P&Z Case 25-52A

RESOLUTION NO. 3502

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF LIBERTY, CLAY COUNTY, MISSOURI ADOPTING THE TRANSPORTATION MASTER PLAN FOR THE CITY

WHEREAS, the City of Liberty, Missouri, (herein called "City") is a Special Charter City located in Clay County, Missouri, being duly created, organized, and existing under the laws of the State of Missouri; and

WHEREAS, the Planning and Zoning Commission (herein called "Commission") has the authority and responsibility under State Statute and the Municipal Code of the City to develop and adopt a comprehensive plan and any updates or additions for the City; and

WHEREAS, the City's comprehensive plan was adopted in 2023; and

WHEREAS, the City Council, in August of 2023, passed Ordinance No. 11802 approving an agreement with HDR Engineering Inc. for the development of a Transportation Master Plan; and

WHEREAS, the Transportation Master Plan, with accompanying maps, charts and descriptive and explanatory matter, contains strategies and recommendations based on broad public input and shows the Commission's recommendations for future transportation needs; and,

WHEREAS, the Transportation Master Plan further seeks to guide and accomplish the coordinated development of the City which, in accordance with existing and future needs, will best promote the general welfare, as well as efficiency and economy, in the community planning and development process; and

WHEREAS, as required under law, proper notice of a public hearing before the Commission on this matter was given; and

WHEREAS, on October 14, 2025, the Commission, under authority granted to it by the Missouri Revised Statutes, after a duly called public hearing, and after considering the views of all those who came before it, voted to approve the Transportation Master Plan by a vote of 8 Ayes to 0 Nays; and

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF LIBERTY, MISSOURI, AS FOLLOWS:

RESOLUTION NO. 3502 (CONT.)

SECTION I

The Transportation Master Plan, including the accompanying maps, charts, and descriptive and explanatory matter, attached hereto as Attachment A, and incorporated herein, is adopted by the Council as part of the comprehensive plan for the City.

SECTION II

The Deputy City Clerk shall make copies of the adopted Transportation Master Plan available for public inspection as required under State Statute and the Municipal Code of the City and shall record a copy of the Transportation Master Plan in the office of the Clay County Recorder of Deeds.

SECTION III

The prior Transportation Master Plan, portions thereof, updates thereto, or additions thereto, are hereby repealed to the extent they are inconsistent with the current Transportation Master Plan.

SECTION IV

The whereas clauses are hereby specifically incorporated herein by reference.

SECTION V

This Resolution shall take effect after passage as provided.

PASSED by the City Council this 10th day of November, 2025.

GREG CANUTESON, MAYOR

ATTEST:

Sarah Ranes
DEPUTY CITY CLERK

LIBERTY, MO

TRANSPORTATION MASTER PLAN

City of Liberty, MO

Transportation Master Plan

July 17, 2025

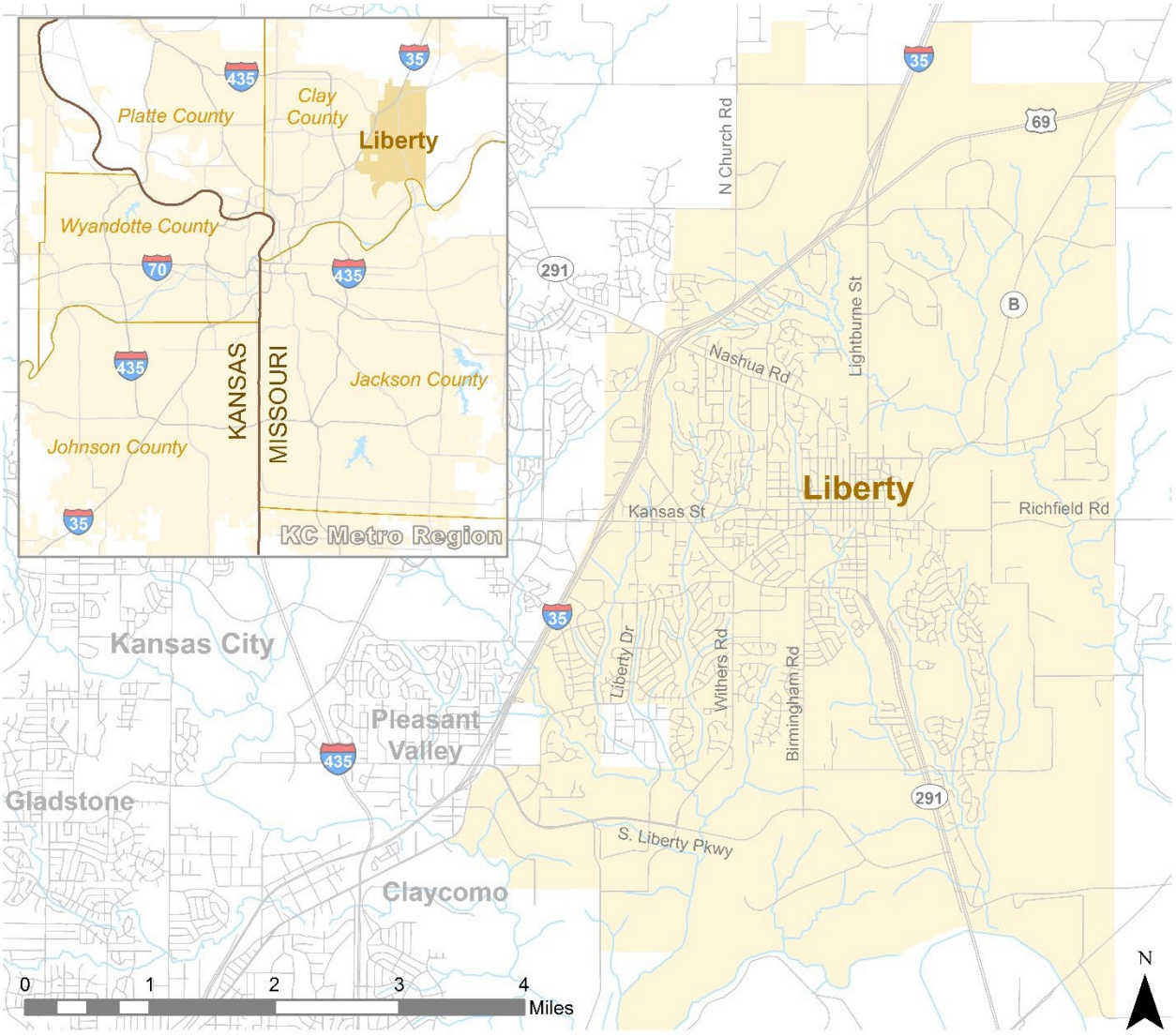
Liberty missouri

Contents

Introduction

Liberty, Missouri is a suburban city located in the northeast portion of the Kansas City Metropolitan Area. With an approximate land area of nearly 30 square miles, Liberty is home to approximately 31,000 residents. The city has good access to major highways including I-35, I-435, and Missouri Route 291. As a vibrant community with strong schools, a thriving downtown, and substantial land available for development, continued growth is expected well into the future. **Figure 1** illustrates the City of Liberty within the regional context, and highlights some of the major transportation corridors.

Figure 1: Study Area / Regional Context Map



The Liberty Transportation Master Plan (TMP) will serve as a guide for the future of transportation as the city grows and works to maintain, enhance, and expand their infrastructure to best serve the needs of its citizens. Specifically, the TMP provides the following:

- A holistic roadmap for future transportation connectivity and capacity
- A guide for transportation infrastructure needs associated with development
- Updated policies that support the City's transportation vision
- A plan for integration of policies into daily business practices
- Guidance on regional and federal funding opportunities

Background / Planning History

This TMP builds upon the ideals and goals set forth in numerous prior planning documents completed by the city including the *2005 Liberty Downtown Master Plan*, the *2008 Liberty for All Strategic Plan*, the *2023 Parks and Recreation Master Plan*, and the *2023 Leading Liberty Forward Comprehensive Plan*.

Comprehensive Plan

The Comprehensive Plan established a set of five core values intended to inform all aspects of the plan. Particularly key to transportation planning, is the core value of **Connected Community**. The Comprehensive Plan acknowledges that "Liberty has invested heavily in its transportation network for both vehicular and non-vehicular traffic. The city has worked to expand pedestrian and bicycle connectivity throughout the city with an extensive network of sidewalks and trails."

Figure 2: Comprehensive Plan Values

Moving forward, the Comprehensive Plan calls for "ongoing investments towards improving existing streets, sidewalks, and trails, with an emphasis on providing connectivity between neighborhoods and nearby services and amenities." In addition, the plan calls for "encouraging compact walkable development, and density near major transportation hubs to increase the viability of future service enhancements."

Based on the established values and associated goals, the Comprehensive Plan outlines a mobility framework plan focusing on establishing a balanced transportation network that "enhances development, quality of life, and equity for all users, while balancing ongoing costs and maintenance." The framework identifies specific locations for new roadway connections, improvements to existing roadways, pedestrian crossing improvements, rail crossing improvements, new roundabouts, and streetscape enhancements. As part of the development of the TMP, these recommendations were re-assessed and incorporated as appropriate.

Data Collection

In addition to obtaining and reviewing previous planning documents, a variety of other data has been collected from various sources in support of the TMP development. This includes recent/proposed development project studies, existing traffic volume and count data, origin-destination flow data, and historic crash data.

Development Plans

Numerous traffic impact studies and development plans have been submitted to the city in recent years (see list below). These plans were reviewed to understand areas of recent and/or proposed development. Existing traffic count data was also extracted from these studies to supplement new counts collected as part of the TMP effort.

- *Blue Jay Drive/Stewart Road Intersection Analysis*, June 2023
- *Whitehorse Residential Development* – South Liberty Parkway at Birmingham Road, September 2022
- *Liberty Apartments* – South Liberty Parkway and Plummer Road, May 2022
- *Montage Mixed-Use Development* – North of I-35 between Church Road and Plattsburg Road, February 2022
- *North Liberty Logistics Park* – Northeast of the I-35 & US-69 interchange, Sept 2021
- *Liberty Commerce Center* – South Liberty Parkway between Hughes Road and Withers Road, July 2021
- *Liberty Heartland Logistics Center* – East of the I-35 & Lightburne Street interchange along Shepherd Road, April 2021
- *Liberty Tradeport* – South Liberty Parkway between Hughes Road and Withers Road, October 2020
- *Geiger Ready Mix Site Modifications* – Church Road, October 2020

- *Liberty Logistics Park* – Southeast of I-35 near Pleasant Valley Road / US-69, January 2020
- *The Wellington Senior Living Community* – Kent Street and Withers Road, October 2019
- *Casey's General Store* – MO-291 Highway and Leonard Street, May 2018.

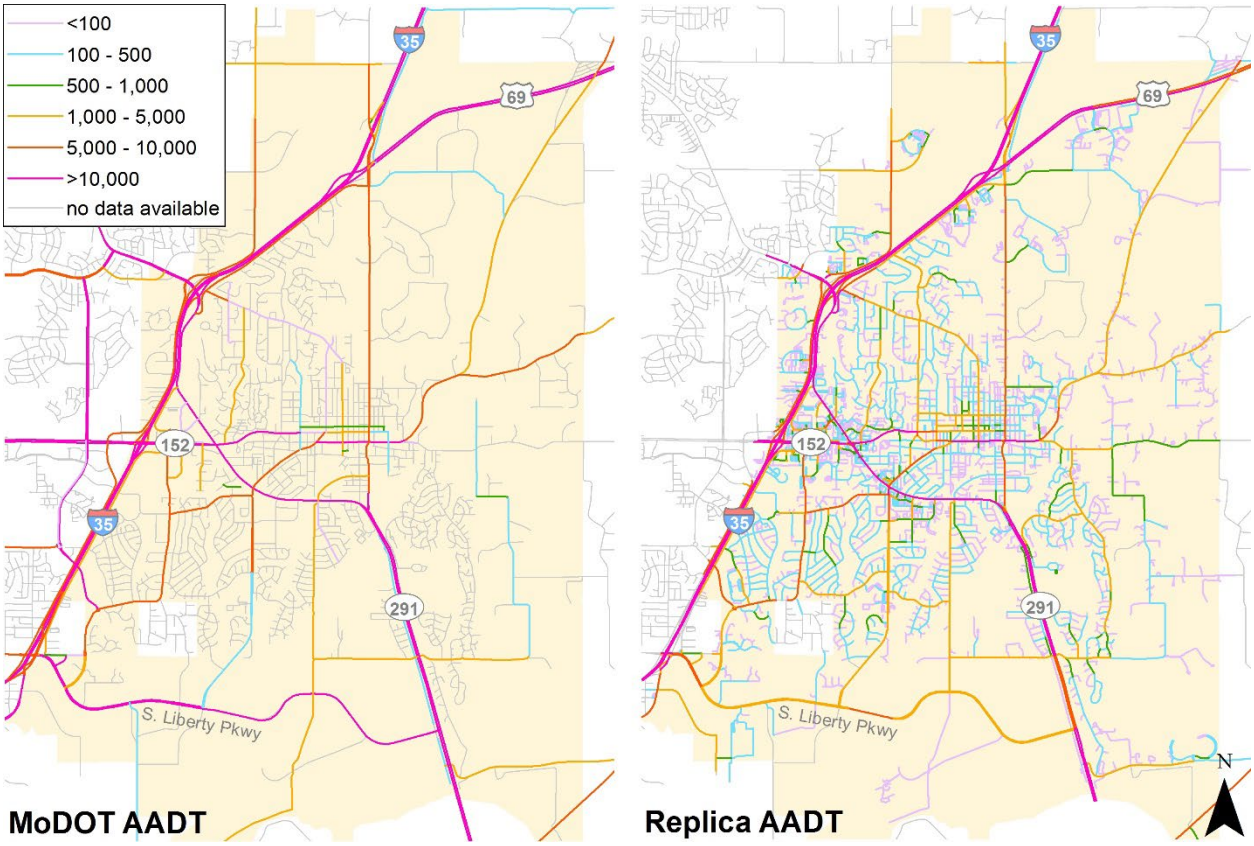
Annual Average Daily Traffic (AADT)

Having a full picture of city-wide existing traffic volumes is important for understanding how the transportation system in Liberty is currently functioning, as well as for identifying any capacity needs. Daily traffic volumes were collected from two sources for use in this study:

- MoDOT Traffic Volume Maps – 2022 AADT count data was provided by MoDOT for the road network shown on the left side of **Figure 3** below. MoDOT data is collected at a limited number of permanent count stations, on an annual basis.
- Replica – 2022 AADT estimates were extracted from the Replica data platform for the road network shown on the right side of **Figure 3** below. Replica data is synthesized using cell phone and other GPS sources, and calibrated against select ground-truth data. The City had a subscription to Replica data as part of a pooled funding agreement with Clay County and other local jurisdictions.

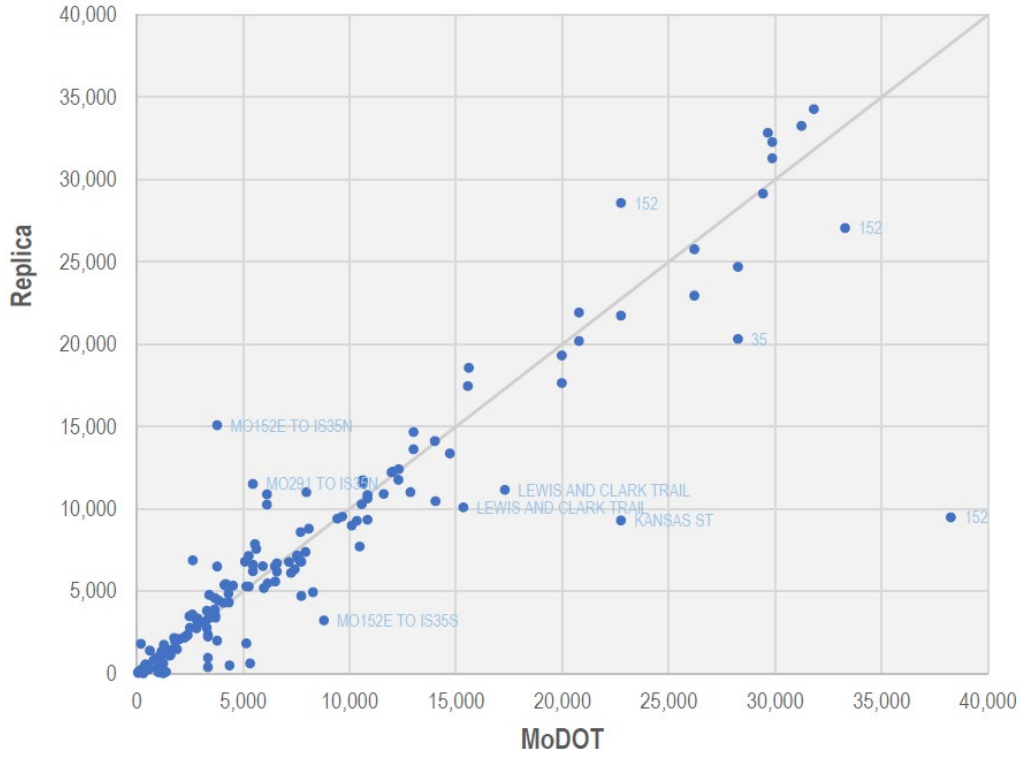
As can be observed by comparing the two AADT sources, the Replica data has significantly more coverage, although most of the higher-capacity facilities are covered by both sources. Note that at the time this comparison was made, the most current AADT data available from Replica was for 2022. For the most accurate comparison, MoDOT volumes from 2022 were also utilized – despite newer MoDOT count data being available.

Figure 3: 2022 AADT Volumes



To compare the accuracy of the synthesized Replica volumes to the actual AADT counts collected by MoDOT, every available MoDOT count location was compared to its corresponding Replica volume. **Figure 4** illustrates the comparison of each MoDOT vs. Replica point using a scatterplot. Because the segmentation of the two networks was different – often with numerous Replica segments making up one MoDOT segment – only the best matching Replica volume was kept for each corresponding MoDOT volume. As shown, the points do show a strong correlation to the Y=X (perfect match) line, indicating that the Replica data is fairly accurate. A few of the outliers are noted with their locations – most of which are along the high-volume MoDOT facilities, or at some of the more complex interchange locations, where differences in network segmentation and/or one-way links may have affected the results.

Figure 4: Scatter Plot MoDOT vs. Replica



Turning Movement Volumes

In conjunction with the City, thirty-one (31) locations were selected as study intersections. For each study intersection, existing traffic volume data was collected and/or developed based upon one of the following sources.

- Turning Movement Counts (TMCs) – In November 2023, four-hour (7-9 AM and 4-6 PM) turning-movement counts were collected at eight (8) selected intersections in the city.
- Prior-Study Counts – Using the recent traffic studies described previously, turning-movement counts and/or existing plus development forecast volumes were extracted for nine (9) of the study intersections.
- Replica Volumes – Turning-movement volumes were extracted from the Replica software platform for both Fall 2022 and Spring 2023 at sixteen (16) locations.
- Operation GreenLight (OGL) TMCs – Turning-movement counts were extracted from OGL-supplied Synchro files, which were created and used by that agency for traffic signal programming and coordination purposes. Thirteen (13) locations were provided. Most of these counts were older, collected in 2013, but provided some helpful information regarding the proportion of turning movements at certain locations.

In locations where more than one source of count data was available, multiple sources were considered in the development of a reasonably balanced existing volume set.

Table 1 lists the 31 study intersections, the existing traffic control at each, and the sources that were considered in the volume development.

Table 1: Study Intersections

Int ID	Name	Traffic Control	Traffic Count Source(s)
1	US-69 & Lightburne	Signal	Replica TMC
2	Lightburne & Shepherd	Signal	New count
3	MO 291 & N Church Rd	Signal	OGL Count
4	MO 291 & I-35 SB Ramps	Signal	Replica TMC
5	MO 291 & I-35 NB Ramps	Signal	Replica TMC
6	Glenn Hendren & Nashua	AWSC	New count
7	Nashua & Woodridge	TWSC	New count
8	Lightburne & Doniphan	OWSC	New count
9	Route B & Route H	OWSC	New count
10	Richfield & Claywoods	OWSC	Replica Segment Volumes + Trip Generation Estimates
11	Richfield & La Frenz	TWSC	New count
12	MO 291 & Stewart	TWSC	Prior Study
13	MO 291 & College/Forest	Signal	Prior Study + Replica TMC + OGL Count
14	MO 291 & Kansas St (Hwy 152)	Signal	Replica TMC + OGL Count
15	Kansas St (Hwy 152) & I-35 SB Ramps	Signal	Replica TMC + OGL Count
16	Kansas St (Hwy 152) & I-35 NB Ramps	Signal	Replica TMC + OGL Count
17	Kansas (Hwy 152) & Conistor	Signal	New count
18	MO 291 & Liberty Dr	Signal	Replica TMC + OGL Count
19	Liberty Dr & Withers	Signal	Replica TMC + OGL Count
20	MO 291 & Leonard	Signal	Prior Study + OGL Count + Replica TMC
21	MO 291 & Ruth Ewing	Signal	Replica TMC + OGL Count
22	MO 291 & South Liberty Pkwy	Signal	Replica TMC + OGL Count
23	Flintlock Flyover & Liberty Dr	Roundabout	New count
24	Liberty Dr & Wales	Signal	Replica TMC + Trip Generation Estimates
25	Withers & Wales	Signal	Replica TMC
26	Pleasant Valley & N Church Rd	Signal	Prior Study
27	Pleasant Valley & US-69/I-35 Ramps	Signal	Prior Study + Replica TMC
28	South Liberty Pkwy & Flintlock	Signal	Prior Study
29	South Liberty Pkwy & Withers	Signal	Prior Study + Replica TMC
30	South Liberty Pkwy & Birmingham	TWSC	Prior Study + Balanced with Int #29
31	MO 291 & Blue Jay	OWSC	Prior Study

AWSC – All-Way Stop-Control, TWSC – Two-Way Stop Control, OWSC – One-Way Stop-Control

Figure 5 and **Figure 6** illustrate the existing turning movement volumes for each of the 31 study intersections within the northern and southern parts of the city, respectively.

Figure 5: Existing Peak-Hour Traffic Volumes – Northern Liberty

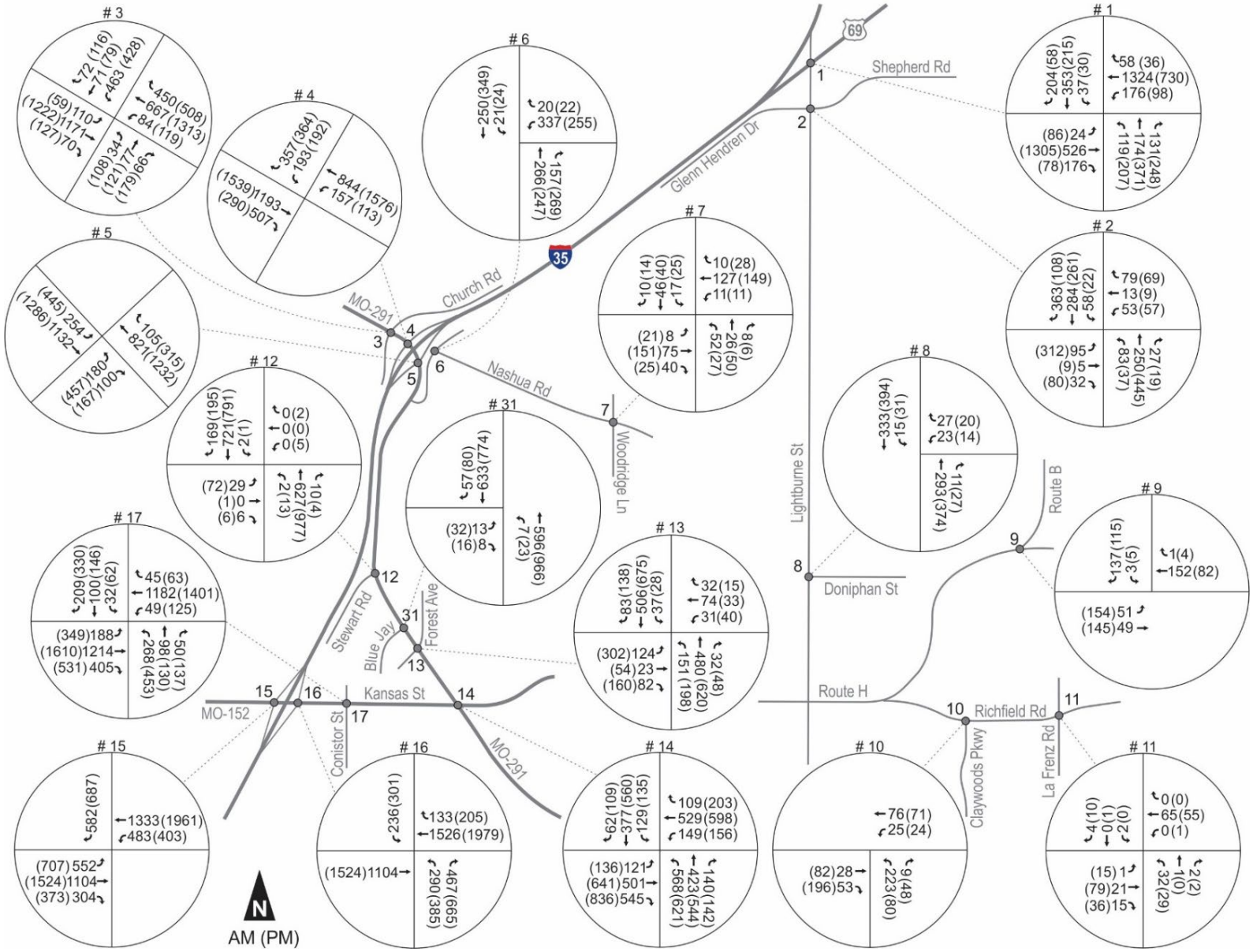
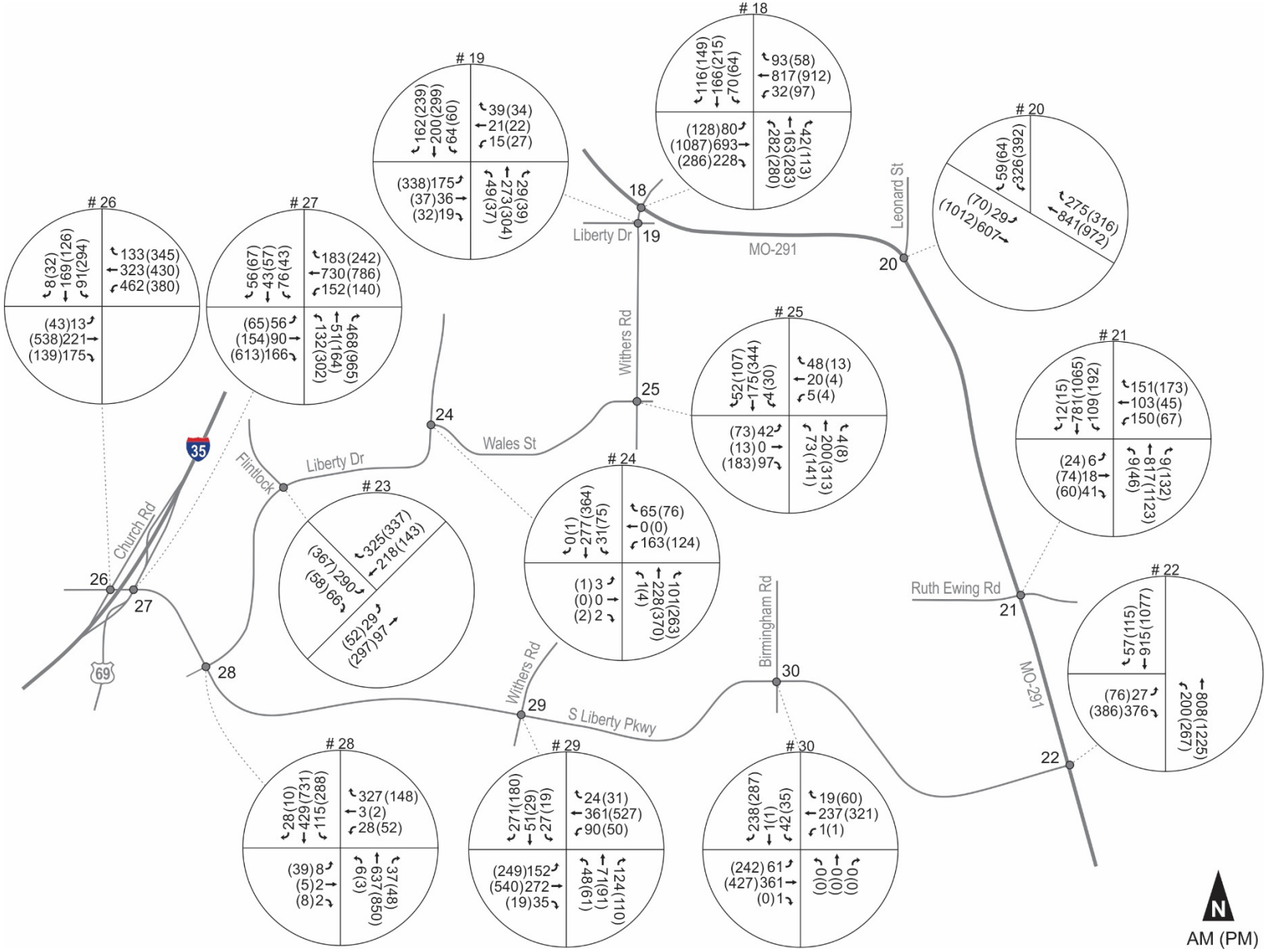


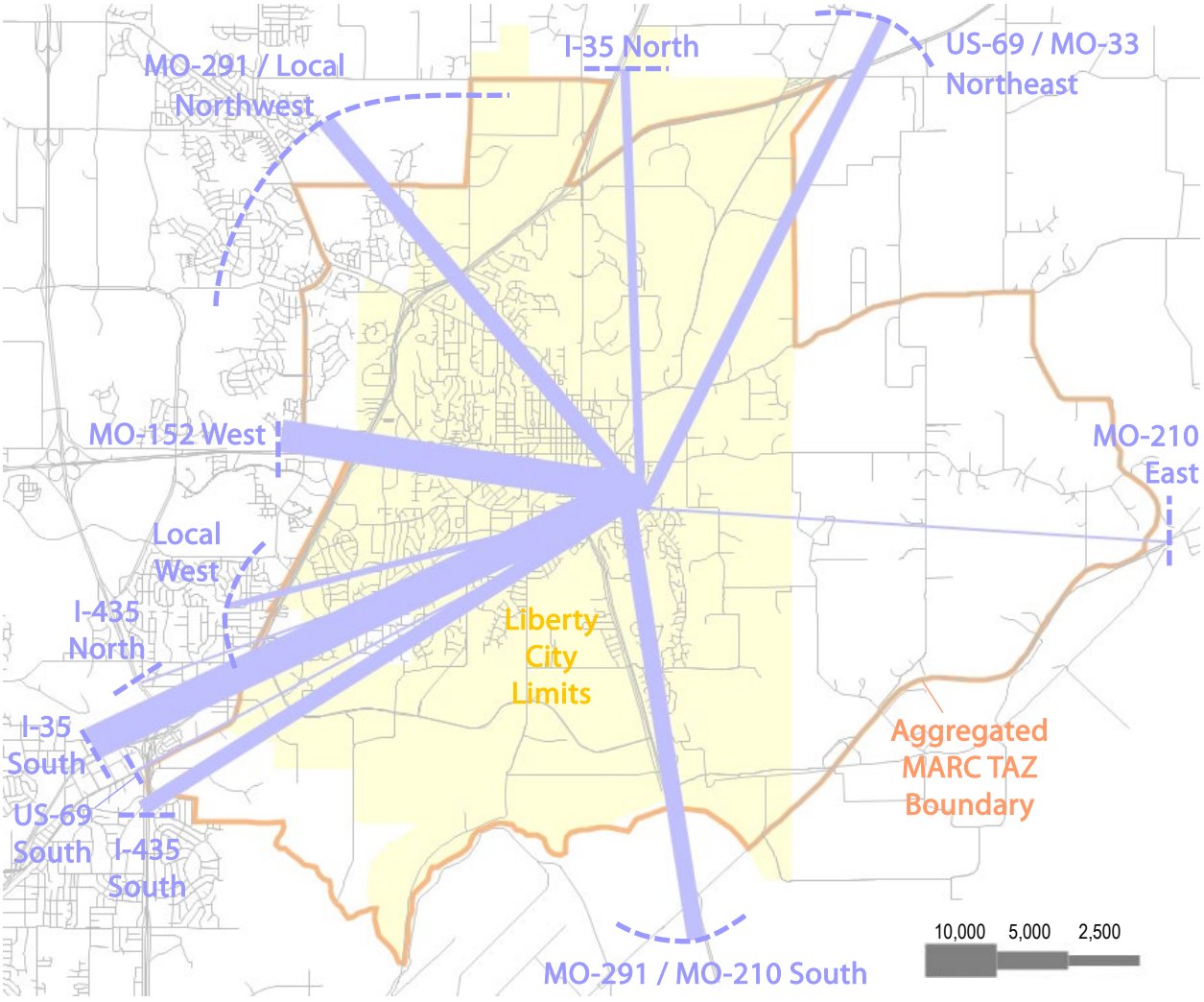
Figure 6: Existing Peak-Hour Traffic Volumes – Southern Liberty



Replica Origin-Destination Data

In addition to volume data, Replica provides origin-destination (O-D) data which was used to understand where people are travelling to / from on a daily basis. For example, **Figure 7** below illustrates the daily traffic flows originating within Liberty and exiting to other areas around the metro region. The relative thickness of each O-D line represents the number of trips leaving the city along each of the major roadway facilities. As shown, some of the heaviest external flows are along MO-152 to the west and I-35 to the south.

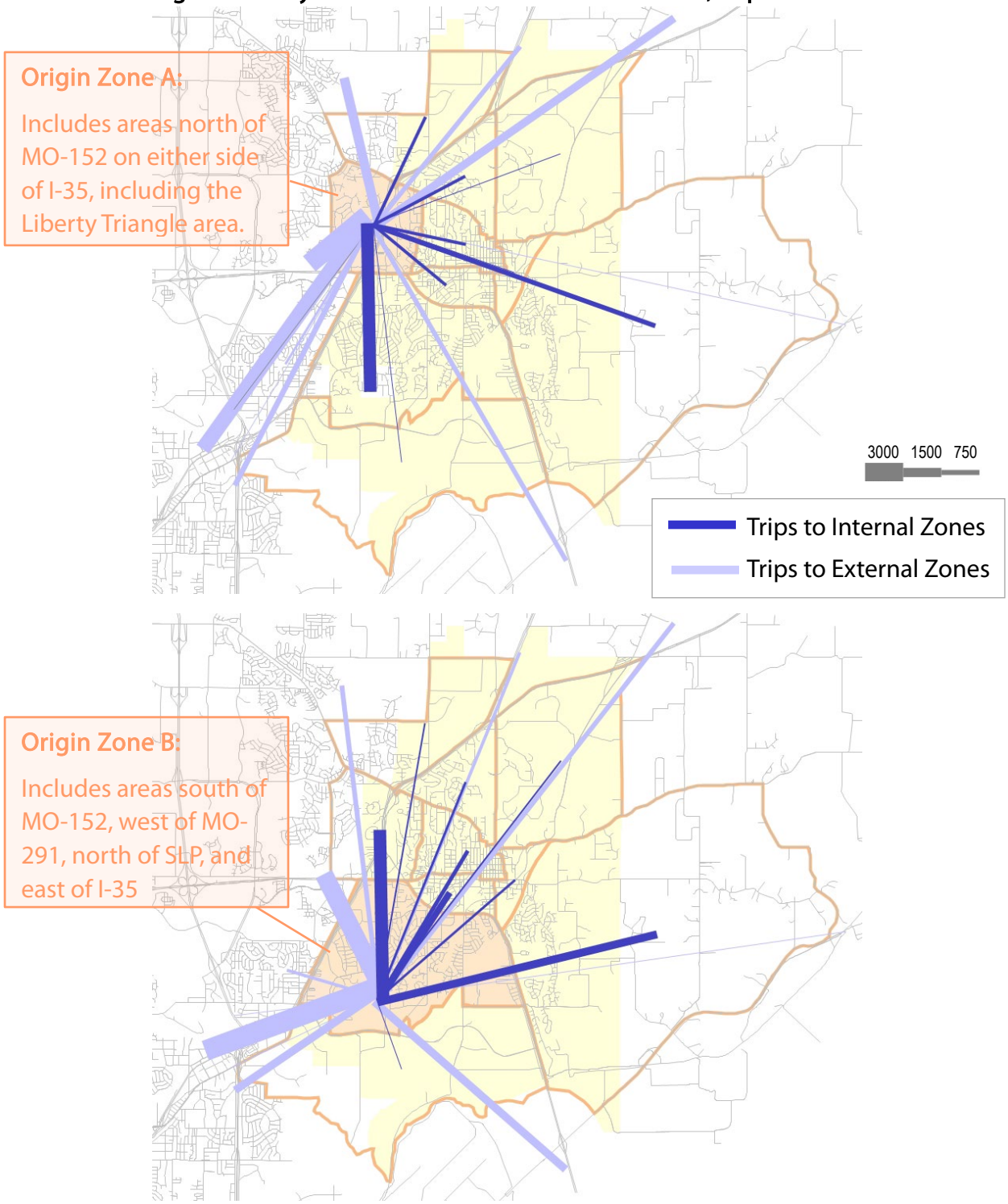
Figure 7: Daily Traffic Flows from Liberty to External Areas, Replica 2022



O-D data must be extracted from the Replica platform using defined areas or zones. For purposes of this study, the zones were based upon the MARC regional travel demand model Traffic Analysis Zone (TAZ) geography. The City of Liberty is essentially comprised of 36 MARC TAZs, which were aggregated into the single zone shown in **Figure 7**. As shown, the TAZ boundaries do not exactly match the Liberty city limits; therefore, a few generally lesser-populated areas outside the actual city limits were included in this exercise.

The Replica O-D data was also used to track common travel patterns within the City of Liberty. In both maps shown in **Figure 8**, the MARC TAZs were aggregated from the original 36 zones to 10 mega-zones representing different regions of the city. The origin zones selected for these two maps have the highest number of originating trips of the 10 mega-zones. Both maps show the relative traffic flows, from the origin zone to each of the other internal zones (dark purple) and external zones (light purple). Among other things, Replica O-D patterns were used to double-check the general accuracy of MARC's base and near-term forecast models.

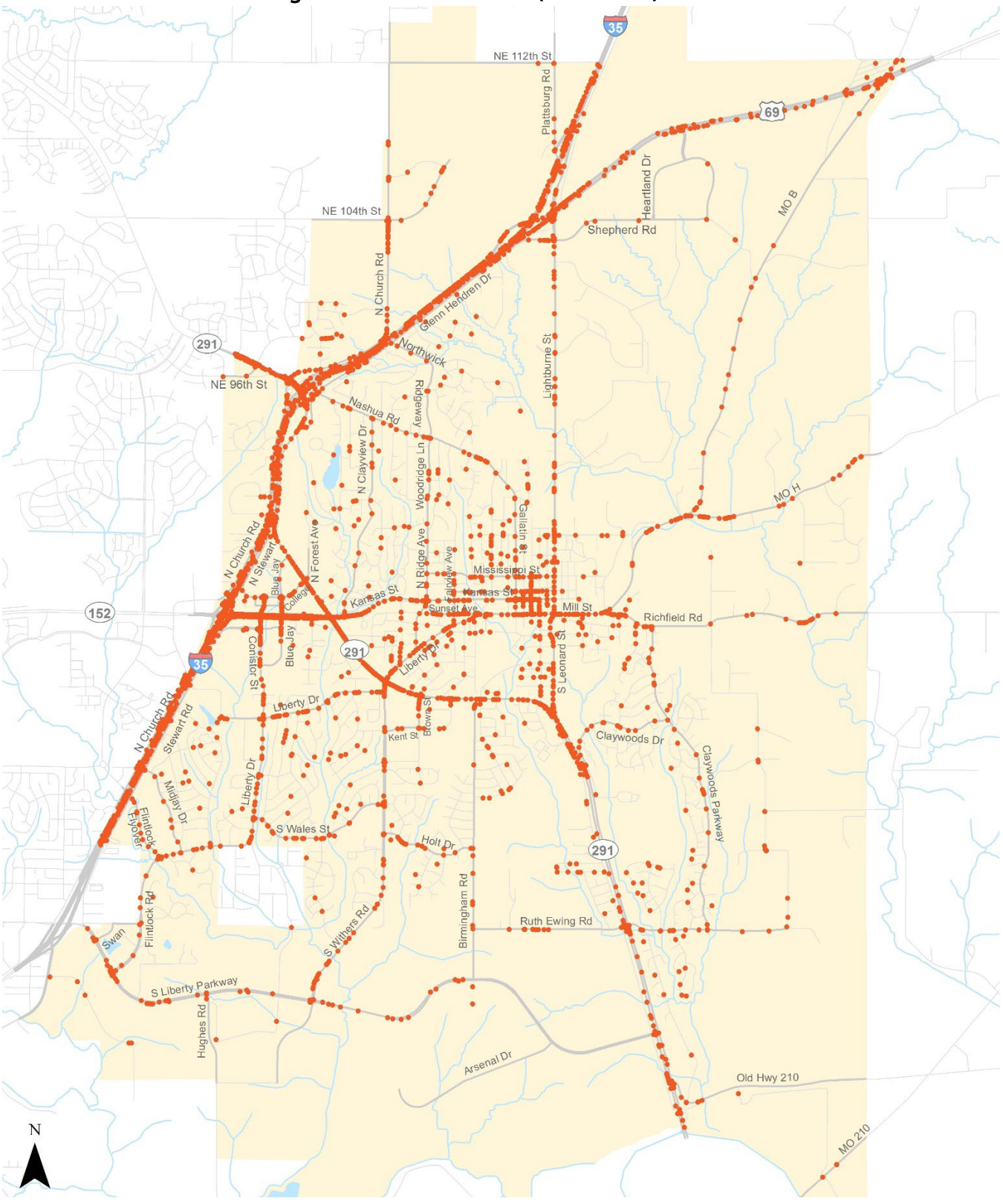
Figure 8: Daily Traffic Flows between Select Zones, Replica 2022



Historic Crash Data

The Mid-America Regional Council (MARC) maintains a transportation safety database with historic, geospatial crash data for the entire MPO planning area. This data includes information regarding crash location, severity, crash type, contributing circumstance, and other information pertinent to tracking regional performance measures. From this data set, historic crash data, for the ten-year period from 2013 through 2022, was obtained for all roads within the city limits of Liberty. The spatial distribution of all crashes occurring within that period is illustrated in **Figure 9**. This data was used for assessing current safety conditions, identifying crash hotspots, and developing the Comprehensive Safety Action Plan (CSAP). More detail is provided in the Appendix.

Figure 9: Historic Crashes (2013-2022)



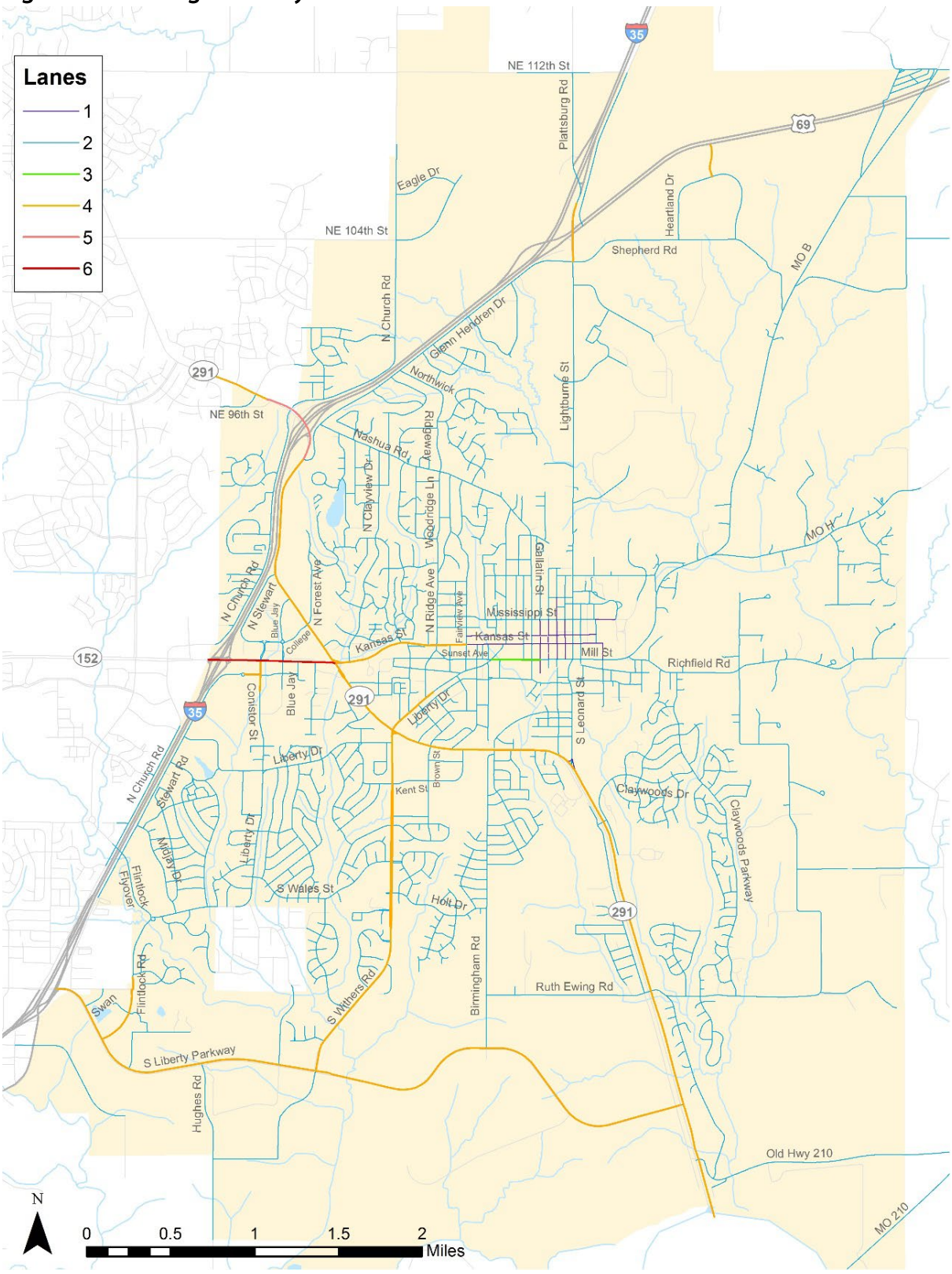
Existing Conditions

This section documents the current state of the transportation system within the City of Liberty, primarily focusing on the existing roadway network and its capacity. Non-motorized transportation, which is crucial to a successful and balanced transportation system, is also discussed.

The City of Liberty is situated next to I-35, a major interstate freeway providing direct access to locations within the Kansas City Metropolitan Area, as well as destinations beyond. Missouri Highway 291 (MO-291) and Missouri Highway 152 (which is city-maintained and designated as Kansas Street within the Liberty city limits) are two other major transportation facilities serving Liberty. In addition, the city maintains a fairly well-connected network of arterials and collectors to serve local travel.

Figure 10 illustrates the Liberty roadway network, highlighting the number of lanes provided on each street (total for both directions and not including freeways). The map shows approximately 200 centerline miles and 425 lane miles of roadways within Liberty, most of which are City-maintained.

Figure 10: Existing Roadway Network – Number of Lanes



Daily Traffic Flows

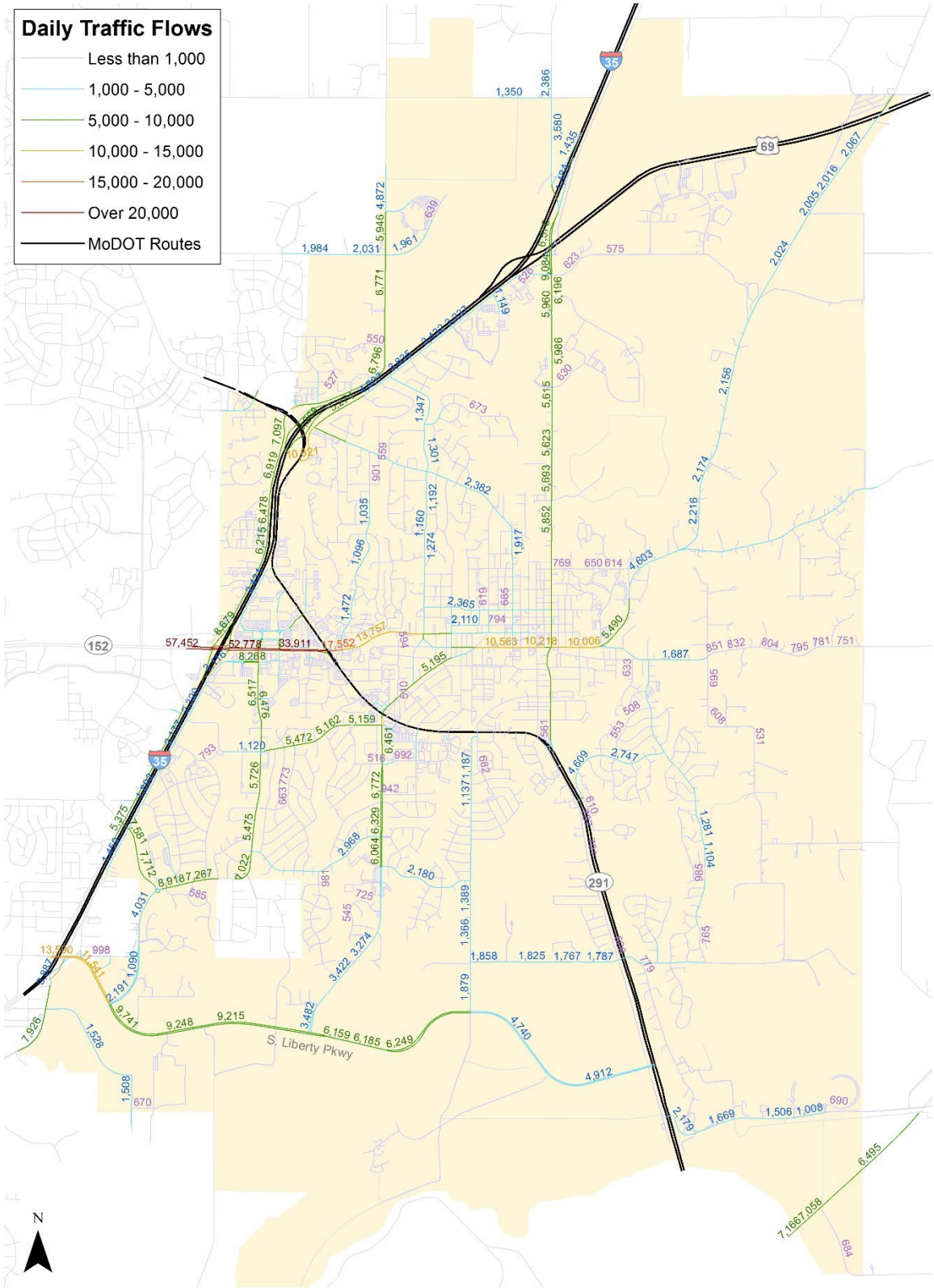
Figure 11, on the following page, was compiled using available Replica data to indicate existing traffic flows for all roads in the City of Liberty. Volumes along MoDOT routes are not shown – for several reasons: 1) as discussed previously in the Data Collection section of this memo, the locations where Replica seems to have the most difficulty matching field counts is along the high capacity MoDOT corridors, 2) AADT volumes on MoDOT facilities are readily available from the MoDOT website, and 3) the City does not have jurisdiction over these facilities.

Table 2 provides a summary of the city-owned facilities that carry the heaviest daily volumes.

Table 2: Summary Statistics on Liberty Roads

	Functional Class	Posted Speed (mph)	AADT
W. Kansas Street (West of MO-291)	Principal Arterial	40	33,500 – 57,500
W. Kansas Street (East of MO-291)	Minor Arterial	40	6,500 – 13,750
Conistor Street	Minor Arterial	30 (North) / 35 (South)	6,500 – 15,000
Mill Street	Minor Arterial	30	10,000
Lightburne Street	Minor Arterial	30 (South), 40 / 45 (North)	6,000
N. Church Road	Major Collector	35	6,500 – 13,000
Liberty Drive	Minor Arterial	35	4,000 – 7,000
South Liberty Pkwy*	Minor Arterial	45 (West) / 40 (East)	4,500 - 11,500

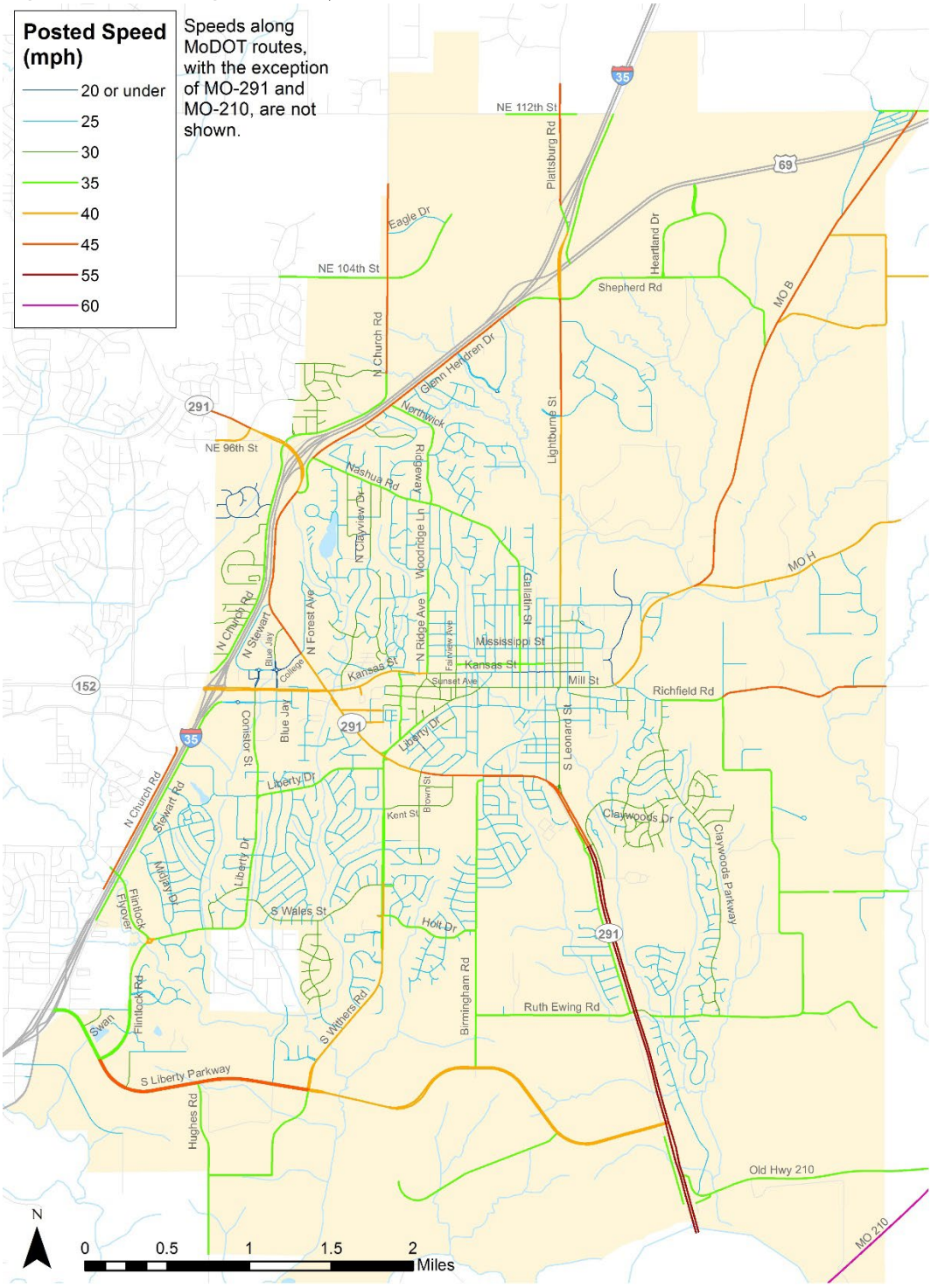
Figure 11: Daily Traffic Flow Map



Corridor Speeds and Travel Times

Existing posted speeds for the Liberty transportation network, are shown in **Figure 12**.

Figure 12: Existing Roadway Network – Posted Speeds



Some speed data is also available from the Replica data source. While speed data coverage is not quite as extensive as ADT data, all the major thoroughfares within Liberty and even some select roads at the collector and local level are included. For each available roadway, Replica provides both the free flow speed (the speed at which uncongested traffic flows, typically similar to the posted speed limit) and the average weekday actual speeds in 15-minute bins.

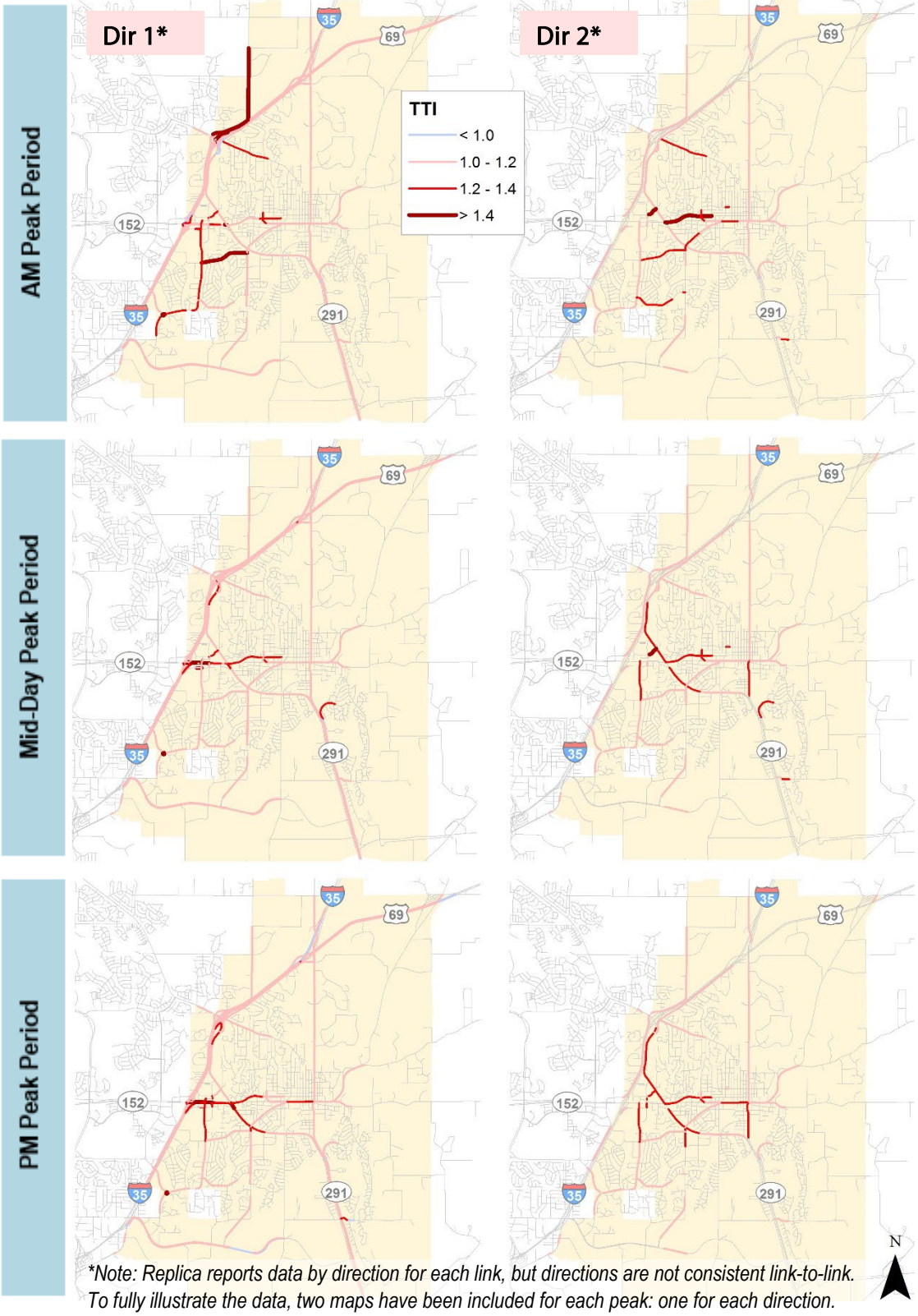
Slower than normal speeds on a given roadway can be an indicator of congestion. One way to measure this is by calculating a Travel Time Index (TTI). This is a measure of the free flow speed (FFS) divided by the actual traveled speed during a given period of time. The maps in **Figure 13** illustrate the TTI by peak period and by each direction along a given roadway segment. The calculation uses the actual speed from the worst (slowest) 15-minute period within each peak period. A TTI value of one (1.0) indicates that the roadway is operating at free flow speed. A TTI value of greater than 1.4 indicates there may be congestion or other issues causing significantly reduced speeds along a particular roadway.

It should be noted that corridors with low traffic volumes were often found to have questionably high TTI values. The likely causes for this are mainly due to the small sample size of actual speeds within each 15-minute period on low volume roads, as well as the potential influence of outliers. Therefore, based on an analysis of the data points, any roads with an ADT of less than 3,000 vpd were determined to have a higher probability of a skewed TTI value. These roads are excluded from the TTI maps in **Figure 13**.

A few of the remaining roads shown on the maps appear to correlate with school locations, where speeds may be influenced by the presence of a school zone speed limit reduction, as well as a large influx of traffic during drop off and pick up times. For example, the high TTI value along N Church Road to the north of Cookingham Drive, is likely a result of traffic heading to/from Liberty North High School.

Aside from roads serving schools, the streets that appear to stand out in terms of higher TTI values equating to congestion generally include the main thoroughfares like MO-291, Kansas Street, and S. Leonard Street.

Figure 13: Travel Time Indices, Replica 2022



*Note: Replica reports data by direction for each link, but directions are not consistent link-to-link. To fully illustrate the data, two maps have been included for each peak: one for each direction.

Existing Intersection Operational Analysis

To assess current congestion levels at the 31 study intersections, an existing conditions model was created in the Synchro Version 11 software. This software package is based on the methodologies from the Highway Capacity Manual 6th Edition (HCM 6th Edition). Each intersection was coded with existing geometry and traffic control, as shown in **Figure 14** and **Figure 15** for the north and south parts of the city, respectively. Current signal timing plans, as obtained from the city and Operation Green Light (OGL), were coded into the models as available. Existing AM and PM peak-hour traffic volumes, as previously provided in **Figures 5-6**, were assessed.

The Synchro models were used to estimate delays and levels of service (LOS). LOS delay thresholds differ between signalized and unsignalized intersections. **Table 3** describes the traffic flow conditions and associated delay and LOS for both intersection types. Signalized intersections are described by a single, hourly flow rate-weighted LOS, whereas unsignalized intersections are assigned multiple LOS, for each movement with conflicting traffic streams, i.e., major street left turns and all side-street movements. At unsignalized intersections, the delay and LOS for the worst-performing movement is typically reported.

Table 3: HCM LOS Thresholds for Intersections

		Delay (sec/veh)	
Traffic Flow Conditions	**LOS**	**Signalized**	**Unsignalized**
Progression is extremely favorable, and most vehicles do not stop at all	A	0-10	0-10
Good progression, some delay	B	10-20	10-15
Fair progression, some delay	C	20-35	15-25
Unfavorable progression, congestion becomes apparent	D	35-55	25-35
Poor progression, significant delay	E	55-80	35-50
Poor progression, extreme delay	F	>80, or v/c >1.00	>50, or v/c > 1.00

One of the 31 selected study intersections (#23) is a roundabout. This intersection was assessed using the Sidra Intersection 9 software and, like the other study intersections, was evaluated for delays and LOS. The results of the existing operational analysis are summarized in **Table 4**.

Figure 14: Existing Geometry and Traffic Control – Northern Liberty

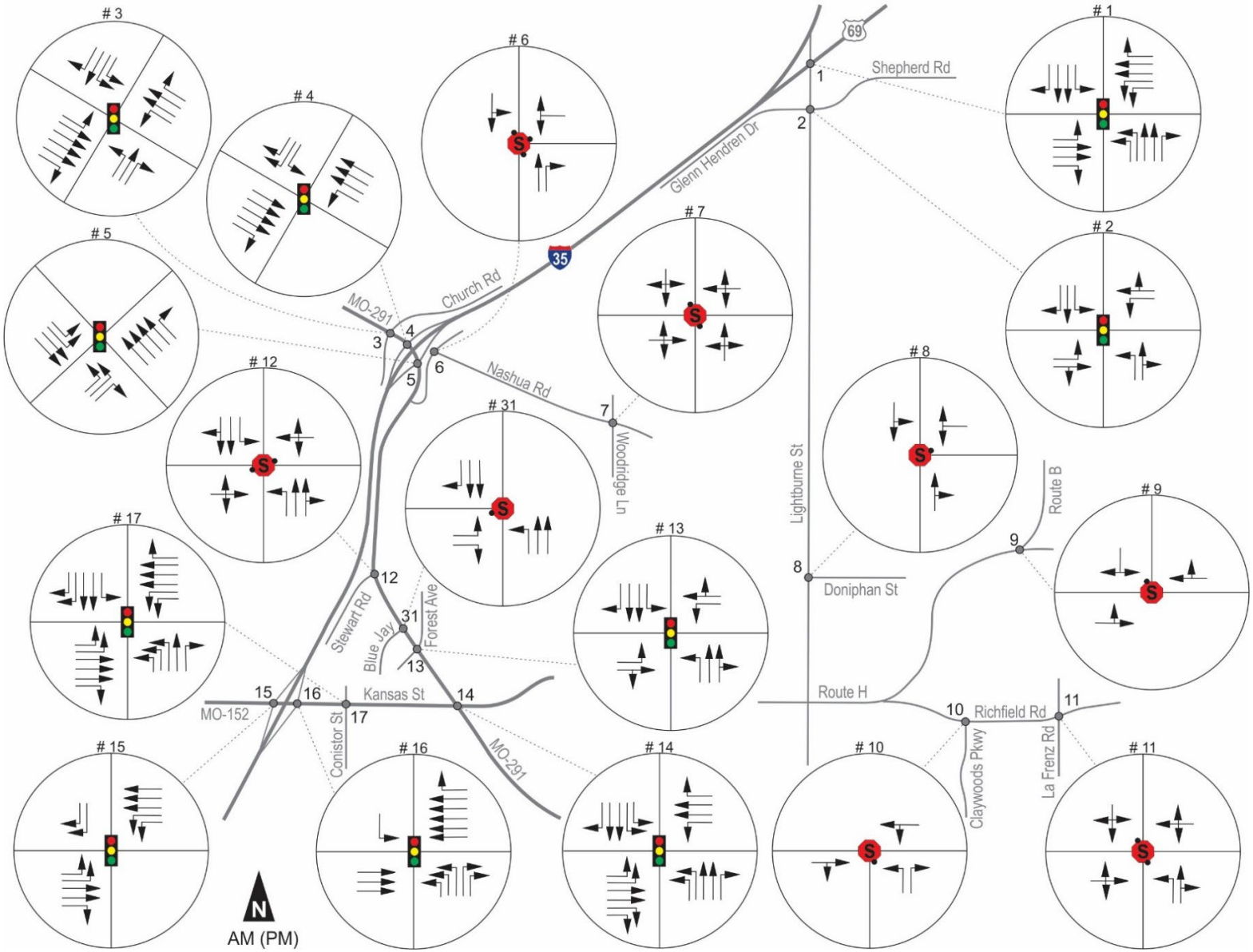


Figure 15: Existing Geometry and Traffic Control – Southern Liberty

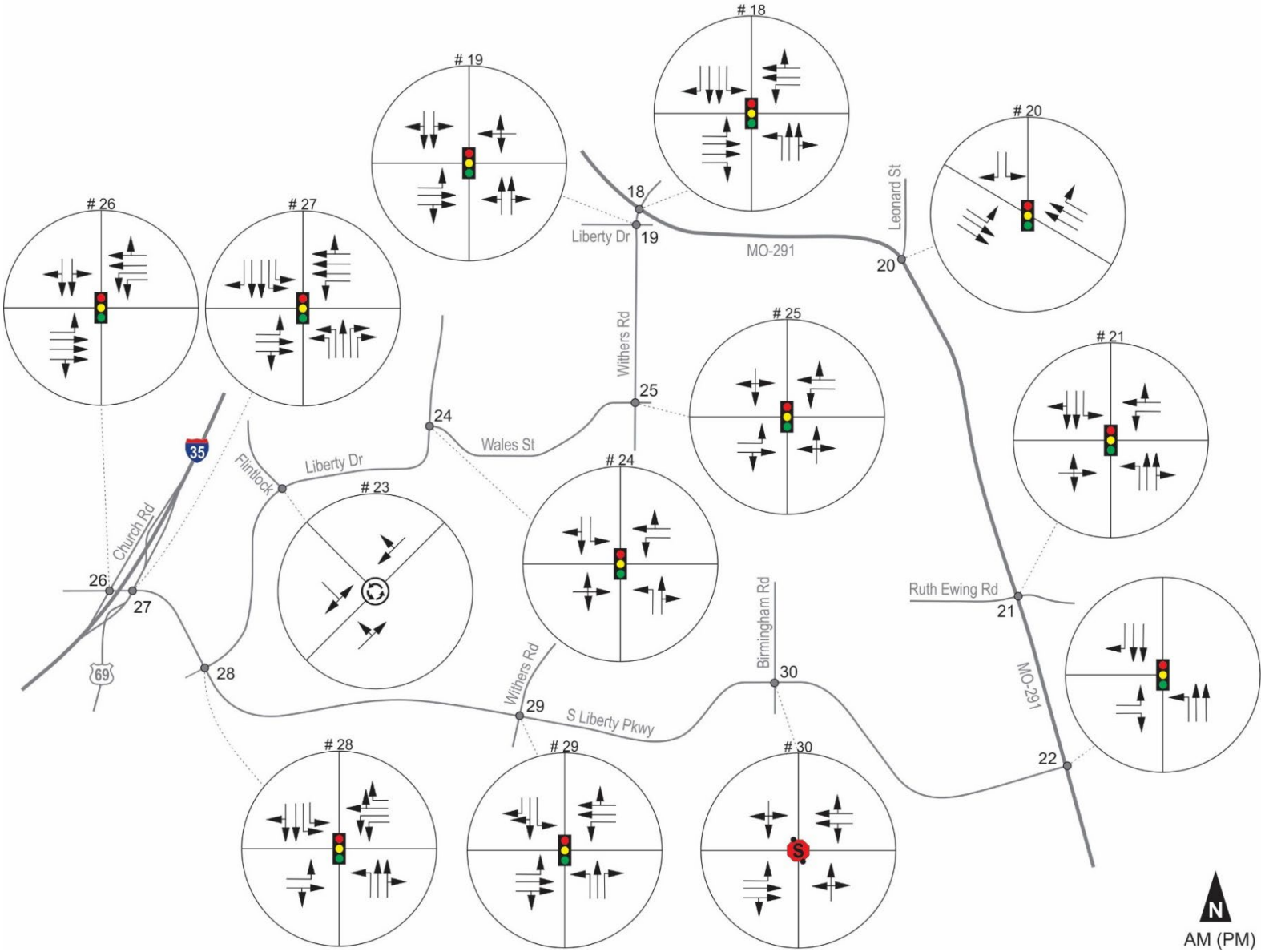


Table 4: Existing Peak-Hour Operational Results

			AM Peak Hour		PM Peak Hour	
Int #	Name	Report Type	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1	US-69 & Lightburne	HCM 6th Signal	41.5	D	45.3	D
2	Lightburne & Shepherd	HCM 6th Signal	21.5	C	28.6	C
3	MO 291 & N Church Rd	HCM 6th Signal	29.5	C	34.1	C
4	MO 291 & I-35 SB Ramps	HCM 2000 Signal	25.1	C	16.1	B
5	MO 291 & I-35 NB Ramps	HCM 2000 Signal	16.0	B	27.6	C
6	Glenn Hendren & Nashua	HCM 6th AWSC	15.8	C	15.8	C
7	Nashua & Woodridge	HCM 6th TWSC	12 (NBL)	B	13.8 (NBL)	B
8	Lightburne & Doniphan	HCM 6th TWSC	12.8 (WBL)	B	14.3 (WBL)	B
9	Route B & Route H	HCM 6th TWSC	9.9 (SBR)	A	9.3 (SBR)	A
10	Richfield & Claywoods	HCM 6th TWSC	11.7 (NBL)	B	11.3 (NBL)	B
11	Richfield & La Frenz	HCM 6th TWSC	8.8 (NBT)	A	8.8 (SBL)	A
12	MO 291 & Stewart	HCM 6th TWSC	35.9 (EBL)	E	198.5 (EBL)	F
13	MO 291 & College/Forest	HCM 6th Signal	24.8	C	25.3	C
14	MO 291 & Kansas St (Hwy 152)	HCM 6th Signal	46.4	D	53.8	D
15	Kansas St (Hwy 152) & I-35 SB Ramps	HCM 2000 Signal	21.5	C	24.6	C
16	Kansas St (Hwy 152) & I-35 NB Ramps	HCM 6th Signal	20.7	C	19.8	B
17	Kansas St (Hwy 152) & Conistor	HCM 6th Signal	27.1	C	39.8	D
18	MO 291 & Liberty Dr	HCM 6th Signal	28.7	C	50.4	D
19	Liberty Dr & Withers	HCM 6th Signal	21.7	C	51.0	D
20	MO 291 & Leonard	HCM 2000 Signal	18.8	B	24.4	C
21	MO 291 & Ruth Ewing	HCM 6th Signal	23.7	C	29.8	C
22	MO 291 & South Liberty Pkwy	HCM 2000 Signal	19.6	B	21.3	C
23	Flintlock Flyover & Liberty Dr	Roundabout	8.9	A	7.1	A
24	Liberty Dr & Wales	HCM 2000 Signal	11.5	B	13.1	B
25	Withers & Wales	HCM 6th Signal	6.7	A	8.3	A
26	Pleasant Valley & N Church Rd	HCM 6th Signal	18.6	B	35.6	D
27	Pleasant Valley & US-69/I-35 Ramps	HCM 6th Signal	29.6	C	40.0	D
28	South Liberty Pkwy & Flintlock	HCM 2000 Signal	30.3	C	30.8	C
29	South Liberty Pkwy & Withers	HCM 2000 Signal	28.1	C	33.6	C
30	South Liberty Pkwy & Birmingham	HCM 6th TWSC	13.5 (SBL)	B	27.2 (SBL)	D
31	MO 291 & Blue Jay	HCM 6th TWSC	15.8 (EBL)	C	21.6 (EBL)	C

As shown in the table, one study intersection currently experiences poor LOS conditions (LOS E or F) during both peak hours:

- *Intersection #12: MO-291 & Stewart Road* – LOS E during the AM Peak Hour and LOS F during the PM Peak Hour. This intersection is currently unsignalized with two-way stop control on the minor (Stewart Road) approaches. It is not uncommon for stop-controlled approaches, left turns in particular, to experience longer delays at intersections with a major crossroad, such as MO-291. Often the volumes experiencing

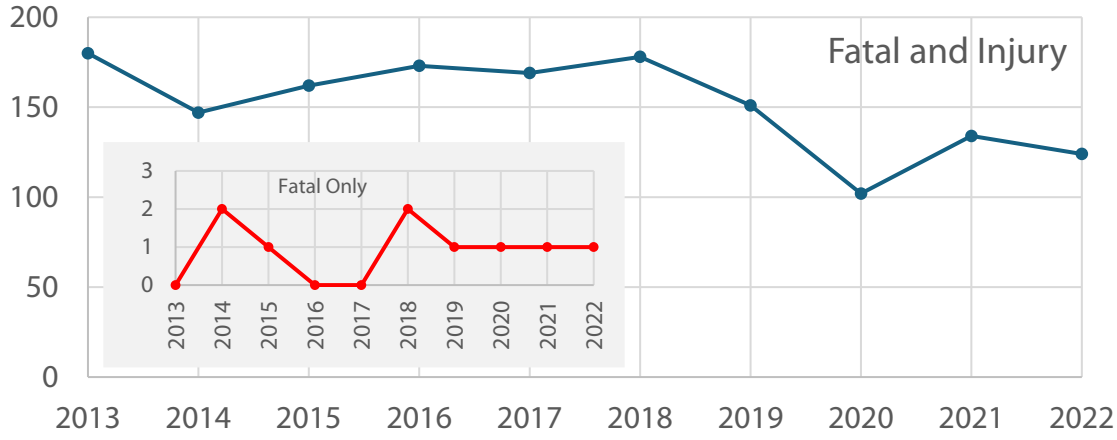
these delays are low; however, at this location, the eastbound Stewart Road approach exceeds 30 vehicles in the AM and 75 vehicles in the PM.

There is currently a plan in place to convert the Stewart Road approaches to right-in / right-out movements only, which should improve operations at the intersection. At the same time, this improvement project will install a traffic signal at MO-291 and Blue Jay Drive (Int #31). Per the operational results shown in **Table 4**, the Blue Jay Drive intersection does not currently experience poor LOS in its unsignalized condition; however, traffic on Stewart Road may divert to Blue Jay Drive to make a left turn once those movements are restricted at intersection #12. A signal at intersection #31 will help accommodate this influx of left-turning traffic.

Current Safety Conditions

Analysis of historic crash data indicates that during the ten-year period from 2013-2022, nine fatalities occurred on roadways within Liberty. In addition, over 1,500 people were injured in crashes during that same time period, with over 150 of them seriously injured. While fatal and injury crashes decreased by 31 percent between 2013 and 2022, the societal cost of all crashes during the ten-year period still exceeds $455 million.

Figure 16: Fatal and Injury Crashes per Year (2013-2022)



The majority of fatal and injury crashes occurred at intersections, on weekday afternoons, and in clear daylight conditions. The age group of occupants with the highest occurrence of fatal and injury crashes was 16 to 22 years of age. Fatal and injury crashes involving driver distraction and driver impairment declined during the ten-year period, but remain a concern. Higher volume and higher speed roadways were found to be at greater risk for fatal and injury crashes. Streets in commercial areas, in open spaces areas, and undivided streets were also shown to have an elevated risk of fatal and injury crashes. See the City's Comprehensive Safety Action Plan for a more detailed presentation of historical safety issues.

Non-Motorized Transportation

Non-Motorized transportation (NMT) refers to any means of transport that is human or animal powered and does not rely on an engine or motor for movement. In the City of Liberty, NMT primarily includes walking and biking. While often regarded as recreational modes, walking and biking can serve many other trip purposes, including work (commute) or school-related trips. Maintaining a well-connected network of sidewalks and trails is essential to promoting not only a healthy community, but a well-balanced transportation system.

A full inventory of sidewalks and trails was not completed as part of this TMP effort; however, through discussions with City staff, local stakeholders, and the general public, it was determined that several gaps currently exist in the City's sidewalk network along typical commuting routes, as well as near parks and schools.

Future Conditions

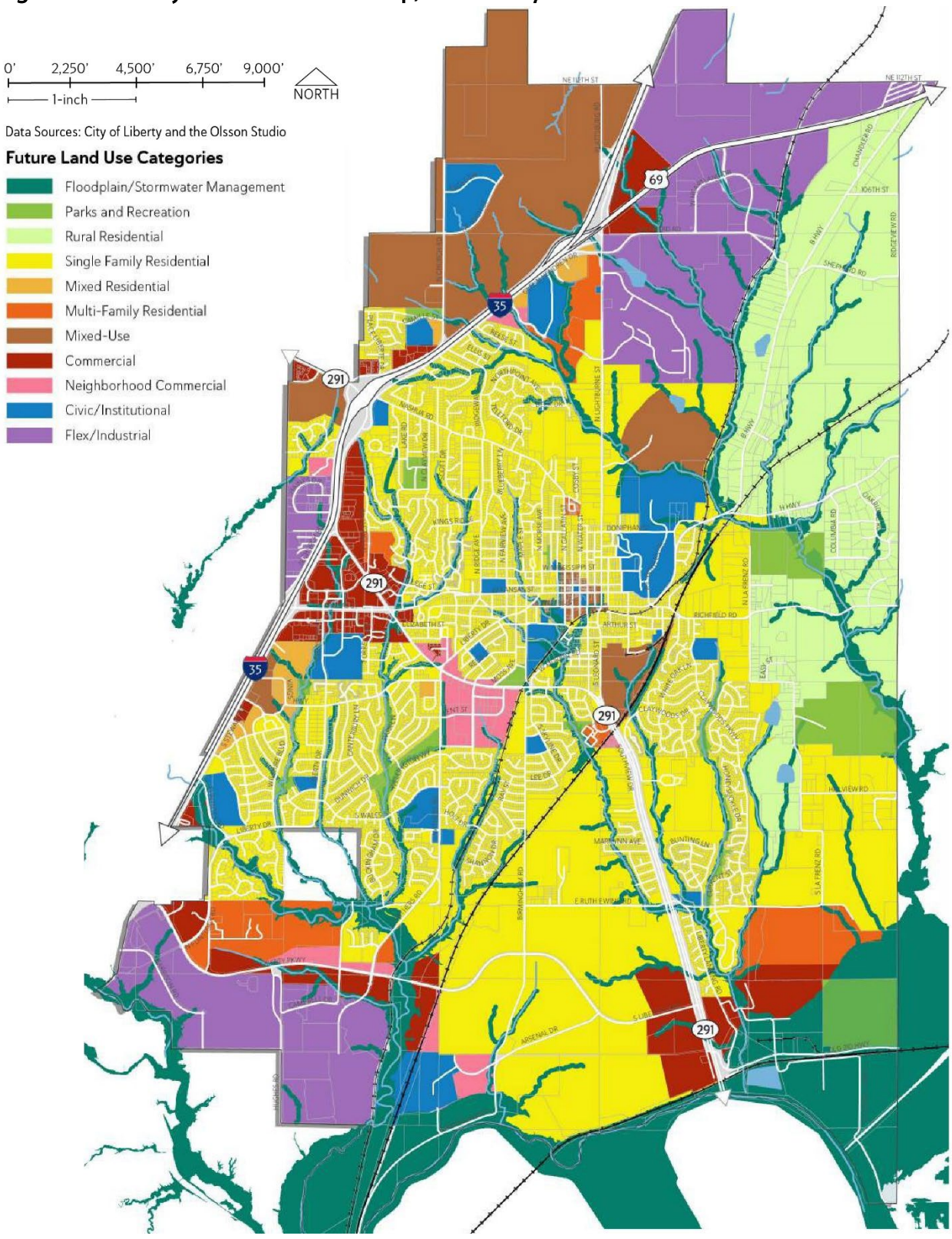
Transportation Forecasts

A key element in determining future transportation needs in Liberty is a long-range traffic volume forecast. By projecting traffic volumes to a future horizon year, analyses can be conducted to determine which transportation facilities can handle the projected future demand and which may need to be improved. The Mid-America Regional Council (MARC) travel demand model was the primary tool used to develop the forecast volumes.

The first step in traffic forecast development is to understand the anticipated future land use in the area. As part of the *2023 Comprehensive Plan*, the city created their anticipated Future Land Use map, which is shown in **Figure 17**. Using the individual land use acreages measured from this map, floor area ratios (FARs) and other industry-standard conversion factors were applied to convert the 11 land use categories used by the city to the 5 categories representing population and employment that are used by MARC's regional travel demand model. The population and employment totals were then geographically aggregated into the MARC model's traffic analysis zone (TAZ) structure.

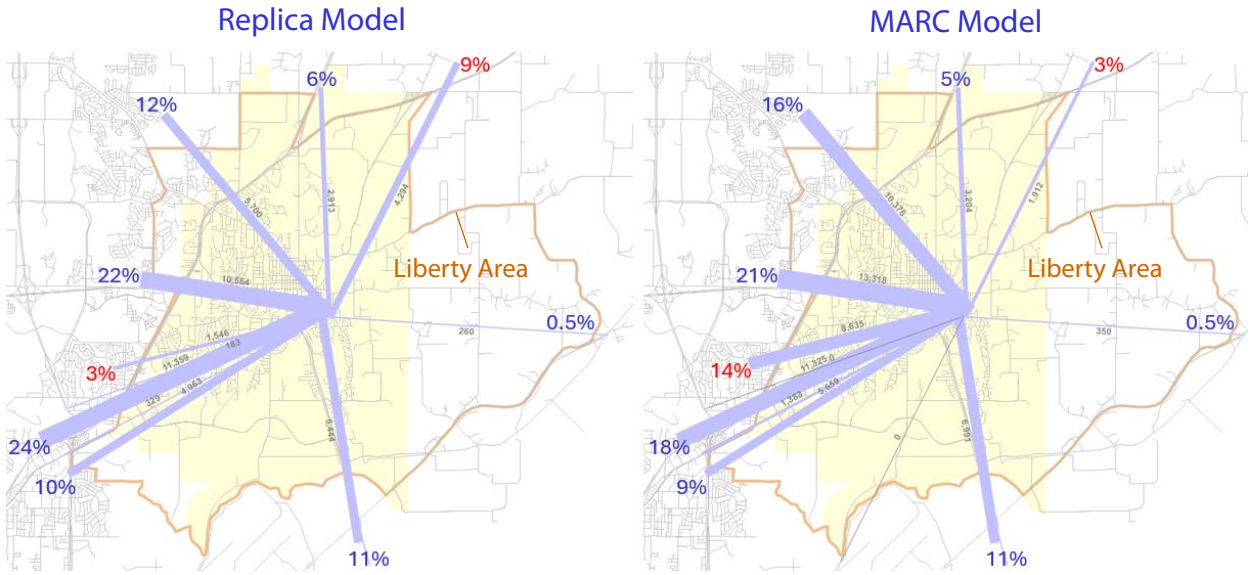
The full coverage of the city's Future Land Use map is assumed to represent "build-out" of the city. The timeframe for when build-out of the city may occur is unknown. While this scenario is still meaningful for long-term planning, it is also important to analyze conditions for a particular future horizon year in order to determine a timeframe for when future projects are needed. Therefore, in addition to the analysis of build-out land use, the future horizon year of 2050 was selected. To develop the 2050 volume forecast, the build-out land use was scaled back by determining the percentage of each zone that is expected to be built out by 2050 and applying it to the build-out totals for each TAZ. For many zones, especially those within the core area of the city, that percentage was set to 100%. On the periphery of the city, where development is less certain, a lower percentage was applied. Liberty City Planning staff assisted with this exercise.

Figure 17: Liberty Future Land Use Map, *2023 Comprehensive Plan*



As a secondary check on the reasonableness of the MARC model forecasts, zonal origin-destination (O-D) data was extracted from the MARC base model and compared to recent (2022) O-D data extracted from Replica (described earlier in this report). This check helped gauge whether the two models are distributing traffic to, from, and within Liberty in a similar manner. The figures below display several O-D comparisons, and generally indicate acceptable correlations between the two sources, despite some variations.

Percentage of Trips originating from the Liberty Area destined for External Areas along Major Routes:



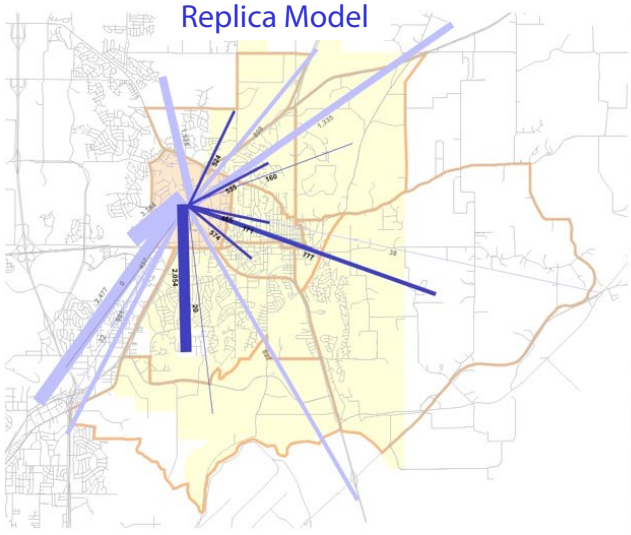
Some of the more pointed differences are highlighted with red text and are described in more detail below.

- The percentage of trips assigned to the area of KCMO directly west of Liberty, and south of Highway 152, is quite a bit higher in the MARC model (14%) as compared to the Replica model (3%) – although in the aggregate, the MARC model is fairly consistent with Replica with regard to trips to and from the southwest (41% vs. 37% respectively). One possible explanation for the higher MARC prediction is the gravity component of the TDM, which can tend to over-assign trips between areas that are in close proximity.
- The percentage of trips assigned to/from the northeast along US-69 and MO Route 33 is lower in the MARC model (3%) as compared to the Replica model (9%). This is likely a result of this area being located near the geographical edge of the MARC model. The O-D data at the MARC external zones was not provided in a manner in which it could be included in this exercise.

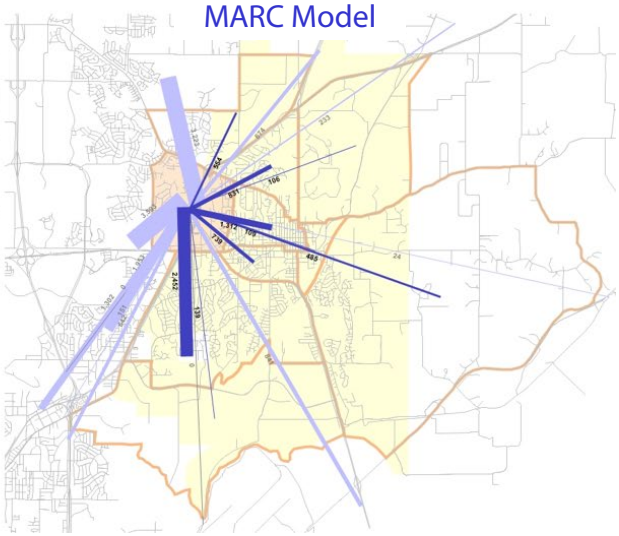
For additional comparisons, distinct areas within Liberty were further subdivided into internal zones, based on the MARC TAZ structure. The following figures show the O-D distribution for two of these internal zones for each model source. The O-D distributions appear to be proportionally similar between the two models, with some of the same variations as described above for the full Liberty area. These similarities offer validation to both models.

Trips originating from the Liberty Triangle / I-35 Area destined for other Internal Liberty Zones (dark purple lines) and External Areas along Major Routes (light purple lines):

Replica Model

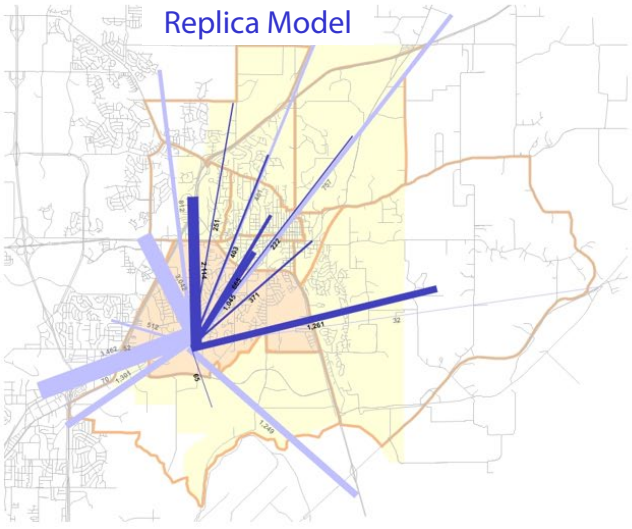


MARC Model

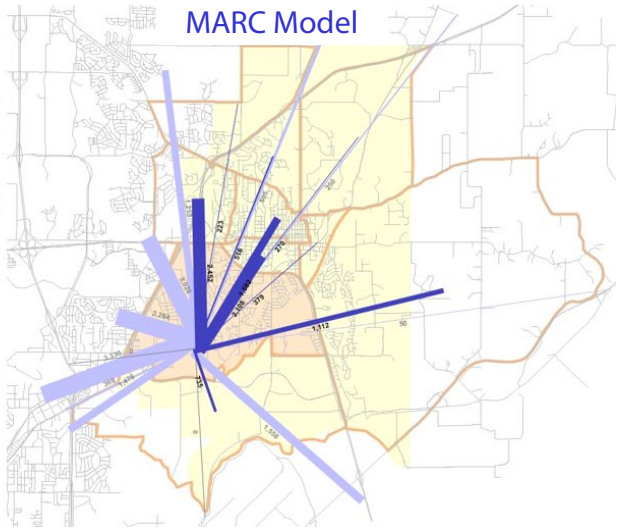


Trips originating from the South Liberty Area destined for other Internal Liberty Zones (dark purple lines) and External Areas along Major Routes (light purple lines):

Replica Model



MARC Model



Current Road Network

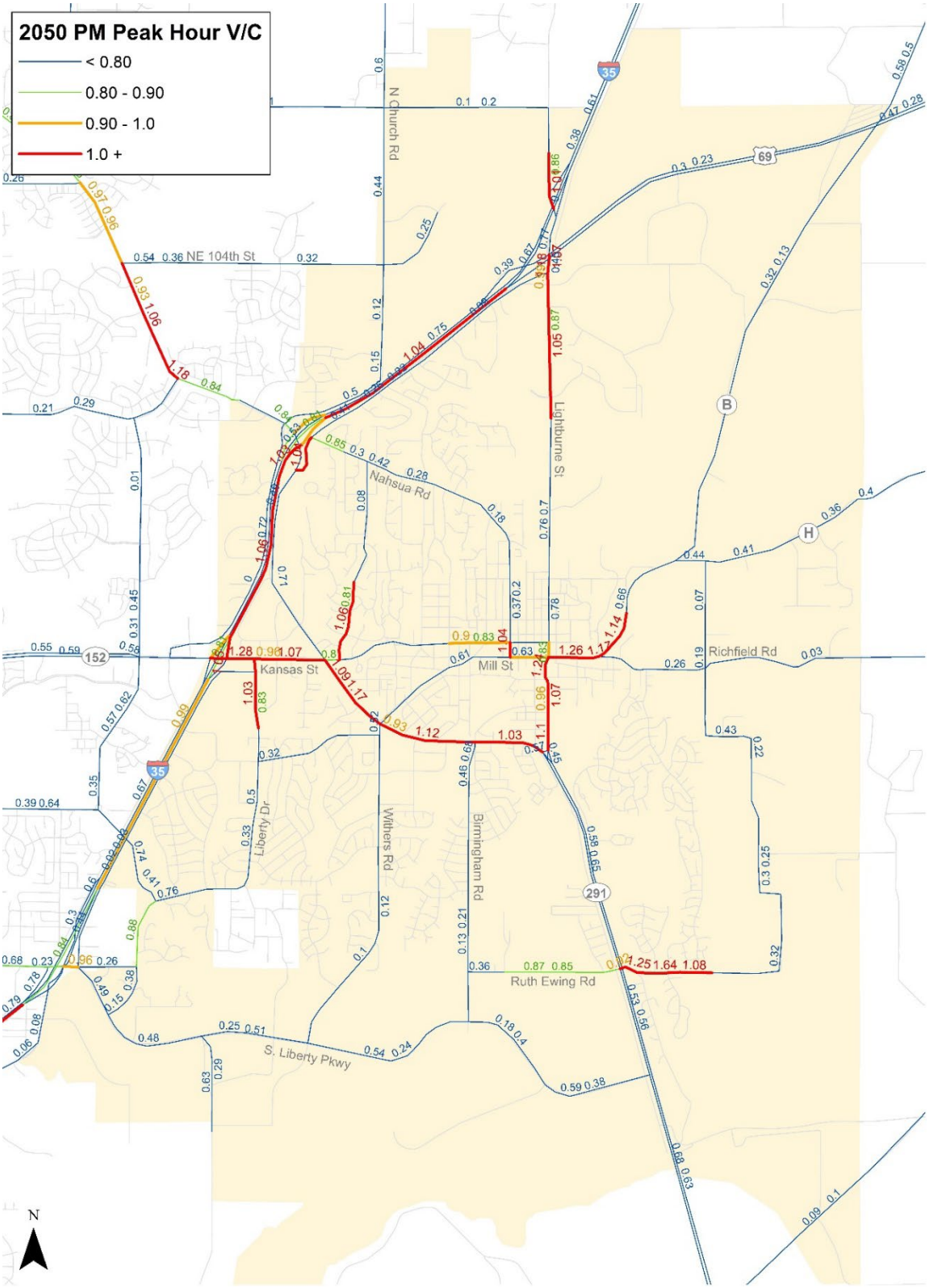
Assuming that Liberty's current road network is maintained as is, into the future, the MARC model predicts daily volumes to grow as shown in **Figure 18** by 2050. I-35, MO-291, and Kansas Street are anticipated to continue to carry the majority of traffic within the Liberty area. However, several other facilities are expected to experience quite a bit of future traffic growth, including Lightburne / Leonard Streets, Mill Street, Liberty Drive, Ruth Ewing Road, and South Liberty Parkway.

In a few spot locations, the model forecasted volumes appear to be lower than the existing volumes shown in Figure 10. N Church Road is a primary example. It is unlikely that volumes will reduce along this facility in the future as it will continue to be an important route to North Liberty High School as well as the many commercial and industrial properties adjacent to the corridor. These projected reductions are likely a result of a regional model's inability to precisely forecast every street within each of its localities.

Overall, with the anticipated growth in Liberty, traffic operations are expected to degrade along several area corridors without added capacity, such as new through lanes and/or turn lanes on existing routes or new alternate routes to divert traffic. **Figure 19** displays the volume-to-capacity ratios (V/C) calculated by the MARC model for the PM Peak Hour by 2050. A ratio value between 0.9 and 1.0 is considered to be approaching failure, while a ratio of 1.0 or more is considered to be failing. As shown, sections of Lightburne and Leonard Streets, Kansas Street, Ruth Ewing Road, and a handful of others are all expected to be nearing or at failing operational conditions by 2050 with no geometric improvements or added capacity.

Figure 18: 2050 Daily Volume Forecast

Figure 19: 2050 Peak Hour Volume-to-Capacity Ratio (V/C)



Beyond 2050, as Liberty reaches full Build-Out, volumes are expected to continue to increase as shown in **Figure 20**. South Liberty Parkway, in particular, is expected to grow substantially beyond even 2050 levels. This is not unexpected given the amount of land still available for development along that corridor.

The Build-Out V/C, shown in **Figure 21**, points out similar trouble spots as the 2050 V/C map. By Build-Out of the city, a few additional corridors appear to become congested within the downtown area. Further east of downtown, some congested areas also appear along Mill Street / Richfield Road (east-west) and La Frenz Road (north-south).

Figure 20: Build-Out Daily Volumes

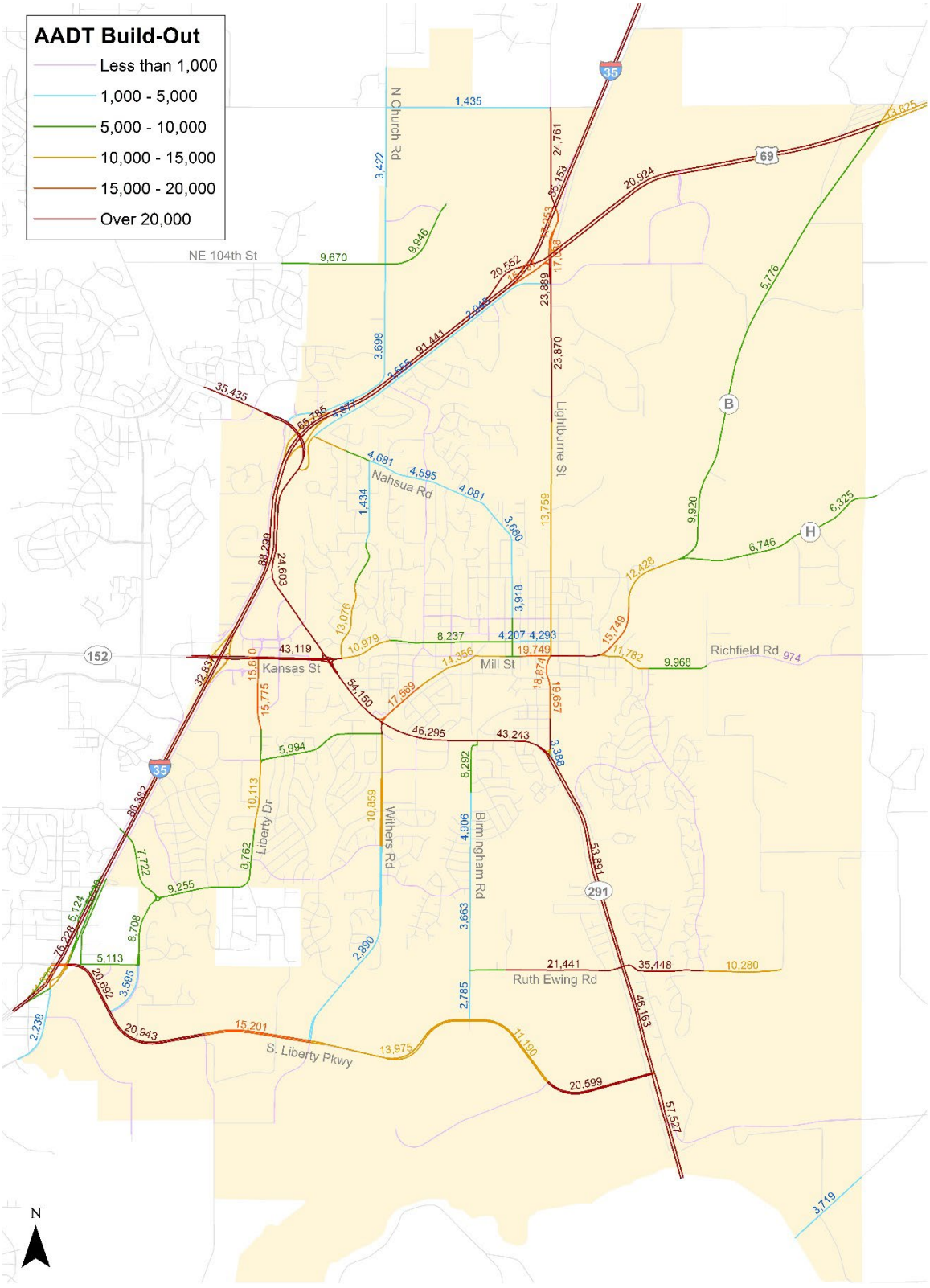
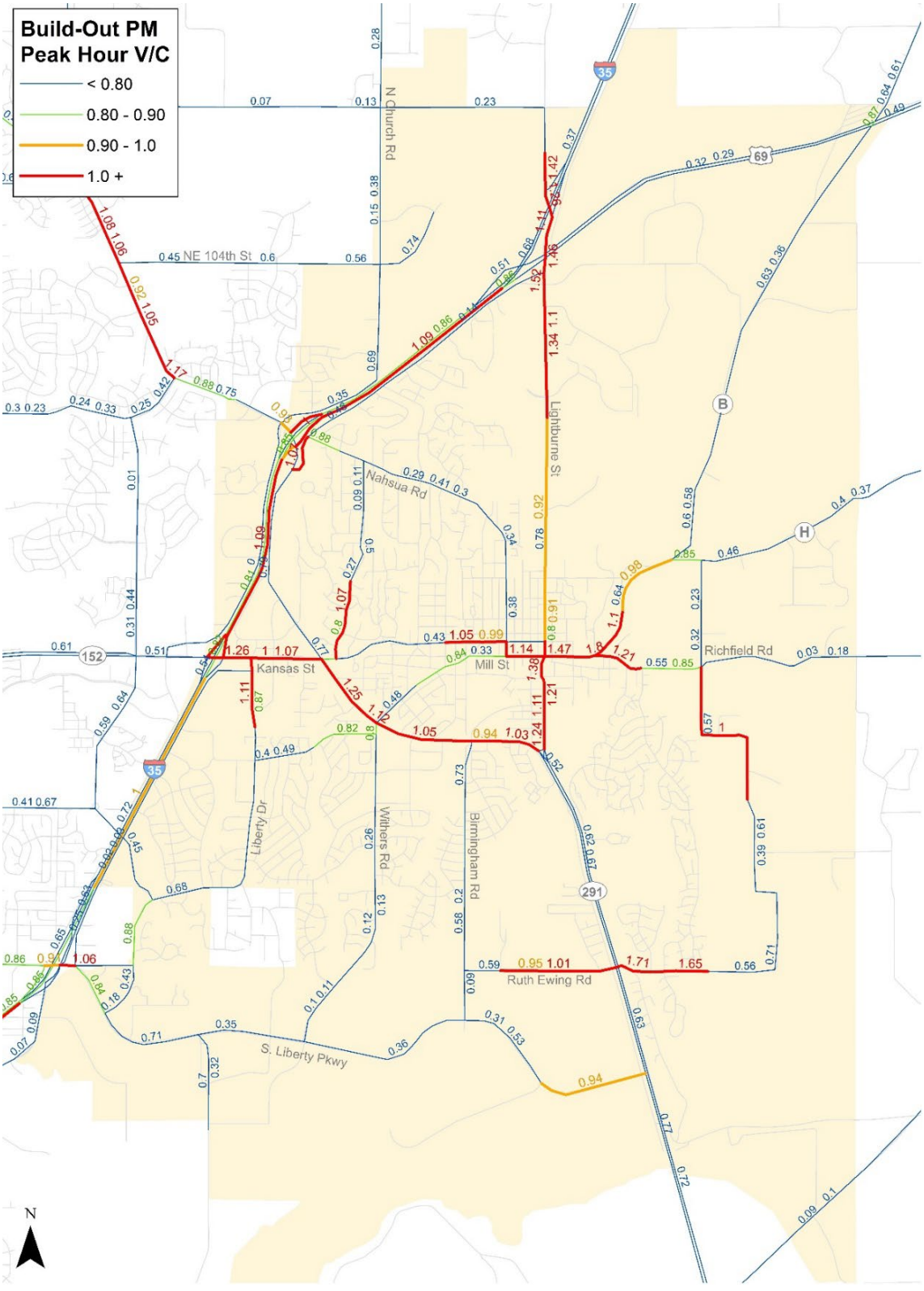


Figure 21: Build-Out Peak Hour Volume-to-Capacity Ratio (V/C)



Alternative Road Network

Based upon the projected congestion observed in the forecast model runs, a mix of capacity improvements and new road connections have been proposed as long-term solutions to help handle future traffic in Liberty. These projects were developed in coordination with city staff and incorporated into an alternative road network test model run, using MARC's regional model, to see how conditions could be expected to change as a result of these improvements.

Capacity Improvements:

- **N Lightburne Street / Plattsburg Road**, from NE 112 Street to Doniphan Street: Widen to four lanes.
- **Mill Street / Richfield Road**, from Route H to La Frenz Road: Widen to four lanes.
- **Route H**, from Mill Street to Route B: Widen to three lanes / incorporate turn lanes.
- **Ruth Ewing Road**, from Birmingham Road to La Frenz Road: Widen to three lanes / incorporate turn lanes, or possibly widen to four lanes.
- **La Frenz Road**, from Richfield Road to Ruth Ewing Road: Potential realignment to reduce right-angle turns, incorporate turn lanes.

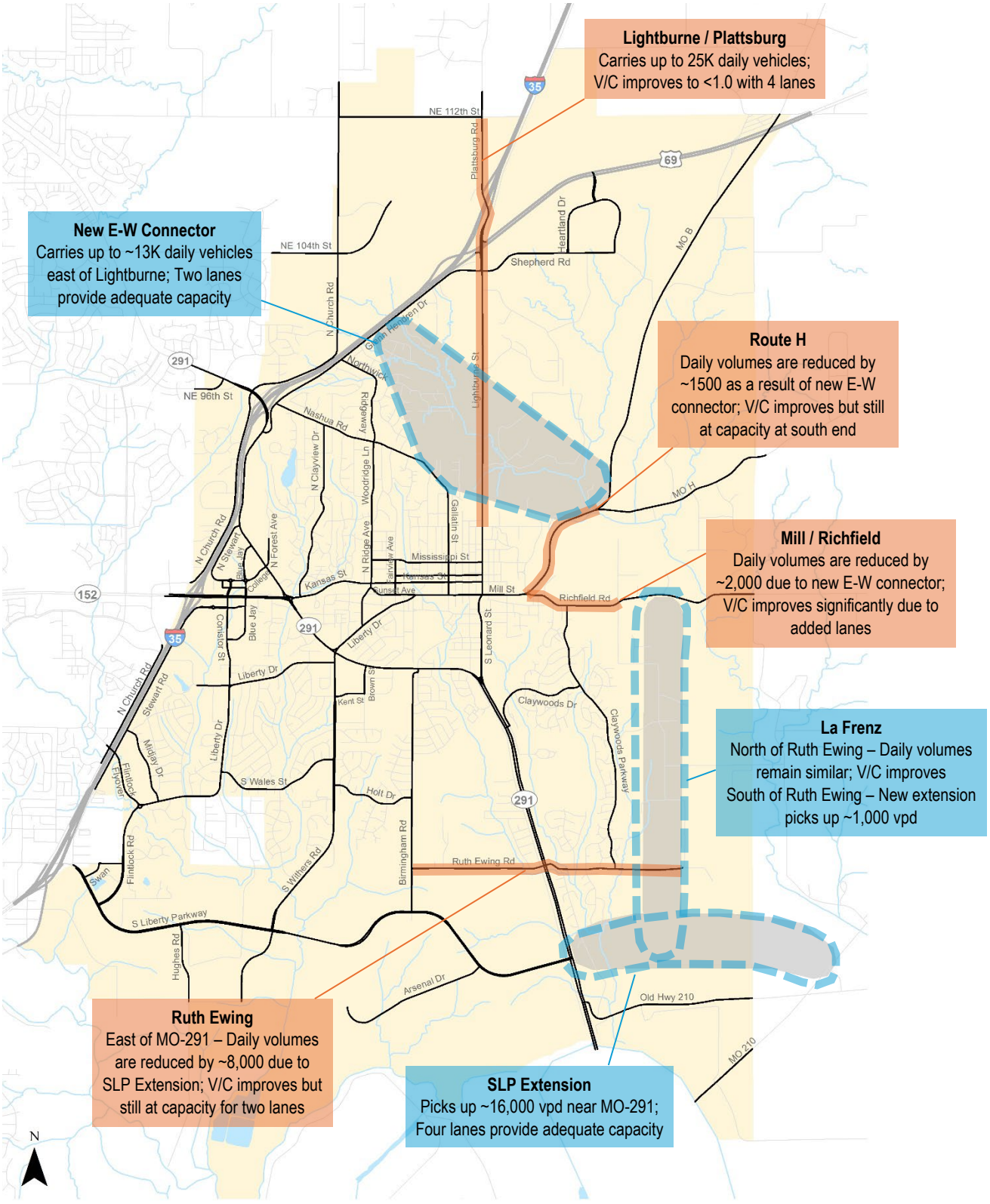
New Connections:

- **Extension of South Liberty Parkway**, from MO-291 to MO-210.
- **Extension of La Frenz Road**, from Ruth Ewing Road south to new extension of South Liberty Parkway.
- **New East-West Connection in North Liberty**, potentially connecting Glenn Hendren Drive or Nashua Road with Route H or Route B. The extension would intersect with Lightburne Road near the former golf course property.

These proposed improvements are not expected to exhaustively address all the capacity issues indicated on the forecast V/C maps. Due to right-of-way restrictions many of the congestion issues downtown and along the heaviest volume roadways, like Kansas Avenue and MO-291, cannot be improved by widening or adding capacity. Providing new, alternative or parallel routes may allow for some diversion of traffic away from these major roads. Increased use of other transportation modes, including non-motorized, could also help to alleviate congestion within Liberty. It is worth noting that these projects specifically address the need for new highway capacity; however, the ultimate designs for these improvements should take into consideration any design-related safety recommendations of the CSAP.

Figure 22 highlights some of the primary results of the alternative road network model run.

Figure 22: Alternative Road Network Results



Stakeholder Engagement

Advisory Committee

As a way to obtain stakeholder feedback on existing and potential future transportation infrastructure needs, an Advisory Committee was formed. This committee included representatives from the development community as well as police, fire, and other city officials and staff. The first meeting was held on August 15, 2024, at the Liberty City Hall. Fourteen committee members were in attendance.

At the meeting, the committee was presented with some background on the Transportation Master Plan (TMP) and its purpose. The status of existing conditions and future land use / traffic volume forecasts were reviewed, and the committee was asked to comment upon where they see existing needs and potential future issues. In addition, a set of specific near-term Capital Improvement Program (CIP) projects were presented, and the committee was asked to prioritize (and supplement) that list.

A second meeting was held on May 1, 2025, at Fire Station 1 in Liberty. Twelve committee members were in attendance. This meeting focused on the final recommendations and ultimate deliverables resulting from the TMP study. Items presented at the meeting included a draft Major Street Map, revised Typical Sections, and a set of Traffic Impact Study (TIS) Guidelines. The committee provided valuable feedback on each of these important elements to be included in the final TMP study.

Full summaries of both meetings are included in the Appendix. All feedback received was considered and incorporated into the final TMP, as deemed appropriate.

Online Survey

An online community survey, open to the general public, was another method used to obtain stakeholder feedback on transportation-related issues in Liberty. The survey included both general transportation needs questions and specific Capital Improvement Program-related ranking questions. Demographic questions were included as well, to see if there were any correlations in the responses. The survey was available for approximately 3 weeks, during late November/early December 2024. Responses were received from 80 members of the community. A full summary of the responses is included in the Appendix.

Recommendations

Major Street Map

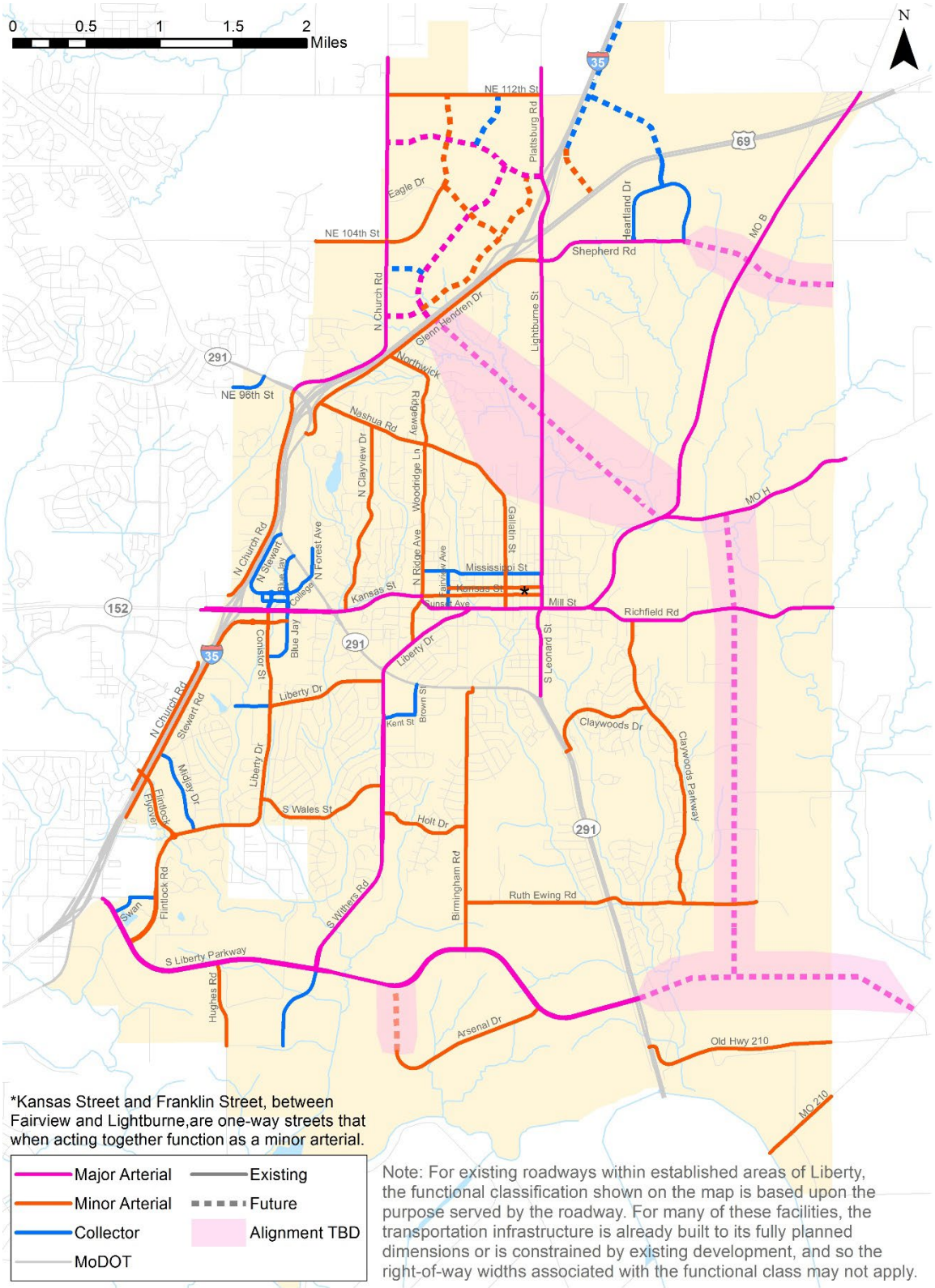
Based on the results of the traffic forecasting exercise, along with discussions with City staff regarding what is realistic and practical, a Major Street Map (MSM) was developed. This map, shown in **Figure 23**, illustrates the existing and anticipated future streets that comprise the City's major transportation network. Each major street, aside from MoDOT-owned facilities, is shown by its City-defined roadway classification.

In select areas, new road connections are desired but exact alignments are unknown. These are also illustrated on the map with wide swaths, the dashed connections shown within each swath indicate the desired connection, and the desired classification, but not a specific alignment. Further studies are needed to determine the best and most practical alignments within each wide swath buffer area. These include:

- An east-west extension of Shepherd Road to the eastern city limits, with a connection at Route B.
- An east-west connection in the north part of Liberty, generally connecting Glenn Hendren Drive (or potentially Nashua Road) with Route B / Route H. The connection would intersect with Lightburne Street.
- A north-south connection in the east part of Liberty, extending from Route H southward and connecting with Richfield Road, Ruth Ewing Road, and points further south.
- An east-west connection in the south part of Liberty, extending South Liberty Parkway to the east to connect with Route 210.
- A second connection/access point for Arsenal Drive with South Liberty Parkway.

For future roads that are not shown as wide swaths, the alignments were generally derived from available development plans including the proposed Montage development, located north of I-35 between N Church Road and Plattsburg Road, and the proposed North Liberty Logistics Park, located east of the Montage development and north of US-69.

Figure 23: Major Street Map



Typical Sections

A typical section provides the configuration of a roadway, shown at a right-angle to the roadway centerline. It includes the dimensions of all key elements between the edges of right-of-way, including lanes, medians, sidewalks, etc. For the City of Liberty, a new set of ten (10) typical sections have been defined as part of this TMP. These sections are categorized by both right-of-way width and City-defined functional classification. The functional classifications assigned to each typical section correspond to those shown on the Major Street Map.

Two important items of note:

1. Local roads, which are not the focus of this plan and are not highlighted on the MSM, will continue to retain the same 52-foot right-of-way section.
2. There are many "established arterials" within the City of Liberty, and included on the MSM, that functionally serve the purpose of an arterial, but do not meet the corresponding right-of-way widths shown in the typical sections. It is not the City's intent to require rebuilding of all existing roadway facilities, particularly when existing/historic development precludes or constrains it. The right-of-way standards will primarily be applied to new roadway construction or for reconstruction of existing roadways if significant changes to adjacent land uses are proposed.

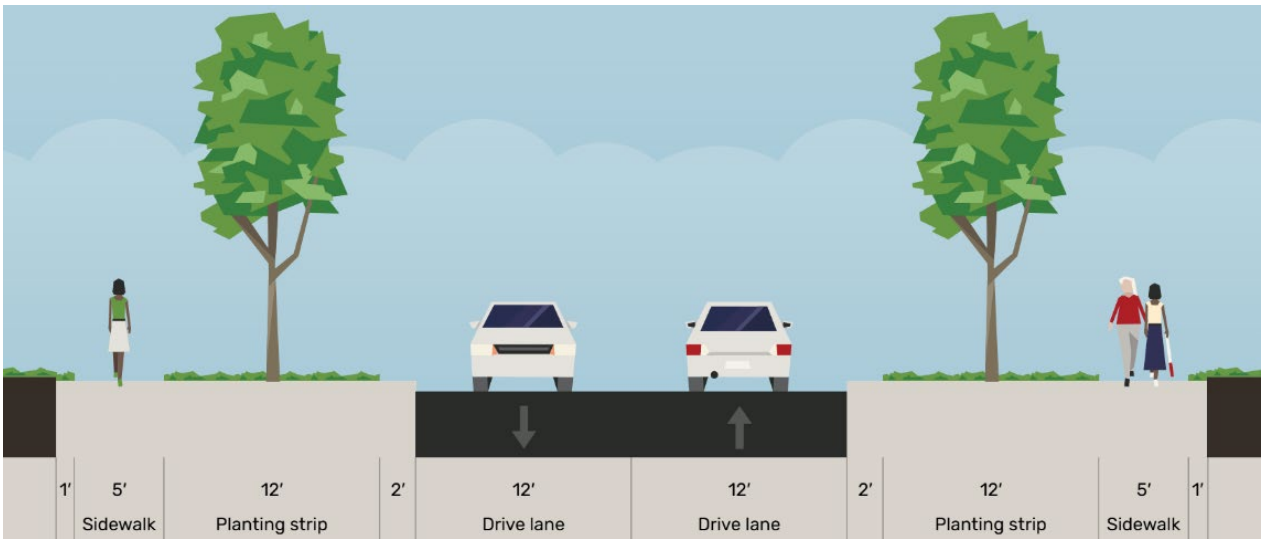
For purposes of the typical section images on the following pages, street trees are shown in all planting strips measuring 8 feet or wider. For planting strips greater than 5 feet but less than 8 feet, other vegetation or small trees are recommended where possible, but should be submitted to the City Arborist for approval. For specific planting requirements and regulations, see the City Code of Ordinances; reference the following chapters:

- Chapter 28A – Public Tree Care
- Chapter 30 Article XV – Subdivision and Neighborhood Design Standards
- Chapter 30 Article XVI – Site Development and Design Standards

64-Foot Right-of-Way (Collectors)

Five typical section options are provided that fit within a 64-foot right-of-way. These are all sections for lower volume, two-lane collectors. Within the right-of-way there are two optional curb-to-curb widths of either 24 feet or 32 feet. Note that the two-foot curb and gutter widths shown in each section are not included in the curb-to-curb widths, although the gutter portion of that width (~16 inches) would be at street grade. The wider curb-to-curb width allows for paved elements like a center turn lane, on-street parking, or bike lanes, while the narrower curb-to-curb width allows for wider sidewalks, trails, and planting strips. The two 24-foot curb-to-curb width sections are shown in **Figure 24** and the three 32-foot curb-to-curb width sections are shown in **Figure 25**.

Figure 24: 64-Foot Right-of-Way / 24-Foot Paved Typical Sections (Collectors)



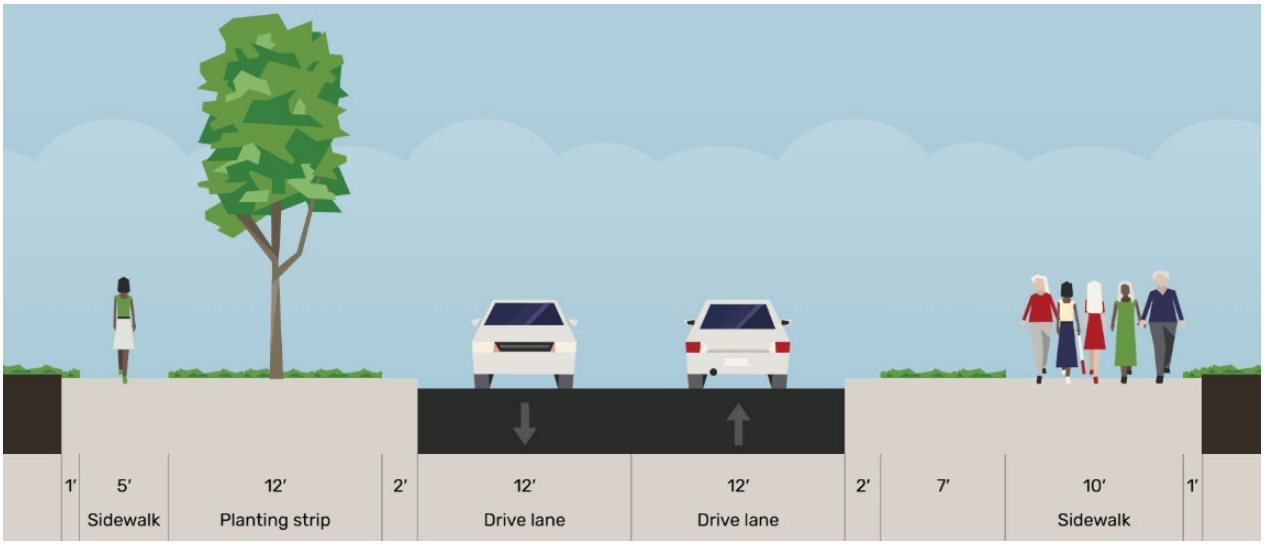
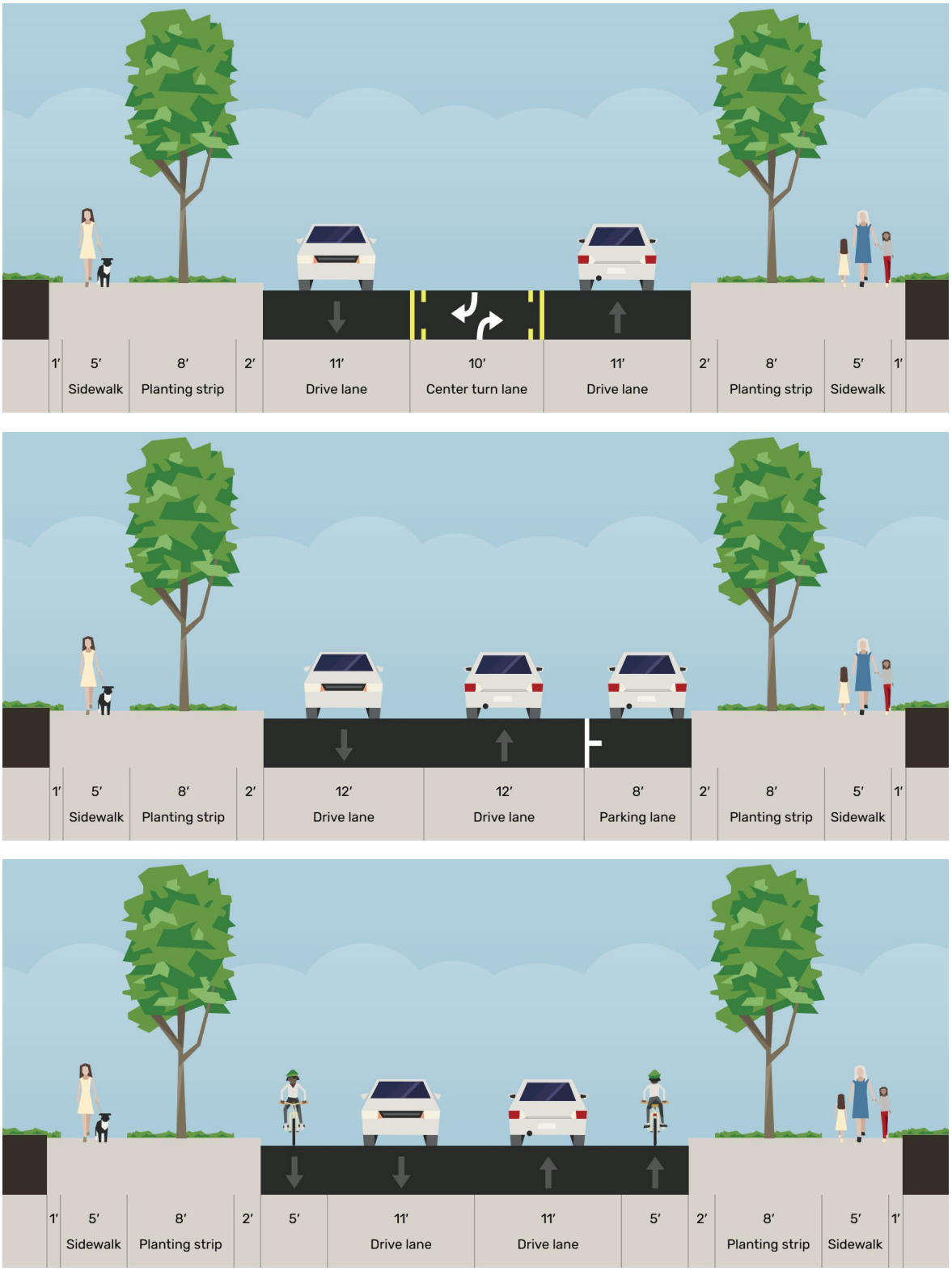


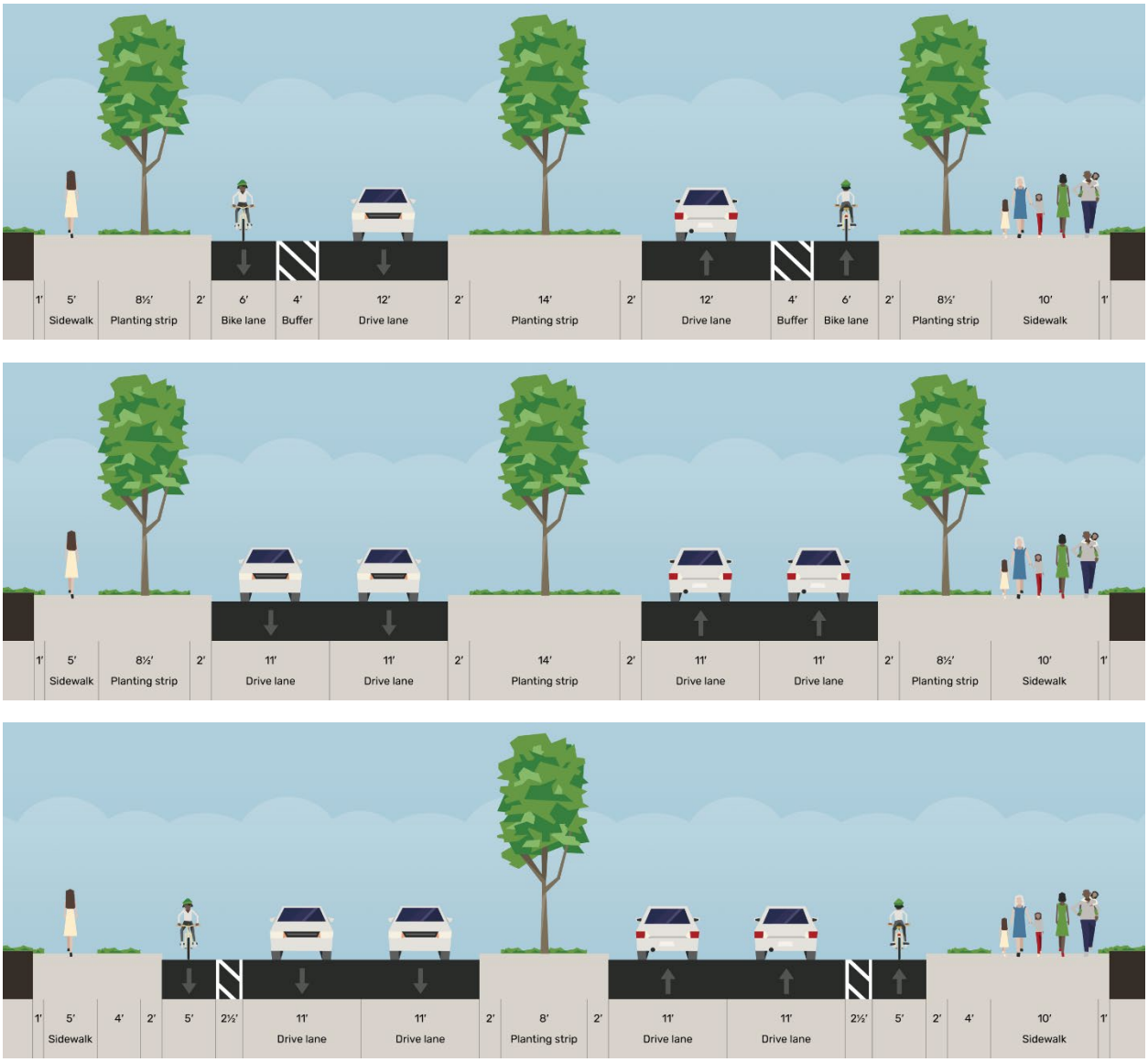
Figure 25: 64-Foot Right-of-Way / 32-Foot Paved Typical Sections (Collectors)



100-Foot Right-of-Way (Minor Arterials)

Three typical section options are provided that fit within a 100-foot right-of-way. These are sections for higher volume, two- or four-lane, minor arterial facilities. Within the right-of-way there are two optional curb-to-curb widths of either 62 feet or 72 feet. The narrower curb-to-curb width allows for either two lanes plus bike lanes or four lanes, while the wider curb-to-curb width allows for four lanes plus bike lanes. All three sections include a median width adequate for providing left-turn lanes at intersections. The three 100-foot typical sections are shown in **Figure 26**.

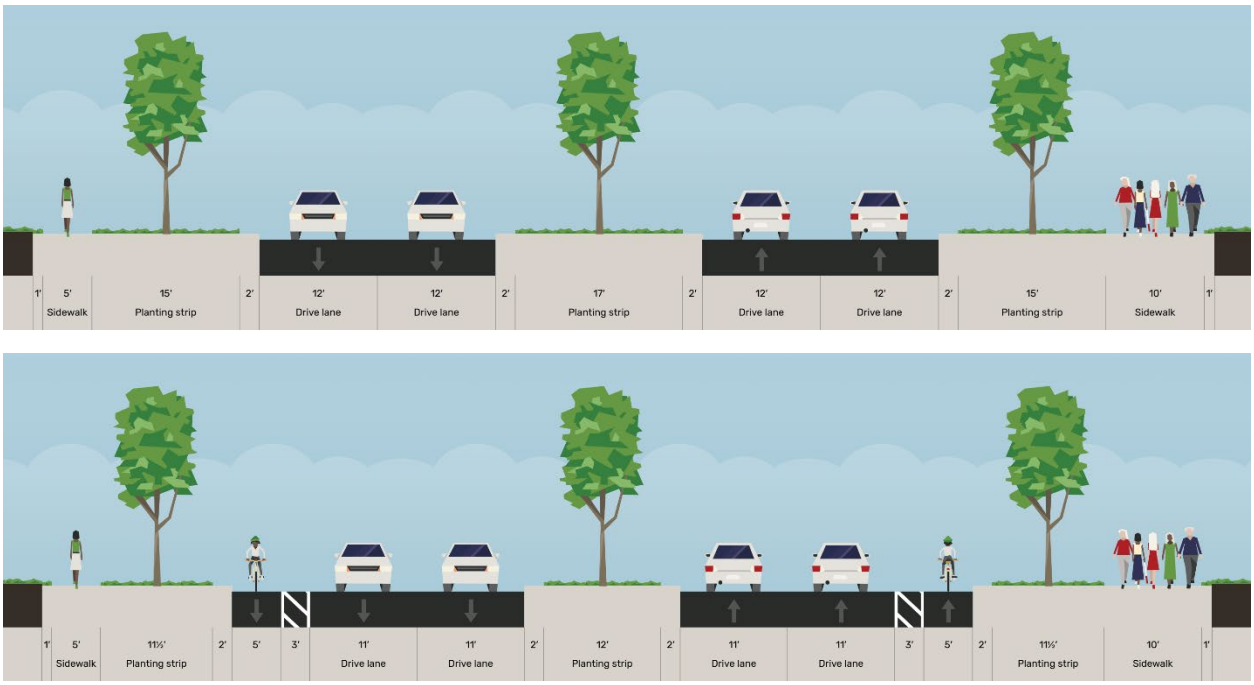
Figure 26: 100-Foot Right-of-Way Typical Sections (Minor Arterials)



120-Foot Right-of-Way (Major Arterials)

Two typical section options are provided that fit within a 120-foot right-of-way. These are sections for the highest volume, four-lane, major arterial facilities. Within the right-of-way there are two optional curb-to-curb widths of either 69 feet or 76 feet. The narrower curb-to-curb width does not allow for bike lanes but includes a wider median and wider planting strips. The wider curb-to-curb width allows for four lanes plus bike lanes. Both sections include a median width adequate for providing left-turn lanes at intersections. The two 120-foot typical sections are shown in **Figure 27**.

Figure 27: 120-Foot Right-of-Way Typical Sections (Major Arterials)



Safety Strategies / Recommendations

Along a separate, but parallel track to the TMP effort, the City has completed a Comprehensive Safety Action Plan (CSAP). The elements of the CSAP are multi-dimensional:

- Data Analysis – Using existing and historical data, crash trends were observed, and a High Injury Network (HIN) was identified. Systemic risks were assessed, and an equity analysis was performed.
- Safe System Approach Strategies – The identification of these strategies focused on three pillars: Safer People (advocacy, communications, education), Safer Roads (development standards, road design, traffic calming elements), and Safer Speeds (speed limit evaluation / adjustment, signal retiming, high visibility enforcement).
- Action Plan – Specific, actionable projects were identified in three categories: Capital Street Improvement Plan projects, Active Transportation projects, and Systemic Traffic Signal Improvement projects.

Development of the safety strategies and recommendations included participation from City staff, local stakeholders, and members of the public. See the full CSAP document for more details.

Current Capital Improvement Program

A capital improvement plan (CIP) or program is an important fiscal and planning tool for local governments to identify and prioritize near-term capital projects. The City of Liberty has substantial existing capital improvement needs. Many of these have been previously identified in the *Leading Liberty Forward* plan, while others have been identified by city staff and the study team through this TMP process. By way of the online survey platform described previously, several broad categories of CIP project types were vetted with the general public. The specifically identified projects were also presented to the City Council for their comment and concurrence.

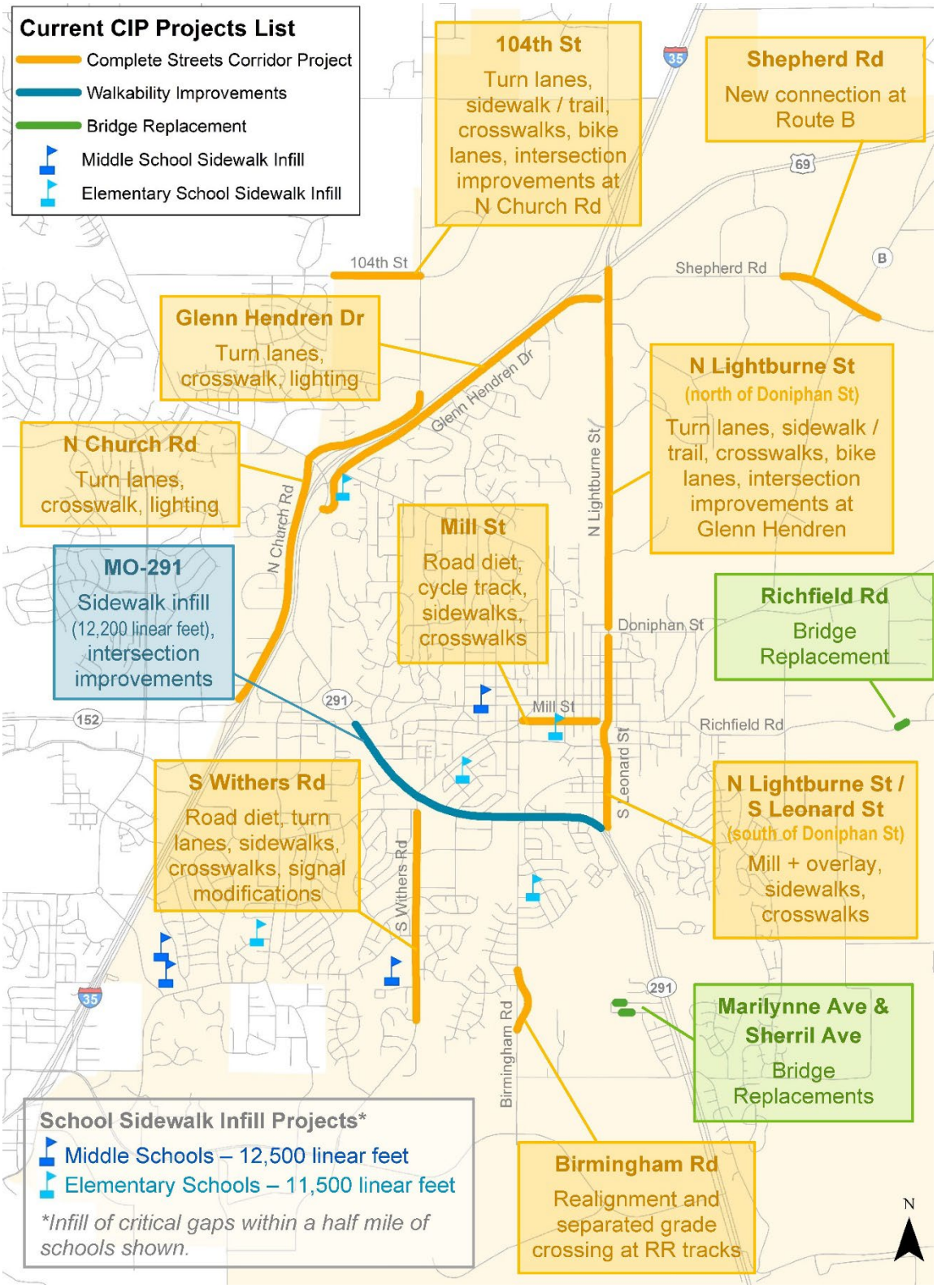
Table 5 summarizes the identified projects and provides estimated costs. The current needs are estimated to be between $134 million and $163 million (in 2024 dollars). When programming the actual funding needed to complete the project in the year of expenditure, the City should consider applying an annual percentage increase to these 2024 totals. If each project takes, on average, ten years to complete, and assuming a 7 percent annual increase, the program costs would be in the range of $275 million to $320 million (approximately twice the 2024 amount). The locations of each project are illustrated in

Figure 28. More detailed information about each project can be found in the full CIP Needs document, provided in the Appendix.

Table 5: Current Capital Improvement Program (CIP) Summary

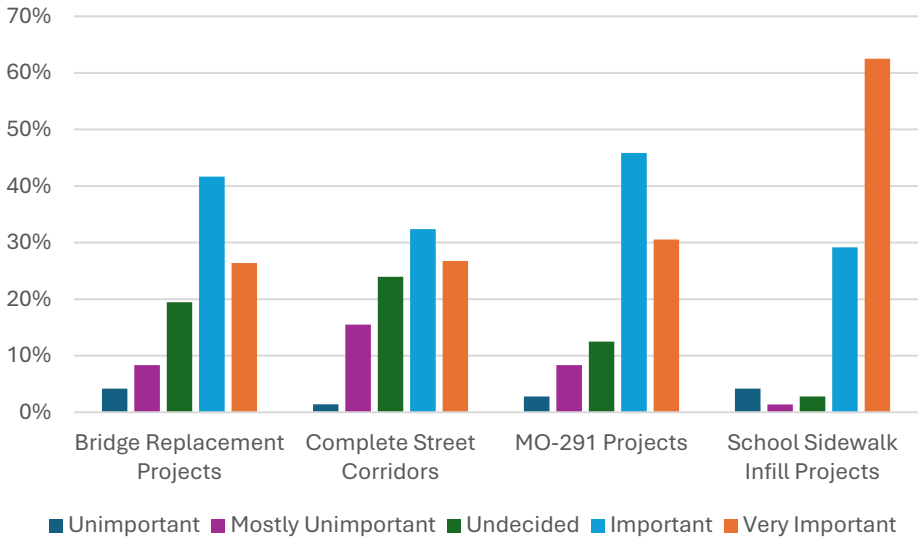
	Project	Scale	Cost (2024$)
Bridge Replacement Projects	Richfield Road Bridge	1 Bridge	$2.0M - $2.5M
	Sherril and Marilynne Avenue Bridges	2 Bridges	$1.75M - $2.0M
	Subtotal		**$3.75M - $4.5M**
Complete Street Corridor Projects	104th Street Reconstruction: *City limits to Church Rd*	~0.5 mi	$10.0M - $12.0M
	Birmingham Road: *Melissa Street to South of CPKC Railroad Tracks*	~0.5 mi	$10.0M - $12.0M
	Church Road: *Charlie's Car Wash Entrance to Camille Street*	~2.2 mi	$25.0M - $27.0M
	Glenn Hendren Drive: *MO-291 to Lightburne Street*	~2.1 mi	$24.0M – $27.0M
	Lightburne and Leonard: *MO-291 to Doniphan Street*	~1.1 mi	$5.0M –$7.0M
	Lightburne Street North: *Doniphan Street to US-69*	~1.9 mi	$25.0M –$28.0M
	Mill Street: *Liberty Drive to Lightburne Street*	~0.5 mi	$1.5M –$2.5M
	Shepherd Road: *Heartland Drive to East of MO Route B*	~0.7 mi	$12.0M - $14.0M
	Withers Road: *Liberty Drive to Homestead*	~1.2 mi	$2.0M - $3.0M
	Subtotal	**~10.7 mi**	**$114.5M - $132.5M**
MO-291 Corridor Projects	MO-291 Corridor Walkability Improvements *Kansas Street to Leonard Street*	**1.5 mi**	$3.0M – $4.0M
	MO-291 Corridor Intersection Safety Improvements *Liberty Drive to Leonard Street*	**3 ints**	$13.0M – $14.0M
	Subtotal		**$16.0M - $18.0M**
School Sidewalk Infill Projects	Elementary School Sidewalk Infill *Within ½ mile of LPS Elementary Schools*	2.2 mi	$2.5M – $3.5M
	Middle School Sidewalk Infill *Within ½ mile of LPS Middle Schools*	2.4 mi	$3M – $4M
	Subtotal	**4.6 mi**	**$5.5M – $7.5M**
Current Capital Improvement Program Total (in 2024 dollars)			**$139.75M - $162.5M**

Figure 28: Current Capital Improvement Program (CIP) Needs Overview Map



No formal priority has been established within the program list. However, public sentiment appears to rank the school sidewalk infill projects most highly. **Figure 29** summarizes the results of the public online survey, in which respondents were asked how important each of the types of projects are to supporting the mobility of Liberty residents.

Figure 29: Online Survey Response to CIP projects



Appendices

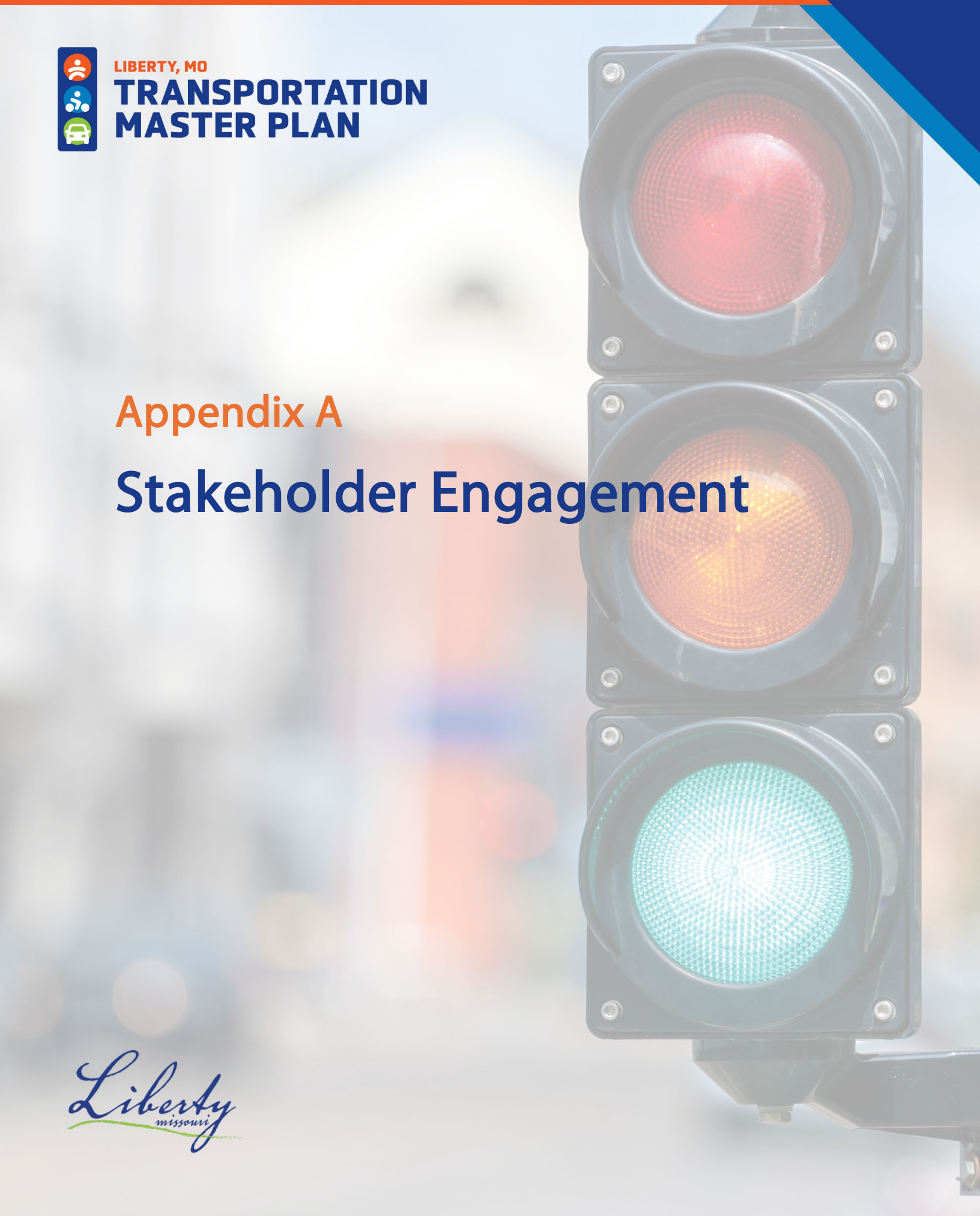
Stakeholder Engagement Materials

Current Capital Improvement Program (CIP) Memo

Traffic Impact Study Guidelines

LIBERTY, MO

TRANSPORTATION MASTER PLAN



Appendix A

Stakeholder Engagement

Liberty missouri

LIBERTY, MO
TRANSPORTATION MASTER PLAN

Liberty missouri

Advisory Committee Meeting #1

August 15, 2024

2:00 pm – 3:30 pm

Liberty City Hall Council Chambers

Agenda

- Introductions
- Plan Background and Purpose
- Existing Conditions Overview
- Future Forecast Overview
- Near-term Capital Improvement Program
- Next Steps

Introductions

City of Liberty Staff Leadership:

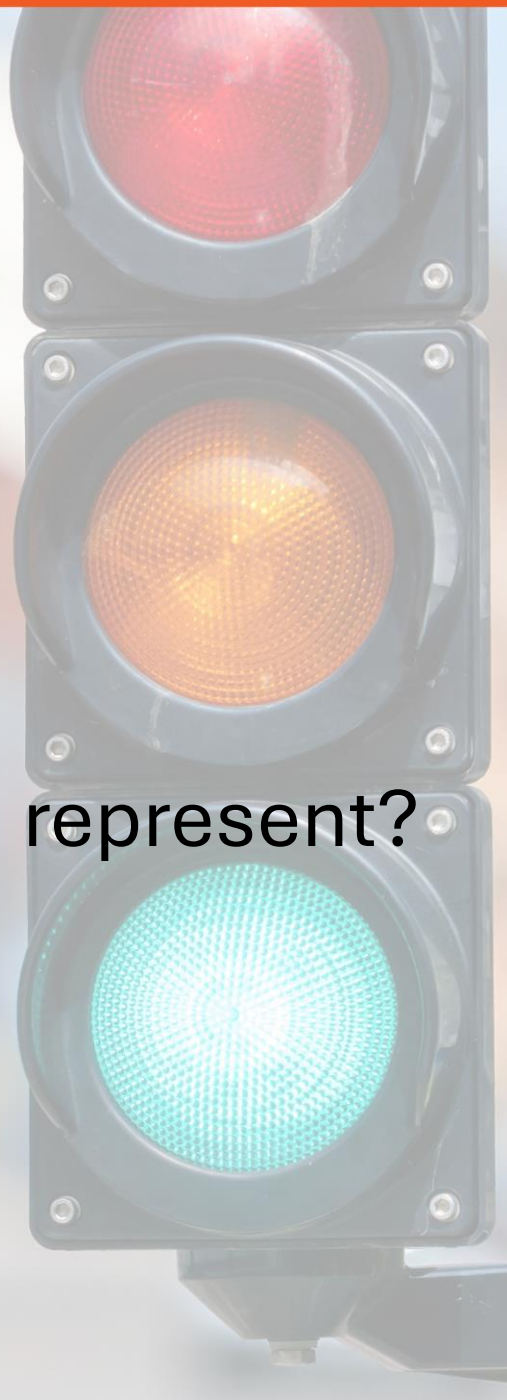
- Sherri McIntyre
- John Findlay
- Joshua Martinez

Consultant Facilitators:

- Christopher Kinzel
- Jay Aber
- Molly Nick

Introductions

- What is your name and organization that you represent?
- What do you love about Liberty?



Plan Background and Purpose

Planning History in Liberty

2002 **Parks and Open Space Master Plan** Transportation Elements:

- Linear parks/trails
- Street corridor enhancements
- Future Trails

2008 **Liberty for All** Transportation Elements:

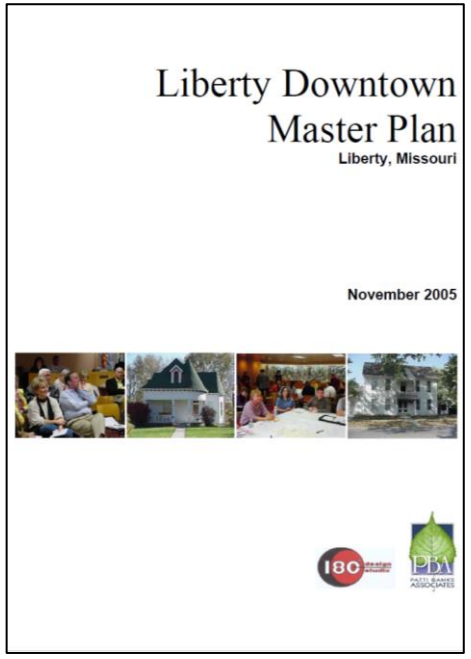
- Safety, maneuverability, efficiency
- Walking, bicycling, driving, riding
- Promote economic development
- Road surface conditions

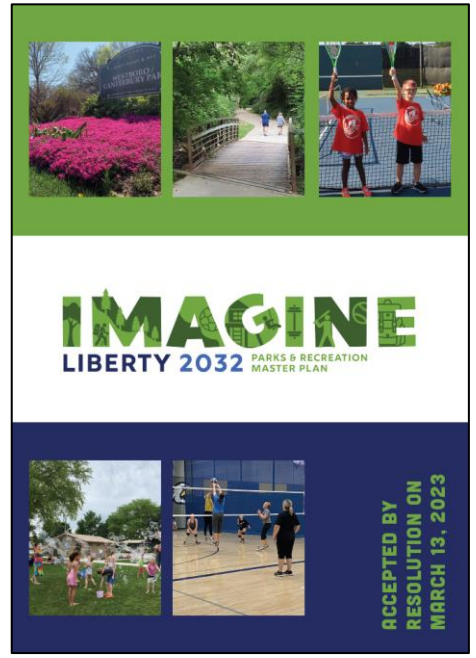
2005 **Liberty Downtown Master Plan** Transportation Elements:

- Pedestrian access to downtown
- Traffic calming on downtown streets
- Main Street streetscape, ped experience

2023 **Imagine Liberty 2032 – Parks & Recreation Master Plan** Transportation Elements:

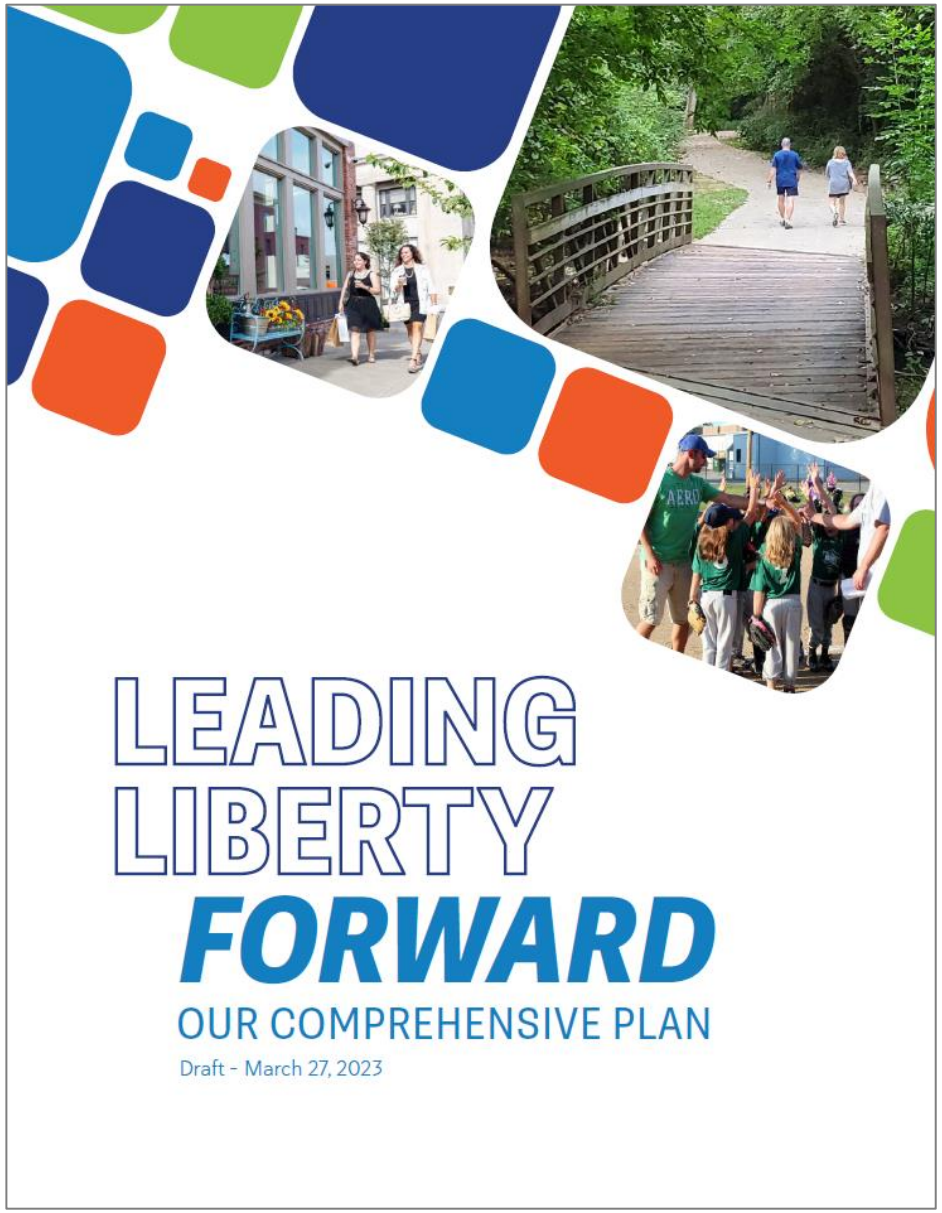
- Walking and biking trails
- Enhanced streetscape routes
- Regional and local trail system





Leading Liberty Forward Comprehensive Plan

Liberty aspires to be a vibrant, connected community that considers the needs of all people, while celebrating its history and hometown feel.



Leading Liberty Forward Core Values

Connected Community (CC)

Liberty has **invested heavily in its transportation network** for both **vehicular and non-vehicular** traffic. The city has worked to expand **pedestrian and bicycle connectivity** throughout the City with an extensive network of sidewalks and trails.

While significant progress has been made throughout the community to **improve traffic flow and safety**, there is still work to be done to ensure safe travel throughout the City **as growth and development continues**.

Leading Liberty Forward Mobility Framework

Much of the transportation network within the City is well defined and serves the community well with a mixture of travel modes. **A balanced transportation network enhances development, the quality of life, and equity for all users while balancing the ongoing costs and maintenance** of what is often the single largest investment of a city.

To address this, it is important to understand the long-term vision of the community, including what types of places are planned, **where enhancements to the existing network should be explored, how to leverage available resources to improve existing roadways and where to preserve right-of-way for potential future needs**.

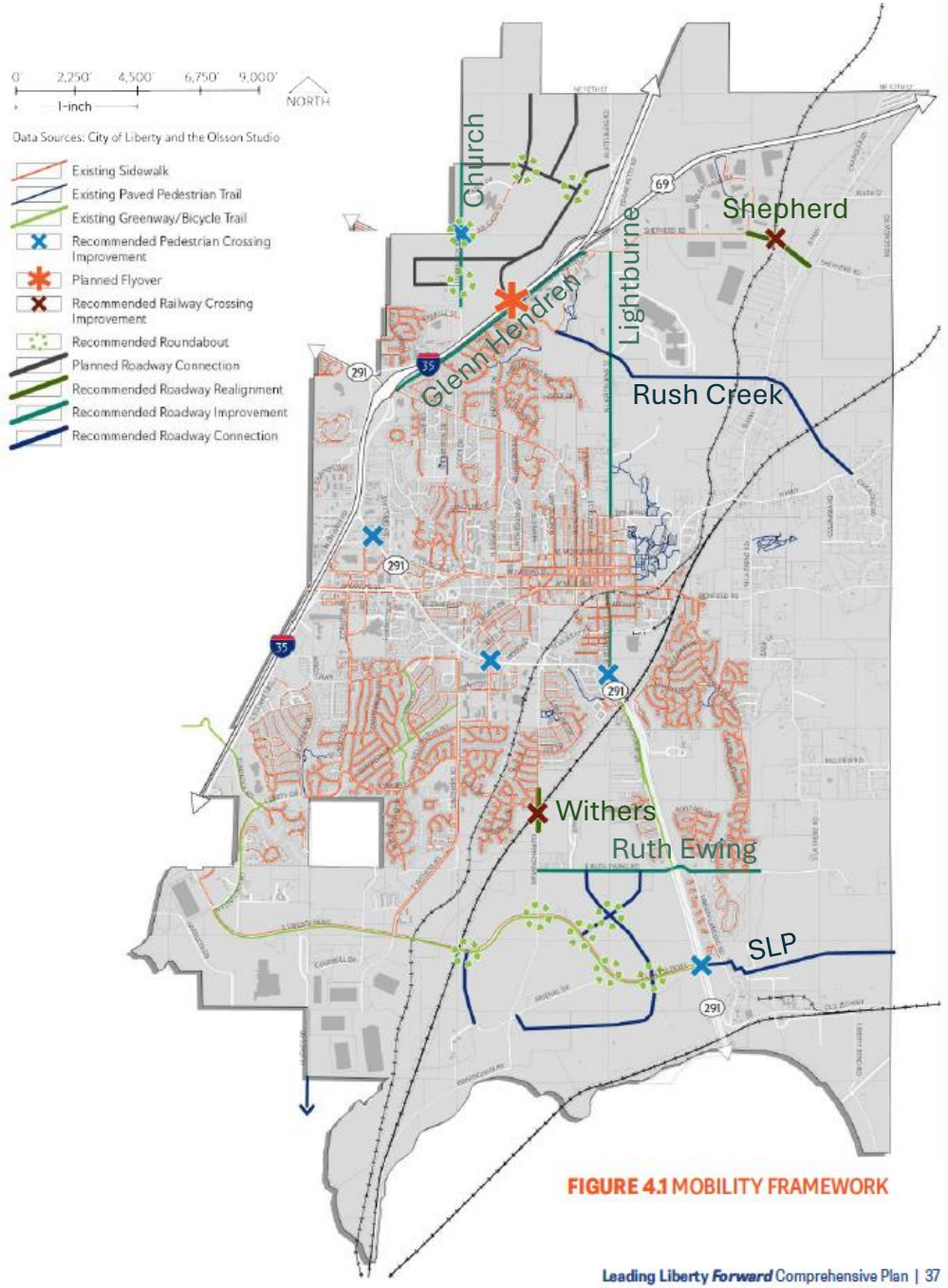


FIGURE 4.1 MOBILITY FRAMEWORK

Transportation Master Plan Overview

Plan Purpose:

Develop a plan to maintain, enhance, and expand Liberty's transportation infrastructure to serve the needs of its citizens and to support the City's larger vision for sustainable growth and progress.

Plan Goals:

- Provide a holistic **road-map for future transportation connectivity and capacity**
- Serve as a guide for developers and the City with regard to transportation **infrastructure needs associated with development**
- **Update and expand City policies** to support the City's transportation vision
- Create plan elements that are easily integrated into the City's daily business practices
- Consider regional and federal priorities in order to capitalize on available non-city infrastructure funding in the future.

Transportation Master Plan Scope

Stakeholder Engagement
- Advisory Committee
- Public Online Survey

Existing Conditions Analysis

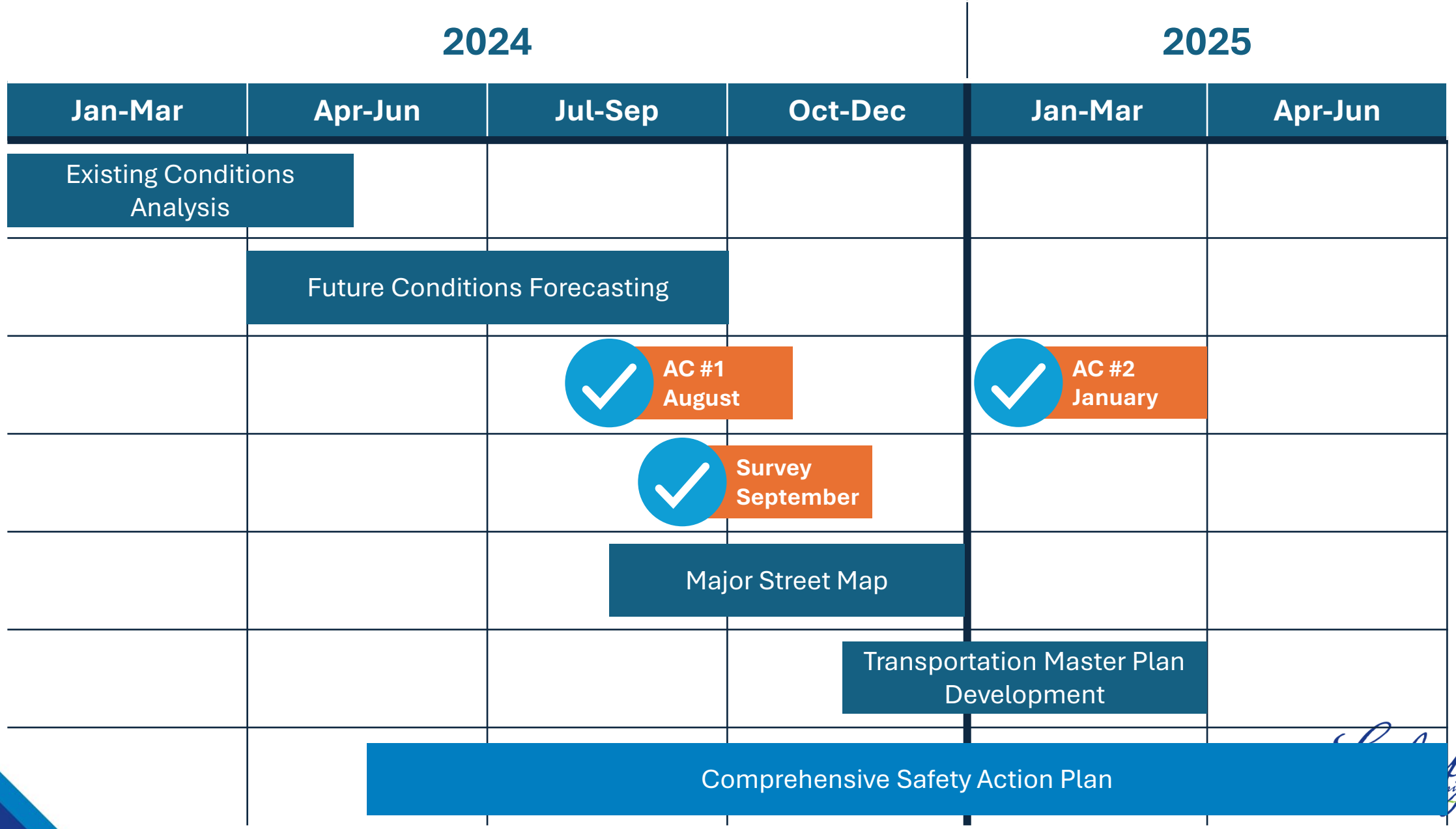
Future Conditions Forecasting

Near-term Capital Projects

Major street map
- Street typologies
- Street elements
- Future connections

Final Plan
- Policy recommendations

Transportation Master Plan Schedule



Transportation Master Plan + Comprehensive Safety Action Plan

Transportation Master Plan

Focus: Transportation Mobility

- Traffic analysis
- Future growth projections

Outcomes:

- Major street map
- Street elements related to mobility
- Policies related to traffic studies and development
- Capital Improvement Program infrastructure projects

Comprehensive Safety Action Plan

Focus: Traffic Safety

- Safe streets
- Safe user behavior and speeds
- Multimodal mobility

Outcomes:

- High Injury Network
- Safety countermeasures
- Policies related to project prioritization, street design, enforcement, education
- Capital Improvement Program infrastructure projects

Liberty missouri

Existing Conditions Overview

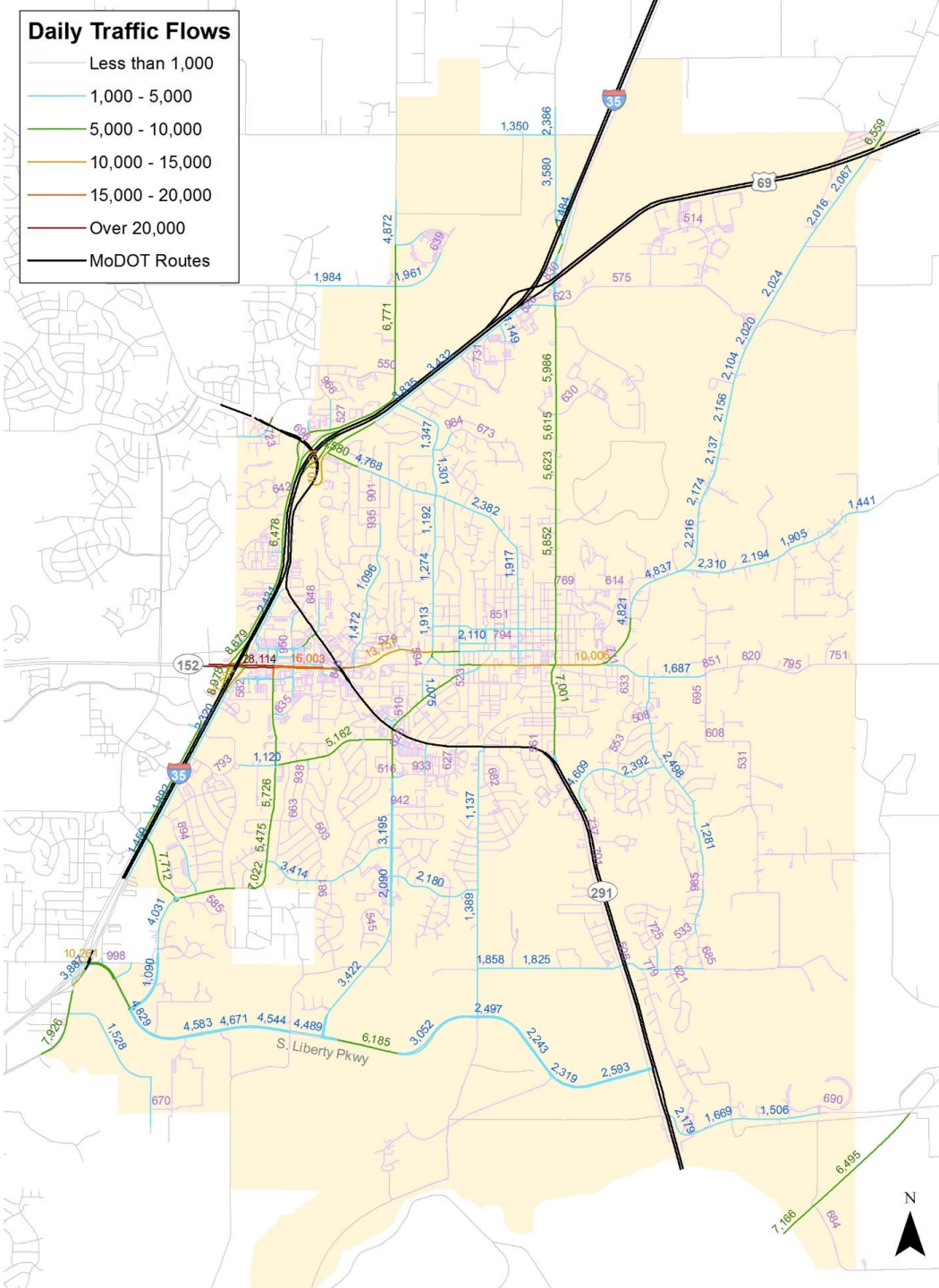
Existing Conditions Overview

Highest traffic volume roads include:

- Kansas Street
- MO-291 Highway

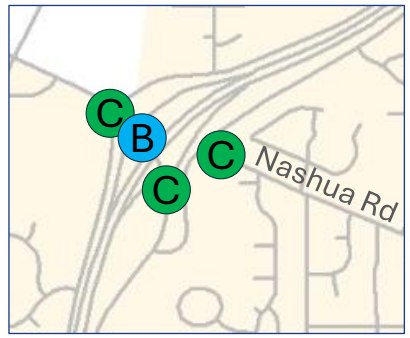
High traffic volume roads include:

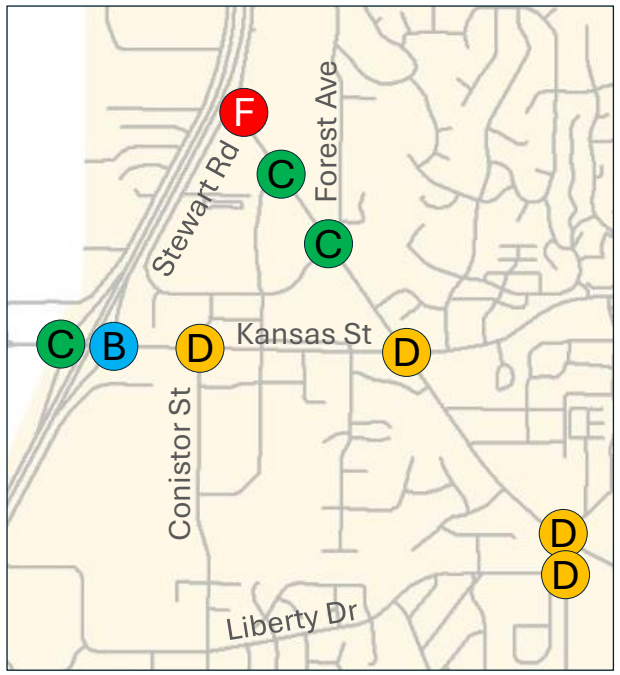
- Mill Street
- Lightburne Street
- Leonard Street
- Liberty Drive
- Church Road
- Flintlock Road

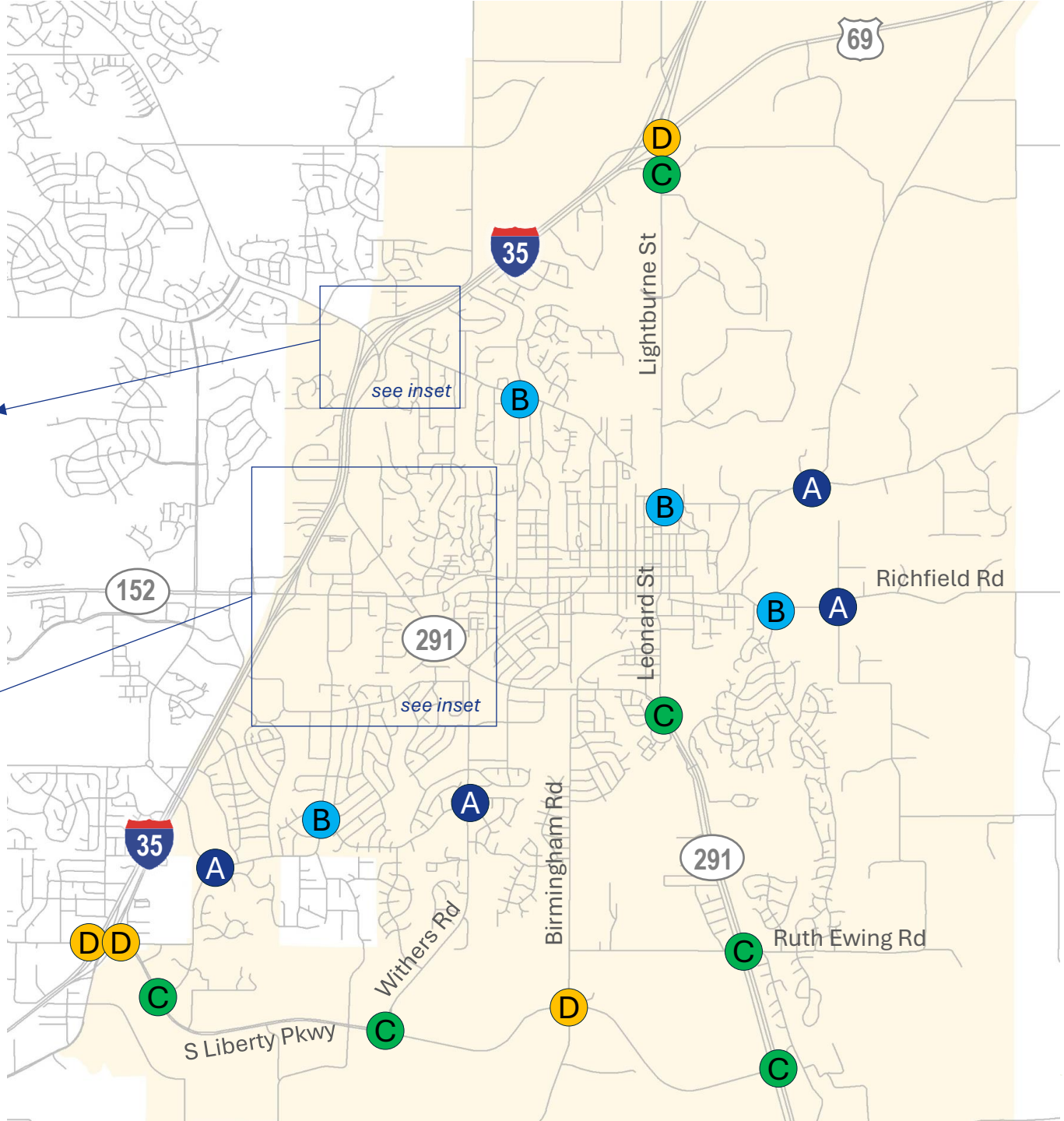


Existing Conditions Overview

PM Peak Hour LOS



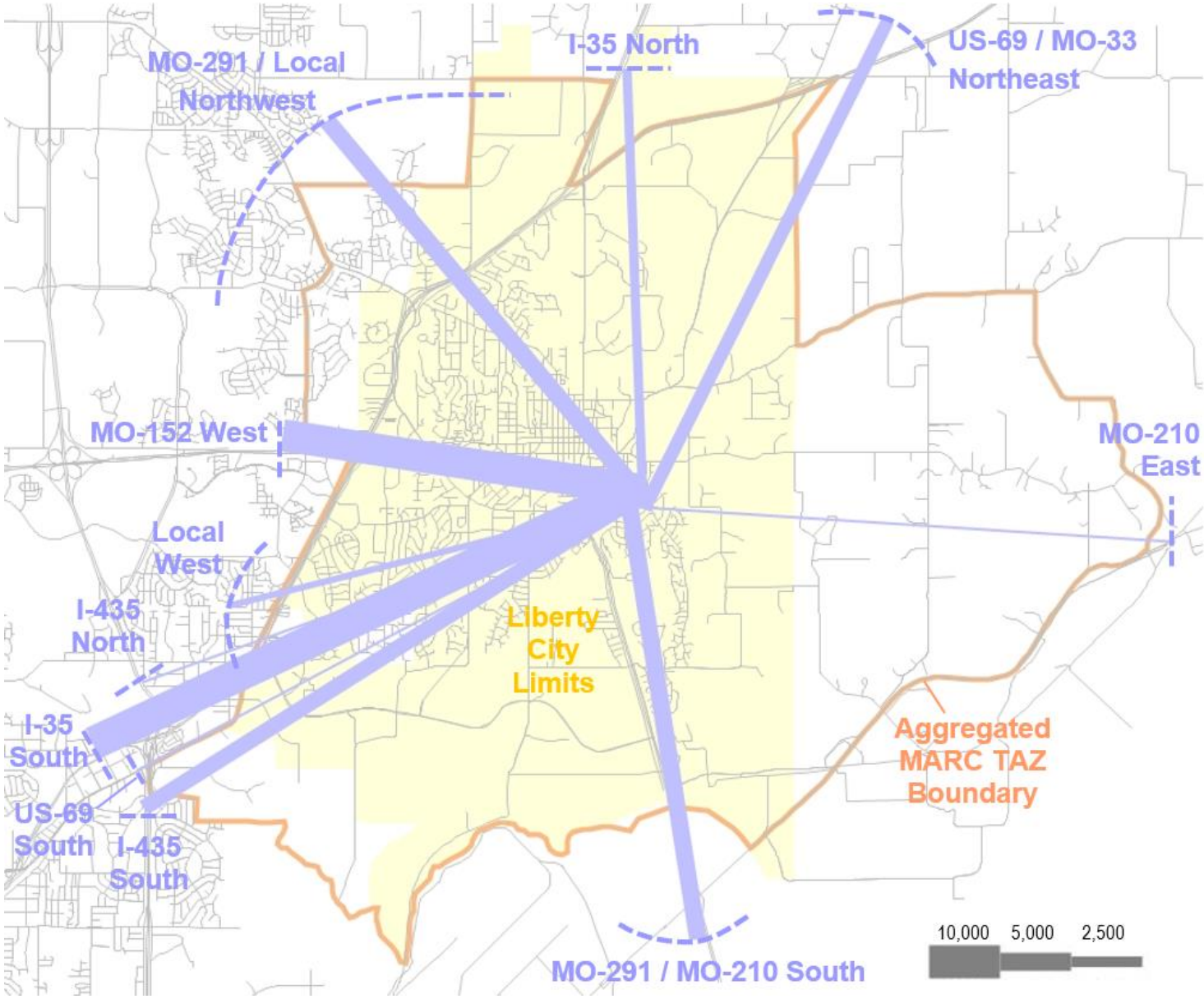




Existing Conditions Overview

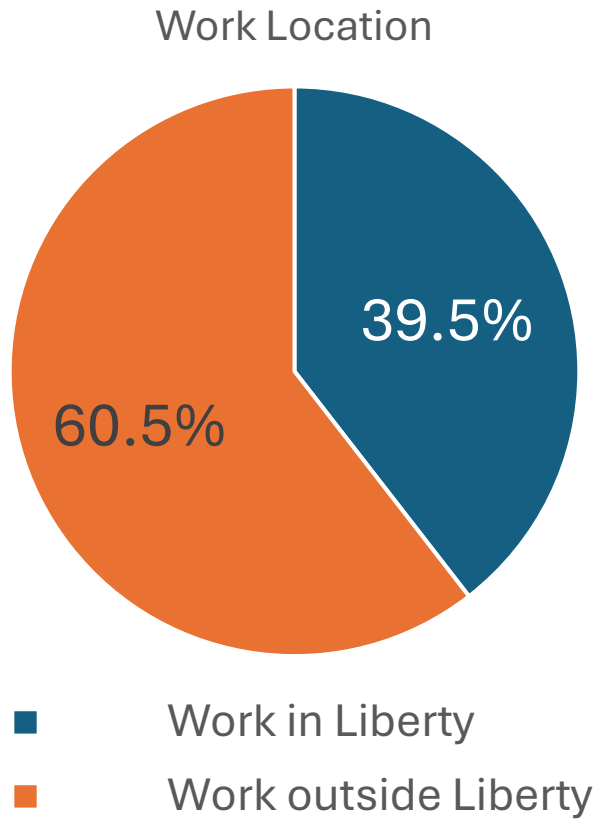
Daily peak hour trips (primarily commuter trips)

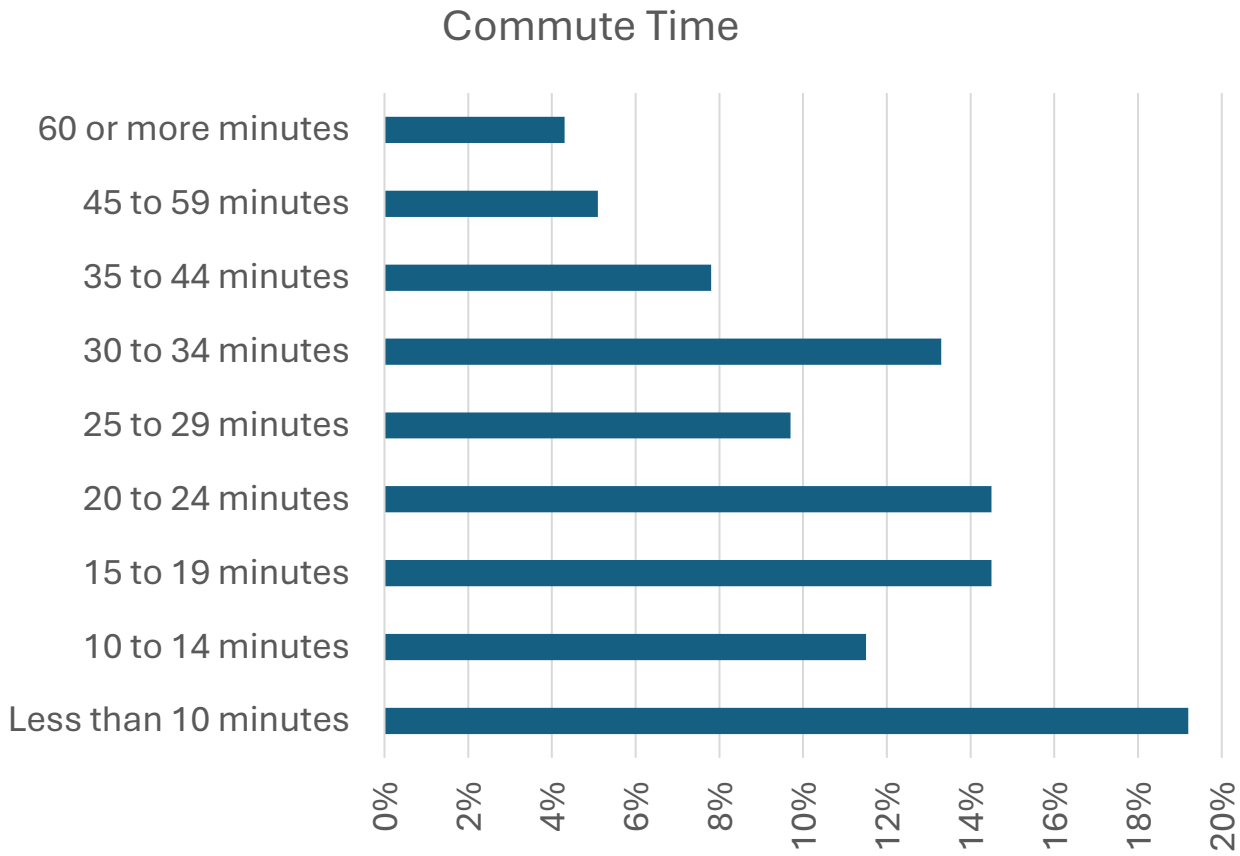
- I-35/I-435 to the south
- MO-152 to the west
- MO-291 to the northwest
- MO-291/MO-210 to the south and east



Existing Conditions Overview

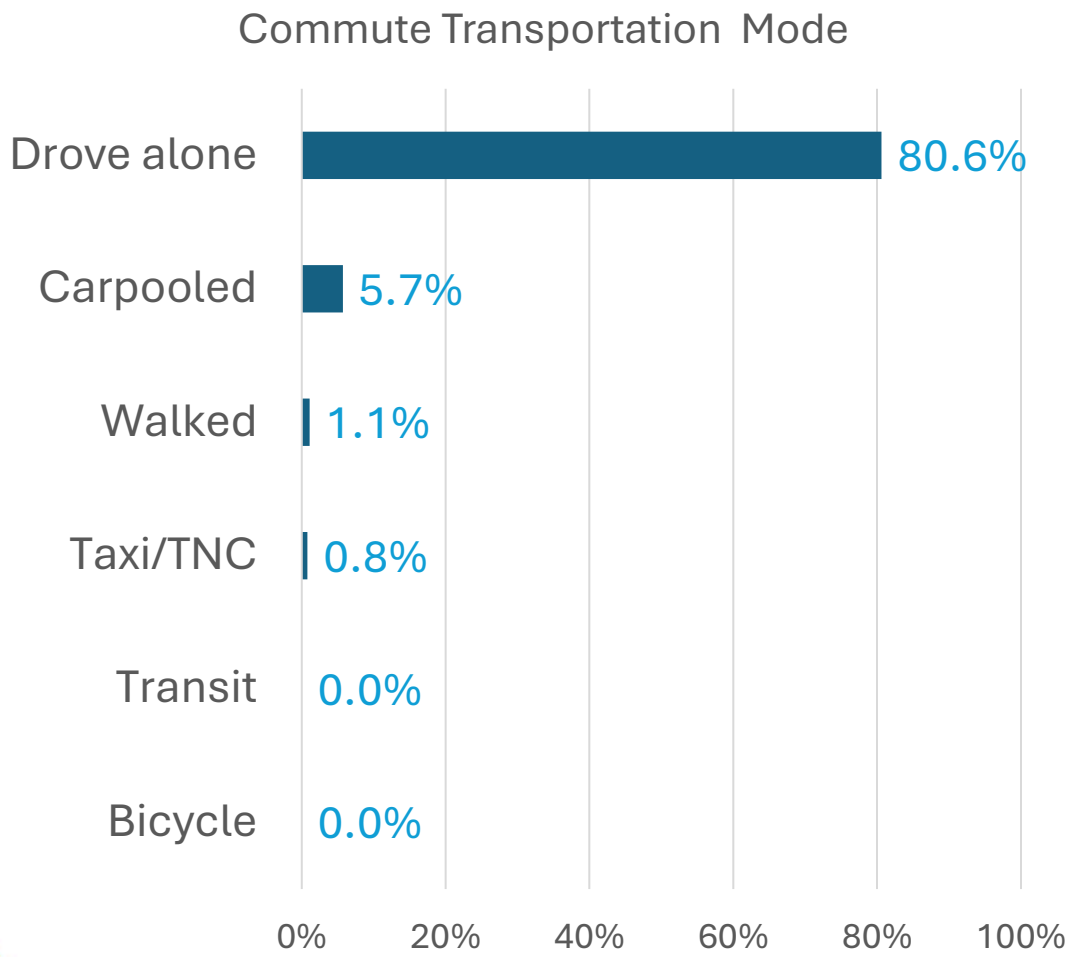
- 60% of working-age Liberty residents work outside of Liberty
- 12% of working-age Liberty residents work from home
- Average commute time = 23 minutes

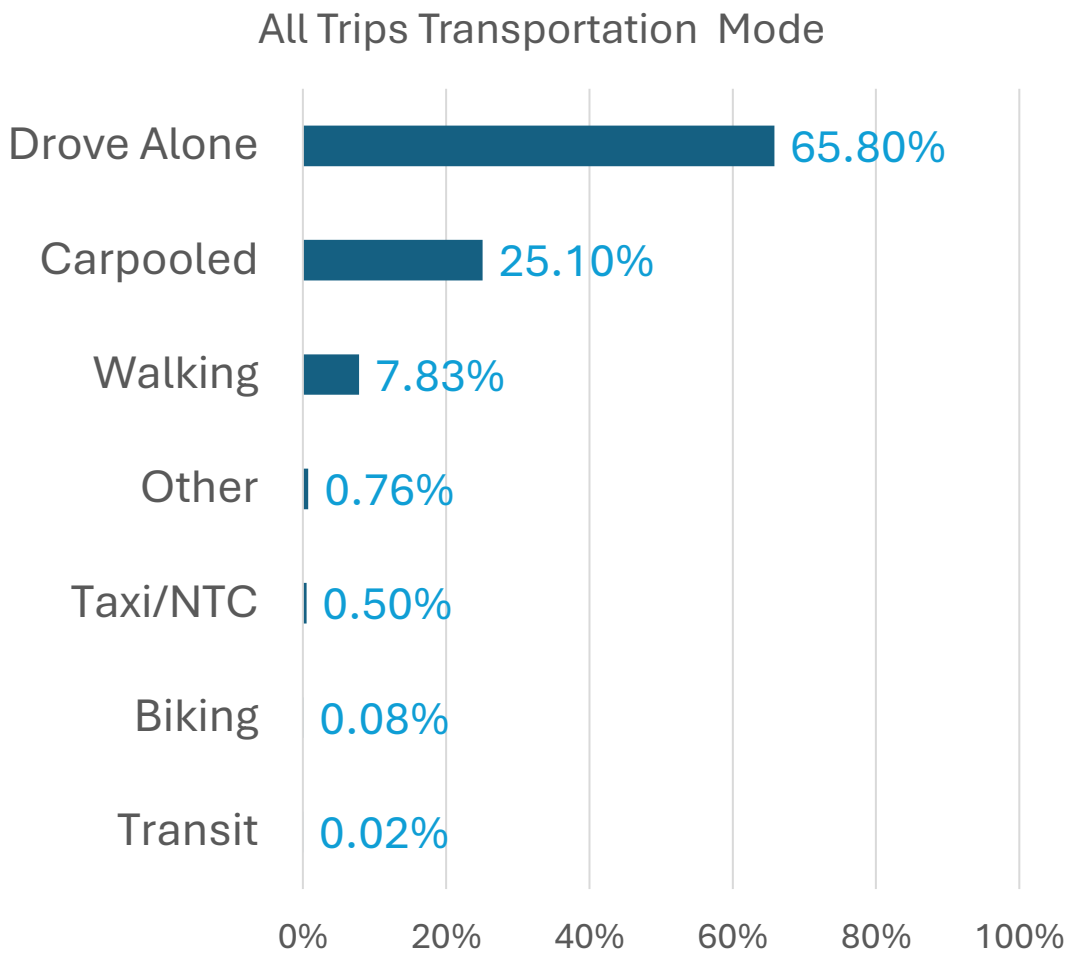




Existing Conditions Overview

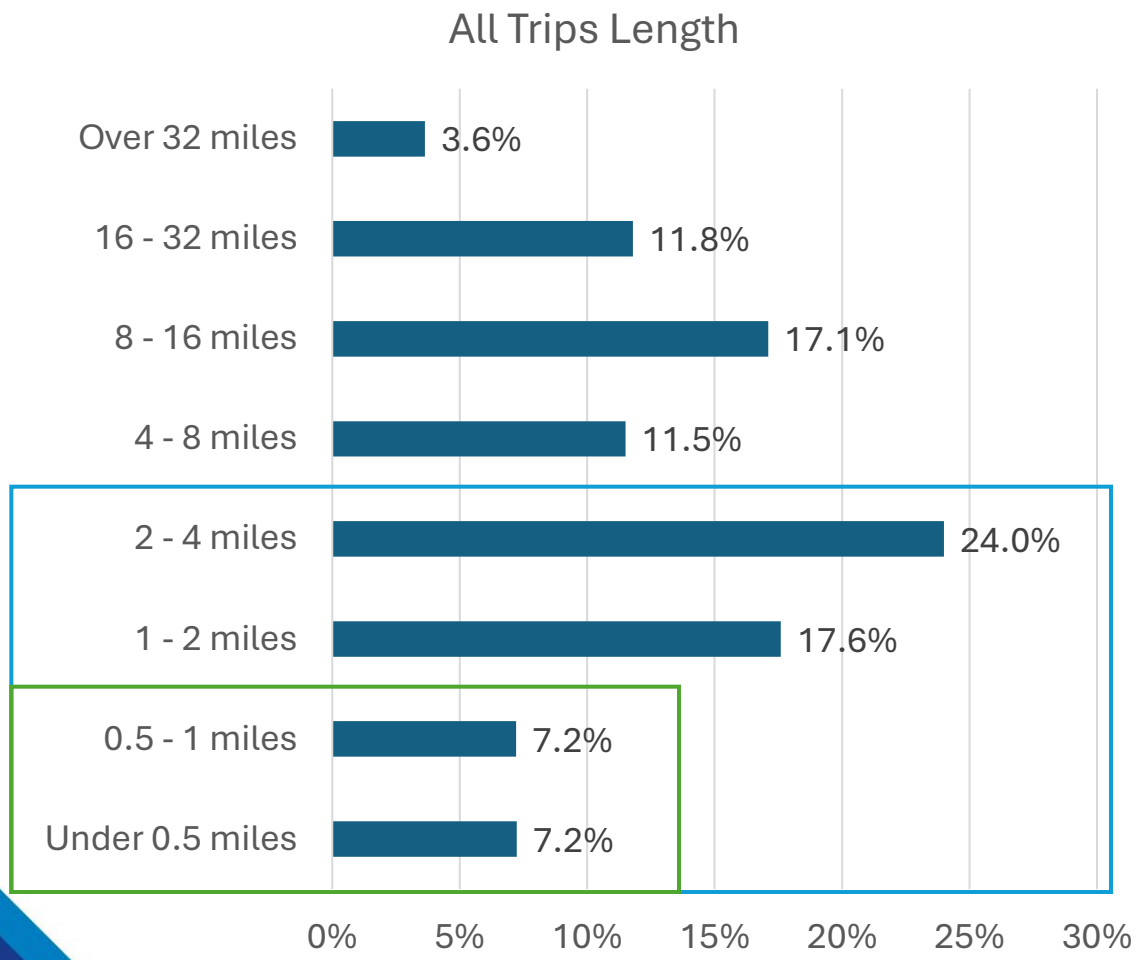
- Commuter trips have more single-occupancy vehicle trips
- All trips include more carpooling and walking

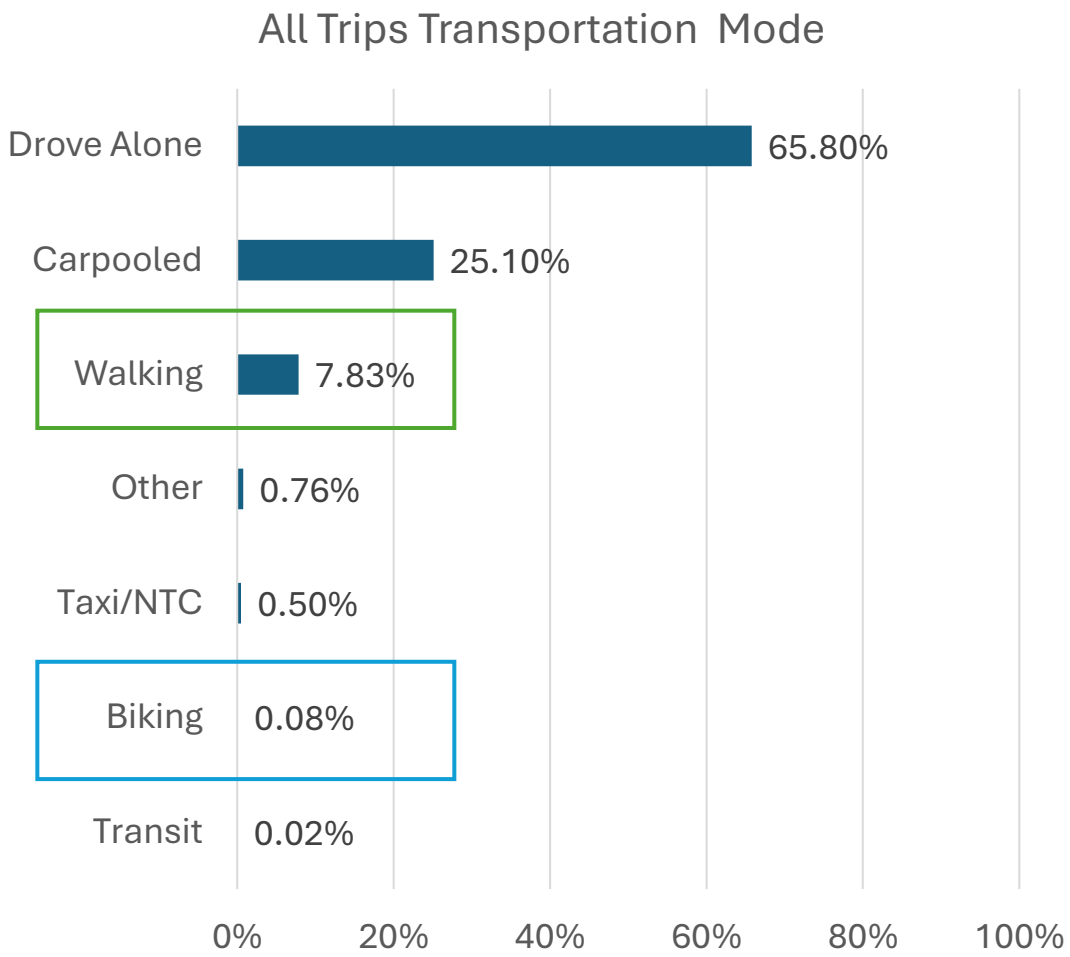




Existing Conditions Overview

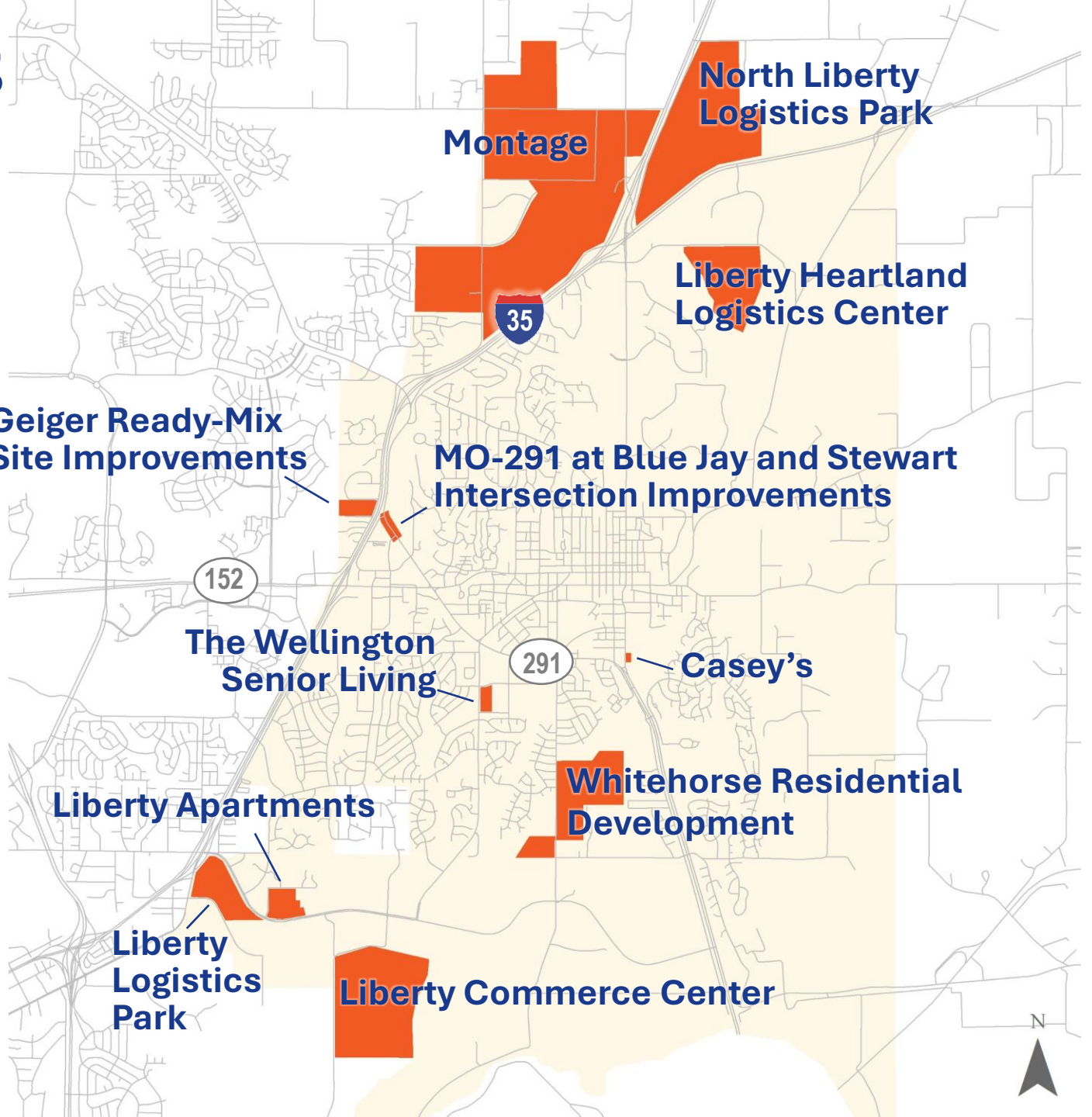
- 14% of trips in Liberty are <1 mile (walkable range)
- 56% of trips in Liberty are <4 miles (bikeable range)





Existing Conditions Overview

Many recent / proposed developments in Liberty



Existing Conditions Discussion Questions

- Where do you see transportation issues in the community today?
- Where could we leverage transportation investments for economic development and quality of life today?

Future Forecast Overview

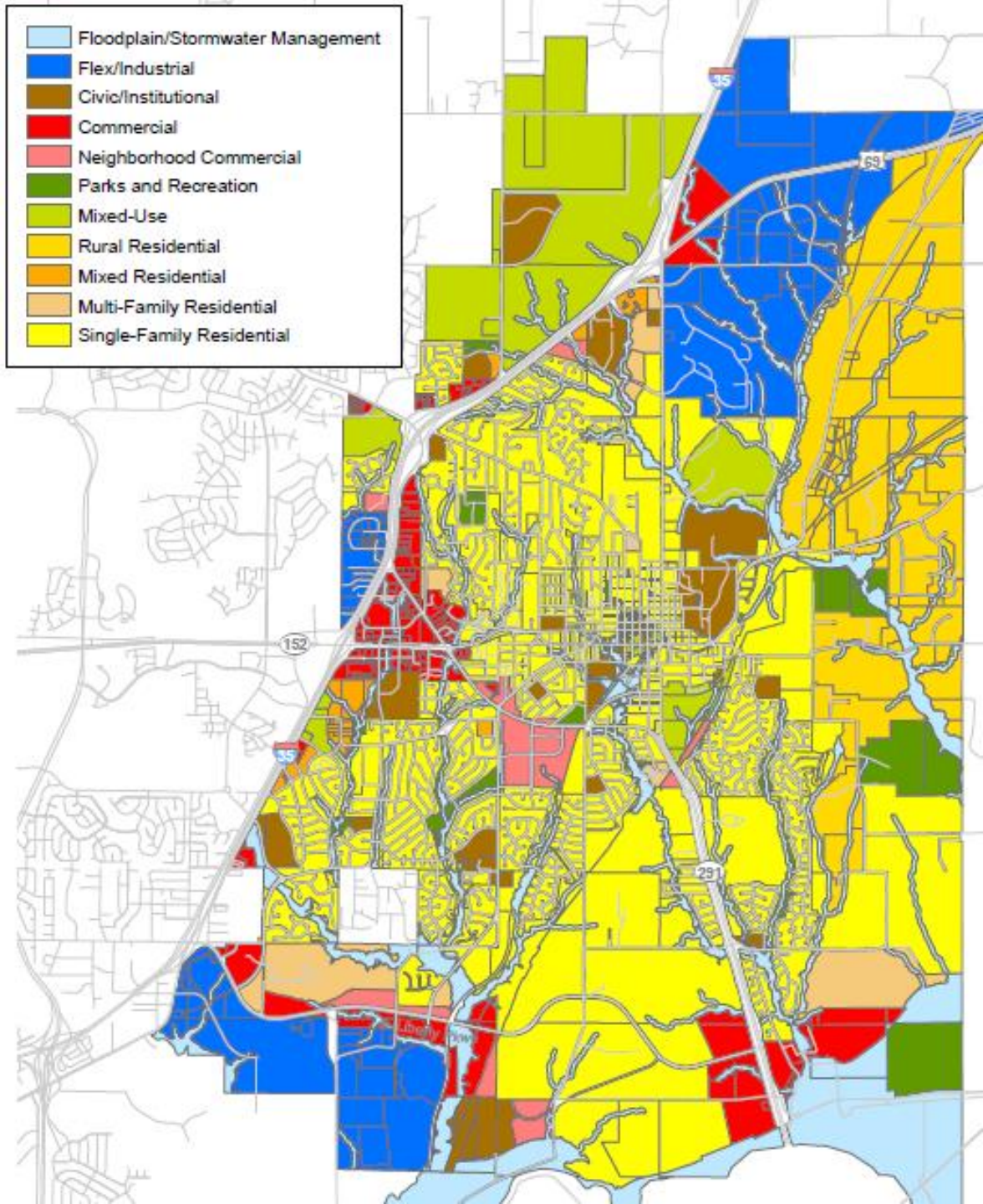
Future Forecast Overview

Future land use map

- Developed with Leading Liberty Forward

Traffic conditions projections

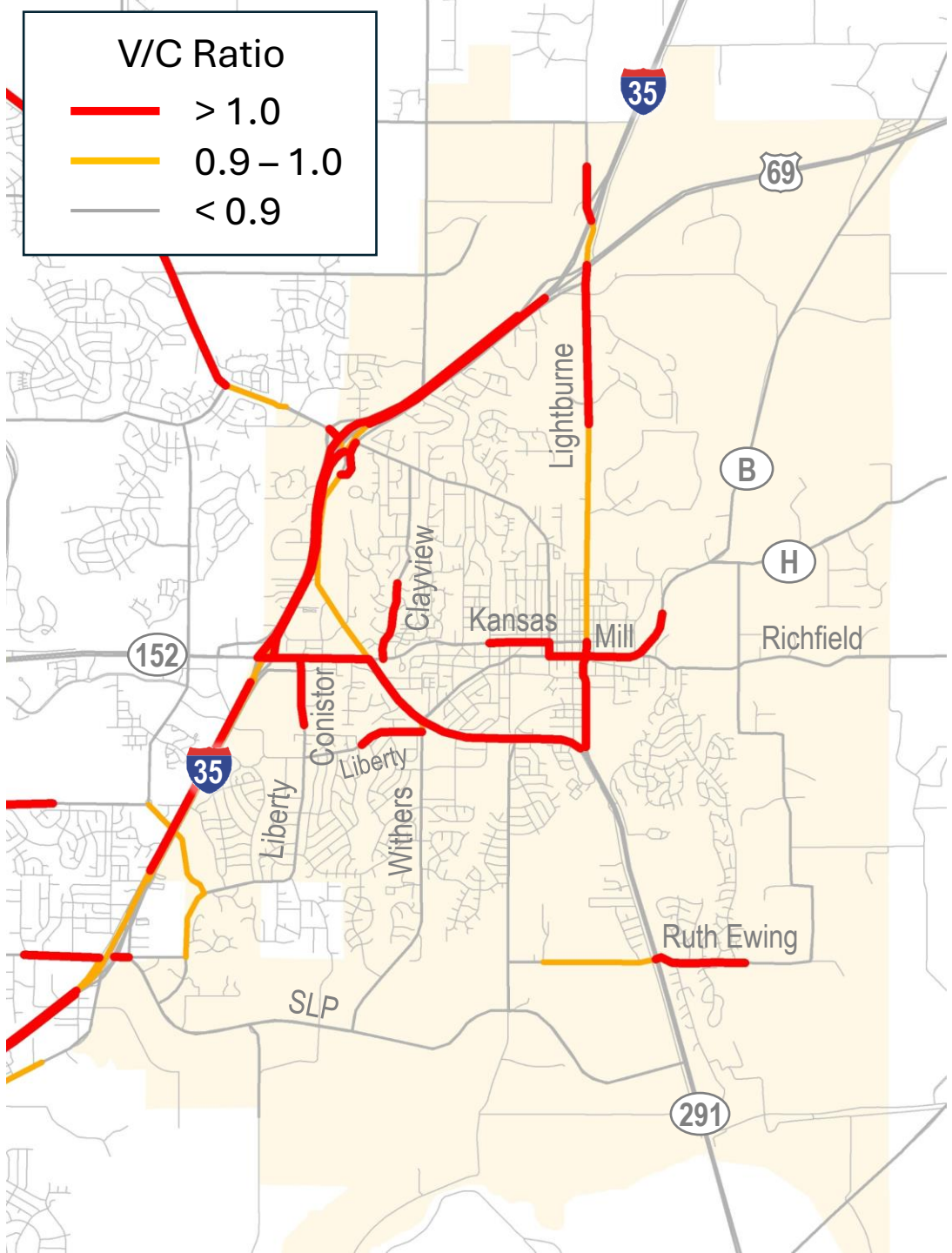
- **Traffic volume** projected based on future growth in line with future land use map (Assuming ~50% of open land in Liberty is developed)
- **Traffic congestion** mapped based on traffic volume compared to road capacity/number of lanes (volume/capacity ratio)



Future Forecast Overview

Future Traffic Congestion Projected on parts of:

- MO-291 Highway
- Kansas Street
- Lightburne Street
- Leonard Street
- Mill Street/Route H
- Liberty Drive
- Conistor Street
- Ruth Ewing Road
- Clayview Drive



Future Conditions Discussion Questions

- Where do you anticipate transportation issues emerging in the community in the future?
- Where could we leverage transportation investments for economic development and quality of life in the future?

Near-term Capital Improvement Program Projects

Near-term Capital Improvement Program

Developed draft project list based on:

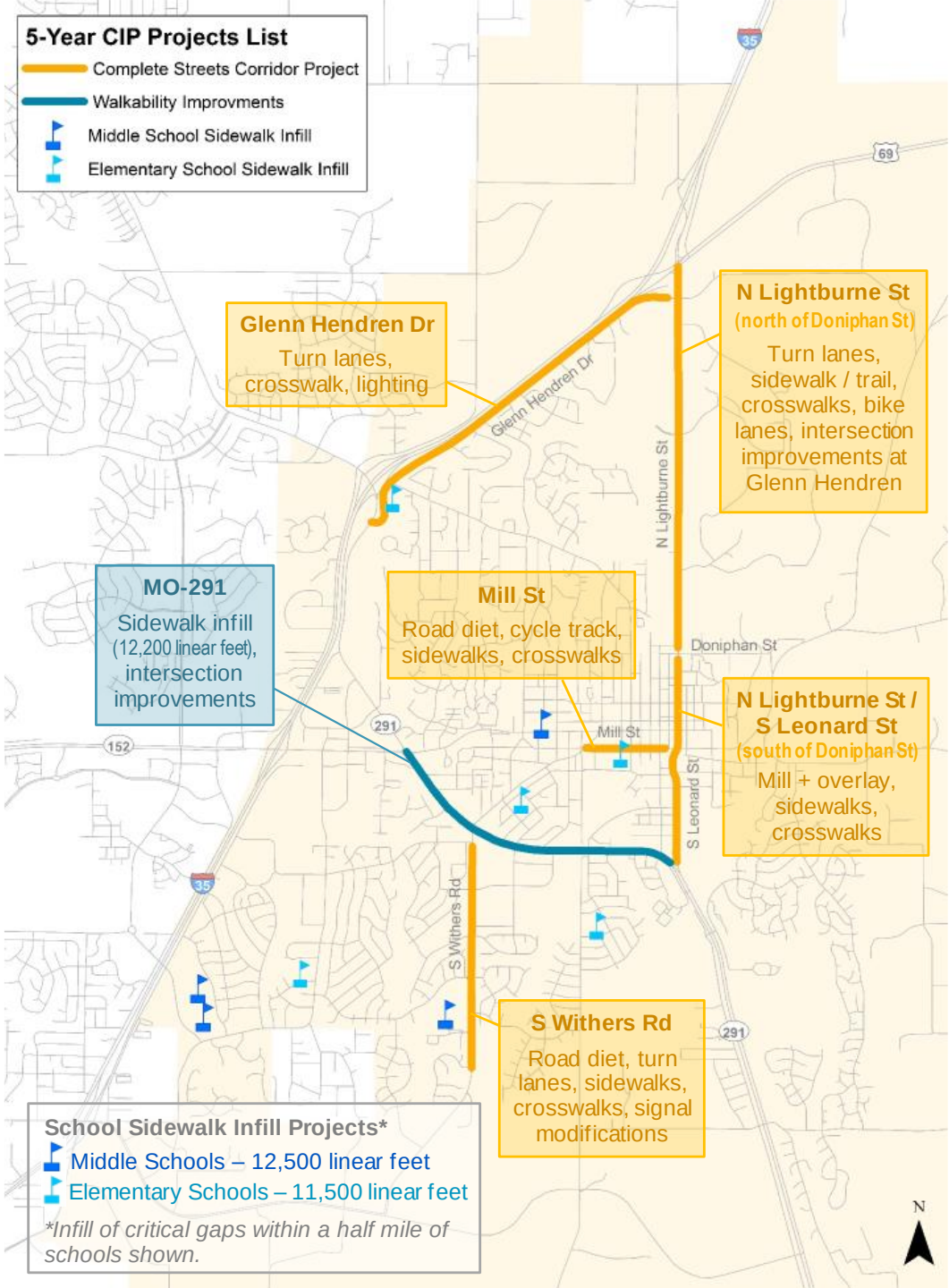
- Leading Liberty Forward priorities
- Future growth areas
- Areas with traffic congestion
- Recent feedback from public and elected officials

Three primary project types:

- MO-291 walkability and intersection improvements
- Complete street corridor improvements throughout the city
- Sidewalk construction projects near public schools

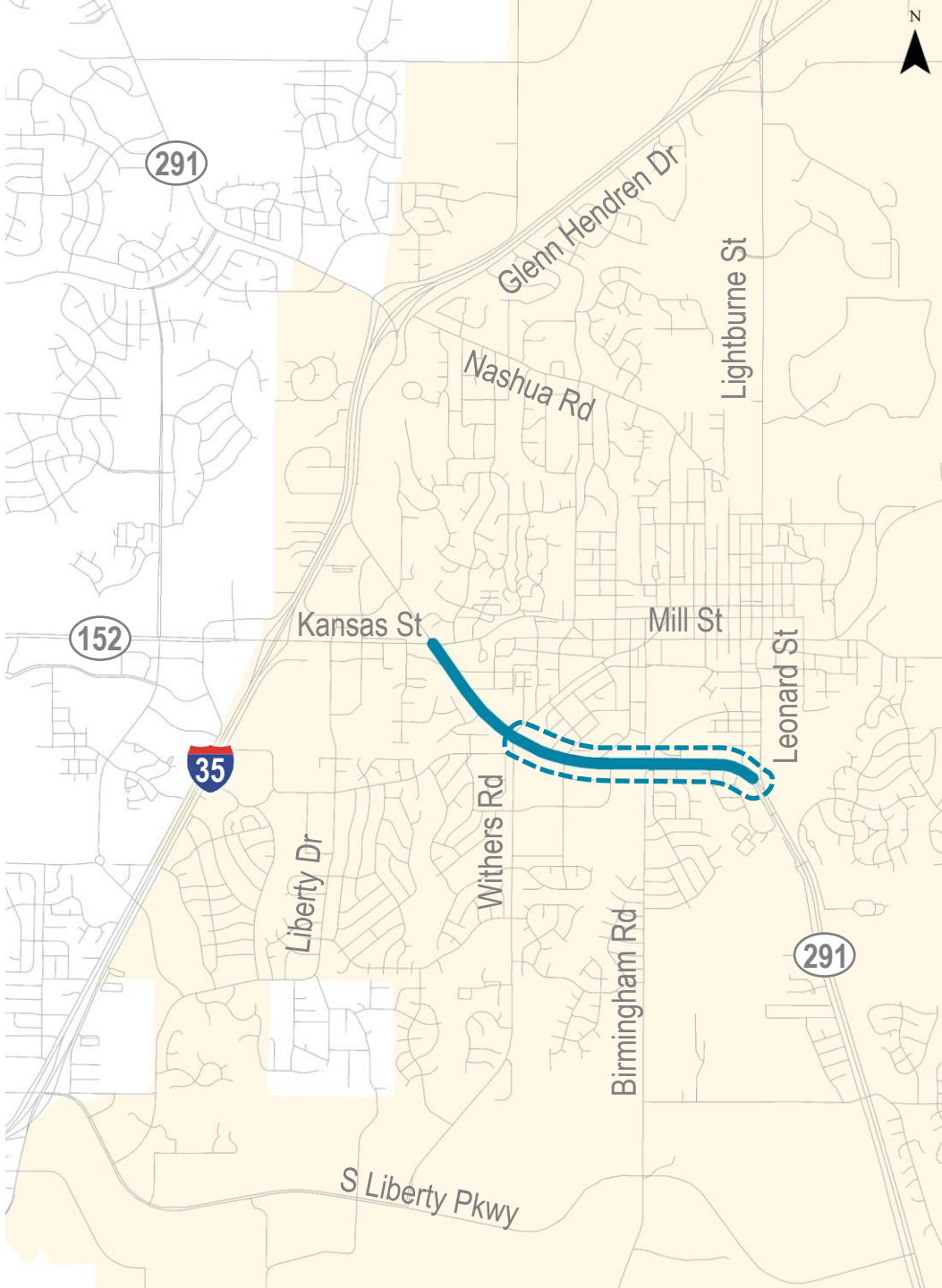
Near-term Capital Improvement Program

Project Overview	Project Scale	Project Cost (2024 dollars)
School Sidewalk Infill Projects	4.6 miles (~58 blocks)	$5.5M – $7.5M
MO-291 Corridor Projects	1.5 miles (~20 blocks)	$16M – $18M
Complete Street Corridor Projects	6.8 miles (~90 blocks)	$57.5M – $67.5M
Total	**12.9 miles (168 blocks)**	**$79M – $93M**



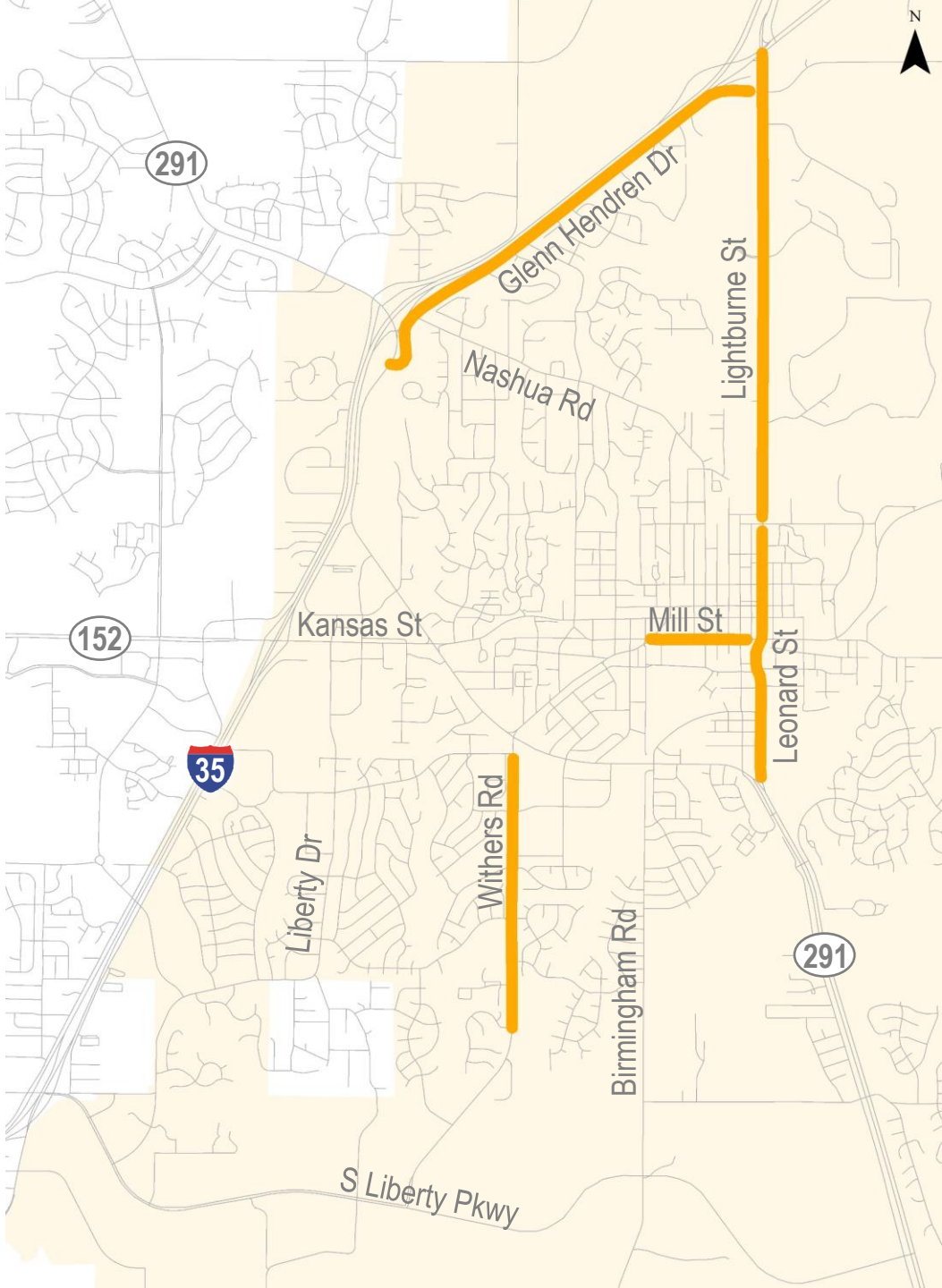
MO-291 Corridor Projects

MO-291 Corridor Projects	Project Scale	Project Cost (2024 dollars)
MO-291 Corridor Walkability Improvements *Kansas Street to Leonard Street*	1.5 miles (~20 blocks)	$3M – $4M
MO-291 Corridor Intersection Safety Improvements *Liberty Drive to Leonard Street*	3 Intersections (Within ~20 blocks)	$13M – $14M
Total	**1.5 miles (~20 blocks)**	**$16M – $18M**



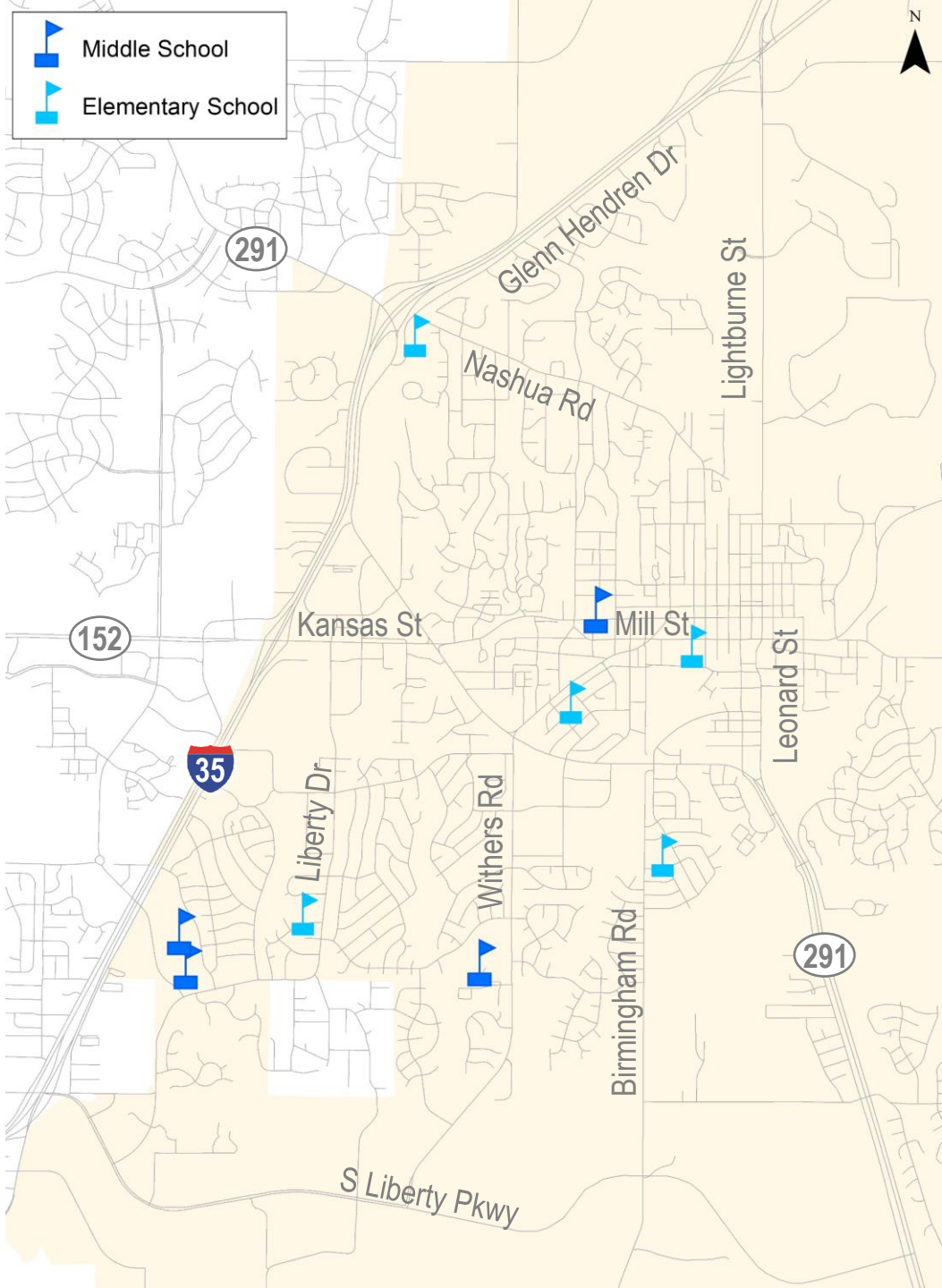
Complete Street Corridor Projects

Complete Street Corridor Projects	Project Scale	Project Cost (2024 dollars)
Mill Street Complete Street Corridor Project *Liberty Drive to Lightburne Street*	0.5 miles (~ 7 blocks)	$1.5M –$2.5M
Withers Road Complete Street Corridor Project *Liberty Drive to Homestead*	~1.2 miles (15 blocks)	$2M –$3M
Lightburne and Leonard Complete Street Corridor Project *MO-291 to Doniphan Street*	1.1 miles (~15 blocks)	$5M –$7M
Glen Hendren Drive Complete Street Corridor Project *MO-291 to Lightburne Street*	~2.1 miles (~28 blocks)	$24M – $27M
Lightburne Street North Complete Street Corridor Project *Doniphan Street to US-69*	~1.9 miles (~25 blocks)	$25M –$28M
Total	**6.8 miles** **(~90 blocks)**	**$57.5M – $67.5M**



School Sidewalk Infill Projects

School Sidewalk Infill Projects	Project Scale	Project Cost (2024 dollars)
Elementary School Sidewalk Infill *Within ½ mile of LPS Elementary Schools*	2.2 miles (~28 blocks)	$2.5M – $3.5M
Middle School Sidewalk Infill *Within ½ mile of LPS Middle Schools*	2.4 miles (~30 blocks)	$3M – $4M
Total	**4.6 miles** **(~58 blocks)**	**$5.5M – $7.5M**



Near-term CIP Discussion Questions

- What are our priorities in the near term?
- What are we missing?
- What other opportunities exist in the near term?

Next Steps

Next Steps

Transportation Master Plan

- Continue future forecast modeling scenarios
- Community online survey
- Major street map recommendations
  - Street Typologies
  - Typical cross-section and street elements

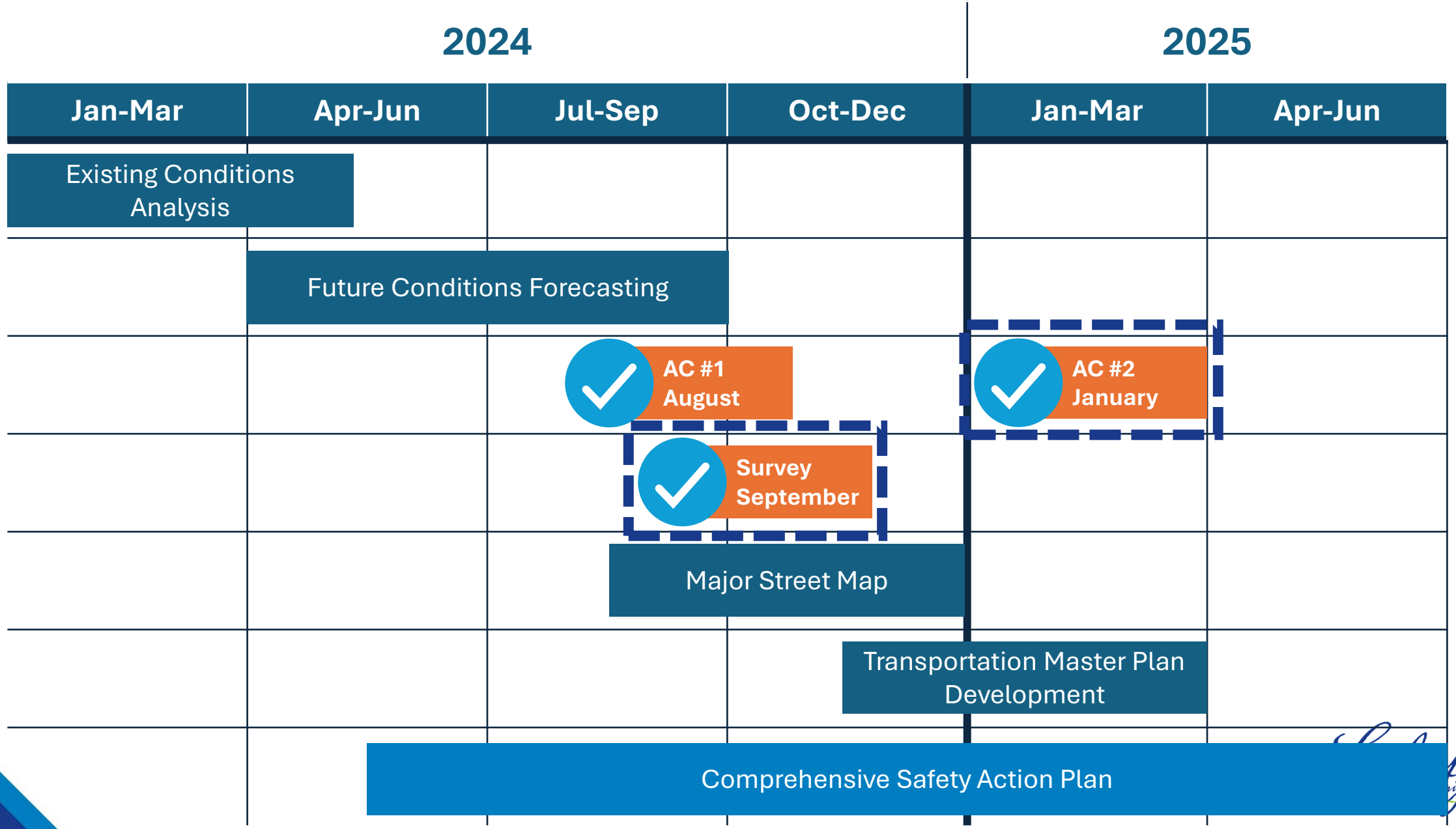
Comprehensive Safety Action Plan

- Data analysis
- Advisory Committee #1 in September

Community Online Survey

- What would you want to know from the public?
- Do you have any publications or other outlets to help us distribute the survey?

Transportation Master Plan Schedule



LIBERTY, MO
TRANSPORTATION MASTER PLAN

Liberty missouri

Thank you!

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Jay Aber

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Christopher Kinzel

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Advisory Committee Meeting #1

August 15, 2024

Introductions

Committee members were given the opportunity to introduce themselves to the group and comment about what they love about Liberty.

- Small town feel but close to KC
- On-street parking, traditional neighborhood development
- Community feel, people helping people, charm, hometown feel
- Arts, historic preservation, tree plan, sophisticated staff for size of city
- Historic downtown, unique, diverse population
- Schools
- Community support for public safety

Plan Background and Purpose

Information on the following topics was presented: Planning history and prior studies, the purpose / goals / scope / schedule for the current Transportation Master Plan (TMP) study, and the Comprehensive Safety Action Plan (CSAP) study, which is being conducted along a parallel track to the TMP effort.

Existing Conditions Overview

Information on the following topics was presented: Daily traffic volumes, study intersection levels of service, origin-destination / commute patterns, bikeable / walkable trip lengths, and recent development studies.

The committee was asked to comment on where they see existing transportation issues:

- What was the reason for selecting a project like MO-291 @ Stewart Road / Blue Jay Drive rather than MO-291 @ Liberty Drive / Withers Road near City Park?
- Kansas Ave near I-35 is a safety concern. Too much traffic and signals are not timed appropriately. People are constantly slamming on their brakes.
- Development studies typically do not look at traffic impacts outside the general vicinity of the proposed development, but all developments lead to increased traffic throughout Liberty. Developers are not held accountable for general population increases, but this does have an impact on Liberty's transportation needs.
- The Flintlock Flyover has been a very successful project. Similar investments in alternative routes could help alleviate over-crowded facilities like Kansas Ave.
- Is there a correlation between LOS and safety or are existing conditions just being assessed for operations? *Note that a much more in depth look at safety will occur as part of the CSAP.*

But in addition, there are some correlations that can be drawn between LOS and safety. Crashes tend to increase when traffic is flowing at higher speeds and crashes also tend to increase when traffic is overly congested. Therefore, facilities with LOS A-B and LOS E-F tend to be less safe than those with LOS C-D.

- Hallmark employs 1500-2000 people at their facility on North Lightburne Street, and about 30% of those are residents of Liberty. Having a local public transportation system would benefit those employees. *Note that Liberty has made an investment to participate in the IRIS program, which provides point-to-point service for a low fee.*
- The origin-destination and commuting flows show 60% of residents work outside of Liberty, but how many people are commuting into Liberty each day either for schools or employment, particularly some of the large employers like Hallmark?
- The investments the city has made in providing senior transportation services are appreciated. Continuing these services should be a priority.

Future Forecast Overview

Information on the following topics was presented: Future land use for the build-out of Liberty as developed for the Comprehensive Plan, Traffic volume projections for the 2050 horizon year, and corresponding future congestion that could be anticipated.

The committee was asked to comment on where they anticipate future transportation issues emerging:

- Will the recommendations of this study also be provided to MoDOT and KCMO, given that many of the areas shown to have issues are outside Liberty or serve as gateways to the city? *Note that the city understands that coordination with these other entities is and will continue to be crucial.*
- Is there still any consideration being given to connecting S. Liberty Parkway to La Frenz Road? This would include an extension to the east and north. *Note that the Comprehensive Plan does show an extension to the east. Any further extensions would need to consider topography and the presence of large estate lots in the area.*
- Along the S. Liberty Parkway, has the city considered construction of grade-separated interchanges or overpasses rather than installing traffic signals at major intersections? Such a configuration would be more efficient for trucks. *Note that per the City's designated truck routes, trucks are prohibited from using S. Liberty Parkway to the east of Withers Road. The Comprehensive Plan discusses installing roundabouts, which would encourage slower speeds and better safety. This could also help dissuade trucks from using SLP as a cut-through route.*
- Investments should be made to connect S. Liberty Parkway / Pleasant Valley Road to northbound I-435. *Note that this is outside the city limits of Liberty.*
- An extension of Hughes Road to the south has been studied previously and could be an effective reliever route.

Near-Term Capital Improvement Program Projects

A set of near-term Capital Improvement Program (CIP) projects were presented that essentially fit into three categories: MO-291 Corridor Projects, Other Complete Streets Corridor Projects, and School Sidewalk Infill Projects.

The committee was asked to comment on their near-term priorities and what might be missing from the current list:

- Is walkability really a concern for the city? Most kids are driven to school – even if they live a block away. *Note that during the comprehensive planning process, walkability was an issue that rose to the top as a priority for many residents.*
- The intersection of Nashua Road & Glenn Hendren Drive experiences traffic issues during school arrival and dismissal times.
- It may be true that the Council mostly gets complaints from residents about being unable to get places fast. But what we (the committee) all talked about loving about Liberty was its livability and small-town feel. We should lean towards making these proposed sidewalk improvements. And as adults, we change our behavior in ways that could help reduce congestion and drive times.
- Glad to see that road diets are on the CIP list. We should encourage reducing the vehicular footprint to make our roads more walkable and in turn encourage walking.
- One missing item is improvements on 104th Street and 112th Street, and at the intersections of those streets at N Church Road, to better serve Liberty North High School. *Note that the city is currently pursuing a design contract to implement improvements in this area. The city is working with the Montage developers and has also applied for federal funds. This should be added to the near-term CIP list.*
- Support for sidewalk improvements around neighborhood schools or in the downtown area is one thing, but it doesn't seem like most of Liberty's population is walking or biking other than maybe for recreation. Sometimes these ideas come from the loud minority. Nobody wants to walk or bike along MO-291, Glenn Hendren, or commercial areas in general.
- Along MO-291, would the city consider building a trail just on the north side instead of building sidewalks on both sides of the road?

Next Steps

- An online community survey, open to the public, will be published in October. Please write down or email us any questions you think should be included in the survey.
- The next TMP Advisory Committee meeting will be held in January 2025. More details will be provided as the date approaches.
- An Advisory Committee for the CSAP will be convened in October. All members of the TMP committee will also be invited to participate in this group discussion.

LIBERTY, MO
TRANSPORTATION MASTER PLAN

Liberty missouri

Advisory Committee Meeting #2

May 1, 2025

8:30 – 10:00 AM

Fire Station 1

Agenda

- Introductions
- Project Recap
- Online Survey Results
- Major Street Map
- Typical Sections
- Traffic Impact Study (TIS) Guidelines

Introductions

City of Liberty Staff Leadership

- Sherri McIntyre
- John Findlay
- Joshua Martinez

Consultant Facilitators

- Christopher Kinzel
- Molly Nick
- Sam Cicero

Introductions

- What is your name and organization that you represent?
- What's the biggest local transportation issue that's been on your mind since we last met?

Project Recap

Transportation Master Plan Overview

Plan Purpose

Develop a plan to maintain, enhance, and expand Liberty's transportation infrastructure to serve the needs of its citizens and to support the City's larger vision for sustainable growth and progress.

Plan Goals

- Provide a holistic **road-map for future transportation connectivity and capacity**
- Serve as a guide for developers and the City with regard to transportation **infrastructure needs associated with development**
- **Update and expand City policies** to support the City's transportation vision
- Create plan elements that are easily integrated into the City's daily business practices
- Consider regional and federal priorities in order to capitalize on available non-city infrastructure funding in the future.

Transportation Master Plan Scope

Prior Meeting Topics

Existing Conditions Analysis

Future Conditions Forecasting

Current Capital Projects

Today's Meeting Topics

Major Street Map

- Street classification
- Future connections

Typical Sections

Final Plan

- TIS Guidelines

Transportation Master Plan + Comprehensive Safety Action Plan

Transportation Master Plan

Focus: Transportation Mobility

- Traffic analysis
- Future growth projections

Outcomes:

- Major street map
- Street elements related to mobility
- Policies related to traffic studies and development
- Capital Improvement Program infrastructure projects

Comprehensive Safety Action Plan

Focus: Traffic Safety

- Safe streets
- Safe user behavior and speeds
- Multimodal mobility

Outcomes:

- High Injury Network
- Safety countermeasures
- Policies related to project prioritization, street design, enforcement, education
- Capital Improvement Program infrastructure projects

Liberty missouri

Online Survey Results

Online Survey

Overview

- Available November/December 2024
- Distributed via existing city communication channels
- 80 Respondents; 91% Liberty Residents

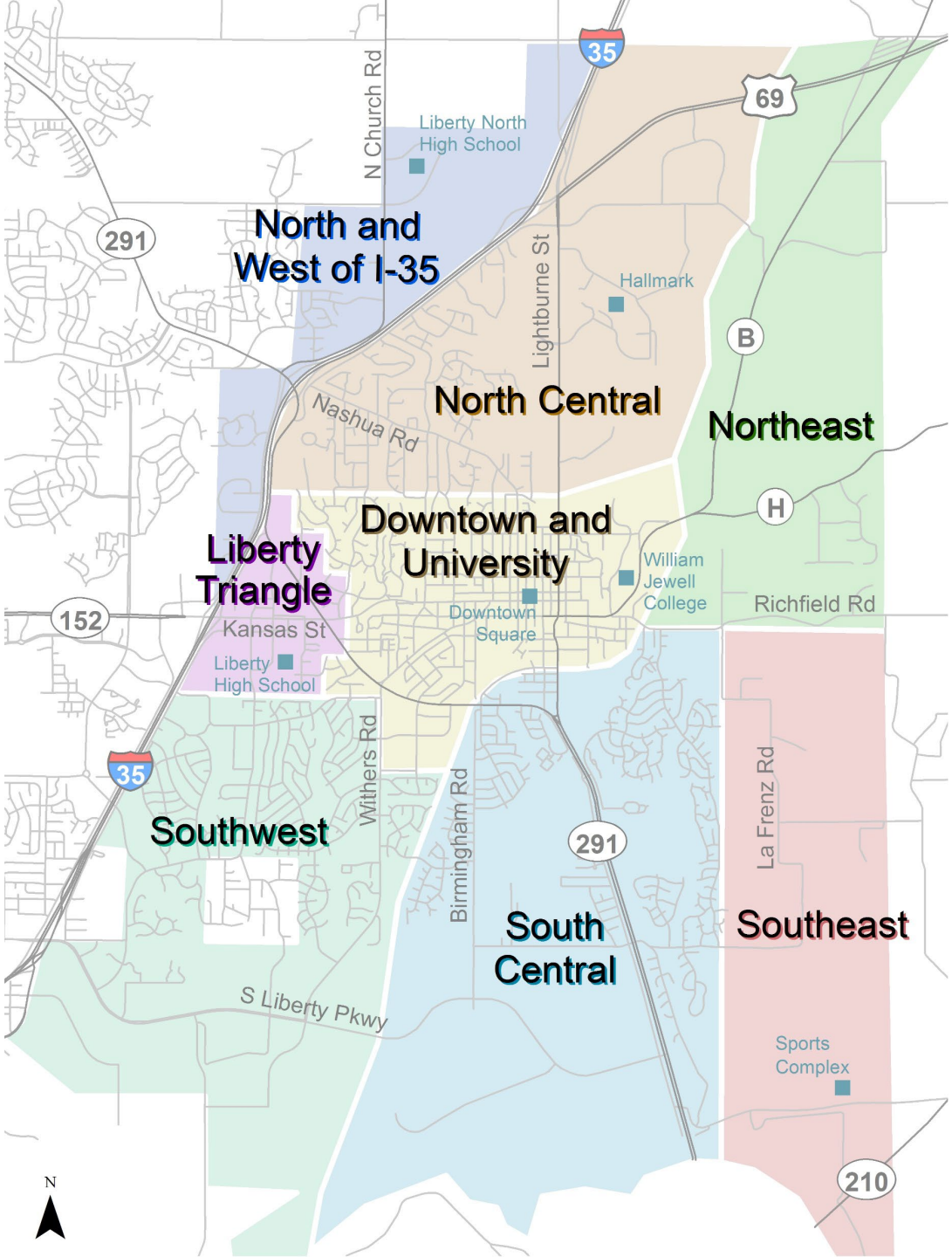
Top Transportation Issues Identified

- Traffic congestion **(34%)**
- Sidewalk safety **(32%)**
- Safety and traffic volume on MO-291 Highway **(28%)** and Kansas Street **(13%)**
- Lack of safe bike lanes **(12%)**
- Road conditions **(6%)**
- Speeding **(4%)**
- Public transportation **(3%)**

Online Survey

Greatest Investment Needs by Geographic Area:

- Downtown & University
- South Central
- Liberty Triangle
- North Central



Online Survey

Correlation to Projects Identified for Current Capital Improvement Program (CIP)

- School Sidewalk Infill Projects **(92%)**
- Corridor Projects to Improve MO-291 **(77%)**
- Bridge Replacement Projects **(68%)**
- Complete Street Corridors **(59%)**

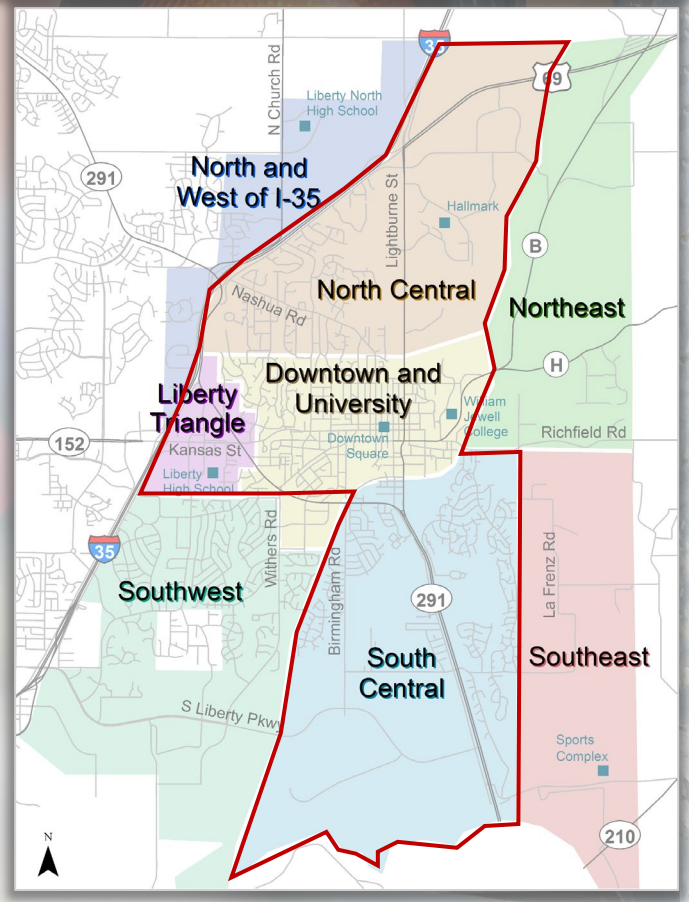
% of respondents that ranked the project as "important" or "very important"

Online Survey Discussion Questions

- Any surprises with the top issues?
- Agree with the areas of needed investment?

Top Transportation Issues Identified

- Traffic congestion **(34%)**
- Sidewalk safety **(32%)**
- Safety and traffic volume on MO-291 Highway **(28%)** and Kansas Street **(13%)**
- Lack of safe bike lanes **(12%)**
- Road conditions **(6%)**
- Speeding **(4%)**
- Public transportation **(3%)**



Major Street Map

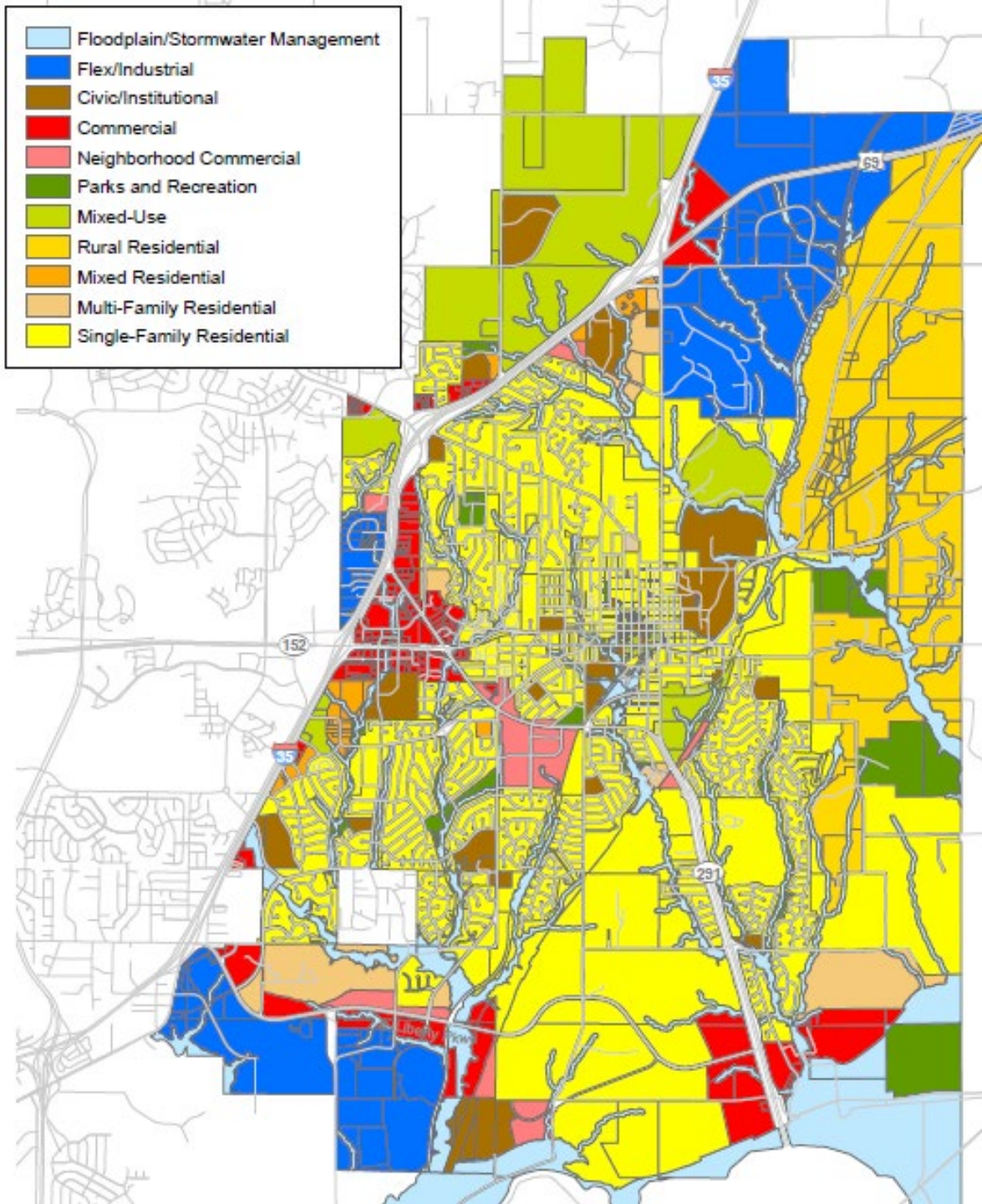
Future Forecast Recap

Future land use map

- Developed with Leading Liberty Forward

Traffic conditions projections

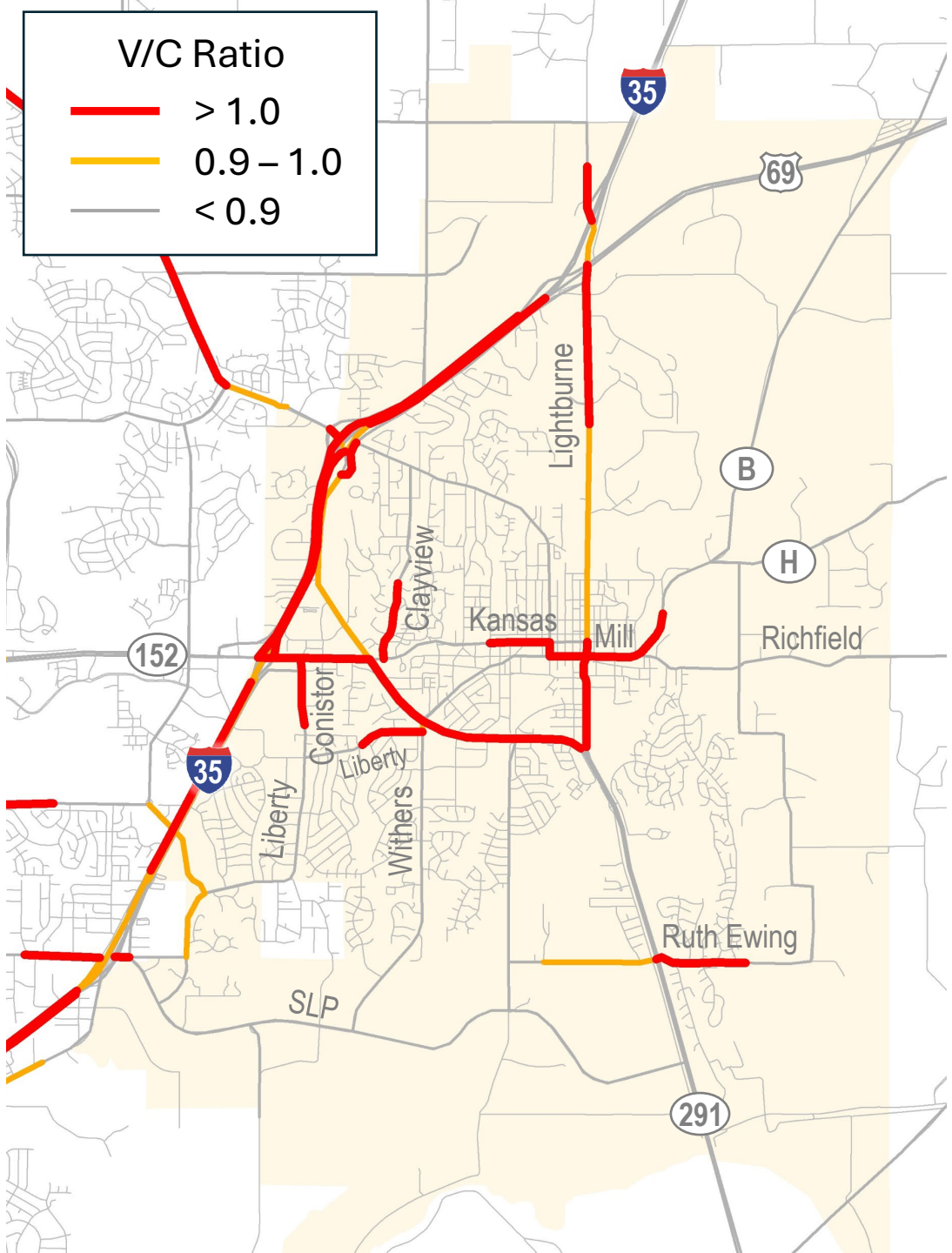
- **Traffic volume** projected based on future growth in line with future land use map (Assuming ~50% of open land in Liberty is developed)
- **Traffic congestion** mapped based on traffic volume compared to road capacity/number of lanes (volume/capacity ratio)



Future Forecast Recap

Future Traffic Congestion Projected on parts of:

- MO-291 Highway
- Kansas Street
- Lightburne Street
- Leonard Street
- Mill Street/Route H
- Liberty Drive
- Conistor Street
- Ruth Ewing Road
- Clayview Drive



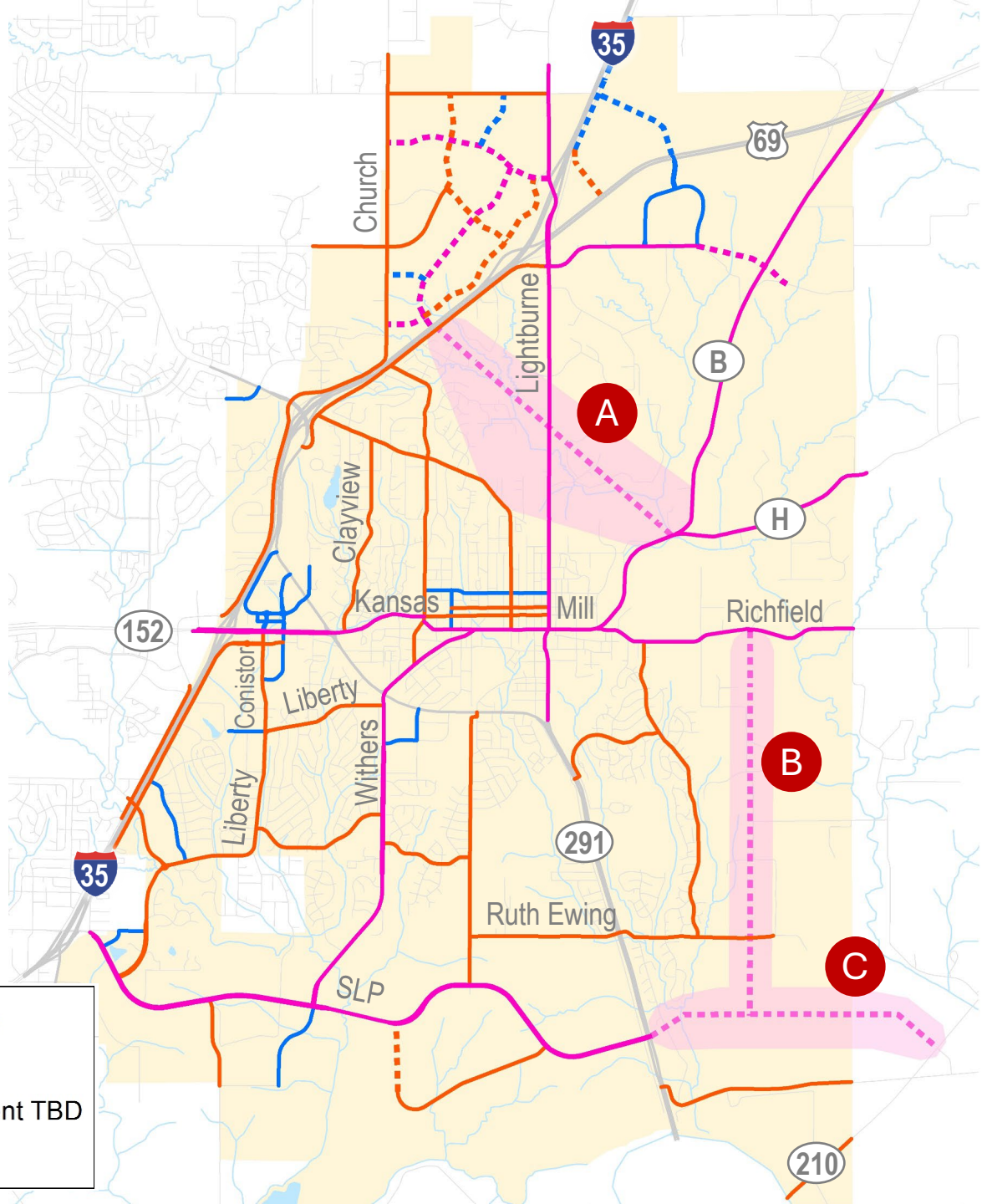
Major Street Map

New Connections:

A An east-west connection in the north part of Liberty, generally connecting Glenn Hendren Drive (or potentially Nashua Road) with Route B / H. Would intersect with Lightburne Street.

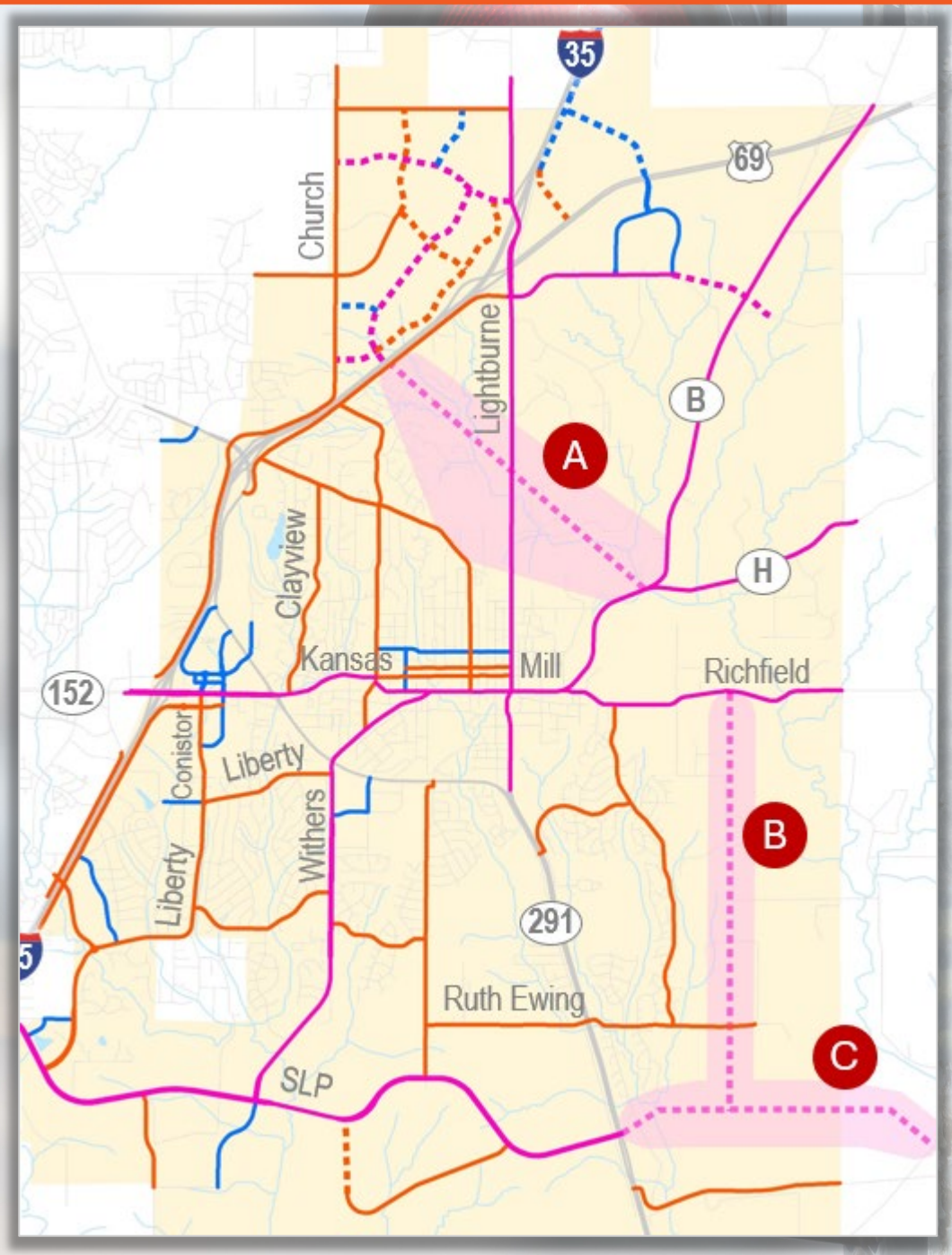
B A north-south connection in the east part of Liberty, generally connecting Richfield Road with Ruth Ewing Road (and points further south).

C An eastward extension of South Liberty Parkway to connect with Route 210.



Major Street Map Discussion Questions

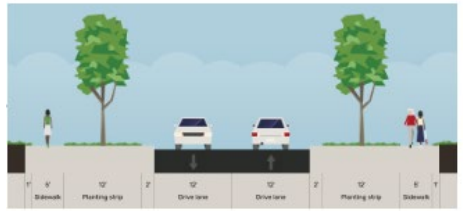
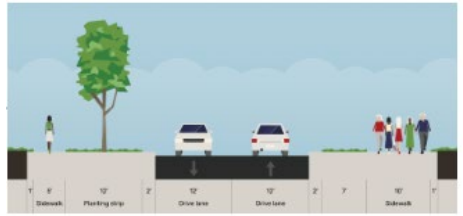
- Are the road classifications reasonable?
- Do the proposed new roads make sense?
- Anything missing?

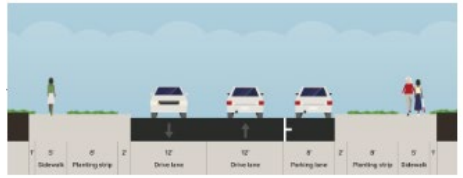


Typical Sections

Typical Sections

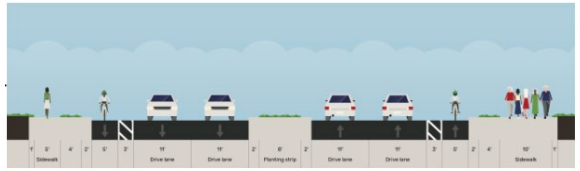
64’ ROW
5 Sections

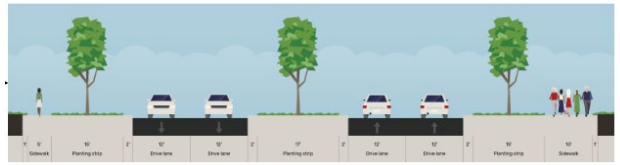
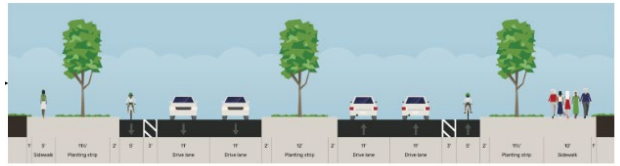



100’ ROW
3 Sections





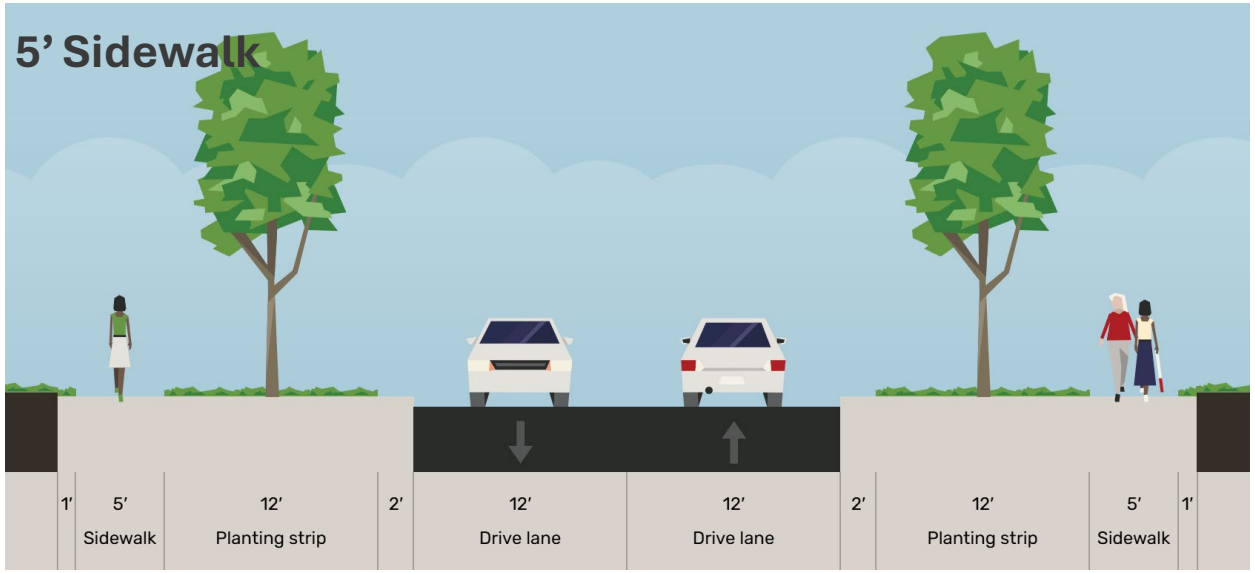
120’ ROW
2 Sections

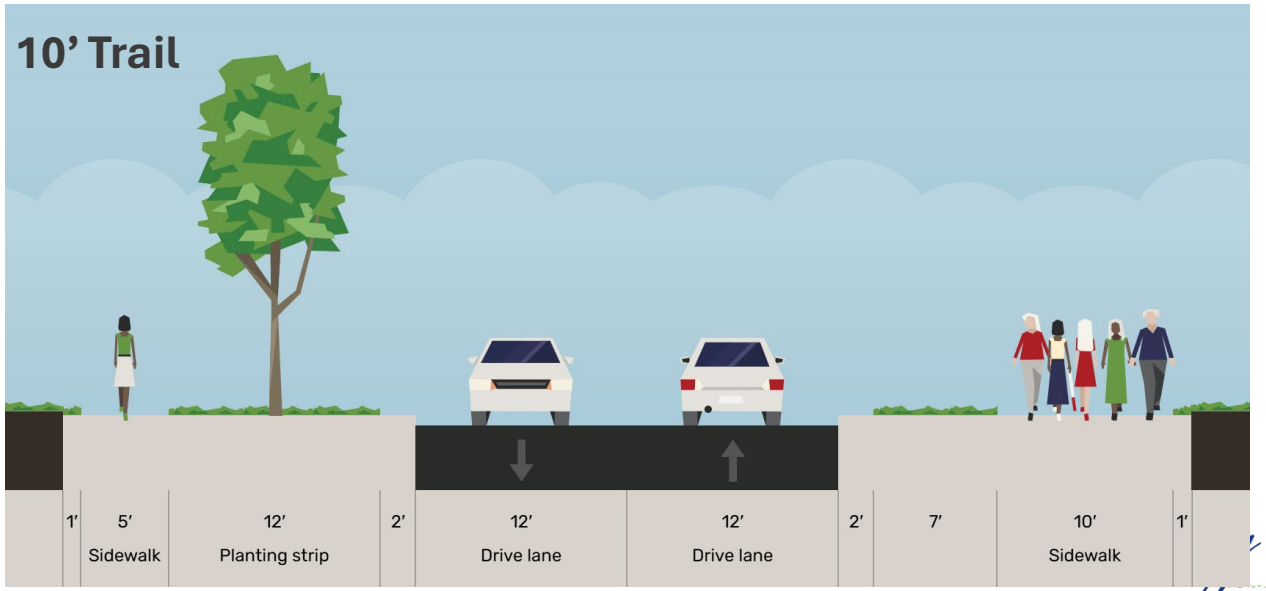



Typical Sections

64’ Right-of-Way (ROW)

24’ Curb-to-Curb Collector



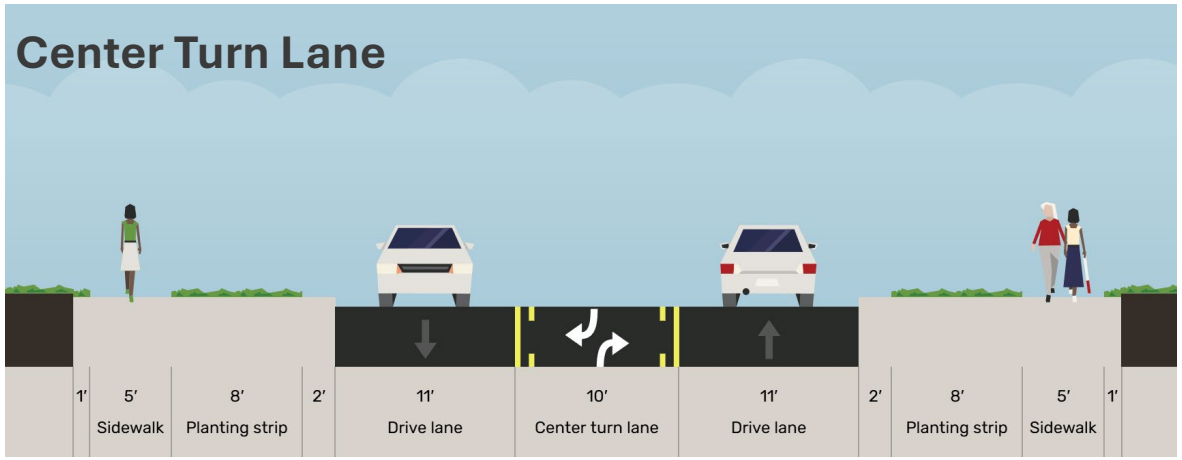


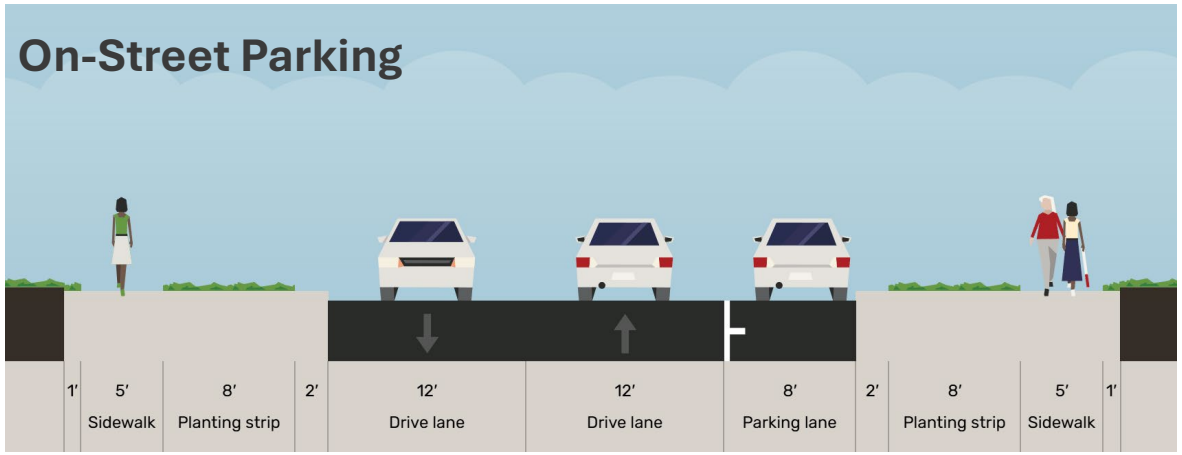
Typical Sections

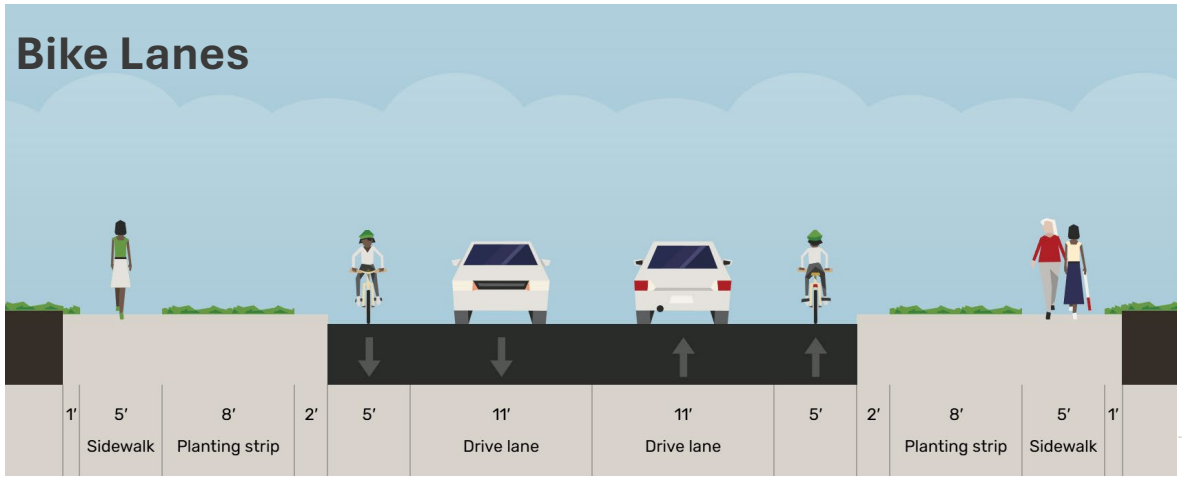
64’ Right-of-Way (ROW)

32’ Curb-to-Curb

Collector



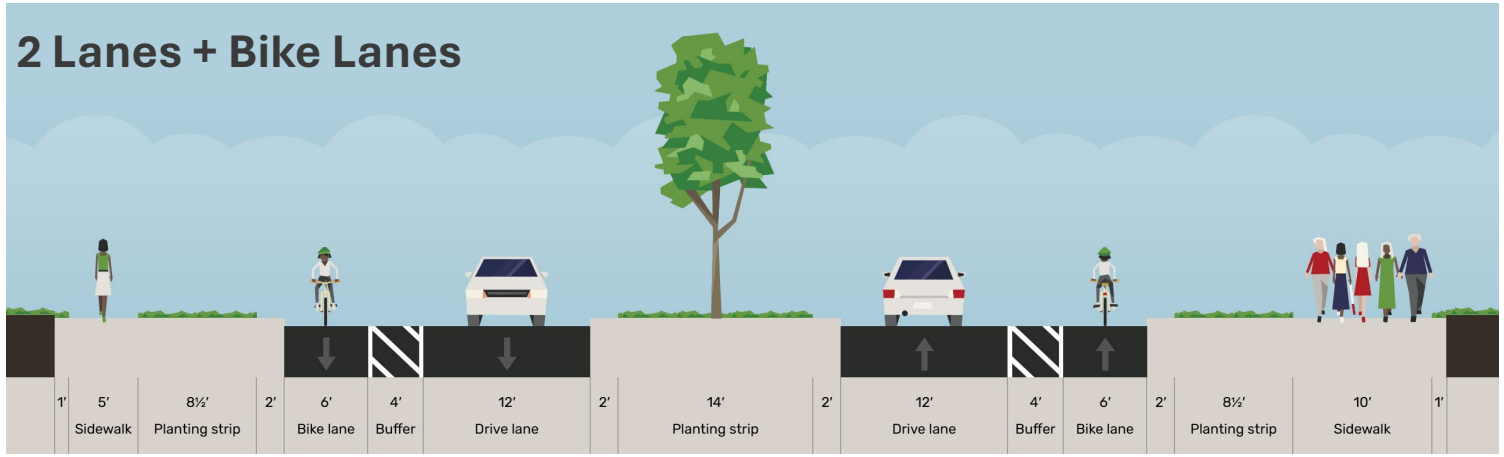


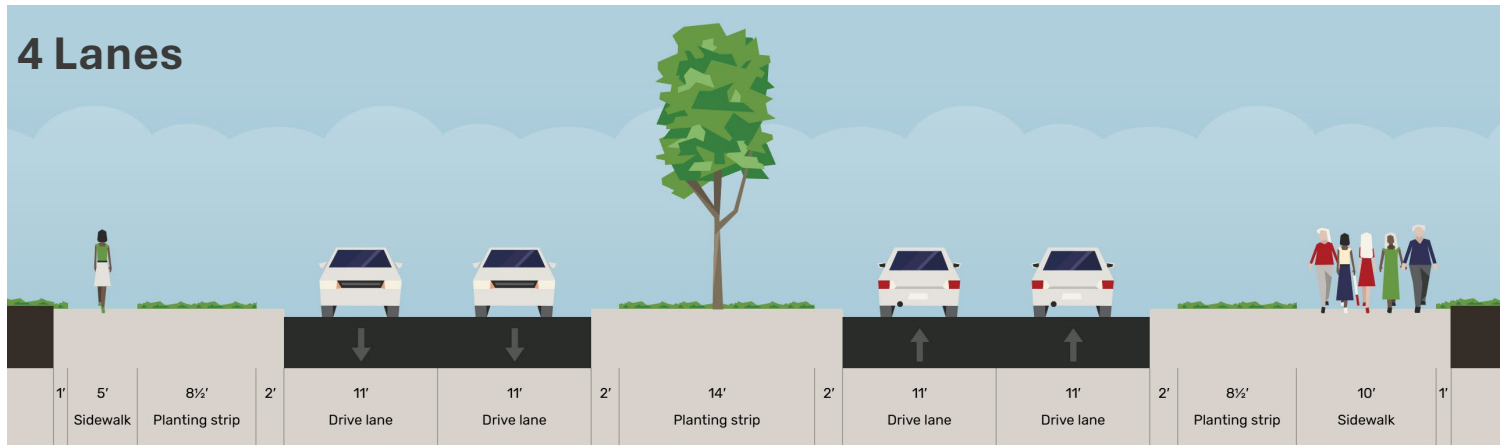


Typical Sections

100’ Right-of-Way (ROW)

64’ Curb-to-Curb Minor Arterial

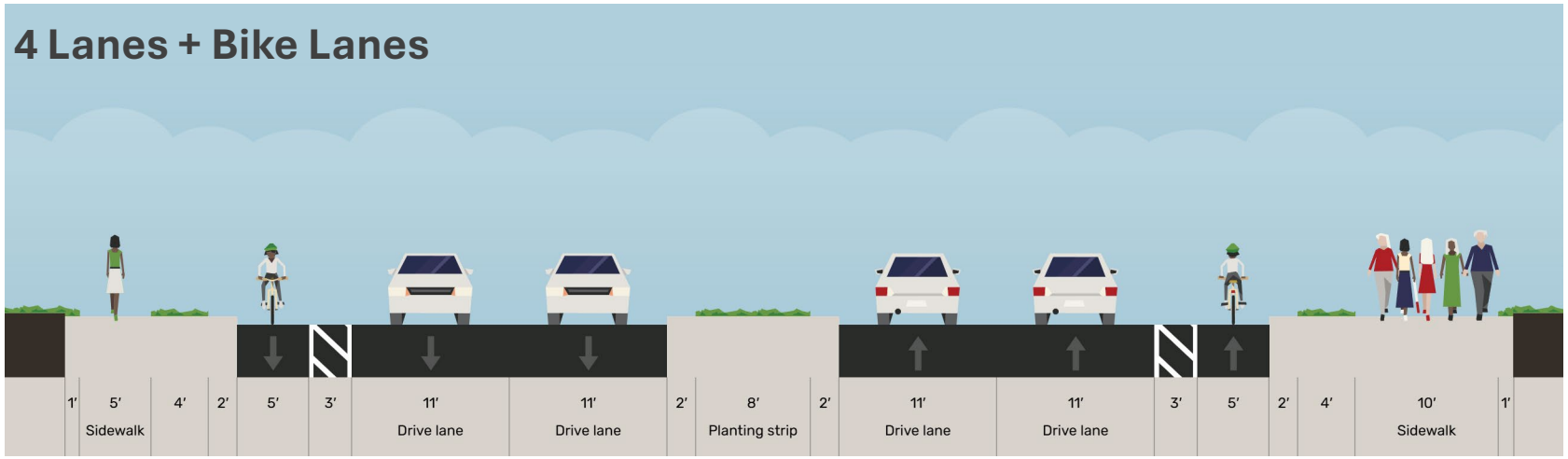




Typical Sections

100’ Right-of-Way (ROW)

72’ Curb-to-Curb Minor Arterial

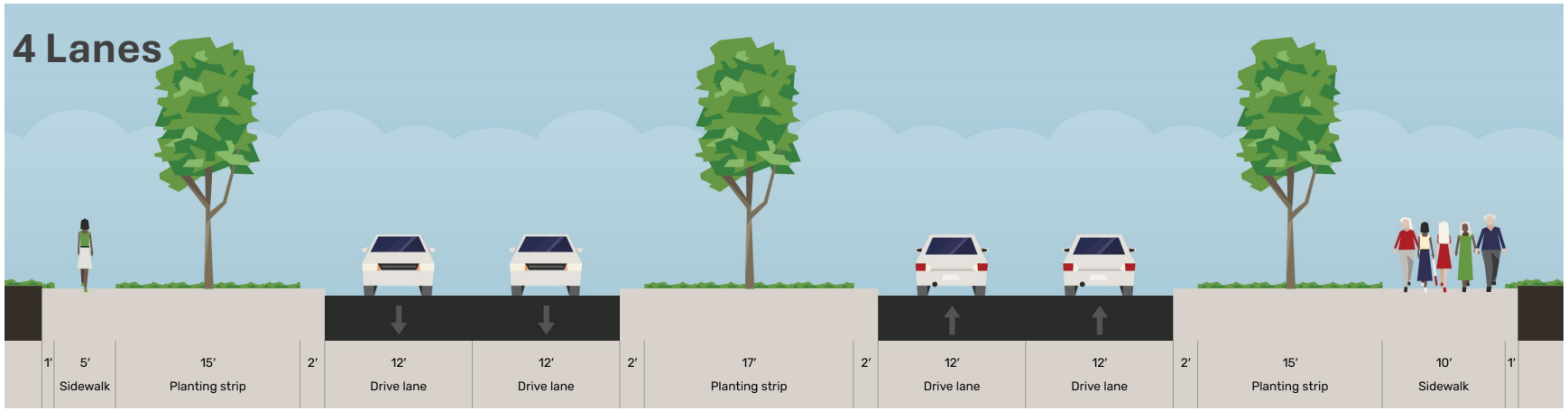


Typical Sections

120’ Right-of-Way (ROW)

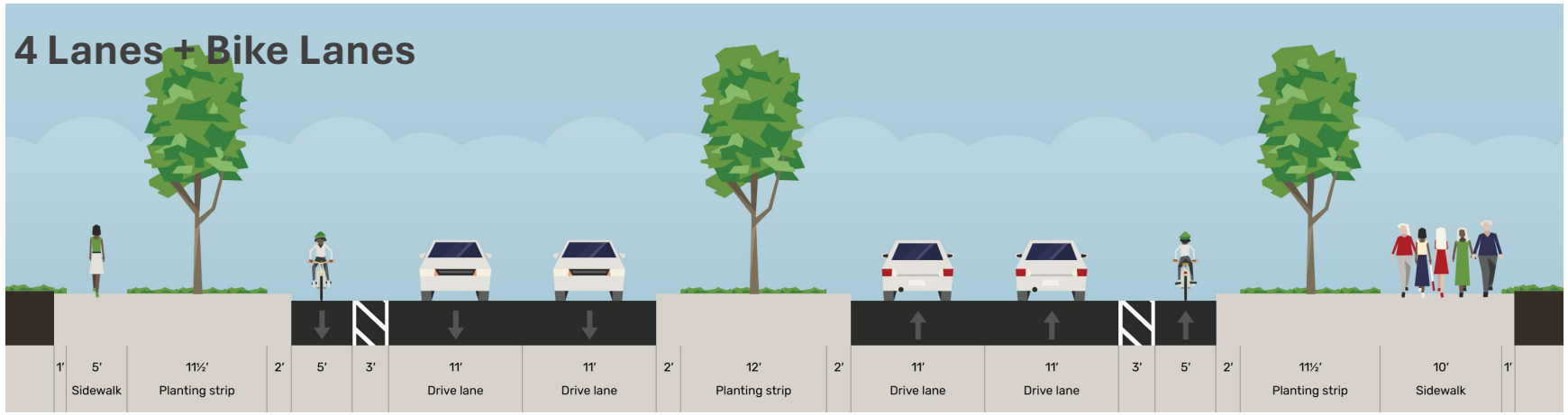
69’ Curb-to-Curb

Major Arterial



76’ Curb-to-Curb

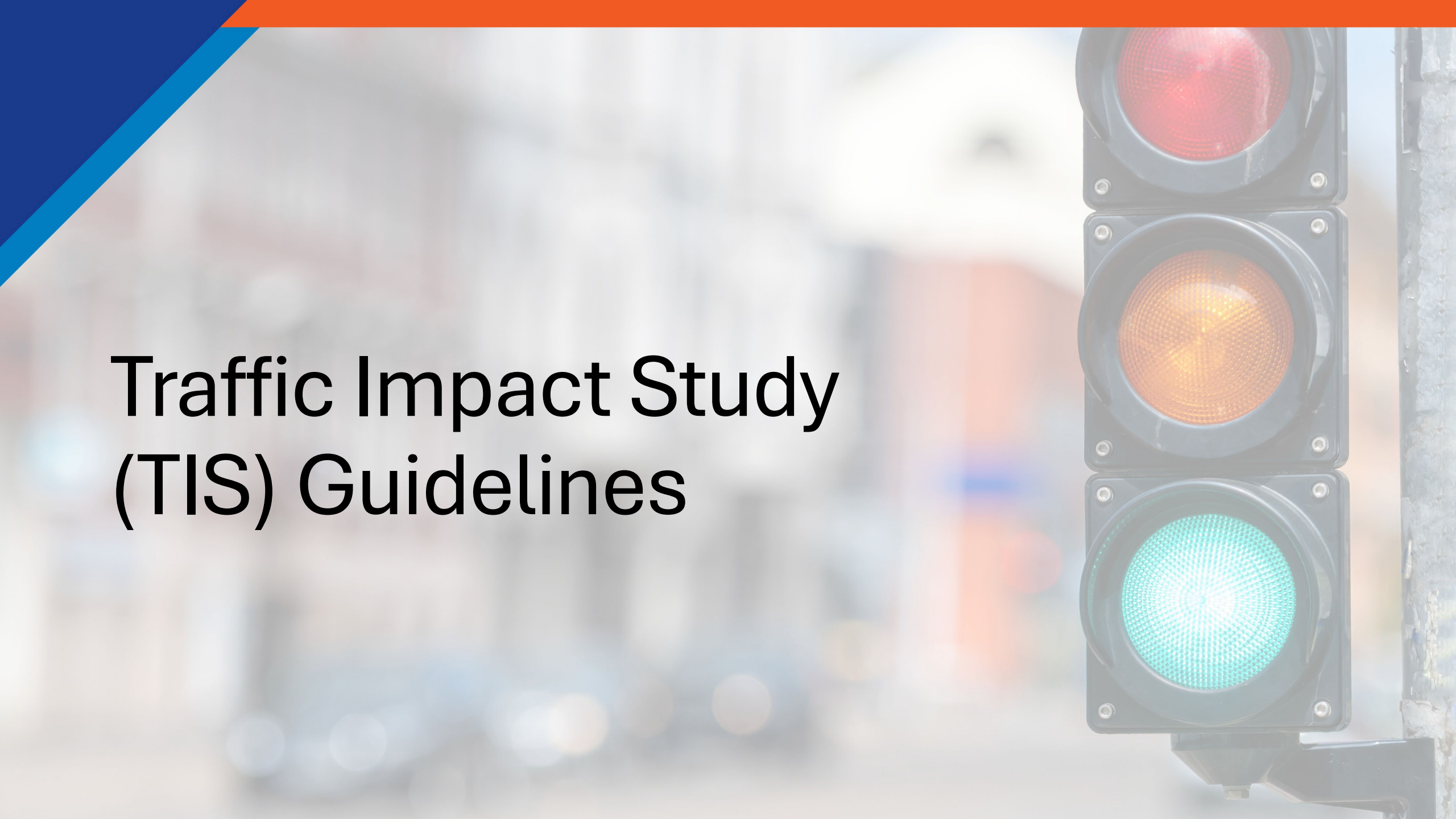
Major Arterial



Typical Section Discussion Questions

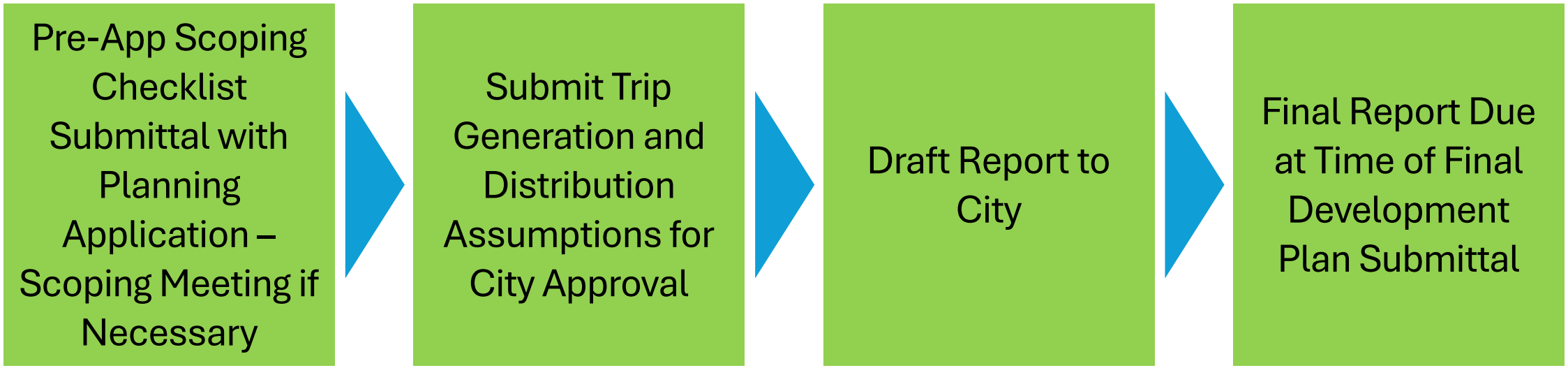
- Do these sections provide an adequate foundation?

Traffic Impact Study (TIS) Guidelines



TIS Guidelines

Process Flow Chart



TIS Guidelines

Scoping Checklist

Scoping Checklist – Items to Potentially Be Addressed in TIS

TIS level: □1 □2 □3 □4 **Analysis Years:** □ Existing: ____ □ Opening Day: ____ □20 Years:_____ □Other:_____

	Ped	Bike	Auto	Truck	Rail
	Existing and No-Project Conditions				
Infrastructure/ Service Inventory	□Sidewalks □Trails/Paths □Mid-block crossings □Signalization	□On-street □Off-Street	□Functional Classes □Lanes □Traffic Control □Speeds □Parking – On-Street □Parking – Off-Street	□Truck Routes	□Grade Xings
Demand/ Usage	□Intersection Crossings □Mid-block Crossings	□Turning Mvmts	□ADT □Turning Mvmts □Parking Occupancy	□Truck Turning Mvmts □Truck ADT	□Grade Xing Vols
Safety	□Crash Patterns	□Crash Patterns	□Crash Patterns □Sight Distances	□Crash Patterns	□Xing Crashes
Operational Performance	□Ped LOS	□Bike LOS	□LOS □Queueing	□LOS □Queueing	□Grade Xing Delay
	Conditions with Project				
Connectivity and Circulation	□Pedestrian Gaps □Site Review	□Bike Gaps □Site Review	□Network Connectivity □Access Management □Site Review	□Proximity to Truck Route □Site Review	□Site Review
Demand/ Usage	□Pedestrian Trip Generation	□Pedestrian Trip Generation	□Auto Trip Generation □Auto Trip Distribution □Auto Trip Assignment □Auto Parking Generation	□Truck Trip Generation	
Operational Performance	□Ped LOS	□HCM Bike LOS	□LOS □Queueing	□LOS □Queueing	□Grade Xing Delay
Safety	□Safety Impacts	□Safety Impacts	□Sight Distance □Safety Impacts	□Sight Distance □Safety Impacts	□Safety Impacts

TIS Guidelines Discussion Questions

- Do you like the scoping checklist process as a way to get applicants and the City on the same page?

Next Steps

- Complete TMP document
- Integrate Safety Action Plan

LIBERTY, MO
TRANSPORTATION MASTER PLAN

Liberty missouri

Thank you!

Joshua Martinez

jmartinez@libertymo.gov

Christopher Kinzel

christopher.kinzel@hdrinc.com

Advisory Committee Meeting #2

May 1, 2025

Attachments: sign-in sheet, presentation slides

Introductions

Committee members were given the opportunity to introduce themselves to the group and comment about any transportation issues that have been on their mind since we last met.

- Thinking of long-term solutions, not just short-term
- Being proactive in establishing connections along major throughfares
- Trails and pedestrian access
- Growth and success of the City
- Impact on personal commute from restricting left turns at MO-291 & Stewart Road
- Noticing the more dangerous intersections/areas, from the perspective of having a new driver in the house
- Focusing on crosswalks and pedestrian safety, specifically within the Montage development

Project Recap

Information on the following topics was presented: Reminder of purpose and goals of the Transportation Master Plan (TMP) study; Recap of prior topics presented – Existing Conditions, Future Forecasting, and Current Capital Projects; Brief status of Comprehensive Safety Action Plan (CSAP) study which is being conducted along a parallel track.

Online Survey Results

Results and information from the public online survey were presented.

The committee was asked whether they agree with the sentiments of the survey respondents or were surprised by any of the results:

- It is not surprising that the Southwest region did not arise as an area where a lot of transportation issues are present. That area is fairly self-sufficient with good transportation access. The transportation backbone within that area should serve as an example of how other areas may be able to be improved.
- It is unfortunate that public transportation was not a high-ranking transportation issue. Public transportation is critical for lower income residents; in the future we should be planning for increased density, smaller lot sizes, reduced infrastructure, and transit-oriented development.
- It is not surprising that traffic congestion was the top-ranking transportation issue, and that there is little interest in public transportation. City staff often receive complaints about traffic and opposition to growth, particularly new multi-family construction projects. Many residents want Liberty to remain a small single-family bedroom community.

- It is surprising that speeding was ranked as one of the lower priority transportation issues, given that residents perceive safety to be very important.

Major Street Map

Information on the identification and classification of existing major streets was presented, as well as locations of potential future roadway connections.

The committee was asked to comment on all aspects of the proposed map:

- How are arterials defined? *The City intends to change their current definitions of arterials and collectors so that they are not based upon traffic volumes, but rather the look and feel, and purpose of the street.*
- Will the general public be able to provide input on this map? *Yes, there will be a public review period, and the map will also be reviewed/approved by Council before ultimately being adopted into the City's design criteria.*
- Consider connecting future connections "A" and "B"? Or extend "B" up to Route H / Shepherd Road / US-69? Although maybe having a parallel connection to the existing Route B is not needed in this area. Consider showing the future extension of Shepherd Road further east to the City limits?
- Consider showing existing roads – especially within the historical district differently? Despite being shown as arterials, there is not adequate right-of-way to accommodate the typical sections associated with arterials. *The City does not intend to enforce the typical section standard widths upon existing, constrained roadways. This will only apply to new construction. Using terminology like "established arterials" may be considered. If changes are not made to the map, this will at least be addressed in the text of the plan.*
- Should Church Road be classified as a major arterial instead of minor arterial? Especially given that there are major arterials within the Montage development?

Typical Sections

A set of new typical sections, corresponding to the major street map classifications, were presented. The new sections match the same ROW width categories as the existing sections but offer some flexibility between the ROW limits. The local/residential street typical sections are not expected to change from the current 52-foot ROW width, and have not been addressed as part of this update.

The committee was asked to provide comments on the revised sections:

- Planter strip widths need to be a minimum of 8 feet to accommodate trees. The City is currently having issues with trees planted in 5-foot strips that have grown and are now damaging sidewalks. *The sections currently do not show trees on any planting strips of 8 feet or less. However, the sections are not intended to dictate landscaping. Final decisions regarding landscaping will be made by the City arborist.*
- The City should determine a tree type that is feasible to plant in an 8-foot planting strip and show it on the typical section. They would not want a developer to insist that they don't need

to plant trees because the section doesn't show one. Street trees are an asset that encourages pedestrian activity by providing shade and encourages safety by slowing vehicular speeds due to optical narrowing.

- What about flexibility? *The sections are designed to be flexible. For example, driving lanes can be reduced to 11 feet without requiring a design exception. This will be noted in the plan and on the section drawings. Also, the drawings currently show all sections as centered on the roadway centerline, but this could be adjusted to accommodate certain off-street amenities.*

- Is it necessary to have sections with both on-street bike lanes and a 10-foot trail? *Any section with bike lanes would only be implemented if the City adopts a bike plan that identifies a particular roadway as having bike lanes. There is a benefit to having both bike lanes and a trail because they are designed for different types of users – those biking for transportation vs. those biking for recreation/children. Particularly with the growing popularity of e-bikes, those higher speed users should be on the street and not on the trails.*

- Should the City consider restricting one side of the street (trail) to bicycles and one side to pedestrians (sidewalk) to help avoid conflicts? *This would cause connectivity issues for pedestrians. The City does not want to create any more barriers to promoting walkability.*

- Are the trails intended to be asphalt or concrete pavers? *Per City, probably concrete.*

TIS Guidelines

A set of Traffic Impact Study Guidelines has been developed. The process flow chart for TIS submittals and a scoping checklist were presented. The intent is not to require additional work from developers but rather as a way for applicants and the City to more easily reach agreement as to what is needed and when.

The committee was asked for their input.

- This will be good for developers to help understand upfront what is needed. Very helpful.
- It would be beneficial to be able to review the entire document. *The City will distribute copies to the Committee.*

JANUARY 2025

SURVEY RESULTS SUMMARY MEMO

Liberty missouri

Contents

This online survey was conducted between November 26, 2024 and December 13, 2024, with a total of **80 respondents** completing it. It was distributed via existing city communication channels.

Transportation Issues and Needs

In your opinion, what are the biggest transportation issues facing Liberty?

Respondents mentioned the following as **the top transportation issues** in their open-ended responses:

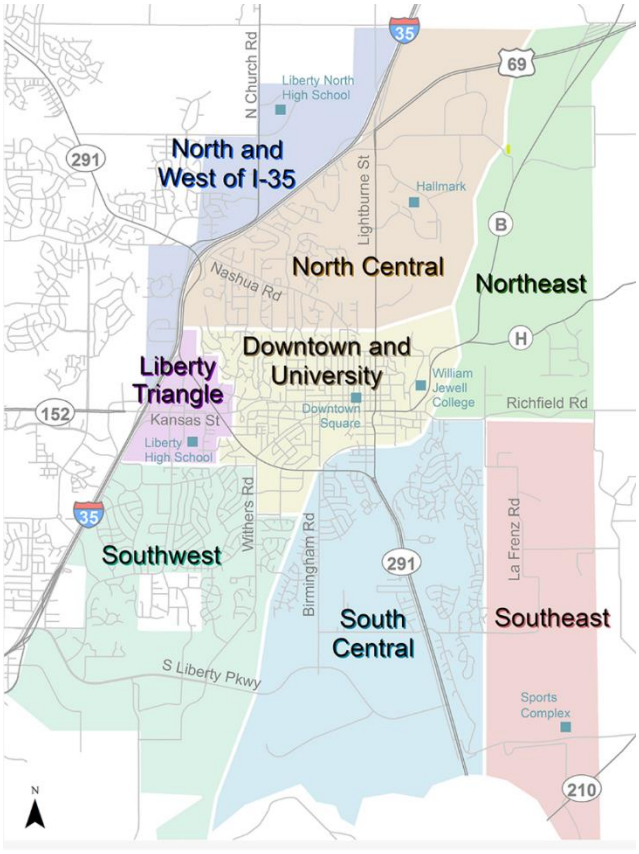
- Traffic congestion (34%)
- Sidewalk safety (32%)
- Safety and traffic volume on MO-291 Highway (28%) and Kansas Street (13%)
- Lack of safe bike lanes (12%)
- Road conditions (6%)
- Speeding (4%)
- Public transportation (3%)

Greatest Investment Need by Geographical Area

Using the map shown, please indicate the top four areas in Liberty that you feel need the greatest transportation system investment.

They identified the following **four geographical areas** of Liberty as needing the **greatest transportation system investment**:

1. Downtown and University
2. South Central
3. Liberty Triangle
4. North Central



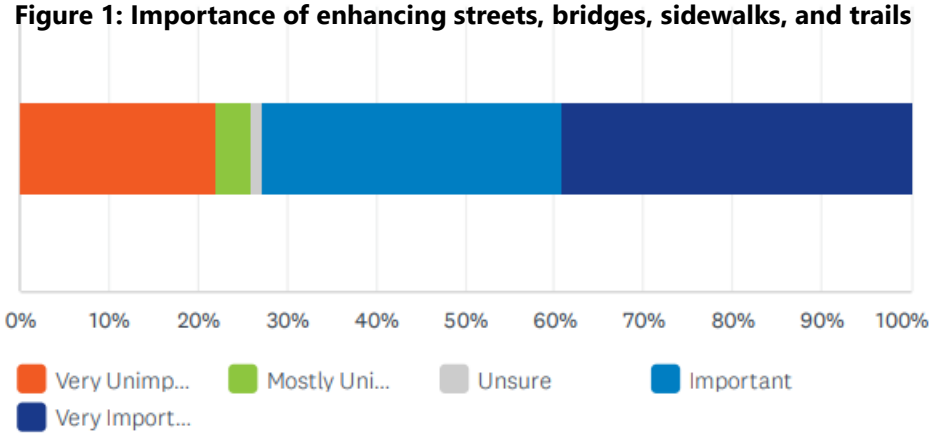
Importance of Improvement Projects

How important is it for the City of Liberty to enhance its streets, bridges, sidewalks, and trails?

73%

of respondents believe it is very important or important for Liberty to **enhance its streets, bridges, sidewalks, and trails.**

Figure 1: Importance of enhancing streets, bridges, sidewalks, and trails

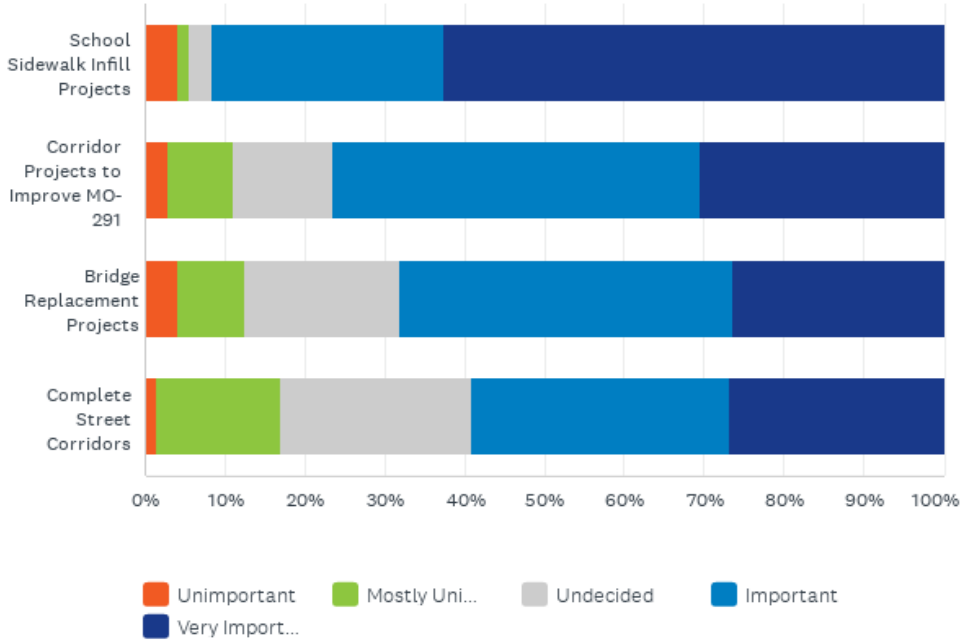


How important do you feel each of the following projects are to support the mobility of Liberty residents?

Respondents were provided with context about the types of projects, including potential cost and scale. The percent of respondents who selected "important" or "very important" is as shown, with School Sidewalk Infill Projects being ranked highest.

- **School Sidewalk Infill Projects** – **92%**
- **Corridor Projects to Improve MO-291** – **77%**
- **Bridge Replacement Projects** – **68%**
- **Complete Street Corridors** – **59%**

Figure 2: Importance of improvement projects

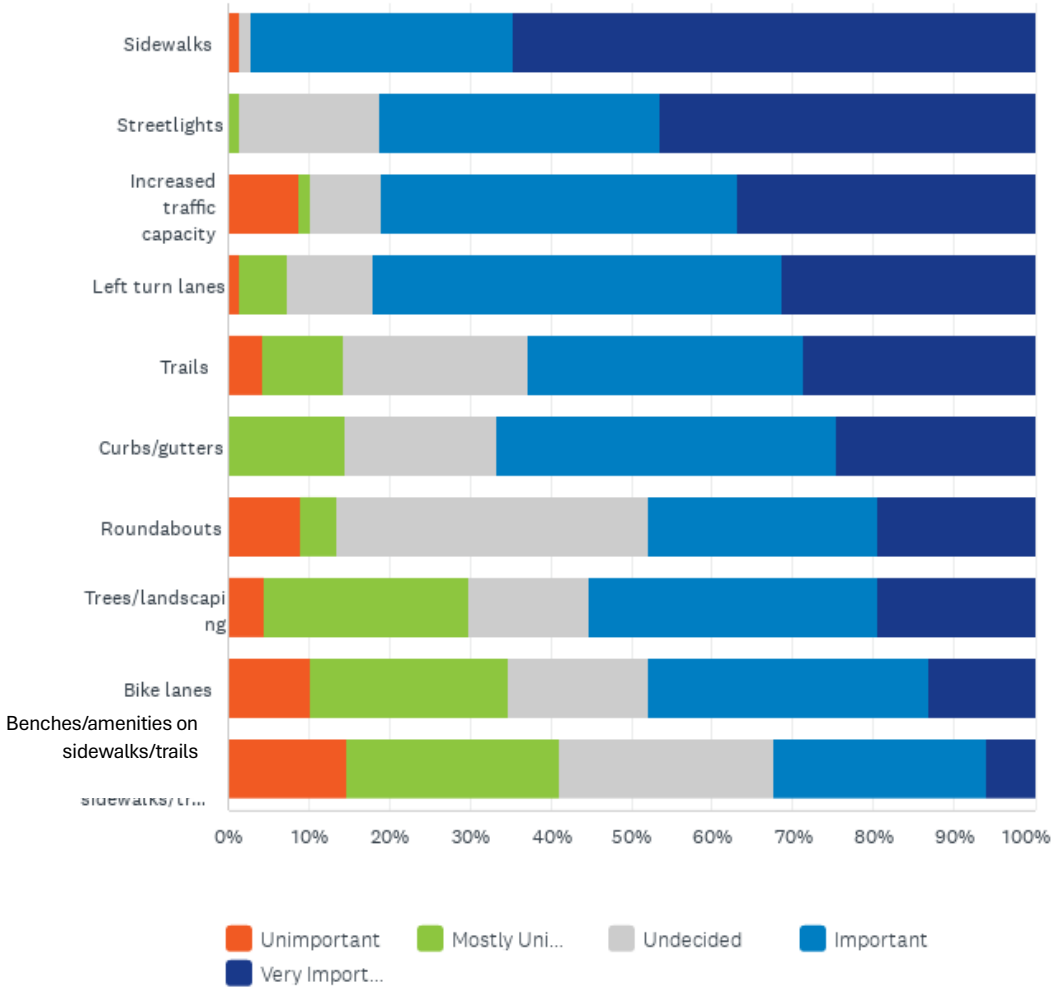


Transportation Features

Please indicate the level of importance for each of the following transportation features.

Sidewalks, **streetlights**, **additional traffic lanes/increased traffic capacity**, and **left turn lanes** were identified as the most important transportation features for residents. Benches and amenities on sidewalks and trails were noted as least important. **Figure 3** shows full results.

Figure 3: Importance of transportation features



Respondent Characteristics

Relation to Liberty

Please select the answer below that best applies to you: I live in Liberty, I commute to Liberty for work, I frequently travel to Liberty (shopping, family, dining, medical care, etc.).

- **91%** of respondents **live** in Liberty.
- **4% commute** to Liberty for work.
- **3% frequently travel** to Liberty.

Mode of Transportation

Respondents were asked two questions about their use of different modes of transportation:

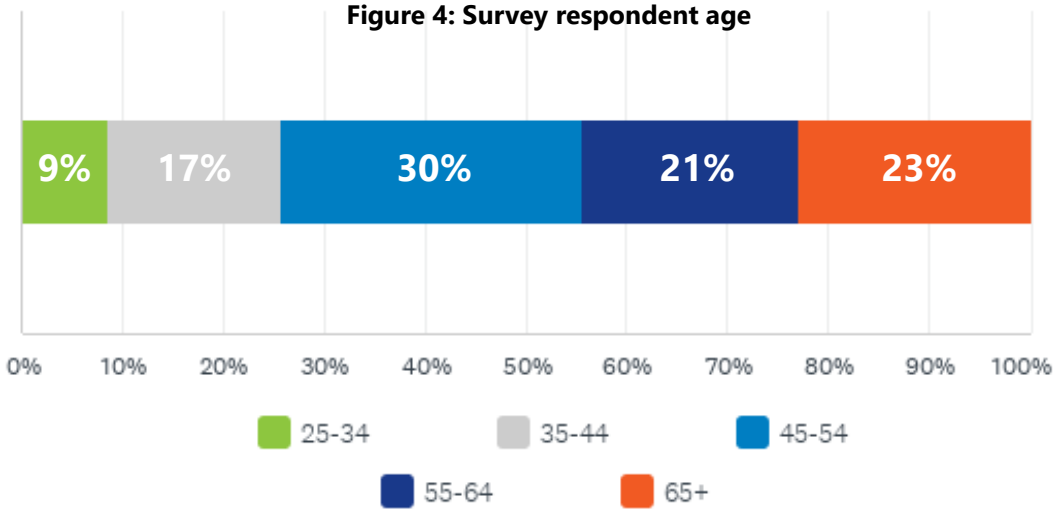
- *Per week, how often do you: drive or ride in an automobile, ride a motorcycle, ride a bicycle, walk, ride using public transportation.*
- *What is your primary mode of transportation? (Automobile, motorcycle, bicycle, walking, public transportation, other)*

Driving or riding in an automobile was the primary mode of transportation for respondents, with 87% saying they do so every day. 26% of respondents said they walk every day. Biking, riding a motorcycle, and taking public transit were the least used modes of transportation.

Age

No respondents were under the age of 25.

Figure 4: Survey respondent age



LIBERTY, MO
TRANSPORTATION MASTER PLAN

Appendix B

Current Capital Improvement Program (CIP) Memo

Liberty missouri

LIBERTY, MO
TRANSPORTATION MASTER PLAN

CURRENT CAPITAL IMPROVEMENT NEEDS

NOT FOR CONSTRUCTION

Liberty missouri

Contents

Overview

The City of Liberty has substantial existing capital improvement needs. These needs include projects identified as priorities in the Leading Liberty Forward Plan, projects that have been identified by staff to address infrastructure deficiencies, and projects that would help advance economic development in Liberty. This document details these projects, the project costs, and the project assumptions. The current needs are estimated to be between $139.75 million and $162.50 million. This funding would replace three bridges, reconstruct or reconfigure approximately 10.7 miles of roadway corridors, fill approximately 6.1 miles of sidewalk gaps, and improve intersection safety on MO-291 Highway.

Table 1 includes an overview of the project categories and opinion of probable project costs. The proposed projects are shown in the map included as Figure 1. Project details for each project are included following the maps and tables. Note that all project cost estimates are based on 2024 dollars with no allowance for inflationary costs.

Table 1 - Current Capital Improvement Program Needs Overview

Project Overview	Project Scale	Project Cost (2024 dollars)
Bridge Replacement Projects	3 Bridges	$3.75M - $4.50M
Complete Street Corridor Projects	~10.7 miles (~141 blocks)	$114.50M – $132.50M
MO-291 Corridor Projects	~1.5 miles (~20 blocks)	$16.00M – $18.00M
School Sidewalk Infill Projects	~4.6 miles (~58 blocks)	$5.50M – $7.50M
Total	~16.8 miles (~219 blocks)	$139.75M – $162.50M

Figure 1 – Current Capital Improvement Program Needs Overview Map

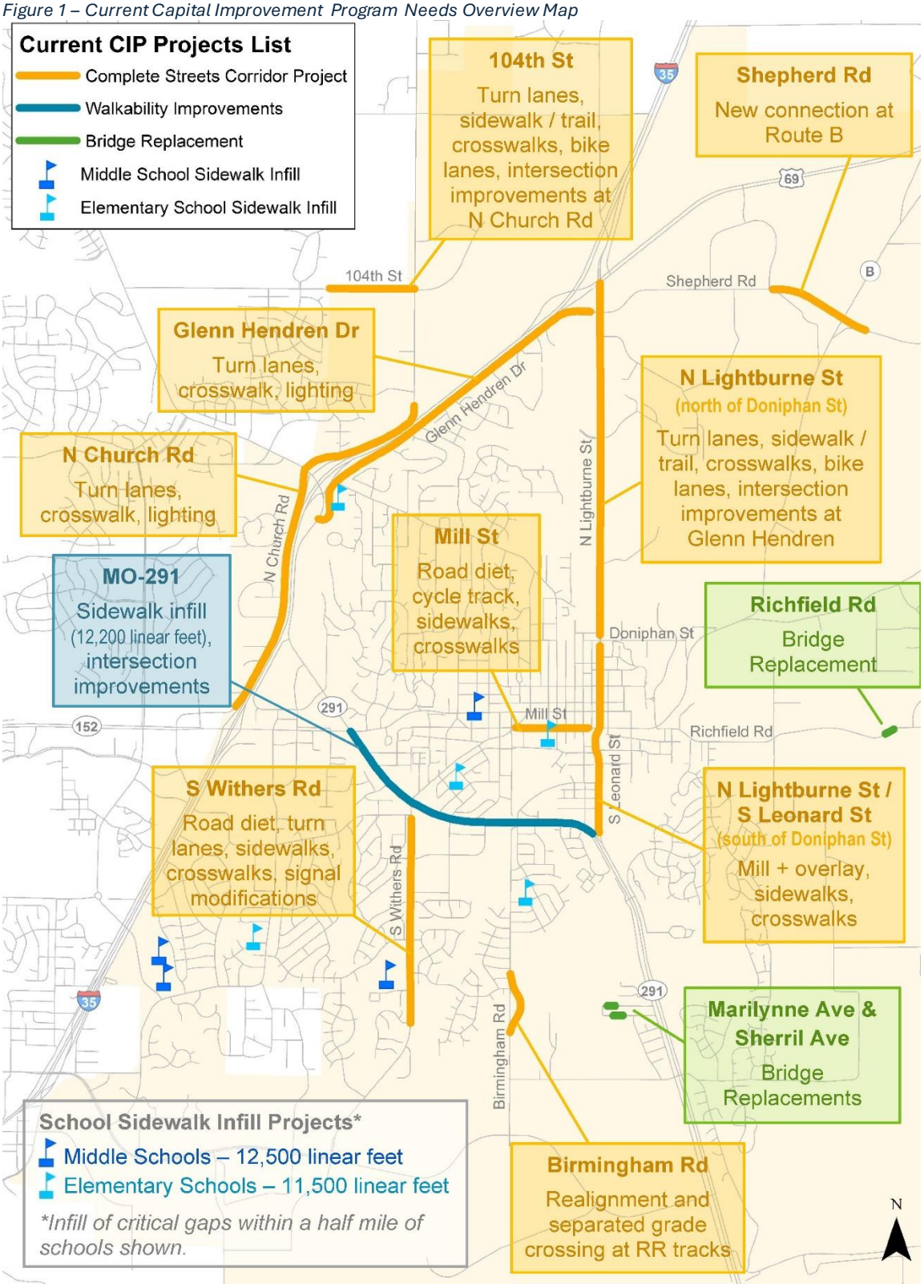
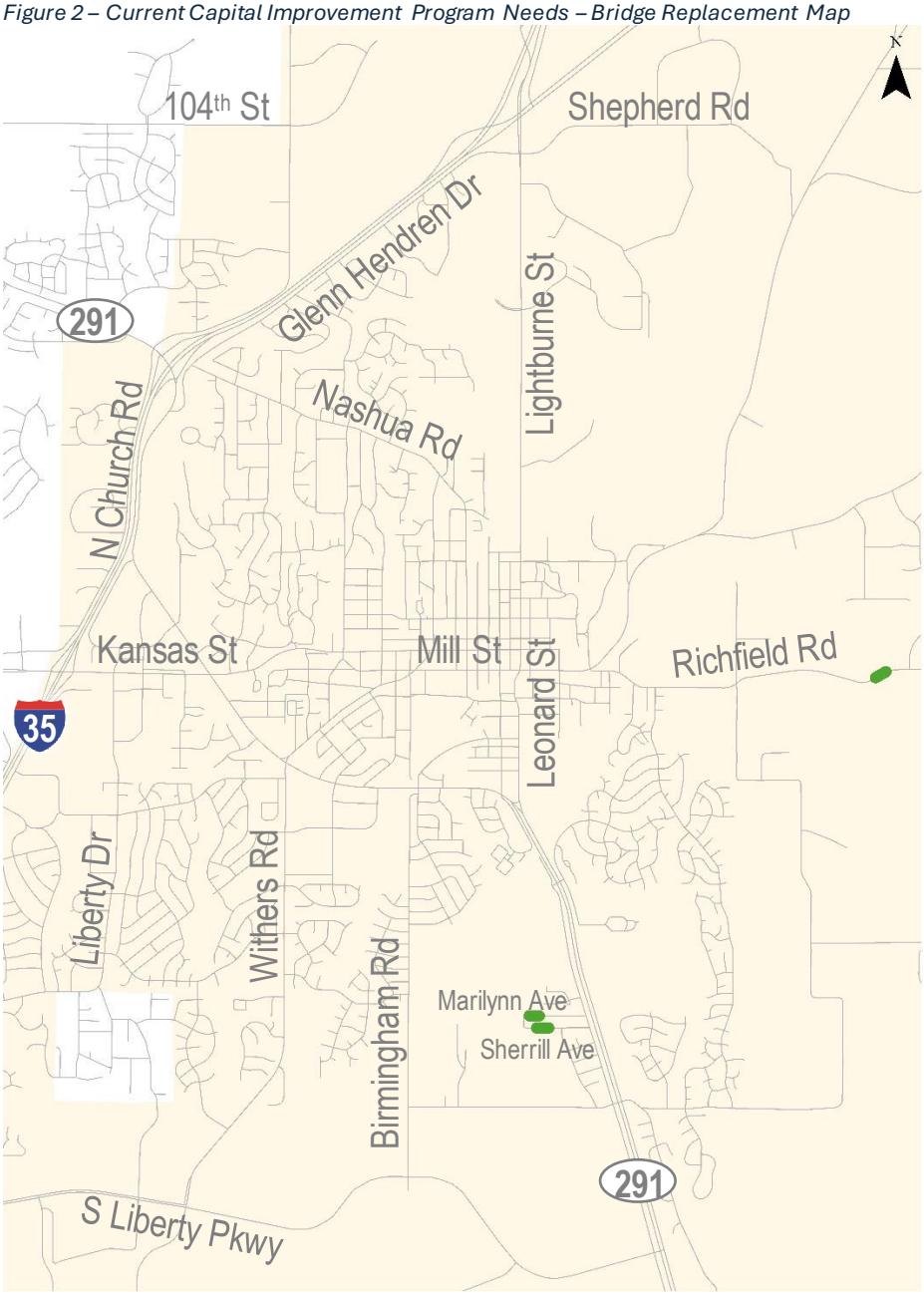


Table 2 – Current Capital Improvement Program Needs – Bridge Replacement

Bridge Replacement Projects	Project Scale	Project Cost (2024 dollars)
Richfield Road Bridge	1 Bridge	$2.00M - $2.50M
Sherril and Marilynne Avenue Bridges	2 Bridges	$1.75M - $2.00M
Total	3 Bridges	$3.75M – $4.50M

Figure 2 – Current Capital Improvement Program Needs – Bridge Replacement Map



A complete street project in the city is one that:

- Improves mobility for all users
- Promotes safe transportation options
- Includes beautification elements

While the specific design is not complete on these streets, it was assumed for cost purposes that many of these projects would include elements such as landscaped medians, trees, sidewalks and trails, frequent pedestrian crossings, street furniture (such as benches), street lighting, and curb and gutter with enclosed storm sewer (instead of roadside ditches). These elements will make it safer and easier for pedestrians and cyclists to use the road and manage vehicle speeds while still providing improved traffic operations for drivers. They also provide safer crossings across railroad tracks and new street connections that can give more direct and shorter trips through the city.

Table 3 - Current Capital Improvement Program Needs – Complete Street Corridor Projects

Complete Street Corridor Projects	Project Scale	Project Cost (2024 dollars)
104th Street Reconstruction *City Limits to Church Road*	~0.5 miles (~7 blocks)	$10.0M - $12.0M
Birmingham Road *Melissa Street to South of CPKC Railroad Tracks*	~0.5 miles (~7 blocks)	$10.0M - $12.0M
Church Road *Charlie's Car Wash Entrance to Camille Street*	~2.2 miles (28 blocks)	$25.0M - $27.0M
Glenn Hendren Drive *MO-291 to Lightburne Street*	~2.1 miles (~28 blocks)	$24.0M – $27.0M
Lightburne and Leonard *MO-291 to Doniphan Street*	~1.1 miles (~15 blocks)	$5.0M –$7.0M
Lightburne Street North *Doniphan Street to US-69*	~1.9 miles (~25 blocks)	$25.0M –$28.0M
Mill Street *Liberty Drive to Lightburne Street*	~0.5 miles (~ 7 blocks)	$1.5M –$2.5M
Shepherd Road *Heartland Drive to East of MO Route B*	~0.7 miles (~9 blocks)	$12.0M - $14.0M
Withers Road *Liberty Drive to Homestead*	~1.2 miles (~15 blocks)	$2.0M –$3.0M
Total	10.7 miles (~141 blocks)	$114.5M – $132.5M

Figure 3 – Current Capital Improvement Program Needs – Complete Street Corridor Projects Map

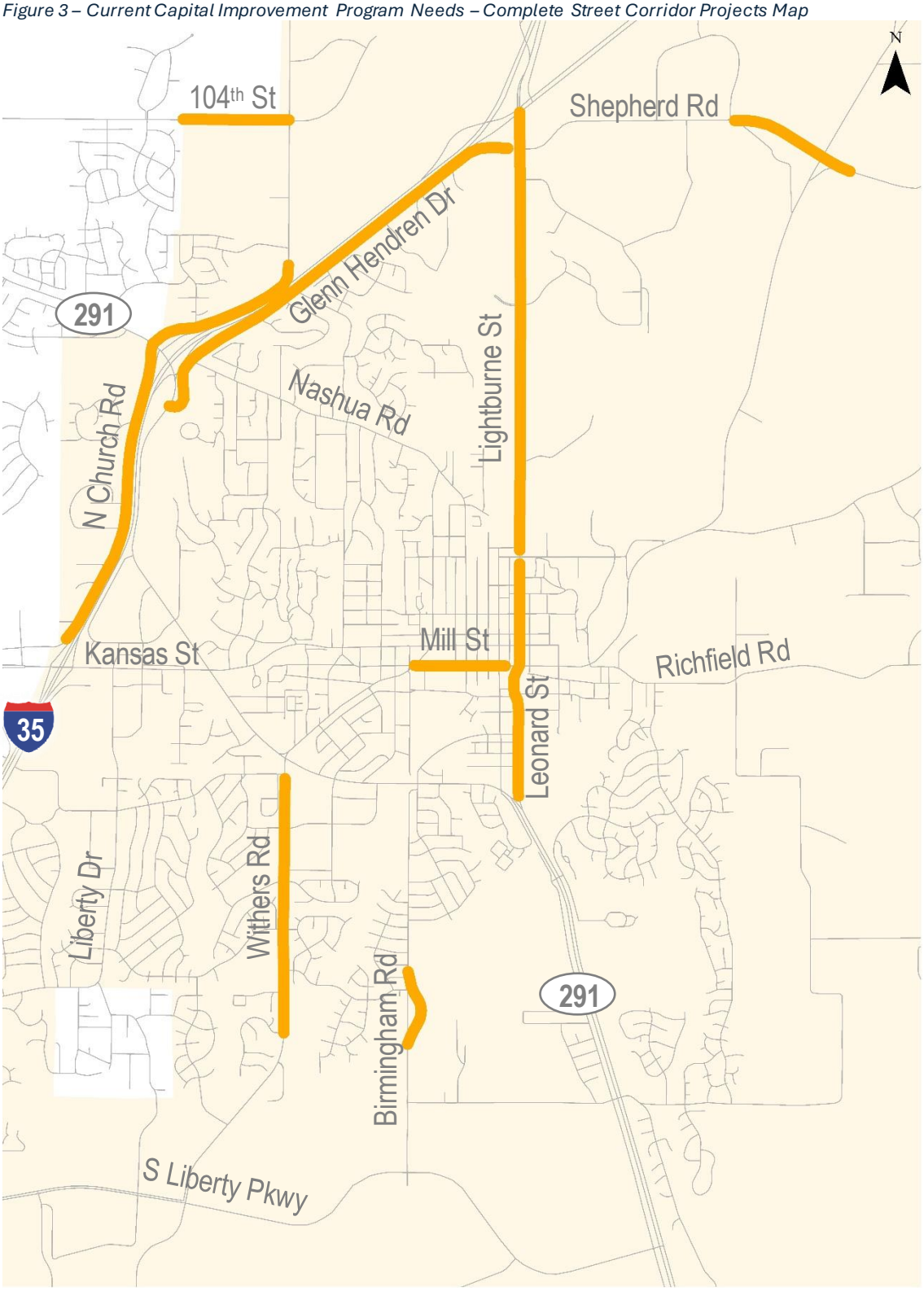


Table 4 - Current Capital Improvement Program Needs – MO-291 Corridor Projects

MO-291 Corridor Projects	Project Scale	Project Cost (2024 dollars)
MO-291 Corridor Walkability Improvements *Kansas Street to Leonard Street*	1.5 miles (~20 blocks)	$3.0M – $4.0M
MO-291 Corridor Intersection Safety Improvements *Liberty Drive to Leonard Street*	3 Intersections (Within ~20 blocks)	$13.0M – $14.0M
Total	1.5 miles (~20 blocks)	$16.0M – $18.0M

Figure 4 – Current Capital Improvement Program Needs – MO-291 Corridor Projects Map

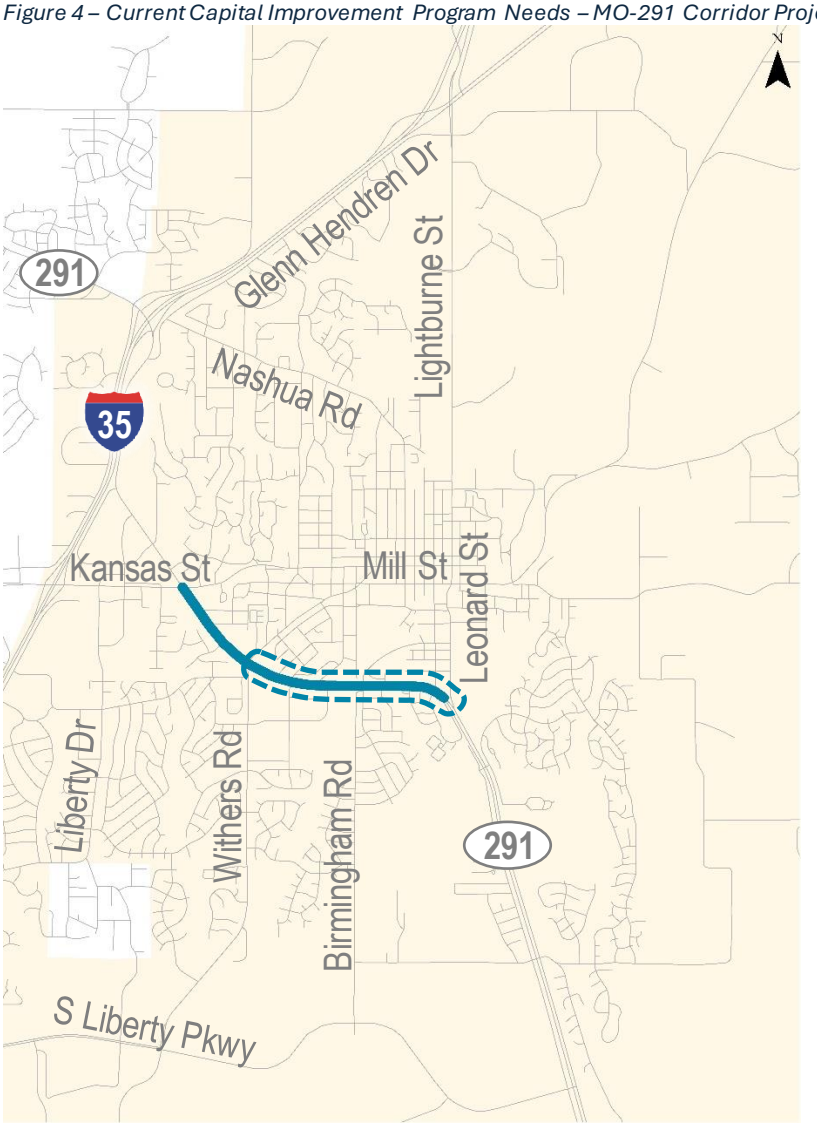
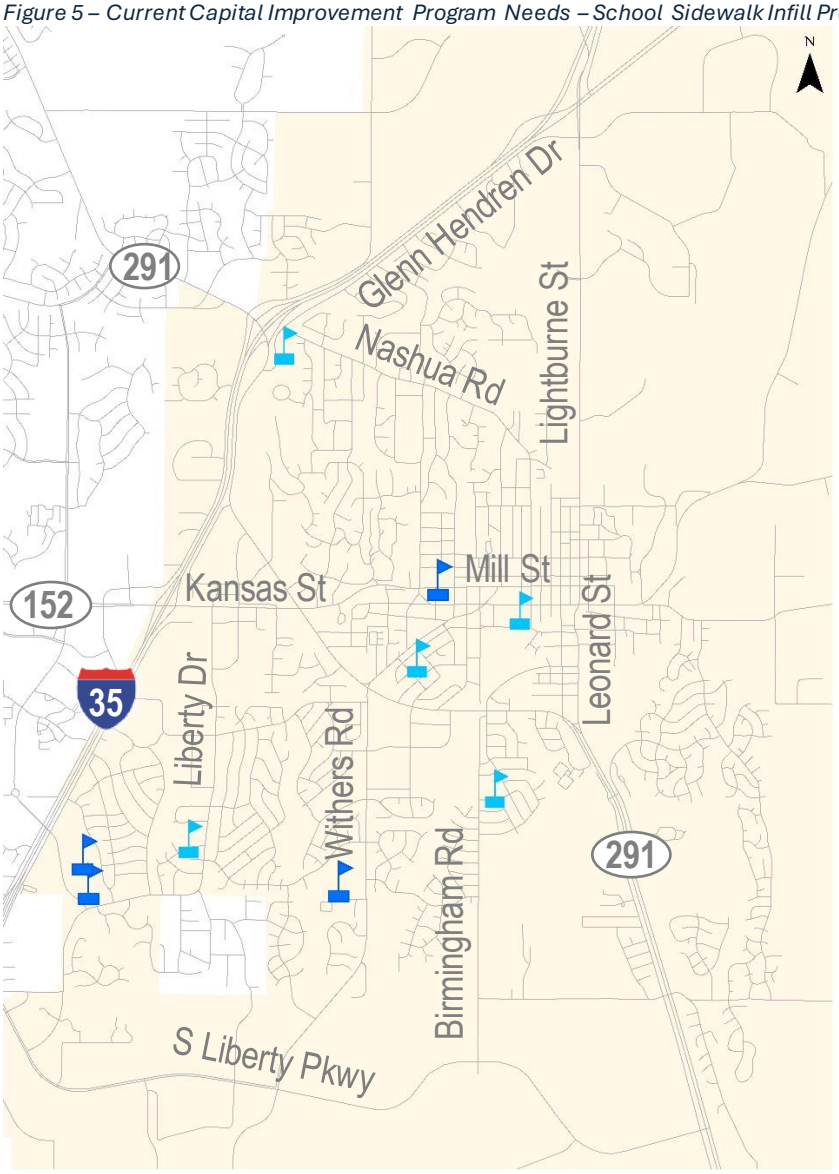


Table 5 - Current Capital Improvement Program Needs – School Sidewalk Infill Projects

School Sidewalk Infill Projects	Project Scale	Project Cost (2024 dollars)
Elementary School Sidewalk Infill *Within ½ mile of LPS Elementary Schools*	2.2 miles (~28 blocks)	$2.5M – $3.5M
Middle School Sidewalk Infill *Within ½ mile of LPS Middle Schools*	2.4 miles (~30 blocks)	$3M – $4M
Total	4.6 miles (~58 blocks)	$5.5M – $7.5M

Figure 5 – Current Capital Improvement Program Needs – School Sidewalk Infill Projects Map



Project Details

The following pages include information for each of the projects identified as current capital improvement needs. The project sheets include the project category, name, location, description, costs, and assumptions.

Bridge Replacement: Richfield Road Bridge

Project Location

Richfield Road Bridge over Rush Creek (1/8 mile west of Don Allen Drive)

Project Description

The bridge on Richfield Road over Rush Creek will be replaced.

Estimated Project Cost Range

Professional Services:	$0.25M – $0.40M
Right of Way:	$0.00M – $0.10M
Construction:	$1.75M – $2.00M
Total:	**$2.00M - $2.50M**

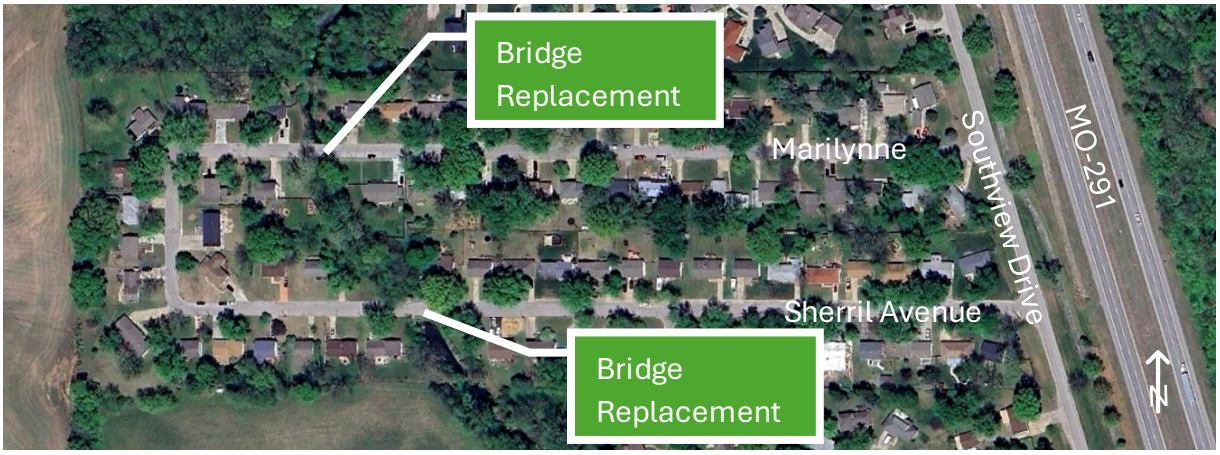
Project Assumptions

- Remove existing bridge structure and road pavement
- Replace the bridge with a new structure approximately 100' in length with two 12' lanes
- Replace pavement in advance of the bridge slab to provide a smooth transition
- Construct retaining walls, slope protection, and grading necessary for bridge construction
- Install grass seeding and sod in disturbed areas

Bridge Replacement: Sherril and Marilynne Avenue Bridges

Project Location

Box Culverts on Marilynne Avenue and Sherril Avenue (1/4 mile west of Southview Drive)



Project Description

The box culverts on Sherril and Marilynne Avenue will be replaced. The new structures will accommodate new sidewalks.

Estimated Project Cost Range

Professional Services:	$0.15M – $0.20M
Right of Way:	$0.0M – $0.10M
Construction:	$1.60M – $1.70M
Total:	**$1.75M - $2.00M**

Project Assumptions

- Remove existing bridge structures and road pavement
- Replace the bridges with new structures, approximately 90’ and 115’ in length with two 12’ lanes and 5’ wide sidewalks on both sides of the bridge structures
- Replace pavement and curb and gutter in advance of the bridge slab to provide a smooth transition
- Construct retaining walls, slope protection, and grading necessary for bridge construction
- Install grass seeding and sod in disturbed areas

Complete Street Corridor Project: 104th Street

Project Location

104th Street from City Limits to Church Road (Approx. 0.5 miles or 7 city blocks)

Project Description

104th Street will be reconstructed as a two-lane undivided road with curb and gutter and sidewalks on both sides of the road.

Estimated Project Cost Range

Professional Services:	$1.00M – $1.25M
Right of Way:	$0.00M – $0.10M
Construction:	$9.00M – $10.65M
Total:	**$10.00M - $12.00M**

Project Assumptions

- 24' wide full-depth pavement removal
- Reconstructed cross-section with three 12' lanes, a 5' sidewalk on the south side, and an 8' trail on the north side
- Reconstruction of intersection at Church Road as a roundabout
- Construct ADA ramps at all intersections
- Storm Sewer
  - Storm sewer basins every 400' on average, plus pipe
  - One box culvert extension 150' in length
- Average 5' excavation/embankment
- Reconstruct affected driveways
- Streetlights at 200' spacing
- Speed feedback signs – two signs (one northbound, one southbound)
- Sod & trees at 200' spacing on both sides and median plus seeding on backslopes

Complete Street Corridor Project: Birmingham Road

Project Location

Birmingham Road from Melissa Street to South of CPKC Railroad Tracks (Approx. 0.5 miles or 7 city blocks)

Project Description

Birmingham Road will be reconstructed as a 2-lane undivided road with sidewalk on both sides of the road and re-aligned over the CPKC railroad. The railroad crossing will be built as a bridge to grade-separate the crossing.

Estimated Project Cost Range

Professional Services:	$1.00M – $1.25M
Right of Way:	$0.00M – $0.00M
Construction:	$9.00M – $10.75M
Total:	**$10.00M - $12.00M**

Project Assumptions

- 24' wide full-depth pavement removal and railroad grade crossing removal
- Reconstructed roadway with two 14' lanes and 5' wide sidewalks on both sides of the road
- Roadway re-aligned to provide grade separation over railroad tracks
- Approximately 215' long bridge constructed over CPKC railroad tracks
  - Construct retaining walls approaching the bridge
- Storm Sewer
  - Storm sewer basins every 400' on average, plus pipe
- Excavation/embankment
  - Haul-in approximately 65,000 cubic yards of soil to build up grade in advance of bridge structure
- Reconstruct affected driveways
- Construct ADA ramps at all intersections

Complete Street Corridor Project: Church Road

Project Location

Church Road from Charlie's Car Wash Entrance to Camille Street (Approx. 2.2 miles or 28 city blocks)

Project Description

Church Road will be reconstructed as a two-lane divided road with a landscaped median, and a 10' trail on the west side of the road.

Estimated Project Cost Range

Professional Services:	$2.25M – $2.75M
Right of Way:	$0.0M – $0.25M
Construction:	$22.75M – $24.00M
Total:	**$25.00M - $27.00M**

Project Assumptions

- 24' wide full-depth pavement removal
- Reconstructed cross-section with two 16' lanes, a 20' center median with 250' left turn lanes at each public road intersection, and a 10' trail on the east side
- Construct ADA ramps at all intersections
- Storm Sewer
  - Storm sewer basins every 400' on average, plus pipe
  - Three box culvert extensions 50' in length
- Earthwork - average 5' excavation/embankment
- Construct one pedestrian crossing with RRFB, street lighting, signing, pavement marking
- Reconstruct affected driveways
- Streetlights at 200' spacing
- Speed feedback signs – two signs (one northbound, one southbound)
- Sod & trees at 200' spacing on both sides and median plus seeding on backslopes

Complete Street Corridor Project: Glenn Hendren Drive

Project Location

Glenn Hendren Drive from MO-291 Highway to Lightburne Street (Approx. 2.1 miles or 28 city blocks)

Project Description

Glenn Hendren Drive would be reconstructed as a two-lane divided road with a landscaped median, and a 10' trail on the east side of the road.

Estimated Project Cost Range

Professional Services:	$2.00M – $2.50M
Right of Way:	$0.00M – $0.25M
Construction:	$22.00M – $24.25M
Total:	**$24.00M - $27.00M**

Project Assumptions

- 24' wide full-depth pavement removal
- Reconstructed cross-section with two 16' lanes, a 20' center median with 250' left turn lanes at each public road intersection, and a 10' trail on the east side
- Construct ADA ramps at all intersections
- Storm Sewer
  - Storm sewer basins every 400' on average, plus pipe
  - Three box culvert extensions 50' in length
- Earthwork
  - Average 5' excavation/embankment
  - 500' long x 15' cut/fill for vertical road realignment for future Rush Creek I-35 flyover
- Construct one pedestrian crossing with RRFB, street lighting, signing, pavement marking
- Reconstruct affected driveways
- Streetlights at 200' spacing
- Speed feedback signs – two signs (one northbound, one southbound)
- Sod & trees at 200' spacing on both sides and median plus seeding on backslopes

Complete Street Corridor Project: Lightburne St and Leonard St

Project Location

Leonard Street from MO-291 to Mill Street and Lightburne Street from Mill Street to Doniphan Street (Approx. 1.1 miles or 15 city blocks)

Project Description

Leonard and Lightburne Street would be partially reconstructed to fix stormwater issues, beautify the corridor, and improve safety and mobility for all users.

Estimated Project Cost Range

Professional Services:	$0.50M – $0.75M
Right of Way:	$0.00M – $0.25M
Construction:	$4.50M – $6.00M
Total:	**$5.00M - $7.00M**

Project Assumptions

- Partial reconstruction as 2-lane undivided
  - 24’ of mill + overlay
  - Reconstruct ADA ramps | sidewalks | curbs
  - Full depth pavement replacement of 20% of roadway
- Storm Sewer – reconstruct 25% of storm sewer basins
- Construct five pedestrian crossings with RRFB, street lighting, signing, pavement marking
- Reconstruct affected driveways
- Speed feedback signs – two signs (one northbound, one southbound)
- Sod & trees at 100’ spacing on both sides of street
- Mill Street intersection improvements

Complete Street Corridor Project: Lightburne Street North

Project Location

Lightburne Street from Doniphan Street to US-69 (Approx. 1.9 miles or 25 city blocks)

Project Description

Lightburne Street would be reconstructed as a two-lane divided road with a landscaped median, a 10' trail on one side of the road, and a 5' sidewalk on the other side of the road.

Estimated Project Cost Range

Professional Services:	$2.50M – $3.00M
Right of Way:	$0.00M – $0.25M
Construction:	$22.50M – $24.75M
Total:	**$25.00M - $28.00M**

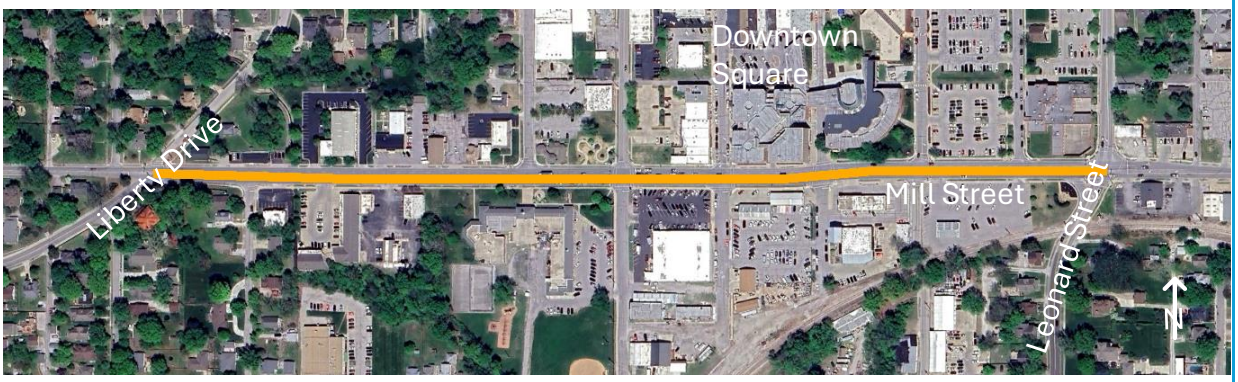
Project Assumptions

- 24' wide full depth pavement removal
- Reconstructed cross section with two 16' lanes, 20' center median with 250' left turn lanes at each public road intersection, and 10' trail on one side and 5' sidewalk on other side
- Construct ADA ramps at all intersections
- Construct two pedestrian crossings with RRFB, street lighting, signing, pavement marking
- Earthwork - Average 5' excavation/embankment
- Construct roundabout at Glenn Hendren Drive
- Storm Sewer
  - Storm sewer basins every 400' on average plus pipe
  - Three box culverts 150' in length
- Reconstruct affected driveways
- Streetlights at 200' spacing
- Speed feedback signs – two signs (one northbound, one southbound)
- Sod & trees at 200' spacing on both sides and median plus seeding on backslopes
- 1.82-acre right-of-way acquisition allowance (15' of right of way for 5,280 L.F. of project)

Complete Street Corridor Project: Mill Street

Project Location

Mill Street from Liberty Drive to Leonard Street (Approx. 0.5 miles or 7 city blocks)



Project Description

A road diet would be implemented on Mill Street to repurpose one westbound travel lane as a cycle track and improve sidewalks and pedestrian crossings.

Estimated Project Cost Range

Professional Services:	$0.10M – $0.25M
Right of Way:	$0.0M – $0.25M
Construction:	$1.40M – $2.00M
Total:	**$1.50M - $2.50M**

Project Assumptions

- Road diet
  - 2” mill + overlay
  - Pavement markings – three lanes plus two-way cycle track on one side of road
  - 10% reconstruction of curbs
- Improve/widen sidewalks
  - 10% sidewalk reconstruction
  - Reconstruct sidewalk on one side to a 10’ wide trail
  - Reconstruction of 25% of ADA ramps
- Additional Pedestrian crossings
- Precast concrete barriers for bicycle lanes (~40% of roadway project length)
- One major traffic signal modification
- Reconstruct affected driveways
- Construct five pedestrian crossings with RRFB, street lighting, signing, pavement marking
- Speed feedback signs – two signs (one northbound, one southbound)
- Sod & trees at 100’ spacing on both sides of street

Complete Street Corridor Project: Shepherd Road

Project Location

Shepherd Road from Heartland Drive to East of MO Route B (Approx. 0.7 miles or 9 city blocks)

Project Description

Shepherd Road will be extended as a 2-lane undivided road with sidewalk on one side to connect from Heartland Drive to existing Shepherd Road east of MO Route B. A new bridge will be constructed over the CPKC railroad.

Estimated Project Cost Range

Professional Services:	$1.25M – $1.50M
Right of Way:	$0.25M – $0.50M
Construction:	$10.50M – $12.00M
Total:	**$12.00M - $14.00M**

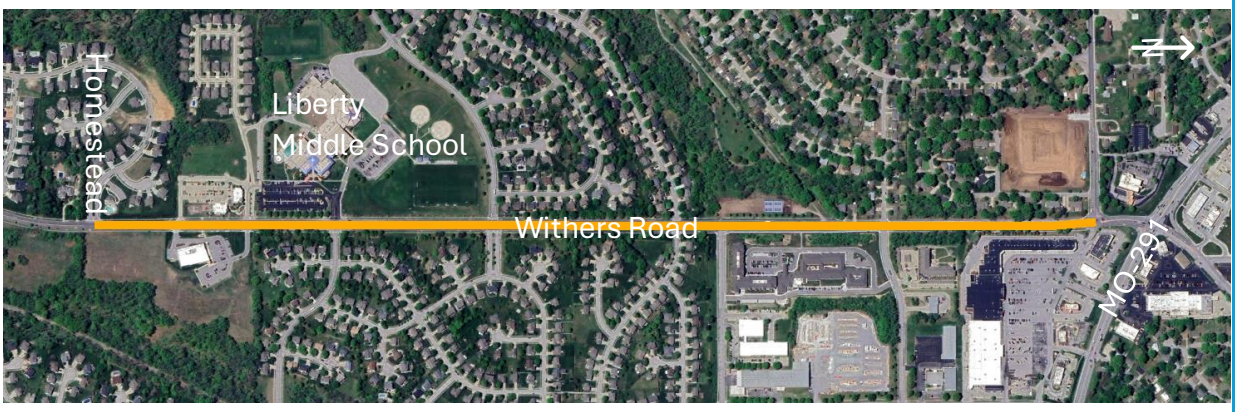
Project Assumptions

- Construct a new roadway with two 14’ lanes and 5’ wide sidewalks on both sides of the road
- Construct a new signalized intersection at Missouri Route B
- Construct approximately 510’ long bridge over BNSF railroad tracks and Rush Creek Tributary
- Excavation/embankment
  - Haul-in approximately 75,000 cubic yards of soil to build up grade in advance of bridge structure
- Storm Sewer
  - Storm sewer basins every 400’ on average, plus pipe
- Construct ADA ramps at all intersections

Complete Street Corridor Project: Withers Road

Project Location

Withers Road from Homestead Drive to Liberty Drive (Approx. 1.2 miles or 15 city blocks)



Project Description

Left turn lanes will be installed on Withers Road at all major intersections and sidewalks and crosswalks will be improved. A road diet will be implemented from Liberty Drive to Kent Street to install a continuous center turn lane.

Estimated Project Cost Range

Professional Services:	$0.25M – $0.40M
Right of Way:	$0.00M – $0.10M
Construction:	$1.75M – $2.50M
Total:	**$2.00M - $3.00M**

Project Assumptions

- Road diet
  - Restripe road from Liberty Drive to Kent Street
- Add left-turn lanes
  - 8 left turn lanes 250’ long
  - Full depth pavement installation plus curbs and 2’ wide mill + overlay adjacent to new pavement
  - Three box culvert extensions 50’ in length
- Improve/modify three traffic signals
- Reconstruct affected driveways
- Speed feedback signs – two signs (one northbound, one southbound)
- Improve sidewalks, curbs, ADA ramps
  - 10% of sidewalks reconstructed
  - Remove sidewalk from Kent Street to Homestead Drive and replace with 10’ wide trail
  - 10% of curbs reconstructed
  - 25% of ADA ramps reconstructed
- Construct three pedestrian crossings with RRFB, street lighting, signing, pavement marking
- Sod & trees at 100’ spacing adjacent to new left-turn lanes

MO-291 Corridor: Walkability Improvements

Project Location

MO-291 Corridor from Kansas Street to Leonard Street (Approx. 1.5 miles or 20 city blocks)

Project Description

Sidewalk gaps will be filled along MO-291 on both sides of the highway and additional safe crossings will be installed.

Estimated Project Cost Range

Professional Services:	$0.20M – $0.30M
Right of Way:	$0.00M – $0.00M
Construction:	$2.80M – $3.70M
Total:	**$3.00M - $4.00M**

Project Assumptions

- Add/improve pedestrian signals at Brown Street and Skyline Drive
- Construct two crossings with PHB (HAWK signal), street lighting, refuge island, signing, pavement marking
- Construct ADA ramps at all major commercial driveways and public streets
- Reconstruct affected driveways
- Sod and trees adjacent to new sidewalks
- Sidewalk construction ~12,200 L.F. x 5' wide
  - Kansas to Liberty
    - Southwest side ~2,800 L.F. | Northeast side ~1,000 L.F.
  - Liberty to Brown
    - Southwest side ~800 L.F. | Northeast side ~1,300 L.F.
  - Brown to Kent
    - South side ~0 L.F. | North side ~1,200 L.F.
  - Kent to Skyline
    - South side ~0 L.F. | North side ~1,100 L.F.
  - Skyline to Leonard
    - South side ~2,500 L.F. | North side ~1,500 L.F.

MO-291 Corridor: Intersection Safety Improvements

Project Location

MO-291 Highway between Liberty Drive and Leonard Street (Three intersections)

Project Description

Up to three intersections will be reconstructed to improve safety, pedestrian access, and traffic operations in this area of MO-291.

Estimated Project Cost Range

Professional Services:	$1.25M – $1.40M
Right of Way:	$0.0M – $0.10M
Construction:	$11.75M – $12.50M
Total:	**$13.00M - $14.00M**

Project Assumptions

- Reconstruction of up to three major intersections. These may include the intersections at:
  - Liberty Drive
  - Brown Street
  - Kent Street
  - Skyline Drive
  - Leonard Street
- Reconstruction may include some form of innovative intersection such as a roundabout or J-turn.
- Streetlights included on all approach streets and intersection
- Intersections would include sidewalks, ADA ramps, and signalized push-buttons for safe and convenient pedestrian crossings of all approach streets.
- Landscaping, sod & trees included at intersection corners and center median
- Project may include some access management of driveways adjacent to the reconstructed intersections
- Reconstruct affected driveways

Sidewalk Infill Project: Elementary Schools

Project Location

Within 1/2 mile of all Liberty Public Schools elementary schools inside Liberty city limits (Approx. 2.2 miles or 28 city blocks of sidewalk)

Project Description

Critical sidewalk gaps will be filled within a 1/2-mile buffer area of all public elementary schools and additional safe crossings will be installed.

Estimated Project Cost Range

Professional Services:	$0.20M – $0.30M
Right of Way:	$0.10M – $0.20M
Construction:	$2.20M – $3.00M
Total:	**$2.50M - $3.50M**

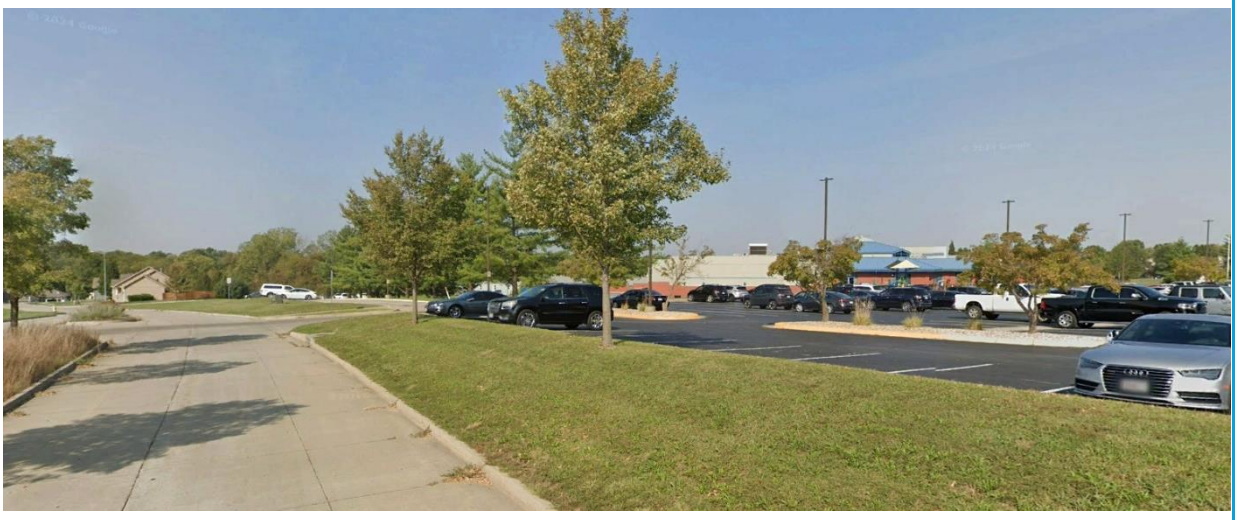
Project Assumptions

- Reconstruct sidewalk as 5' wide
- Reconstruct ADA ramps at all affected intersections
- 25% of new sidewalks require curb reconstruction and storm sewer work adjacent to sidewalk
- 25 driveway reconstructions
- Install 4' of sod adjacent to new sidewalks
- Construct three pedestrian crossings with RRFB, street lighting, signing, pavement marking
- Ridgeview Elementary School ~2,500 L.F. of sidewalk needs
- Alexander Doniphan Elementary School ~1,600 L.F. of sidewalk needs
- Lewis and Clark Elementary School ~4,300 L.F. of sidewalk needs
- Franklin Elementary School ~1,400 L.F. of sidewalk needs
- Manor Hill Elementary School ~1,700 L.F. of sidewalk needs

Sidewalk Infill Project: Middle Schools

Project Location

Within 1/2 mile of all Liberty Public Schools middle schools within Liberty city limits (Approx. 2.4 miles or 30 city blocks of sidewalk)



Project Description

Critical sidewalk gaps will be filled within a 1/2-mile buffer area of all public elementary schools and additional safe crossings will be installed.

Estimated Project Cost Range

Professional Services:	$0.20M – $0.30M
Right of Way:	$0.0M – $0.10M
Construction:	$2.80M – $3.60M
Total:	**$3.00M - $4.00M**

Project Assumptions

- Reconstruct sidewalk as 5’ wide
- Reconstruct ADA ramps at affected intersections
- 25% of new sidewalks require curb reconstruction and storm sewer work adjacent to sidewalk
- 25 driveway reconstructions
- Install 4’ of sod adjacent to new sidewalks
- Construct three pedestrian crossings with RRFB, street lighting, signing, pavement marking
- Discover and South View Middle Schools ~1,400 L.F. of sidewalk needs
- Liberty Middle School ~800 L.F. of sidewalk needs
- Heritage Middle School ~10,300 L.F. of sidewalk needs

LIBERTY, MO
TRANSPORTATION MASTER PLAN

Appendix C

Traffic Impact Study (TIS) Guidelines

Liberty missouri

LIBERTY, MO
TRANSPORTATION MASTER PLAN

Traffic Impact Study (TIS) Guidelines

June 13, 2025

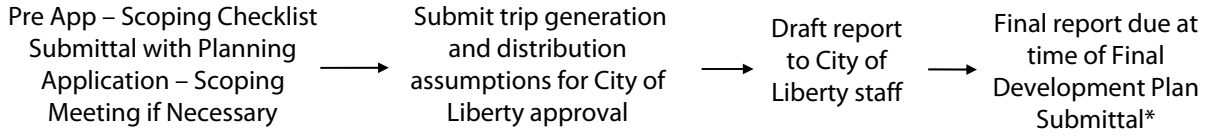
Liberty missouri

Introduction

The purpose of this document is to clearly outline the minimum requirements for a TIS prepared as part of the land development approval process in the City of Liberty, MO. A TIS identifies and quantifies the potential impacts of site development on the local and regional transportation system and specifies the measures necessary to mitigate those impacts. Any deviations from the guidance herein must be approved by the City of Liberty.

The general process for scoping and preparing a TIS is outlined in **Figure 1**. Submittal timeline requirements should be set by City of Liberty staff during project scoping. The subsequent sections present more detailed information on the TIS preparation requirements.

Figure 1: TIS Process Flow Chart



**Final TIS due at the time of Final Development Plan (FDP) Submittal; however, applicants may elect to submit earlier within the process. It should be noted that TIS submitted prior to FDP approval are subject to change based on final approved development plans.*

TIS Triggers and Scope

The following situations will require a TIS:

- A currently undeveloped property proposed for development and/or rezoning.
- A currently developed property proposed for expansion, intensification, or redevelopment.
- A previously approved project in either category above that has not been developed within time frames specified in this section and is re-starting.

The final determination of whether a TIS is required will be made by the City of Liberty.

The scope of the TIS for a proposed development is gauged by the number of new vehicular trips the development, redevelopment, or expansion is expected to add to the roadway system. This document establishes four Levels of TIS, depending on the magnitude of traffic generated – as shown in **Table 1**. The City of Liberty can request a TIS and/or modify the scope requirements of a TIS based on local conditions and knowledge.

Table 1. Traffic Impact Study Levels	Level 1	Level 2	Level 3	Level 4
Criteria				
Projected net new peak-hour vehicular trips generated by project	20-99	100 – 499	≥500	≥500
Proposed land-use deviates from Liberty, MO Zoning	n.a.	n.a.	No	Yes
Requirements				
Connectivity and circulation review, trip generation estimates, access management review	✓	✓	✓	✓
Multimodal Impact Analysis				
Existing, Opening Day		✓	✓	✓
20 years (No Project)				✓
20 Years (With Project)			✓	✓

Scoping Checklist. The City of Liberty must approve the scope of work and technical approach. As part of the pre-application process, the applicant (or authorized representative) should complete the **Scoping Checklist**, provided at the end of this document. If needed, a scoping meeting may be held to discuss the potential scope elements, with the goal of reaching agreement regarding which transportation modes are to be studied, and in what level of detail. For most studies, many of the elements in the Checklist will not be needed – but this format gives the City of Liberty the ability to draw in almost any element that could be needed. Each item that will be part of the TIS, and other study specifics (study intersection list, peak hours, clarifications, what data the City of Liberty or other agencies can provide, etc.) should be attached on a separate sheet. The discussion beginning on page 8 provides guidelines for each step and element of the checklist.

Horizon Years. Study horizon years are associated with each TIS Level in **Table 1**. Note that 20-year analyses, which should use the Mid-America Regional Council (MARC) travel-demand model and other available sources, are required for Levels 3 and 4. Level 3 analysis does not require a "No Project" scenario – it is treated as a cumulative analysis. In contrast, Level 4 analysis requires comparison of conditions with and without the project – a true long-term impact analysis.

Phased Projects. If a large project (expected to generate more than 500 peak-hour vehicle trips) is phased, the opening day for each major phase should be studied as well as the build-out. For later-year phases, an updated TIS will be required if the original study is more than two years old; unless the applicant can demonstrate that the nature of the proposed development, and the near-term and long-term forecasted background transportation conditions, have not changed substantially, with concurrence from the City of Liberty.

Study Area. For Level 1 studies, the study area contains the site and its bounding transportation infrastructure (streets, trails, etc.). For all other Levels: at a minimum, the study area should contain roadways extending in all directions from the site to the nearest arterial or collector intersection. As a rule of thumb, all intersections experiencing an increase of 50 or more vehicles during any peak hour as a result of the project should be studied – within a reasonable distance of the project. The City of Liberty should make the final determination of what study area is reasonable.

Data Collection. The applicant is responsible for collecting all of the required transportation data. The applicant should confer with City of Liberty staff, and the staff of other agencies (such as MARC or MoDOT, as appropriate) regarding available transportation data in the agency's possession.

Responsibility and Qualifications. It is the applicant's responsibility to prepare the TIS. The individual preparing the TIS must be a registered engineer in the state of Missouri, qualified and experienced in preparing a TIS. The City of Liberty will make the final determination as to whether a particular individual is qualified, and will provide a reviewer meeting the same qualification criteria.

Submittal Requirements. TIS reports should generally follow a consistent outline (see next section). Alternate formats must be approved by the City of Liberty prior to submittal. A draft report should be submitted electronically to the City of Liberty. After the applicant receives and addresses the City of Liberty's comments, a final report should be submitted to the City of Liberty. The report should contain, in appendices, detailed calculations supporting the main body of the report, such as intersection level of service (LOS) analysis.

TIS Report Outline

The TIS should be prepared according to generally acceptable professional practice and should address the study elements listed below. The City of Liberty must approve all major assumptions. The TIS should provide sufficient text, maps, graphics, and tables to describe the study findings and recommendations.

Executive Summary: This section should summarize key findings of the TIS, including the identified impacts and proposed mitigation.

Introduction and Study Scope: This section should explain the context of the TIS and the scope of the work.

Existing Conditions: The TIS should document existing transportation conditions – covering the Scoping Checklist's infrastructure/service inventory, existing demand/usage, safety issues, and operational performance.

Project Description: This section should provide the following information:

- Proposed site location, layout, access (motorized and non-motorized), land-uses, and development phasing
- Existing site access (motorized and non-motorized), land-uses (types, intensities, building arrangement), and parking
- Information on nearby parcels' access and land-use, and their relationship to the proposed project

Opening Day Conditions (No Project): The TIS should present the background transportation conditions on the assumed opening day. This includes any changes in transportation infrastructure, service, demand, safety, or operational performance anticipated to take place between the existing conditions and opening day – for each mode identified on the Scoping Meeting Checklist. If opening day is within one year of existing conditions, and no substantial changes are expected during that time frame, existing conditions can be used for Opening Day.

Opening Day Conditions (With Project): This section should present the opening day conditions with the proposed project added, evaluating all the elements identified in the Scoping Meeting Checklist. If the project will cause any impact thresholds to be exceeded (see "Description of Checklist Elements" beginning on **Page 8**), mitigation measures should be identified, and their effect on the performance of the relevant mode should be identified.

Long-Term (20-Year) Conditions (without project): This section is only required for Level 4 studies. The goal of this analysis is to provide a base scenario against which to compare "with project" conditions against, in cases where the project is large and represents a land-use change from the Comprehensive Land-Use Plan. In most cases, this scenario should be based on traffic forecasts provided by MARC. For large projects (more than 500 peak-hour trips), the applicant should develop a forecasting methodology subject to approval by the City of Liberty.

Long-Term (20-Year) Conditions (with project): This section is only required for Level 3 and 4 studies. The goal of this analysis is to provide the City of Liberty with a clear picture of how the proposed project affects the City's long-range roadway and land-use planning.

- For Level 3 studies, a detailed impact comparison is not required. The section should present long-term conditions, identify areas where impact thresholds are exceeded in the long-term, and identify possible long-term mitigation measures.

- For Level 4 studies, long-term conditions with and without the proposed project should be compared. If the project causes an impact threshold to be exceeded for any mode, mitigation measures should be identified.

Recommendations: This section should explicitly state all recommended mitigation measures developed in the TIS. This section should also detail why the recommended measures were selected as the best option(s), and why other potential measures were not selected or were determined to be infeasible.

Technical Details

Details supporting the **Scoping Meeting Checklist** are included on the following pages. (The checklist itself is included at the end of the Appendix.) Some common terms are defined here:

- *Study Area:* The geographic area to be included in the TIS. It is selected to contain the site boundaries, all study intersections, and all study non-motorized crossings. Study area limits were defined previously in this document.
- *Study Roadways:* Includes all collectors and arterials in the study area, and any local street that connects directly to the project site.
- *Study Intersections:* As a rule of thumb, all signalized intersections on the study roadways experiencing an increase of 50 or more vehicles during any peak hour as a result of the project should be studied – within a reasonable distance of the project. Key unsignalized intersections, at which the project affects side-street movements, should also be considered. The City of Liberty will make the final determination of what study intersection list is reasonable.
- *Study Non-Motorized Crossings:* Includes all existing mid-block pedestrian crossings of study roadways, and off-street bicycle path intersections with study roadways, if they have the potential to either (1) be crossed by vehicular traffic generated by the proposed site or (2) be used by pedestrian or bicycle trips generated by the proposed site.
- *Study Railroad Crossings:* Includes any at-grade railroad crossing of a study roadway.
- *Safety Focus Areas:* Includes any areas, within the study area, identified as a safety concern (for any transportation mode) by the City of Liberty.
- *Freight Generator:* Any proposed site that is anticipated to generate 100 or more truck trips per day, or more than 5 trucks during any peak hour.
- *Impact Threshold:* A value above which a study element (intersection, pedestrian crossing, etc.) is considered to be operating unacceptably.
- *Mitigation Measures:* Infrastructure modifications required to address the identified impacts. Modifications could be on- or off-site and could affect any of the study modes (auto, truck, bike, pedestrian). Typical mitigation measures include the addition of turn lanes, installation of signals (if warranted), provision of sidewalk connections, or other such improvements.

Descriptions of Checklist Elements

Existing and No-Project Conditions

	Ped	Bike	Auto	Truck	Rail
Infrastructure/ Service Inventory	□Sidewalks □Trails/Paths □Mid-block Crossings □Signalization	□On-street □Off-Street	□Functional Classes □Lanes □Traffic Control □Speeds □Parking – On-Street □Parking – Off-Street	□ Truck Routes	□Grade Xings

The purpose of the infrastructure/service inventory is to identify transportation infrastructure in the study area that is relevant to the analysis of the proposed site. **These inventories are conducted for all TIS Levels (1-4).**

Pedestrians: The TIS should clearly describe the locations of existing sidewalks, trails and paths in the study area, including widths and surface type. Gaps should be noted. Study intersections with missing crossings should be noted. The type of crossing control used at each study pedestrian crossing should be described (crosswalk markings, pedestrian signalization, countdown signals, detection, etc.).

Bicycles: The TIS should clearly describe the locations of existing on-street and off-street bicycle facilities, including widths and surface type. Gaps should be noted. The type of crossing control used at each study bicycle crossing should be described (signs or extended markings, etc.).

Automobiles: The TIS should clearly describe the locations of all study roadways, as well as number of lanes, posted speeds, and functional class. Any existing local streets that are proposed to be directly connected to the site should be similarly described. The existing traffic control type (signal, two-way stop, four-way stop, roundabout, etc.) at each of the study intersections should be identified. Traffic signal timing information for study intersections should be obtained from the City of Liberty at this stage.

- *Parking:* The TIS should clearly describe the locations of existing on-street parking in the study area. If any existing off-street parking area is relevant to the site under study (either an adjacent use for which parking could potentially be shared, or a public parking lot that could potentially be used by vehicles generated by the proposed site), the TIS should clearly describe its location as well. For any existing parking that may be used by the proposed project, the TIS should also document the parking capacity, time/usage restrictions, and pricing characteristics (if any).

Trucks: The TIS should clearly describe the locations of any existing truck routes on the study roadways.

Rail: The TIS should clearly describe the locations of study grade crossings, including the type of control (gated, flashers, etc.) and number of train tracks at each.

For each of the modes described above, the TIS should also identify known/planned changes to the inventoried infrastructure anticipated over the planning horizon selected for the TIS. This includes specific funded projects as well as those contained in relevant plans such as Liberty's Transportation Master Plan.

	Ped	Bike	Auto	Truck	Rail
Demand/ Usage	□Intersection Crossings □Mid-block Crossings	□Turning Mvmts	□ADT □Turning Mvmts □Parking Occupancy	□Truck Turning Mvmts □Truck ADT	□Grade Xing Vols

The purpose of the Demand/Usage element is to identify the extent to which existing transportation infrastructure in the study area is being used, to set up for the comparative analysis of Proposed Conditions. **These items are not evaluated for Level 1 studies, unless specifically noted.**

Pedestrians: The TIS should include pedestrian counts at each study pedestrian crossing, separated by direction. These counts should be conducted simultaneously with the vehicular turning movement counts described below, and reported in the same time increments.

Bicycles: The TIS should include counts of existing on-street bicycle turning movements at each study bicycle crossing. These counts should be conducted simultaneously with the vehicular turning movement counts described below, and reported in the same time increments.

Automobiles: The TIS should identify existing Average Daily Traffic (ADT) volumes on study roadways for which information is available. The City of Liberty, at its discretion, may require new ADT counts to be conducted on specific study roadways (preferably for 48 continuous hours in 15-minute increments) if available counts are outdated (over two years old) or if no counts are available.

The TIS also should identify existing peak-hour turning movements at each study intersection as well as each study crossing. Typically, both the a.m. (7-9) and p.m. (4-6) peak hours should be studied. If it can be demonstrated that the project will not generate traffic during one of the peak hours (for example, a restaurant that is only open for lunch and dinner), the City of Liberty may waive the requirement to analyze that period. Mid-day and weekend counts may also be required, based on the nature of the proposed project, at the discretion of the City of Liberty. Where current City of Liberty-approved turning-movement counts (no more than two years old) are not available, new counts must be conducted (and should be provided in 15-minute increments). As mentioned in other areas, the counts should include (and identify) bicycles, pedestrians, and heavy vehicles.

Any new peak-hour and daily counts should be conducted on a Tuesday, Wednesday, or Thursday while school is in session (except for special studies when weekends or Monday/Friday counts are needed).

- *Parking:* If any existing on- or off-street parking areas may be used by the proposed project, the analysis should include counts to identify peak parking occupancies in these areas.

Trucks: The vehicular peak-hour turning-movement counts at all study intersections and non-motorized crossings should include heavy vehicles, to support the accuracy of operational calculations. For a TIS involving a freight generator, the vehicular ADT counts should also break out heavy vehicles separately.

Rail: For railroad crossings being studied, the TIS should identify daily train volumes and crossroad vehicular volumes. Unless otherwise directed by the City of Liberty, this data can be obtained from the FRA railroad crossing inventory.

	Ped	Bike	Auto	Truck	Truck/Rail
Safety	□Crash Patterns	□Crash Patterns	□Crash Patterns □Sight Distances	□Crash Patterns	□Xing Crashes

The purpose of the safety element is to identify existing safety issues (primarily crash patterns) that could affect, or be affected by, the proposed project. **Safety analyses are not included in Level 1 studies, and are only included in other TIS Levels if very specific safety issues have been identified in the study area by the relevant agencies.**

If a safety concern for a given transportation mode has been identified within the study area by the City of Liberty, the TIS will include analysis of the most recent available five-year record of crashes related to that mode in the safety focus area(s) identified for that mode, to determine if a crash pattern exists.

	Ped	Bike	Auto	Truck	Rail
Operational Performance	□Ped LOS	□Bike LOS	□LOS □Queueing	□LOS □Queueing	□Grade Xing Delay

The purpose of the Operational Performance element is to identify how well the existing transportation infrastructure currently serves each of the studied transportation modes, to set up for the comparative analysis of Proposed Conditions. **These items are not evaluated for Level 1 studies.**

Pedestrians: For study intersections or crossings with 10 or more pedestrians per hour crossing any leg (both directions combined) during any of the studied peak hours, the intersection or crossing should be assessed with regard to the adequacy of the crossing treatment, including topics such as crosswalk design and pedestrian signal timing.

Bicycles: For study intersections or crossings that include bike lanes and at which any single approach experiences more than 10 bicycles per hour, the intersection or crossing should be assessed with regard to bicycle facility design and operations including signing and striping.

Automobiles and Trucks: The TIS should examine the following items:

- *Level of Service (LOS):* The TIS should include computation of Level of Service (LOS) for each study intersection using the methods described in the most recent version of the Transportation Research Board's *Highway Capacity Manual (HCM).* LOS should be reported for each movement (or lane group) at the intersection. If required by the City of Liberty, traffic simulation will be conducted for closely spaced intersections, improvements relying on signal timing/phasing, or complex traffic conditions. The impact thresholds for intersection-wide LOS are:
  - LOS A – D acceptable on all streets identified on the Major Street Map as major and minor arterials
  - LOS A – C acceptable on all other roadways (the highest class of road defines an intersection)
- *Queuing:* The TIS should identify whether any existing study-intersection queues exceed acceptable thresholds. The impact threshold for queuing is a queue storage ratio of 1.0 (queue exceeds storage length) for 95th percentile queues.
- *Residential Traffic:* The TIS should identify whether traffic volumes on any study roadways that are local residential streets exceed acceptable thresholds. The impact threshold for local residential streets is 2,000 vehicles per day.
- *Parking:* If parking demand will be studied under Proposed Conditions, and potential on-or off-street areas to share site-generated parking were identified as part of the Infrastructure/Service Inventory, the TIS should include the parking locations identified in the Demand/Usage element. The impact threshold for parking is a peak occupancy of 85 percent.

Rail: For any study railroad crossings at which the peak-hour crossroad volume exceeds 200 vehicles per hour and the conflicting hourly train volume (determined by dividing the daily train volume by 24) exceeds 2 trains per hour, the TIS should analyze vehicular delay at the crossing. This delay should be converted to an LOS using the HCM signalized intersection scale, and the impact thresholds are the same as for intersections.

Conditions with Project

	Ped	Bike	Auto	Truck	Rail
Connectivity and Circulation	□Pedestrian Gaps □Site Review	□Bike Gaps □Site Review	□Network Connectivity □Access Management □Site Review	□Proximity to Truck Route □Site Review	□Site Review

The purpose of the Connectivity and Circulation element is to determine whether the project provides necessary internal connectivity and circulation for all relevant transportation modes, as well as necessary connectivity to the existing transportation system. **Connectivity analyses are conducted for all study Levels (1-4).**

Pedestrians: The TIS should identify whether the internal site plan provides adequate sidewalks and pedestrian connections as required by the relevant regulations and standards of the City of Liberty. This also includes pedestrian connections between abutting cul-de-sacs, pedestrian connections to adjacent collectors/arterials, and consistency with Safe Routes to School principles. If the site abuts or includes collector/arterial roadways that have been identified as pedestrian gaps by the City of Liberty, the TIS should address the ways in which the project will address these gaps. Similarly, if the site abuts or includes uncompleted portions of the planned trail system, the TIS should address the project's role in their completion.

Bicycles: The TIS should identify whether the internal site plan provides any impediments to bicycle travel, as well as the steps needed to relieve those impediments. As with the pedestrian analysis, this also includes bicycle connections between abutting cul-de-sacs, bicycle connections to adjacent collectors/arterials, and consistency with Safe Routes to School principles. If the site abuts or includes roadways or connections that have been shown as future (on- or off-street) bicycle facilities in current planning documents, the TIS should address the project's role in completing these facilities. If the site presents an opportunity to add to the bicycle network in a previously unplanned or unforeseen way, the TIS should address this as well.

Automobiles: Three major categories are evaluated:

- *Connectivity:* Sites shall be designed to be in compliance with Article XV – Subdivision and Neighborhood Design Standards and Article XVI - Site Development and Design Standards of the current version of the City of Liberty's Unified Development Ordinance. Furthermore, each site shall provide multiple access connections between the site and City arterial/collector streets.
- *Site Plan Review:* The TIS should evaluate and comment on the on-site circulation. Items discussed should include an assessment of on-site intersections and driveways/roadways with respect to operations and safety (including driveway throat length, driveway widths,

vehicle turning radii, sight distance, queueing, emergency access, etc.). Shared access and cross-parcel traffic flows should also be considered.

- *Access Management Review:* The TIS should compare the proposed site access to the *Liberty, Missouri – Code of Ordinances (Chapter 30)* as well as other applicable design standards and guidelines, and comment on the plan's consistency with these standards.

Trucks: If the site is identified as a freight generator, the TIS should discuss the site's proximity and connectivity to the truck route system and any truck connectivity issues raised by the site design or location. The TIS should also evaluate the site plan from a truck standpoint – items such as on-site truck circulation, truck loading/unloading areas, truck loading/unloading area dimensions, truck parking, truck queueing etc.

Rail: If travelways to/from or within the site involve an at-grade railroad crossing(s), the TIS should identify the alternative routes that may be available if the railroad tracks are blocked for unexpected lengthy periods of time. This should include consideration of emergency vehicle access.

	Ped	Bike	Auto	Truck	Rail
Demand/ Usage	□Pedestrian Trip Generation	□Pedestrian Trip Generation	□Auto Trip Generation □Auto Trip Distribution □Auto Trip Assignment □Auto Parking Generation	□Truck Trip Generation	

The purpose of the Demand/Usage element is to evaluate the effects of the demand generated by the site for each relevant mode of transportation.

Pedestrians: Pedestrian trip generation will generally not be calculated for projects unless the project is known to be a major pedestrian generator anticipated to affect study intersections or crossings. In such cases, the added pedestrian demand should be incorporated into the operational analysis.

Bicycles: Bicycle trip generation will generally not be calculated for projects unless the project is known to be a major bicycle generator anticipated to affect study intersections or crossings. In such cases, the added bicycle demand should be incorporated into the operational analysis.

Automobiles: The TIS should evaluate projected vehicular demand in the following ways:

- *Trip Generation:* Vehicular trip generation should be calculated (for the previously identified peak hours) using the most recent version of ITE's *Trip Generation*. Local trip generation characteristics may be used if deemed to be properly collected and consistent with the subject development application, and are especially encouraged in three cases:
  - When a proposed use(s) does not have a corresponding ITE category
  - When an ITE rate is based on antiquated data or a small sample
  - When the TIS addresses an existing project that is relocating or expanding

  For redevelopment or rezoning projects, the applicant should calculate both the total project trip generation and the net difference between the proposed project and the existing use. **If operational analysis is required, the trip generation assumptions and calculations must be approved by the City of Liberty prior to initiation of the operational analysis.**

- *Trip Distribution and Assignment:* **This step is not required for Level 1 studies.** For Level 2 and above, The TIS should clearly present and support the assumed trip distribution throughout the study area for the previously identified peak hours (including project driveways for developments that are not single-family residential). Similarly, the major assignment assumptions will be presented and explained. For redevelopment or rezoning projects, the applicant will need to determine whether the distribution of the proposed project differs from that of the existing or previously approved/zoned use, because the assignment will need to represent the net difference. **If operational analysis is required,**

the trip distribution assumptions must be approved by the City of Liberty prior to initiation of the operational analysis.

- *Parking:* The TIS should discuss the proposed site's parking provisions in relationship to the City of Liberty's required parking ratios, and confirm that both the ratios and the proposed parking are reasonable. When a use does not fit into the categories identified by the parking ratio requirements, or it is more specialized in a way that could affect parking ratios, ITE's *Parking Generation* should be consulted as a source for determining potential parking demand. If a use is not covered by *Parking Generation* or the parking ratio requirements, actual field studies of similar uses should be conducted to verify expected demand. In the case of mixed-use developments, or projects that are proposing to share parking with other uses, the TIS should include a shared parking analysis that accounts for the time-of-day variations in on-site demand in order to prevent inefficient, oversized parking provisions. The TIS should also discuss the site's provisions of accessible parking in relation to the City of Liberty's policies and ADA requirements.

Trucks: If the site is identified as a freight generator, the trip-generation, distribution, and assignment components of the analysis should identify trucks separately.

	Ped	Bike	Auto	Truck	Rail
Operational Performance	□Ped LOS	□HCM Bike LOS	□LOS □Queueing	□LOS □Queueing	□Grade Xing Delay

The purpose of the Operational Performance element is to identify the operational impacts of the proposed project on the transportation system. **These items are not evaluated for Level 1 studies.** If impacts are identified, the TIS should evaluate mitigation measures to address them.

Pedestrians: Study intersections or crossings that were examined under Existing Conditions should be re-examined for all future scenarios using the same methodology. In addition, if any future scenario causes any other intersection or pedestrian crossing to exceed 10 pedestrians per hour (both directions combined), that intersection or crossing should be examined as well.

Bicycles: Study intersections or crossings that were examined under Existing Conditions should be re-examined for all future scenarios using the same methodology. In addition, if any future scenario causes any other intersection or bicycle crossing to exceed 10 bicycles per hour (both directions combined), that intersection or crossing should be examined as well.

Automobiles and Trucks:

- *Level of Service (LOS):* The TIS should duplicate the operational analysis conducted for No Project conditions (with LOS reported by movement or lane group), but using traffic volumes and assumptions for the project for appropriate horizon years. The future scenarios should also include applicable study driveways and/or new intersections created as part of the project.
- *Queuing:* The TIS should examine intersection queues for the future scenarios using the same impact thresholds described under Existing Conditions.
- *Residential Traffic:* The TIS should identify whether traffic volumes on any study roadways that are local residential streets will exceed the vehicular volume impact threshold under the "With Project" scenarios.

Rail: For any study railroad crossings at which the peak-hour crossroad volume will exceed 200 vehicles per hour with the proposed project and the conflicting hourly train volume (determined by dividing the daily train volume by 24) exceeds 2 trains per hour, the TIS should analyze vehicular delay at the crossing with the same impact thresholds used for No Project conditions.

	Ped	Bike	Auto	Truck	Rail
Safety	□Safety Impacts	□Safety Impacts	□Sight Distance □Safety Impacts	□Sight Distance □Safety Impacts	□Safety Impacts

The purpose of the safety element is to identify the project's impacts on any safety issues identified under No Project conditions.

If a safety concern for any of the transportation modes was analyzed under "No Project" conditions, the TIS should include analysis of the project's anticipated impact to that safety concern using available standard safety methodology. In addition, if there are new safety issues related to the new demand (considering all modes), these issues should also be addressed in the TIS in this section.

The TIS should identify whether adequate sight distance has been provided at project driveways and any intersections whose design will change in conjunction with the project.

Scoping Checklist – Items to Potentially Be Addressed in TIS

TIS level: □1 □2 □3 □4 **Analysis Years:** □ Existing: ____ □ Opening Day: ____ □20 Years:_____ □Other:_____

	Ped	Bike	Auto	Truck	Rail
	Existing and No-Project Conditions				
Infrastructure/ Service Inventory	□Sidewalks □Trails/Paths □Mid-block Crossings □Signalization	□On-street □Off-Street	□Functional Classes □Lanes □Traffic Control □Speeds □Parking – On-Street □Parking – Off-Street	□Truck Routes	□Grade Xings
Demand/ Usage	□Intersection Crossings □Mid-block Crossings	□Turning Mvmts	□ADT □Turning Mvmts □Parking Occupancy	□Truck Turning Mvmts □Truck ADT	□Grade Xing Vols
Safety	□Crash Patterns	□Crash Patterns	□Crash Patterns □Sight Distances	□Crash Patterns	□Xing Crashes
Operational Performance	□Ped LOS	□Bike LOS	□LOS □Queueing	□LOS □Queueing	□Grade Xing Delay
	Conditions with Project				
Connectivity and Circulation	□Pedestrian Gaps □Site Review	□Bike Gaps □Site Review	□Network Connectivity □Access Management □Site Review	□Proximity to Truck Route □Site Review	□Site Review
Demand/ Usage	□Pedestrian Trip Generation	□Pedestrian Trip Generation	□Auto Trip Generation □Auto Trip Distribution □Auto Trip Assignment □Auto Parking Generation	□Truck Trip Generation	
Operational Performance	□Ped LOS	□HCM Bike LOS	□LOS □Queueing	□LOS □Queueing	□Grade Xing Delay
Safety	□Safety Impacts	□Safety Impacts	□Sight Distance □Safety Impacts	□Sight Distance □Safety Impacts	□Safety Impacts