building types to land organization to conform with the *Sector Plan and Regulation Plan*.

Recommendations

The current Form Based Code can be improved in two regards:

- 1) adjust the land use standards;
- 2) develop more specific parking guidelines.

To better serve the long-term vision, land organization should monitor and coordinate economic and social activities. A mix of small and medium lot developments are recommended to the lots that cross Westgate and Rock Creek sectors and adjacent to Metcalf Avenue (shown in **Figure 2**). While the current Form Based Code is mainly emphasizing building types to be designated in certain land blocks, the focus can be slightly shifted to land organization. Land size adjustments in the Form Based Code will bring great potential to change the overall development environment.

Parking Guidelines are recommended to be developed as a separate section. The main issue of the current Form Based Code is that parking guidelines are not sufficient to provide guidelines to promote a welcoming environment for developments. Existing developments highly rely on the assumption that people are highly likely to drive to Mission. Shared parking can be widely introduced to reduce the one-purpose parking. Additionally, maximum parking standards should be helpful to mitigate the issue of parking supply overload for both new developments and redevelopments.

American Planning Association recommendations using plain English for developing a form based code. “The more that the code uses plain English, the more readable, understandable, and usable the new code will be.” Several places of the Form Based Code can be adjusted by using plain English. For instance, the introduction of “low-rise buildings” can be simplified regarding the parcel usage and area limitation. Additionally, shorter sentences will be helpful to make more clarity for both developers and reviewers.

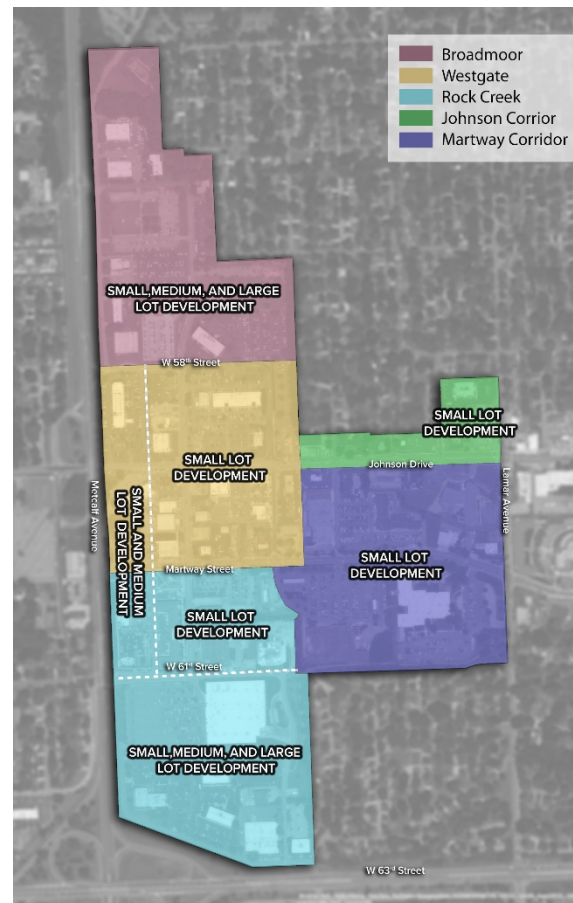


Figure 2. Sector Reorganization

APPENDIX K SOURCES AS CITED

Greene et al. (2017). *Form Based Code for the West Gateway Study Area*. The City of Mission, Kansas.

United States Government (2011). *Form-Based Code Overland Park, Kansas*. Overland Park, Kansas.

Stroud, N. (2018). *Living with Your Form-Based Code*. Issue number 4. Practice Form-Based Zoning.

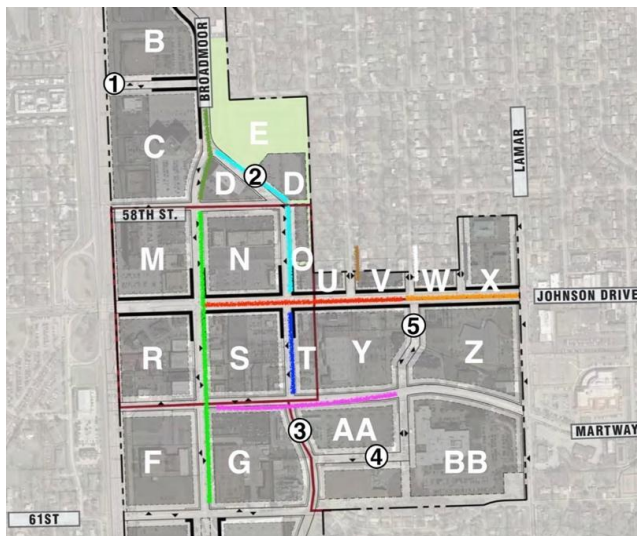
APPENDIX L - FORM BASED CODE REVIEW (TRANSPORTATION)

Background

The roadways are categorized into five groups including:

- Type I- Regional Boulevards which are the surrounding highway system,
- Type II- Urban Boulevards provides connection from the West to East,
- Type III-Avenues which provide important movement for the North-South,
- Type IV Two-Way Streets are primarily connection between major streets and
- Type V Limited-Access Streets which are narrow, park side streets with moving traffic and parking and the highest pedestrian experience.

Figure 1: In Figure 1, the streets that are highlighted in different colors indicate different sections of streets that the city has proposed Form-Based Code guidelines. And these are the streets we focus on in this memo.



New Road/ Extensions

Several streets have been extended to promote better circulation, mobility, and access. Some existing parking lots have been converted into streets to allow the necessary connections.

- (1) Future signalized access at the new 57th and Metcalf Intersection is anticipated to occur.
- (2) Barkley is extended to connect directly into Broadmoor Avenue
- (3) Barkley is anticipated to be extended to connect 61st to Martway
- (4) The new 60th Street is connected with the extension of Walmer and Barkley
- (5) The extension of Walmer to the south connect with Martway and a new 60th Street

Existing Conditions

Johnson Drive

The ground-level retail and office spaces along Johnson drive could provide a strong pedestrian realm, but the limit tree zone and short sidewalk size along the street does not encourage people to walk. So, it is important to create a pedestrian-friendly environment. Since parking and service access should be accommodated away from Johnson Drive frontages, many buildings would need to use Broadmoor Avenue, Barkley Street and the new Wallmar for their parking and service access. However, putting on-street parking on these streets could generate congestion and create traffic accidents.

Martway Street

Barkley and Wallmer extension would be constructed to connect with a new 60th Street on the South to assist with traffic dispersal and lead more cars to the Martway, it is important to reduce North-South travel speed to reduce accident.

Broadmoor Street

The new 57th and Metcalf intersection is anticipated to occur, and the Barkley is extended to connect Broadmoor which will make it a busy area. It is important to control speed for vehicles, promote open roadway and smooth traffic flow.

Barkley Street

This section is on a slope and the numbers of access are generated by limited access on Johnson drive, it is not safe or convenient to put parking spaces on both sides. Adding parking lanes will also reduce the size of Broadmoor park.

Methodology

To better understand and review the streets codes, I broke down the street into different sections. I reviewed the current layout of the street and used google map street view to get more current information of the street, then I compared it to the proposed Form-Based Code design to make the final recommendations for each street.

Analysis & Recommendations

Johnson Drive (Type II- Urban Boulevard)

Section between Broadmoor and Barkley looking east:

Current Layout: First, the boulevard has 76 feet of right-of-way and 52 feet of pavement. Second, the boulevard has two travel lanes of 25 feet and 27 feet in width. Third, there is a 12 feet concrete median, providing a refuge for those crossing the street. Fourth, there is only one sidewalk provided on the left side of the boulevard with a width of 12 feet.

Proposed Form-Based Code: First, the boulevard will have 76 feet of right-of-way and 60 feet of pavement. Second, the boulevard will have four travel lanes of 12 feet in width and one middle turn lane of 12 feet in width. Third, they will incorporate 4 feet sidewalks with

4 feet tree zone on both sides to provide a buffer between the automobiles and the pedestrians.

Review & Recommendation: Narrow each travel lane to 10 feet, expand the left-side sidewalk to 6 feet and the right-side sidewalk to 10 feet in order to slow down vehicle speed and encourage pedestrians to walk. Also, street lights and pedestrian lights need to be added to improve safety and walkability, creating a pedestrian-friendly environment.

Table 1: Recommend Typical Section (Johnson Drive: Broadmoor to Barkley)

SIDE WALK	TREE ZONE	TRAVEL LANE	TRAVEL LANE	TURN LANE	TRAVEL LANE	TRAVEL LANE	TREE ZONE	SIDE WALK
6	4	10	10	10	10	10	4	10

Johnson Drive (Type II- Urban Boulevard)

Section between Walmer and Russell looking east:

Current Layout: First, the boulevard has 66 feet of right-of-way and 62 feet of pavement. Second, the boulevard has two roadways of 34 feet on the left and 28 feet on the right. Third, there is a 4 feet concrete median, providing a refuge for those crossing the street. Fourth, there are no sidewalks provided on both sides of the boulevard.

Proposed Form-Based Code: First, the boulevard will have 66 feet of right-of-way and 48 feet of pavement. Second, the boulevard will have four travel lanes of 12 feet in width. Third, they will incorporate 5 feet sidewalks with 4 feet tree zone on both sides to provide a buffer between the automobiles and the pedestrians.

Review & Recommendation: Narrow each travel lane to 10 feet, expand the left-side sidewalk to 6 feet and the right-side sidewalk to 10 feet in order to slow down vehicle speed and provide a pedestrian-friendly environment. I suggest adding a 10-foot turn lane in the middle.

Table 2: Recommend Typical Section (Johnson Drive: Walmer to Russell)

SIDE WALK	TRAVEL LANE	TRAVEL LANE	TURN LANE	TRAVEL LANE	TRAVEL LANE	SIDE WALK
6	10	10	10	10	10	10

Broadmoor Street (Type III-Avenues)

Section between Martway and 61st Street looking north:

Current Layout: First, the avenue has 50 feet of right-of-way. Second, the avenue has 30 feet of pavement in width. Third, there is sidewalk provided on the left side of the boulevard with width of 14 feet and on the right with width of 6 feet.

Proposed Form-Based Code: First, the boulevard will have 54 feet of right-of-way and 38 feet of pavement. Second, the avenue will have two travel lanes of 11 feet in width. Third, the avenue will have on-street parking on both sides with width of 8 feet. Fourth, the avenue will incorporate 4 feet sidewalk with 4 feet tree zone on both sides to provide a buffer between the automobiles and the pedestrians. Fifth, 2 feet of additional right of way is required on both sides of this street.

Review & Recommendation: Since parking access and service access should be accommodated away from Johnson Drive frontages, many buildings would need to use Broadmoor Avenue for their parking and service access. Putting on-street parking on this avenue will generate congestion and create traffic accidents. I would recommend removing the on-street parking on both sides of the avenue, add a 9-foot turn lane in the middle. Expanding left side sidewalk to 5 feet, right-side sidewalk to 10 feet, narrowing each travel lane to 9 feet, and adding pedestrian lights on both sides will also improve pedestrian walking experience.

Table 3: *Recommend Typical Section (Broadmoor Street: Martway to 61st Street)*

SIDE WALK	TREE ZONE	TRAVEL LANE	TURN LANE	TRAVEL LANE	TREE ZONE	SIDE WALK
5	4	9	9	9	4	10

Broadmoor Street (Type III-Avenues)

Section between 58th and Barkley Looking north:

Current Layout: First, the avenue has 48 feet of right-of-way. Second, the avenue has 34 feet of pavement in width. Third, there are sidewalks provided on both sides of the boulevard with a width of 7 feet.

Proposed Form-Based Code: First, the boulevard will have 56 feet of right-of-way and 38 feet of pavement. Second, the avenue will have two travel lanes of 11 feet in width. Third, the avenue will have on-street parking on both sides with width of 8 feet. Fourth, the avenue will incorporate 5 feet of sidewalks with 4 feet tree zone on both sides to provide a buffer between the automobiles and the pedestrians. Fifth, 4 feet of additional right-of-way is required on both sides of this street.

Review & Recommendation: Since block B, D and C have enough space for parking, and the new 57th and Metcalf intersection is anticipated to occur, putting on-street parking on a busy boulevard is not necessary. It will generate congestion and possibly create accidents. I recommend removing the parking lanes on both sides and narrowing each travel lane to 9 feet. Adding a 9-foot turn lane in the middle when only approaching intersection area and expanding right-side sidewalk to 10 feet which will create a pedestrian-friendly environment. Also adding pedestrian lights on both sides will improve pedestrian walking experience.

Table 4: Recommend Typical Section (Broadmoor Street: 58th to Barkley Street)

SIDE WALK	TREE ZONE	TRAVEL LANE	TRAVEL LANE	TREE ZONE	SIDE WALK
6	4	9	9	4	10

Martway Street (Type IV Two-way Streets)

Section between Broadmoor and Barkley looking east:

Current Layout: First, the street has 57 feet of right-of-way. Second, the avenue has 43 feet of pavement in width. Third, there is sidewalk provided on the left side of the avenue with width of 8 feet and on the right with width of 6 feet.

Proposed Form-Based Code: First, the boulevard will have 56 feet of right-of-way and 38 feet of pavement. Second, the avenue will have two travel lanes of 11 feet in width. Third, the avenue will have on-street parking on both sides with width of 8 feet. Fourth, the avenue will incorporate 5 feet sidewalks with 4 feet tree zone on both sides to provide a buffer between the automobiles and the pedestrians. Fifth, 2 feet of additional right-of-way is required on both sides of this street.

Review & Recommendation: Since Barkley and Walmer extension would be constructed to assist with traffic dispersal and lead more cars to the Martway, at the same time block S, block G and block Y can accommodate parking structures in their blocks, having on-street parking is not necessary. I do not recommend constructing on-street parking along Martway. Instead, I recommend narrowing each travel lane to 10 feet and expanding left-side sidewalk to 10 feet. I also recommend providing a 3-foot bike lane on both sides of the street to improve access for bicycles and to connectivity to the bike trails as well as adding a 10-foot turn lane in the middle of the street.

Table 5: Recommend Typical Section (Martway Street: Broadmoor to Barkley)

SIDE WALK	TREE ZONE	BIKE LANE	TRAVEL LANE	TURN LANE	TRAVEL LANE	BIKE LANE	TREE ZONE	SIDE WALK
10	4	3	10	10	10	3	4	10

Barkley Street (Type IV Two-way Streets)

Section between 58th and Johnson Dr looking north:

Current Layout: First, the street has 57 feet of right-of-way. Second, the street has 42 feet of pavement in width. Third, there is sidewalk provided on the left side of the street with a width of 5 feet and on the right with width of 10 feet.

Proposed Form-Based Code: First, the street will have 56 feet of right-of-way and 36 feet of pavement. Second, the street will have two travel lanes of 10 feet in width. Third, the street will have on-street parking on both sides with width of 8 feet. Fourth, the street will

incorporate 6 feet sidewalks with 4 feet tree zone on both sides to provide a buffer between the automobiles and the pedestrians.

Review & Recommendation: Since this section is on a slope and number of access is generated from both sides of the streets with limited access on Johnson drive, it is not safe or convenient to put parking lanes on both sides of the streets. In addition, adding parking lanes will reduce the size of Broadmoor park in block D. Since block N is large enough to accommodate a parking structure in the middle of the block, I recommend removing both parking lanes, narrowing each travel lane to 9 feet and adding a 9-foot turn lane in the middle.

Table 6: Recommend Typical Section (Barkley Street: 58th to Johnson Dr)

SIDE WALK	TREE ZONE	TRAVEL LANE	TURN LANE	TRAVEL LANE	TREE ZONE	SIDE WALK
6	4	9	9	9	4	6

Barkley Street (Type IV Two-way Streets)

Section between Johnson Drive and Martway Street looking north:

Current Layout: First, the street has 50 feet of right-of-way. Second, the street has 29 feet of pavement in width. Third, there is sidewalk provided on the left side of the street with width of 17 feet and on the right with width of 4 feet.

Proposed Form-Based Code: First, the street will have 56 feet of right-of-way and 36 feet of pavement. Second, the street will have two travel lanes of 10 feet in width. Third, the street will have on-street parking on both sides with width of 8 feet. Fourth, the street will incorporate 6 feet sidewalks with 4 feet tree zone on both sides to provide a buffer between the automobiles and the pedestrians. Fifth, 3 feet of additional Right of Way is required on both sides of this street.

Review & Recommendation: Since the number of access is generated from both sides of the streets with limited access on Johnson drive, there will be safety issues with the 3 feet of additional Right of Way required on both sides of this street by adding on-street parking. I recommend removing both parking lanes on this street, narrowing each travel lane to 9 feet, and adding a 9-foot turn lane in the middle.

Table 7: Recommend Typical Section (Barkley Street: Johnson Drive to Martway Street)

SIDE WALK	TREE ZONE	TRAVEL LANE	TURN LANE	TRAVEL LANE	TREE ZONE	SIDE WALK
6	4	9	9	9	4	6

Riggs Street (Type IV Two-way Streets)

Section north of Johnson Drive looking north:

Current Layout: First, the street has 59 feet of right-of-way. Second, the street has 25 feet of pavement in width. Third, there is one sidewalk is provided on the left side of the street with width of 23 feet and one on the right with width of 11 feet.

Proposed Form-Based Code: First, the street will have 59 feet of right-of-way and 20 feet of pavement. Second, the street will have two travel lanes of 10 feet in width. Third, the street will incorporate 5 feet sidewalks with 5 feet tree zone on both sides to provide a buffer between the automobiles and the pedestrians. Fifth, there will be 19 feet of setback/greenway provided on the left.

Review & Recommendation: The street is located between two Mid-Rise zones. The side street setback for Mid-Rise building is 10 feet maximum. Therefore, I suggest adding a 9-foot turn lane in the middle of the street when only approaching intersection and narrowing each travel lane to 9 feet.

Table 8: Recommend Typical Section (Riggs Street: north of Johnson Drive)

SIDE WALK	TREE ZONE	TRAVEL LANE	TRAVEL LANE	TREE ZONE	SIDE WALK
5	5	9	9	5	5

Walmer Street (Type IV Two-way Streets)

Section north of Johnson Drive looking north:

Current Layout: First, the street has 40 feet of right-of-way. Second, the street has 26 feet of pavement in width. Third, there is sidewalk provided on the left side of the street with a width of 9 feet and on the right with width of 5 feet.

Proposed Form-Based Code: First, the street will have 40 feet of right-of-way and 22 feet of pavement. Second, the street will have two travel lanes of 11 feet in width. Third, the street will incorporate 4 feet sidewalk with 5 feet tree zone on both sides to provide a buffer between the automobiles and the pedestrians.

Review & Recommendation: There will be new extension of Wallmer to connect with a new 60th Street on the South and a new intersection will be created in Wallmer. I recommend removing both tree zones and add a 9-foot turn lane in the middle when approaching intersection area and narrow each travel lane to 9 feet.

Table 9: Recommend Typical Section (Wallmer Street: north of Johnson Drive)

SIDE WALK	TREE ZONE	TRAVEL LANE	TRAVEL LANE	TREE ZONE	SIDE WALK
4	5	9	9	5	4

Russell Street (Type IV-Two-way Streets)

Section north of Johnson Drive looking north:

Current Layout: First, the street has 33 feet of right-of-way. Second, the street has 24 feet of pavement in width. Third, there is sidewalk provided on the left side of the street with a width of 9 feet.

Proposed Form-Based Code: First, the street will have 33 feet of right-of-way and 20 feet of pavement. Second, the street will have two travel lanes of 10 feet in width. Third, the street will incorporate 4 feet of sidewalks on both sides and with 5 feet tree zone on the right to provide a buffer between the automobiles and the pedestrians.

Review & Recommendation: The ground-level retail area in block X could provide a strong pedestrian realm, so I would recommend expanding sidewalk to 5 feet on the right side and reduce the tree zone to 4 feet. I also recommend narrowing each travel lane to 9 feet.

Table 10: *Recommend Typical Section (Russell Street: north of Johnson Drive)*

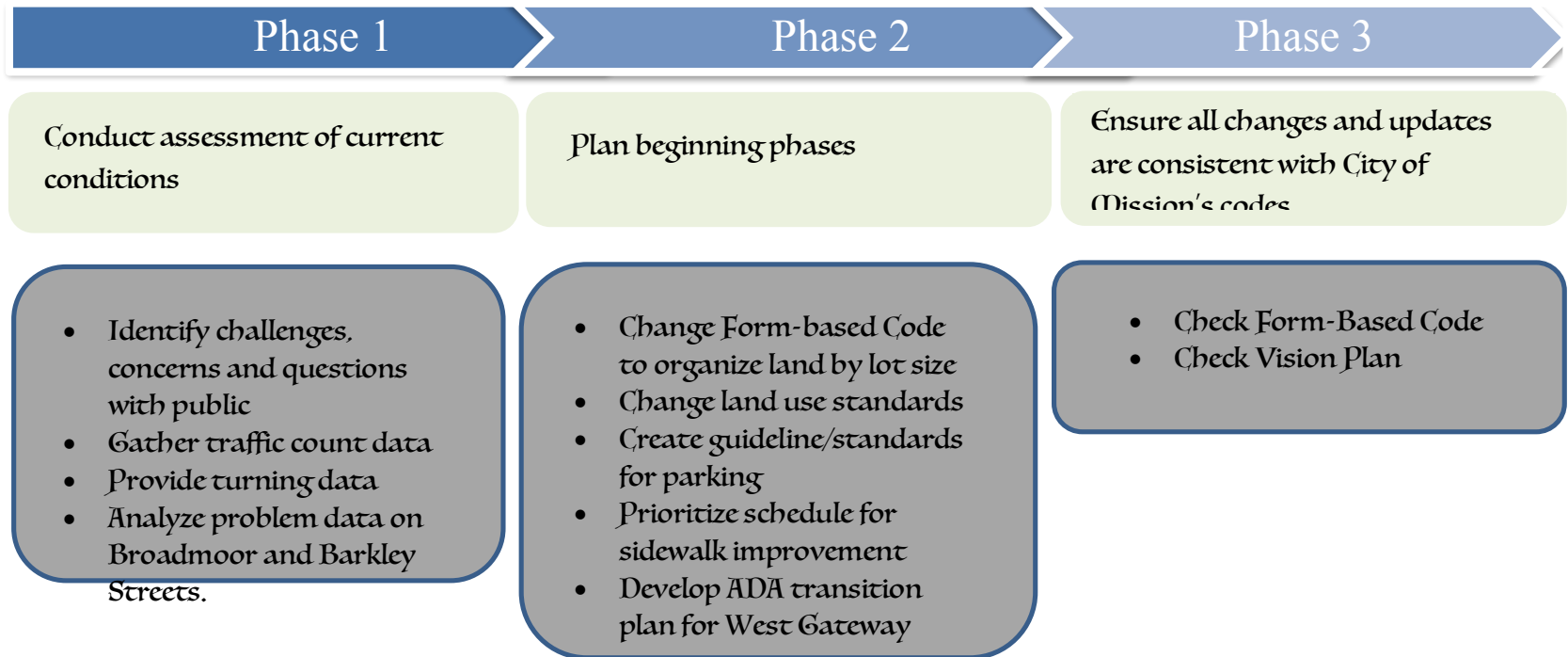
SIDE WALK	TRAVEL LANE	TRAVEL LANE	TREE ZONE	SIDE WALK
4	9	9	4	5

APPENDIX L SOURCES AS CITED

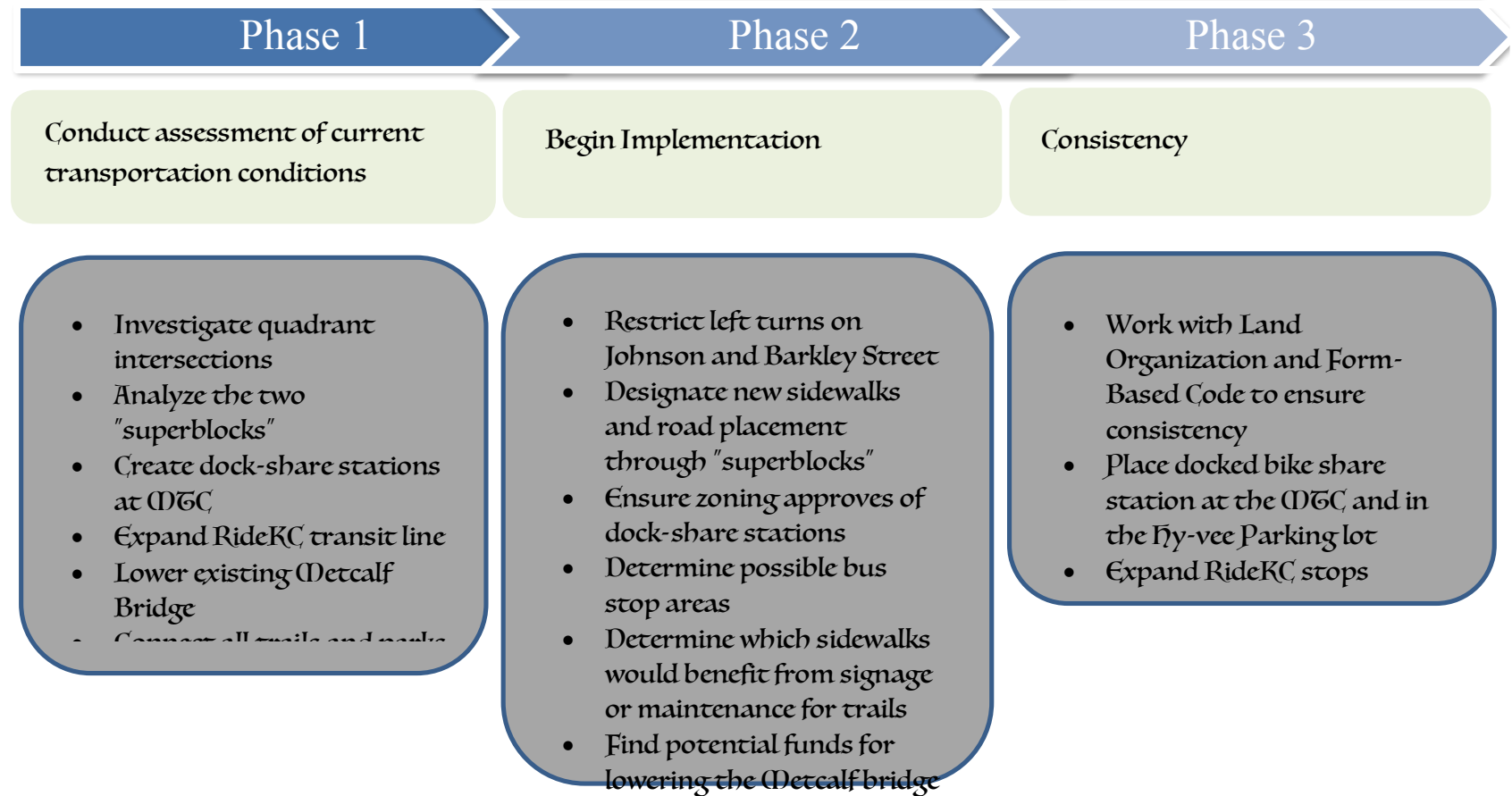
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APPENDIX M - IMPLEMENTATION

Short-Term Goal Process



Long-Term Goal Process



Ongoing Process:

- Identify where consistent funding is needed
- Continuously maintain and update sidewalks
- Green Storm water Infrastructure should be implemented in conjunction with street improvements
- Increase native grasses in parks
- When new construction occurs, designate a certain percentage as pervious surface
- Ensure all new construction is done more compactly

APPENDIX N - FUNDING

Background

Several projects within the Johnson Drive study area need funding for implementation. The best options to achieve funding goals come from federal, state, and local funding opportunities. A mix of funding from all three sources will ensure the best chance for complete funding because there are more opportunities. Applying to multiple funding opportunities diversifies the chance for success because it will not limit the City of Mission to one source. This memo will provide specific funding opportunities and provide the necessary procedures for securing funding.

Federal Funding

The first opportunity for funding from the federal level comes from the Surface Transportation Program (STP). STP is used as flexible funding for local projects that preserve and improve the condition and performance of any federal-eligible highway; construction or rehabilitation of a bridge or tunnel on any public road; pedestrian and bicycle infrastructure; and transit capital projects. This program should be utilized to help fund the Metcalf Avenue bridge because it fits the requirements of being a public road, pedestrian bridge and is in an area with a population greater than 5,000 and less than 200,000.

To apply for this funding, the City of Mission should submit an application to the Surface Transportation Program on the Mid-America Regional Council (MARC) website. MARC will issue a call for projects, and project sponsors must submit proposals by a deadline to be considered for the next round of funding. MARC staff will rank the applications according to established scoring criteria and will forward the applications to the Kansas and Missouri STP/Bridge Priorities committees for evaluation. The scoring results represent only one piece of information in the evaluation process. Sponsors are highly encouraged to attend specified meetings to present their projects to the committees and answer questions.

Each committee will forward its final funding recommendations to the Total Transportation Policy Committee for approval. The next federal opportunity for funding comes from the Highway Safety Improvement Program (HSIP). This type of funding is intended to fix roads that are hazardous and unsafe. Funding is awarded to population areas greater than 5,000 and is 90 percent funded by the federal government. However, funding is very competitive, and any application has to show that a certain area of road is dangerous. Depending on crash data, this funding would be perfect for redesigning lanes and intersections of Johnson Drive to improve safety.

To help ensure funding for traffic studies, the City of Mission should apply for the 402-safety program, which are funds available to cities and counties for safety-related activities such as traffic studies and safety training. Traffic counts and turning counts could be funded to assess safety on Johnson Drive, Metcalf Avenue, and Lemar Avenue. KDOT has two consultants on retainer to perform studies as needed. Safety training is provided by KU and KSU professors plus KDOT personnel. The program is 100 percent federal funded and to apply contact Bill Legge, Local Road Engineer Bur. of Local Projects, 785-296-3861.

Another funding opportunity for the City of Mission is the Transportation Alternatives Set Aside. This program is intended to help localities fund trails and bicycle infrastructure and the City of Mission should use this program to fund trail improvements and bicycle improvements on major City streets. The Active Transportation Programming Committee (ATPC) oversees TA Set-Aside funds. ATPC reviews project applications and prioritizes projects that address the goals, priorities, and policy framework of MARC's long-range transportation plan. The committee also considers input from MARC's transportation modal committees, including the Bicycle-Pedestrian Advisory Committee (BPAC). Project funding recommendations are submitted to the Total Transportation Policy Committee (TTPC) and MARC Board for consideration and approval.

State Funding

The next funding opportunities come from the state of Kansas. Economic development is the first funding opportunity program for the City of Mission and it is intended to create new jobs and to encourage capital investment in Kansas by helping fund transportation improvements to recruit new businesses and encourage growth of existing businesses. This program has the ability to help fund transportation improvements on Johnson Drive so that business activities can increase. Applications are considered year-round. Local governments, often in partnership with a private business, may apply. There is a high probability that the City will receive funds through this program.

Another funding program for the state to help with transportation needs on Johnson Drive is the Federal Fund Exchange program. The federal fund exchange program is a voluntary program that allows a local public agency (LPA) to trade all or a portion of its federal fund allocations in a specific federal fiscal year with the Kansas Department of Transportation (KDOT) in exchange for state transportation dollars. This is a great opportunity because any of the funds can be used on transportation related projects. The exchange rate for FFY 2019 is \$0.90 of state funds for every \$1.00 of local federal obligation authority exchanged. This rate is determined by the Secretary on an annual basis.

The last state funded program that the City of Mission should apply for is ITS Set-Aside program. ITS is the application of advanced sensor, computer, electronics, and communications technologies and management strategies in an integrated manner providing traveler information to increase the safety and efficiency of the surface transportation system. Usually KDOT send letters or emails to cities and counties about the program. The project application process and timeline are included in the mailing. Likelihood of funding is high with this program.

Local Funding

The main source of funding that the City of Mission should utilize is the CARS program from Johnson County. This program is a great way for the City to fund transportation and roadway improvements. As the City of Mission submits their 5-year plan to the County, the City of Mission should identify the projects along Johnson Drive and include them in the plan. Since Metcalf Avenue is an eligible arterial road in the program, the City should

submit as many improvements as possible. These improvements would include lane width changes, new pavement, and parking.

APPENDIX N SOURCES AS CITED

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