

April 26, 2024

# LOCALLY PREFERRED ALTERNATIVES REFINEMENT



East-West  
Transit Study  
RideKC

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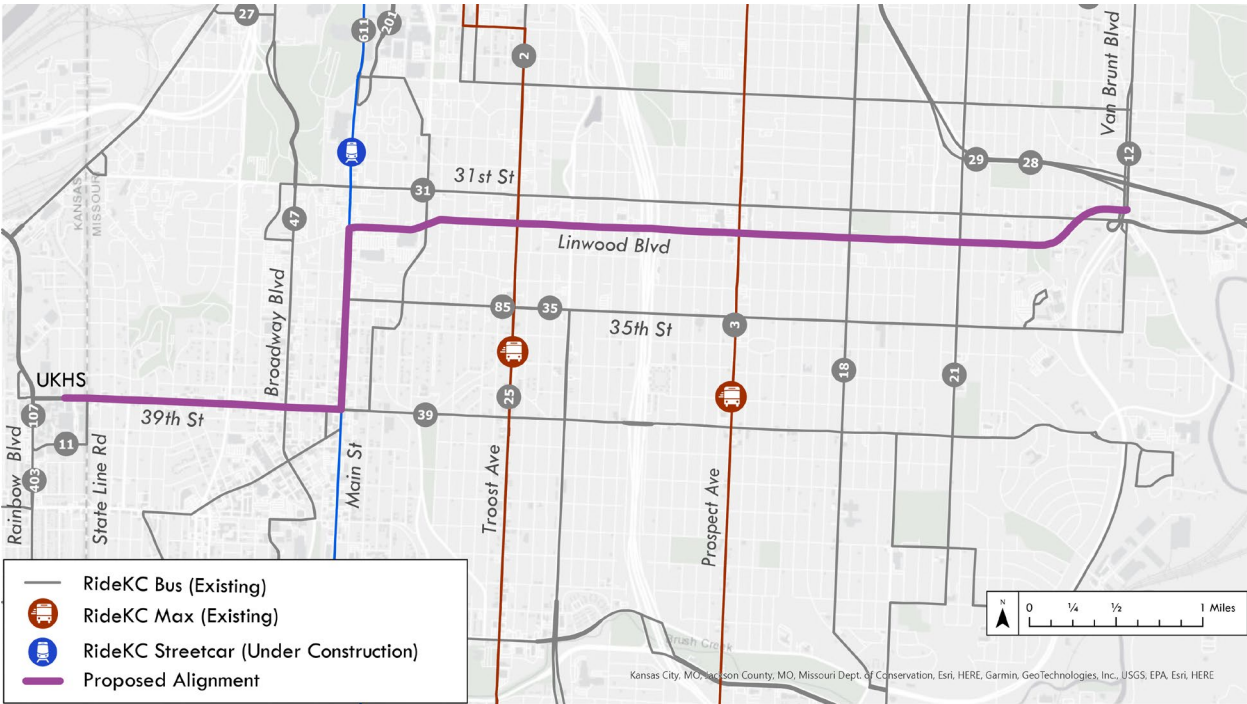
# Locally Preferred Alternatives Refinement: Station Locations, Local Route Modifications, & Ridership

## INTRODUCTION

In May 2023, the Kansas City Area Transportation Authority (KCATA), in cooperation with project partners across state lines, evaluated an east-west, high-capacity transit connection between The University of Kansas Health System and a terminus on the east side of Kansas City, MO. The vision for the East-West Corridor is to create a fast, efficient, and attractive public transit service that connects to existing Streetcar and MAX services. As an economic investment for the greater Kansas City area, the corridor would strengthen the RideKC transit network. Through the study process, which included both public engagement and technical evaluation, the study identified a set of alternatives for evaluation, followed by a preferred alignment and mode, for a high-capacity transit connection. The May 2023 recommendation was a Streetcar project with the alignment shown in Figure 1. From west to east, the alignment will follow 39th Street, Main Street, Linwood Blvd and terminate at Linwood and Van Brunt/Hardesty Avenue.

This current effort, Phase 1.5, the Locally Preferred Alternatives Refinement, continues the work of Phase 1 completed in May 2023. It further defines the East-West Streetcar project including the station locations, service plan, local route modifications, ridership, and capital and operating costs. These elements are documented within this report.

Figure 1. Final Recommended Streetcar Alignment



## STATION LOCATIONS

### Considerations in Selecting Station Locations

Several factors were used to identify potential station locations along the locally preferred route. The distance between stations was limited to  $\frac{1}{4}$  to  $\frac{1}{2}$ -mile to support adequate service coverage. The presence of Justice 40<sup>1</sup> indicators were used to identify underserved/disenfranchised communities that could benefit from enhanced service. Previous planning studies were taken into consideration, namely the Next Rail Streetcar Expansion Study, Linwood Corridor Complete Streets & Bikeway Plan, and the Midtown/Plaza Area Plan. In addition to those mentioned above, transit service connections, ridership demand based, walkability, and future land use analyses were also considered.

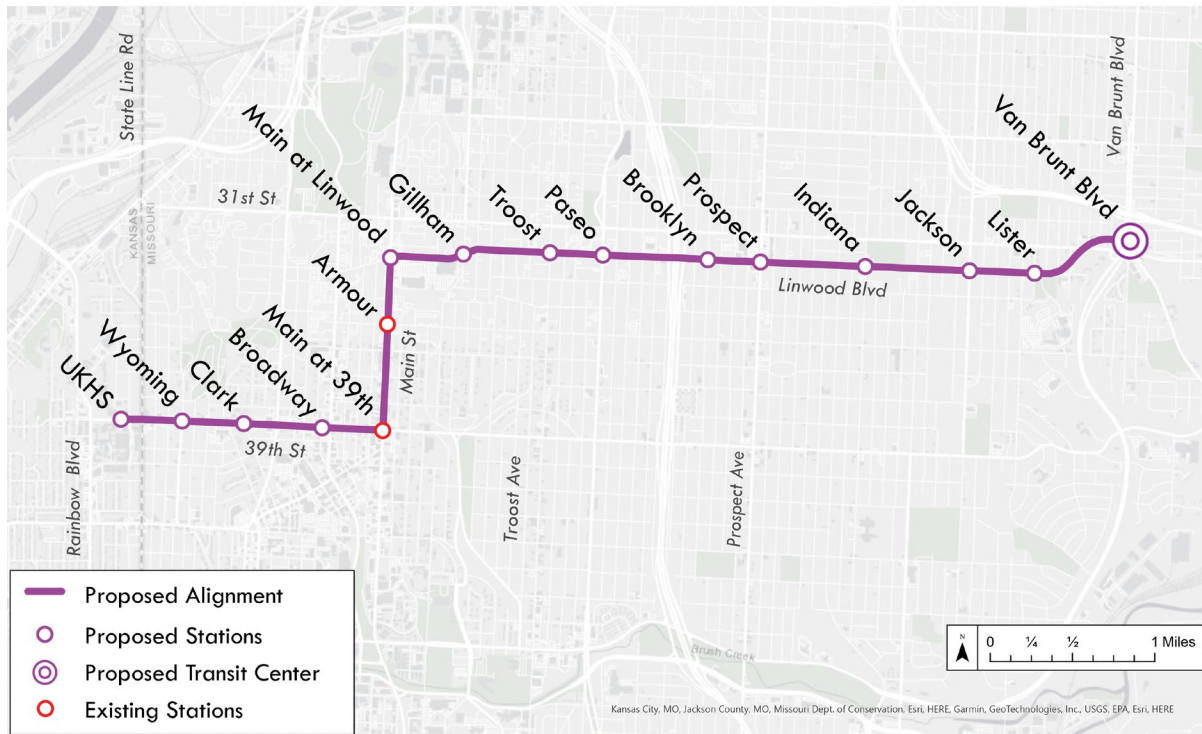
### Proposed Station Locations

Thoughtful and critical analysis resulted in the proposal of 16 station locations, two of which are part of the existing RideKC Streetcar extension, for the east-west transit route. Station locations refer to a general intersection-level location and not the exact site of the station within the city block or quadrant of an intersection. Precise station site options for a station location will be developed in a future study phase and could vary by up to 500 feet based on site constraints as they are discovered. The proposed station locations are subject to change as the project is further defined and station sites are further developed. Between the western terminus of the University of Kansas Health System (UKHS) and Van Brunt Boulevard on the east end, the average distance between stations was calculated to be approximately .47 miles.

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<sup>1</sup> Justice 40 is a Federal Government initiative with the goal of investing 40% of the overall benefits of certain Federal investments to communities that are marginalized, underserved, and overburdened by pollution. The Climate and Economic Justice Screen Tool (CEJST) helps identify these communities.  
<https://www.whitehouse.gov/environmentaljustice/justice40/>

Figure 2. Proposed Station Locations



### 39<sup>th</sup> Street

39<sup>th</sup> Street is host to five station locations with UKHS functioning as a significant transfer location and western terminus of the corridor. At the western terminus within the UKHS campus, transfers to other transit service include:

- RideKC Route 107 with service between downtown Kansas City, Kansas, and UKHS
- RideKC Route 11 with service between the Northeast neighborhood of Kansas City, Missouri, and UKHS.
- RideKC Route 403 with service between Olathe, Kansas, and UKHS
- RideKC Route 39 with service between east Kansas City (near 39<sup>th</sup> Street and Emanuel Cleaver II Blvd) and UKHS, a service parallel to the East-West Streetcar alignment the south along 39<sup>th</sup> Street and east of Main Street. West of Main Street, Route 39 follows the same alignment as the East-West Streetcar alignment.

Additionally, the Main at 39<sup>th</sup> station location (at the intersection of 39<sup>th</sup> Street and Main Street) will offer transfer capabilities between the RideKC Streetcar Main Street Extension and the East-West Streetcar.

### Main Street

Along Main Street, the alignment has three stations and overlaps with the existing KC Streetcar Main Street Extension. Two of the three proposed station locations have existing station infrastructure.

## Linwood Boulevard

The streetcar improvements on Linwood Boulevard account for a little more than four miles in distance. There are nine stations along this segment. At the eastern terminus, the Van Brunt station will serve as a new transit center for connections to current routes that currently service the bus transfer facility at 31<sup>st</sup> Street and Van Brunt Boulevard:

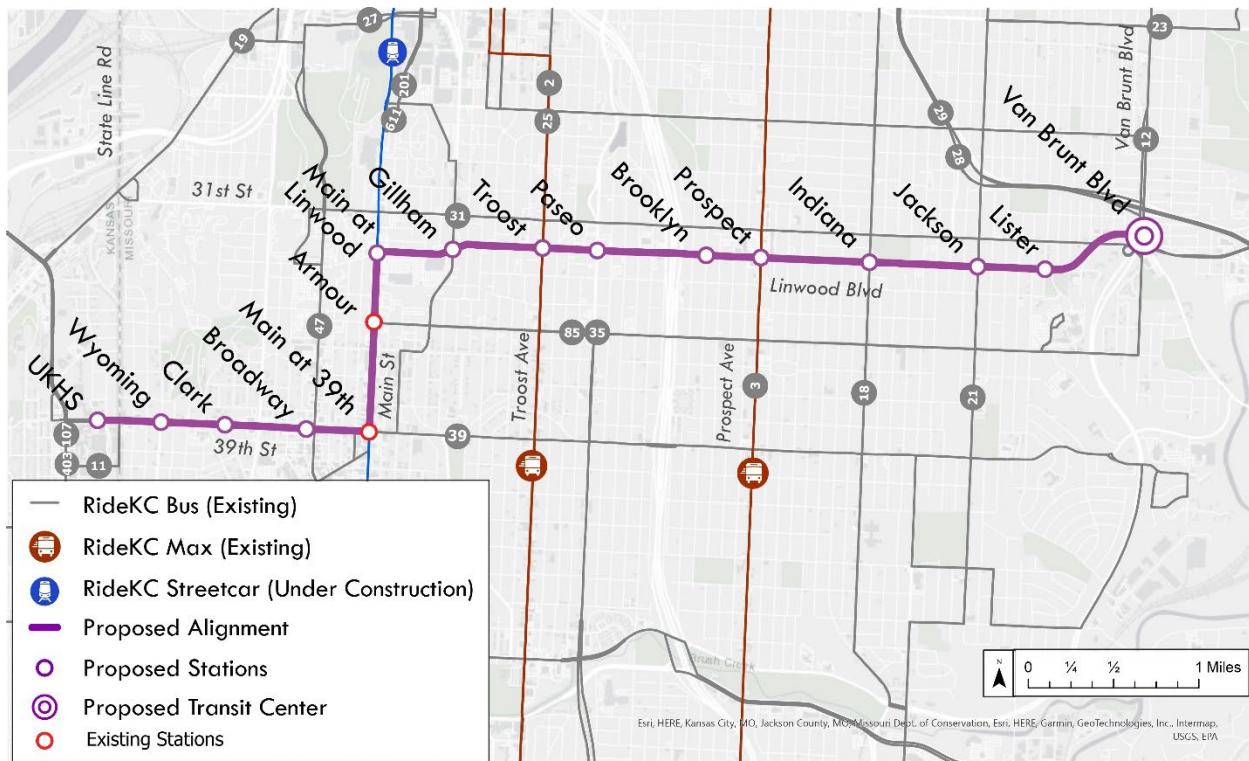
- RideKC local Route 12 with service along Hardesty north of 31<sup>st</sup> Street and continuing west along the 12<sup>th</sup> Street corridor into downtown Kansas City, Missouri
- RideKC local Route 27 serving 27<sup>th</sup> Street in downtown Kansas City, Missouri
- RideKC Route 28 with service to Bannister Road and Blue Ridge Boulevard via Blue Ridge Crossing
- RideKC Route 31 serving the 31<sup>st</sup> Street corridor in midtown Kansas City, Missouri and east to Blue Ridge Crossing
- RideKC Route 35 serving the 35<sup>th</sup> Street corridor in midtown Kansas City and the Country Club Plaza
- IRIS On-Demand app-based ride service providing service within the Downtown/Midtown/Plaza zone

Connections east of the 31<sup>st</sup> Street and Van Brunt Boulevard provided by RideKC Route 31 would be maintained with the implementation of East-West Streetcar.

## Relationship to the Existing Transit Network

Incorporating proposed station locations into the existing transit network (see Figure 3) provides better connections and service. Therefore, planning efforts prioritized placement of stations around connections to other transit services including streetcar, bus rapid transit (MAX) services, and local bus services, where possible.

Figure 3. Proposed Station Locations and Existing Transit Network



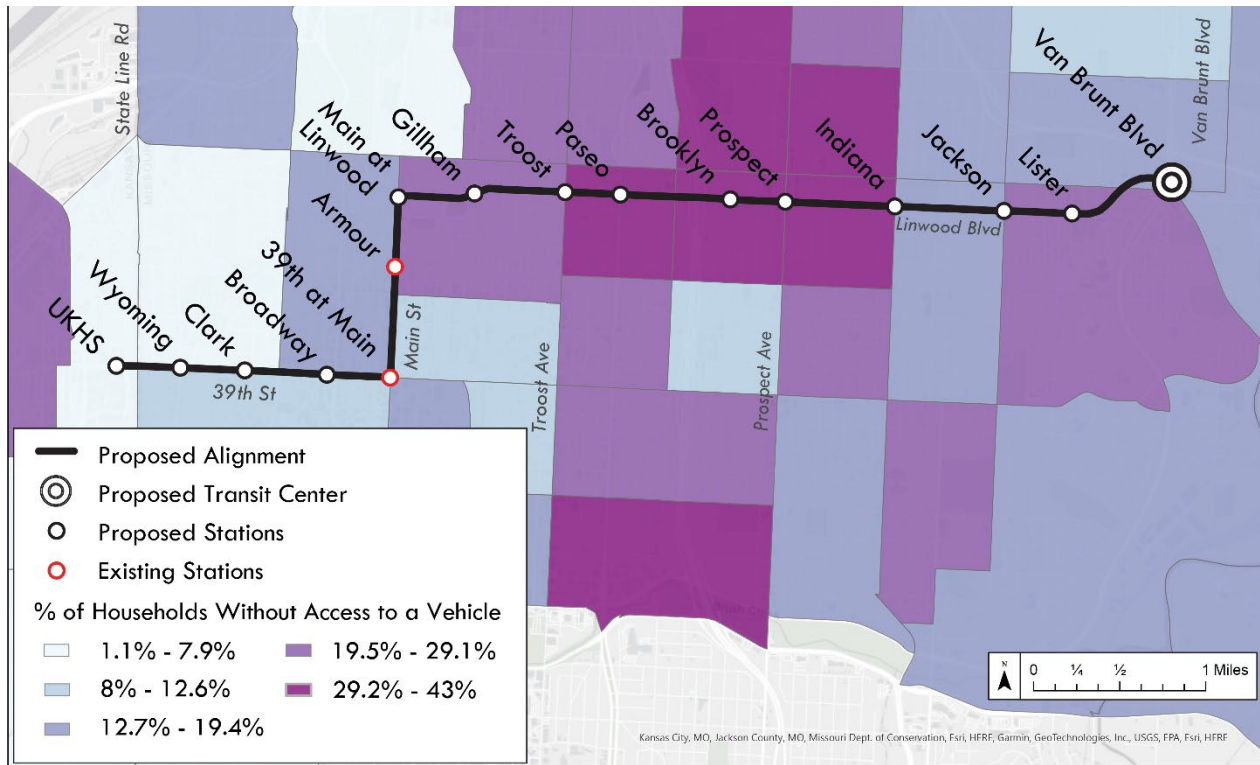
## Equitable Access to Transit

Equitable access to transportation and destinations was a critical driver in the analysis used to identify proposed station sites along the corridor. A demographic analysis of the alignment was used to support station site location focusing on access to employment, housing, and transportation. Using these analyses, the placement of stations was prioritized to intersect with existing transit stations to enable a wider range of mobility to valuable destinations, particularly for riders originating from transit dependent and/or disadvantaged census tracts. Disadvantaged census tracts were defined using the federal Climate and Economic Justice Screening Tool (CEJST), which defines disadvantaged tracts by those experiencing burdens in climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development.<sup>2</sup>

<sup>2</sup> Climate and Economic Justice Screening Tool, U.S. Executive Office Council on Environmental Quality accessed at <https://screeningtool.geoplatform.gov/en/about>

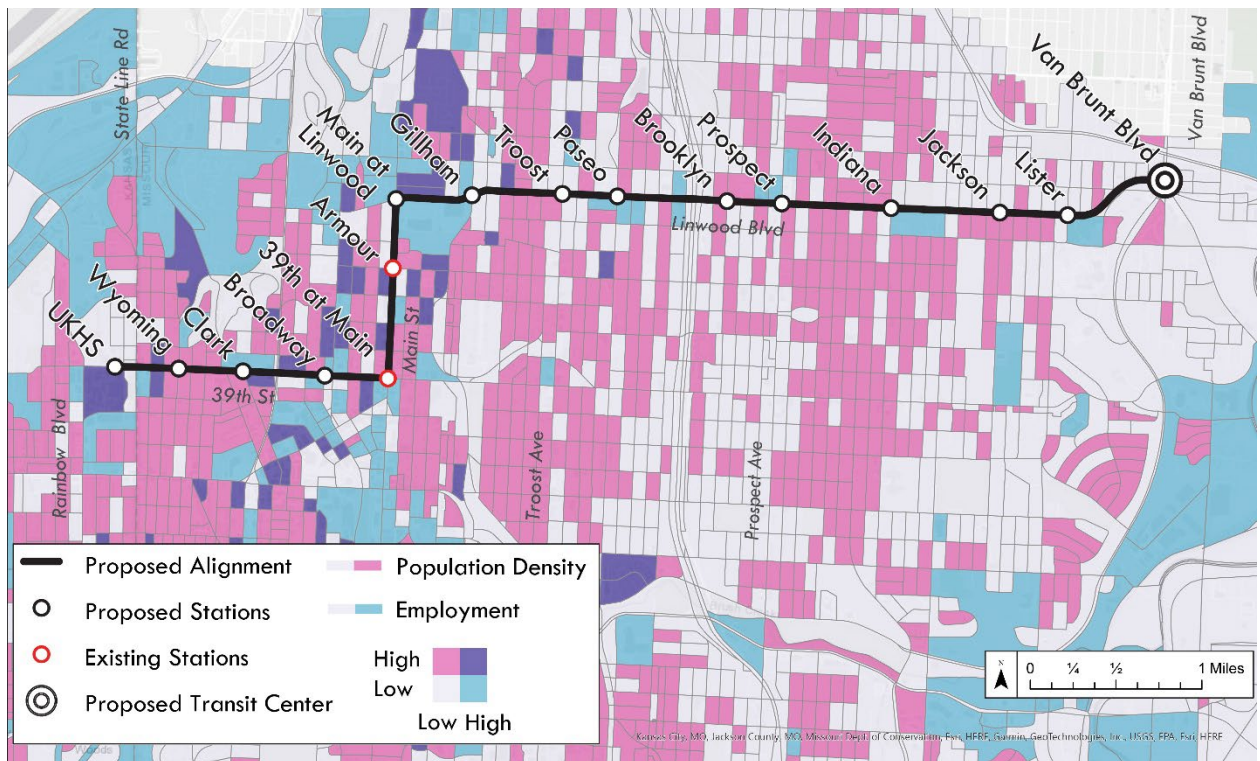


Figure 4. Proposed Station Locations and Households without Access to a Private Vehicle



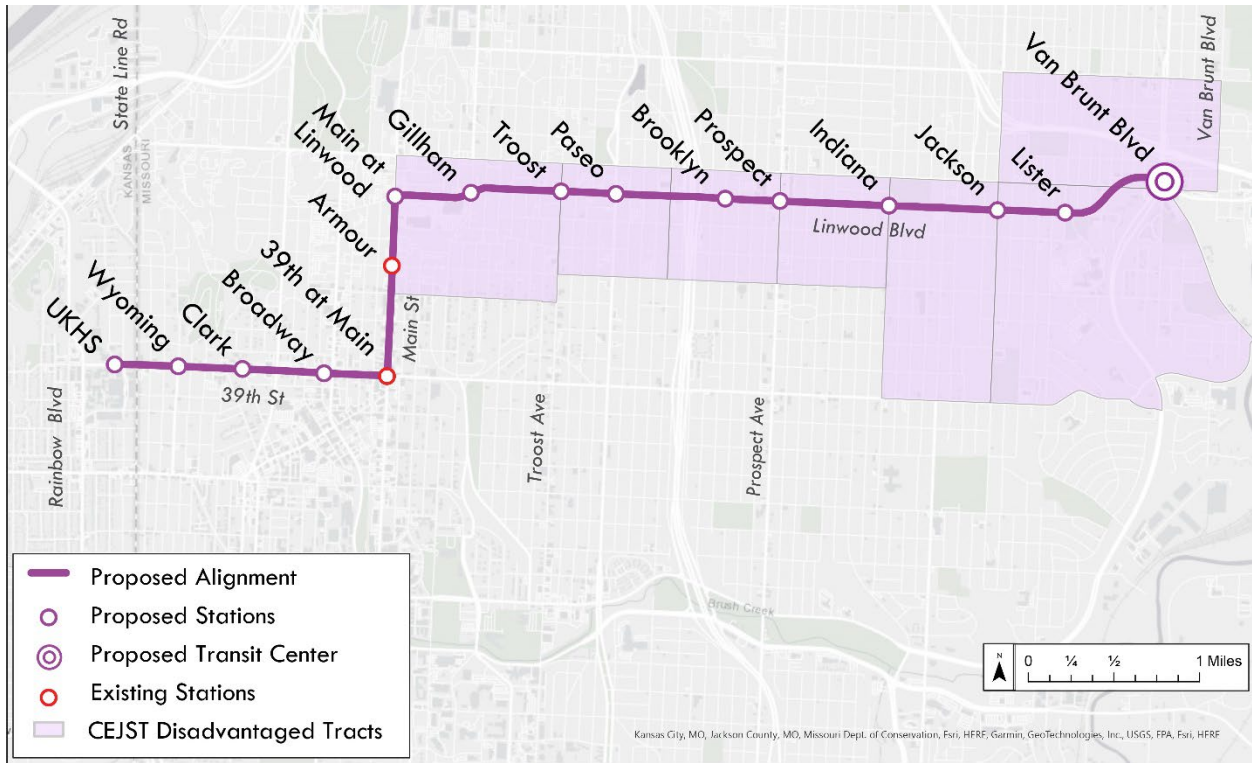
U.S. Census Bureau (2022). 2018-2022. American Community Survey 5-year Public Use. Retrieved from <https://data.census.gov/>.

Figure 5. Proposed Stations and Population Density and Employment



U.S. Census Bureau (2022). 2018-2022. American Community Survey 5-year Public Use. Retrieved from <https://data.census.gov/>.

Figure 6. Proposed Stations and Climate & Economic Justice Tool (CEJST) Disadvantaged Census Tracts



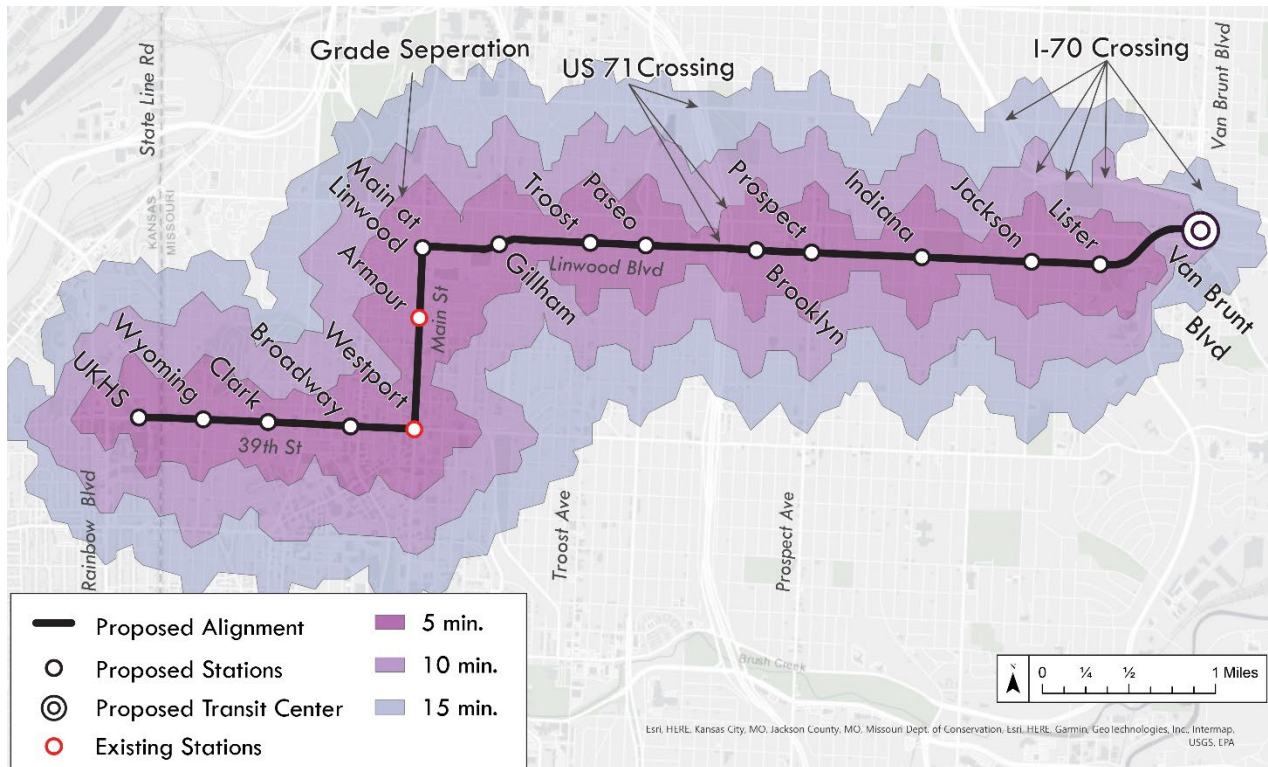
Council on Environmental Quality (2023). Climate and Economic Justice Screening Tool. Retrieved from <https://screeningtool.geoplatform.gov/en/downloads#11.79/39.0315/-94.53943>.



## Walkshed Analysis

For many, a ride on transit begins and ends with a walk. Therefore, walkability to access the proposed streetcar and destinations was an essential consideration in citing station locations. Therefore, a spatial analysis to understand the accessibility provided within a 5-, 10-, and 15-minute walking distance aided in supplying a rationale for stations along the proposed route. This analysis determining streets that could be accessed via foot from each of the proposed stations. Special consideration was given to the walkability to 31<sup>st</sup> Street, which serves as a commercial corridor for the area, and physical barriers or challenging pedestrian areas such as grade separations, U.S. 71 crossing, I-70.

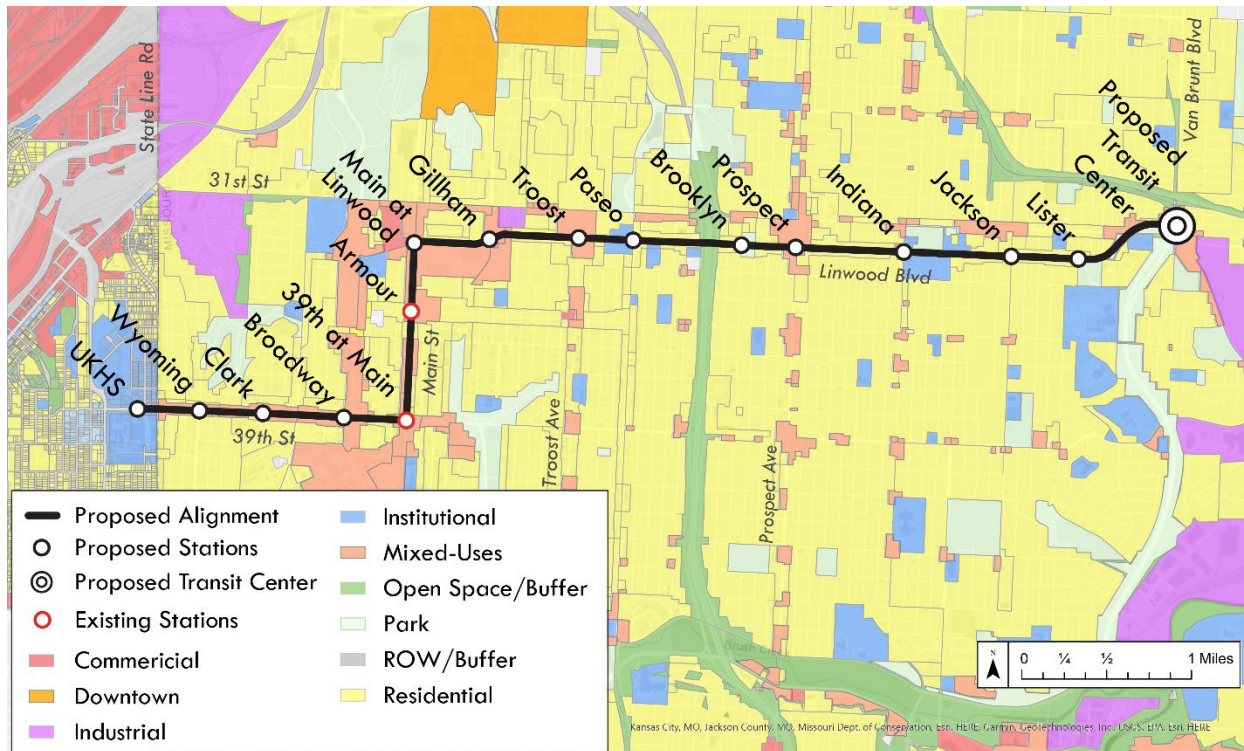
Figure 8. Proposed Stations and 5-, 10-, and 15-Minute Walksheds and Barriers to Walking



## Future Land Use Analysis

Assessing future land use planning by both the governments of Kansas City, Kansas and Kansas City, Missouri provided greater insight into where density will be focused throughout the transit corridor. Providing trips to and from daily activities is a crucial function of rapid transit. Identifying destinations for daily activities was vital to the selection of station locations. Therefore, placement was prioritized around institutional, mixed-use, commercial, and dense residential future land uses which will provide transit customers access to appointments, employment, shopping, housing and other opportunities.

Figure 9. Proposed Stations and Future Land Use Plans



United Government of Wyandotte County and Kansas City, Kansas. City of Kansas City, Missouri.

## EAST–WEST LOCAL SERVICE

Two primary east-west existing transit routes serve the proposed 39<sup>th</sup> Street (Route 39) and Linwood corridors (Route 31 on 31<sup>st</sup> Street), in addition to other nearby routes. With a high-capacity high speed transit service on Linwood Boulevard from Van Brunt Boulevard to Main Street, and on 39<sup>th</sup> Street from Main Street to University of Kansas Health System, alternatives were evaluated to determine how local service on these routes could be modified while balancing two objectives. Objectives include to provide service and access to existing riders in the service areas, while balancing operating and maintenance (O&M) costs that could be reduced by minimizing overlapping service, allowing resources to be used to improve service on other routes.

Several scenarios were evaluated based on O&M cost implications, ridership, and system considerations as follows.

### Route 31

Route 31 provides 15-minute daytime frequency with a full-service span, 5:00 am to 12:15 am. The route extends from the Penn Valley campus of the Metropolitan Community College (MCC) at 31<sup>st</sup> and Pennsylvania to Blue Ridge Crossing at 43<sup>rd</sup> and Sterling. The route serves approximately 2,800 weekday riders.

Route 31 operates one to two blocks north of Linwood (a distance of 640 to 940 feet) from Main Street to Van Brunt. The service on Route 31 would be largely duplicated by a new service on Linwood. Route 31 also extends east from Van Brunt along 40 Highway to the retail commercial area at Blue Ridge Crossing. This extension would not be duplicated by the new service as Van Brunt would serve as the eastern terminus. Route 31 also extends west of Main Street approximately 0.45 miles to 31<sup>st</sup> Street and Pennsylvania serving the Penn Valley Metropolitan Community College (MCC). This portion of Route 31 would not be duplicated by the new service.

Three scenarios were identified for assessing modifications to local service on Route 31 to complement a proposed streetcar on Linwood:

- Maintain current service as is.
- Reduce service to 30-minute headways all day.
- Eliminate service on 31<sup>st</sup> Street.

If Route 31 service is eliminated, supplemental service from Van Brunt to Blue Ridge Crossing should be maintained with a route from the east end of the streetcar line to Blue Ridge Crossing.

## Evaluation Of Scenarios – Route 31

The table below shows the estimated operating and maintenance (O&M) costs for the three scenarios for Route 31.

Table 1. Route 31 Operating Scenarios and Cost Estimates

Scenarios	Incremental Cost		Fully Allocated Cost	
	O&M Cost	Change vs. Current	O&M cost	Change vs. Current
Maintain Current Service	\$3,292,000	\$0	\$5,906,000	\$0
Reduce Service to 30 minutes	\$2,123,000	-\$1,169,000	\$3,809,000	-\$2,097,000
Eliminate Route 31 with Extension	\$964,000	-\$2,328,000	\$1,393,000	-\$4,513,000

As shown in the table, Route 31 has an O&M cost of \$3.3 million. Reducing the service from the current 15-minute headways to 30 minutes would reduce costs by \$1.17 million. Eliminating service on Route 31 west of Van Brunt Avenue but maintaining service on the east extension to Blue Ridge Crossing with 30-minute headways would reduce the O&M cost by \$2.3 million, resulting in a cost of \$964,000.

Weekday ridership on Route 31 is approximately 2,800 based on KCATA’s counts for the month dated September 2023. Ridership on the extension east of Van Brunt is 300 to 360, accounting for about 13 percent of the route’s ridership. Approximately 200 daily riders ride past Main Street on the west end to Broadway or the MCC campus, representing seven percent of the route’s ridership.

### Conclusions and Recommendations

Route 31 is an important link in KCATA’s grid system in the south part of the city serving an area with high transit dependency and connecting with significant KCATA north–south routes, including three MAX routes (and the future streetcar on Main Street). Although streetcar service on Linwood Boulevard would duplicate some of Route 31’s service area, it can be assumed that a portion of the route’s ridership originates north of 31<sup>st</sup> Street. Requiring these passengers to walk the additional distance to Linwood would inconvenience a considerable portion of the ridership.

The extension east of Van Brunt has significant ridership and should be maintained. The portion of the route west of Main Street poses a challenge because the distance to MCC from Main Street makes for a long walk, but the distance is too short to be effectively served by a connecting route.

It is recommended that service on Route 31 be reduced to 30-minute weekday headways, maintaining the routing from MCC to Blue Ridge Crossing. This scenario would reduce incremental operating cost by \$1.17 million but provide several benefits:

- Maintains a minimum level of service in an important transit corridor.
- Maintains a one-seat ride for passengers east of Van Brunt.
- Maintains a connection west of Main Street to the MCC campus.

### Route 39

Route 39 provides 30-minute daytime frequency with a full-service span, 5:00 am to 12:30 am. The route extends from 39<sup>th</sup> and Rainbow (UKHS) to 39<sup>th</sup> and Hardesty. The route serves approximately 3,000 weekday riders.

The streetcar line would operate on 39<sup>th</sup> Street from Main Street to KU Med Center making Route 39 service west of Main Street redundant. Two scenarios were identified for addressing service on Route 39.

- Maintain current service as is.
- Eliminate service west of Main Street.

In addition, improving the frequency of Route 39 to 15 minutes during the weekday time period was evaluated.

#### Evaluation Of Scenarios – Route 39

The table below shows the estimated O&M cost for the three scenarios for Route 39.

Table 2. Route 39 Operating Scenarios and Cost Estimates

Scenarios	Incremental Cost		Fully Allocated Cost	
	O&M Cost	Change vs. Current	O&M cost	Change vs. Current
Maintain Current Service	\$1,958,000	\$0	\$3,298,000	\$0
Eliminate Service West of Main St.	\$1,378,000	-\$580,000	\$2,409,000	-\$889,000
Improve Service to 15-Minute	\$2,575,684	\$617,684	\$4,563,000	\$1,265,111

As shown in the table, Route 39 has a O&M cost of \$1.96 million. Eliminating the service west of Main Street but maintaining service west of the extension to 39<sup>th</sup> & Hardesty, so as not overlap with the proposed streetcar, would reduce O&M costs by \$580,000. Alternatively, improving service of the line from the current 30-minute to 15-minute headways would incur an additional cost of \$618,000 increasing the cost to \$2.58 million.

Weekday ridership on Route 39 is approximately 1,870 based on KCATA’s counts for the month dated September 2023. Ridership on the extension west of Main Street is approximately 260, accounting for about 14% of the route’s ridership.

#### Conclusions and Recommendations

Route 39 serves as a crucial segment of KCATA’s transit network, solidifying east west service in the city’s southern communities. As previously mentioned, route 39 also aligns within an area of high transit dependency while also connecting to KCATA’s fabric of north–south routes, including essential connections to the regions three MAX routes (and the future streetcar on Main Street).

While the streetcar service on 39<sup>th</sup> Street would duplicate service on the segment that runs west of Main Street, it has been determined that a significant segment of the route’s ridership originates east of the streetcar. Moreover, many of KCATA’s route 39 customers utilize the service to access locations west of



Main Street, thus eliminating the route's service would inconvenience riders with transfers paired with long wait times on the returning trip eastbound.

In light of this O&M analysis, the Route 39 service should be maintained as a bare minimum course of action. The potential reduction in costs of \$580,000 provides minimal savings for the agency, while putting undue inconvenience on the riders who board east of Main Street to access services west of Main Street.

As an alternative, improving service to 15-minute headways offers meaningful benefits to the route's current riders while also adding only a marginal cost to O&M. Moreover, the direct connections to KCATA's arterial MAX routes and the new streetcar line work to further bolster the area's transit connectedness and efficiency. Implementing this service improvement in the near term could encourage additional ridership within the 39<sup>th</sup> Street corridor in advance of opening the East-West Streetcar, which would further the success of the East-West Streetcar through additional riders on the service when it opens.

# SERVICE PLAN, RUNNING TIME, VEHICLE NEEDS, OPERATING AND MAINTENANCE ESTIMATE

## Service Plan

An initial service plan for the East-West Streetcar project is shown in Table 3 and Table 4. The service plan is based on projected service levels upon operation of the Main Street and Riverfront Extensions, provided on the Kansas City Streetcar. The service plan is subject to change as planning for the project progresses.

Weekday service will be offered 20 hours of the day and have ten- to twelve-minute frequencies during morning peak, midday, and evening peak periods. Weekday off-peak periods in the very early morning and late night will have 20-minute frequencies. On weekends, service will be offered 20 hours on Saturdays and 18 hours on Sundays and have 15-minute frequencies during the morning, midday and evening and 30-minute frequencies in the very early morning and late nighttime periods.

Table 3. Weekday Service Plan

Time Period	Time Start	Time End	Frequency
Early AM	5:00 am	6:00 am	20
AM Peak	6:00 am	9:00 am	10-12
Midday	9:00 am	3:00 pm	10-12
PM Peak	3:00 pm	6:00 pm	10-12
Early Evening	6:00 pm	8:00 pm	10-12
Evening	8:00 pm	10:00 pm	10-12
Late Night	10:00 pm	12:00 am (1:00 am on Friday nights)	20

Table 4. Weekend Service Plan

Time Period	Time Start	Time End	Frequency
Early AM	5:00 am	7:00 am	30
AM Peak	7:00 am	9:00 am	15
Midday	9:00 am	3:00 pm	15
PM Peak	3:00 pm	6:00 pm	15
Early Evening	6:00 pm	8:00 pm	15
Evening	8:00 pm	10:00 pm	15
Late Night	10:00 pm	1:00 am on Saturday nights/ 12:00 am on Sunday nights	30

The anticipated service plan is one component that informs the number of trips that required during the day and subsequently the number of vehicles needed to operate those trips.

## Running Times

Another component that contributes to understanding the number of vehicles needed for service are the end-to-end running times of each trip through the corridor. Running times also help inform the service competitiveness through comparison to other travel modes doing the same trip.

Running times were established primarily by using existing sources of known delay for transit service on the corridor alignment, which are the existing RideKC Route 31 and Route 39 bus service schedules. The Route 31 schedule was used to estimate travel times along the portion of the East-West Corridor between Main Street and Van Brunt. While Route 31 is on 31<sup>st</sup> Street and the East-West Corridor is on Linwood, both corridors have the same number of traffic signals and locations of signals except for two locations. The Route 39 bus runs along the same portion of the proposed East-West alignment between Main Street and UKHS.

The number of existing bus stops along Routes 31 and 39 were compared to the proposed number of stations for the East-West Corridor. With fewer stations on the proposed East-West alignment, the delay in running time was reduced by the difference in the number of stations and an estimated delay of approximately 20 seconds for each stop (10 seconds for loading and unloading passengers and 10 seconds for vehicle deceleration and acceleration) multiplied by a factor of .5 for the probability of stopping at any existing bus stop.

The portion of the East-West Corridor between Linwood Blvd and 39<sup>th</sup> Street was modeled for the Streetcar Main Street Extension project. The running times for this portion of the corridor were taken directly from that model completed in 2021. An additional 1.5 minutes was added to this portion of the alignment for the turning movements required at the intersection of 39<sup>th</sup> Street and Main Street and Linwood Blvd and Main Street. The resulting running times are shown in Table 5.

Table 5. East West Running Times by Direction of Travel and Peak versus Off-Peak Time Period

Time Period	Eastbound Running Time (minutes)			Westbound Running Time (minutes)		
	Local Routes 31, 39 and Main Street Extension	East-West Streetcar	% Reduction	Local Routes 31, 39 and Main Street Extension	East-West Streetcar	% Reduction
Peak	34.0	29.8	12%	37.0	32.8	11%
Off-Peak	33.0	28.8	13%	36.0	31.8	12%

## Operating Plan and Vehicle Requirements

Both the service plan and running times were inputs into the operating plan and vehicle needs shown in Table 6 and Table 7. To establish cycle times, a layover of 20 percent of the running time was assumed. The operating plan shows that eight vehicles are needed in service during peak and midday weekday periods and five vehicles are needed in service during peak and midday weekend time periods. With reserve vehicle and spare vehicle requirements of 25% and 20-30% of the in-service vehicles, respectively, the total fleet need is 13 vehicles.

Table 6. Weekday Operating Plan and Vehicle Requirements

Time Period	Westbound Running Time (mins)	Eastbound Running Time (mins)	Minimum Layover Time* (mins)	Cycle Time (mins)	Headway (mins)	Number of Vehicles Required in Service	Number of Vehicles in Reserve	Number of Spare Vehicles	Total Number of Vehicles Required
Early AM	31.8	28.8	13.0	73.7	20	4	1	2	7
AM Peak	32.8	29.8	13.0	75.7	10-12	8	2	3	13
Midday	31.8	28.8	13.0	73.7	10-12	8	2	3	13
PM Peak	32.8	29.8	13.0	75.7	10-12	8	2	3	13
Early Evening	31.8	28.8	13.0	73.7	10-12	8	2	3	13
Evening	31.8	28.8	13.0	73.7	10-12	8	2	3	13
Late Night	31.8	28.8	13.0	73.7	20	4	1	2	7
*Layover calculated as 20% of westbound and eastbound combined running time									

Table 7. Weekend Operating Plan and Vehicle Requirements

Time Period	Westbound Running Time (mins)	Eastbound Running Time (mins)	Minimum Layover Time* (mins)	Cycle Time (mins)	Headway (mins)	Number of Vehicles Required	Number of Vehicles in Reserve	Number of Spare Vehicles	Total Number of Vehicles Required
Early AM	31.8	28.8	13.0	73.7	30	3	1	1	5
AM Peak	31.8	28.8	13.0	73.7	15	5	2	2	9
Midday	31.8	28.8	13.0	73.7	15	5	2	2	9
PM Peak	31.8	28.8	13.0	73.7	15	5	2	2	9
Early Evening	31.8	28.8	13.0	73.7	15	5	2	2	9
Evening	31.8	28.8	13.0	73.7	15	5	2	2	9
Late Night	31.8	28.8	13.0	73.7	30	3	1	1	5
*Layover calculated as 20% of westbound and eastbound combined running time									

## Operating and Maintenance Cost Estimate

The service plan above, utilizing 10-minute peak frequency, estimates 45,630 annual vehicle hours and 476,266 annual vehicle miles. This is based on an assumption of 255 weekdays, 52 Saturdays and 58 Sundays or holidays. Based on a per vehicle hour cost of \$250.38 in 2023 dollars, the annual cost for operating and maintaining the service is \$11,425,000 (rounded to the nearest thousand) shown in Table 8. The vehicle hour cost is based on the model developed previously for the Streetcar Extension, which was \$186 in 2021 dollars. This value was escalated by 8.00% for 2022 (annual average) and by 3.87% for 2023 (January to October average), which are historic inflation rates reported by the U.S. Bureau of

Labor Statistics CPI-U (Consumer Price Index for All Urban Consumers). An additional 20 percent contingency was added.

Table 8. Operating and Maintenance Cost Estimate, 2023 Dollars

Operating and Maintenance Cost Estimate, 2023 Dollars	
Annual Vehicle Hours	45,630
Vehicle Hour Costs (2023 dollars)	\$250.38
Annual Operating and Maintenance Cost	\$11,425,000

## RIDERSHIP FORECASTS

Ridership forecasts were developed using the FTA accepted Simplified Trips-On-Project Software (STOPS) model that was utilized for the Main Street Extension. The model is calibrated to a 2019 base year, the calibration is documented in the *Kansas City Streetcar Main Street Extension Travel Forecasts Report*.

The model was updated to include the Riverfront Extension and Main Street Extension as part of the current year no build network. The build network was updated to reflect the identified route modifications to Route 31. Utilizing the service plan and station locations previously identified, the project was coded into the model. The project forecasts are shown in Table 9. The project is forecasted to carry 7,040 riders a day. The project is forecasted to produce approximately 2,100 new transit trips in the system.

Table 9. Ridership Forecast by Route

Route	Existing	No Build	Build
	2019	2019	2019
<b>Main Street Streetcar</b>	5,180	13,110	12,800
<b>East-West</b>	NA	NA	7,040
<b>Prospect MAX</b>	NA	4,590	4,620
<b>Troost MAX</b>	5,100	4,560	4,940
<b>7th Street</b>	670	700	700
<b>31 Street</b>	3,150	3,010	860
<b>35th Street</b>	1,040	950	530
<b>39th Street</b>	2,420	2,360	1,760
<b>Broadway</b>	1,760	1,380	1,310

**Notes:**

*Prospect Max went into service in December of 2019. The STOPS model is calibrated to Fall of 2019. For this reason, Prospect Max is not reflected in the 2019 calibrated ridership part of the current calibrated model but will be included in the next model update.*

Table 10 provides the ridership by segment of the project. Most of the ridership occurs in the segment of the route from Main Street to 31<sup>st</sup> and Van Brunt. This is consistent with the existing observed transit markets.

Table 10. Ridership by Segment

Route	Boardings	Alightings
UKHS to 39 <sup>th</sup> & Main	620	560
39 <sup>th</sup> & Main to Linwood & Main	580	770
Linwood & Main to Linwood & Prospect	3,480	3,900
Linwood & Prospect to 31 <sup>st</sup> & Van Brunt	2,130	1,810

As the project advances, the ridership forecasts will require continual updates to reflect the latest design considerations. The ridership model will also require updates to reflect the latest guidance from FTA for projects seeking Capital Investment Grant funding.

## OPINION OF PROBABLE CONSTRUCTION COSTS

Utilizing additional conceptual engineering developed during this phase of the study, the capital cost estimate from Phase 1 was refined into a conceptual Opinion of Probable Construction Costs (OPCC). Costs are presented both in present-year costs and escalated to a year of expenditure (YoE) of 2030 with 5% annual inflation assumed.

Cost data for individual components comes from a combination of Main Street Extension pricing escalated to 2023, the Riverfront Extension OPCC, and other recent streetcar projects. It should be noted that at the time of the estimate, construction prices are highly volatile at the present time and unit costs may fluctuate significantly between now and the potential future bid date or YoE.

Allocated contingencies consistent with this level of design (typically 30%) are applied to each line item. Unallocated contingency of 24% is applied to the total project to achieve a total project consistency of 40% as suggested by the FTA OP40 document guidelines.

The costs presented in the OPCC are based on conceptual planning efforts to date. No field work or detailed engineering has been performed. Costs will be subject to change as the design evolves and develops. Costs are based upon available information as of submittal and represent current market conditions. Construction prices are highly volatile at the present time and unit costs may fluctuate significantly between now and the potential future bid date.

### Project Segments

The project is broken into six segments that can be added up to a total. These roughly align with the service plan but are primarily for accounting convenience when tallying quantities.

1. 31st & Van Brunt to Prospect
2. Prospect to Main
3. Linwood & Main Intersection (an average of the two intersection options)
4. 39th & Main Intersection (an average of the four intersection options)
5. Main to State Line
6. State Line to UKHS

At two intersections, Linwood & Main and 39th & Main, rough order of magnitude costs were developed for two and four different options, respectively. The six intersection options are not additive with the six mainline segments. They are for comparison between options and adding them to the four mainline segments would duplicate some costs that are counted in other segments for the mainline figure.

Costs for three different Vehicle Maintenance Facility (VMF) concepts are included as their own segment. To get the full project cost, one of these values needed to be added to the sum of the six mainline segments.

### Project Assumptions

Due to the conceptual nature of the project, some basic assumptions are required to identify a scope of work and to develop costs. End points were identified in Phase 1 and the service plan analysis in this phase identified the potential stop locations along the corridor.

To extrapolate this data, we made the following assumptions:



- Corridor will typically feature two embedded track guideways, one eastbound and one westbound. These will utilize the details developed for the Main Street Extension with 115RE rail and a 14” track slab.
- The bridge over US 71 will not require significant modifications and will accept a shallow track slab detail utilizing 112TRAM rail like the KC Terminal Bridge.
- Platforms will match the typical layouts for the Main Street Extension, for both side platforms and center platforms at a terminus.
- Intersections with traffic signals currently will retain those and require modifications to accommodate streetcar operations.
- Intersections at points where the streetcar makes moves requiring protection will receive new signals.
- Intersections along the alignment will require ¾ of their pedestrian ramps to be modified on average.
- Roadway improvements will typically be limited to the extent included in the Main Street Extension: mill and overlay, with full-depth pavement replacement limited to “slivers” where excavation for the track slab reduces the viability of the remaining section alongside it. Sidewalks will typically not be upgraded.
- Utility relocations funded by the project will be limited to publicly owned systems such as water, sanitary sewer, and storm sewer. Third-party utility relocations will be paid for by their respective owners according to the franchise agreements with the city.

## OPCC Structure

The FTA Standard Cost Categories (SCC) for New Starts Projects (dated May 24, 2023) was used as a framework for the OPCC. This format breaks costs down into ten broad categories:

10. Guideway and Track Elements
20. Stations, Stops, Terminals, Intermodal
30. Support Facilities, Yards, Shops, Administrative Buildings
40. Sitework & Special Conditions
50. Systems
60. ROW, Land, Existing Improvements
70. Vehicles
80. Professional Services (applies to Categories 10-50)
90. Unallocated Contingency
100. Finance Charges

Under each of these categories, high-level line items appropriate for the study’s current level of detail captured project components such as track feet of guideway, platforms, vehicles, and other significant cost drivers. Other costs were captured as allowances based on track feet of alignment or route feet of segment.

## 10 – Guideway and Track Elements

This category covers guideway and track costs, including rough grading, excavation, subgrade preparation, and the guideway itself.

Items in this category were captured by estimating route mileage based upon endpoints identified in the service plan. Segment lengths were measured in Google Earth and used to develop lengths for guideway construction. Turnouts were counted by assuming a double crossover at each terminus, two turnouts in the Main Street Extension tracks at each intersection with Main Street, and two additional turnouts for a crossover at each intersection with Main Street.

## 20 - Stations, Stops, Terminals, Intermodal

This category covers the station stops, which for streetcar is limited to open platforms with accessories such as a canopy, bench, and real-time arrival sign.

The service plan identifies the number of proposed stops for the alignment. Aside from the two terminus platforms, split side platforms were assumed for cost purposes. At each terminus, a single, double-sided platform like the UMKC terminus of the Main Street Extension was assumed.

## 30 - Support Facilities, Yards, Shops, Administrative Buildings

This category covers support facilities for maintenance, administration, etc. and their associated costs for track, civil, structural, architectural work, and other disciplines.

Operational goals were used to schematically lay out possible configurations. An assumption was made for track length and number of turnouts required to hold and service the required number of vehicles. An assumption was made on square footage of maintenance bays and storage buildings. Site improvements were captured with an allowance, as this scope did not include a greater level of detail for those elements.

## 40 – Sitework & Special Conditions

This category covers civil and utility improvements associated with the mainline of the project.

Utility relocations were estimated based on an allowance per route foot. Detailed utility information is not available at this time; utility relocation allowances are based on KC project history in the Main Street corridor. These costs will require refinement in later phases with detailed utility impact analysis. Street lighting is also included as an allowance per route foot.

Pedestrian and roadway improvements are also a part of this category. Pedestrian improvements are included as an allowance per intersection. Roadway improvements are included as an allowance per route foot. A per-track-foot allowance covers track drainage.

Temporary maintenance of traffic, contractor indirect costs (such as staff, office, equipment, etc.), and the KCMO 1% for Art in Transit fund are included as percentages of the overall capital project costs.

## 50 – Systems

This category covers operational systems for the alignment. Traffic signals and pedestrian signals are counted by each instance based upon existing conditions and operational assumptions that might require a new signal. Train control is counted per each installation at places like terminuses and interlockings.

Traction power substations are estimated at one per track mile (or one per ½ route mile).

The Overhead Contact System (OCS) and Traction Power Distribution system is included as an allowance per track foot of guideway. An allowance per route foot covering Communications is included in Category 50, as well.

#### 60 – ROW, Land, Existing Improvements

This category covers costs for ROW and easement acquisitions, including the associated professional services.

The primary cost in this category for the mainline is easements. These may be temporary for construction or permanent for improvements that fall outside the ROW. This cost is included as an allowance per track foot.

An estimated lump sum property acquisition costs for a VMF are also covered in this category. This value was taken by reviewing assessed values for parcels in the areas under consideration for the VMF.

#### 70 – Vehicles

The acquisition of vehicles and the spare parts to support maintenance of those vehicles are covered in this category. The total number of vehicles is based upon the service plan and the cost of the vehicles and spare parts is pro-rated over the project segments according to segment length. Professional Services for Vehicle Procurement falls under Category 80.

#### 80 – Professional Services

Professional services include Preliminary Engineering, Final Design, Project Management for Design and Construction, Construction Administration and Management, Professional Liability and other Non-Construction Insurance, Legal fees, Surveys, Testing, Investigation, Inspection, and Start-up costs. These are all estimated as a percentage of overall construction costs. As noted above, the cost of Professional Services for Vehicle Procurement falls into this category as well.

Allocated contingencies are typically not carried on these values, However, because Professional Services for Vehicle Procurement is based upon a lump sum number and does not scale by construction cost or number of vehicles it does carry a 20% contingency.

#### 90 – Unallocated Contingency

This is “below the line” contingency carried on the project to provide project-wide contingency.

#### 100 – Finance Charges

These are not considered in this OPCC. A funding and financing plan has not been developed for the project at this time.

### Summary of OPCC

A high-level OPCC can be used for programming and identification of funding needs. The project cost summaries are as shown in the Table 11. As with the design and service plan, the OPCC will require further development as the project progresses.

Table 12 shows the cost for individual design options for intersecting the 39<sup>th</sup> Street and Linwood Boulevard track with the existing Streetcar Main Street Extension track. These costs are already accounted for in the Revenue Track costs in Table 11 and are presented in Table 12 for comparison.

Table 11. Opinion of Probable Construction Cost

Project Component		Description	Current Year 2023	YoE 2030
Revenue Track Only				
Segment 1	31st & Van Brunt to Prospect		\$240 M	\$321 M
Segment 2	Prospect to Main		\$241 M	\$323 M
Segment 3	Linwood & Main Intersection		\$79 M	\$106 M
Segment 4	39th & Main Intersection		\$64 M	\$85 M
Segment 5	Main to State Line		\$170 M	\$227 M
Segment 6	State Line to UKHS		\$49 M	\$65 M
<i>Revenue Track Only Subtotal</i>			\$843 M	\$1,127 M
Vehicle Maintenance Facility			\$85 M - \$105 M	\$115 M - \$141 M
<b>Total</b>			<b>\$928 M - \$948</b>	<b>\$1,242 M - \$1,268 M</b>

Notes:

1. Costs are based on conceptual planning efforts to date. No field work or detailed engineering has been performed.
2. Utility information not available at this time; utility relocation allowances are based on KC project history.
3. Line items are high-level and typically accounted for as an allowance or parametrically.
4. Costs will be subject to change as the design evolves and develops.
5. Costs are based upon available information as of submittal and represent current market conditions.
6. Construction prices are highly volatile at the present time and unit costs may fluctuate significantly between now and the potential future bid date.
7. Values are rounded to the nearest million for presentation purposes. Due to rounding, totals may not add up to the same totals in the Financial Strategy technical memo.

Table 12. Opinion of Probable Construction Cost – Individual Costs for Intersection Design Options

Intersection Options		Description	Current Year 2023	YoE 2030
<b>Linwood &amp; Main - Inside</b>	Linwood approaching Main from Inside Lanes		\$85.2 M	\$114.2 M
<b>Linwood &amp; Main - Outside</b>	Linwood approaching Main from Outside Lanes		\$85.6 M	\$114.6 M
<b>39th &amp; Main - Option 1</b>	Diverging Alignments with ROW Take		\$75.4 M	\$101.1 M
<b>39th &amp; Main - Option 2</b>	Wide Right Turn		\$69.5 M	\$93.2 M
<b>39th &amp; Main - Option 3</b>	Offset Center Platform with ROW Take		\$71.4 M	\$95.6 M
<b>39th &amp; Main - Option 4</b>	Offset Transit Plaza with ROW Take		\$71.5 M	\$95.8 M

Notes:

1. Intersection options are not additive with alignment segments. Options developed for comparison at that intersection only.
2. Same notes apply as in Table 11.