

MEMO

	Overnight
	Regular Mail
	Hand Delivery
X	Email

TO:	Bob Nugent, Lawrence Transit
FROM:	Tom Worker-Braddock, Olsson Associates
RE:	Lawrence Transit Center Locational Analysis – Round 2 candidate site evaluation
DATE:	June 11th, 2013
PROJECT #:	013-0542
PHASE:	2

This memo describes the three candidate sites that resulted from a preliminary location analysis using a combination of GIS analysis and qualitative criteria¹. This memo will present site plans for the three sites, costs associated with orientating the transit network to serve each site, and additional vehicle costs to maintain system frequency. The three candidate sites are listed below, and identified on Figure 1:

- 925 Iowa
- 2029 Becker Drive
- 1101 Mississippi

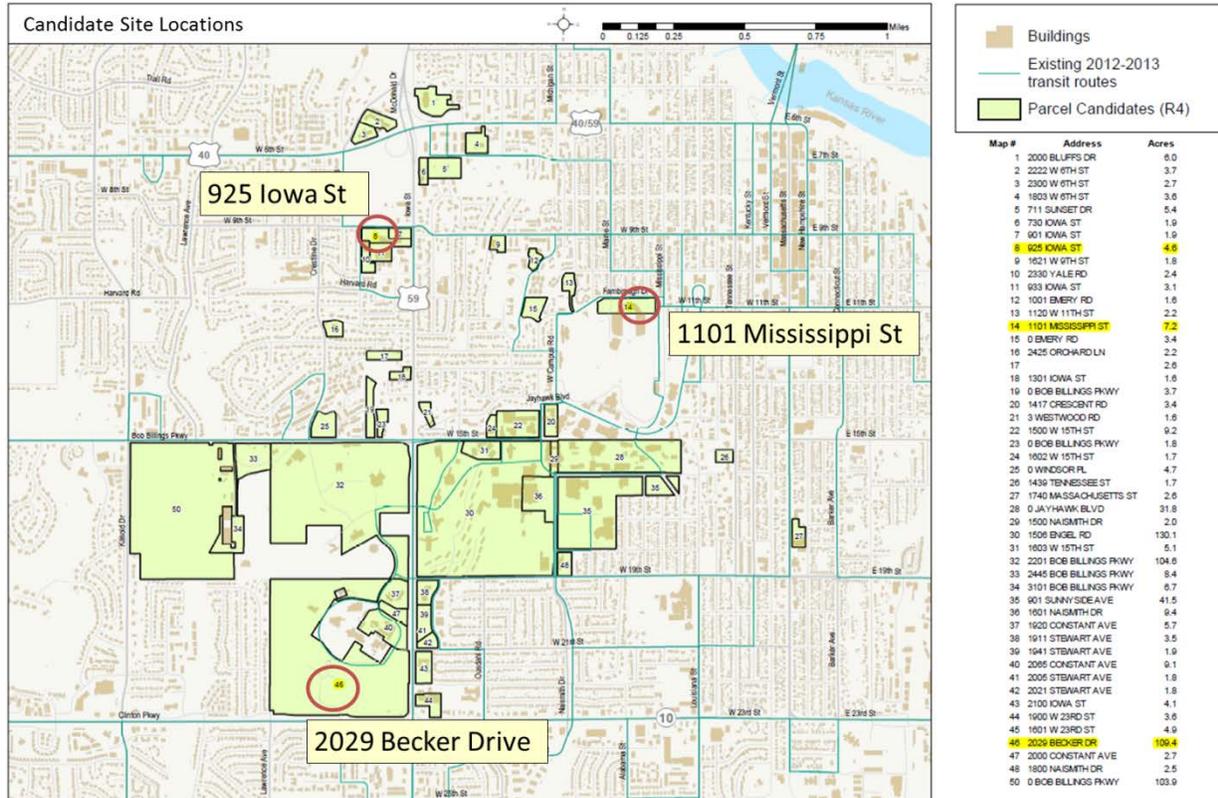
Table 1 summarizes the costs identified in this memo. 1101 Mississippi has the highest site development costs at \$2.7 million, but because of lower costs associated with renetworking, has the lowest overall costs at \$2.8 million. 925 Iowa has the next lowest total costs of \$3.2 million. 2029 Becker Drive, although having the lowest site costs, ends up having the highest overall costs, primarily due to higher renetworking costs, and the need to buy additional vehicles to maintain the system's current frequency.

¹ The process used to arrive at these three sites is described in the June 11th, 2013 memo titled *Lawrence Transit Center Locational Analysis – GIS Process and Initial Candidate Site Discussion*, and is included in Appendix I.

Table 1: Comparison of all costs

	2029 Becker Drive	1101 Mississippi	925 Iowa
Direct Site Costs	\$ 1,818,975	\$ 1,910,100	\$ 1,840,150
Adjacent Costs	\$ 213,280	\$ 337,375	\$ 296,200
20 Percent Contingency	\$ 406,451	\$ 449,495	\$ 427,270
<i>Sub-total site costs</i>	<i>\$ 2,438,706</i>	<i>\$ 2,696,970</i>	<i>\$ 2,563,620</i>
Renetworking Costs	\$ 534,725	\$ 101,632	\$ 366,061
Additional Vehicle Costs	\$ 690,000	\$ -	\$ 310,000
Total Costs	\$ 3,663,431	\$ 2,798,602	\$ 3,239,681

Figure 1: Candidate Site Locations



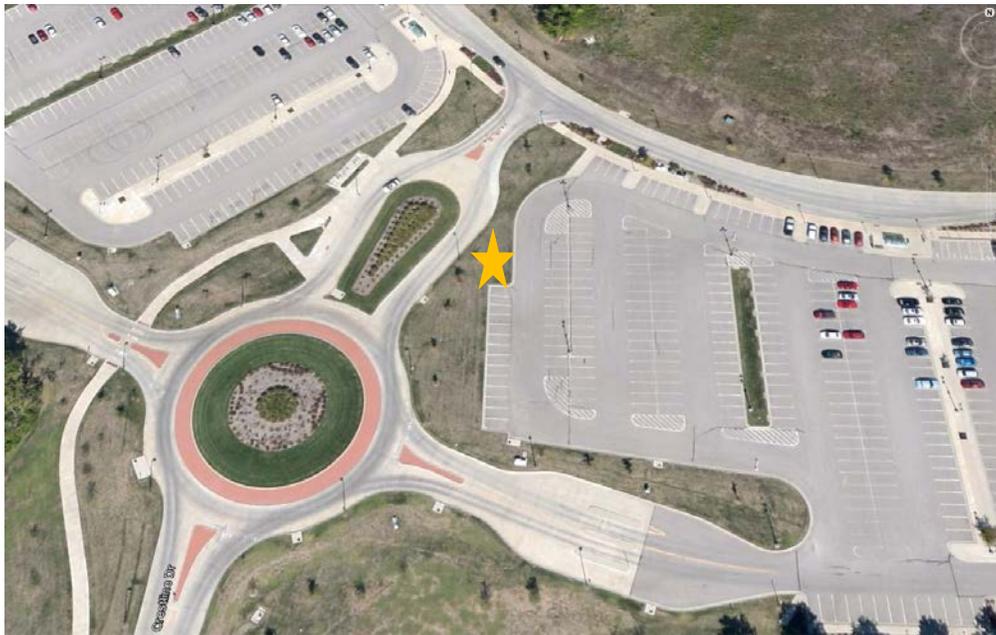
Sources: City of Lawrence GIS Department, modified by Olsson Associates

The three candidate sites were previously visited in the earlier selection rounds. The details and study team comments of each site are summarized as follows.

2029 Becker Drive (KU Park and Ride)
Current Land Use: Institutional
Future Land Use: Public / Semi-Public
Parcel Size: 109.4 Acres
Total Appraised Value: \$2,468,030 (entire parcel)
Notes: Site is part of larger parcel.
Study Team Comments: <ul style="list-style-type: none"> • Crestline Drive becoming a main entrance to KU. • High synergy potential to serve both KU needs and City needs. • The existing horse-shoe median north of the round-about on Crestline Drive was originally designed to accommodate additional buses. • Existing traffic would make horse-shoe median unsuitable for a transit center. • A likely location for a new transit center would be in the parking lot east of the horse-shoe median. • Accessing this site will likely require intensive transit network restructuring.

Sources: City of Lawrence GIS Department, Horizon 2020. Douglas County Appraiser.

Figure 2: 2029 Becker Drive



Source: Google Earth
 Note: Site location is generalized

925 Iowa Street (SE Corner of 9th Street and Centennial Drive)
Current Land Use: Commercial
Future Land Use: Commercial
Parcel Size: 4.6 Acres
Total Appraised Value: \$1,898,000 (entire parcel)
Notes: Site is part of larger parcel.
Study Team Comments: <ul style="list-style-type: none"> • A stop light would be required at Rockledge Road and 9th Street to handle additional transit vehicles. • “Lots of good things going for it” • High synergy possible with surrounding land uses. • Mitigation measures may be required for adjacent residential uses.

Sources: City of Lawrence GIS Department, Horizon 2020. Douglas County Appraiser.

Figure 3: 925 Iowa (SE Corner of 9th Street and Centennial Drive)

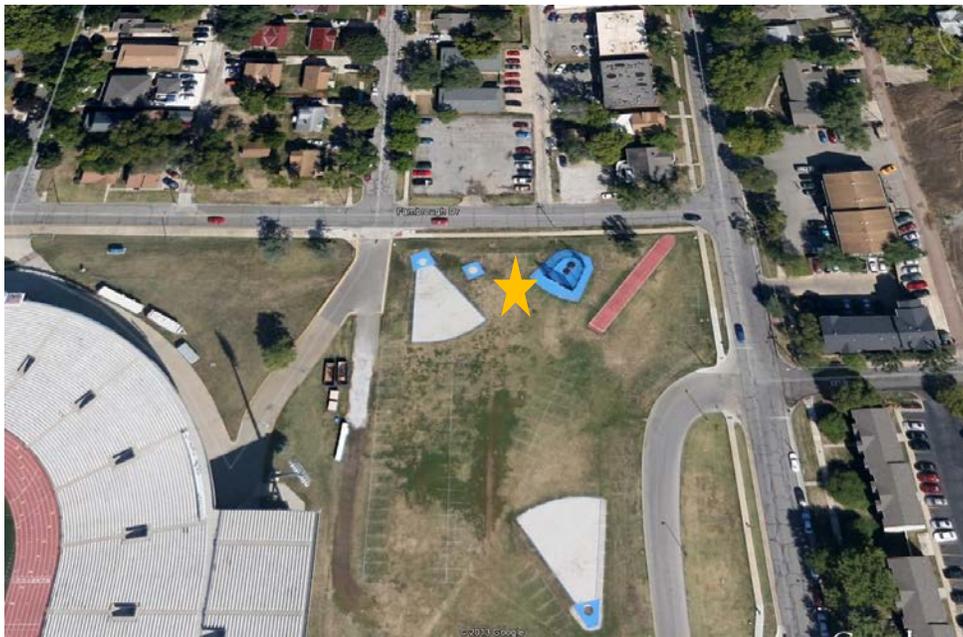


Source: Google Earth
 Note: Site location is generalized

1101 Mississippi (NW of Memorial Stadium)
Current Land Use: Institutional
Future Land Use: Public / Semi-Public
Parcel Size: 7.2 Acres
Total Appraised Value: \$222,240
Study Team Comments: <ul style="list-style-type: none">• There's long been a desire to correct existing off-set intersection.• KU Track and Field area could be relocated to new Rock Chalk Park.• High opportunities for synergy to serve both City needs and KU needs, as well as athletic events.• Surrounding residential land use is predominately, but not completely, rental.• Mitigation measures may be required for adjacent residential uses.

Sources: City of Lawrence GIS Department, Horizon 2020. Douglas County Appraiser.

Figure 4: 1101 Mississippi



Source: Google Earth

Note: Site location is generalized

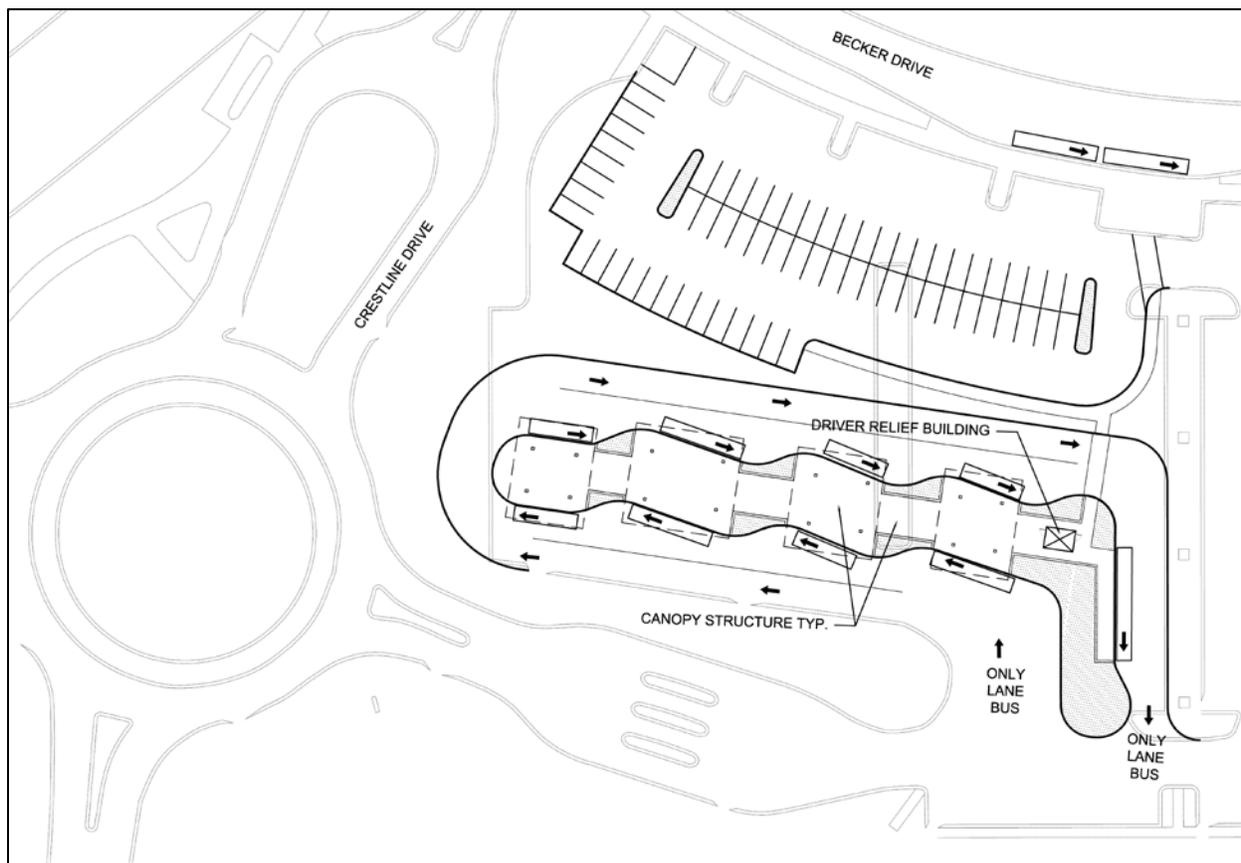
Conceptual layouts for each site

A conceptual layout was developed for each site. Each concept met the general criteria desired for a transit center as identified in discussions with the study team. The purpose of the conceptual layouts at this stage is not to arrive at the best layout for that site, but rather to determine the practicality and operational challenges or opportunities of the potential transit center location, and to arrive at order of magnitude costs for developing each site. The full site plans and cost sheets are included in Appendix II.

2029 Becker Drive (KU Park & Ride)

The conceptual layout for 2029 Becker Drive is presented in Figure 5. The transit center would be built inside an existing parking lot at the KU Park & Ride facility. This would result in a loss of 125 parking spaces. The layout features a horseshoe shaped layout adjacent to Crestline Drive. Nine buses would use the interior space of the transit center, while two additional buses would utilize the existing bus pull-outs at the existing Park & Ride facility. The total project cost would be \$2,438,706, including a 20 percent contingency, and \$213,000 to reconfigure the parking lot to the north of the transit center.

Figure 5: Site plan excerpt for 2029 Becker Drive

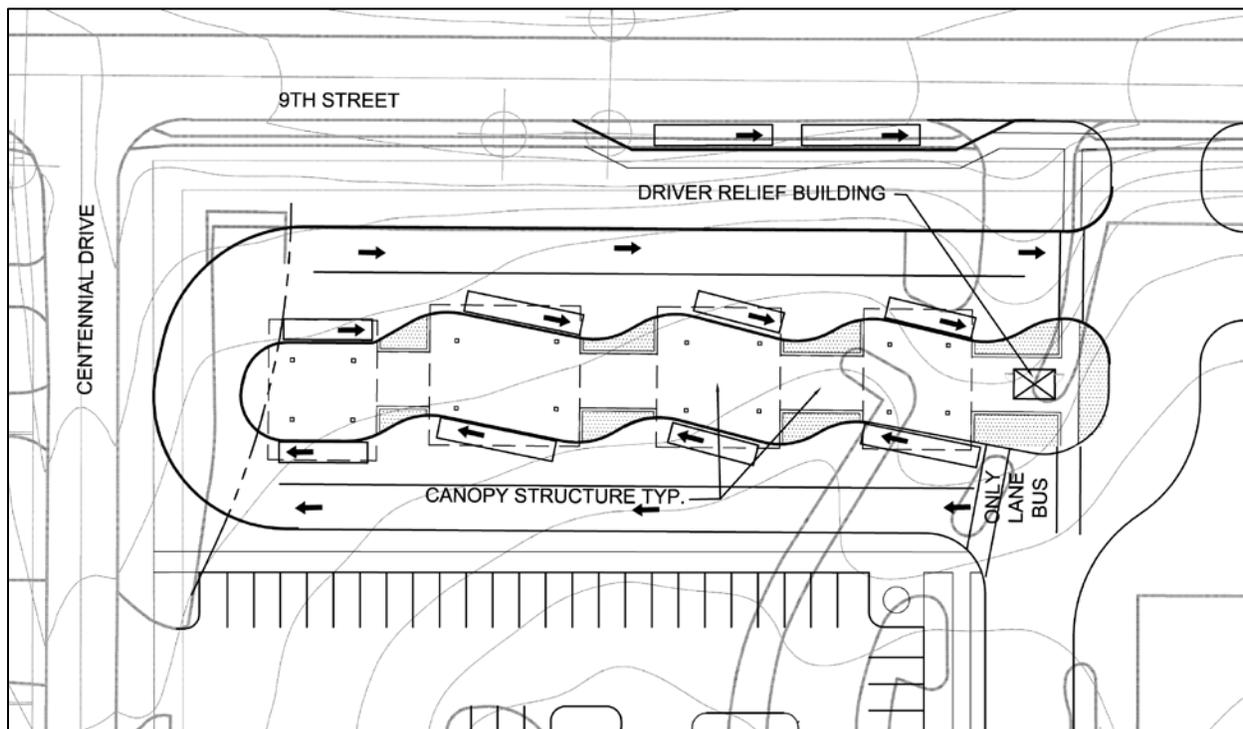


925 Iowa Street

The conceptual layout for 925 Iowa Street is presented in Figure 6. The layout features a horseshoe shaped layout placed in the existing parking lot at the southeast corner of Centennial

Drive and 9th Street, with buses accessing the center from 9th Street through the parking lot access lane. This layout buffers the effects of transit center operations on the single family uses to the east. Eight buses would use the interior space of the transit center, while two additional buses would utilize bus pull-outs on 9th Street. This layout would result in the loss of approximately 85 parking spaces. The total project costs would be \$2,563,620, including a 20 percent contingency, and \$296,000 to reconfigure the parking lot.

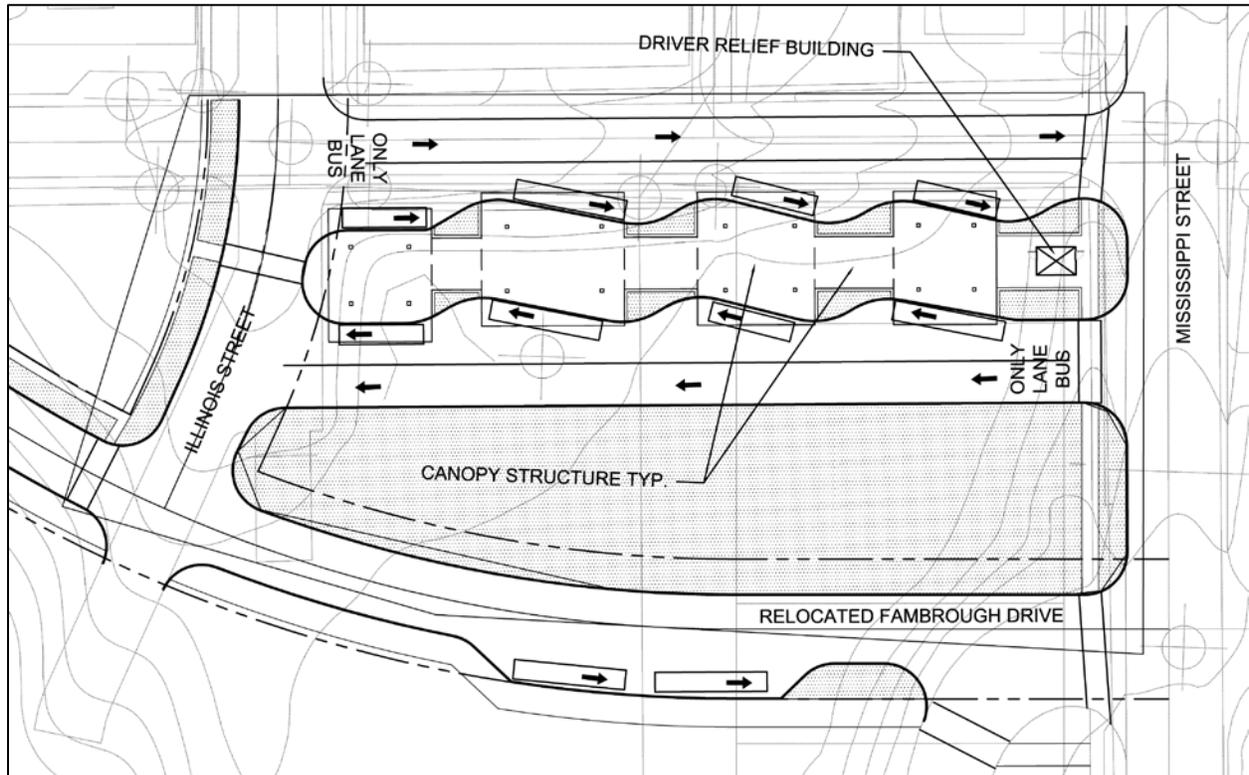
Figure 6: Site plan excerpt for 925 Iowa



1101 Mississippi

The conceptual layout for 1101 Mississippi is presented in Figure 7. The layout features a parallel transit center adjacent to a reconfigured 11th Street / Fambrough Drive. Eight buses would use the interior space of the transit center, while two additional buses would utilize bus pull-outs on a relocated Fambrough Drive. The total project costs would be \$2,696,970, including a 20 percent contingency, and \$337,000 to relocate Illinois Street and Fambrough Drive. It should be noted that reconfiguring the 11th and Mississippi intersection has been discussed before, and that these costs may be incurred regardless if a transit center is built at this location.

Figure 7: Site plan excerpt for 1101 Mississippi



Transit network changes required to serve each site

One component of the site evaluation process was to determine the additional cost or savings that would be incurred to reconfigure the transit network around the transit center. These cost changes would be the result of both revenue mile additions or savings associated with the network change, and the change in the number of vehicles required to serve a transit center location should the routes frequency stay the same. A full scale redrawing of the network is beyond the scope of this project, so relatively simple and direct adjustments were made to the network to serve each candidate site. These adjustments are focused on determining the required change in revenue miles to reach each candidate site, and were not necessarily made in accordance with serving transit dependent populations, major activity centers, or optimizing the resulting network.

This analysis focused on city routes currently serving the downtown transit center, including the following routes:

- Route 1
- Route 3
- Route 4
- Route 6
- Route 7
- Route 10
- Route 11

Route 5 and Route 9 were not included in this analysis as they are both cross-town routes that did not previously access the downtown transit center. Routes that only operate while KU is in

session were not included in this analysis. Some of those routes may have minor route changes to serve a new transit center, but their underlying focus will remain serving the KU campus. Both schedule variations of Route 11 were analyzed, as the city may be responsible for part of the cost if route changes require an additional vehicle. In addition, the following assumptions were made for the network analysis:

- A cost of \$5.00 per revenue mile.
- The number of daily runs per route would remain the same.
- The frequency per route would remain the same.
- Service to downtown would continue where feasible for specific routes.

The alignments used for this analysis are included in Appendix III. It should be stressed these alignments are illustrative only, and are only for the purpose of this analysis. The alignments have not been subject to the same level of analysis that would occur before actual network changes.

Table 2 presents the additional network costs that would be incurred to serve each of the three candidate sites, compared to the existing service. 1101 Mississippi would incur the least additional cost of \$102,000, while serving a transit center at 2029 Becker Drive would require an additional \$535,000 beyond current expenses. It should be noted that many of the route alignments used for this analysis continue to serve major portions of downtown, and explains why cost savings are not realized. A policy decision to adjust service to downtown may result in higher savings.

Table 2: Savings or Costs above existing transit center location

Daily Savings or Costs above existing	Route 1	Route 3	Route 4	Route 6	Route 7	Route 10	Route 11A	Route 11B	Annual Cost Difference
925 Iowa	\$ 483.86	\$ 35.89	\$ 13.53	\$ 165.48	\$ 101.13	\$ 39.97	\$ 333.42	\$ 333.42	\$ 366,061
1101 Mississippi	\$ 261.17	\$ (19.62)	\$ (54.14)	\$ 132.02	\$ 94.91	\$ (148.09)	\$ 59.50	\$ 59.50	\$ 101,632
2029 Becker Drive (KU P&R)	\$ 471.99	\$ 242.77	\$ 164.91	\$ 587.21	\$ (19.89)	\$ 2.40	\$ 264.47	\$ 264.47	\$ 534,725

Table 3 presents the number of additional buses that may be required to serve each candidate location. Additional buses on a route would be necessary if the route frequency stays the same, but revenue miles were added beyond what the existing number of buses could serve. It was assumed that a route could be optimized to absorb up to another 0.19 vehicles (i.e, if a route indicated that it would need 1.19 buses, then that route could probably be optimized to get by with just one bus).

As the table indicates, to serve 925 Iowa, Route 1 would likely need an additional bus. An additional bus for Route 11B was not included, as the vehicles required are still below what's currently necessary to serve Route 11A. The total cost for the additional vehicle for Route 1 would be \$310,000.

1101 Mississippi would not require any additional vehicles, although Route 1 and Route 7 may have to be optimized.

Serving 2029 Becker Drive would require the most additional vehicles. Additional vehicles would likely be required for Route 1, Route 4, and Route 6. The additional costs for these vehicles would be \$690,000.

Table 3: Number of Buses required to serve each location

Number of Buses	Route 1	Route 3	Route 4	Route 6	Route 7	Route 10	Route 11A	Route 11B	Additional
Cost of Bus	\$ 310,000	\$ 70,000	\$ 70,000	\$ 310,000	\$ 310,000	\$ 310,000	\$ 375,000	\$ 375,000	Vehicle Costs
Existing	0.87	0.30	1.00	1.80	0.95	0.95	2.53	1.90	
925 Iowa	1.32	0.35	1.02	2.01	1.06	0.99	3.02	2.26	\$ 310,000
1101 Mississippi	1.11	0.27	0.92	1.96	1.06	0.80	2.62	1.96	
2029 Becker Drive (KU P&R)	1.30	0.64	1.23	2.53	0.93	0.95	2.92	2.19	\$ 690,000

Discussion and Evaluation

Table 4 displays all of the costs associated with each of the three sites. 1101 Mississippi has the highest site development costs at \$2.7 million, but because of lower costs associated with renetworking, has the lowest overall costs at \$2.8 million. 925 Iowa has the next lowest total costs of \$3.2 million. 2029 Becker Drive, although having the lowest site costs, ends up having the highest overall costs, primarily due to higher renetworking costs, and having to buy additional vehicles to maintain the system's current frequency.

Table 4: Comparison of all costs

	2029 Becker Drive	1101 Mississippi	925 Iowa
Direct Site Costs	\$ 1,818,975	\$ 1,910,100	\$ 1,840,150
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CC: File

Appendix I

MEMO

	Overnight
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TO:	Bob Nugent, Lawrence Transit
FROM:	Tom Worker-Braddock, Olsson Associates
RE:	Lawrence Transit Center Locational Analysis - GIS Process and Initial Candidate Site Discussion
DATE:	June 11th, 2013
PROJECT #:	013-0542
PHASE:	2

This memo is to summarize the process that identified a preliminary list of potential sites for new transit center. The selection process is generally summarized as using GIS software to identify various central locations, performing a series of GIS queries to identify sites with characteristics suitable for a transit center, a field trip to visit sites, and then an evaluation of the sites against criteria previously identified by the study team.

GIS Methodology

The consultant and city's GIS Coordinator met in late March to discuss the general availability of data, and approach to apply GIS queries in identifying candidate location for a possible transit center. Minutes from the March 22nd, 2013 meet are included in the appendix.

Site Size

Through discussions with the Lawrence Transit Administrator, it was determined that a new transit center would be required to accommodate three, 40 foot city buses, five 30 foot city buses, and provide street side accommodations for two, 40 foot KU buses. In addition, the study team at the April 11th Project Kick-Off meeting indicated a desire for the site to accommodate a driver/supervisor break room and restroom. It was determined that 1.5 acres at a minimum would be required to accommodate this facility.

Centers Map

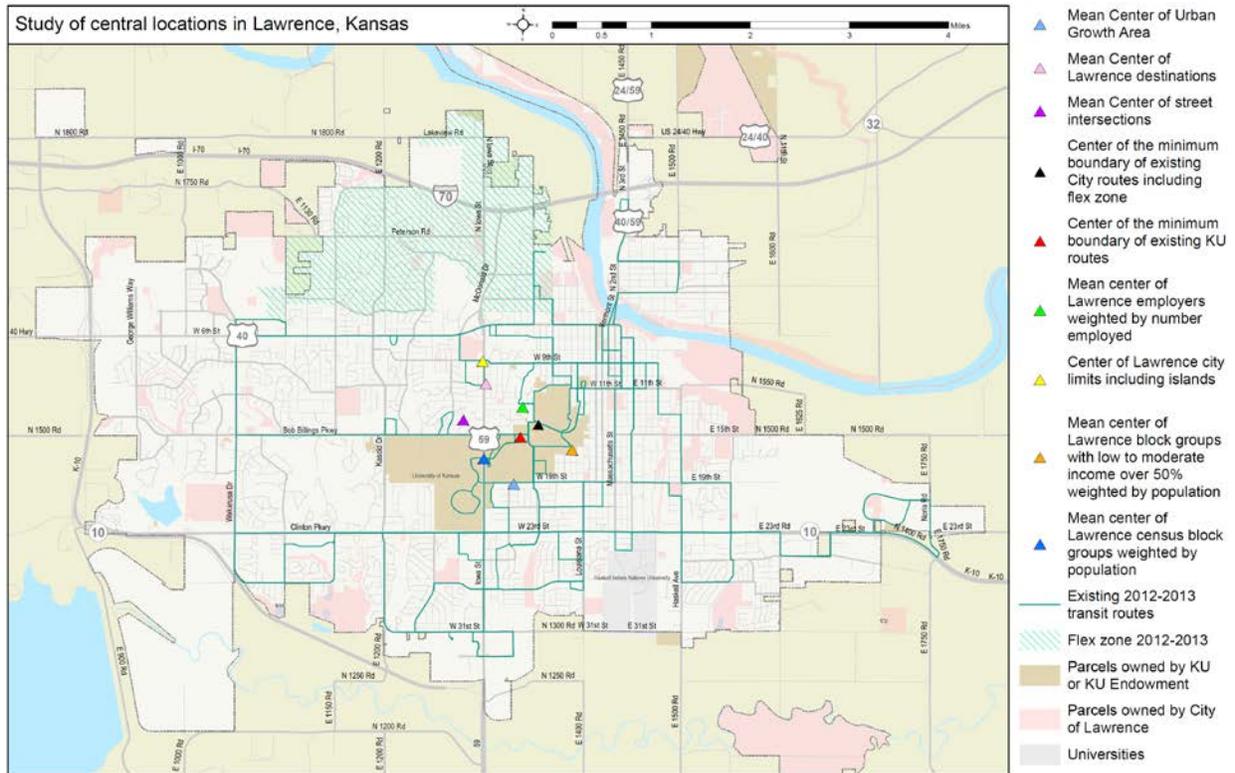
Lawrence's GIS Coordinator created a map with various geographic centers identified. These centers included:

- Mean Center of Urban Growth Area

- Mean Center of Lawrence destinations (grocers, medical facilities, employment assistance, social service agencies, middle or high schools)
- Mean Center of street intersections
- Center of the minimum boundary of existing City routes including flex zone
- Center of the minimum boundary of existing KU routes
- Mean center of Lawrence employers weighted by number employed
- Center of Lawrence city limits including islands
- Mean center of Lawrence block groups with low to moderate income over 50% weighted by population
- Mean center of Lawrence census block groups weighted by population

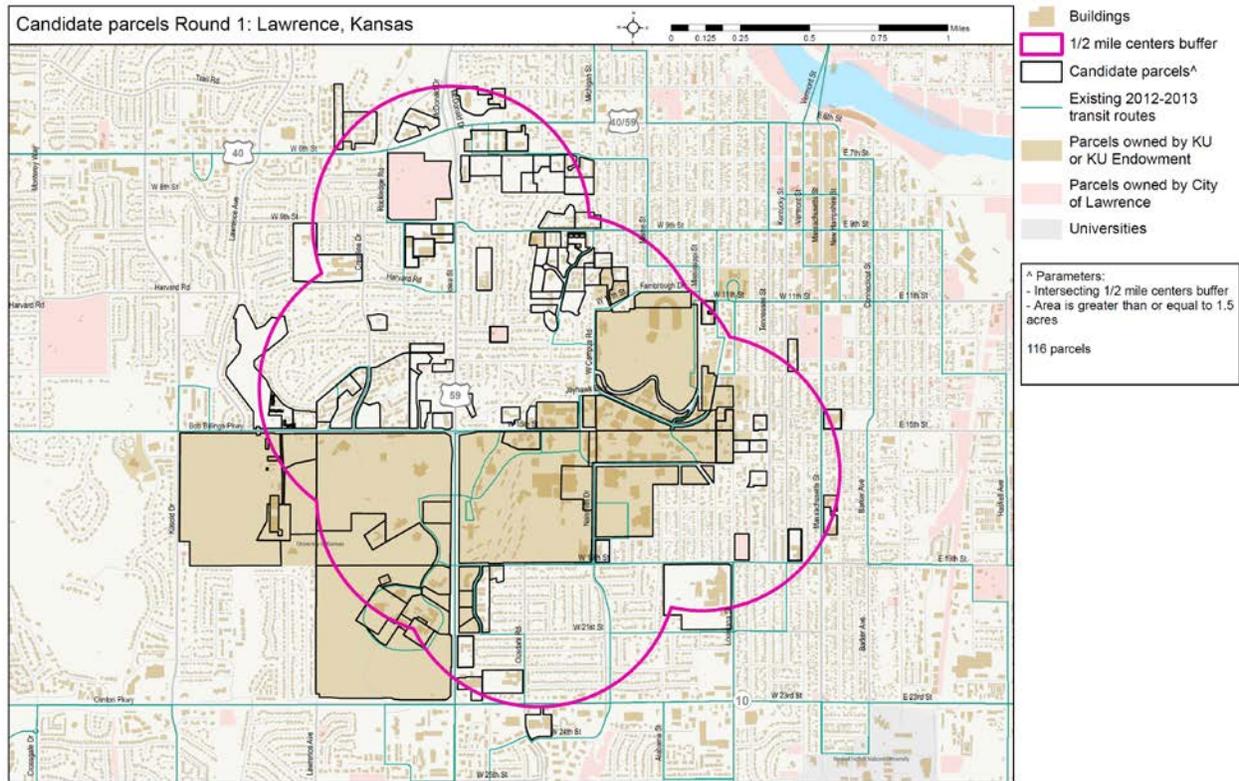
Figure 1 displays this map. The various centers are clustered around the 15th and Iowa area. Full size versions of maps discussed in this document are included in the appendix.

Figure 1: Mean Center Map



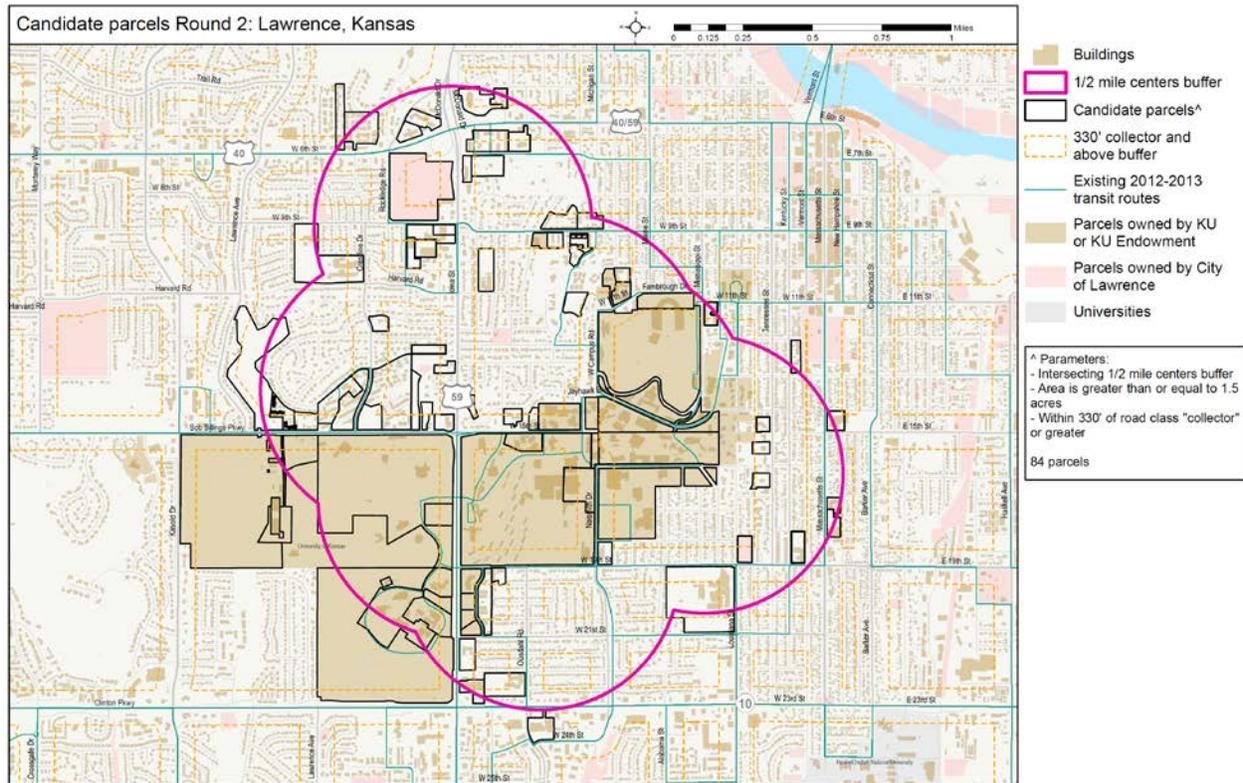
Next, a half mile buffer was created around these centers, and parcels equal to or greater than 1.5 acres were identified. This resulted in 116 parcels, displayed in Figure 2.

Figure 2: Candidate parcels Round 1 – Parcels above 1.5 acres



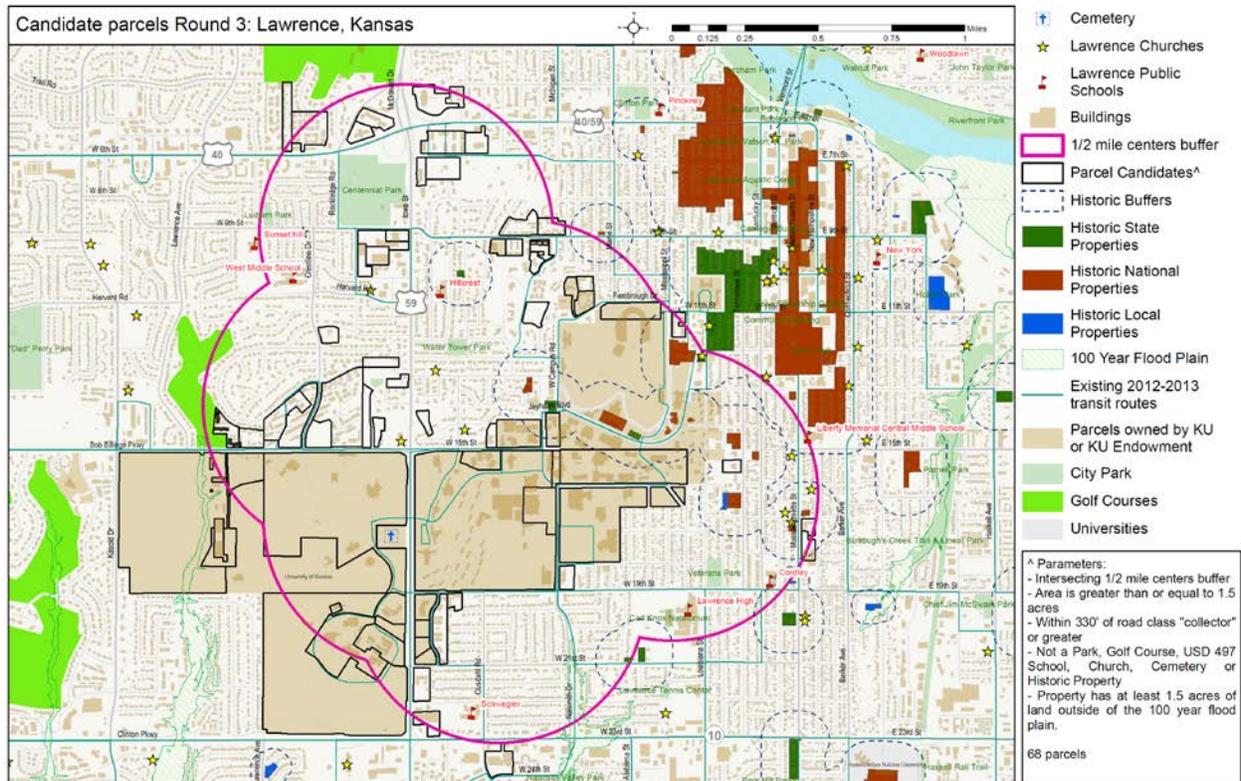
Round 2 of the GIS process selected of those 116 parcels, only those parcels that were within 330 feet (half a block) of road classified as collector or higher. This would limit transit vehicles from traveling on local streets or deep into residential neighborhoods. This resulted in 86 parcels, and is displayed in Figure 3

Figure 3: Round 2 – Within 330 feet of collector street or above



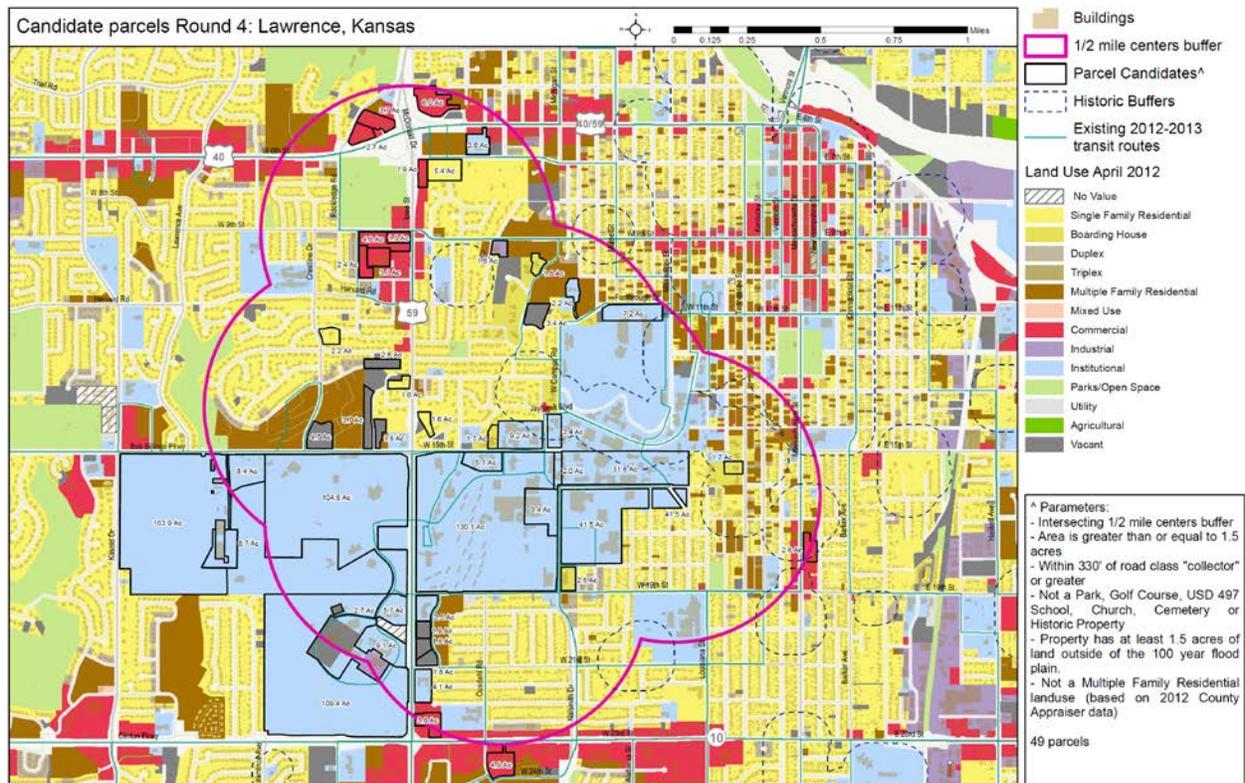
Round 3 excluded properties that were a sensitive land use, including parks, golf courses, school district property, churches, cemeteries, or historic properties. In addition an historic environs buffer of 200 to 500 feet was placed around historic properties or landmarks. Lawrence's Historic Resources Commission typically has to review development within this buffer. Finally, sites that did not have more than 1.5 acres beyond the 100 year flood plain were also excluded. 68 parcels remained after these exclusions, and are displayed in Figure 4.

Figure 4: Round 3 – Not a sensitive land use.



The fourth selected from the remaining parcels that were not multi-family housing. 49 parcels remained and are displayed in Figure 5, along with Lawrence's existing land use.

Figure 5: Round 4 – Not multi-family



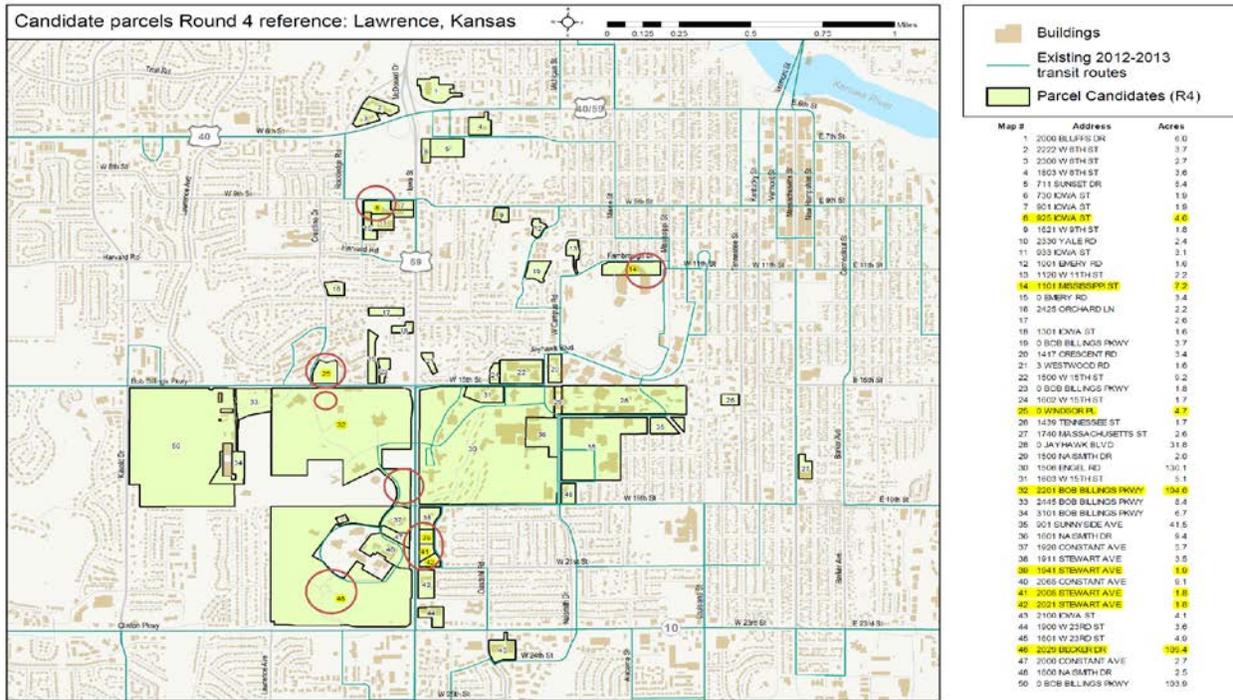
Initial Candidate Site Discussion

Of the remaining parcels, a more subjective selection process selected seven sites for further review. This selection was based on their existing land use (many of the parcels were vacant), ease of vehicle access to major travel corridors, and potential for redevelopment. Sites selected were:

- 2029 Beck Drive (KU Park and Ride)
- 2021 Stewart Avenue
- NW Corner of 19th and Iowa
- NE Corner of Crestline Drive and Bob Billings Parkway
- SE Corner of Crestline Drive and Bob Billings Parkway
- 925 Iowa Street (SE corner of 9th Street and Centennial Drive)
- 1101 Mississippi (northwest of Memorial Stadium)

The sites are displayed in Figure 6.

Figure 6: Initial candidate site location

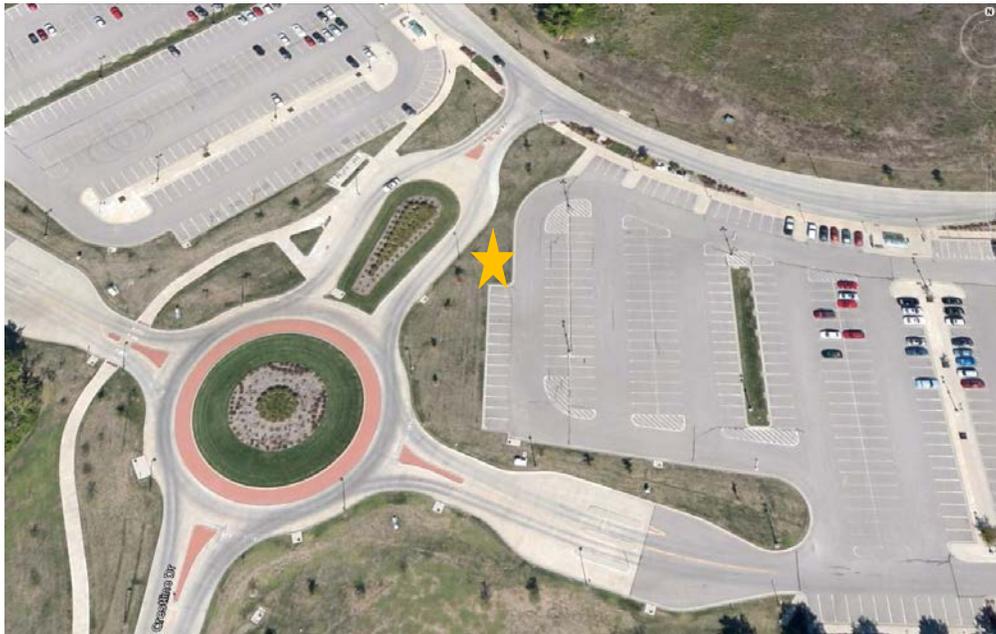


These sites were visited by the study team. The details and study team comments of each site are summarized as follows.

2029 Becker Drive (KU Park and Ride)
Current Land Use: Institutional
Future Land Use: Public / Semi-Public
Parcel Size: 109.4 Acres
Total Appraised Value: \$2,468,030 (entire parcel)
Notes: Site is part of larger parcel.
Study Team Comments: <ul style="list-style-type: none"> • Crestline Drive becoming a main entrance to KU. • High synergy potential to serve both KU needs and City needs. • The existing horse-shoe median north of the round-about on Crestline Drive was originally designed to accommodate additional buses. • Existing traffic would make horse-shoe median unsuitable for a transit center. • A likely location for a new transit center would be in the parking lot east of the horse-shoe median. • Accessing this site will likely require intensive transit network restructuring.

Sources: City of Lawrence GIS Department, Horizon 2020. Douglas County Appraiser.

Figure 7: 2029 Becker Drive

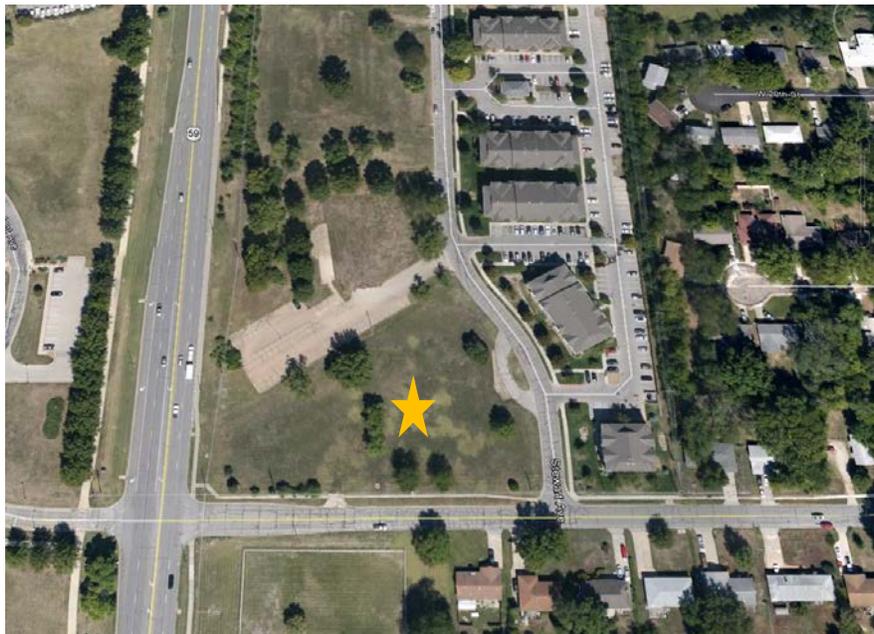


Source: Google Earth
 Note: Site location is generalized

2021 Stewart Avenue
Current Land Use: Vacant
Future Land Use: Medium / High Density Residential
Parcel Size: 1.8 Acres
Total Appraised Value: \$651,060
Study Team Comments: <ul style="list-style-type: none"> • Southern-most parcel of these three vacant parcels would be best. • Transit center at this location could be seen as duplicative of nearby KU Park & Ride. • An additional stop light would be required at 21st Street and Iowa. Questions about queuing on 19th Street to Iowa affecting access from Stuart Avenue to 19th Street. • Surrounding residential is multi-family, or likely renters in single-family houses.

Sources: City of Lawrence GIS Department, Horizon 2020. Douglas County Appraiser.

Figure 8: 2021 Stewart Avenue

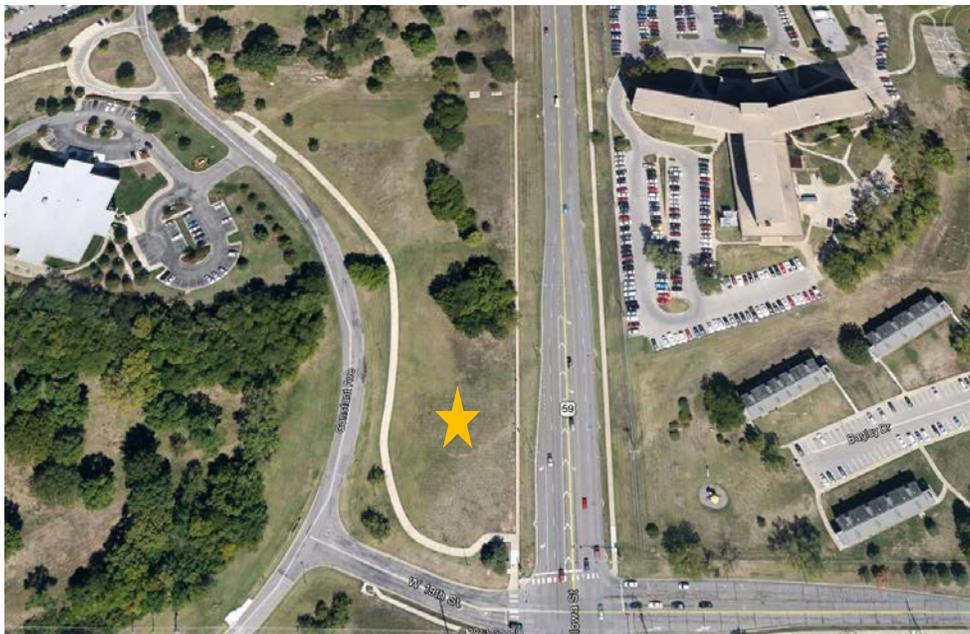


Source: Google Earth
 Note: Site location is generalized

NW Corner of 19th and Iowa
Current Land Use: Institutional
Future Land Use: Public / Semi-Public
Parcel Size: 104.6 Acres
Total Appraised Value: \$7,748,860
Notes: Site is part of larger parcel.
Study Team Comments: <ul style="list-style-type: none">• KU master plan has this location designated a major gateway to KU.

Sources: City of Lawrence GIS Department, Horizon 2020. Douglas County Appraiser.

Figure 9: NW Corner of 19th and Iowa

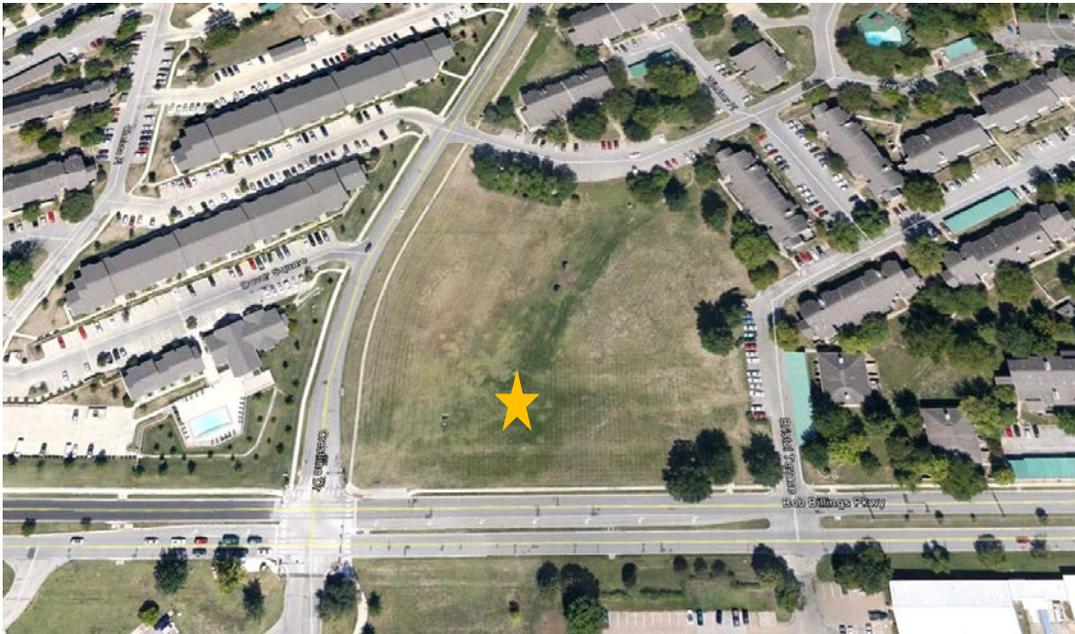


Source: Google Earth
Note: Site location is generalized

NE Corner of Crestline Drive and Bob Billings Parkway
Current Land Use: Vacant
Future Land Use: Medium / High Density Residential
Parcel Size: 4.7 Acres
Total Appraised Value: \$534,320
Study Team Comments: <ul style="list-style-type: none">• Transit center may not be the highest and best use for this particular site.• Would be less accepted by neighborhood than SE corner of intersection

Sources: City of Lawrence GIS Department, Horizon 2020. Douglas County Appraiser.

Figure 10: NE Corner of Crestline Drive and Bob Billings Parkway

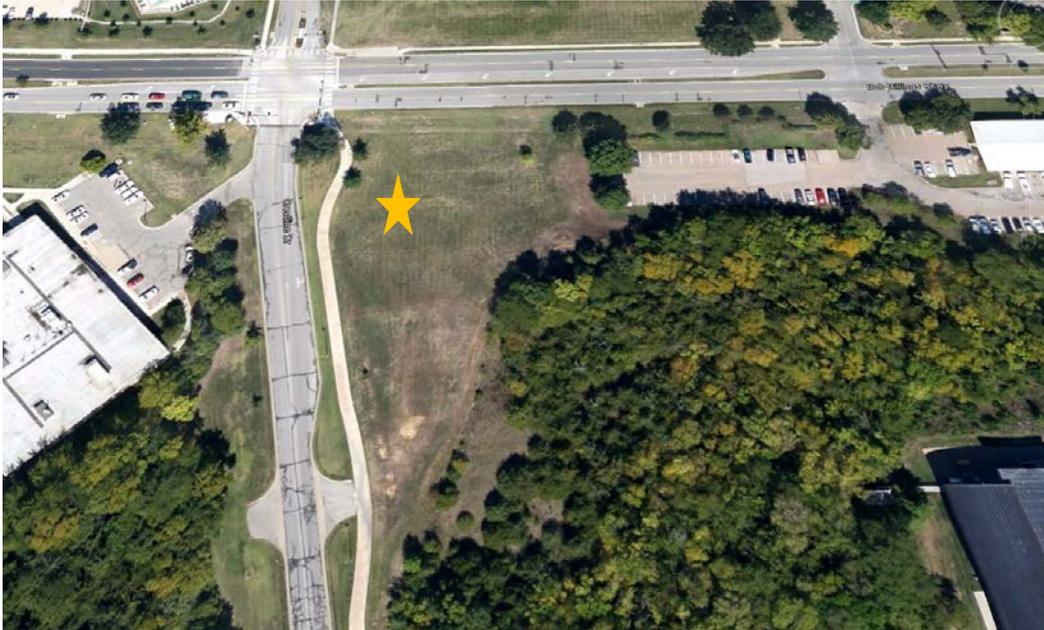


Source: Google Earth
Note: Site location is generalized

SE Corner of Crestline Drive and Bob Billings Parkway
Current Land Use: Institutional (vacant)
Future Land Use: Public / Semi-Public
Parcel Size: 104.6 Acres
Total Appraised Value: \$7,748,860
Notes: Site is part of larger parcel.
Study Team Comments: <ul style="list-style-type: none">• Possible topography issues.• Would be better accepted by neighborhood than NE corner of intersection.• Some concerns about distance from Iowa Street.• Site grading to address topography would be required.

Sources: City of Lawrence GIS Department, Horizon 2020. Douglas County Appraiser.

Figure 11: SE Corner of Crestline Drive and Bob Billings Parkway



Source: Google Earth
Note: Site location is generalized

925 Iowa Street (SE Corner of 9th Street and Centennial Drive)
Current Land Use: Commercial
Future Land Use: Commercial
Parcel Size: 4.6 Acres
Total Appraised Value: \$1,898,000 (entire parcel)
Notes: Site is part of larger parcel.
Study Team Comments:
<ul style="list-style-type: none"> • A stop light would be required at Rockledge Road and 9th Street to handle additional transit vehicles. • “Lots of good things going for it” • High synergy possible with surrounding land uses. • Mitigation measures may be required for adjacent residential uses.

Sources: City of Lawrence GIS Department, Horizon 2020. Douglas County Appraiser.

Figure 12: 925 Iowa (SE Corner of 9th Street and Centennial Drive)

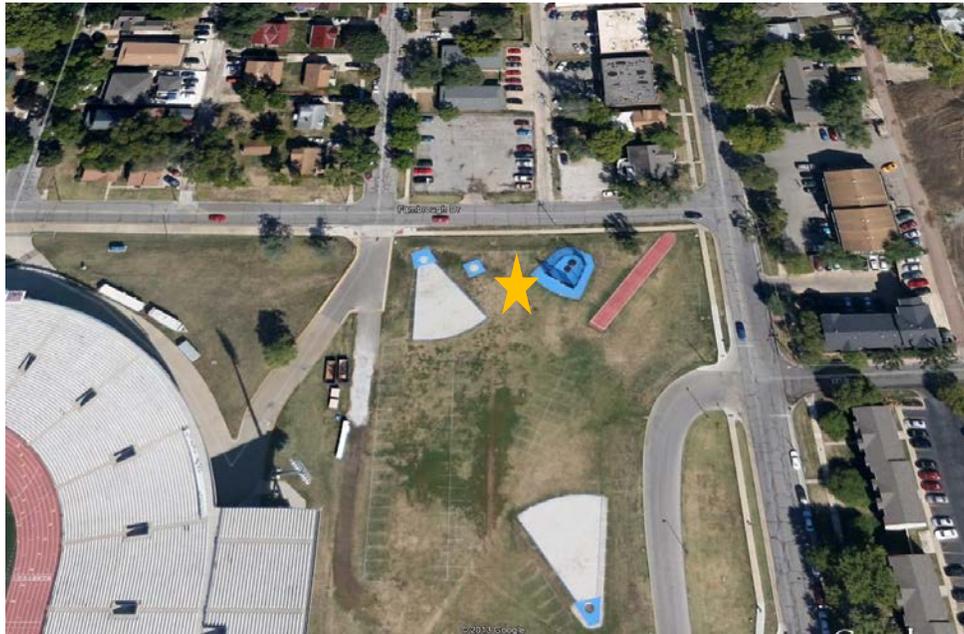


Source: Google Earth
 Note: Site location is generalized

1101 Mississippi (NW of Memorial Stadium)
Current Land Use: Institutional
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Parcel Size: 7.2 Acres
Total Appraised Value: \$222,240
Study Team Comments: <ul style="list-style-type: none">• There's long been a desire to correct existing off-set intersection.• KU Track and Field area could be relocated to new Rock Chalk Park.• High opportunities for synergy to serve both City needs and KU needs, as well as athletic events.• Surrounding residential land use is predominately, but not completely, rental.• Mitigation measures may be required for adjacent residential uses.

Sources: City of Lawrence GIS Department, Horizon 2020. Douglas County Appraiser.

Figure 13: 1101 Mississippi



Source: Google Earth
Note: Site location is generalized

Discussion and Evaluation

The seven sites were evaluated according to criteria broadly discussed by the study team throughout the project. The criteria are:

- Safety (lower risk for pedestrian conflicts, unsignalized left turns, etc).
- Surrounding land use is compatible
- Opportunities for synergy
- No need for additional traffic control
- Future land use compatible to redevelopment
- Major grading is not required
- Central to existing system or ridership patterns

Each of the sites were evaluated on how they best met the criteria. One of three scores was given for how well each site met each criterion. A score of 1, symbolized by an empty circle, meant the site does not adequately address the criterion. A score of 2, symbolized by a half-circle, meant the site does address part of the criterion, with some qualifications. A score of 3, symbolized by a full circle, meant that the site met the criterion. Figure 14 displays the matrix for the initial sites.

Figure 14: Initial Site Matrix Evaluation

Site	Safety (Lower risk for pedestrian conflict, unsignalized left turns)	Surrounding existing land use is compatible	Opportunity for Synergy	No need for additional traffic control	Future land use compatible to redevelopment	Major site grading not required	Central to existing system / ridership	Summary (1 = low, 3 = high)
2029 Becker Drive (KU Park and Ride)	●	●	○	●	●	○	○	2.6
2021 Stewart Avenue	○	○	○	○	●	●	○	2.0
NW Corner of 19 th and Iowa	○	●	○	○	○	○	○	1.9
SE Corner of Crestline Drive and Bob Billings Parkway	●	●	○	●	●	○	○	2.1
NE Corner of Crestline Drive and Bob Billings Parkway	○	○	○	○	○	○	○	1.3
925 Iowa Street (SE corner of 9 th St and Centennial Dr)	○	●	○	○	●	●	○	2.4
1101 Mississippi (NW of Memorial Stadium)	○	○	●	●	●	●	●	2.7

Legend	Wt.	Guide
○	1	Does not adequately meet criterion
◐	2	Addresses part of the criterion, with some qualifications
●	3	Best meets criterion

Safety:

Most of the sites evaluated have some potential for pedestrian or vehicular conflicts. 2029 Becker Drive was ranked higher because the existing land use already separates pedestrians and vehicles. The SE corner of Crestline drive and Bob Billings Parkway was also ranked higher because the site is not near other major pedestrian or vehicle trip generators.

Surrounding existing land use is compatible:

Some sites were in areas adjacent to residential, and may be less suitable for a transit center than in areas that were surrounded by institutional land or commercial.

Opportunity for synergy:

Most sites did not have an inherent opportunity to synergize with the existing land use, nearby attractions, or the transit systems. Both 2029 Becker Drive and 925 Iowa could leverage existing activity currently located at their sites. 1101 Mississippi was ranked higher due to potential opportunities interacting well with KU on Wheels, and athletic functions.

No need for additional traffic control:

Some sites would need additional traffic control measure beyond those currently in place, for the safe operation of a transit center. 2021 Stewart Avenue would likely require an additional traffic signal on Iowa Street, and may have queuing issues to access westbound 19th Street. Other sites, such as NW Corner of 19th and Iowa, NE Corner of Crestline Drive and Bob Billings Parkway, and 925 Iowa, would require additional evaluation to determine if additional traffic control was needed.

Future land use is compatible to redevelopment:

KU has indicated that the NW corner of 19th and Iowa is envisioned to be a gateway feature for the university, and likely incompatible with a transit center. The NE Corner of Crestline Drive and Bob Billings Parkway appears a likely candidate for an expansion of existing high density residential.

Major site grading not required:

Both the northeast and southeast corner of Crestline Drive and Bob Billings Parkway may require substantial grading, while the NW corner of 19th and Iowa may also require some level of grading. While 1101 Mississippi may require substantial grading, it was assumed that this would be done anyways to realign the 11th and Mississippi intersection.

Central to existing system / ridership:

Some sites are less centrally located to the major routes or ridership. 2029 Becker Drive, for instance, may require additional time commitments to egress and ingress a transit center located near the middle of a large parcel.

Summary:

The grade that each site met for each criterion was averaged. 1101 Mississippi was ranked highest with a score of 2.7. 2029 Becker Drive was ranked second highest with a score of 2.6. 925 South Iowa was ranked third with a score of 2.4. These three sites will move forward to the next level of evaluation.

CC: File



Lawrence Transit Center Locational Analysis - GIS Process and Initial Candidate Site Discussion

Appendix

Meeting Minutes

Project:	Lawrence Transit Center Location Analysis
Location:	Lawrence City Hall
Date & Time:	March 22 nd , 2013. 4:00 pm to 5:00 pm
RE:	Preliminary GIS Preparation
PROJECT #:	013-0542
PHASE:	1

NAME	ORGANIZATION	PHONE #	EMAIL
Micah Seybold	City of Lawrence	785-832-3325	mseybold@lawrenceks.org
Tom Worker-Braddock	Olsson Associates	913.381.1170	tworkerbraddock@olssonassociates.com

Micah Seybold and Tom Worker-Braddock to discuss the preliminary data requirements and map requirements in preparation for the April 11th kick-off meeting.

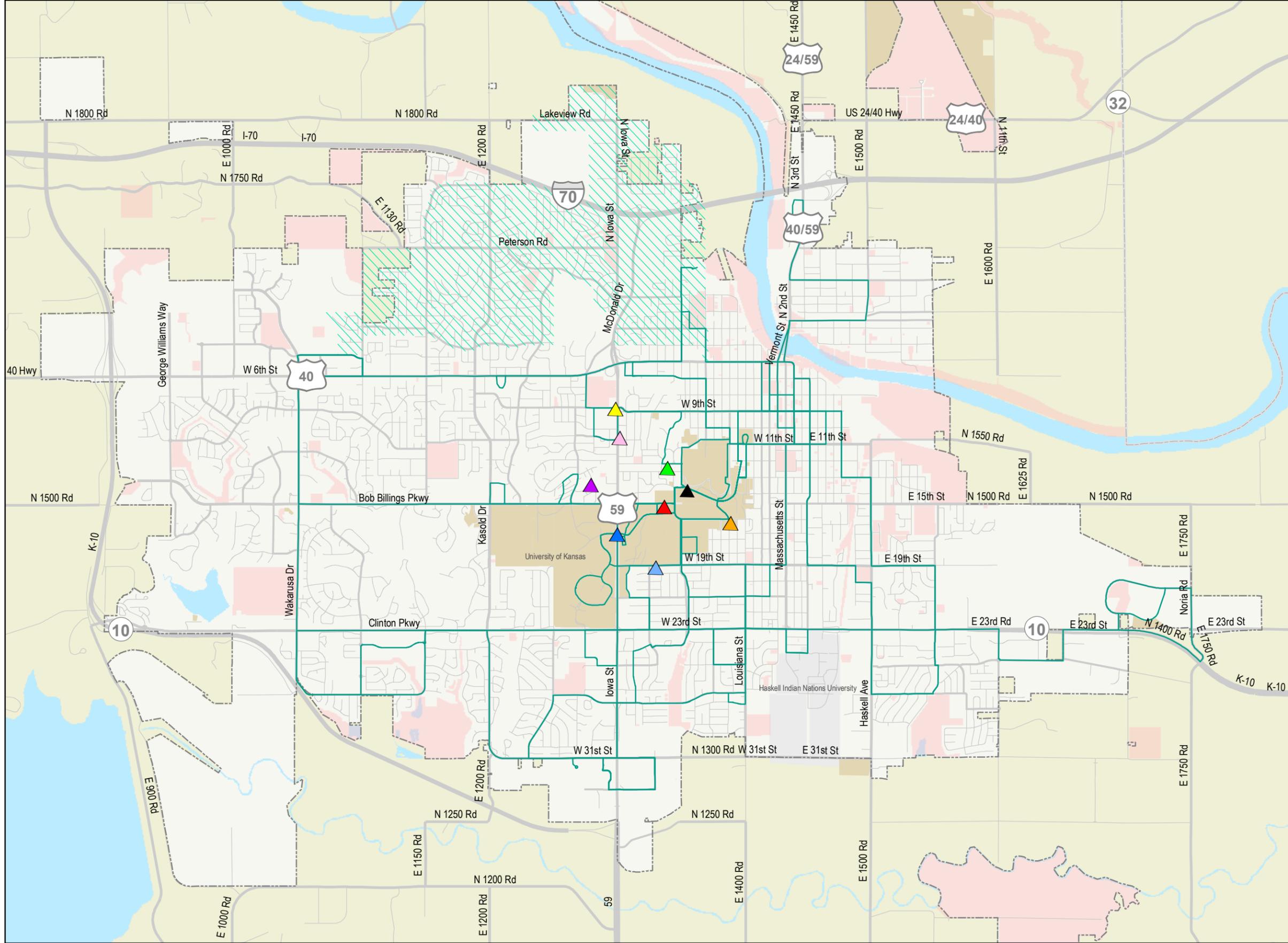
Maps will be prepared for the Kick-off meeting in 11x17 format, but will prepare 8.5x11 maps for the report.

Micah will prepare the following maps:

- Mean of Center map (indicating mean centers of: city routes, KU routes, employers, City Limits, low to moderate income population by block group, population by block group, city road network). One possible method to calculate the road network center is to convert intersections into points, and determine the center of the points. These maps will indicate KU and City property..
- Map of major employers (>100 employees) and major attractions (grocery stores, social service agencies, pharmacies, other medical providers).

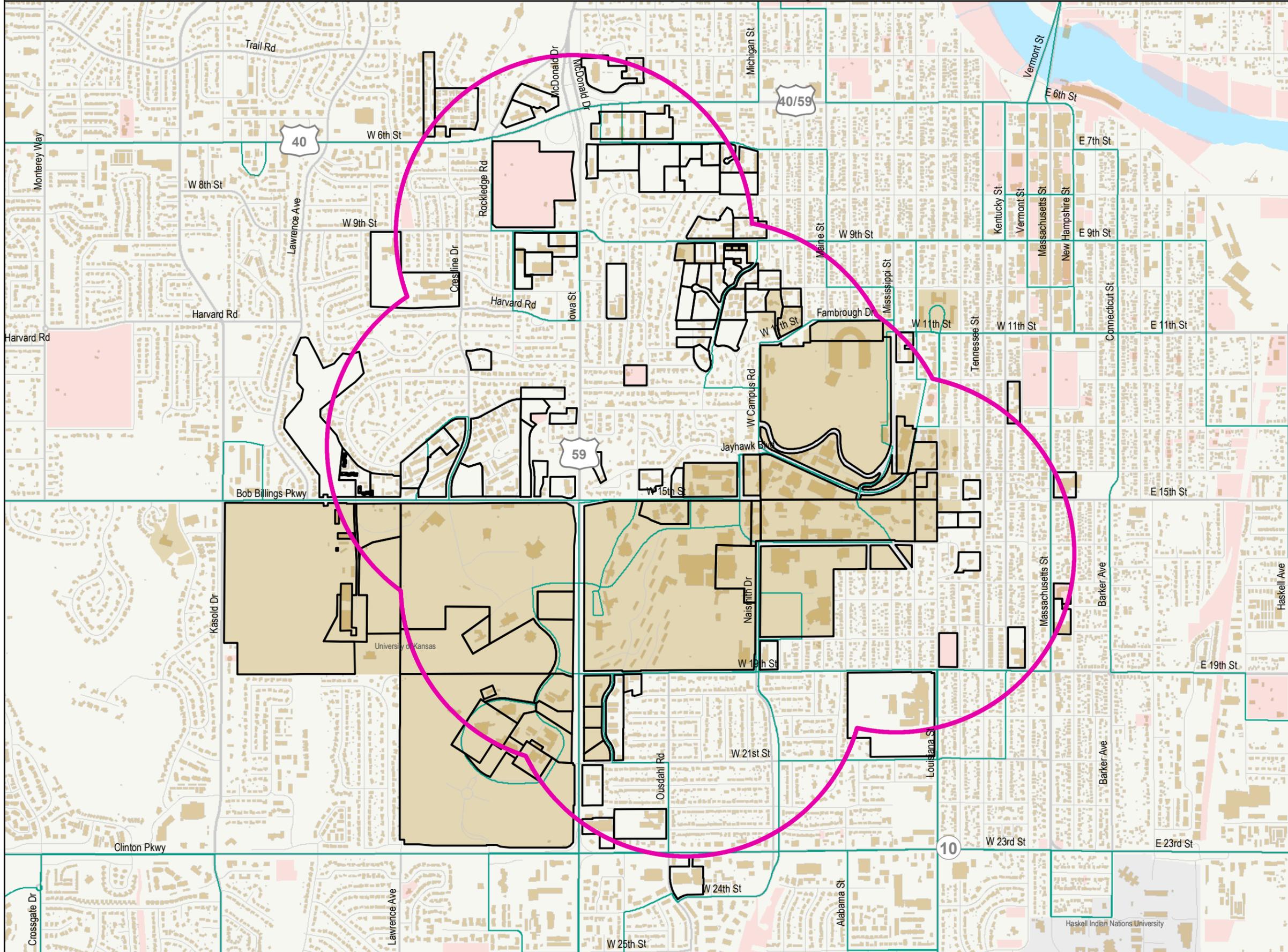
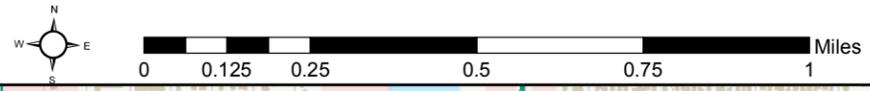
There was discussion about the limited availability of property data. Information on "For Sale" property is not exportable to GIS format, but is queryable by property size. This can be used on a somewhat limited basis once transit center requirements are identified in the kick-off meeting. County assessor's data is currently only available by individual properties, and not through a geospatial database. Tom will follow up to see if there's a better way to access the assessor's data.

Study of central locations in Lawrence, Kansas



- ▲ Mean Center of Urban Growth Area
- ▲ Mean Center of Lawrence destinations
- ▲ Mean Center of street intersections
- ▲ Center of the minimum boundary of existing City routes including flex zone
- ▲ Center of the minimum boundary of existing KU routes
- ▲ Mean center of Lawrence employers weighted by number employed
- ▲ Center of Lawrence city limits including islands
- ▲ Mean center of Lawrence block groups with low to moderate income over 50% weighted by population
- ▲ Mean center of Lawrence census block groups weighted by population
- Existing 2012-2013 transit routes
- ▨ Flex zone 2012-2013
- Parcels owned by KU or KU Endowment
- Parcels owned by City of Lawrence
- Universities

Candidate parcels Round 1: Lawrence, Kansas

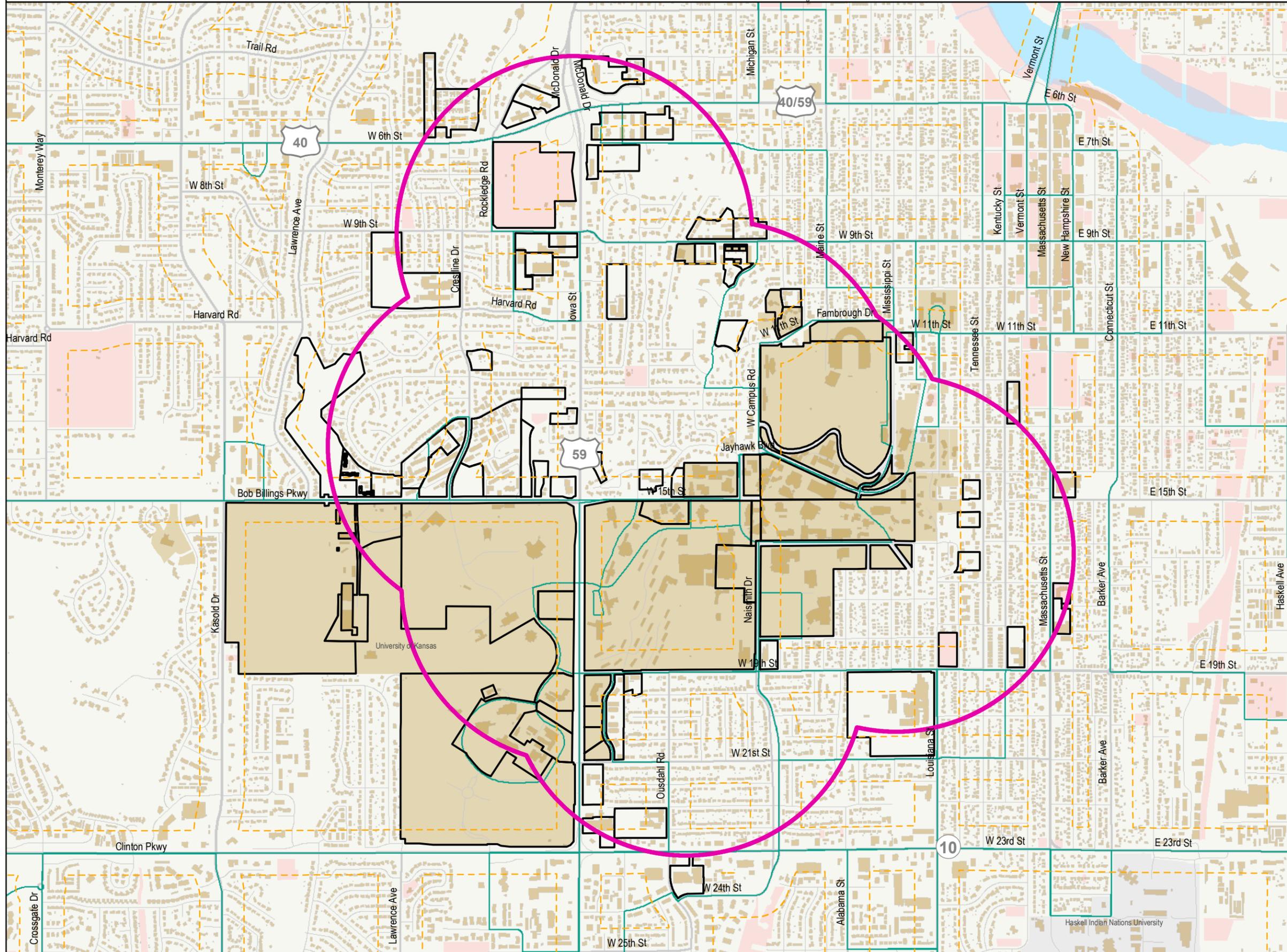
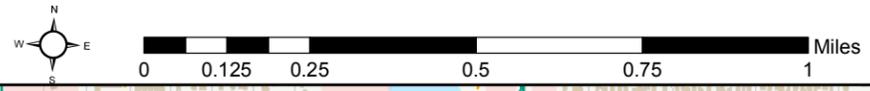


- Buildings
- 1/2 mile centers buffer
- Candidate parcels[^]
- Existing 2012-2013 transit routes
- Parcels owned by KU or KU Endowment
- Parcels owned by City of Lawrence
- Universities

[^] Parameters:
 - Intersecting 1/2 mile centers buffer
 - Area is greater than or equal to 1.5 acres

116 parcels

Candidate parcels Round 2: Lawrence, Kansas

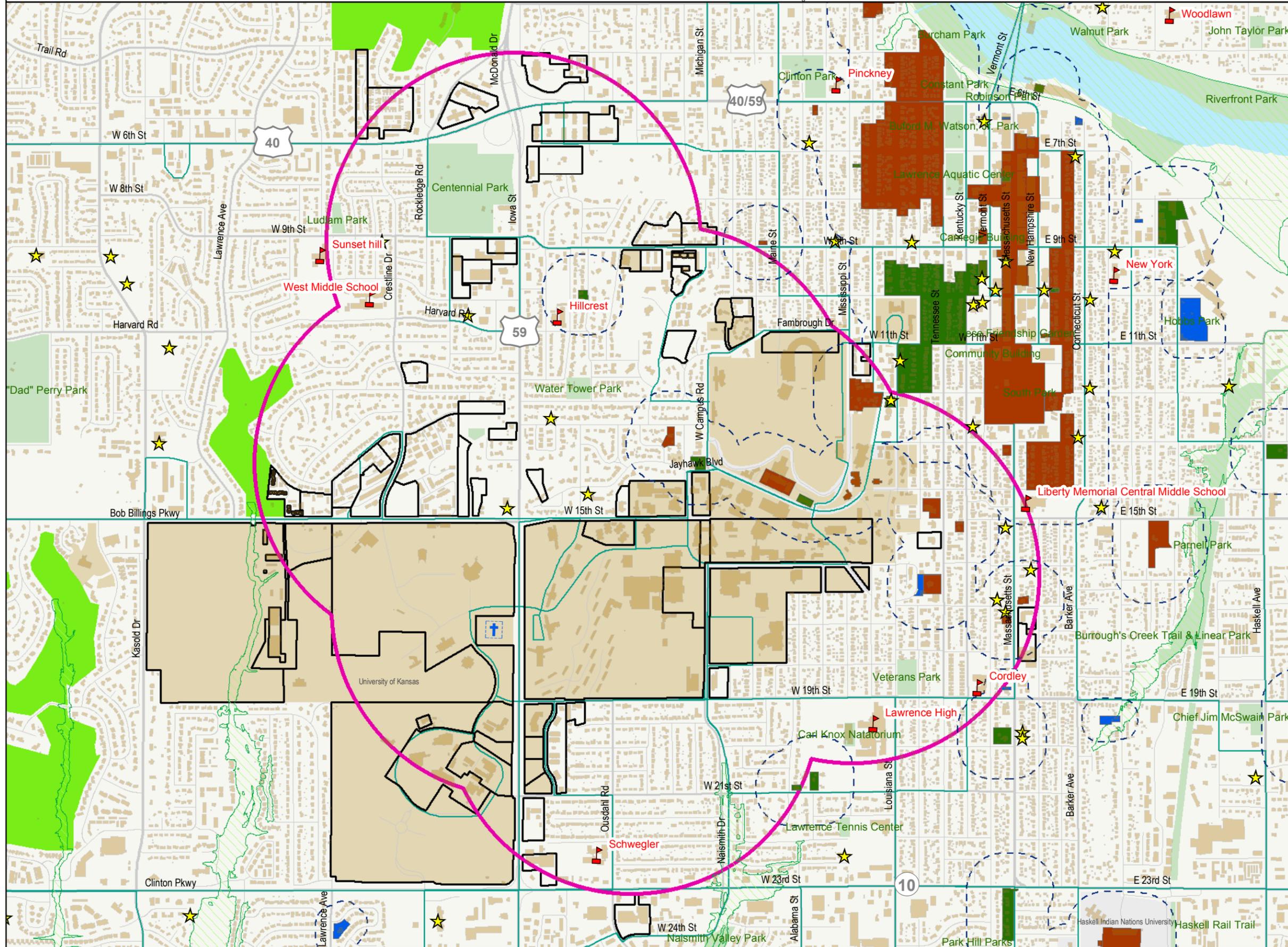
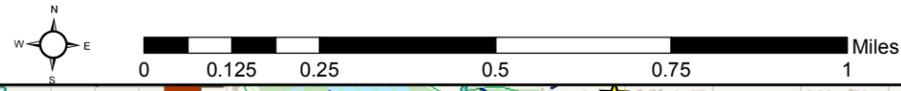


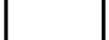
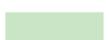
- Buildings
- 1/2 mile centers buffer
- Candidate parcels[^]
- 330' collector and above buffer
- Existing 2012-2013 transit routes
- Parcels owned by KU or KU Endowment
- Parcels owned by City of Lawrence
- Universities

[^] Parameters:
 - Intersecting 1/2 mile centers buffer
 - Area is greater than or equal to 1.5 acres
 - Within 330' of road class "collector" or greater

84 parcels

Candidate parcels Round 3: Lawrence, Kansas



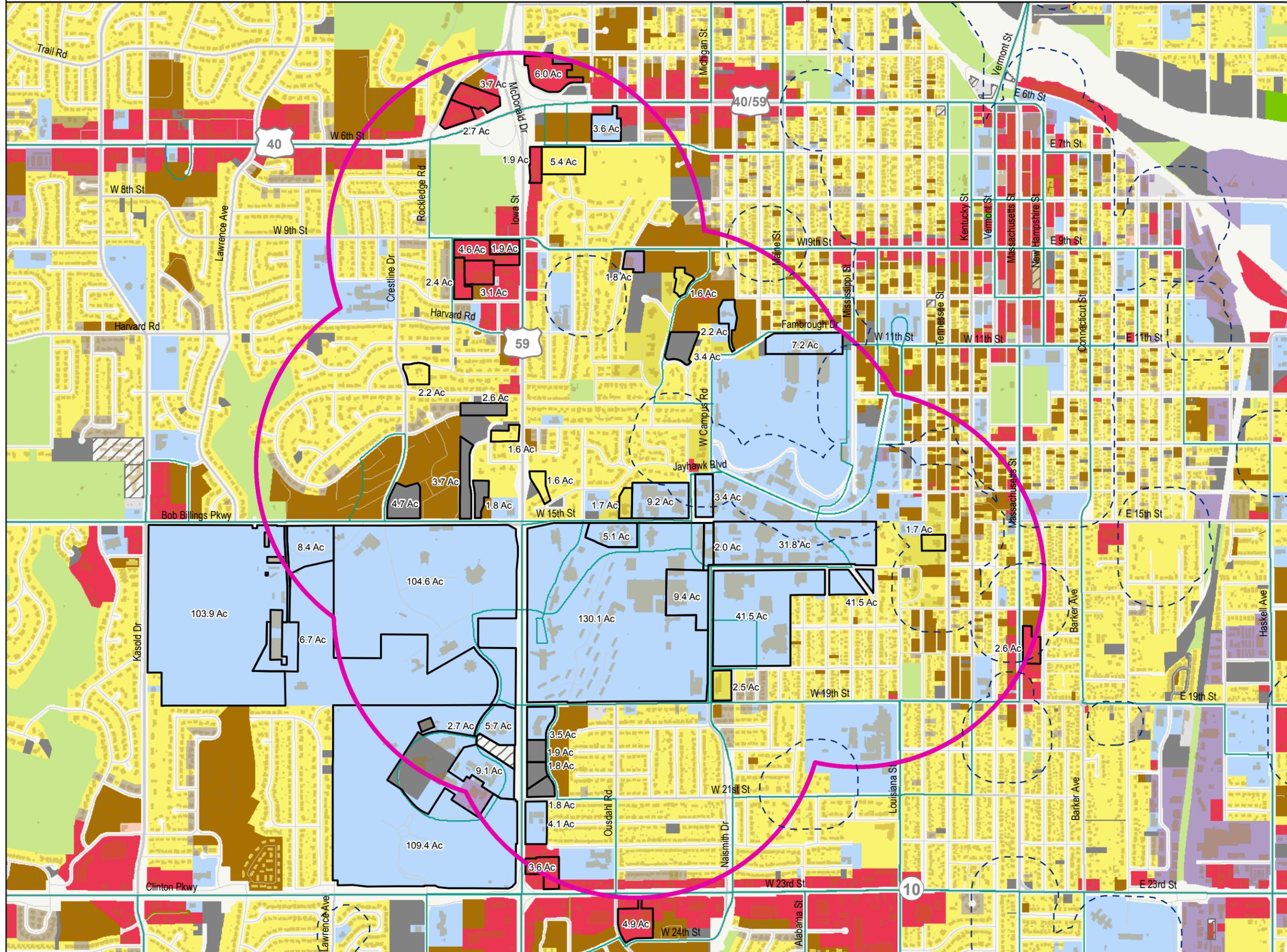
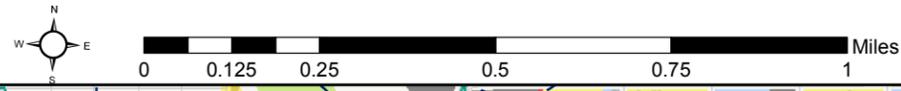
-  Cemetery
-  Lawrence Churches
-  Lawrence Public Schools
-  Buildings
-  1/2 mile centers buffer
-  Parcel Candidates[^]
-  Historic Buffers
-  Historic State Properties
-  Historic National Properties
-  Historic Local Properties
-  100 Year Flood Plain
-  Existing 2012-2013 transit routes
-  Parcels owned by KU or KU Endowment
-  City Park
-  Golf Courses
-  Universities

[^] Parameters:

- Intersecting 1/2 mile centers buffer
- Area is greater than or equal to 1.5 acres
- Within 330' of road class "collector" or greater
- Not a Park, Golf Course, USD 497 School, Church, Cemetery or Historic Property
- Property has at least 1.5 acres of land outside of the 100 year flood plain.

68 parcels

Candidate parcels Round 4: Lawrence, Kansas



- Buildings
- 1/2 mile centers buffer
- Parcel Candidates^
- Historic Buffers
- Existing 2012-2013 transit routes

Land Use April 2012

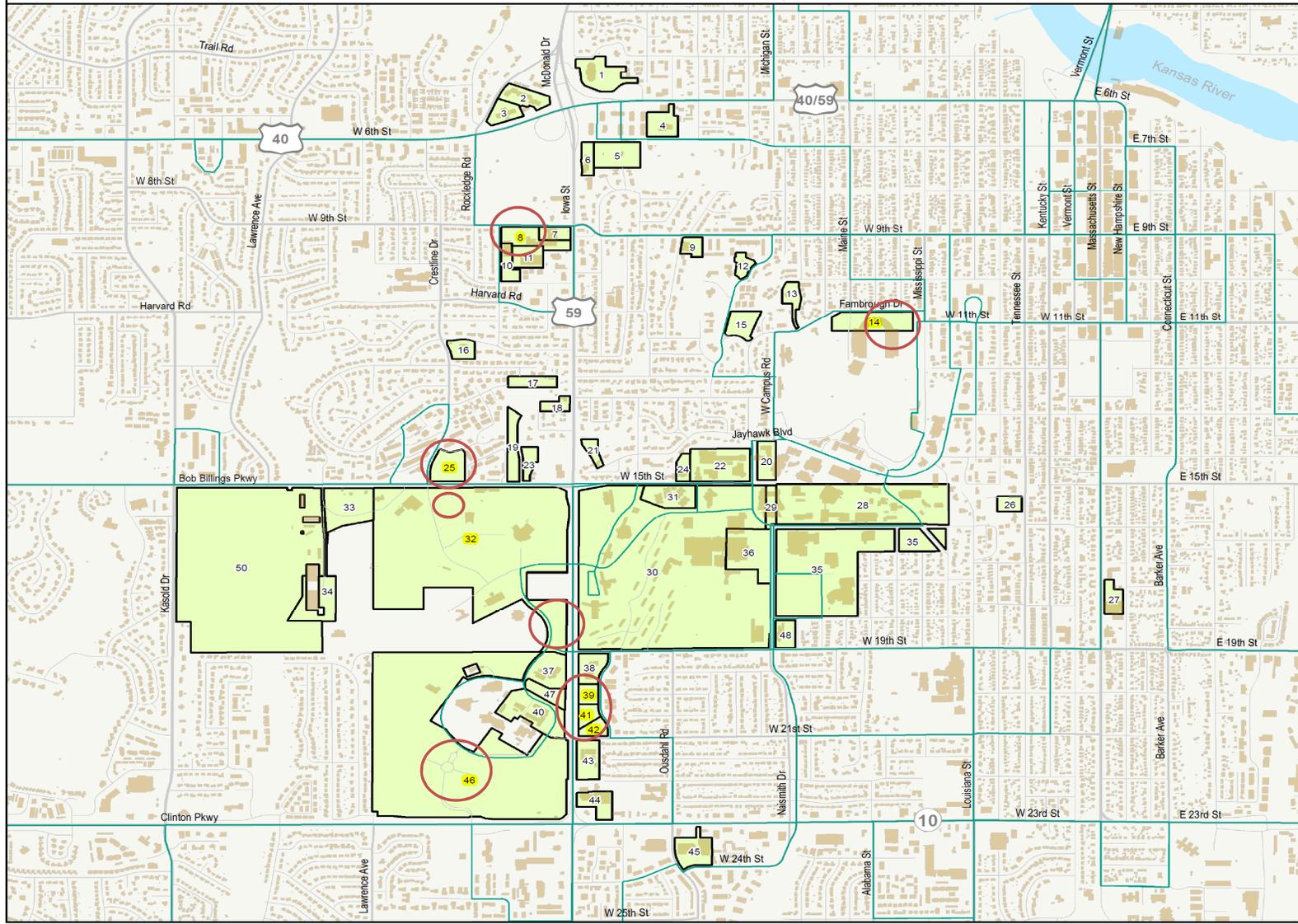
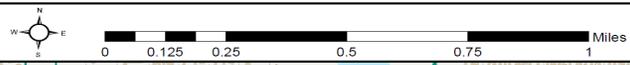
- No Value
- Single Family Residential
- Boarding House
- Duplex
- Triplex
- Multiple Family Residential
- Mixed Use
- Commercial
- Industrial
- Institutional
- Parks/Open Space
- Utility
- Agricultural
- Vacant

^ Parameters:

- Intersecting 1/2 mile centers buffer
- Area is greater than or equal to 1.5 acres
- Within 330' of road class "collector" or greater
- Not a Park, Golf Course, USD 497 School, Church, Cemetery or Historic Property
- Property has at least 1.5 acres of land outside of the 100 year flood plain.
- Not a Multiple Family Residential landuse (based on 2012 County Appraiser data)

49 parcels

Candidate parcels Round 4 reference: Lawrence, Kansas



- Buildings
- Existing 2012-2013 transit routes
- Parcel Candidates (R4)

Map #	Address	Acres
1	2000 BLUFFS DR	6.0
2	2222 W 6TH ST	3.7
3	2300 W 6TH ST	2.7
4	1803 W 6TH ST	3.6
5	711 SUNSET DR	5.4
6	730 IOWA ST	1.9
7	901 IOWA ST	1.9
8	925 IOWA ST	4.6
9	1621 W 9TH ST	1.8
10	2330 YALE RD	2.4
11	933 IOWA ST	3.1
12	1001 EMERY RD	1.6
13	1120 W 11TH ST	2.2
14	1101 MISSISSIPPI ST	7.2
15	0 EMERY RD	3.4
16	2425 ORCHARD LN	2.2
17		2.6
18	1301 IOWA ST	1.6
19	0 BOB BILLINGS PKWY	3.7
20	1417 CRESCENT RD	3.4
21	3 WESTWOOD RD	1.6
22	1500 W 15TH ST	9.2
23	0 BOB BILLINGS PKWY	1.8
24	1602 W 15TH ST	1.7
25	0 WINDSOR FL	4.7
26	1439 TENNESSEE ST	1.7
27	1740 MASSACHUSETTS ST	2.6
28	0 JAYHAWK BLVD	31.8
29	1500 NAISMITH DR	2.0
30	1506 ENGEL RD	130.1
31	1603 W 15TH ST	5.1
32	2201 BOB BILLINGS PKWY	104.6
33	2445 BOB BILLINGS PKWY	8.4
34	3101 BOB BILLINGS PKWY	6.7
35	901 SUNNY SIDE AVE	41.5
36	1601 NAISMITH DR	9.4
37	1920 CONSTANT AVE	5.7
38	1911 STEWART AVE	3.5
39	1941 STEWART AVE	1.9
40	2065 CONSTANT AVE	9.1
41	2005 STEWART AVE	1.8
42	2021 STEWART AVE	1.8
43	2100 IOWA ST	4.1
44	1900 W 23RD ST	3.6
45	1601 W 23RD ST	4.9
46	2029 BECKER DR	109.4
47	2000 CONSTANT AVE	2.7
48	1800 NAISMITH DR	2.5
50	0 BOB BILLINGS PKWY	103.9



Appendix II: Site Plans and Cost Estimates

2029 Becker Drive**Preliminary Opinion of Probable Construction Costs**

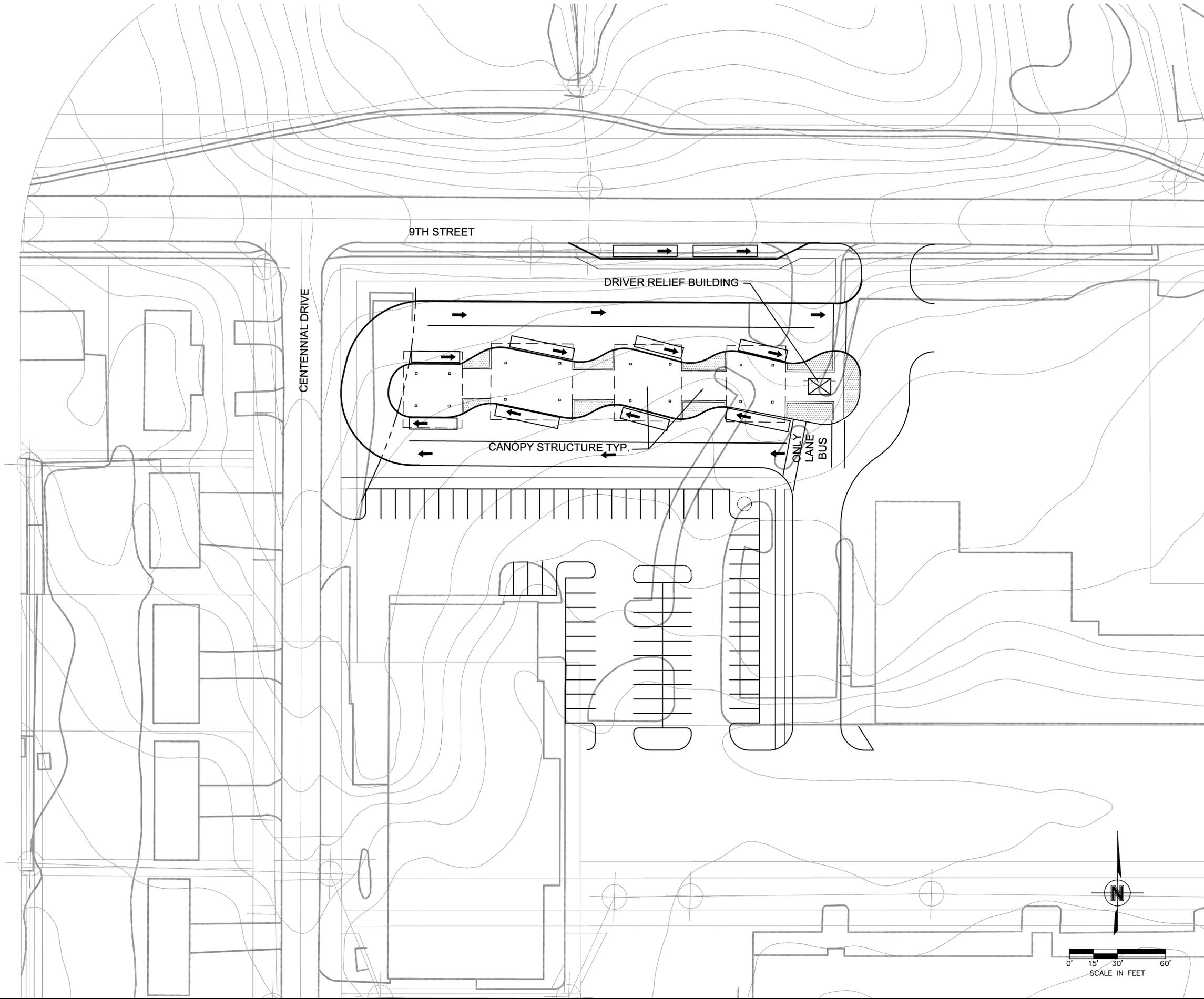
11-Jun-13

Transit Center		QTY	UNITS	COST	TOTAL
1	Mobilization	1	LS	\$48,000.00	\$48,000.00
2	Clearing/Grubing/limited site demolition	1	LS	\$85,000.00	\$85,000.00
3	Structure / 9,000 sq ft	1	LS	\$900,000.00	\$900,000.00
4	Restroom Building	1	LS	\$100,000.00	\$100,000.00
5	Information Kiosk	1	EA	\$15,000.00	\$15,000.00
6	Construction Staking	1	LS	\$10,000.00	\$10,000.00
7	Earthwork	4000	CY	\$12.00	\$48,000.00
8	Monument Sign with Utility Hookup	1	LS	\$10,000.00	\$10,000.00
9	Private Utilities	1	LS	\$40,000.00	\$40,000.00
10	Retaining walls	0	SFF	\$20.00	\$0.00
11	Erosion Control	1	LS	\$18,000.00	\$18,000.00
12	Seeding	0.7	ACRE	\$2,000.00	\$1,400.00
13	ADA ram-conc. w/ truncated domes	5	EA	\$1,800.00	\$9,000.00
14	bollards	20	EA	\$900.00	\$18,000.00
15	Pavement Markings	1	LS	\$4,500.00	\$4,500.00
16	Site Lighting	10	EA	\$6,000.00	\$60,000.00
17	Traffic Control	1	LS	\$18,000.00	\$18,000.00
18	Irrigation	1	LS	\$7,000.00	\$7,000.00
19	Landscaping	1	LS	\$60,000.00	\$60,000.00
20	Bench	20	EA	\$2,000.00	\$40,000.00
21	Bike rack	2	EA	\$2,500.00	\$5,000.00
22	Litter receptacle	6	EA	\$1,250.00	\$7,500.00
23	Digital Reader Board	8	EA	\$10,000.00	\$80,000.00
24	New Curb and Gutter	1390	LF	\$20.00	\$27,800.00
25	Decorative Crosswalk	710	SF	\$20.00	\$14,200.00
26	Concrete Pavement 10"	2965	SY	\$75.00	\$222,375.00
27	Concrete Sidewalk 4"	8400	SF	\$5.50	\$46,200.00
28	Storm Sewer Inlets	4	EA	\$3,000.00	\$12,000.00
29	Storm Sewer Pipe	600	LF	\$75.00	\$45,000.00
Transit Center Sub-Total					\$1,818,975.00
Reconfigured Parking Lot		QTY	UNITS	COST	TOTAL
1	Asphalt Pavement 8"	2515	SY	\$45.00	\$113,175.00
2	New Curb & Gutter	620	LF	\$20.00	\$12,400.00
3	Concrete Sidewalk 4"	1310	SF	\$5.50	\$7,205.00
5	Pavement Markings	1	LS	\$2,500.00	\$2,500.00
3	Storm Sewer Inlets	4	EA	\$3,000.00	\$12,000.00
4	Storm Sewer Pipe	200	LF	\$75.00	\$15,000.00
6	Landscape	1	LS	\$15,000.00	\$15,000.00
5	Site Lighting	6	EA	\$6,000.00	\$36,000.00
Transit Center Sub-Total					\$213,280.00
Project Sub-Total:				\$2,032,255.00	
Contingency 20%				\$406,451.00	
Project Total:				\$2,438,706.00	

9th St. & Iowa St. Transit Center**Preliminary Opinion of Probable Construction Costs**

11-Jun-13

Transit Center		QTY	UNITS	COST	TOTAL
1	Mobilization	1	LS	\$48,000.00	\$48,000.00
2	Clearing/Grubing/limited site demolition	1	LS	\$85,000.00	\$85,000.00
3	Structure / 9,000 sq ft	1	LS	\$900,000.00	\$900,000.00
4	Restroom Building	1	LS	\$100,000.00	\$100,000.00
5	Information Kiosk	1	EA	\$15,000.00	\$15,000.00
6	Construction Staking	1	LS	\$10,000.00	\$10,000.00
7	Earthwork	8000	CY	\$12.00	\$96,000.00
8	Monument Sign with Utility Hookup	1	LS	\$10,000.00	\$10,000.00
9	Private Utilities	1	LS	\$30,000.00	\$30,000.00
10	Retaining walls	1600	SFF	\$20.00	\$32,000.00
11	Erosion Control	1	LS	\$18,000.00	\$18,000.00
12	Seeding	0.7	ACRE	\$2,000.00	\$1,400.00
13	ADA ram-conc. w/ truncated domes	5	EA	\$1,800.00	\$9,000.00
14	bollards	20	EA	\$900.00	\$18,000.00
15	Pavement Markings	1	LS	\$4,500.00	\$4,500.00
16	Site Lighting	10	EA	\$6,000.00	\$60,000.00
17	Traffic Control	1	LS	\$18,000.00	\$18,000.00
18	Irrigation	1	LS	\$7,000.00	\$7,000.00
19	Landscaping	1	LS	\$50,000.00	\$50,000.00
20	Bench	20	EA	\$2,000.00	\$40,000.00
21	Bike rack	2	EA	\$2,500.00	\$5,000.00
22	Litter receptacle	6	EA	\$1,250.00	\$7,500.00
23	Digital Reader Board	8	EA	\$10,000.00	\$80,000.00
24	New Curb and Gutter	1400	LF	\$20.00	\$28,000.00
25	Decorative Crosswalk	710	SF	\$20.00	\$14,200.00
26	Concrete Pavement 10"	2474	SY	\$75.00	\$185,550.00
27	Concrete Sidewalk 4"	8000	SF	\$5.50	\$44,000.00
28	Storm Sewer Inlets	4	EA	\$3,000.00	\$12,000.00
29	Storm Sewer Pipe	600	LF	\$75.00	\$45,000.00
Transit Center Sub-Total					\$1,840,150.00
Reconfigured Parking Lot		QTY	UNITS	COST	TOTAL
1	Asphalt Pavement 8"	3780	SY	\$45.00	\$170,100.00
2	New Curb & Gutter	1400	LF	\$20.00	\$28,000.00
3	Concrete Sidewalk 4"	3200	SF	\$5.50	\$17,600.00
3	Storm Sewer Inlets	4	EA	\$3,000.00	\$12,000.00
4	Storm Sewer Pipe	200	LF	\$75.00	\$15,000.00
5	Pavement Markings	1	LS	\$2,500.00	\$2,500.00
6	Landscape	1	LS	\$15,000.00	\$15,000.00
7	Site Lighting	6	EA	\$6,000.00	\$36,000.00
Transit Center Sub-Total					\$296,200.00
Project Sub-Total:				\$2,136,350.00	
Contingency 20%				\$427,270.00	
Project Total:				\$2,563,620.00	



REV. NO.	DATE	REVISIONS DESCRIPTION	BY

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

9TH and IOWA

LAWRENCE TRANSIT CENTER
 CONCEPT DESIGN

LAWRENCE, KANSAS

2013

REVISIONS

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 checked by: ENG
 approved by: ENG
 QA/QC by: ENG
 project no.: 1234
 drawing no.: 130542 PBBase.DWG
 date: 06.11.13

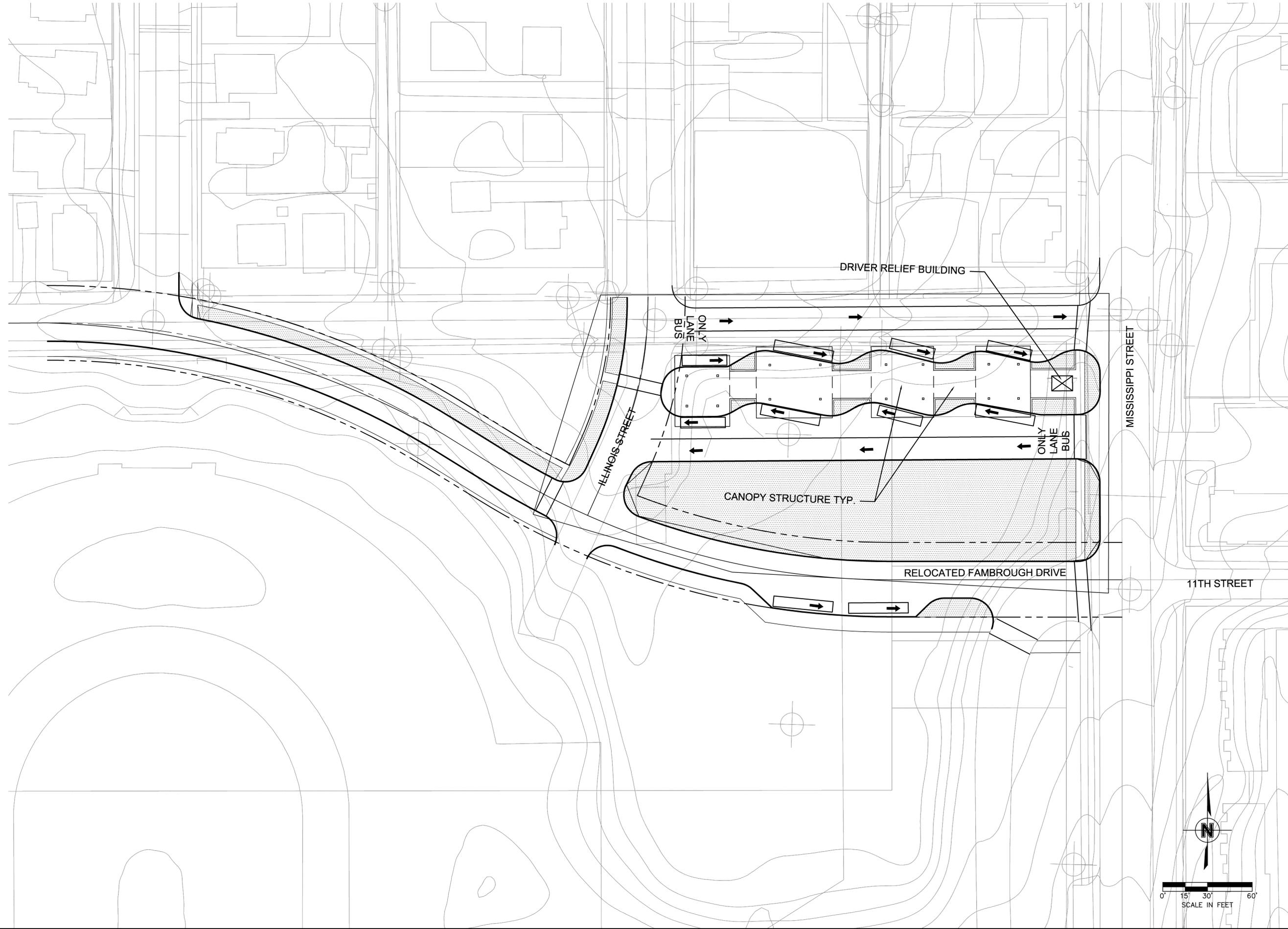
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11th Street & Mississippi St Transit Center**Preliminary Opinion of Probable Construction Costs**

11-Jun-13

Transit Center		QTY	UNITS	COST	TOTAL
1	Mobilization	1	LS	\$48,000.00	\$48,000.00
2	Clearing/Grubing/limited site demolition	1	LS	\$15,000.00	\$15,000.00
3	Structure / 9,000 sq ft	1	LS	\$900,000.00	\$900,000.00
4	Restroom Building	1	LS	\$100,000.00	\$100,000.00
5	Information Kiosk	1	EA	\$15,000.00	\$15,000.00
6	Construction Staking	1	LS	\$10,000.00	\$10,000.00
7	Earthwork	15000	CY	\$12.00	\$180,000.00
8	Monument Sign with Utility Hookup	1	LS	\$10,000.00	\$10,000.00
9	Private Utilities	1	LS	\$30,000.00	\$30,000.00
10	Retaining walls	840	SFF	\$20.00	\$16,800.00
11	Erosion Control	1	LS	\$18,000.00	\$18,000.00
12	Seeding	0.7	ACRE	\$2,000.00	\$1,400.00
13	ADA ram-conc. w/ truncated domes	5	EA	\$1,800.00	\$9,000.00
14	bollards	20	EA	\$900.00	\$18,000.00
15	Pavement Markings	1	LS	\$4,500.00	\$4,500.00
16	Site Lighting	10	EA	\$6,000.00	\$60,000.00
17	Traffic Control	1	LS	\$18,000.00	\$18,000.00
18	Irrigation	1	LS	\$8,000.00	\$8,000.00
19	Landscaping	1	LS	\$70,000.00	\$70,000.00
20	Bench	20	EA	\$2,000.00	\$40,000.00
21	Bike rack	2	EA	\$2,500.00	\$5,000.00
22	Litter receptacle	6	EA	\$1,250.00	\$7,500.00
23	Digital Reader Board	8	EA	\$10,000.00	\$80,000.00
24	New Curb and Gutter	1285	LF	\$20.00	\$25,700.00
25	Decorative Crosswalk	710	SF	\$20.00	\$14,200.00
26	Concrete Pavement 10"	2240	SY	\$75.00	\$168,000.00
27	Concrete Sidewalk 4"	8000	SF	\$5.50	\$44,000.00
28	Storm Sewer Inlets	4	EA	\$3,000.00	\$12,000.00
29	Storm Sewer Pipe	600	LF	\$75.00	\$45,000.00
				Transit Center Sub-Total	\$1,910,100.00
Public Streets Relocation		QTY	UNITS	COST	TOTAL
1	Fambrough Drive	755	LF	\$375.00	\$283,125.00
2	Illinois Street	155	LF	\$350.00	\$54,250.00
				Public Streets Relocation Sub-Total	\$337,375.00
				Project Sub-Total:	\$2,247,475.00
				Contingency 20%	\$449,495.00
				Project Total:	\$2,696,970.00

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REV. NO.	DATE	REVISIONS DESCRIPTION	BY

11th and MISSISSIPPI

LAWRENCE TRANSIT CENTER
 CONCEPT DESIGN

LAWRENCE, KANSAS

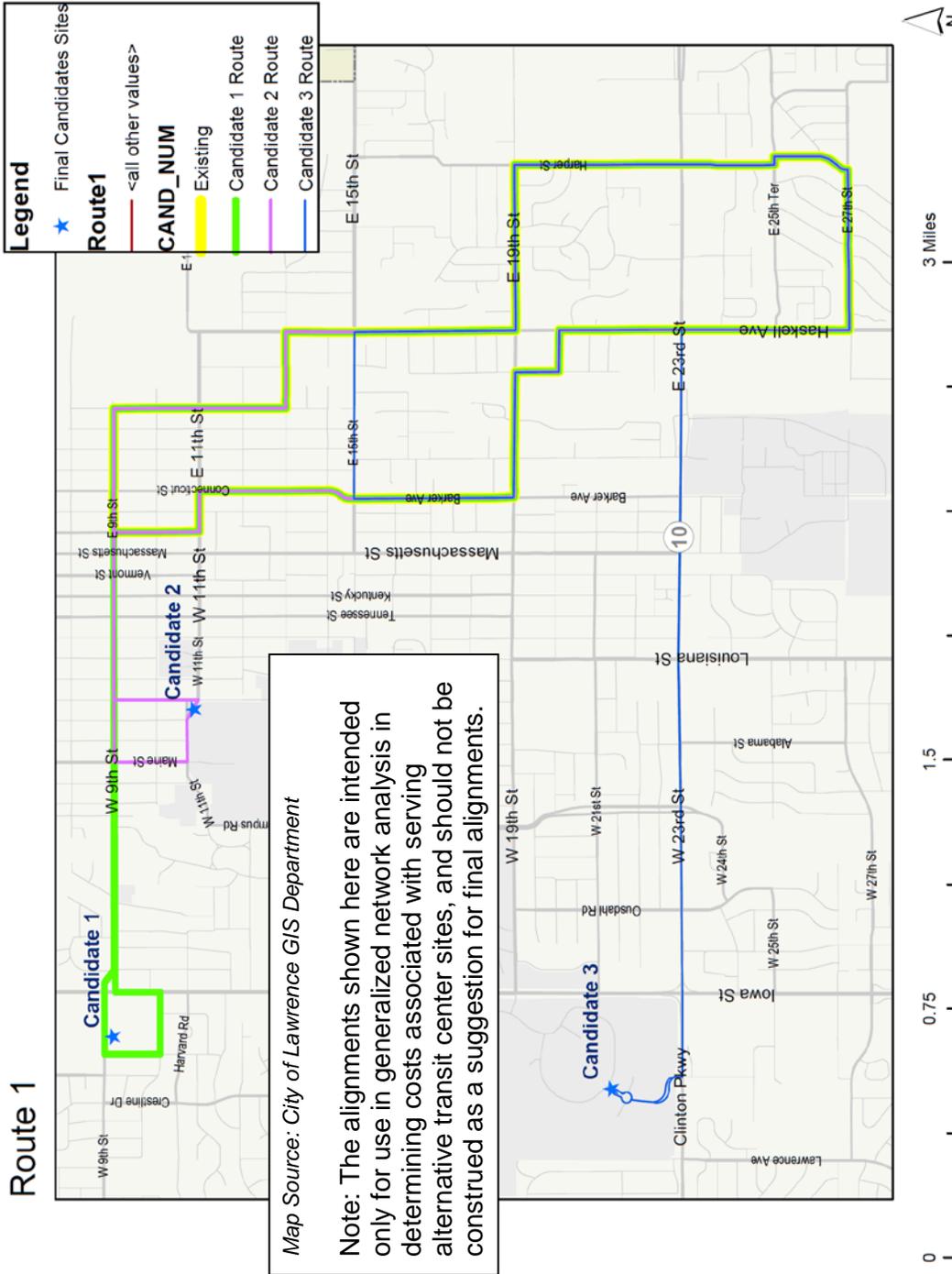
2013

REVISIONS

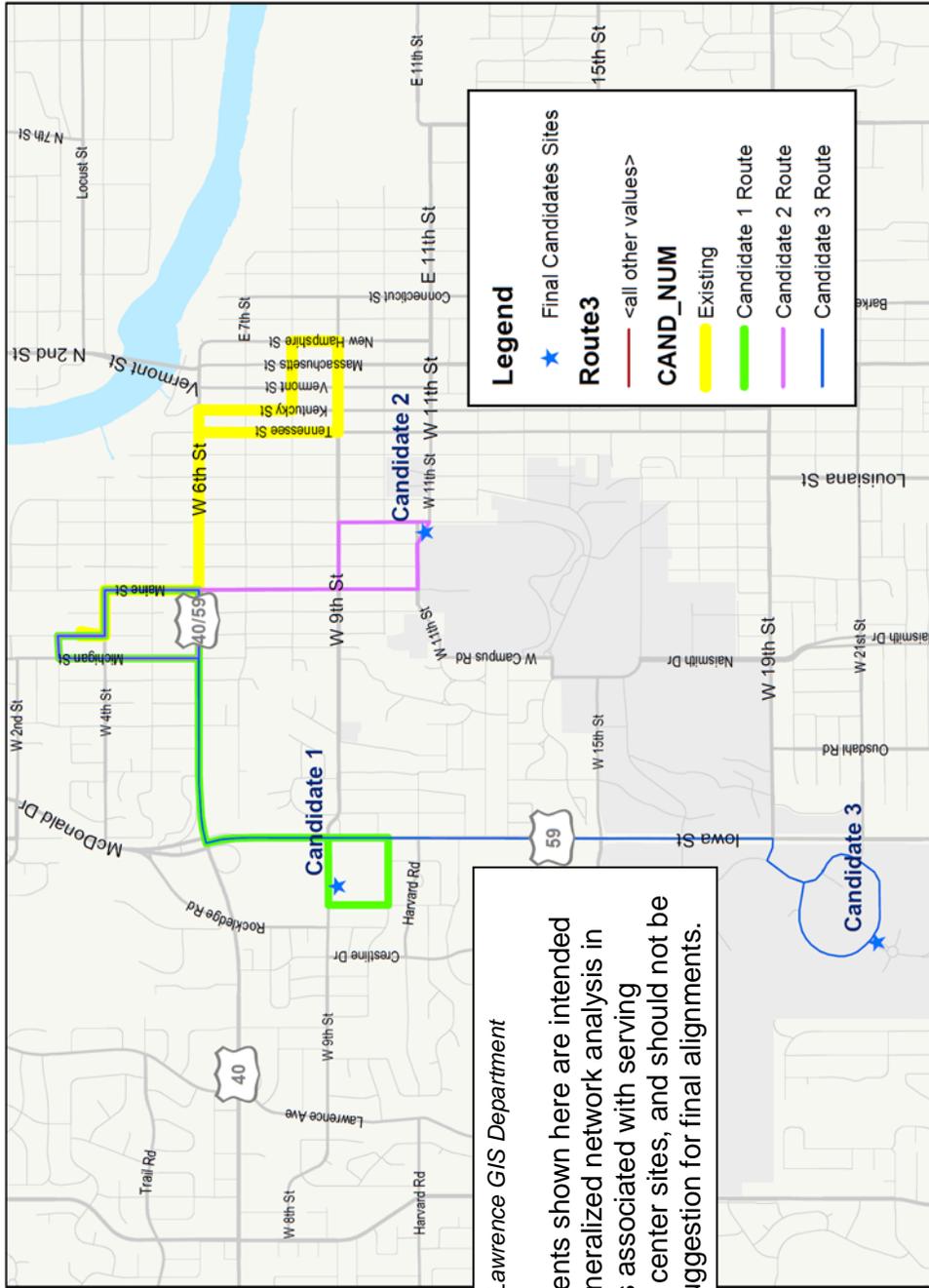
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project no.:	1234
drawing no.:	130542_PBASE.DWG
date:	06.11.13

SHEET
C100

Appendix III: Illustrative Alignments for network analysis.



Route 3



Map Source: City of Lawrence GIS Department

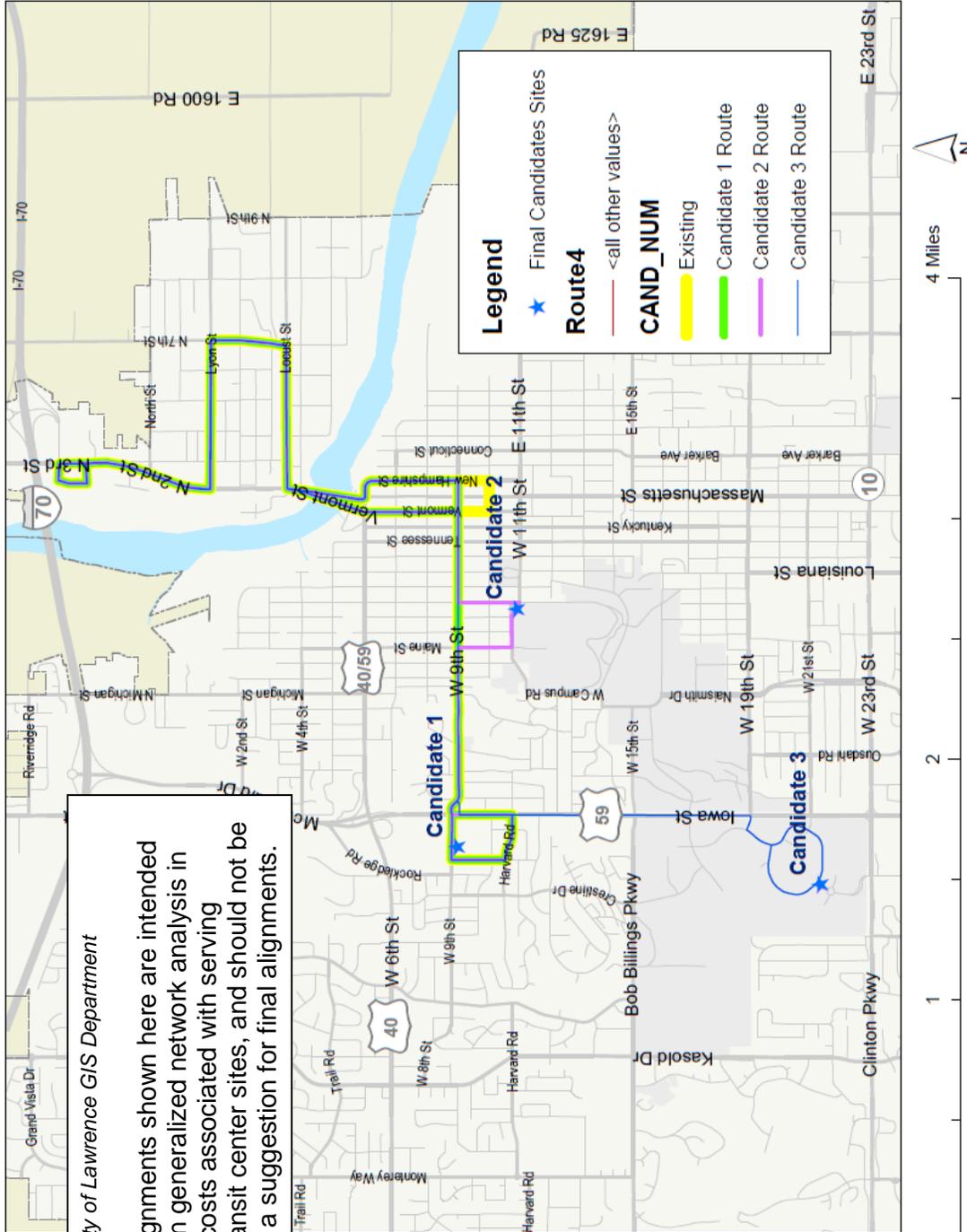
Note: The alignments shown here are intended only for use in generalized network analysis in determining costs associated with serving alternative transit center sites, and should not be construed as a suggestion for final alignments.

Legend

- ★ Final Candidates Sites
- Route3**
- <all other values>
- CAND_NUM**
- Existing
- Candidate 1 Route
- Candidate 2 Route
- Candidate 3 Route



Route 4



Map Source: City of Lawrence GIS Department

Note: The alignments shown here are intended only for use in generalized network analysis in determining costs associated with serving alternative transit center sites, and should not be construed as a suggestion for final alignments.

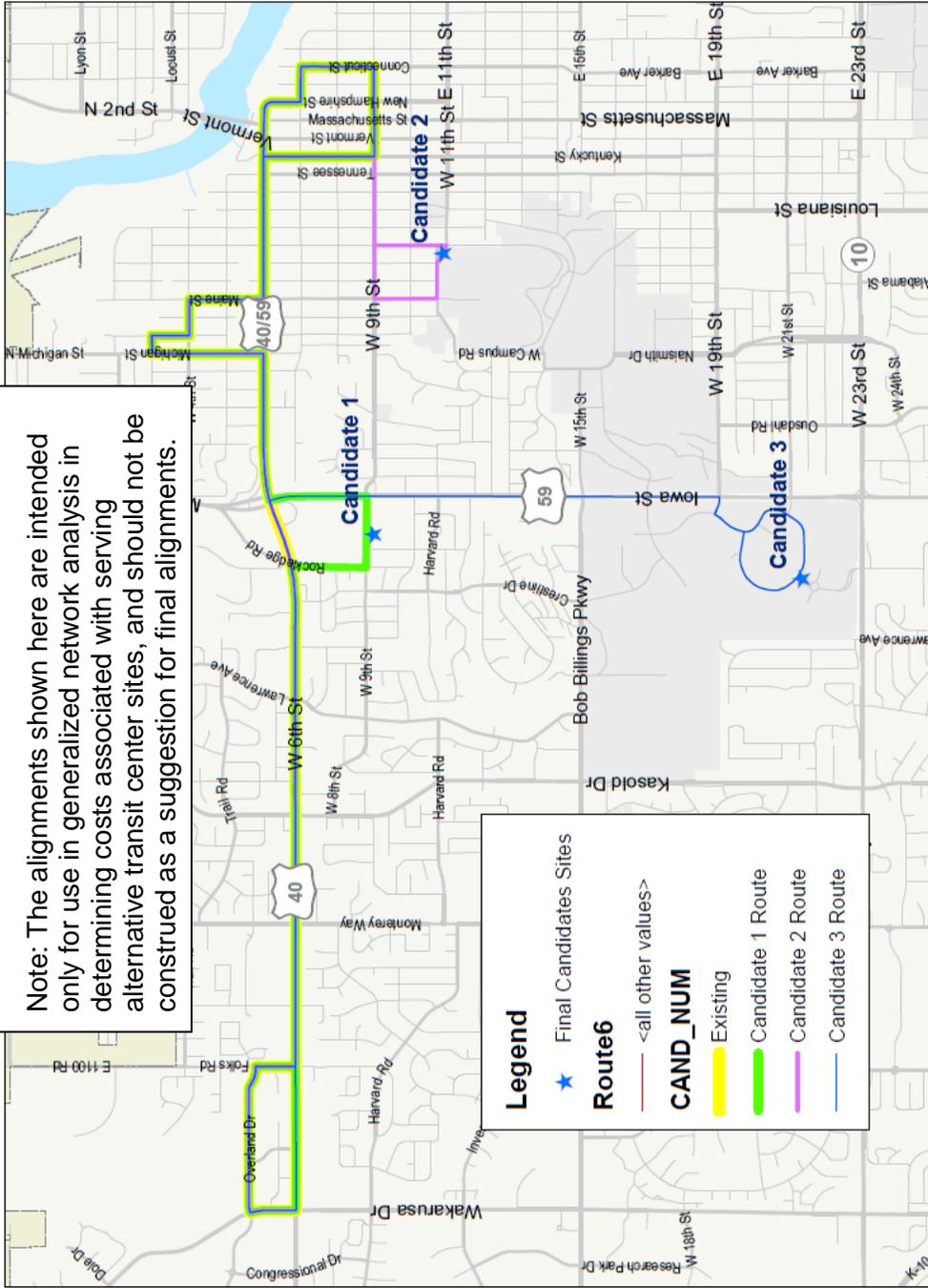
Legend

- ★ Final Candidates Sites
- Route4**
- <all other values>
- CAND_NUM**
- Existing
- Candidate 1 Route
- Candidate 2 Route
- Candidate 3 Route

Route 6

Map Source: City of Lawrence GIS Department

Note: The alignments shown here are intended only for use in generalized network analysis in determining costs associated with serving alternative transit center sites, and should not be construed as a suggestion for final alignments.



4 Miles

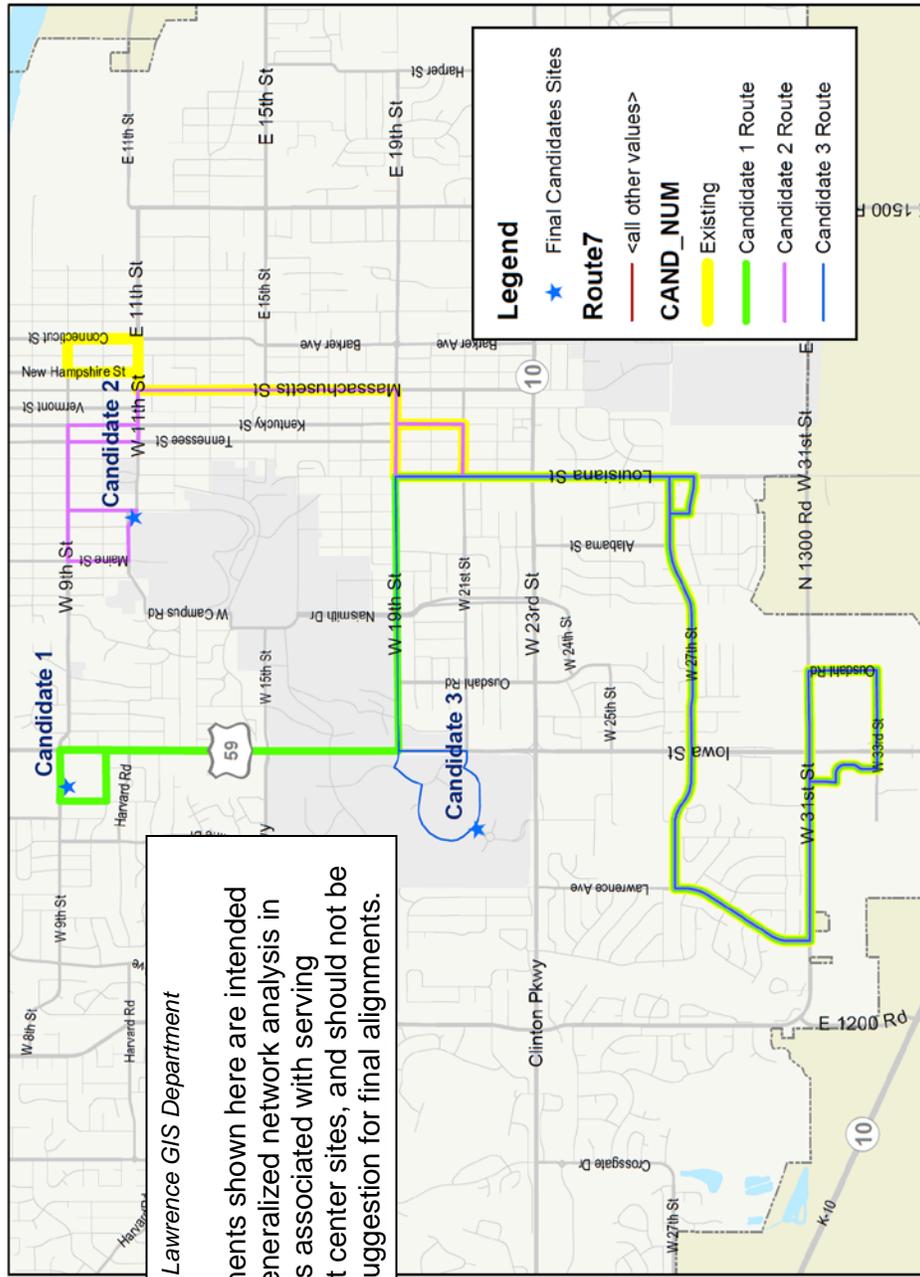
2

1

0



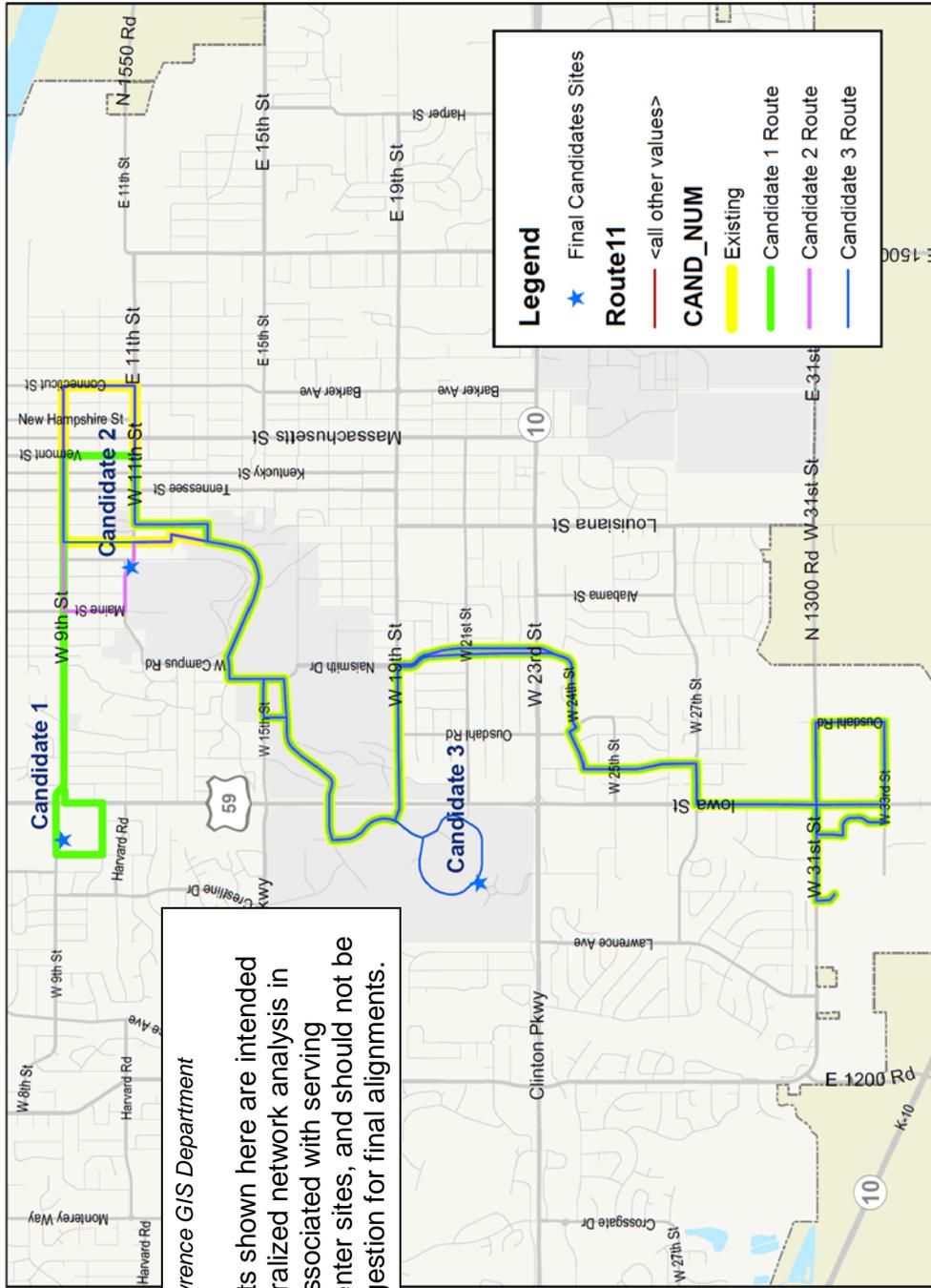
Route 7



Map Source: City of Lawrence GIS Department

Note: The alignments shown here are intended only for use in generalized network analysis in determining costs associated with serving alternative transit center sites, and should not be construed as a suggestion for final alignments.

Route 11



Map Source: City of Lawrence GIS Department

Note: The alignments shown here are intended only for use in generalized network analysis in determining costs associated with serving alternative transit center sites, and should not be construed as a suggestion for final alignments.