



**REINVENTING!**  
**METRO!**  
BUS RAPID TRANSIT STUDY

**ALTERNATIVES ANALYSIS REPORT**

Southwest Ohio  
Regional Transit Authority



June 2023





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[flickr.com/photos/63837784@N08/5908782353/](https://www.flickr.com/photos/63837784@N08/5908782353/) <https://www.dodsondev.com/gather-arts-district> ; Google Earth Streetview  
P.96 City of Raleigh  
P.97: Lane Transit District

### 3 REVIEW OF RELEVANT STUDIES AND PLANS

- P.100: SORTA  
P.102: SORTA  
P.103 City of Cincinnati; City of North College Hill; City of Norwood  
P.110: City of Cincinnati; Hamilton County Planning + Development  
P.111: City of Cincinnati  
P.113: Cincinnati USA Regional Chamber; Fehr and Peers; University of Cincinnati Economics Center, REDI Cincinnati  
P.114: Cincinnati USA Regional Chamber  
P.115: [crownincincinnati.org](http://crownincincinnati.org)  
P.116: Cincinnati Mobility Lab, Fehr and Peers  
P.117: Cincinnati Mobility Lab, Fehr and Peers  
P.118: OKI Regional Council of Governments



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## 4 BRT CORRIDOR ALTERNATIVES

- P.121: SORTA
- P.132: WSP USA; Google Earth Streetview
- P.137: WSP USA: Masabi <https://www.masabi.com/2021/09/27/bus-users-in-cincinnati-can-tap-and-ride-with-validation-units-powered-by-masabi/>

## 5 STEP 1 OUTREACH

- P.154: Razor Communications; SORTA
- P.155: Razor Communications; SORTA
- P.156: WSP USA
- P.161: C. Robinson Associates

## 7 STEP 2 OUTREACH

- P.196: Razor Communications; SORTA
- P.197: Razor Communications; SORTA
- P.198: WSP USA
- P.199: Razor Communications; SORTA
- P.200: Razor Communications; SORTA
- P.203: Razor Communications; SORTA
- P.204: C. Robinson Associates
- P.206: C. Robinson Associates
- P.207: C. Robinson Associates

## 8 LOCALLY PREFERRED ALTERNATIVE

- P.212: The Boston Globe <https://www.bostonglobe.com/2021/10/29/metro/love-them-or-hate-them-states-first-center-running-bus-lanes-are-debuting-boston-this-weekend-heres-what-that-means/> ; WSP USA; Chicago Transit Authority <https://www.transitchicago.com/newsprojects/bpz/> ; City of Seattle <https://www.seattle.gov/transportation/projects-and-programs/programs/transit-program/spot-improvements>
- P.213: <https://www.metrojacksonville.com/article/2010-aug-a-look-at-brt-the-kansas-city-max>  
Transit Signal Priority
- P.216: WSP USA
- P.217: WSP USA
- P.220: WSP USA
- P.224: Kane County, Illinois Bus Rapid Transit Primer <http://kdot.countyofkane.org/Randall%20Orchard%20Bus%20Rapid%20Transit%20Study/Bus%20Rapid%20Transit%20PRIMER.pdf> ; Light Rail Now [https://www.lightrailnow.org/facts/fa\\_brt\\_2006-10a-4.htm](https://www.lightrailnow.org/facts/fa_brt_2006-10a-4.htm) ; IndyGo



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## Acronyms and Abbreviations

ADA: Americans with Disabilities Act  
ACS: American Community Survey  
AVL: Automatic Vehicle Location  
ART: Albuquerque Rapid Transit (New Mexico)  
BAT: Bus and Turn (lanes, also called Business Access and Transit)  
BEB: Battery Electric Bus  
BUILD: Better Utilizing Investments to Leverage Development (grant)  
CBC: Cincinnati Business Committee  
BIL: Bipartisan Infrastructure Law  
BRT: Bus Rapid Transit  
CE: Categorical Exclusion  
CIG: Capital Investment Grant  
COA: Class of Action  
CMAQ: Congestion Mitigation-Air Quality  
CNG: Compressed Natural Gas  
COTA: Central Ohio Transit Authority  
CUF: Clifton Heights-University Heights-Fairview  
DOTE: Department of Transportation and Engineering (City of Cincinnati)  
EmX: Emerald Express  
EPA: Environmental Protection Agency  
FAST: Fixing America's Surface Transportation (act)  
FAQs: Frequently Asked Questions  
FCEB: Fuel Cell Electric Bus (hydrogen)  
FHWA: Federal Highway Administration  
FTA: Federal Transit Administration  
GCRTA: Greater Cleveland Regional Transit Authority  
GIS: Geographic Information Systems  
GRTC: Greater Richmond Transit Company (Virginia)  
GTFS: General Transit Feed Specification  
HD: Historic District  
HOV: High Occupancy Vehicle  
ITDP: Institute for Transportation and Development Policy  
ITS: Intelligent Transportation Systems  
LPA: Locally Preferred Alternative  
LTD: Lane Transit District (Eugene, Oregon)  
MBTA: Massachusetts Bay Transportation Authority (Boston)  
MLK: Dr. Martin Luther King, Jr. Drive  
MOD: Mobility on Demand  
MPO: Metropolitan Planning Organization  
NEPA: National Environmental Policy Act  
NIOSH: National Institute of Occupational Safety & Health  
NRHP: National Register of Historic Places  
O-D: Origin-Destination  
OKI: Ohio Kentucky Indiana Regional Council of Governments  
OTR: Over-the-Rhine  
PD: Project Development  
PSTA: Pinellas Suncoast Transit Authority (St. Petersburg, Florida)  
QR: Quick Response (code)  
RAISE: Rebuilding American Infrastructure with Sustainability and Equity (grant)  
ROW: Right of Way



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SCC: Standard Cost Category  
SORTA: Southwest Ohio Regional Transit Authority  
TANK: Transit Authority of Northern Kentucky  
TIFIA: Transportation Infrastructure Finance and Innovation Act  
TNC: Transportation Network Company  
TOD: Transit Oriented Development  
TSP: Transit Signal Priority  
UC: University of Cincinnati  
USB: Universal Serial Bus  
USDOT: U.S. Department of Transportation  
VA: Veterans Administration (Department of Veterans Affairs)  
YOE: Year of Expenditure





# Executive Summary

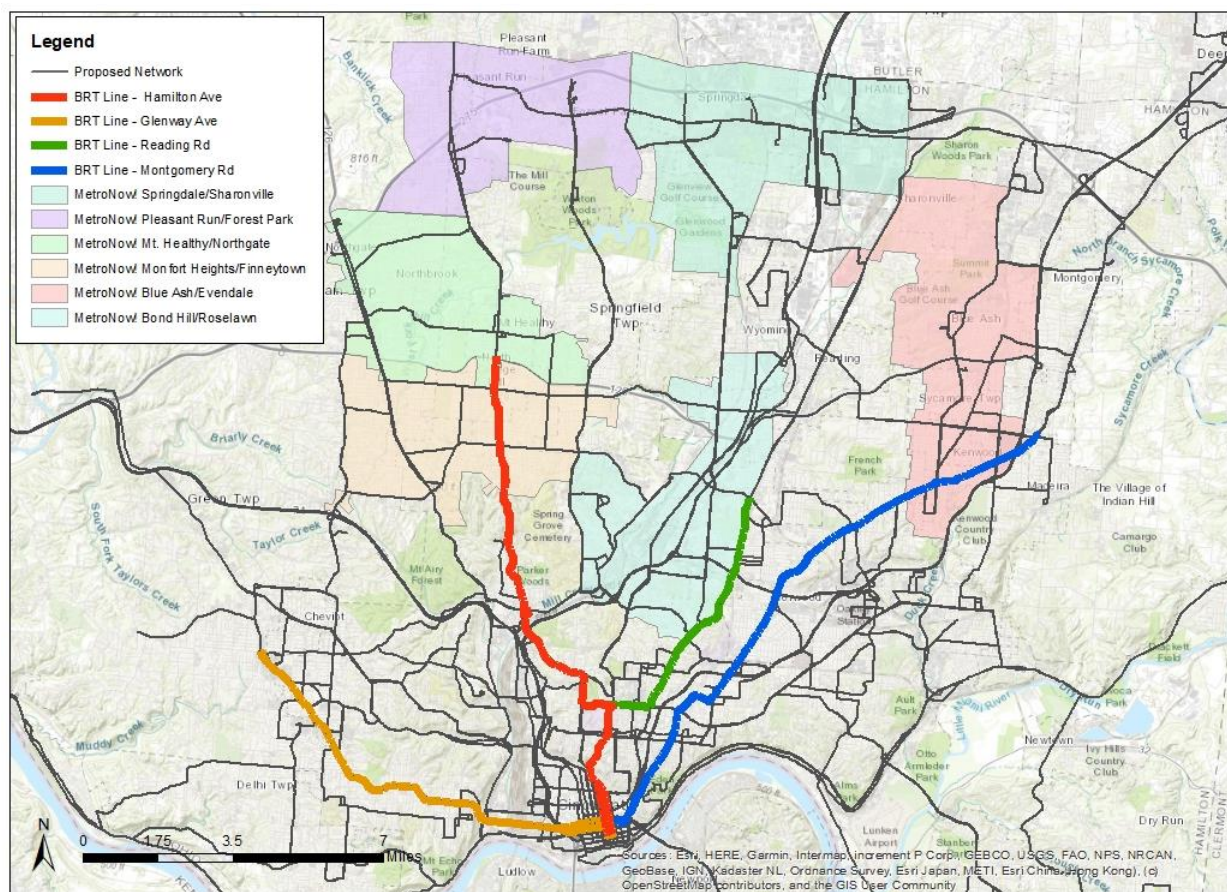


# Executive Summary

## Project Background

The Southwest Ohio Regional Transit Authority (SORTA) conducted this Alternatives Analysis to examine strategies to extend its service delivery beyond its fixed-route bus network through the introduction of Bus Rapid Transit (BRT) service. As shown in Figure E-1, SORTA's Reinventing Metro plan identified four corridors for future BRT development. BRT service will complement SORTA's existing transportation system which consists of regular fixed-route, express, paratransit and mobility-on-demand services. This study was designed to determine which corridors should be developed as SORTA's first BRT service and other corridors that would receive enhancements in the short term with development as BRT lines in the future. The BRT Study should also help inform SORTA decisionmakers of the most effective way to implement BRT in Hamilton County.

Figure E-1. Reinventing Metro Proposed BRT Network



A Stakeholder Advisory Committee, with representatives of the cities, villages, and townships located along the corridors, as well as county and regional organizations and entities was established to help guide progress of the study, convey information, and obtain essential input on study outcomes.





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## PURPOSE AND NEED FOR THE STUDY

The four study corridors extend from downtown Cincinnati along four of the most heavily used transit and travel corridors in Hamilton County. Each serves the Government Square and Riverfront transit centers. Each also serves existing and planned transit centers and transfer facilities: the Glenway Crossing Transit Center along the Glenway Avenue corridor; the Northside Transit Center and planned North College Hills Transit Center along the Hamilton Avenue corridor; the planned Uptown Multimodal Center on the Reading Road corridor, and the planned Walnut Hills Transit Center along the Montgomery Road corridor.

Population density along the corridors is high, ranging from 5,500 to 6,600 persons per square mile—over 200% of the Hamilton County average. Each corridor's employment population ranges from 107,000 to 148,000. Health care and social assistance jobs comprise the largest share of employment in each, between 16% and 18% of the total, followed by retail, manufacturing, professional / scientific / tech services, and education.

The four corridors are the most heavily used travel corridors in Metro's fixed route service area, with each corridor ranging from 11,300 to 20,000 daily trips on all modes. Including activity at all stops on all routes serving various portions of the proposed alignment, 2,800-6,400 boardings occur each weekday along each.

The primary bus routes in the corridors are 33 Glenway, 17 Hamilton Avenue, 43 Reading Road, and 4 Kenwood-Blue Ash. They comprise the four highest ridership routes in the system, carrying an average of 2,750 to 5,000 weekday riders. They operate every 10-15 minutes during peak and 10-20 minutes during off-peak periods. Operating on major travel and commuter corridors, their on-time performance ranges from 71% to 79%.

Slow bus speeds and low on-time performance can be attributed to existing operating conditions. Buses operate in mixed traffic on arterial roadways and thus are subject to existing traffic conditions. Traffic is slowed by congestion caused by high traffic volumes during peak period, turning movements, uncoordinated traffic signals, and incidents. Buses are further slowed by short stop spacing and by boarding passengers who often pay through the farebox. Elderly and disabled riders need time to board buses that lack level boarding.

Given these conditions, the purpose of the BRT Corridors Alternatives Analysis is to provide an improved travel experience through frequent and reliable service. Project goals include:

### **Improve travel speed and reliability**

Current bus service along the corridors is often slow and unreliable. Operating on a four-lane urban arterial roadway, the average bus speed is below 15.0 mph. Slow speeds and unreliability are attributed to heavy auto and truck traffic and turning movements along the corridor, double parking and stopped delivery vehicles, frequent uncoordinated traffic signals, short bus stop spacing, lengthy dwell times as passengers climb steps and pay fares on-board, and the lack of priority treatments for buses. Trips on the bus can also be crowded with standees, further slowing the boarding and alighting process at stops and affecting on-time performance.

BRT service will improve travel times by increasing the overall average speed by at least 20%. This is accomplished, in part, with over 80% of the corridor in priority bus lanes including side-running BAT (Bus and Turn, or Business Access and Transit) lanes and center-running bus only lanes in strategic locations. Faster travel speeds will also be facilitated through the use of transit signal priority throughout



the length of the corridor, average station spacing of 0.7 miles, off-board fare payment, and level boarding. By providing these treatments, on-time performance is expected to exceed 90%, further shortening travel time from current conditions, thereby providing passengers with consistent, high quality, reliable service.

### Increase ridership and mode share.

Improved speeds and reliability will enhance the experience for existing riders and help SORTA attract new riders to transit, leading to a higher transit mode share. Passenger amenities provided at stations – replacing minimal facilities with shelters, seating, and protected waiting areas – will also enhance the experience.

In addition to faster service, higher frequency service will provide added capacity and reduce wait times and, therefore, overall travel times. Ten minute frequencies will be operated during midday and evening periods, with 15 minutes on Saturday and Sunday to enhance convenience, encourage more frequent ridership among existing users, and attract new riders. Sixty-foot articulated buses will provide sufficient capacity to accommodate larger passenger loads in greater comfort and allow for on-board accommodation of bicycles. Station stops, situated at major boarding/alighting locations and major employment and activity centers, will feature large, attractive shelters to provide a comfortable and safe waiting environment while real-time information displays will provide accurate arrival times. BRT service will be uniquely branded to emphasize its rapid transit characteristics and offer a new transportation alternative of commuters. Existing local service will be adjusted to maintain some local service to all existing stops.

BRT will provide disadvantaged communities the benefit of high quality BRT service and infrastructure including a faster, more comfortable, and more reliable experience on modern vehicles supported by state-of-the-art equipment and information and fare payment technology. Station locations will serve as a catalyst for pedestrian connectivity enhancements, streetscape upgrades, and new development.

## GOALS AND OBJECTIVES

The goals of the study were developed collaboratively with SORTA leadership, key staff, and the study’s Stakeholder Advisory Committee are listed in Table E-1.

**Table E-1. Goals and Objectives**

Goals	Objectives
Attract riders and increase mode share	Identify priority corridors that have the highest ridership potential and maximize FTA Capital Improvement Grant (CIG) program funding opportunities.
Improve transit speed and reliability	Identify priority corridors where travel time and reliability can be most improved.
Enhance transportation network connectivity	Identify and enhance priority corridors that maximize service to regional travel markets, transit facilities and network services.
Provide equitable access to frequent services	Identify priority corridors that maximize equitable access to high quality, frequent transit service and support further development of those corridors.



Goals	Objectives
Ensure constructability and compatibility with the built environment	Identify priority corridors that are most conducive to installation of dedicated transitways or other transit priority treatments.
Support economic development	Identify priority corridors that have maximum economic redevelopment opportunities and policies in place.

## STUDY ORGANIZATION AND PROCESS

The BRT Study was initiated on June 27, 2022, which began the process of organizing work task, developing a schedule, assigning resources, and confirming communications protocols. The project approach involved a two-step process:

Step 1 was conducted between July 2022 and January 2023. The study corridors were refined (Figure E-2) and an education program was developed to describe the characteristics and attributes of BRT. This included a review of BRT teams in selected peer cities to help illustrate the wide variety of BRT treatments, development processes, timelines, and results.

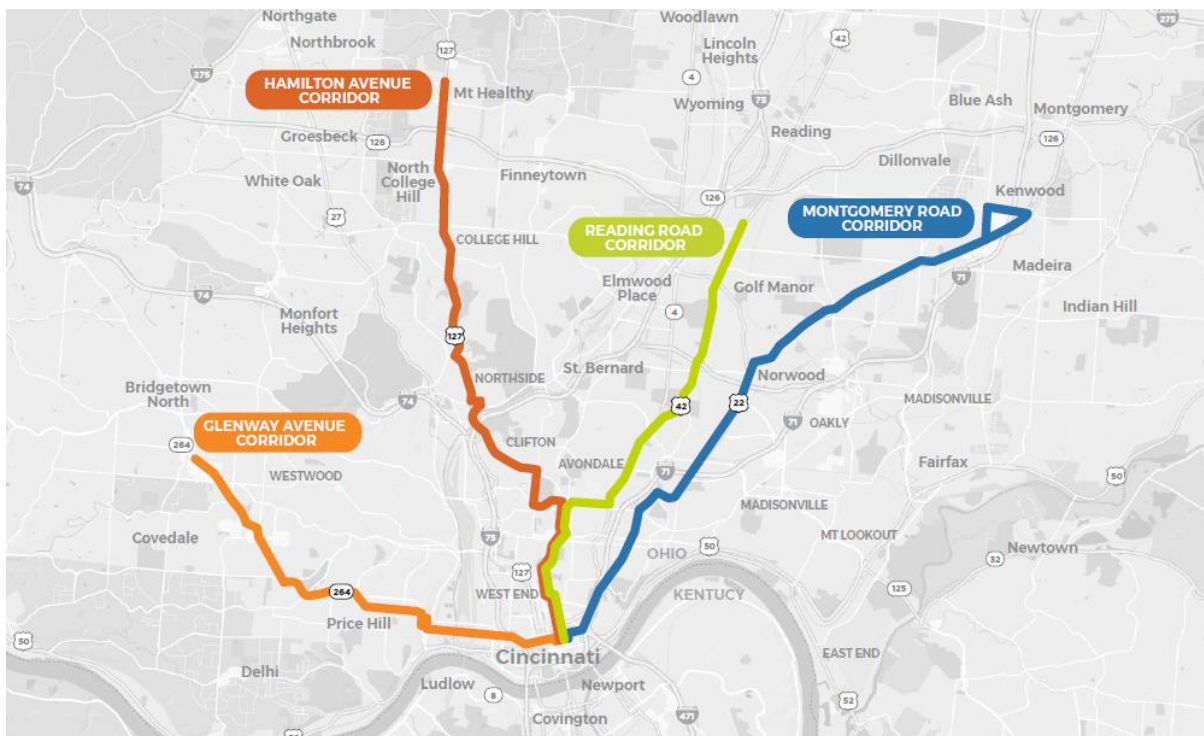
This was followed by an existing conditions analysis that included an overview of the SORTA system, a review of relevant studies and plans to determine their potential impact on BRT development and community acceptance, and a detailed assessment of population, demographic, and transportation characteristics of the study corridors.

Step 1 also featured an extensive community and stakeholder outreach program that included a project website, social media, email communications, media relations, public meetings, community meetings, community and city council presentations, and an extensive number of pop-up events throughout the service area. Public-facing activities were held between September and December 2022. A survey was also conducted during this period.

The conclusion of Step 1 was a rigorous evaluation (screening) of the four corridors to determine which two of the four corridors would be immediately prioritized for further development as BRT corridors in Step 2. The screening process was based on a series of goals and objectives that were crafted jointly by SORTA, the members of the Stakeholder Advisory Committee, and the study team. A metrics-focused set of evaluation criteria was developed and data collected and analyzed, along with more qualitative measures such as Transit Oriented Development (TOD) to determine the relative ranking of each. A numeric ranking was used to score the corridors under each evaluation criteria.



**Figure E-2. Refined Corridors for Step 1 Evaluation**



Step 2 of the study was conducted between January 2023 and April 2023. It began with an analysis of alignment and station locations on the corridors prioritized for BRT advancement in Step 1. The analysis resulted in the refinement of corridor alignments and station locations that were then advanced in design up to the 10% conceptual level. This is considered a sufficient and appropriate level of design to estimate capital and operating costs, ridership, and community impacts.

An outreach effort similar to the one conducted under Step 1 was conducted as part of Step 2. The program included extensive community meetings, presentations, and pop-up events along with four in-person community design workshops and virtual workshop. A second survey was also conducted during this period.

The results of Step 2 comprise the Locally Preferred Alternative (LPA) for both the Reading Road and Hamilton Avenue BRT corridors, which defines the project for entry into the Federal Transit Administration (FTA) Capital Investment Grant (CIG) process for Small Starts project rating and funding recommendation.

## Elements of BRT

BRT is a higher speed, higher capacity mode of public transit now in operation in over 40 cities across the U.S. - including the nearby cities of Columbus, Cleveland, and Indianapolis – with several others in development. BRT uses a wide array of design features and technologies to create a system tailored to meet local conditions and needs. As described in this section, no two BRT corridors are exactly alike. Examples from other cities are used to help describe each feature and technology, and how they work together to improve access to jobs, activities, and opportunities.





BRT also:

- is an enhanced bus system that operates on bus lanes or other transitways, combining the flexibility of buses with the efficiency of rail.
- operates at faster speeds, provides greater service reliability, and increased customer service.
- uses a combination of advanced technologies, infrastructure, and operational investments that provide significantly better service than traditional bus service.
- can play a significant role in the economic development of corridors.
- positively impacts businesses and property values.

**Figure E-3: BRT Examples**



A wide range of design features and technologies can be combined to create a BRT system that meets the goals of the community and is appropriate to local conditions such as traffic, ridership, and the built environment. These include:

- Frequent, all-day service
- Connections to major destinations
- State-of-the-art buses
- Fewer stations but at key locations
- Attractive, clean, safe, and comfortable stations
- Less time stopped at stations
- Technology to help shorten travel time
- Priority lanes for buses
- Unique identity



## BRT and Transit Oriented Development

New transit systems, including BRT have the potential to bring much more than frequent and reliable service with dedicated infrastructure. The investments associated with these systems – exclusive right of ways, new stations, and amenities – often engender other improvements to public infrastructure such as sidewalks and adjacent or nearby plazas and public spaces. In some cases, cities and their planning agencies have established policies and zoning codes that encourage development and public realm improvements near transit to create walkable, dense, and connected environments: this development strategy is called Transit-Oriented Development (TOD). TOD requires a coordinated effort from governments (particularly the land use regulator), transit agencies, developers, and community members to maximize the benefits of transit to create connected and thriving communities. There is no “one-size-fits-all” approach to BRT TOD; successful TOD implementation relies on stakeholders and decision makers coming together to implement policies that encourage mixed-use walkable environments.

While TOD has been traditionally associated with rail transit, BRT has had success generating TOD. BRT systems are becoming more common, primarily due to their relatively high cost-to-benefit ratio and ability to provide service at levels comparable to other fixed guideway systems. Across the U.S, cities and transit agencies are opting for BRT over other fixed guideway systems due to the benefit-cost ratio for the investment.

That strong economic return has been the case for the Cleveland Health Line BRT system, which has often been credited as one of the most successful BRT systems in the country. The Health Line generated approximately \$9.5 billion in private and institutional development within walking distance of the corridor. Similar impacts are seen in other parts of the country where BRT systems are being implemented.

Figure E-4. Impact of Health Line on Euclid Avenue, Cleveland



## Community and Stakeholder Outreach: Step 1

A critical component of the study involved collecting input and feedback from key SORTA stakeholders and partner agencies, as well as the people the BRT network will serve – existing and potential transit users living in, working in, traveling through, or visiting the four corridor areas. It was essential to educate, engage, inform, and seek feedback from all potential users, being especially mindful of traditionally underserved and underrepresented communities. The strategy and tactics used throughout the study were designed to engage, inform, and educate the community as the project team gathered input to ensure that the BRT project will be designed to meet the needs of the community and SORTA’s goals and objectives.

Therefore, through the outreach program, SORTA emphasized its intention to **take the study to the people**. It was crucial to communicate to SORTA’s audiences the scope of the project, and the multiple benefits and ease of the BRT system. It was also important to anticipate and answer concerns that may



arise from such engagement, including geographic and geopolitical equity issues, concerns about affordable housing and displacement, and challenges regarding inflation-related costs.

Communications goals for the BRT Study included:

- Educate SORTA staff, board members, regional partners, existing and potential transit users, and the general public about the multiple benefits of BRT and how BRT will improve SORTA's book of services.
- Engage and seek input from SORTA staff, regional stakeholders, and existing and potential transit users about the BRT corridor evaluation and analysis process.
- Build community support and excitement for bringing BRT to the Cincinnati region.

The Step 1 outreach program aimed to educate and excite the public, SORTA staff, regional stakeholders, and existing and potential transit users about the BRT concept, and to engage them in the BRT corridor evaluation and analysis process. As described in Section 1, a series of tactics was used to communicate the project and obtain public and stakeholder input.

## **PUBLIC MEETINGS**

A series of eight public meetings were in October 2022. The purpose of the meetings was to introduce the BRT concept to the public and gather input on the four route alternatives being considered.

Six of the meetings were held in-person at locations along the four proposed corridors (Glenway, Hamilton, Reading, and Montgomery) and along a Metro service route. All of the in-person meetings were held in late afternoon and early evening hours. The meetings were held open-house style; visitors could come at their convenience any time during the meeting hours.

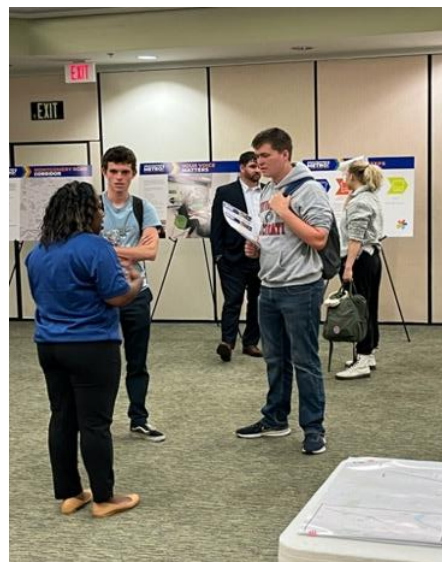
Two of the public meetings were held virtually, both on October 18, 2022. One was held midday; the other was held in the late afternoon/early evening period. The meetings were held using a Zoom webinar format. Participants accessed the meetings by clicking on a link posted prominently on the project website or by logging into Facebook and watching the meetings via SORTA's Facebook Live feed; no pre-registry was needed to participate.

Overall, participants in the public meetings were very positive. Observed reactions ranged from curious to enthusiastic, and many long conversations were held with project team members. Most participants were excited about the prospect of BRT, and hopeful that it will greatly enhance Metro's service offerings. Speed and frequency were forefront in survey respondents' minds, with 65% indicating that reducing travel time was the feature "very important," and 84% marking "service every 10-15 minutes" as one of their top three preferred features.





Figure E-5. Step 1 Public Meetings



## SURVEY

The project team developed a survey to help assess and understand the public's perception of and interest in BRT, service features, and service corridor preferences. Key learnings included:

- Approximately 79% of respondents ride Metro at least one in a while. Forty-two percent ride Metro at least several times a week.
- Reducing travel time was very important to 65% of respondents; 30% thought it was somewhat important.
- Features that online survey respondents were most interested in included frequent service, dedicated bus lanes and smart traffic signals. Inclusion of these features in Metro's new BRT service would probably or definitely encourage 88% of respondents to seek out opportunities to use BRT.
- Comfort and convenience features that online survey respondents were most interested in were real-time travel information, enhanced bus stations, and Wi-Fi. Inclusion of these features in Metro's new BRT service would probably or definitely encourage 87% of respondents to seek out opportunities to use BRT.
- Features that abbreviated survey respondents were most interested in were similar to the online respondents: frequent service, dedicated bus lanes, and real-time information displays.
- Of the combined pool of both online and abbreviated survey respondents, the Hamilton corridor received the highest level of interest (39%). This number reflected the fact that a high level of respondents lived on or within walking distance of the Hamilton corridor.
- When asked about future routes, 25% suggested a crosstown route and 19% suggested a route on the east side of town (east of I-71).

## COMMUNITY AND POP-UP EVENTS

To maximize the awareness and engagement of Cincinnati community members, the outreach strategy also focused on connecting with people where they live, work, and play. The locations for the pop-up events were selected to ensure engagement with transit users, non-transit riders, students, older adults, persons with disabilities, minorities, and low-income persons. The goal was to provide an



environment that encouraged dynamic two-way communication and promoted constructive feedback. Sixteen pop-up events were held in each of the four proposed BRT corridors between September and December 2022.

**Figure E-6. Step 1 Community and Pop-Up Meetings**



The community members generally expressed support for excitement about BRT and potential corridor enhancements. They were particularly enthusiastic about the proposed safety improvements.

## **SORTA STAFF ENGAGEMENT**

This effort was designed to ensure that all SORTA staff were aware, informed, engaged, and given the opportunity to participate in the BRT study activities. This foundational step enhanced community participation as employees were involved and prepared to drive community engagement. Many SORTA employees interact with passengers daily. Early communication with employees provided the BRT planning team with input from the people who best understand current customers and the neighborhoods through which they travel. This also helped these staff members become project champions within the communities.

**Figure E-7. Step 1 SORTA Staff Engagement**



## **Corridor Profiles**

Each of the corridors – Glenway Avenue, Hamilton Avenue, Reading Road, and Montgomery Road – were profiled in terms of characteristics, demographics, transit usage, and other factors.



The Glenway Avenue corridor serves a portion of the west side of Cincinnati. The corridor is wholly located within the City of Cincinnati and borders on Green Township to the west. In downtown, the corridor alignment primarily runs along Eighth Street westbound from Main Street and Seventh Street eastbound to Walnut Street. West of downtown, the alignment operates bi-directionally on two-way streets. Between downtown and the Lower Price Hill area, the eastern portion of Eighth Street serves the Queensgate area while the western portion consists of an elevated viaduct, with few intersecting streets, above the Mill Creek and Queensgate rail yards. The Lower Price Hill business district sits at the end of West Eighth Street at the base of Price Hill. The alignment climbs Price Hill via a double hairpin turn in Glenway Avenue, Wilder Avenue, and Warsaw Avenue. It proceeds up the hill via Warsaw Avenue which eventually levels off and proceeds westbound through the Price Hill neighborhood. The alignment transitions from Warsaw Avenue to Glenway Avenue. At this point the alignment remains on Glenway Avenue, proceeding west and northwest to the Western Hills area and ending in the vicinity of Western Hills Plaza at Parkcrest Lane. The corridor also encompasses the Glenway Crossing Transit Center, located on Glencrossing Way near Anderson Ferry Road, about 0.3 miles west of Glenway Avenue.

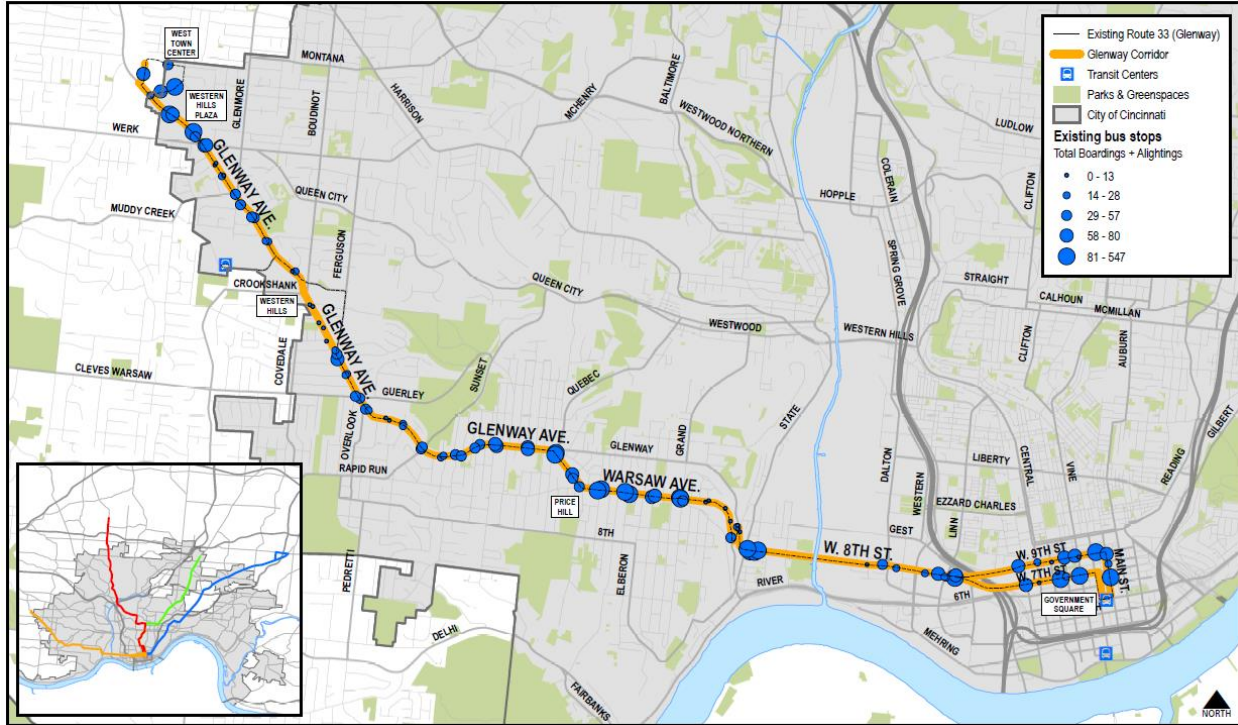
Boardings and alightings on the Glenway Avenue corridor, as shown in Figure E-8, are strongest along the mixed residential-neighborhood commercial areas along Warsaw and Glenway avenues in Price Hill and Lower Price Hill. West of this segment, ridership drops until the alignment reaches Western





Hills Plaza and adjacent retail centers, where activity picks up. There is additional activity in downtown and in the industrial area just west of I-75.

**Figure E-8. Glenway Avenue Corridor Current Transit Boardings and Alightings**





The Hamilton Avenue corridor runs generally north-northwest from downtown. It is the longest of the four corridors, at about 12 miles. It also runs through portions of three different political jurisdictions: Cincinnati, North College Hill, and Mt. Healthy. In the urban core, the alignment runs northbound on Main Street and southbound on Walnut Street in downtown and Over-the-Rhine (OTR). Starting at Walnut and Liberty streets, the alignment runs bi-directionally on two-way streets to its outer terminus. North of OTR, the alignment climbs the hill to reach the Uptown area, crossing Calhoun and McMillan streets which are served by crosstown Route 31. The alignment proceeds north on Jefferson Avenue, with the University of Cincinnati (UC) campus on the west side of Jefferson and the Corryville (“Short Vine”) business district and neighborhood on the east side. At the intersection of Jefferson and Dr. Martin Luther King, Jr. Drive (MLK), the Uptown medical district is located immediately to the northeast. The alignment proceeds west on MLK, along which the 22-acre Environmental Protection Agency (EPA) research center is located, along the northern edge of the UC campus and southern edge of Burnet Woods Park. The alignment then turns north on Clifton Avenue, alongside the western edge of the park, serving TriHealth Good Samaritan Hospital on the west side of the street. At the Clifton neighborhood business district, the alignment proceeds west on Ludlow Avenue. Cincinnati State Technical and Community College is located adjacent to Ludlow Avenue.

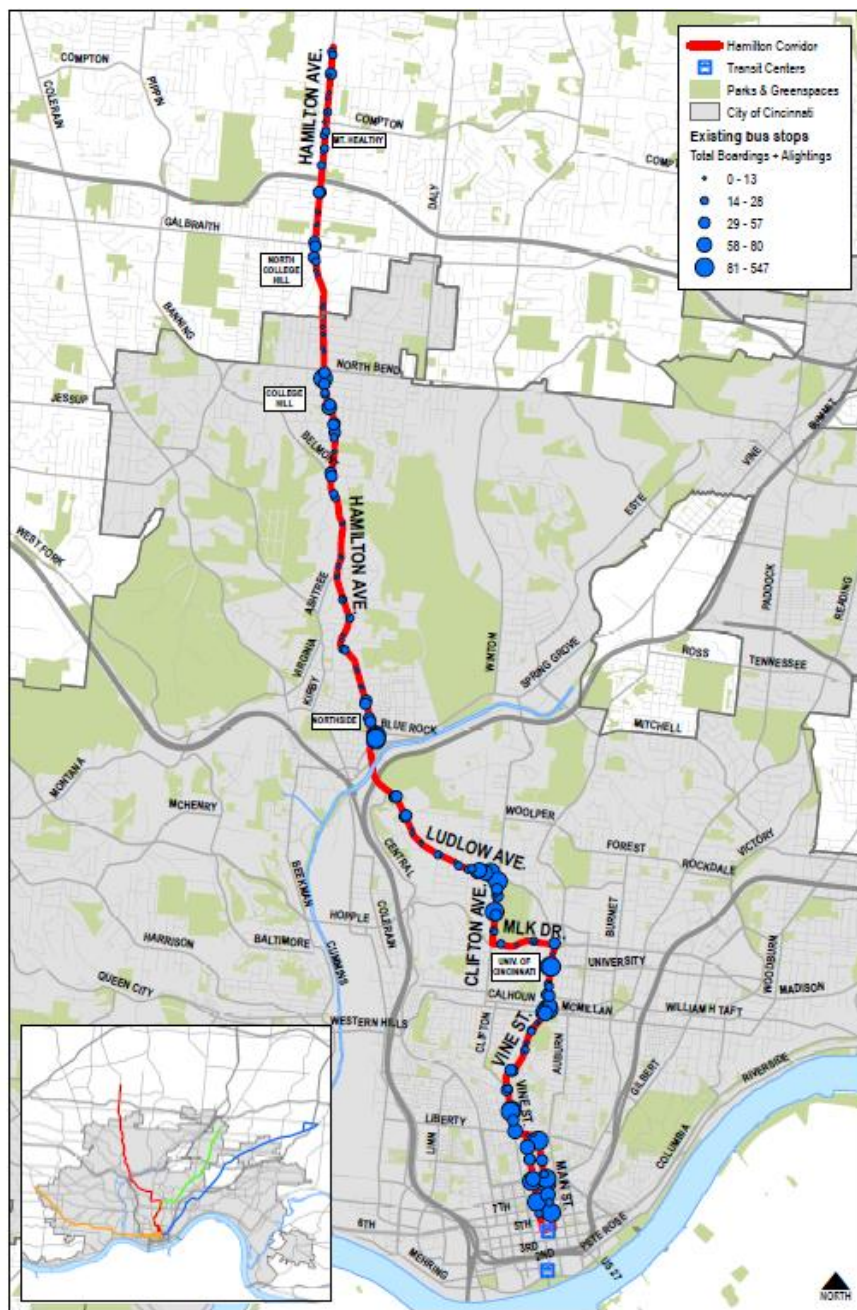
After crossing over I-75 via the Ludlow Viaduct, the alignment serves the Northside Transit Center, the second largest transfer hub in the Metro fixed route system and the largest hub outside downtown. The remaining and longest portion of the Hamilton corridor alignment runs on Hamilton Avenue through the Northside and College Hill neighborhoods in Cincinnati and the cities of North College Hill and Mt.





Healthy. SORTA is in the process of working with the City of North College Hill on a transit center in the vicinity of Hamilton Avenue and Galbraith Road. The outlying northern terminus is Hilltop Plaza in Mt. Healthy.

**Figure E-9. Hamilton Avenue Corridor Current Transit Boardings and Alightings**



As shown in Figure E-9, ridership activity along the corridor is very strong and steady between and within downtown, OTR and the uptown area. The primary local route in the corridor is Route 17, which runs along Clifton and Hamilton avenues, currently extending north and west of the BRT corridor terminus in Mt. Healthy. Route 17's alignment differs from the BRT alignment in the uptown area, operating on Clifton Avenue between downtown and MLK – on the west side of the UC campus - instead of the BRT alignment on Vine, Jefferson, and Clifton. Other routes serve various portions of the Hamilton corridor, including Metro\*Plus and Routes 46 and 78 between downtown and uptown, Route 37 on MLK and Ludlow, and Route 15X on Hamilton.

Ridership activity is also strong in Northside, including at the Northside Transit Center (Figure 4-19) and in College Hill, especially at North Bend Road. Activity levels are lower but steady north of this point.



# REINVENTING METRO! BUS RAPID TRANSIT STUDY

## READING ROAD CORRIDOR

The Reading Road Corridor extends from the intersection of Reading Road (US 42) and SR 561/Seymour Avenue to downtown Cincinnati. It would serve the Uptown area, the University of Cincinnati, and multiple hospitals and other medical facilities.

**LENGTH**  
Approximately 12 miles

**PRIMARY ROADS TRAVELED**

- Reading Road
- Martin Luther King, Jr. Drive (MLK)
- Vine Street

**COMMUNITIES SERVED**

- Golf Manor
- Roselawn
- Bond Hill
- Paddock Hills
- North Avondale
- Avondale
- Coryville
- CUF (Clifton Heights, University Heights, Fairview)
- Mt. Auburn
- Over-the-Rhine (OTR)
- Downtown

**EXISTING METRO ROUTES ALONG CORRIDOR**

- Route 43 (Seymour Avenue to MLK Avenue)
- Metro\*Plus (Burnet Avenue to downtown)
- Route 46 (William Howard Taft/ E. McMillan to downtown)
- Route 78 (MLK to downtown)

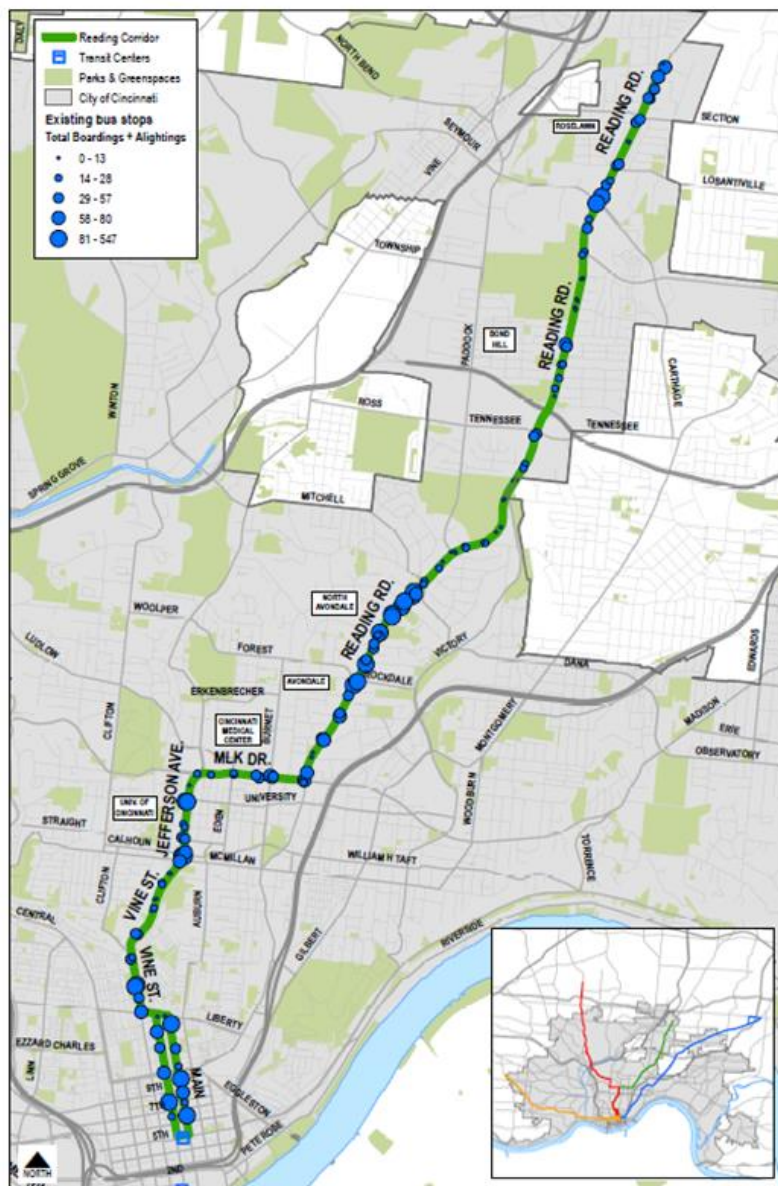
## READING ROAD CORRIDOR DESCRIPTION

The Reading Road corridor is situated entirely within the City of Cincinnati. The alignment between downtown and the uptown area is the same as the Hamilton corridor: northbound on Main Street and southbound Walnut Street in downtown and OTR and bi-directional on Liberty Street, Vine Street, and Jefferson Avenue to MLK. At the intersection of Jefferson and MLK, the Reading Road corridor alignment turns east on MLK and proceeds north on Reading Road from uptown to the outlying terminus in Roselawn.





Figure E-10. Reading Road Corridor Current Transit Boardings and Alightings



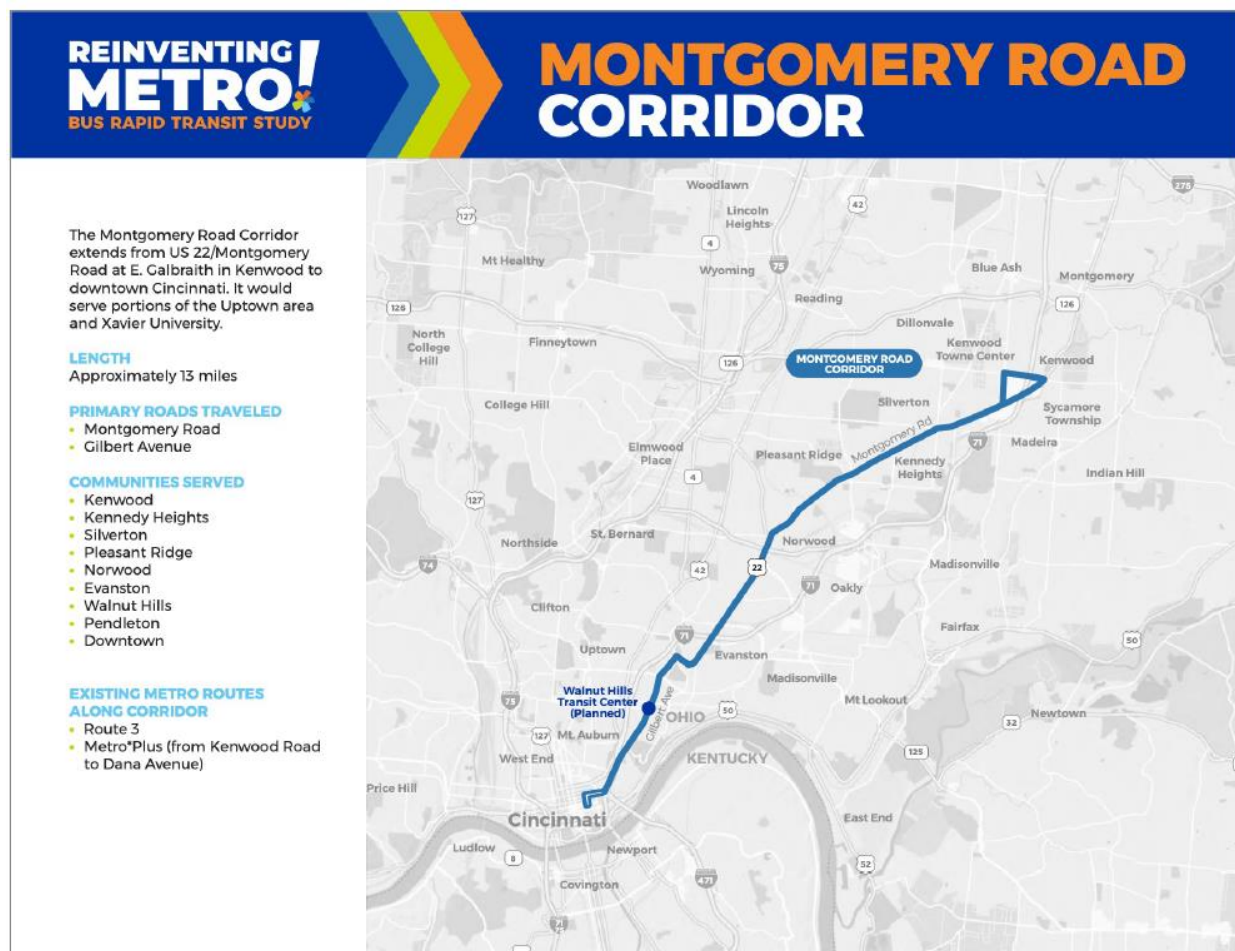
Reading Road ridership activity is shown in Figure E-10. Reading Road is served by Route 43, which operates along the BRT corridor between MLK and Roselawn, extending north of the outlying BRT terminus. Route does not follow the BRT corridor through uptown and OTR but remains on Reading Road between MLK and downtown.

Ridership activity is very strong and steady along the entire corridor. There is significant ridership between and within downtown, OTR and the uptown area. North of uptown, ridership activity is very high in Avondale and North Avondale. Between Mitchell Avenue and the Norwood Lateral, ridership drops off somewhat. Other routes serve various portions of the Hamilton corridor, including Metro\*Plus and Routes 46 and 78 between downtown and uptown, Route 37 on MLK and Ludlow, and Route 51 in uptown and Avondale.

There are currently no neighborhood transit centers located along the corridor outside downtown; however, SORTA is working with the Uptown Consortium on development of an Uptown Multimodal Center that would serve Metro fixed routes, including BRT, and the several shuttle services

operated by UC and the medical centers. A specific location has not yet been fixed but is anticipated to be in the vicinity of Reading Road and MLK.





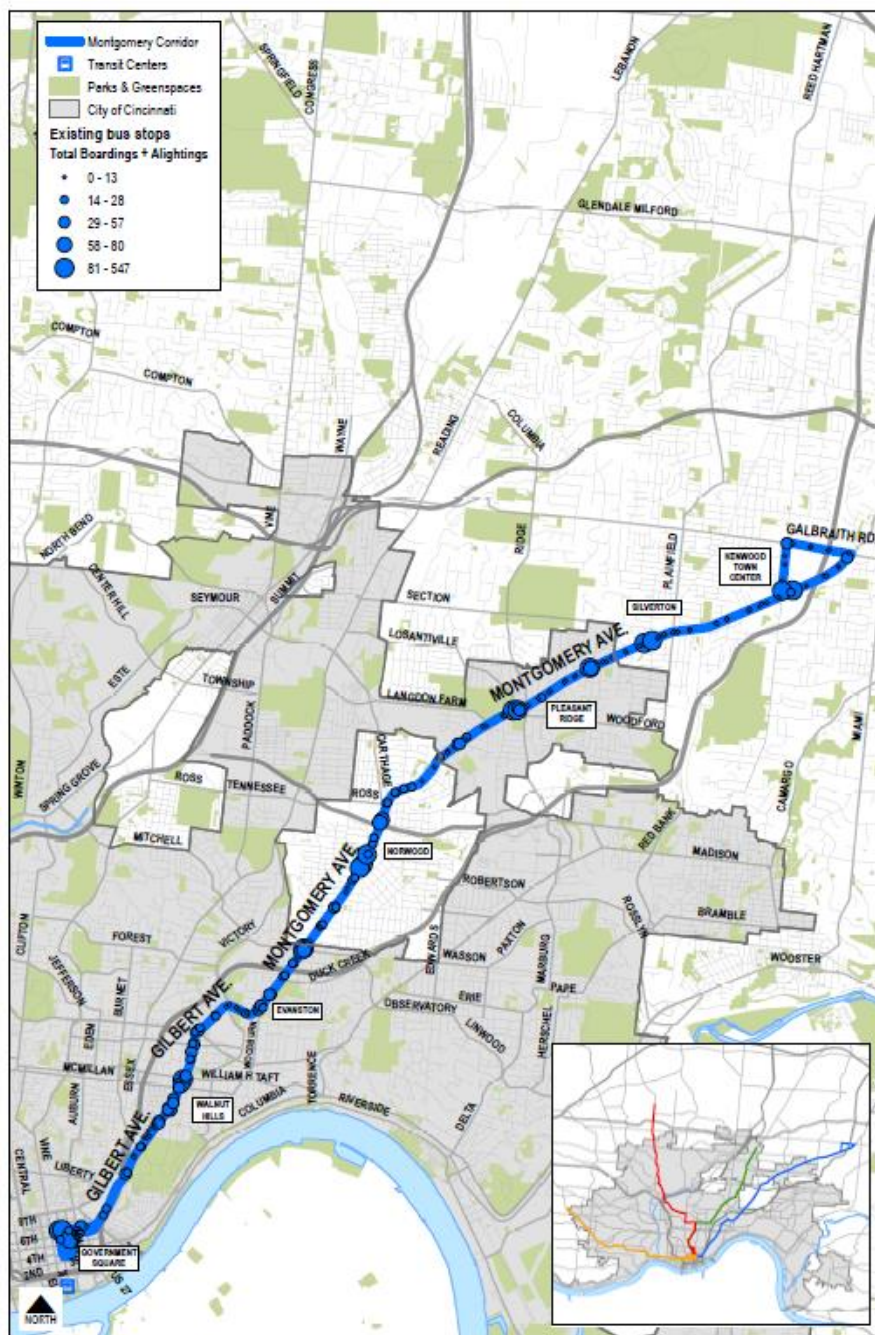
The Montgomery Road corridor extends from downtown Cincinnati northeast to Sycamore Township. In addition to the township and the City of Cincinnati, it also extends through the cities of Norwood and Silverton.

The southern third of the corridor alignment runs along Gilbert Avenue from the east side of downtown through the Walnut Hills neighborhood. Both are densely populated neighborhoods. Walnut Hills has experienced significant revitalization and new development in recent years; Silverton has not. Gilbert Avenue merges into Montgomery Road in Silverton. Xavier University is located just west of Montgomery Road in this area. North of Silverton, the corridor runs through Norwood and re-enters Cincinnati at the Pleasant Ridge neighborhood. The corridor continues through the Kennedy Heights neighborhood, Silverton, and Sycamore Township. The outlying terminus is in the Kenwood area.

Ridership activity along the Montgomery Road corridor is generally steady throughout its entire length as shown in Figure E-11. It is currently served by Route 4 for its entire length. The portion of the corridor between Silverton and Sycamore Township is also served by the Metro\*Plus route. In addition, portions of Routes 3, 5, and 51 serve smaller segments of the corridor.



**Figure E-11. Montgomery Road Corridor Current Transit Boardings and Alightings**



Outside downtown, ridership activity is heaviest along Gilbert Avenue within Walnut Hills and Evanston and in Norwood south of the Norwood Lateral. Ridership activity is somewhat lower north of this point but there are significant ridership activity nodes in the centers of Pleasant Ridge and Kennedy Heights. The Kenwood area is also a major transit generator.

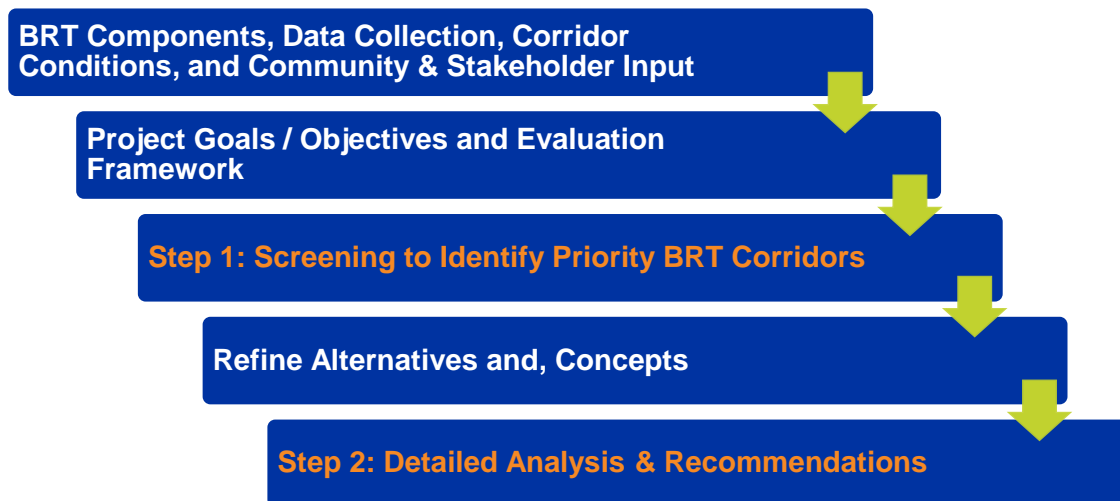
Outside downtown there are currently no neighborhood transit centers along the Montgomery Road corridor. However, SORTA is currently planning a transfer facility in Walnut Hills, historically one of the busiest transfer points in the system and a major interface location between Route 4 and the crosstown Route 31.



## Corridor Screening

The development of appropriate solutions and next steps for each corridor was conducted as two-step process. Step 1 established goals that informed the analysis approach and methodology for the study. Evaluation of candidate corridors served as a “fatal flaw” assessment to identify the two corridors that were advanced to conceptual design and a detailed Step 2 analysis.

Figure E-12 Alternatives Analysis Process



### EVALUATION FRAMEWORK

The evaluation framework illustrated in Figure E-13 represents the structure for development of detailed evaluation criteria and metrics to assess potential benefits / impacts as well as inform decision-making.

Figure E-13. Alternatives Evaluation Framework



Project goals and objectives are the basis of the analysis framework to ensure successful integration of BRT infrastructure within the community fabric in support of sustainable service improvements and connecting opportunities.

The alternatives development and analysis processes begins by establishing appropriate expectations prior to the definition of alternatives, including the level of investment to designate and approach to preservation or conversion of right of way for transit priority operations.

BRT alternatives are developed as combinations of capital and service operating components shown in Table E-2.









**Table E-2. Capital and Operating Components**

Capital Components	Service Components
Alignment & routing	Logical termini
Technology (fare collection & Intelligent Transportation Systems, ITS)	Frequency and span
Guideway and transitway assumptions	Station/Stop spacing
Station locations and amenities	Connectivity and interoperability

Industry best practices, complemented by their collective experience in the development of long range and regional high-capacity transit system plans, and available transportation and land use network data were used to develop six preliminary goals and accompanying objectives. SORTA vetted the project goals with the community and stakeholder groups for concurrence and refinement during Step 1. These goals (Table E-3) and their objectives represent the desired outcomes of the project. This section profile and outlines opportunities and externalities related to each study goal.

**Table E-3. Alternatives Evaluation Framework**

	<b>Attract Riders and Increase Mode Share</b>
	<b>Improve Transit Speed and Reliability</b>
	<b>Enhance Transportation Network Connectivity</b>
	<b>Provide Equitable Access to Frequent Services</b>
	<b>Ensure Constructability and Built Environment</b>
	<b>Support Economic Development</b>

## RESULTS

The scoring is summarized in Table E-4.





**Table E-4. Step 1 Evaluation Summary and Criterion Scoring**

Criterion	Glenway	Hamilton	Reading	Montgomery
 Traffic conditions and congestion	★★★★☆	★★★★☆	★★★★☆	★★★★☆
 Roadway conditions, geometry, and capital improvements	★★★★☆	★★★★☆	★★★★☆	★★★★☆
 Equity Index metrics - intersecting boundaries, communities	★★★☆☆	★★★★★	★★★★☆	★★★★☆
 Potential to improve transit delay and hotspots	★★★★☆	★★★★☆	★★★★☆	★★★★☆
 O-D travel markets and travel flows	★★★★☆	★★★★★	★★★★☆	★★★☆☆
 Existing ridership (include shared segments)	★★★☆☆	★★★★☆	★★★★☆	★★★★☆
 Third party boundaries, facilities of inter-jurisdictional control	★★★★☆	★★★★☆	★★★★☆	★★★☆☆
 Existing transit frequency / utilization	★★★★☆	★★★★★	★★★★☆	★★★★☆
 Transit Center / Intermodal connectivity	★★★★☆	★★★★☆	★★★★☆	★★★★☆
 Land uses and pop / emp density	★★★★☆	★★★★★	★★★★★	★★★★☆
 Major / Regional activity centers	★★★★☆	★★★★★	★★★★☆	★★★★☆
 Transit supportive policies and TOD	★★★☆☆	★★★★☆	★★★★☆	★★★☆☆
<b>Total score out of 60</b>	<b>36</b>	<b>43</b>	<b>49</b>	<b>28</b>

The Reading Road and Hamilton Avenue corridors are the highest rated in aggregate. These two corridors have a shared alignment between the two strongest trip drivers of Downtown and Uptown (University of Cincinnati and medical center district). The Reading Road corridor also provides direct connectivity through equity and justice communities in Avondale and Bond Hill.

As a result, the Reading Road and Hamilton Avenue corridors have been advanced for further development as BRT Corridors in Step 2.

Although the communities of west Cincinnati also experience historic equity and justice issues, the Glenway Avenue corridor provides less direct connectivity to equity communities due to topography and development patterns. The lower density of residents, as well as lower number of activity centers and jobs located directly along Glenway Avenue and Montgomery Road, led to Reading Road and Hamilton Avenue being the strongest candidates to advance for conceptual design and potential grant funding application. The Glenway Avenue and Montgomery Road corridors would both benefit from corridor

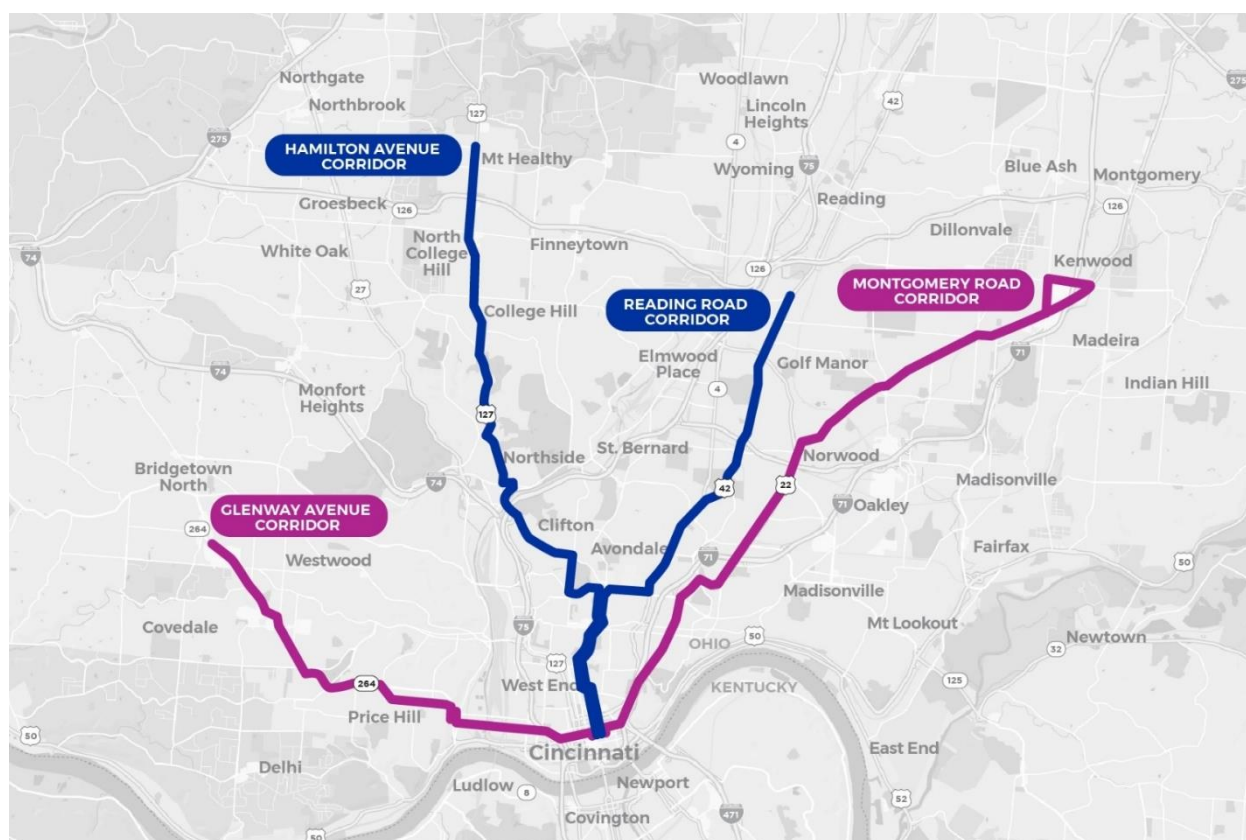




enhancement projects and should continue to be evaluated for high capacity transit opportunities in the future.

As a result, the Glenway Avenue and Montgomery Road corridors will be considered for further development as Enhanced Corridors to include a range of service, safety, and passenger amenity improvements.

**Figure E-14. Step 1 Screening Results: BRT and Enhanced Corridors**



## Community and Stakeholder Outreach: Step 2

On January 17, 2023, Metro announced that based on the results of technical studies and public input received, the Reading Road and Hamilton Avenue corridors would receive the region's first BRT service. Although the Glenway Avenue and Montgomery Road corridors would not be receiving BRT initially, Metro also announced that it will be developing plans to provide enhanced services along those corridors as part of the overall BRT project.

To help communicate these messages and continue building excitement and engagement in the BRT planning process, the team prepared a public outreach strategy for Step II that would build upon and expand the outreach efforts initiated in Step 1.



## COMMUNITY DESIGN WORKSHOPS

A key element of Step 2 outreach was an in-person charette-style workshop program. Four community design workshops were held in February 2023 at locations along the two recommended BRT corridors. Each workshop consisted of two components: an introductory overview presentation and a series of interactive activity stations designed to collect public input around four topic areas: station locations, station features, potential connections, and TOD opportunities.

In-person workshop attendance exceeded expectations. Pre-registration for each session was excellent, with walk-ins adding to those numbers. Each session welcomed at least 25 guests, with two (College Hill and Northside) gathering a crowd of more than 40 people. Participants were enthusiastic and engaged project team members with questions and comments at each activity station. Many provided insights on the type of development desired around specific station locations, as well as multiple preferences for station amenities, including real-time bus arrival information. Photos from the workshops are shown in Figure E-15.

**Figure E-15. Step 2 Community Design Workshops**



The results of the four community design workshops are summarized as follows:

- Attendees exhibited a high level of enthusiasm about BRT and the study process.
- There is general consensus on the proposed station locations.
- Suggestions were provided for a few additional station locations.
- Some attendees felt that the University of Cincinnati would be better served with the BRT running on Clifton Avenue instead of Jefferson Avenue.
- Many felt that shelter designs should be neighborhood-appropriate, especially given the number of historic districts along the corridors.
- Traffic calming is a significant issue in some neighborhoods. How does BRT work with traffic calming techniques?
- Crosstown connections and linkages are desired.
- Additional corridors should be considered for BRT in the future.

## VIRTUAL WORKSHOP / ONLINE SURVEY

To ensure as many community members as possible had the opportunity to provide input, a virtual workshop was created using the Public Input online survey tool. Offered between February 20 and



March 20, 2023, the virtual workshop garnered 395 visits and 97 completed sessions, including 309 total comments.

Key results included:

- 48% reported they would most likely use the Hamilton Corridor with 41% responding they would use the combined Uptown/Downtown segment and 16% saying they would use the Reading BRT corridor.
- For the proposed bus station location along Hamilton Avenue, the stations with the highest “strongly agree” percentages were the Northside Transit Center (68%), the Clifton Business District Station (66%); the Cincinnati State Station (54%); and several proposed additional stop locations for consideration.
- For the proposed bus station locations along the Reading corridor, those with the highest “strongly agree” responses were the proposed Uptown Multimodal Center on Burnet (61%), followed by the Avondale Town Center Station (46%), and Reading-Dana Station (42%). Several additional points for consideration were also offered.
- For the proposed bus station locations along the combined Uptown/Downtown corridor, the ones with the highest “strongly agree” percentage responses were Findlay Market Station (75%), Riverfront Transit Center (70%), University of Cincinnati Station (70%), and Vine-McMillan-Calhoun Station (69%).
- In terms of station design, modern stations with brick or wood features received the highest responses. In terms of station features, ambient lighting, security cameras, and emergency call boxes received responses of 69% or more in favor.

## COMMUNITY AND POP-UP EVENTS

Pop-up events were scheduled throughout the two selected BRT corridors in February 2023 to obtain feedback on the proposed station locations. The event participants were also encouraged to participate in one of the community workshops. It is estimated that the study’s outreach team met with over 700 community members during pop-up events held along the selected BRT corridors. Photos of some of the events are shown in Figure E-16.

**Figure E-16. Step 2 Community Meetings and Pop-Ups**







Participants were generally interested and excited about the prospect of BRT were engaged on issues such as station locations and potential station features. They were generally supportive of the proposed station locations.

Some participants indicated that additional station locations should be considered, including:

- Walmart on Reading Road in Evendale (north of the planned Reading Road Corridor terminus)
- Hamilton Avenue at Ashtree Drive (Hamilton Avenue Corridor)
- New Prospect Church on Summit Road (near the Reading Road Corridor)
- Reading Road between Sherman Avenue and Tennessee Avenue (Reading Road Corridor).
- Reading Road at Wyoming Avenue/West Benson Street (north of the planned Reading Road Corridor terminus)

## COMMUNITY AND LOCAL JURISDICTION COUNCIL MEETINGS

Each of the community councils along the selected BRT corridors and the Enhanced Transit corridors was asked to add a SORTA agenda item to an upcoming regularly scheduled meeting. The project team was asked to present at 15 Community Council meetings between February and April 2023. At each meeting at which the study team was invited, the BRT corridor selection process was described and community members were asked to offer feedback on the station locations and amenities. Community Council members expressed similar excitement about the BRT project. The focus tended to be more toward economic development and safety.

## SORTA STAFF ENGAGEMENT

A second round of SORTA staff engagement was conducted to share the initial results of the study and demonstrate that staff comments and suggestions were considered.

**Figure E-17. Step 2 SORTA Staff Engagement**



Overall, SORTA staff were pleased with the selection of the Hamilton and Reading corridors for BRT development and the concepts for transit enhancements along the Glenway Avenue and Montgomery Road corridors.



# Locally Preferred Alternative

The alignments and stations that comprise the Locally Preferred Alternative (LPA) for the Reading Road Corridor and Hamilton Avenue Corridor BRT lines are shown in Figure E-18.

Figure E-18. Reading Road and Hamilton Avenue BRT LPA Alignments and Stations








## RUNNING WAYS

Both corridors will operate along a variety of running ways as described in Table E-5. As shown in Figures E-19 and E-20, most of the Hamilton Avenue and Reading Road corridors will operate within a priority treatment. Segments featuring center-running bus only lanes are along Jefferson Avenue, MLK, Clifton Avenue, and Ludlow Avenue.

**Table E-5. Running Way/Lane Treatments**

Treatment	Description	Example
<p>BRT-Only Center Lane: 2 Lanes</p>	<p>Two lanes, one in each direction, dedicated for exclusive bus operation. Non-BRT traffic is prohibited from operating in the BRT-only lanes except where permitted for left turns at select signalized intersections.</p> <p>Lanes can be delineated with red pavement, red striping, or other pavement treatments.</p>	
<p>BRT-Only Center Lane: 1 Lane</p>	<p>One lane, in only one direction, dedicated for exclusive bus operation. Non-BRT traffic is prohibited from operating in the BRT-only lanes except where permitted for left turns at select signalized intersections.</p> <p>Lanes can be delineated with red pavement, red striping, or other pavement treatments.</p> <p>Buses in the other direction without BRT-only lanes typically operate in mixed traffic.</p>	
<p>BAT Lanes: Both Sides</p>	<p>Bus and Turn Lanes on both sides (curbside) of the street providing priority for buses but allowing non-BRT traffic to use the lanes only to turn into and out of curb cuts and not for through travel.</p>	
<p>BAT Lane: 1 Side</p>	<p>Bus and Turn Lanes on one side (curbside) of the street providing priority for buses but allowing non-BRT traffic to use the lanes only to turn into and out of curb cuts and not for through travel. Buses in the non-BRT side operate in mixed traffic</p>	




Treatment	Description	Example
Mixed Traffic	No lane priority; BRT buses operate in the same lanes as other traffic	



Figure E-19. Running Way Priority Treatments – Reading Road Corridor

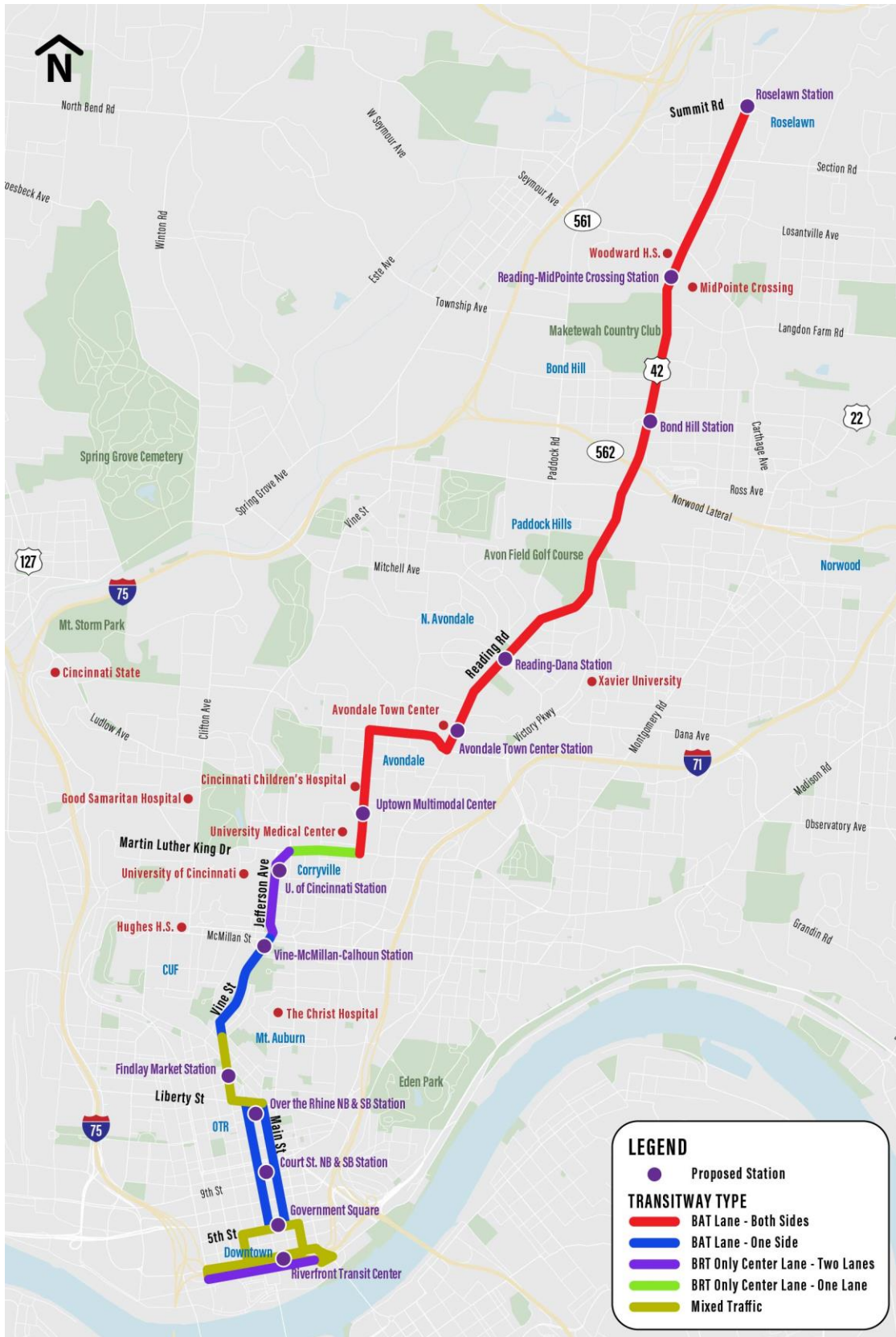
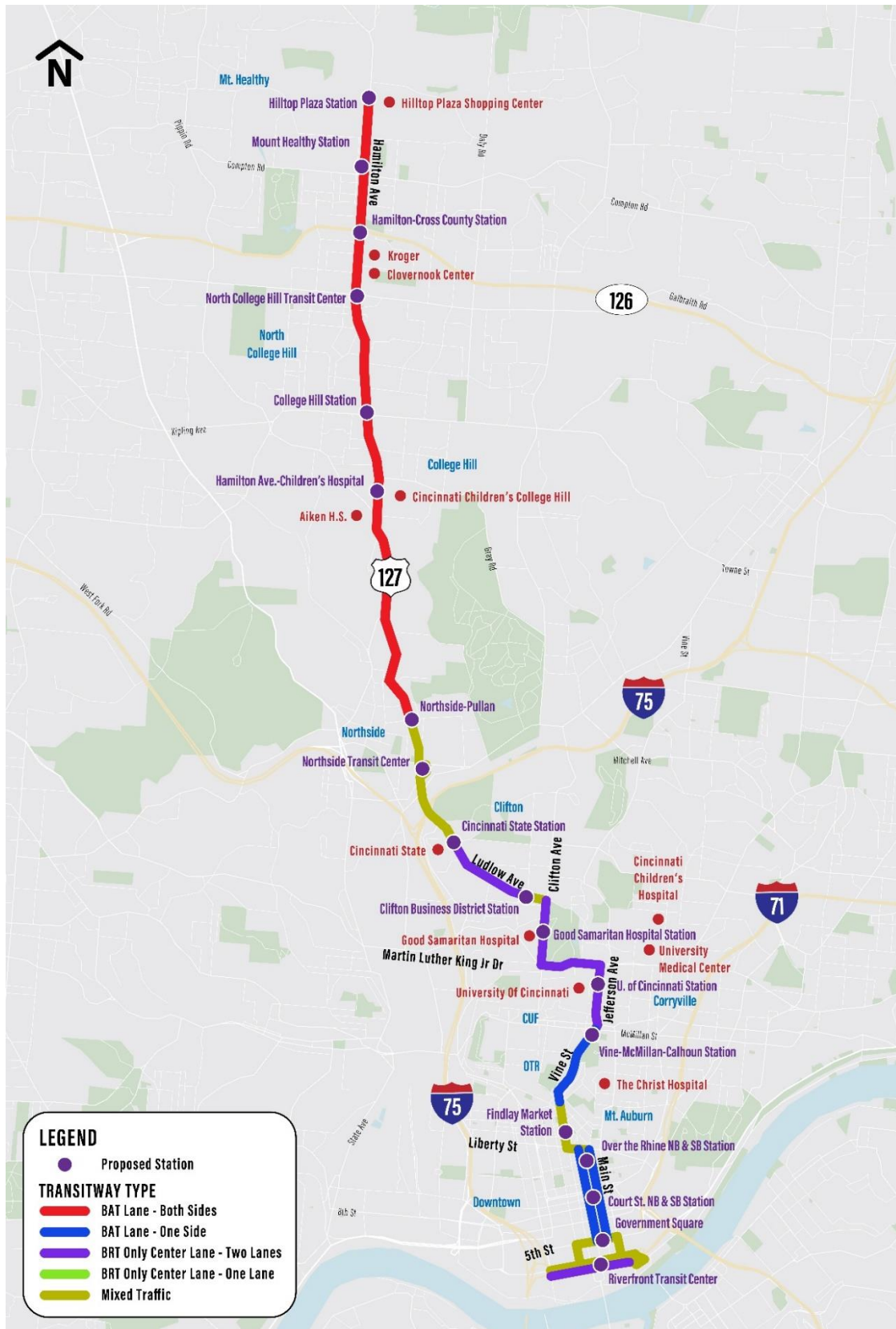






Figure E-20. Running Way Treatments – Hamilton Avenue Corridor





## TRANSIT SIGNAL PRIORITY

Transit signal priority (TSP) applications will be included at signalized intersections to help facilitate BRT through and turning movements. TSP will facilitate BRT operations by minimizing lengthy delays at intersections. It is not anticipated that TSP will be utilized in the downtown Cincinnati area on Main and Walnut Streets as TSP would not provide significant benefit downtown as compared to other locations along the corridors. There is one instance where a bus-only signal will facilitate BRT bus turning movement where traffic is currently prohibited from making a left turn: the intersection of Vine Street southbound to Liberty Street eastbound. A BRT bus-only signal will minimize delay while allowing the alignment to provide a stop at Vine and Elder streets, a few blocks to the north, to serve Findlay Market and vicinity.

## STATIONS

Table E-6 lists the station locations – and distance between stations - for each corridor and the combined segment. Excluding the portion of the alignment between Government Square and the Riverfront Transit Center, average spacing between stations on both corridors, including the combined segment, is 0.7 miles. Spacing ranges between 0.4 miles and 2.0 miles.

**Table E-6. Station Locations and Spacing**

Station	Location	Distance from Previous Station
<b>Reading Road Corridor</b>		
Roselawn	Valley Center: Reading Road between Summit and Section roads	--
Midpointe Crossing	Reading Road at Woodward High School-Midpointe Crossing entrance roads	0.9 mi
Bond Hill	Reading Road at Northcutt Avenue	0.4 mi.
Reading-Dana	Reading Road at Dana Avenue	1.8 mi.
Avondale Town Center	Reading Road at Lexington Avenue	0.6 mi.
Uptown Multimodal Center	Burnet Avenue at Albert Sabin Way	1.2 mi.
University of Cincinnati	Jefferson Avenue at University Avenue	0.9 mi.
<b>Hamilton Avenue Corridor</b>		
Hilltop Plaza	Hamilton Avenue south of Meredith Drive	--
North College Hill	Hamilton Avenue at Hill Avenue	0.5 mi.
Cross County	Hamilton Avenue at Centeridge Avenue (Kroger supermarket, south of Cross County Highway)	0.7 mi.
North College Hill Transit Center	Hamilton Avenue at Goodman Avenue	0.5 mi.
College Hill	Hamilton Avenue at North Bend Road	1.0 mi.
College Hill-Children's Hospital	Hamilton Avenue at Belmont Avenue	0.6 mi.
Northside-Pullan	Hamilton Avenue at Pullan Avenue	2.0 mi.





Station	Location	Distance from Previous Station
Northside Transit Center	Between Blue Rock Street and Spring Grove Avenue	0.5 mi.
Cincinnati State	Ludlow Avenue at Cincinnati State Entrance Drive	0.7 mi.
Clifton Business District	Ludlow Avenue at Middleton Avenue	0.9 mi.
Good Samaritan Hospital	Clifton Avenue at South Entrance Drive	0.5 mi.
University of Cincinnati	Jefferson Avenue at University Avenue	0.9 mi.
<b>Combined Segment</b>		
Vine-Calhoun/McMillan	Vine Street between Calhoun and McMillan streets	0.4 mi.
Findlay Market	Vine Street at Elder Street	1.0 mi.
Over-the Rhine (southbound)	Walnut Street at 14 <sup>th</sup> Street	0.4 mi.
Court Street (southbound)	Walnut Street at Court Street	0.4 mi.
Government Square (southbound)	Fifth Street between Walnut and Main streets	0.4 mi.
Riverfront Transit Center	Below Second Street	1.3 mi
Government Square (northbound)	Fifth Street between Walnut and Main streets	1.1 mi.
Court Street (northbound)	Main Street at Court Street	0.4 mi
Over-the-Rhine (northbound)	Main Street at 14 <sup>th</sup> Street	0.4 mi

## DESIGN

Station design will be conducted in the detailed design phase following this study. The following two conceptual renderings, however, provide a sense of scale and features. Figure E-21 shows a concept for a station along a segment of center-running BRT-only lanes segment; Figure E-22 shows a concept for a curbside platform station along a BAT lane segment.



Figure E-21. BRT Station Concept - Center BRT-Only Lanes



Figure E-22. BRT Station Concept – Curbside BAT Lanes





## VEHICLES

The BRT lines require a different type of bus than currently found in SORTA’s fixed route fleet to accommodate high passenger loads, wheelchair positions, on-board bike storage, and additional passenger amenities. As a result, 60-ft articulated buses will be used. They will feature low floors and be designed to facilitate precision docking at stations to eliminate the need for ramps or bridgeplates, thereby minimizing the amount of time needed for boarding and alighting. Because pre-paid, off-board fare payment systems will be used, passengers will be able to enter the buses by any of the doors, not just the front door near the operator. A typical BRT bus is shown in Figure E-23.

The most significant and unique characteristics of the BRT buses are doors on both sides of the bus. This allows maximum design flexibility for the Reading Road and Hamilton Avenue BRT lines, future extensions, and additional BRT lines to apply center platform stations where BRT-only lanes can be accommodated in the middle of a street.

In addition, SORTA expects that its BRT fleet will be zero emission, using either battery electric buses (BEBs) or fuel cell electric buses (FCEBs) which are powered by hydrogen.

**Figure E-23: Articulated BRT-Style Bus**



## OPERATING CHARACTERISTICS

BRT requires a high frequency of service to accommodate expected ridership attracted to the convenience of the service. High frequency also minimizes wait time, which is factored in overall travel time of BRT users. As a result, the conceptual operating plan for the Reading Road and Hamilton corridors, as shown in Table E-7, is 10 minutes throughout the day on weekdays, including AM and PM peak periods and the midday and evening off-peak periods. After 9 pm, service frequency would widen from 10 to 15 minutes.

Weekend and holiday frequencies would range from 15 to 20 minutes. Overnight or 24 hour local service is not proposed at this time. Existing local service in both corridors currently operates 24/7.

**Table E-7. Proposed Service Frequency**

Time Period	12 am – 4 am	4 am – 9 am	9 am – 3 pm	3 pm – 6 pm	6 pm – 9 pm	9 pm – 1 am
Frequency	--	10-20 min.	10 min.	10 min.	10 min.	15-20 min.



## FLEET AND COST

Fleet, capital cost, and operating cost estimates are shown in Table E-8. The capital cost of the Reading Road Corridor encompasses the entire corridor between Roselawn and downtown Cincinnati. The capital cost of the Hamilton Avenue corridor encompasses the portion from the split point from the Reading Road Corridor, at Jefferson and MLK to the outer terminus in Mt. Healthy. The exception is for buses, which are allocated to each corridor based on their service from downtown to their outer terminus locations. Fleet requirements and costs will be subject to further refinement as the project progresses. The operating costs do not reflect offsets that will occur as existing local service is modified.

**Table E-8. Vehicle and Cost Estimates**

Time Period	Reading Corridor	Hamilton Corridor	Total
Peak Vehicle Requirement	8	9	17
Total Vehicle Requirement	10	11	21
Total Project Cost (Current Year \$)	\$141,634,331	\$133,527,222	\$275,161,553
Year of Expenditure (YOE) Cost	\$147,030,599	\$138,164,609	\$285,645,208
Operating Cost (FY 2021\$)	\$8,514,111	\$10,006,275	
Opening Year \$ (2027-2028)	\$11,022,415	\$12,954,178	

## Next Steps

Following completion of this study, the next steps have been or will be undertaken to implement the Reading Road Corridor and Hamilton Avenue Corridor BRT projects:

- **Approval and adoption of the LPA:** The SORTA Board of Trustees approved the LPA in February 2023, allowing SORTA to advance the project into the project development and environmental review phase in coordination with FTA.
- **National Environmental Policy Act (NEPA):** Projects that anticipate the use of federal funds for further development are subject to the requirements of the National Environmental Policy Act (NEPA). The first step in this process is to complete a Class of Action (COA) Determination in coordination with the FTA. Based upon the preliminary environmental analysis completed as part of the planning phase, it is anticipated that FTA will determine that the COA will be a Documented Categorical Exclusion (DCE). This determination and approval are expected in mid-2023, allowing SORTA team to complete the DCE process in 2024.
- **Request entry into the FTA Capital Investment Grant (CIG) Program:** It is anticipated that this project will be funded, in part, through FTA's Capital Investment Grant (CIG) Program. Of FTA's three CIG eligibility categories, Reading Road Corridor and Hamilton Avenue Corridor are expected to qualify as Small Starts project. FTA requires that the sponsoring agency (SORTA) request entry into the program. It is anticipated that this process will be completed and that FTA will approve the project to enter the Project Development phase by mid-2023. SORTA must provide an estimate of PD costs and demonstrate that it has non-CIG funding available for Project Development work.

The criteria are divided into two categories: Project Justification and Project Commitment.





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A minimum of a medium ranking for both Project Justification and Financial Commitment is required to achieve an overall project rating of medium to be eligible for a CIG. To achieve at least a medium Financial Commitment rating, SORTA must demonstrate that it is in good financial condition based on audited statement and has a reasonable plan to commit local share funding and lay out the reasonableness of its financial plan.

- **Project Development:** SORTA facilitated achievement of this timetable by conducting this study prior to a request to enter the CIG program. Achievement will also be facilitated with a DCE determination, which allows environmental analysis per NEPA requirements to be completed in 2024.

Preliminary engineering completed during the NEPA process will form the basis of the final design. The results of this phase include final plans, specifications, a bid package for construction and vehicle procurement plan. The project's design and financial plan are expected to be refined during the engineering phase, resulting in a final project scope, schedule, budget, and 20-year capital and operating plan for its construction and ongoing operations and maintenance.



# 1. Introduction

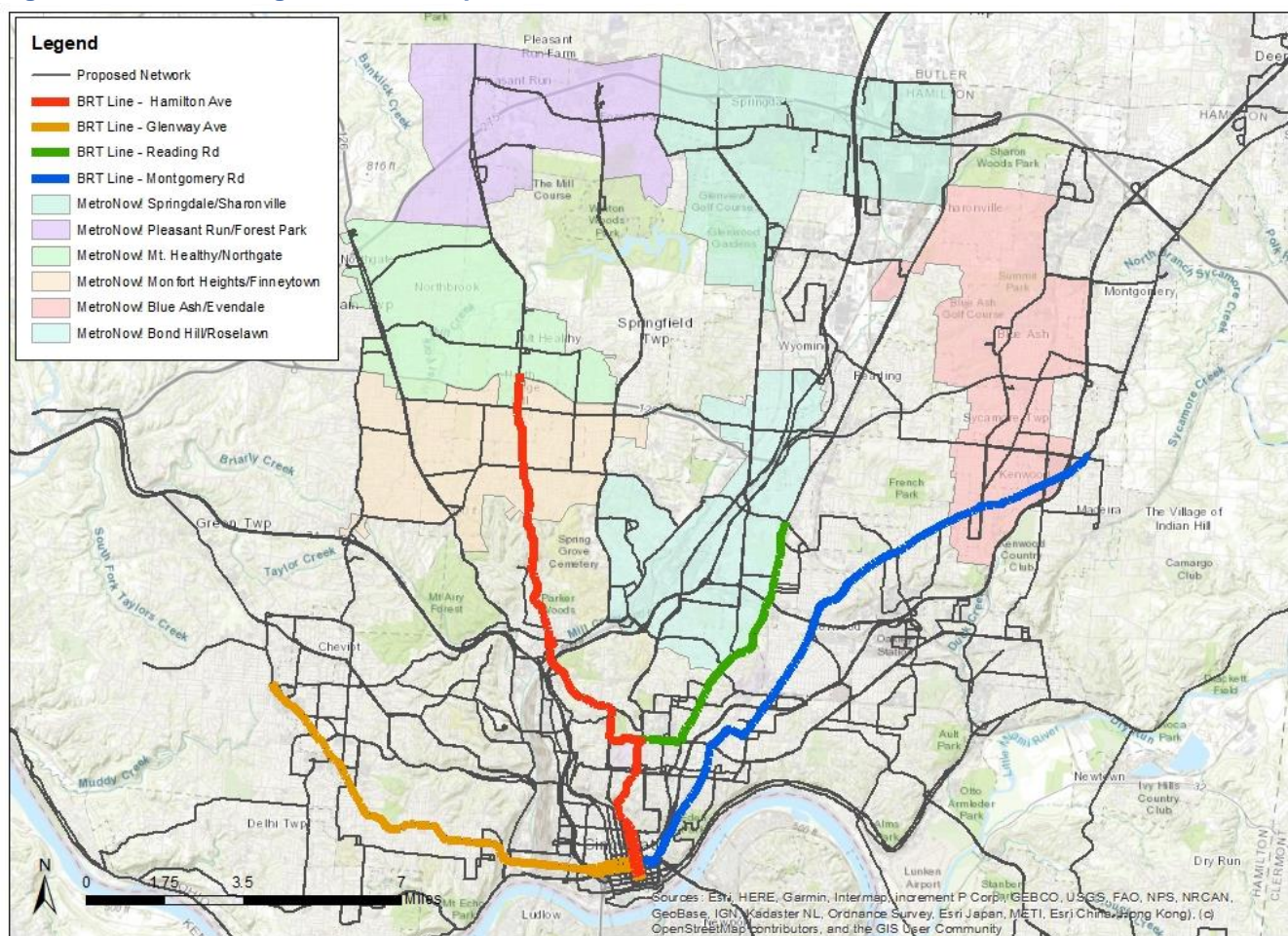




# 1. Introduction

The Southwest Ohio Regional Transit Authority (SORTA) conducted this Alternatives Analysis to examine strategies to extend its service delivery beyond its fixed-route bus network through the introduction of Bus Rapid Transit (BRT) service. As shown in Figure E-1, SORTA's Reinventing Metro plan identified four corridors for future BRT development. BRT service will complement SORTA's existing transportation system which consists of regular fixed-route, express, paratransit, and mobility-on-demand services. This study was designed to determine which corridors should be developed as SORTA's first BRT service and other corridors that would receive enhancements in the short term with development as BRT lines in the future. The BRT Study should also help inform SORTA decisionmakers of the most effective way to implement BRT in Hamilton County.

**Figure 1-1: Reinventing Metro Bus Rapid Transit Corridors**





## Purpose and Need for the Study

A Purpose and Need Statement describes the reasons for conducting a study and its underlying needs. Defining the purpose and need is a critical step in the project development process in that it guides the design and evaluation of alternatives. Once the study is completed and a Locally Preferred Alternative (LPA) selected, the Purpose and Need Statement lays the foundation for review of the project as part of the National Environmental Policy Act (NEPA).

The four study corridors extend from downtown Cincinnati along four of the most heavily used transit and travel corridors in Hamilton County. Each serves the Government Square and Riverfront transit centers. Each also serves existing and planned transit centers and transfer facilities: the Glenway Crossing Transit Center along the Glenway Avenue corridor; the Northside Transit Center and planned North College Hills Transit Center along the Hamilton Avenue corridor; the planned Uptown Multimodal Center on the Reading Road corridor, and the planned Walnut Hills Transit Center along the Montgomery Road corridor.

Population density along the corridors is high, ranging from 5,500 to 6,600 persons per square mile—over 200% of the Hamilton County average. Each corridor's employment population ranges from 107,000 to 148,000. Health care and social assistance jobs comprise the largest share of employment in each corridor, between 16% and 18% of the total, followed by retail, manufacturing, professional / scientific / tech services, and education.

The four corridors are the most heavily used travel corridors in Metro's fixed route service area, with each ranging from 11,300 to 20,000 daily trips on all modes. Including activity at all stops on all routes serving various portions of the proposed alignment, 2,800-6,400 boardings occur each weekday along each.

The primary bus routes in the corridors are 33 Glenway, 17 Hamilton Avenue, 43 Reading Road, and 4 Kenwood-Blue Ash. They comprise the four highest ridership routes in the system, carrying an average of 2,750 to 5,000 weekday riders. They operate every 10-15 minutes during peak and 10-20 minutes during off-peak periods. Operating on major travel and commuter corridors, their on-time performance ranges from 71% to 79%.

Slow bus speeds and low on-time performance can be attributed to existing operating conditions. Buses operate in mixed traffic on arterial roadways and thus are subject to existing traffic conditions. Traffic is slowed by congestion caused by high traffic volumes during peak period, turning movements, uncoordinated traffic signals, and incidents. Buses are further slowed by short stop spacing and by boarding passengers who often pay through the farebox. Elderly and disabled riders need time to board buses that lack level boarding.

Given these conditions, the purpose of the BRT Study is to provide an improved travel experience through frequent and reliable service. Project goals include:

### Improve travel speed and reliability

Current bus service along the corridors is often slow and unreliable. Operating on a four-lane urban arterial roadway, the average bus speed is below 15.0 mph. Slow speeds and unreliability are attributed to heavy auto and truck traffic and turning movements along the corridor, double parking and stopped delivery vehicles, frequent uncoordinated traffic signals, short bus stop spacing, lengthy dwell times as passengers climb steps and pay fares on-board, and the lack of priority treatments for buses. Trips on





the bus can also be crowded with standees, further slowing the boarding and alighting process at stops and affecting on-time performance.

BRT service will improve travel times by increasing the overall average speed by at least 20%. This is accomplished, in part, with over 80% of the corridor in priority bus lanes including side-running BAT (Bus and Turn, or Business Access and Transit) lanes and center-running bus only lanes in strategic locations. Faster travel speeds will also be facilitated through the use of transit signal priority throughout the length of the corridor, average station spacing of 0.7 miles, off-board fare payment, and level boarding. By providing these treatments, on-time performance is expected to exceed 90%, further shortening travel time from current conditions, thereby providing passengers with consistent, high quality, reliable service.

### **Increase ridership and mode share**

Improved speeds and reliability will enhance the experience for existing riders and help SORTA attract new riders to transit, leading to a higher transit mode share. Passenger amenities provided at stations – replacing minimal facilities with shelters, seating, and protected waiting areas – will also enhance the experience.

In addition to faster service, higher frequency service will provide added capacity and reduce wait times and, therefore, overall travel times. Ten minute frequencies will be operated during midday and evening periods, with 15 minutes on Saturday and Sunday to enhance convenience, encourage more frequent ridership among existing users, and attract new riders. Sixty-foot articulated buses will provide sufficient capacity to accommodate larger passenger loads in greater comfort and allow for on-board accommodation of bicycles. Station stops, situated at major boarding/alighting locations and major employment and activity centers, will feature large, attractive shelters to provide a comfortable and safe waiting environment while real-time information displays will provide accurate arrival times. BRT service will be uniquely branded to emphasize its rapid transit characteristics and offer a new transportation alternative of commuters. Existing local routes will be adjusted to maintain some bus service to all existing stops.

BRT will provide disadvantaged communities the benefit of high quality BRT service and infrastructure including a faster, more comfortable, and more reliable experience on modern vehicles supported by state-of-the-art equipment and information and fare payment technology. Station locations will serve as a catalyst for pedestrian connectivity enhancements, streetscape upgrades, and new development.

## **Goals and Objectives**

The goals of the study were developed collaboratively with SORTA leadership, key staff, and the study's Stakeholder Advisory Committee (described below) are listed in Table 1-1.

The goals and objectives formed the basis on which the Step 1 alternatives were evaluated, as discussed in Section 6.



**Table 1-1. Goals and Objectives**

Goals	Objectives
Attract riders and increase mode share	Identify priority corridors that have the highest ridership potential and maximize FTA Capital Improvement Grant (CIG) program funding opportunities.
Improve transit speed and reliability	Identify priority corridors where travel time and reliability can be most improved.
Enhance transportation network connectivity	Identify and enhance priority corridors that maximize service to regional travel markets, transit facilities and network services.
Provide equitable access to frequent services	Identify priority corridors that maximize equitable access to high quality, frequent transit service and support further development of those corridors.
Ensure constructability and compatibility with the built environment	Identify priority corridors that are most conducive to installation of dedicated transitways or other transit priority treatments.
Support economic development	Identify priority corridors that have maximum economic redevelopment opportunities and policies in place.

## Stakeholder Advisory Committee

A Stakeholder Advisory Committee was established to help guide progress of the study, convey information, and obtain essential input on study outcomes. Committee representation is shown in Table 1-2.

**Table 1-2. Stakeholder Advisory Committee Representation**

Entity	Member
City of Cincinnati	John Brazina, Director, Department of Transportation and Engineering
Cincinnati USA Regional Chamber	Pete Metz, Director, The Connected Region
Hamilton County	Jeff Aloutto, Assistant County Administrator Eric Beck, County Engineer
City of Mount Healthy	Joseph Roetting, City Council
City of Norwood	Victor Schneider, Mayor
City of North College Hill	Tracie Nichols, Mayor
City of Silverton	John Smith, Mayor
OKI Regional Council of Governments	Robert Koehler, Deputy Executive Director
SORTA	Kreg Keesee, SORTA Board Chair Blake Ethridge, SORTA Board Planning and Operations Committee Chair



Entity	Member
	Darryl Haley, CEO Khaled Shammout, Chief Strategic Planning, Development, and Innovation Officer
Sycamore Township	Tom James, Trustee
Cincinnati Neighborhoods	Avondale: Tony Moore Bond Hill: Jacqueline Edmerson Clifton: Gerald Checco Clifton Heights-University Heights-Fairview (CUF): Chip Kussmaul College Hill: David Borreson Corryville: Bill Crawford East Price Hill: Sheila Rosenthal Evanston: James Stallworth Kennedy Heights: Sharifah Tafari Lower Price Hill: Kimberley Thomas Mt. Auburn: Stephen Gibbs North Avondale: Sarah Koucky Northside: Bree Moss Over-the-Rhine: Maurice Wagoner Paddock Hills: Steve Munday Pleasant Ridge: Terri Gossard Roselawn: Ted McConnell West Price Hill: Karen Ball Westwood: Katie Frazier
Citizen	Judi Craig
Consultant	Tim Reynolds, WSP Will Tolbert, WSP

The committee met seven times between August 2022 and April 2023. Several updates were also provided the committee members during this period.

## Community and Stakeholder Outreach Program

A critical component of the study involved collecting input and feedback from key SORTA stakeholders and partner agencies, as well as the people the BRT network will serve – existing and potential transit users living in, working in, traveling through, or visiting the four corridor areas. It was essential to educate, engage, inform, and seek feedback from all potential users, being especially mindful of traditionally underserved and underrepresented communities. The strategy and tactics used throughout the study were designed to engage, inform, and educate the community as the project team gathered input to ensure that the BRT project will be designed to meet the needs of the community and SORTA’s goals and objectives.

Therefore, through the outreach program, SORTA emphasized its intention to **take the study to the people**. It was crucial to communicate to SORTA’s audiences the scope of the project, and the multiple benefits and ease of the BRT system. It was also important to anticipate and answer concerns that may arise from such engagement, including geographic and geopolitical equity issues, concerns about affordable housing and displacement, and challenges regarding inflation-related costs.



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## COMMUNICATION GOALS AND OBJECTIVES

Communications goals for the BRT Study include:

- Educate SORTA staff, board members, regional partners, existing and potential transit users, and the general public about the multiple benefits of BRT and how BRT will improve SORTA's book of services.
- Engage and seek input from SORTA staff, regional stakeholders, and existing and potential transit users about the BRT corridor evaluation and analysis process.
- Build community support and excitement for bringing BRT to the Cincinnati region.

The following objectives outline measurements through which the success of planned communications efforts for the BRT Study can be determined:

- Hold a minimum of five meetings with representatives of regional partner agencies and key stakeholders via SORTA's Stakeholder Advisory Committee at the beginning and the conclusion of the study to introduce the project, describe the study's purpose, outline the four corridor options, solicit feedback, summarize, discuss public survey results, and seek input on route alternatives and recommendations.
- Conduct a series of public meetings (in-person and virtual) to educate community members about BRT, offer opportunities to ask questions, gather input on routes, schedules, and preferred service options.
- Conduct in-person and virtual public meetings once the two preferred routes have been identified to share results of the alternatives analysis and gather community input regarding proposed recommendations.
- Provide stakeholders with multiple opportunities to learn about BRT and available options for providing feedback to the project team over the course of the study and analysis.
- Secure ongoing communications with local media outlets about the BRT Study at key project milestones to keep the public informed of the project benefits and process.
- Target the general audiences including the following:
  - Existing and potential transit users
  - Business community
  - Commuters
  - Emergency service providers
  - General public
  - Local/regional TV, radio, newspaper outlets
  - Additional underserved populations including students, minority groups, transportation disadvantaged, senior citizens, and the disabled community

## STRATEGIES

The following strategies were development to communicate with the public and stakeholders:

- Develop and consistently reiterate messaging that clearly defines the purpose and benefits of BRT and the purpose of the study.
- Proactively meet with community representatives and other key agencies/organizations to share information about the study; gather their insights to help inform project planning and communications; and recruit their assistance with sharing study information and input opportunities among their constituents.





- Utilize both pre- and post-study outreach tactics both online and in-person to assess public preferences on study topics and convey that public input is an important part of the BRT planning process.
- Build and maintain a dedicated information resource to house comprehensive information around the BRT Study, public input opportunities, progress updates, and study results and recommendations to which all traffic can be driven.
- Keep key media contacts informed and up to date as appropriate to ensure fair and accurate coverage.

## TACTICS

A series of tactics were developed to undertake the outreach strategies:

- Key message development
- Project website
- Media relations and monitoring
- SORTA staff engagement
- Public survey
- Public meetings (in-person and virtual)
- Pop-ups and community events/meetings
- Digital communications (email and social media)

## WEBSITE

The project communications team developed a branded website specific to the BRT Study, [MetroBRTStudy.com](https://MetroBRTStudy.com). Content highlighted the benefits of BRT and the purpose of the study. It also included information about upcoming public input opportunities and linked to content from completed sessions; copies of study materials; completed study reports/documents; and a list of frequently asked questions (FAQs) with answers. The website also provided a place where visitors could submit questions and comments.

Pages of the website (excerpts shown in Figure 1-2) included:

- Homepage – Introduced BRT and the BRT Study; provided links to other pages of the website; provided information about Reinventing Metro and a link to the Reinventing Metro webpage; provided links to sign up for progress updates and to submit questions and comments to the project team.
- About BRT – Briefly explained the BRT concept and outlined its benefits and features. Page links included a BRT FAQs, a report on BRT in other cities, a BRT terminology primer, and an in-depth report on “What is Bus Rapid Transit?”
- The Study – Offered a portal to the full BRT study and information on its progress. In addition to providing a map of all for corridor route alternatives combined, the page provided links to maps and info for each individual corridor.
- Participate – the Participate page explained the goals of public engagement efforts, provided a link to the virtual survey, and listed dates and locations for all in-person events, which was updated regularly.
- Materials – the Materials page provided links to important project materials. Links included the BRT Systems Profiles report, the Reinventing Metro Service Implementation Study, and the Analysis of Potential Arterial BRT Corridors in Cincinnati and Northern Kentucky report.
- Contact Us – the Contact Us page allowed visitors to submit their name, email, and any questions or comments, which were answered by the project team.



- Pop-ups – pop-up windows were strategically placed to take visitors to the online survey during Step 1 and to promote public meetings.

The website received a considerable amount of traffic since its launch in August 2022.

- 5,143 users
- 6,972 sessions/total visits
- 1 min. 40 sec. average visit duration
- 4.47 pages/session, which shows a lot of interest in various aspects of the study
- 7.85% bounce rate, which is very low, meaning most people come to the site purposely and stay on it – an average of one minute and 40 seconds.

The most visited pages were:

1. Home (14,912)
2. Participate (5,244)
3. Study (3,012)
4. About BRT (2,316)
5. Hamilton Corridor (974)
6. Reading Corridor (781)
7. Montgomery Corridor (749)
8. Glenway Corridor (580)

Most visitors came directly to the page, followed by referral (mostly from the go-metro website), and then social.

## PROJECT EMAIL

The *Contact Us* page of the website includes a form that people can use to submit questions and comments to the project team. A project email address, [info@MetroBRTStudy.org](mailto:info@MetroBRTStudy.org), was also set up for people to use for communicating with the project team.

As of April 12, 2023, the project received 67 emails through these two channels. Responses were provided to all senders. A contact log that documents all the emails received and responses given is provided separately as part of the BRT Study.



Figure 1-2: Project Website Excerpts

**REINVENTING METRO!**  
BUS RAPID TRANSIT STUDY

Home About BRT The Study Participate Materials Contact Us

## INTRODUCING BUS RAPID TRANSIT

Through Reinventing Metro, the Southwest Ohio Regional Transit Authority (SORTA) is bringing a bold, new transit innovation to Greater Cincinnati: Bus Rapid Transit or BRT. BRT will bring faster-than-ever service and significantly reduced travel times to the corridors it travels along.

SORTA/Metro is currently conducting a nine-month study to determine where to launch BRT service and what that initial service will look like. For an update on the study's progress, visit our [Study](#) page.

This website has been developed to provide you with information about BRT and how it can benefit both Metro users and the communities it travels through, as well as keep you up-to-date on BRT study progress and upcoming public input opportunities. Click the buttons below for more information.

ABOUT BRT THE STUDY PARTICIPATE MATERIALS

September 2022  
**BRT System Profiles**  
[View Document](#)  
Brief overview of BRT systems in peer cities throughout the U.S.

February 2019  
**Reinventing Metro Service Implementation Study**  
[View Document](#)  
Metro's plan for improving transit service throughout the Greater Cincinnati metropolitan region

January 2012  
**Analysis of Potential Arterial Bus Rapid Transit (BRT) Corridors in Cincinnati and Northern Kentucky**  
[View Document](#)  
Initial analysis of potential BRT usage in the Greater Cincinnati metropolitan area

## YOUR VOICE MATTERS

Public input is an important part of the BRT Study process. Feedback received during the study will be used to help make decisions about where to launch BRT and what amenities to offer.

The project team would like to know your thoughts and ideas about which corridors best serve your needs and the city's needs, as well as the features you'd like to see and more.

Information about current and upcoming public input opportunities are posted below. Be sure to check back often as new opportunities will be posted as they are scheduled.

## FREQUENTLY ASKED QUESTIONS

General BRT Study BRT Service and Operations

What is Bus Rapid Transit (BRT)?

Why BRT?

Why choose BRT over light rail?

What other cities have BRT?



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## Study Organization and Process

The Alternatives Analysis was initiated on June 27, 2022, which began the process of organizing work task, developing a schedule, assigning resources, and confirming communications protocols. The project approach involved a two-step process:

### STEP 1 - OUTREACH, ANALYSIS, AND SCREENING

Step 1 was conducted between July 2022 and January 2023. An education program was developed to describe the characteristics and attributes of BRT. This included a review of BRT teams in selected peer cities to help illustrate the wide variety of BRT treatments, development processes, timelines, and results.

This was followed by an existing conditions analysis that included an overview of the SORTA system (Section 3), a review of relevant studies and plans to determine their potential impact on BRT development and community acceptance (Section 4), and a detailed assessment of population, demographic, and transportation characteristics of the study corridors (Section 5).

Step 1 also featured an extensive community and stakeholder outreach program that included a project website, social media, email communications, media relations, public meetings, community meetings, community and city council presentations, and an extensive number of pop-up events throughout the service area. Public-facing activities were held between September and December 2022. A survey was also conducted during this period. Step 1 outreach activities and outcomes are described in Section 6.

The conclusion of Step 1 was a rigorous evaluation (screening) of the four corridors to determine which two of the four corridors would be immediately prioritized for further development as BRT corridors in Step 2. The screening process was based on a series of goals and objectives that were crafted jointly by SORTA, the members of the Stakeholder Advisory Committee, and the study team. A metrics-focused set of evaluation criteria was developed and data collected and analyzed, along with more qualitative measures such as Transit Oriented Development (TOD) to determine the relative ranking of each. A numeric ranking was used to score the corridors under each evaluation criteria. The process and results are described in Section 7.

### STEP 2 – OUTREACH, ANALYSIS AND REFINEMENT

Step 2 of the Alternatives Analysis was conducted between January 2023 and April 2023. It began with an analysis of alignment and station locations on the corridors prioritized for BRT advancement in Step 1. The analysis resulted in the refinement of corridor alignments and station locations that were then advanced in design up to the 10% conceptual level. This is considered a sufficient and appropriate level of design to estimate capital and operating costs, ridership, and community impacts.

An outreach effort similar to the one conducted under Step 1 was conducted as part of Step 2. The program included extensive community meetings, presentations, and pop-up events along with four in-person community design workshops and a virtual workshop. A second survey was also conducted during this period.

The results of Step 2 comprise the Locally Preferred Alternative (LPA) for both the Reading Road and Hamilton Avenue BRT corridors, which defines the projects for entry into the Federal Transit Administration (FTA) Capital Investment Grant (CIG) process for Small Starts project rating and funding recommendation.





## 2. What is BRT?



## 2. What is Bus Rapid Transit?



Bus Rapid Transit, or BRT, is a higher speed, higher capacity mode of public transit now in operation in over 40 cities across the U.S. - including the nearby cities of Columbus, Cleveland, and Indianapolis – with several others in development. BRT uses a wide array of design features and technologies to create a system tailored to meet local conditions and needs. As described in this section, no two BRT corridors are exactly alike. Examples from other cities are used to help describe each feature and technology, and how they work together to improve access to jobs, activities, and opportunities.



BRT also:

- is an enhanced bus system that operates on bus lanes or other transitways, combining the flexibility of buses with the efficiency of rail.
- operates at faster speeds, provides greater service reliability, and increased customer service.
- uses a combination of advanced technologies, infrastructure, and operational investments that provide significantly better service than traditional bus service.
- can play a significant role in the economic development of corridors.
- positively impacts businesses and property values.







## Features of BRT

A wide range of design features and technologies can be combined to create a BRT system that meets the goals of the community and is appropriate to local conditions such as traffic, ridership, and the built environment. Each feature listed below is described in more detail and illustrated with examples from BRT systems across the U.S.

- Frequent, all-day service
- Connections to major destinations
- State-of-the-art buses
- Fewer stations but at key locations
- Attractive, clean, safe, and comfortable stations
- Less time stopped at stations
- Technology to help shorten travel time
- Priority lanes for buses
- Unique identity



### FREQUENT, ALL-DAY SERVICE

High frequency and convenient hours of operation are important factors in attracting riders to BRT. Wait times are short. During busy travel times, passengers do not need a timetable- they'll know the next bus will be arriving in 15 minutes or less. Service can run into the late-night hours and on weekends, helping to provide critical access to jobs and other activities and opportunities.



### CONNECTIONS TO MAJOR DESTINATIONS



BRT lines are designed to connect where people live with employment and activity centers along busy travel corridors. Cleveland's Health Line, for example, connects downtown and Cleveland State University campus with the busy University Circle area, home of the Cleveland Clinic, University Hospital, Case Western Reserve University, and several cultural institutions. Convenient and direct connections between major activity centers help generate ridership.



## STATE OF THE ART BUSES

The size and type of BRT vehicles are tailored to the corridor and ridership demand. Most BRT systems use 60-ft. “articulated” buses that have a higher capacity than a standard 40-ft. bus. Metro’s fleet already includes several articulated buses on some of its busiest routes. BRT buses feature Wi-Fi, charging outlets, next stop displays, and comfortable seating. They also provide state-of-the-art accommodations for persons with disabilities and accommodate bikes, strollers, and other mobility devices.



Metro is currently exploring options for low- or zero-emission, alternative fuel buses that will gradually replace existing diesel buses as they are retired from service. Alternatives include battery electric buses (BEBs) and fuel cell electric buses (FCEBs) powered by hydrogen along with compressed natural gas (CNG) buses. BEBs are rapidly growing in popularity as battery storage and charging technology is rapidly improving. Indianapolis is one of the first cities to design its BRT system for BEBs, which are charged overnight at its bus garage and receive a “quick charge” at each end of the BRT route.

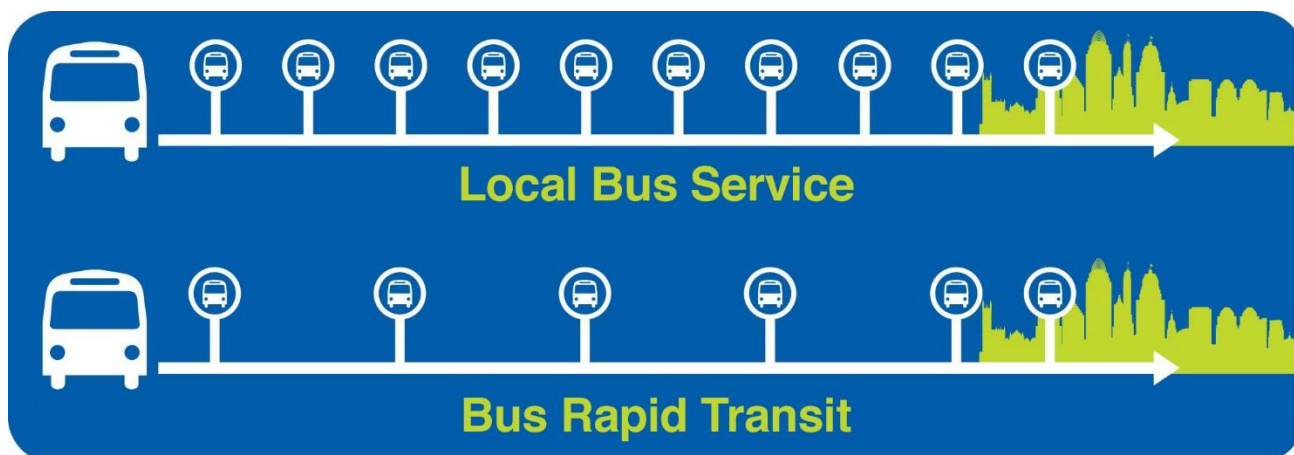


## FEWER STATIONS BUT AT KEY LOCATIONS

One of the key factors that causes slow bus service is having to stop every one or two blocks. To shorten travel times, BRT stops, or stations, are typically spaced an average of every half mile, although spacing can vary depending on where key activity centers and ridership demand exist.

BRT station locations must be carefully planned to make sure that residents and workers can easily access the service. Stations are typically located at major job and activity centers, such as hospitals and schools, along with neighborhood business districts, senior citizen housing, and major transfer points with other bus routes. As they develop BRT systems, many transit agencies maintain some “all stops” local service along the BRT route to ensure everyone has access to vital transit services.





## ATTRACTIVE, CLEAN, SAFE, AND COMFORTABLE STATIONS

Good design of BRT stations creates a welcoming environment, providing sufficient shelter from the elements while creating an open feel. Stations include seating, real-time next bus arrival displays, ticket vending machines for pre-paid fares, maps, and schedule information. BRT systems typically employ a unified look of all stations along the line, although different sizes and configurations allow for their placement in a variety of conditions and environments. At night, high visibility and good lighting are essential.



Station designs and size vary from city to city. Specific design elements can also serve as an opportunity to incorporate artwork and highlight neighborhood identity. Stations often include blue light emergency call boxes, markers or pylons that help identify the system and station, and landscaping elements.





## LESS TIME STOPPED AT STATIONS

Travel time is impacted by the amount of time buses are stopped to board and disembark passengers. The time stopped at stations can be reduced, in part, by raising the sidewalk or platform by a few inches to match the level of the floor of the bus. This is called “level boarding” - eliminating the need for passengers to negotiate steps, ramps, and lifts - making it quick and easy for everyone to board and exit the bus.



Level boarding also provides for “precision docking.” This enables the bus to stop within just a few inches of the station platform. Docking technologies vary and continue to evolve. However, a low-tech solution used by many systems called a “rub

rail.” A plastic rail is installed along the edge of the platform, allowing the bus operator to safely approach the platform and stop as close to the platform edge as possible. This further enables all passengers, whether they walk or roll, to easily, safely, and quickly board and exit the bus.

One of the chief causes of delay at a bus stop is lining up to board through the front door while customers pay with cash or tap or swipe a card at the farebox. With BRT, customers pay for their fare in advance, either at a ticket vending machine at the station, online, or with an app. As a result, passengers can board via any door, not just the front door, further speeding up the boarding process.







## SMART SIGNALS

Another significant source of delay for buses is hitting a red light at an intersection and sitting for several minutes waiting for a green light and traffic to clear. Transit Signal Priority (TSP) uses technology to enable buses to communicate with the traffic signal. As a bus approaches a signal, an optical detector engages with the traffic signal to hold the green light a few seconds longer to allow it to clear the intersection and stay on schedule.



TSP can go hand in hand with a design concept called a “queue jump.” There are different varieties of queue jumps but they are often used in conjunction with a right turn-only lane. The green arrow for motorists turning right also allows buses to safely move straight through the intersection before other traffic gets the green light to proceed.



## PRIORITY LANES FOR BUSES



One of the most impactful BRT treatments in terms of shortening travel time for passengers is the use of priority, or exclusive lanes, for buses along key segments of the route. There is a wide range of strategies for applying bus only lanes in an urban setting.

Metro and the City of Cincinnati have recently taken the first steps toward traffic lane modifications that help buses

bypass congestion and provide more reliable service for passengers. While they extend for only a few blocks and are in effect only during peak (rush hour) periods, the red lanes on Main Street have been successful in moving buses and passengers smoothly through downtown.

Consideration of priority and exclusive lanes for buses requires careful planning and coordination with neighborhoods, business districts, and the various jurisdictions that a potential BRT line would traverse. Consensus must be achieved on acceptable traffic flow, on-street parking needs, and the extent, location, and application of exclusive bus lanes.





Another variation of priority lanes for buses is called a “BAT lane.” BAT stands for “Business Access & Transit” or “Bus and Turn.” These are generally located in the curb lane. Motorists are allowed in the BAT lane to turn right and access homes, business, stores, and other destinations along the street. All through traffic is prohibited from using the BAT lane, allowing buses to move more efficiently than when they are sharing a lane with all general traffic.



## UNIQUE IDENTITY

The examples of BRT from across the U.S. highlighted in this presentation feature a unique identity, or brand, different from the overall network. Unique branding helps highlight the special qualities of the BRT service and infrastructure, including buses, stations, and priority lanes and treatments. Some brands keep a measure of the transit system’s name.





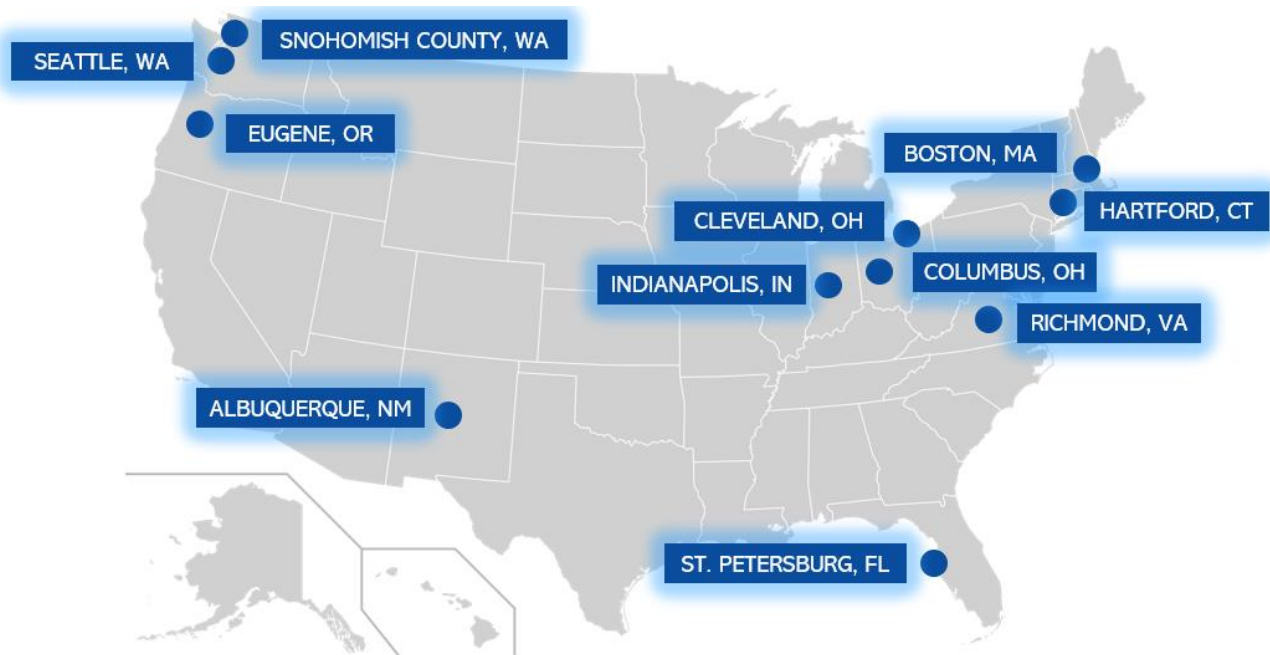


## BRT in Other Cities

The growth in BRT systems across the U.S. in the last 20 years has resulted in nearly 50 cities with some type of BRT, ranging from arterial, mixed traffic systems – often described as “BRT Lite” – to busway systems using grade-separated right-of-way with no interference from other traffic.

To further describe “What is BRT?”, 11 case studies (Figure 2-1) are presented on the following page. The selection is designed to show the range of BRT applications and how various transit systems combine a mix of treatments along a single BRT line to achieve their goals such as faster speeds and improved customer experience.

**Figure 2-1: BRT Case Studies**





# BRT

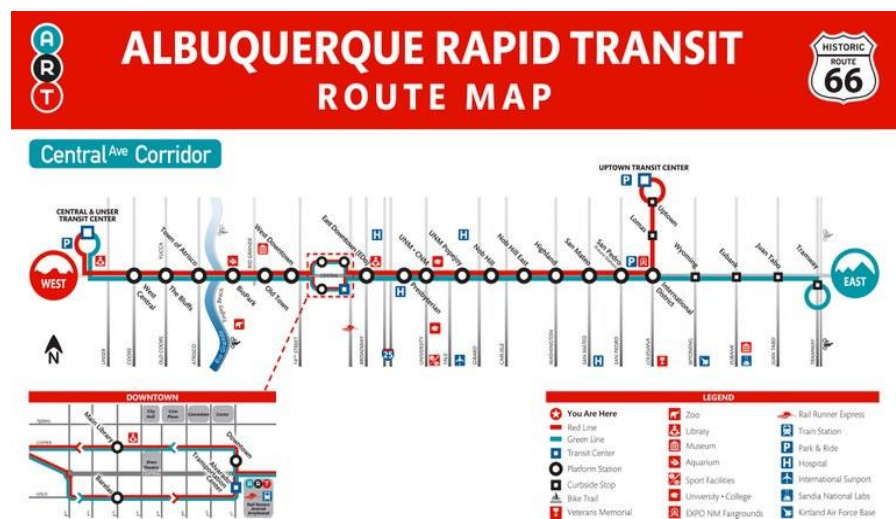
# ALBUQUERQUE, NM



Opened:	2020
Length:	13 mi.
Stations:	28
Station spacing:	0.5 mi. avg.
Capital cost:	\$134m
FTA:	\$75m (Small Starts)
Other federal:	\$32m
Local:	\$27m
Operating cost:	\$1.6m/year (2020)
Peak buses:	15
Bus type:	60' articulated
Hours:	5:30a-10:00p
Wait time:	8 min.
Ridership:	4,040/wkdy (2020)

The Central Avenue BRT in Albuquerque, branded Albuquerque Rapid Transit (ART), is the first BRT in New Mexico. It is operated by the City of Albuquerque's transit agency, ABQ Ride. ART runs in median transit lanes for about 3.5 miles west of downtown and 4.5 miles east of downtown, with a combination of dual lane (one-lane in each direction) operation with select areas of single, bi-directional lane operation (both directions served by a single lane with signal-controlled entry) through areas of restricted right of way.

Central Avenue, also known as historic Route 66, connects Downtown Albuquerque with key destinations to the east that include the University of New Mexico, ABQ Ride's intermodal transit hub, and moderately dense residential districts. To the west, the line serves expanding residential and commercial areas. ART consists of two lines (red and blue, as shown on the map, left) that merge into mixed traffic at Louisiana Boulevard and split, with the red line extending northward on Louisiana Boulevard for two miles, and the blue line continuing east on Central Avenue for another four miles. Limited improvements have been made in these mixed traffic sections beyond enhanced station areas.



To integrate the median bus lanes into the corridor, two strategies were implemented. In the first configuration, on-street parking was removed, and lanes were shifted outward to retain two general traffic lanes in each direction, matching the previously existing configuration. In the second configuration, one through lane each direction was removed and converted it to transit use while retaining on street parking for business fronting the corridor.



## BRT

## ART ALBUQUERQUE, NM

Except at signalized intersections, cross-streets were converted to right in/right out movements only. U-turns are accommodated at signalized intersection locations.

Pedestrian access was improved by replacing a considerable portion of the existing sidewalk to current standards and implementing landscape buffers, where feasible, to enhance pedestrian comfort.

Fixed route local service was retained on the corridor, supplementing the BRT service with frequent local stops.

ART was the first BRT system in the U.S. to earn Institute for Transportation and Development Policy's (ITDP) Gold rating. ART's initial use of battery electric buses was highly problematic as the manufacturer was unable to meet specifications. ABQ Ride replaced the buses with "clean diesel" models for the time being.

Accidents were also an issue during the first months of operations. Some motorists entered the bus-only lanes illegally or turned against red lights with an oncoming bus to the left. Safety upgrades include additional red pavement markings and no left turn signs.







# BRT

## SILVER LINE BOSTON, MA



Opened:	2004
Length:	2.3 mi.
Washington Street segment only	
Stations:	20 (total)
Station spacing:	0.3 - 0.5 mi.
Capital cost:	\$625m
Silver Line system including 2 tunnel segments	
FTA:	\$332m New Starts
Other federal:	\$150m
Local:	\$144m
Operating cost:	\$5.8m/year
	2017, entire system
Peak buses:	32, entire system
Bus type:	60' articulated
Hours:	24/7
Wait time:	5 min. peak
Ridership:	39,000/wkdy
	2019, entire system

The Silver Line is a network of BRT lines in Boston and Chelsea, Massachusetts, operated by Massachusetts Bay Transportation Authority (MBTA). The portion of the Silver Line along Washington Street was designed, in part, to provide high capacity, rapid transit which was lost in the 1970s when the elevated Orange Line (rail) was removed and relocated. The Silver Line is operated as part of the MBTA bus system but branded as BRT as part of the MBTA “T” rapid transit system, which is primarily rail. Six routes are operated as part of two non-connecting corridors. Silver Line service began operating as Routes SL2 and SL3 in 2004; full SL1 service began in 2005.



Two routes operate on Washington Street between Nubian station (at Nubian Square, formerly Dudley Square, in the Roxbury neighborhood) and Downtown Boston. Bus- and bike-only red lanes are used along most of Washington Street. They are curbside in both directions or in the second lane from the curb to allow for on-street, curbside parking. Articulated diesel hybrid buses are operated on Washington Street. Articulated buses are 60 feet long with an accordion-like hinges between two sections, enabling turns.

The four Silver Line Waterfront routes operate out of an underground terminal at South Station and run through the South Boston Piers Transitway – a dedicated bus tunnel through the Seaport District with stations at Courthouse and World Trade Center. The Waterfront routes use articulated dual-mode buses that operate as electric trolleybuses in the Transitway and conventional diesel buses on the surface. The original fleet consisted of 32 60-foot articulated dual-mode electric-diesel buses with three doors. The fleet was overhauled in 2014-2018. MBTA is now transitioning to zero emission





## BRT

## SILVER LINE BOSTON, MA

buses and has placed five battery electric buses (BEBs) into service in 2019 with additional BEBs starting in 2022.

A planned connecting tunnel (Phase III) was canceled in 2010 due to rising costs; a surface route (SL4) was introduced the previous year. Much of the system lacks various standard BRT features such as dedicated lane enforcement, off-vehicle fare collection, and transit signal priority. As a result, the Washington Street segment of the Silver Line has been criticized for not being “true” BRT. It has some elements of BRT, however, such as frequent service, enhanced station treatments, and off board fare collection at stations, but not at all stops.



The Silver Line’s red lanes concept has been generally well-received and is being expanded to other non-BRT transit corridors in the Boston region. Recent efforts include the Rapid Response Bus Lanes Program which includes the implementation of up to 14 miles of bus lanes throughout Boston and adjacent suburbs of Chelsea, Somerville, and Everett.



# BRT

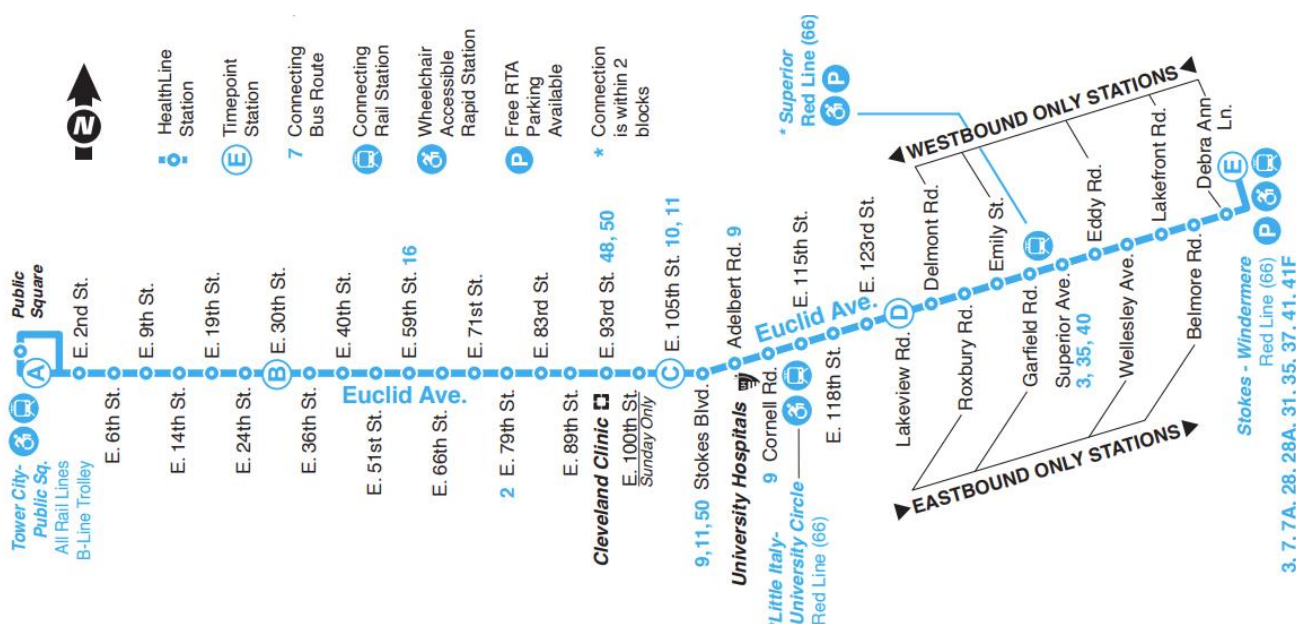
## HEALTH LINE CLEVELAND, OH



Opened:	2008
Length:	9.43 mi. 7.1 mi. center lanes 2.3 mi. curbside
Stations:	36
Station spacing:	0.3 mi.
Capital cost:	\$200m (2008)
FTA:	\$82m New Starts
Other federal:	\$0.6m
State:	\$75m
Local & MPO:	\$22m
Cleveland Clinic:	\$3m
Operating cost:	\$6.3m/year 2019
Peak buses:	24
Bus type:	63' articulated
Hours:	24/7
Wait time:	15 min. peak
Ridership:	13,200/wkdy 2018

The Health Line (originally called the Euclid Corridor Transportation Project) is operated by the Greater Cleveland Regional Transit Authority (GCRTA). It runs along Euclid Avenue from Public Square in downtown Cleveland to East Cleveland. It opened in October 2008. The “Health Line” brand name was the result of a long-term naming rights deal with the Cleveland Clinic and University Hospitals.

The Health Line connects Cleveland’s two largest regional employment and activity centers, Downtown and University Circle. GCRTA markets the service as having a rail-like image: fast, simple, safe, and first-class, characterized by exclusive bus lanes, frequent, 24/7 service; precision docking at stations, level boarding between bus and platform, transit signal priority, off-board fare collection, and real time passenger displays.







## BRT

## HEALTH LINE CLEVELAND, OH

BRT service reduced travel time from 46 minutes to 34 minutes by replacing 108 bus stops with 36 stations approximately every half mile. The guideway includes both median running dedicated lanes and curb running lanes.



Based on its range of priority treatments and features, Cleveland's Health Line achieved a Silver rating for BRT by ITDP.

The street network between Downtown and University Circle includes parallel arterial streets that handle traffic diverted from Euclid Avenue, which was narrowed to one traffic lane in each direction for most of its length.

Annual ridership increased by about 60% over the previous Route 6 bus line which the Health Line replaced. Route 6 line was GCRTA's highest ridership bus line prior to the Health Line going into service in 2008.

Economic development is the Health Line's biggest success story. Just five years from its opening year, it was estimated that the Health Line helped stimulate \$9.5 billion in new investment, as shown left. After ten years of operation, its impact nearly doubled, with the Health Line helping to deliver over \$9.5 billion in economic development along the Euclid corridor – which equals \$190 gained for every dollar spent on creating and launching the new service. Significant segments of Euclid Avenue had sharply declined since the 1950s, resulting in numerous vacant and abandoned properties. Redevelopment, however, has resulted in minimal displacement. New development around Cleveland State University, as one example, has transformed both its campus and surrounding area.





# BRT

# CMAX COLUMBUS, OH



Opened:	2018
Length:	15.6 mi. 3.2 mi. exclusive
Stations:	30
Station spacing:	0.5 mi. avg.
Capital cost:	\$48.6m 2018
FTA:	\$38m Small Starts
Local/State:	\$10.5m
Operating cost:	n/a
CMAX operating costs not reported separately	
Peak buses:	15
Bus type:	60' articulated
Hours:	4:30a-10:00p
Wait time:	10 min peak 15 min. midday
Ridership:	4,300/wkdy 2019

CMAX, the first BRT line in Columbus, is operated by the Central Ohio Transit Authority (COTA). It begins in the southern part of Downtown Columbus, traveling north and northeast to the southern edge of the suburb of Westerville. CMAX opened in 2018. The CMAX line runs primarily along High Street (in downtown) and Cleveland Avenue. End-to-end travel time is about 56 minutes depending on the time of day.

In downtown Columbus, CMAX stops at two major transit centers, providing connections to many other COTA routes. CMAX buses are branded specifically for the service and were among the first in the COTA system to feature USB charging ports and onboard Wi-Fi. The fleet is powered by compressed natural gas (CNG). COTA has a CNG fueling facility at its main garage, which also services other buses in its fleet.

Prior to implementation of CMAX, the local route serving Cleveland Avenue was COTA's second busiest. With dedicated bus lanes on its High Street segment during rush hours, transit signal priority at key intersections, and half-mile-spaced stations, CMAX service is about 20% faster than conventional local service. COTA opted to retain an all-stops local service, Route 6, on Cleveland Avenue, which runs every 30 minutes. The peak period bus only lanes on High Street are also used by other COTA routes.

Frequent service extends as far north as the Northland Transit Center. North of this point, every other bus continues north to Westerville with a 30-minute frequency.

Most stations employ a consistent and distinctive design. They include covered shelters and prominent information displays







## BRT

## CMAX COLUMBUS, OH

showing real-time bus arrival times. Some stations feature local art. Along High Street, CMAX took advantage of shelters that had been installed a few years previously as part of a revamp of downtown's major north-south thoroughfare.



CMAX was intended, in part, to help reduce traffic congestion on Cleveland Avenue, stimulate economic activity, and increase job and health care access to low-income and minority neighborhoods on Cleveland Avenue. In the 1990s, COTA worked with the City of Columbus and neighborhood development entities to construct the Linden Transit Center, which includes medical offices and a daycare center. The transit center helped catalyze new public and private sector development in an economically distressed part of town. CMAX stations serve the transit center, where transfer connections can be made to crosstown routes. COTA and the City of Columbus are now developing two additional BRT lines. Unlike Cleveland Avenue CMAX, the new lines will feature bus only lanes to improve speed and convenience.





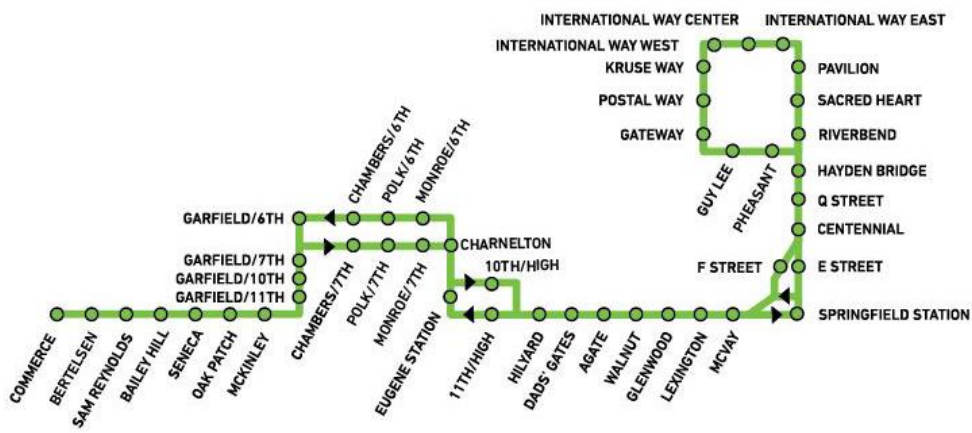
# BRT

## EMERALD EXPRESS (EmX) EUGENE, OR



Opened:	2007-2017 1 <sup>st</sup> segment: 2017 2 <sup>nd</sup> segment: 2010 3 <sup>rd</sup> segment: 2017
Length:	19 mi. 45% bus only lanes
Stations:	44
Station spacing:	0.3 mi.
Capital cost:	\$160m 2007-2017
3 <sup>rd</sup> segment FTA:	\$75m New Starts
3 <sup>rd</sup> segment other federal:	\$2m
3 <sup>rd</sup> segment local:	\$75m
Local & MPO:	\$21m
Operating cost:	\$63m/year 2017
Peak buses:	10
Bus type:	60' articulated
Hours:	5:50a-11:30p
Wait time:	10 min. peak
Ridership:	13,000/wkdy 2018

Eugene, Oregon’s Emerald Express (EmX, pronounced “EM-ex”) BRT system, operated by the Lane Transit District (LTD) consists of three separate project corridors combined to create a single BRT line over roughly 15 years from initial start of design in 2002 to completion of construction of the West Eugene Extension in 2017. EmX connects the adjacent cities of Eugene and Springfield and provide coverage within each city. Major employment and activity centers served in the University of Oregon and Sacred Heart Medical Center.



The route follows several one-way street pairs, primarily in the downtowns of the cities of Eugene and Springfield. Stations feature custom shelters, ticket vending machines, next bus real-time signage, and level boarding (using a “bridgeplate” to cover the narrow gap between bus and platform). The project also introduced low friction plastic “rub rails” to the transit industry now used on many BRT projects implemented since. The rub rails enable buses to “precision dock” at stations, resulting in only a very narrow gap between bus floor and platform.





## BRT

# EMERALD EXPRESS (EmX) EUGENE, OR

EmX replaced existing fixed route service, if it existed, on the route with stations spaced at approximately 1/3 mile. Portions of the EmX project required widening of street rights-of-way. Where this occurred, extensive pedestrian improvements were made, often exceeding minimum standards, to incorporate buffers from traffic, innovative approaches to integrating sustainable tree wells, and universal accessibility.



EmX was awarded a Bronze rating for BRT by ITDP based on its level of bus priority, frequent service, stations, and passenger amenities.

EmX operates along a combination of lane configurations that include:

- Two-way median transit lanes
- Bi-directional median transit lanes
- Curbside BAT lanes on both the left and right side of the roadway
- Median BAT lanes
- Mixed traffic

Outside of the downtowns, the EmX route typically has followed major arterials and larger state highway routes that were originally as five lanes wide or more. In constrained areas, to minimize property or environmental impacts, bi-directional lanes have been implemented which at the time were the first of their kind for BRT in the U.S.







# BRT

# CTFASTRAK HARTFORD, CT

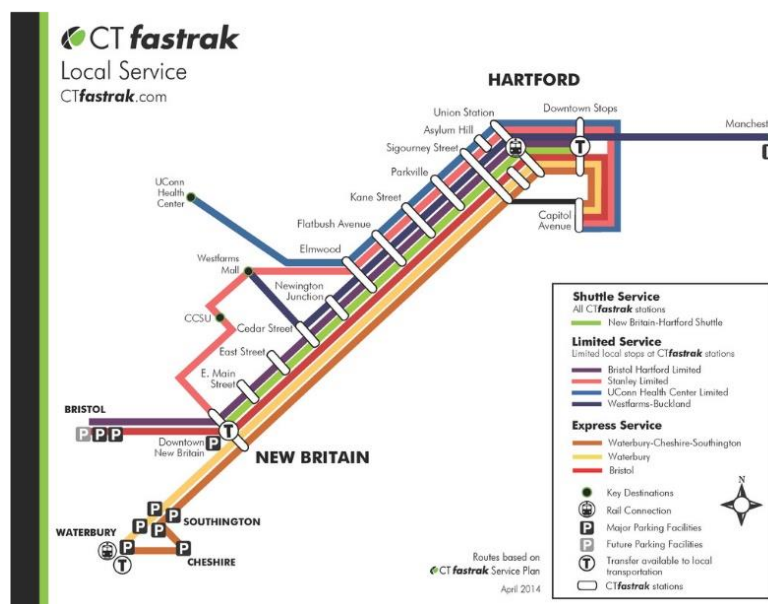


Opened:	2015
Length:	10.7 mi.
Stations:	10
Station spacing:	2 mi.
Capital cost:	\$567m (2015)
FTA:	\$340m New Starts
Other federal:	\$114m CMAQ
State/Local:	\$112m
Operating cost:	\$9m/year 2019
Peak buses:	12
Bus type:	60' articulated
Hours:	5:30a-10:00p
Wait time:	8-14 min.
Ridership:	8,600/wkdy 2022

CTfastrak is Connecticut’s first BRT system. Several BRT route iterations and commuter express routes utilize a bus-only roadway (busway) for all or a portion of the trip. The busway connects the cities of Hartford and New Britain. It is located along a former rail line that was previously purchased by the State of Connecticut; freight service had been discontinued prior to that. CTfastrak routes are integrated with the statewide Connecticut Transit (CTtransit) bus and rail system.

CTfastrak works like a rail line with its own right of way, separated from all other traffic. There are a few at-grade intersections. The basic BRT service pattern operates between downtown Hartford and downtown New Britain, stopping at all intermediate stations on a frequent schedule. It is more flexible than rail, as the buses can exit at various points or at the end of the line and continue directly to other destinations away from the line. The busway consists of two lanes, one in each direction, with shoulders and bus pullouts at its eight stations to enable drop-offs and pickups, while also allowing through buses, such as expresses, to pass without being delayed.

In downtown Hartford, buses exit the busway and operate as a loop on downtown streets. BRT runs in mixed traffic in this area with no signal priority. Standard bus stops are used instead of the large station structures found along the busway. In the New Britain, the busway ends at a major new transit center; the BRT line does not loop through the downtown as it does in Hartford.





## BRT

## CTFASTRAK HARTFORD, CT

CTfastrak provides direct service to and from several suburban and outlying communities with routes that take advantage of the busway. It provides a one-seat, no-transfer ride to many major regional employment, shopping, and health care destinations.



Construction began in 2012; CTfastrak opened for service in March 2015. CTtransit has pursued a transit-oriented development (TOD) program conducting with a market assessment of each station area. The agency worked with host neighborhoods and municipalities to analyze land use plans and potential for zoning changes and application of development incentives. The first results are starting to emerge with selective renovation of existing structures and new construction at stations west of downtown Hartford, including downtown New Britain. Based on its range of priority treatments, and service, CTfastrak achieved a Silver rating for BRT by ITDP.







# BRT RED LINE INDIANAPOLIS, IN



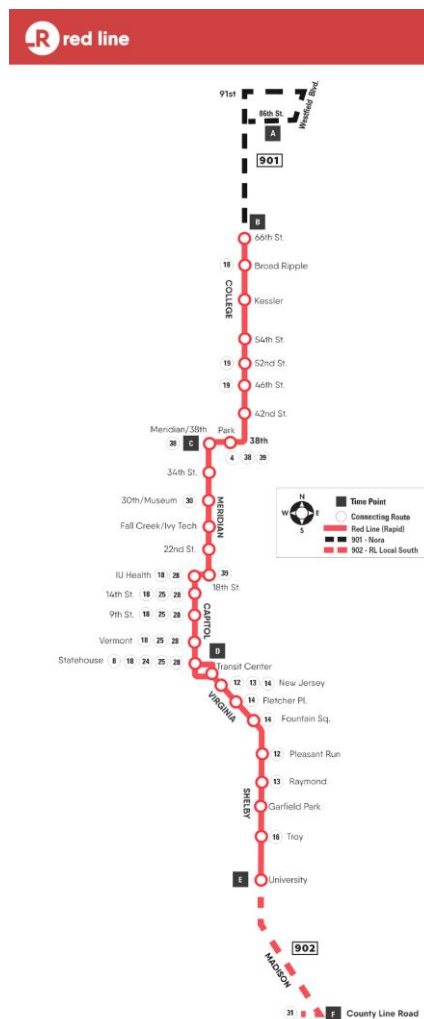
Opened:	2018
Length:	13 mi. 60% bus only lanes
Stations:	27
Station spacing:	0.3-0.5 mi.
Capital cost:	\$96m (2018)
FTA:	\$75m New Starts
Other federal:	\$2m
Local:	\$19m
Operating cost:	\$8m/year 2019
Peak buses:	10
Bus type:	60' articulated
Hours:	5:00a-1:00a
Wait time:	15 min.
Ridership:	4,600/wkdy 2022

The IndyGo Red Line is the first BRT line in Indianapolis. It connects Downtown Indianapolis with the popular Broad Ripple area to the north and the University of Indianapolis campus to the south. The corridor includes 7.7 miles of dedicated bus lanes, transit signal priority at intersections, and stations with weather protection, level boarding platforms, real-time bus arrival information, and off board fare payment vending machines.

The Red Line provides fast and reliable service in a key north-south corridor serving a large portion of the city. An estimated 150,000 jobs and 50,000 residents are within one quarter mile of the line. The corridor includes the densest area of the city and serves four major universities, several hospitals, government agency offices, community services and the Julia M. Carson Transit Center in Downtown providing transfer opportunities to several connecting bus routes. The service improved bus service speed and schedule reliability through the urban core via dedicated BRT lanes and transit signal priority.

One of the first all-electric battery BRTs in the country. Red Line has a total of 13 60-foot, articulated, fully electric buses with doors opening on either side of the bus operate in the corridor. The electric buses help IndyGo achieve its goal of running BRT with a zero emission fleet. Issues with the bus manufacturer have led to a number of significant issues that IndyGo has been working to overcome.

The buses use induction charging at the operating facility and at a facility located at the end of the line. IndyGo purchased a unused bank branch building and converted to an off-street charging facility, layover location, and driver/supervisor room.

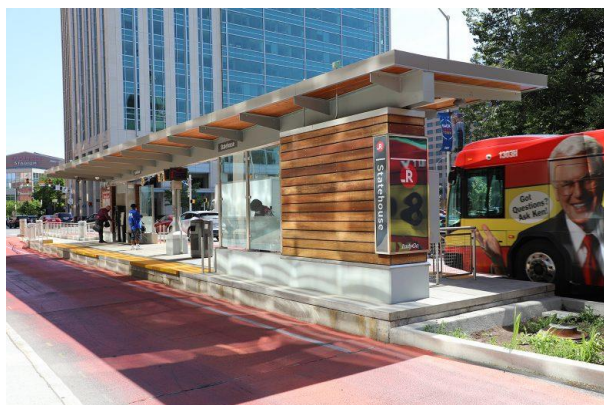






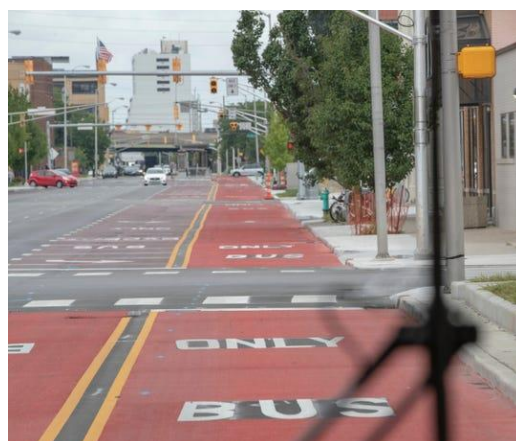
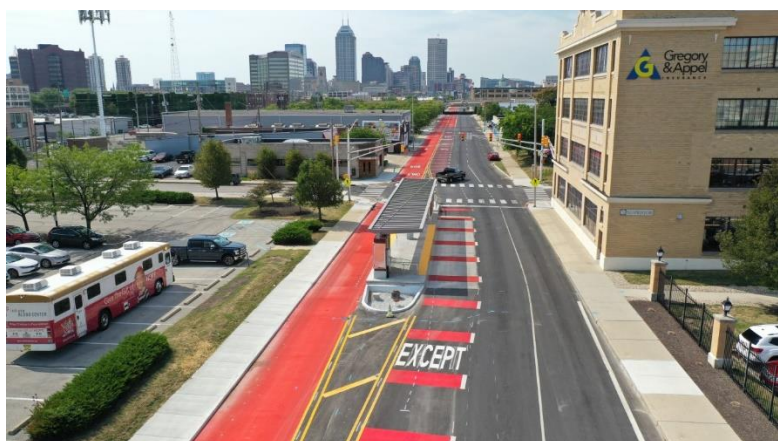
## BRT

## RED LINE INDIANAPOLIS, IN



Instead of front-of-bus bike racks, Red Line buses have on-board bicycle storage. New platform-level boarding allows riders to roll bicycles on and off with ease.

Infrastructure improvements associated with the Red Line included 208 upgraded traffic signals, 30,000 linear feet of sidewalks replacement, new crosswalks, 596 ADA curb ramps, 34 transit platforms, and landscaping, bike racks and bike lanes.





# BRT

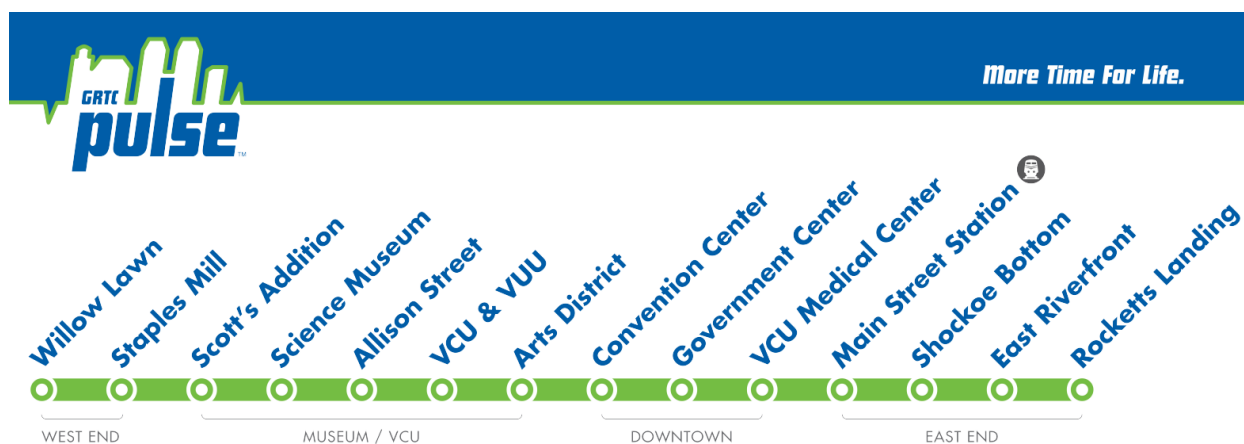
# PULSE RICHMOND, VA



Opened:	2018
Length:	7.6 mi. 3.2 mi .bus only lanes
Stations:	27
Station spacing:	0.5 mi.
Capital cost:	\$65m (2018)
FTA:	\$25m TIGER
State:	\$32m
City/County:	\$8m
Operating cost:	\$5m/year 2019
Peak buses:	8
Bus type:	40'
Hours:	5:30a-1:30a
Wait time:	10 min. peak 15 min. midday
Ridership:	4,600/wkdy 20212

Pulse BRT service was launched on June 24, 2018. It is described by the Greater Richmond Transit Company (GRTC), Richmond’s transit agency, as a modern, high quality, high-capacity rapid transit system that serves a 7.6-mile route along Broad Street and Main Street, from the developing Rocketts Landing neighborhood in the City of Richmond to Willow Lawn in Henrico County. Pulse is jointly sponsored by Bon Secours Richmond Health System and VCU Health System. Pulse links several destinations including Downtown Richmond, Virginia Commonwealth University, Union University, suburban shopping areas, businesses, major medical centers, services, and restaurants.

Pulse recently achieved a bronze rating for BRT by ITDP based on the extent of its exclusive bus lanes, service frequency, stations, and passenger amenities



A 3.6-mile section of the line converted existing right of way from three general purpose lanes in each direction to two, creating center-running BRT bus only lanes. The project also reduced general purpose lanes from 10.5–11-ft. lanes to 9.5–10-ft. lanes for autos and wider lanes for buses in the lanes in which they operate.





## BRT

## PULSE RICHMOND, VA

Pulse travels through a variety of land uses, including suburban, retail/office, university and museum, dense downtown retail, government, and recreational. This variety of land use presented a wide range of needs for the project corridor's design. The design of the project changes along the corridor based on different needs and available options (buses operating in mixed traffic, center-running and curbside-running in various segments of the route) and reflects that there is no single or best solution for integrating a BRT system into an existing right of way, particularly within dense corridors.



Project partners included the U.S. Department of Transportation, the Commonwealth of Virginia (Virginia Department of Rail and Public Transportation and Virginia Department of Transportation), the City of Richmond, Henrico County, and GRTC. The Commonwealth of Virginia made this project a high priority, providing significant funding, early leadership, and technical support. While the Pulse BRT project benefitted from strong state leadership, the City of Richmond was also heavily engaged and committed to the project.

With its extensive use of center running bus only lanes, Pulse increased bus speeds in the corridor by approximately 65%, compared with the previous local service, and reduced travel time for riders by about 33%. It is currently exploring transition in to 60-ft articulated buses instead of the current 40-ft fleet to accommodate growing ridership. Stations were designed only for 40-ft buses and will required retrofitting to accommodate larger buses





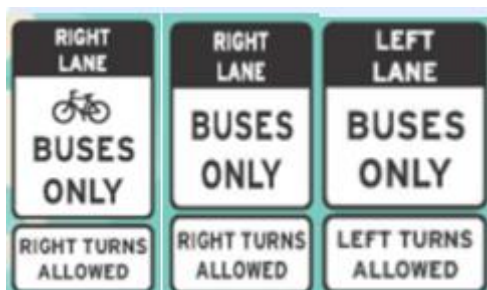


# BRT

## SUNRUNNER ST. PETERSBURG, FL



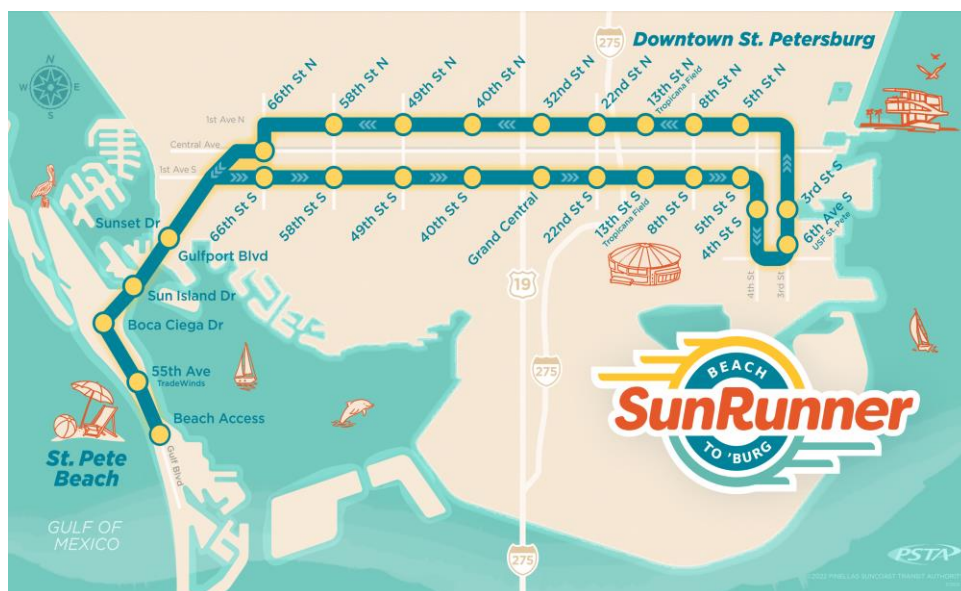
Opened:	2022
Length:	10.3 mi. 70% BAT lanes
Stations:	16
Station spacing:	0.75 mi.
Capital cost:	\$44m (2022)
FTA:	\$22m Small Starts
State:	\$11m
Local:	\$21m
Operating cost:	\$3.8m/year
Peak buses:	7
Bus type:	40' hybrid
Hours:	6:00a-12:30a
Wait time:	10 min. peak
Ridership:	5,800/wkdy projected



The newest BRT system in the U.S., SunRunner, opened in October 2022 in St. Petersburg. The Pinellas Suncoast Transit Authority (PSTA) developed its first BRT line, connecting downtown St Petersburg westward to the resort community of St. Pete Beach on the Gulf of Mexico. Planning for the line began in 2009. In addition to this recreational destination, SunRunner route will connect the Tampa Bay Rays stadium (Tropicana Field), regional hospitals, and the Central Avenue commercial district.

Along 70% of the corridor, dedicated BAT lanes were installed to support BRT speed and reliability. The BAT lanes are located on the left side of a pair of one way streets. The BAT lanes provide a measure for transit priority while allowing motorists to access and exit destinations on the curb side of the street.

PSTA enacted a major public information campaign to educated motorists and pedestrians about the bus only lanes and access to and from stations.





# BRT

# SUNRUNNER ST. PETERSBURG, FL

End-to-end travel time is 35 minutes- about 30% faster than current local “trolley” service that stops at nearly every block. Bus only lanes are marked red. On Pasadena Avenue, the lanes were created by converting the right curbside lanes to BAT lanes. On 1<sup>st</sup> Avenue South and North, along a pair of streets bordering Central Avenue one block south and north respectively, the BAT lanes are for the most part along the left curb. Space for the lane was created by removing on-street parking.

PSTA elected not to purchase buses with left side doors and, even if they had, such vehicles are not currently available in a 40-ft length. As a result, stations on the 1<sup>st</sup> Avenue North and South were designed as “island” stations that can accommodate right-side boarding. With transit lanes on the left side, pedestrians heading to the Central Avenue business district do not have to cross the street while buses avoid conflicts with bicycle lanes.

Vehicles for the service are 40-foot diesel electric hybrids offering bicycle racks onboard and Wi-Fi internet access. Unlike most buses that accommodate bicycles with exterior bike racks on the front of the bus, PSTA crafted its own bike rack to allow two buses to be stored inside the bus.

SunRunner’s branding features a “Mr. Sun,” an icon (shown left) developed by a local artist. Stations are relatively simple with shelters geared towards providing shade from the Florida sun. Platforms are designed for level boarding. Fares can only be paid through cashless fare media. Prominent pylons identify station names and display real-time bus arrival information signage. Some stations will feature artwork, created by a local artist, integrated into the design of the shelters.



As red pavement appears, don't drive, park, load or unload vehicles in the lane.



Vehicles are only allowed in lanes to make a turn.



Only PSTA buses and emergency vehicles are allowed to drive in the red lanes.







# BRT

## RAPID RIDE E LINE SEATTLE, WA

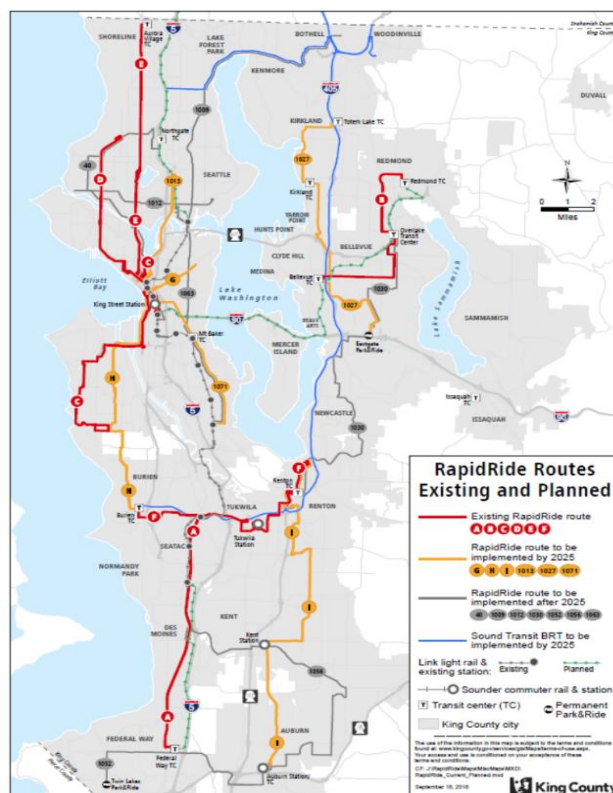


Opened:	2014
Length:	12.5 mi. 50% BAT lanes
Stations:	14
Station spacing:	0.4 mi.
Capital cost:	\$44m (2022)
FTA:	\$48m Small Starts
Other federal:	\$1m
Local/State:	\$25m
Operating cost:	\$4.9m/year
Peak buses:	12
Bus type:	60' articulated
Hours:	24/7
Wait time:	7 min. wkdy 10 min. wknd
Ridership:	15,800/wkdy 2021

The RapidRide E Line connects Downtown Seattle with neighborhoods to the north. At its northern terminus, the E Line connects to the neighboring Swift Blue Line, which serves suburban Snohomish County.

King County Metro (Seattle) currently operates six RapidRide BRT lines with another six in various stages of development. Most of the corridors involved limited use of exclusive, bus only lanes; they instead operate mainly in mixed traffic with spot improvements (such as queue jumps that allow buses to pass through major intersections before other traffic) and implementation of transit signal priority to improve speed and reliability. The forthcoming G and H Lines, both currently in construction, will make more extensive use of dedicated transit lane infrastructure.

The RapidRide E Line, therefore, stands out from those lines in operation by providing BAT lanes on much of the corridor length. The BAT lanes are in effect only during the peak hours of the day, restricting general traffic or parking use between 6 am and 9 am and between 3 pm and 7 pm. During all other times, the lanes revert to general traffic or curbside parking use. As such, streets were typically not widened to accommodate RapidRide. Articulated diesel-electric hybrid vehicles were purchased specifically for RapidRide and comprise a considerable portion of the system capital costs. The buses follow Metro's typical bus livery dominated by a gold paint scheme. The roofline is painted red to distinguish the buses as dedicated to RapidRide service, which are painted green.







## BRT

## RAPID RIDE E LINE SEATTLE, WA



Of King County Metro's six RapidRide routes, the E Line is the least reliable, failing to meet headways 20% of the time. The part time transit lane priority lanes are considered a factor in this performance. However, despite these issues, ridership grew 20% in the first year of operations compared with the

previous local, all-stops route.

RapidRide is considered an example of "BRT Lite," with a relatively small portion of their routes in priority lanes. Red lane markings are not yet commonly used.

Stations use a custom shelter "kit of parts" that are delivered to King County Metro unassembled. King County maintenance crews assemble and install the kits. This approach saves a considerable cost of labor. RapidRide stations are not custom built as is common with many BRT systems, with an implementation approach similar to fixed route transit stops just with a larger shelter footprint.



Stations also include a "tech pylon" designed as an all-in-one solution for major information technology and electrical components, negating the need for a separate electrical and communications enclosure. The pylon includes real-time next bus signage, a map case (behind which is the electrical panel), and an "Orca" (regional fare card) e-fare reader.





# BRT

# SWIFT SNOHOMISH COUNTY, WA

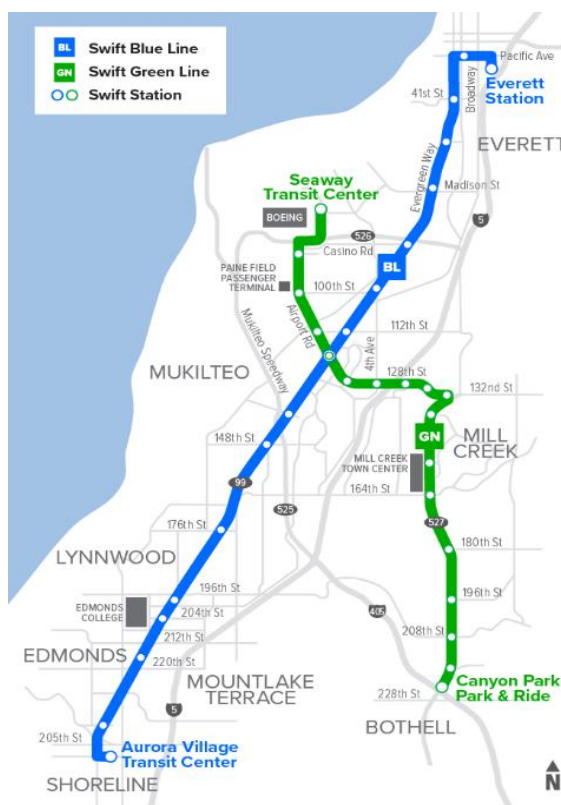


Opened:	2009 Blue Line 2019 Green Line
Length:	29 mi. combined 30% BAT lanes
Stations:	14
Station spacing:	0.75-1.0 mi.
Capital cost:	\$102m combined
FTA:	\$72m Small Starts
Other federal:	\$3m
Local/State:	\$27m
Operating cost:	\$11.2m/year 2021
Peak buses:	21 combined
Bus type:	60' articulated
Hours:	4:15a-11:00p
Wait time:	7 min. wkdy 10-12 min. peak
Ridership:	7,700/wkdy 2021

Serving suburban Snohomish County, located just north of Seattle, Community Transit’s Swift BRT system currently consists of two routes, the Blue and Green lines, with two more lines in development. The Blue Line was the first of the routes implemented. It operates along State Route 99 which links the city of Everett and surrounding communities to Seattle (King County) where commuters can transfer to King County Metro’s RapidRide E Line. The Swift Green Line provides an east-west link through Snohomish County and serves the Boeing aircraft factory, one of the region’s biggest employers, and other businesses that support aircraft production. Combined, the Blue and Green lines provide 29 miles of BRT service, each with just over four miles of exclusive lanes.

On the Blue Line, exclusive lanes were implemented by converting one of three lanes in each direction into a BAT lane. On the Green Line, an existing HOV lane was leveraged for provide transit speed improvements. Both projects were implemented with limited investment in roadway infrastructure, keeping costs per mile low. Only the Green Line used an FTA Small Starts grant as part of the funding package.

Both lines maintained local service with Swift BRT becoming an “overlay” focused on longer trips. Each station includes a nearby local bus stop to facilitate transferring between the two services. This approach allowed Community Transit to open capacity on the local service while offering customers making longer trips a quicker ride via Swift service.







## BRT

## SWIFT SNOHOMISH COUNTY, WA

The Swift Blue Line was among the first BRT lines in the U.S. to have buses outfitted with rear facing, self-secured wheelchair berths. Community Transit also developed an on-board bike rack system that became the template for BRT systems nationwide, which are now available from bus manufacturers as an option.



Community Transit points out the efficiency of its system with station dwell times (the amount of time a bus is stopped at a station) averaging only 10 seconds, helping to speed up overall travel time.

Stations include custom shelters, a tall branding pylon, ticket vending machines, and Orca card (regional, multi-agency fare card) readers. A “kit of parts” design was developed to manage costs as the system expands, relying on a standard design that can be adapted to different locations and conditions. Community Transit contracts directly with the shelter manufacturer to manage station “kit” costs and maintain access to spare parts.



### BRT CASE STUDIES SUMMARY

The features of the 11 U.S. BRT system case studies are summarized in Table 2-1.





**Table 2-1. BRT Case Study Summary**

City	System	Opened	Capital Cost (Opening Year \$)	Length	Average Station Spacing	Bus Type	Peak Buses	Hours	Wait Time	Average Weekday Ridership
Albuquerque NM	ART	2020	\$134 m.	13.0 mi.	0.5 mi.	60'	15	5:30a-10:00p	8 min.	4,040
Boston MA	Silver Line	2004	\$625 m. entire line, including tunnel	2.3 mi on-street segment only	0.3-0.5 mi. on-street segment only	60'	8	24/7	5 min.	39,000 entire line
Cleveland OH	Health Line	2008	\$200 m.	9.4 mi.	0.3 mi.	60'	24	24/7	15 min.	13,200
Columbus OH	CMAX	2018	\$48.6 m.	15.6 mi.	0.5 mi.	40'	15	4:30a-10:00p	10-15 min.	4,300
Eugene OR	EmX	2007-2017	\$160 m.	19.0 mi.	0.3 mi.	60'	8	5:30a-11:30p	10 min.	13,000
Hartford CT	CT Fastrak	2015	\$567 m.	10.7 mi.	2.0 mi on busway	60'	15	5:30a-10:00p	8-14 min.	8,600
Indianapolis IN	Red Line	2018	\$96 m.	13.0 mi.	0.3-0.5 mi.	60'	10	5:00a-1:30a	15 min.	4,600
Richmond VA	Pulse	2018	\$65 m.	7.6 mi.	0.5 mi.	40'	8	5:30a-1:30a	10-15 min.	4,600
St. Petersburg FL	Sun Runner	2022	\$44 m.	10.3 mi.	0.75 mi.	40'	7	6:00a-12:30a	15 min.	5,500 est.
Seattle WA	Rapid Ride E Line	2014	\$44 m.	12.5 mi.	0.4 mi.	60'	12	24/7	7-10 min.	15,800
Snohomish Co. WA	Swift	2009-2019	\$102 m.	29.0 mi.	0.75-1.0 mi.	60'	21	4:15a-11:00p	10-20 min.	7,700



## BRT and Transit Oriented Development

New transit systems, including BRT have the potential to bring much more than frequent and reliable service with dedicated infrastructure. The investments associated with these systems – exclusive right of ways, new stations, and amenities – often engender other improvements to public infrastructure such as sidewalks and adjacent or nearby plazas and public spaces. In some cases, cities and their planning agencies have established policies and zoning codes that encourage development and public realm improvements near transit to create walkable, dense, and connected environments: this development strategy is called Transit-Oriented Development (TOD). TOD requires a coordinated effort from governments (particularly the land use regulator), transit agencies, developers, and community members to maximize the benefits of transit to create connected and thriving communities. There is no “one-size-fits-all” approach to BRT TOD; successful TOD implementation relies on stakeholders and decision makers coming together to implement policies that encourage mixed-use walkable environments.

This section discusses BRT's ability to catalyze TOD near stations, how BRT - in concert with local policies and community involvement - can revitalize neighborhoods. While it can be difficult to precisely correlate specific development to the presence of BRT, case studies are presented where BRT systems have catalyzed TOD. The case studies highlight how TOD and BRT can be a factor for positive change and provide an opportunity to reinforce or create a sense of place.

### WHAT IS TRANSIT ORIENTED DEVELOPMENT?

Transit is successful when it connects people to their daily needs such as employment, education, healthcare, groceries, recreation, and visiting friends and family. Whether a community is rural, suburban, or urban, quality transit is key to their economic health and sustainable growth. TOD is a strategy for community investment that leverages transit into communities in ways that connect people, buildings, programs, and public space with ease. TOD reduces the need for driving by creating compact, vibrant, walkable neighborhoods with convenient access to activities and destinations connected by transit such as BRT. The confluence of activities around transit enhances the sense of place, vibrancy, and identity of communities. Connectivity to more distant destinations, often referred to as first mile/last mile connections, can be enhanced with bicycle and pedestrian infrastructure that extends the reach of transit.

TOD presents an opportunity for transit agencies to generate a higher ridership for their systems by co-locating essential destinations and services along the route. Cities can also support the transit investment with zoning and land use policies that incentivize development along transit corridors, leveraging the infrastructure investment to create partnerships that allow for more affordable housing.

### BRT'S RELATIONSHIP TO TOD

While TOD has been traditionally associated with rail transit, BRT has had success generating TOD. BRT systems are becoming more common, primarily due to their relatively high cost-to-benefit ratio and ability to provide service at levels comparable to other fixed guideway systems. Across the U.S, cities and transit agencies are opting for BRT over other fixed guideway systems due to the benefit-cost ratio for the investment.

That strong economic return has been the case for the Cleveland Health Line BRT system, which has often been credited as one of the most successful BRT systems in the country. As noted previously in the BRT system profiles, the Health Line generated approximately \$9.5 billion in private and institutional



development within walking distance of the corridor. Similar impacts are seen in other parts of the country where BRT systems are being implemented.

In Albuquerque, the ART system came online in 2019 and is already seeing development activity along the corridor. Thanks to supportive zoning ordinances such as the Integrated Development Ordinance - which substantially reduces parking requirements and allows higher densities particularly around station areas in transit corridors - and proactive planning as part of the City's Comprehensive Plan - which encourages development at "Centers and Corridors" - Albuquerque is seeing permits along the ART corridor outpace the rest of the city to the tune of over \$500 million since construction began in 2017. ABQ Ride, the operator of the system, reported that the land along the corridor has almost three times the value per square foot compared to the rest of the city. Despite some early challenges during construction of the system, ART is showing the benefits of coordinated planning and development around transit to generate TOD, as illustrated in Figure 2-2.

**Figure 2-2. Mixed Use TOD at ART BRT Station, Albuquerque**



An ITDP research study identified the three major factors that make TOD successful, regardless of transit type. The first major factor is "government intervention," or robust public policy that facilitates the assemblage of land for redevelopment, tenant incentives, and the reduction of parking requirements. Reducing parking costs can not only decrease construction costs for developments where land is at premium, it can further shift people from single occupancy vehicles to transit generating a boost in ridership. The second major factor is the development potential of the land around the transit system. This is particularly important at "emerging markets," where there is latent economic development potential that just needs an additional piece to complete the puzzle. Lastly, the quality of transit service is a major factor that determines TODs success. When these three factors come together and are proactively assessed and identified early in the development of BRT, TOD can be successfully catalyzed.

When planning for TOD around BRT stations, additional factors should be considered - mostly due to the zone of influence (usually defined as a certain radius from transit stations where community impact is felt most) and perceptions of bus-based systems on market demand. However, as seen in the preceding examples, a BRT station with a similar context and market demand will generally support a similar amount of development as a rail station at a much lower cost.





## RELEVANCE OF TOD TO SORTA'S FUTURE BRT NETWORK

As SORTA's BRT network is conceptualized and designed, it is important to recognize that stations will be located in a variety of neighborhoods and communities. Some stations may be located near residential neighborhoods, major employment centers, or right in the heart of downtown Cincinnati. The most successful TODs recognize the unique elements of the neighborhoods around a transit station. In doing so, the TOD responds to local community needs, providing a unique experience along the transit route. For the entire transit corridors to be successful, each station area should encourage contextual development that responds to local needs. The typologies shown in Figure 2-3 highlight some of the TOD typologies (or development types) that reflect some of the neighborhoods along the future BRT corridors.

Figure 2-3. TOD Typologies

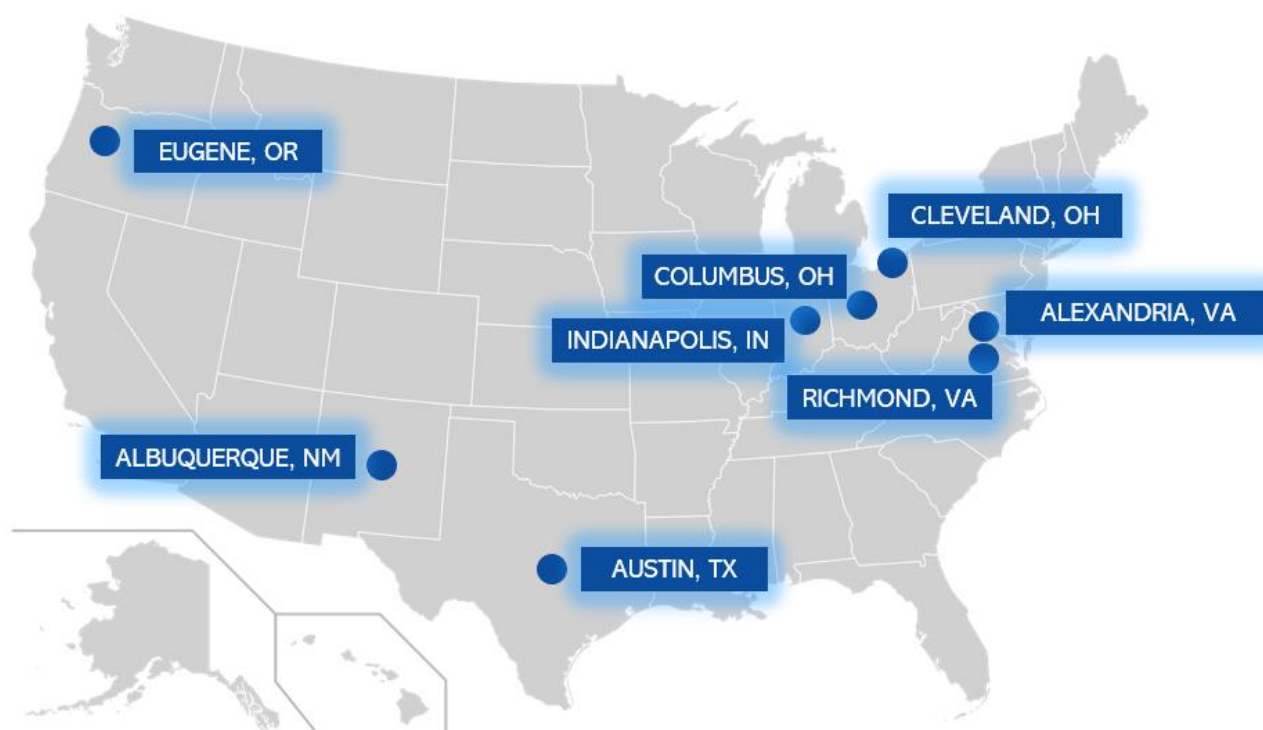
Typology	Description
 <p data-bbox="516 827 781 936"><b>Historic Redevelopment / Adaptive Re-Use</b></p>	<p data-bbox="850 758 1481 1003">This type of TOD occurs within an established community fabric that maintains historic character by rehabilitating existing buildings to restore previous uses or incorporate new uses, or redeveloping land within the established fabric in the same aesthetic and functional style as the historic uses. This typology is more common within the central core of Downtown and its immediate surrounding neighborhoods.</p>
 <p data-bbox="516 1209 683 1245"><b>Mixed-Use</b></p>	<p data-bbox="850 1077 1481 1381">This TOD typology co-locates diverse uses, often a combination of retail and residential uses. This typology can bring essential services and businesses such as clinics or grocery stores together with residential, allowing residents of the building, the neighborhood, and transit rider's convenient access. It can occur throughout the city, with the density reflective of the neighborhood in which its located. These typologies often include affordable housing, particularly at higher densities.</p>
 <p data-bbox="516 1514 829 1623"><b>Institutional Centers (medical, university, corporate campus)</b></p>	<p data-bbox="850 1428 1481 1703">This type of TOD occurs around stations with strong institutional anchors that provide regional employment. These TODs often occur around universities or medical centers and generate both institution-serving development (such as dormitories or research labs) and outward-serving uses (retail, market rate housing). These TODs are a recognition of the benefits of transit access to employees, visitors, and nearby residents.</p>



## TOD CASE STUDIES

This overview of various successful TODs that have occurred in relation to BRT uses examples from cities with BRT systems to highlight different uses, densities, and strategies for TOD that are applicable and comparable in scale and context to that of Cincinnati, the future BRT corridors, and reflect the preceding typologies. These 11 TOD case studies located in eight cities highlight the impact BRTs can have to catalyze development that fills in a community's fabric, augments institutional capability, and restore and invigorate neighborhoods. Each case study summarizes the development size by square feet, which typology it most closely aligns with, a description of the program and how it was realized, images of the development, and a map that shows its proximity to a BRT station.

Figure 2-4. TOD Case Studies





## TOD

# ONE CENTRAL ALBUQUERQUE, NM

One Central is a mixed-use residential building located at the Downtown station of Albuquerque's Albuquerque Rapid Transit (ART) BRT line. The ART operates on an east-west axis through downtown and greater Albuquerque. ART is operated by ABQ Ride, the city-owned transit system.

**Total SF:**  
105,000

**Residential:**  
68 units

**Retail: 44,000**  
**SF**

The One Central project sits at the intersection of several transit services, including an ART BRT station located across the street, as well as commuter bus, intercity bus, commuter rail, and Amtrak all located at the Alvarado Transportation Center located next to One Central's south side.

The Albuquerque Metropolitan Development Agency assisted in financing the project through land acquisition assistance and revenue bonds. It sees One Central as an example of downtown Albuquerque's revitalization, the catalytic impact of ART, and efforts to become a live, work, play city.

Systemwide, ABQ Ride has analyzed the impact of ART on TOD. Between FY 2017 and FY 2021, over \$500 million in new development has occurred on the ART corridor, almost over two times the amount of square footage permitted and three times the value per sq. ft. of the rest of the city.







# TOD

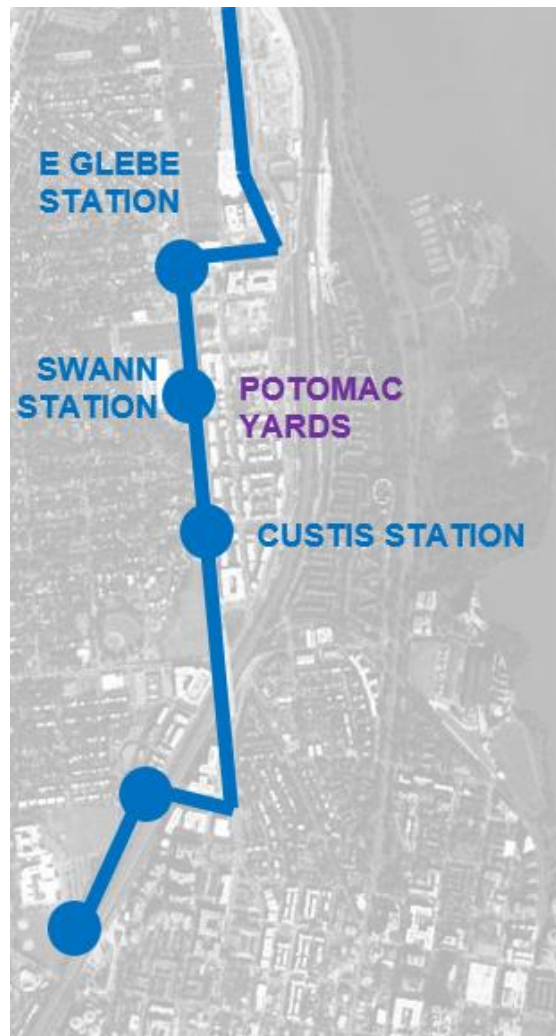
# POTOMAC YARDS ALEXANDRIA, VA

<b>Total SF planned:</b> 4,300,000	<b>Office:</b> 1,900,000 SF	<b>Residential:</b> 2,200 units	<b>Retail:</b> 135,000 SF	<b>Hotel:</b> 625 rooms	<b>Open space / parks:</b> 24 acres
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Potomac Yards is a large master-planned community in Northern Virginia, located between downtown Arlington and Washington, DC to the north, and the City of Alexandria to the south. The Washington Metropolitan Area Transit Authority (WMATA) Metroway BRT service runs through Potomac Yards along US 1, starting in Crystal City and running south to the Braddock Road Metro station.

The Potomac Yards site was once home to one of the largest rail yards on the eastern seaboard. The 165-acre project required extensive environmental remediation. Once a barrier for development and connectivity between Arlington and Alexandria, the site is now home to a mix of uses including office, residential, retail, and hotel. Extensive programmed open space within the project provides residents with access to other parks, trail networks, and transit systems.

The project includes a mix of residential typologies and densities as well, ranging from attached townhomes to multifamily buildings. Over 60 units across the project are owned by the City of Alexandria and operated by the housing authority as low-income affordable units. Potomac Yard's design and development team cite early coordination with city officials, as a crucial step to understand the challenges and opportunities of such a complex site. Integrating BRT along one of the central corridors of the project, US 1, was an early goal for the project and crucial to the project being a successful multimodal mixed-use community.





## TOD

# ZILKER STUDIOS AUSTIN, TX

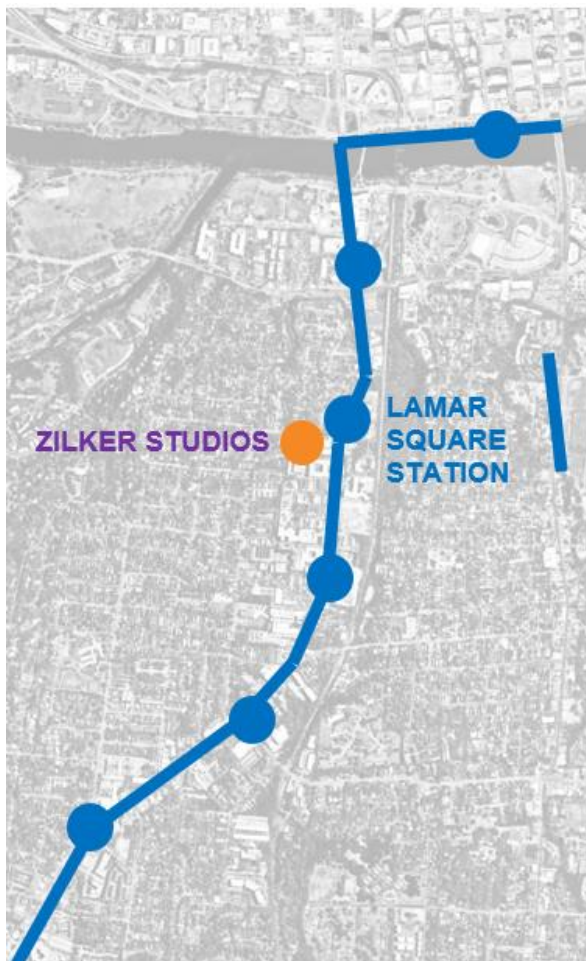
Zilker Studios is an affordable residential project located a short walk from the Lamar Square station of Austin’s MetroRapid Line 801 Line BRT service. MetroRapid operates two service lines that run north-south through the neighborhoods of Austin, including downtown and the University of Texas campus.

**Total SF: 60,000**

**Residential: 110 units**

The project is a seven-story residential building made up entirely of affordable micro-studio units (each 435 SF). The building will be operated by local affordable housing developer, Foundation Communities. A majority of the building’s tenants will be people experiencing homelessness transitioning into stable housing. In addition to a full suite of building amenities, the building will offer residents access to full-time on-site case managers to assist residents with social and supportive services. The funding for the project partially comes from community benefit agreement payments from other development projects in Austin, specifically the “Taco Planned Use District” located just north of the site.

Locating the project along the South Lamar Street transit corridor, and within walking distance to the MetroRapid BRT station, will provide residents, “excellent access to high frequency transit and a quick bus ride to downtown Austin, Zilker Park, retail, and jobs,” according to the project developer.







# TOD

# LINK 59 CLEVELAND, OH

Link 59 is located at the E 59th Street station of Cleveland RTA's Health Line BRT. The Health Line runs along Euclid Avenue, starting from Downtown Cleveland and heading east, serving Cleveland State University, Case Western Reserve University, University Medical Center, and the Cleveland Clinic.

The Link 59 is a three-story mixed-use commercial building. It sits on formerly industrial land that was the site of the Ohio Knitting Mills building. The Cleveland Industrial/Commercial Land Bank purchased the site in 2009 and sold it to a private developer who planned to develop the site as part of a 140,000 SF research campus, which includes office and lab space, as well as community focused retail (Dave's Market and Eatery, a local grocery store chain). Extensive site remediation was required to make the site ready for development, an effort that was undertaken by the developer with public assistance.

The Link 59 project represents the potential for enterprise facilities to locate themselves on transit corridors that are talent rich. The Mayo Clinic, Case Western Reserve University, Cleveland State University, and downtown Cleveland are all accessible to the project via the Health Line.

<b>Total SF:</b> 116,000	<b>Office / Healthcare:</b> 61,000 SF	<b>Retail:</b> 55,000 SF
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## Property Highlights

- Located on the Euclid Ave. HealthLine  
[Link 59 promotes its direct access to the Health Line BRT.](#)







# TOD

# SIX SIX EIGHT EUCLID CLEVELAND, OH

This 236-unit complex is located at the west end of the Health Line in downtown Cleveland across the street from the East 6<sup>th</sup> Street Health Line BRT station. The mixed-use building is the historic restoration and adaptive reuse of the former William Taylor & Sons department store. The building is now branded as Six Six Eight Euclid Avenue. The program includes luxury rental apartment, affordable housing units, office, and retail space. Street-facing ground floor uses include iHeart Media studios and a restaurant.

**Total SF:**  
480,000

**Residential:**  
236 units

**Retail/Office:**  
16,000 SF

The former department store, constructed in 1913, went through several different reuse strategies before conversion to a residential complex. The store closed in 1961. Just a few years later, in 1964, the store was remodeled into an office building and a “modern façade” was applied to the exterior. Despite several efforts over the years to refresh the building, it became vacant again in 2007.

In 2008 the former department store was converted to apartments the same year as the Health Line opened. It was one of the earliest residential projects on Euclid Avenue by the coming of BRT. The building interior was gutted and rebuilt. The 1960s façade was removed and the exterior façade was rebuilt in a design sympathetic to the original. The project was one of the first to utilize the Ohio State Historic Preservation Tax Credit.



Convenient access to the Health Line is promoted as an amenity by the developer in its marketing materials (left).





# TOD

# 250 HIGH COLUMBUS, OH

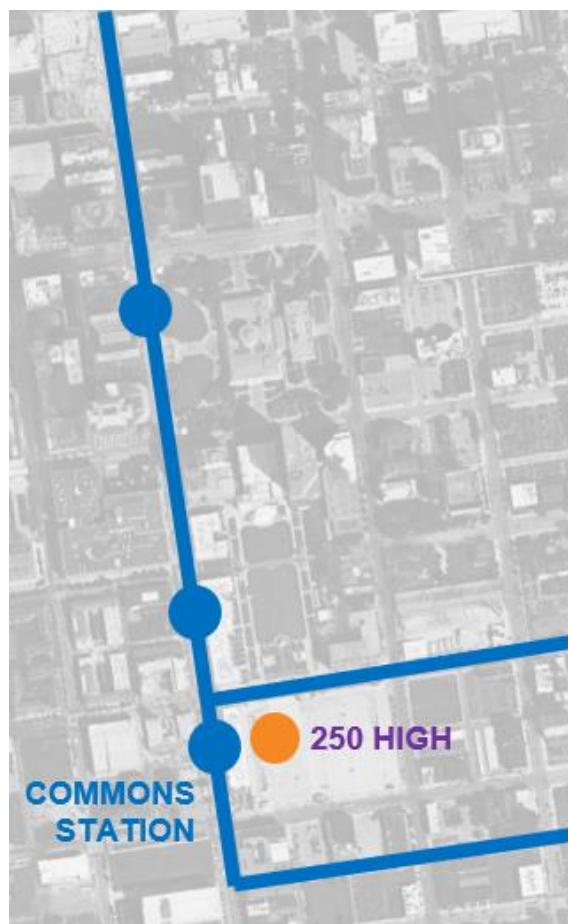
The 250 High project is located at the Commons Station of the CMAX BRT line, operated by the Central Ohio Transit Authority (COTA), in downtown Columbus. CMAX operates north-south through downtown primarily along High Street and continues northwest along Cleveland Avenue. The project is located in the River South neighborhood and is within proximity to the state capitol and Columbus Commons park. The 250 High building occupies a portion of a former downtown shopping mall site.

**Total SF:**  
315,000

**Office:**  
135,000 SF

**Residential:**  
162,000 SF

**Retail:**  
18,000 SF



The 250 High building site was most recently a surface parking lot. The project consists of a 12-story mixed-use structure, with retail at the ground floor, office uses above (floors 2-5), and residential on top (floors 6-12). The building's entire service core is offset from the street and is connected to the Columbus Commons parking garage behind the project, giving the building its unique narrow shape, and allowing it to accommodate different programs on a single floor plate dimension.



The building's entire service core is offset from the street and is connected to the Columbus Commons parking garage behind the project, giving the building its unique narrow shape, and allowing it to accommodate different programs on a single floor plate dimension.

This mixed-use development represents a shifting identity for Columbus' downtown, from a single function office downtown to a vibrant, mixed-use, transit-centered downtown.





## TOD

# UNIVERSITY VILLAGE EUGENE, OR

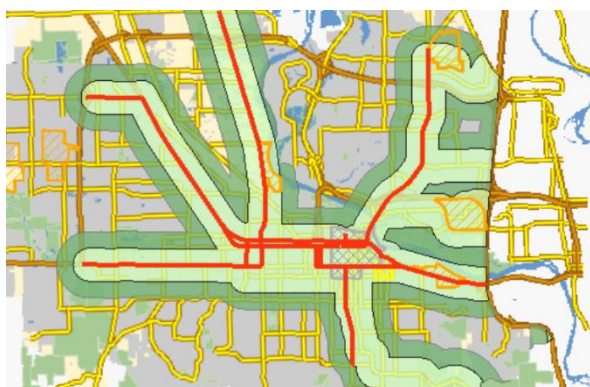
Eugene’s Emerald Express (EmX) BRT network has seen a substantial amount of incremental new development in the vicinity of its BRT stations. Along the first line, a developer has recently proposed a \$75-100 million redevelopment of a former car dealership site into a mixed use project featuring apartments, a hotel, food hall, and retail space.

To help encourage development such as University Village, the City of Eugene created a Transit Oriented Development Overlay Zone. The ordinance is intended to “promote the creation and retention of mixed land uses in areas with high potential for enhanced transit and pedestrian activity.”

The ordinance, which exempts historic properties, applies to new structures on redevelopment sites – such as converting parking to a new structure – along with an expansion of 30% or more square footage. Other provisions involve setback requirements, a requirement that at least one entrance be oriented to a street with transit facilities, prohibition of parking situated between the building and street, and a requirement that structured parking include street-facing ground floor retail.



The planned University Village (above) is located near an existing mixed use TOD (below) opposite the Walnut Street EmX BRT station.



Eugene’s TOD Overlay District (left) corresponds to existing and planned BRT lines.







# TOD

# PURPLE LINE TOD INDIANAPOLIS, IN

While IndyGo, the public transportation provider for Indianapolis and Marion County, estimates that the Red Line has been a factor in attracting over \$350 million in economic development in the midtown area, it has already identified \$76 million in new development along the Purple Line, which is currently under construction and scheduled to open in late 2024. As with the Red Line, IndyGo has prepared a TOD Strategic Plan for the Purple Line. The Purple Line will share a portion of the Red Line alignment between downtown and midtown and provide new east-west BRT service on 38<sup>th</sup> Street.



38<sup>th</sup> Street has long been considered a “food desert” and the Purple Line is a factor in the siting of the new Indy Fresh Market, a full-service grocery store developed by Cook Medical adjacent to its new manufacturing facility that will employ nearly 100 people. It will be served by the Arlington Purple Line station. Cook Medical has stated, “Being two blocks away from a Purple Line stop means residents living in the neighborhood can think of Cook Medical as a viable employer.”

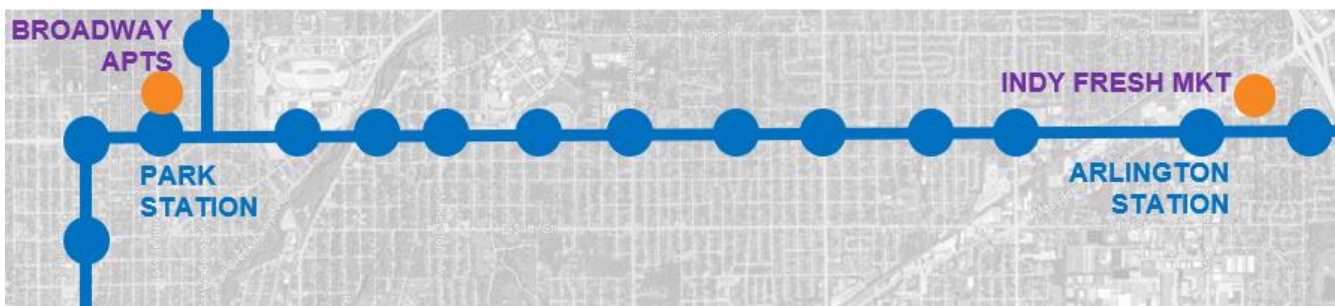
The run-down and economically depressed Arlington station area is becoming a focal point of additional development including a medical device manufacturing facility and a \$50 million medical center operating by Eskenazi Health.



The Broadway Apartments (above left) will replace an abandoned apartment building (below left) across from the Park Purple Line / Red Line Station.



The City of Indianapolis is investing \$2 million on housing and homeownership along the East 38<sup>th</sup> Street Purple Line Corridor. The city’s Department of Metropolitan Development (DMD) is working with Redline Holdings, a development firm, on the Broadway Apartments project, which will be located across from the Park Avenue Purple Line/Red Line station. It replaces four deteriorated apartment houses. Redline has been working with the Indianapolis Metropolitan Housing Authority to develop affordable housing along the Red Line and is seeking low income housing tax credits.





# TOD

# RED LINE FLATS INDIANAPOLIS, IN

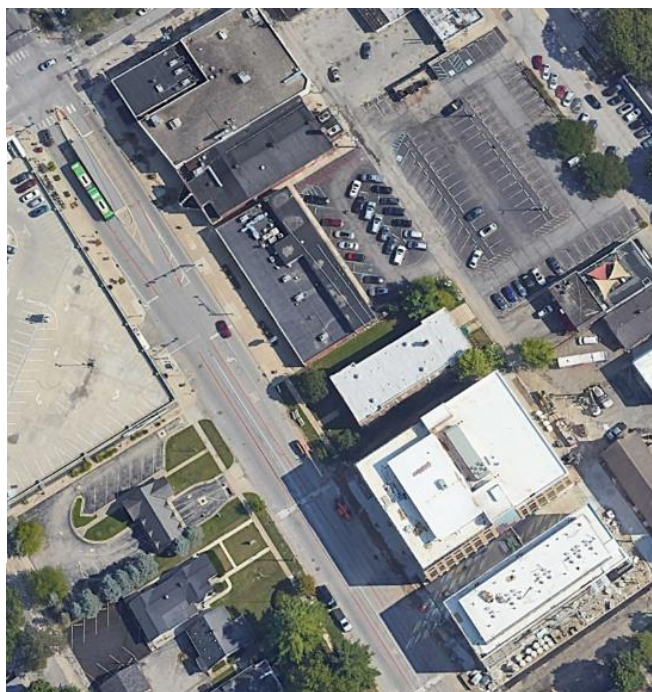


<b>Office:</b> 57,000 SF	<b>Retail:</b> 1,964 SF	<b>Residential:</b> 27 units
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Red Line Flats are currently being built on College Avenue in the Broad Ripple neighborhood of Indianapolis near the northern terminus of the Red Line. Its property brokers are promoting Red Line Flats as “Transit -oriented development with close proximity to IndyGo’s Red line stop in Broad Ripple.”

Red Line Flats consist of a four-story mixed use development. Its office component is being leased by the Eight Eleven Group, a healthcare technology company, as its corporate headquarters for its 250 employees. In addition to ground floor retail space, the project includes 27 apartments.



The Broad Ripple BRT Station is located just 500 feet north of Red Line Flats. A Red Line bus (painted green), is shown at the station (upper left)

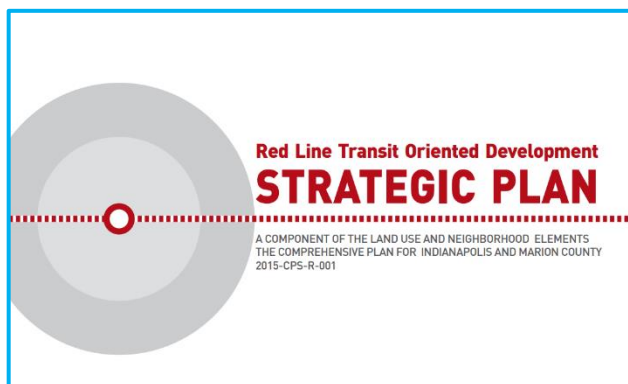






# TOD

# RED LINE TOD INDIANAPOLIS, IN



Indianapolis saw the opportunity to leverage the Red Line BRT to catalyze TOD, including affordable housing, well before the opening of the line in 2019. In 2015, the first major step was the creation of the Red Line TOD Strategic Plan, which consisted of a comprehensive market assessment of each station and created a series of TOD typologies and templates appropriate to each station and neighborhood served.

Since then, the City of Indianapolis developed a TOD Overlay Zone and adopted zoning to facilitate development at Red Line and other future BRT lines (Purple and Blue lines). The city’s Department of Metropolitan Development (DMD) has been actively promoting development along the Red Line by acquiring sites, working with developers, and providing tax incentives and applying funding programs such as a portion of Indianapolis’ allocation of the American Rescue Plan Act. In 2021, the City-County Council voted unanimously to allocate over \$50 million in federal American Rescue Plan funding for pandemic relief towards affordable housing and neighborhood initiatives. In the midst of a housing crisis, DMD has been working to increase the supply of quality housing with the goal of enhancing and preserving diverse neighborhoods.

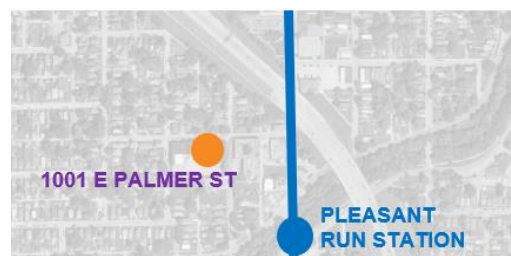


The 1001 Palmer Street project, a short walk west of the Red Line, would renovate the long-closed Abraham Lincoln School, considered an important landmark by residents of the Bates-Hendricks neighborhood on Indianapolis’ south side.

One of these projects is 1001 E. Palmer Street, a 151-unit affordable housing project under the auspices of the Indianapolis Neighborhood Housing Partnership (INHP). The site, a long disused public school, is considered a historic landmark by area residents. NHIP states that the location “will provide future residents with low and moderate incomes a quick connection to a Red Line station.”

In terms of market rate housing, area realtors believe that the Red Line has had a positive impact on home sales and values. The Indianapolis MPO acknowledges that BRT may not be a “market maker” but is a proven “market enhancer. For example, as reported in the *Indianapolis Star* in 2019:

*“John Creamer, a real estate agent with Century 21, said some of his clients purchased homes specifically to be close to the Red Line. He points to a couple from Chicago who frequently rides public transportation and looks at the BRT as a plus. He said the average price of a home on College Avenue three years ago was \$205,000, while the average price in the last 12 months was \$247,000. Creamer believes some of that increase is directly affected by the opening of the Red Line.”*







# TOD

# GATHER ARTS DISTRICT RICHMOND, VA

The Gather Arts District is a commercial complex consisting of four existing buildings built in the early 1900s. The project is located along Richmond’s Pulse BRT service on East Broad Street at the Convention Center Station, which also serves portions of Virginia Commonwealth University, Medical College of Virginia, and the central business district.

**Total SF: 32,000**

**Office: 21,000 SF**

Gather is a provider of co-working space across the U.S. The Gather Arts District project features the adaptive reuse of adjacent historic commercial buildings. The project capitalizes on the art and culture focus of this stretch of Broad Street.

The adaptive reuse project includes ground floor retail to activate the public realm. The upper floors contain approximately 21,000 SF of Class A office/co-working space including a fully equipped podcast studio. Prior to the project the upper floors of the buildings were vacant. The \$2.9 million investment utilized tax credits for the restoration of the buildings.

You can generate new ideas and elevate your business here, in our beautiful 20,000 square-foot office space. Walk to the Convention Center and Virginia State Capitol or use the Pulse to explore the city – filled with galleries, restaurants and shopping, from classic to trend-setting. The downtown Richmond Arts District is where professionals and creatives converge.



Close Proximity to Pulse



The Gather Arts District promotes its convenience to the Pulse BRT Line on its website (above). The project before redevelopment is shown right; the completed project is shown below.





## PREPARING FOR TOD

The time to plan for TOD is in advance of transit. Transit has proven to catalyze development, and in many markets TOD projects start coming online at the same time as the transit service. Planning for TOD in advance of transit's arrival allows time to engage elected leaders, agency officials and the residents to create a vision for TOD. This allows time for communities that may desire TOD to get 'ready' for it. Changes needed to assure the success of TOD may include updating outdated zoning or other regulations, assessing the physical appropriateness of a neighborhood for TOD or identifying market needs. Planning for TOD early can help to identify how short-term investments can meet long term needs.

Early planning also helps decision makers to proactively anticipate the impacts of the BRT to communities along the corridor, both positive and negative. For example, some residents may be concerned that BRT will increase property values and rents to unaffordable numbers, displacing them from their communities. Displacement can be mitigated by proactive planning that pre-emptively identifies impacts such as displacement to establish policies and programs to combat it. Cities and land use agencies across the country are taking steps such as those, in partnership with transit agencies, described above to make sure the benefits of compact, mixed-use development and convenient transit are accessible and affordable to those who rely on it most.

A consistently effective tool to advance TOD are TOD Overlay Zones amended into city zoning codes: Overlay zones are a policy tool that cities employ to augment existing zoning to allow for TOD and other uses that better leverage transit investments than the existing underlying zoning. These tools act as regulations and requirements that mandate transit-supportive designs, yielding more accessible, mixed-use, dense communities around transit. Examples of TOD overlays can be seen in the following cities:

- The City of Raleigh recently completed its *Equitable Development Around Transit Guidebook* that proactively studied four future BRT corridors to identify policy solutions and planning strategies that would mitigate negative impacts to nearby historically marginalized residents to ensure that they could stay and enjoy the future BRT. These strategies included a TOD zoning overlay that set minimum height requirements and requires public spaces around transit be people-oriented and mixed-use. It also allows for more diverse housing types within a certain distance of BRT stations, and a policy toolkit that reinvests future tax revenue into community-oriented programs that preserve existing housing and support owners and tenants. Planning efforts such as these are key to ensuring the benefits of TOD and BRT are equitably realized and that new development is built to be synergized with transit.
- The Metropolitan Development Commission for Indianapolis implemented a TOD District Overlay to promote housing diversity and walkability around BRT lines across the city. The TOD ordinance amended the Indy Rezone policy, the Indianapolis-Marion County Consolidated Zoning Ordinance, legislating development requirements that enhance walkability, connectivity, and housing diversity. The Overlay District identifies commercial and mixed-use property along BRT lines to provide additional design standards to require more people-oriented design near transit. This overlay not

**Figure 2-5. Equitable TOD Guidebook, Raleigh, North Carolina**

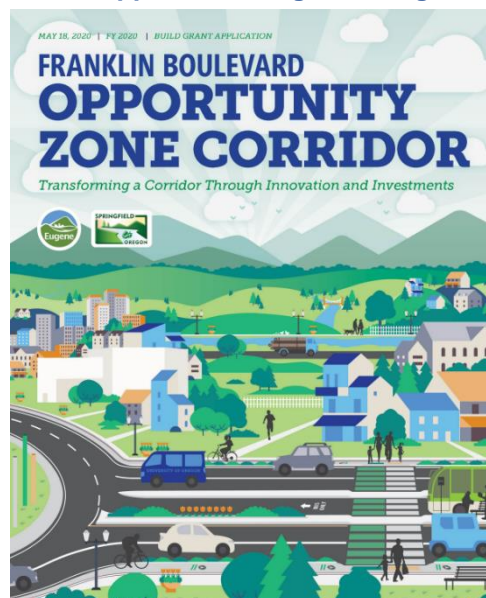




only encourages TOD and augments the BRT, but it also uses proximity to BRT as a primary criteria when reviewing applications for affordable housing construction funding.

- The City of Eugene in Oregon adopted a TOD Overlay Zone to promote the creation and retention of mixed land uses in areas with high potential for enhanced transit and pedestrian activity. Pedestrian circulation and transit access are especially important and have increased emphasis in areas with the TOD overlay zone. The overlay includes additional development standards that encourage transit use and the provision of amenities that support the use of bicycles and pedestrian facilities. The Overlay applies to new development on vacant land, redevelopment sites and conversions, and developments that expand 30% larger than the existing building.
- The cities of Eugene and Springfield have also capitalized on the EmX BRT network to apply for federal grants to assist them in planning a Franklin Boulevard Opportunity Zone Corridor. The goals are to transform the boulevard into a safe, comfortable, multimodal street; redevelop the boulevard to support economic growth; strengthen connections for all modes including BRT; and reinforce the corridor as the spine of the regional transit system.

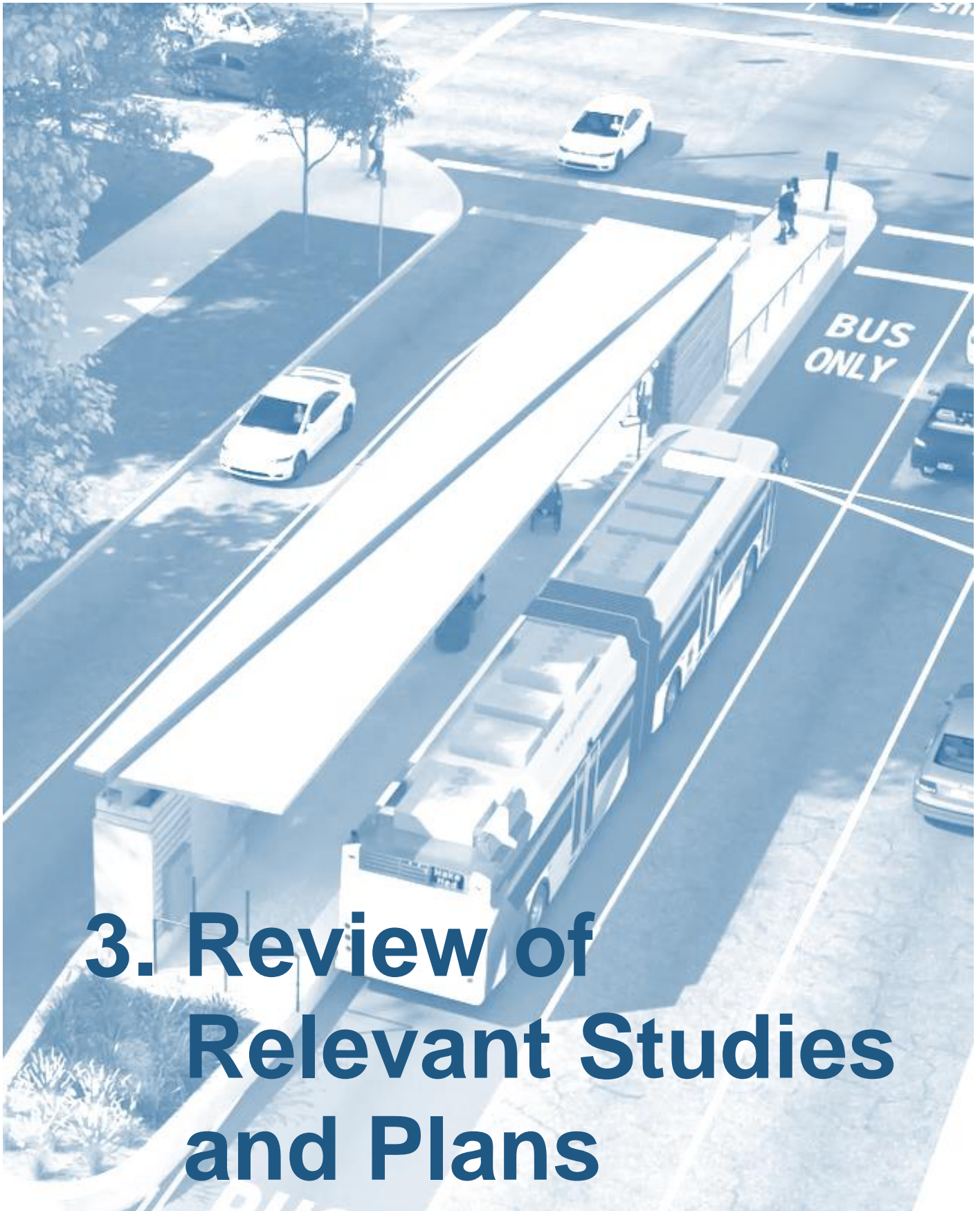
**Figure 2-6: Franklin Corridor BUILD Grant Application, Eugene, Oregon**



Walkable mixed-use neighborhoods are increasingly desirable. In the last five years walkable urban locations have outperformed sprawling suburban locations within the same metro area<sup>6</sup>. Planning for TOD in advance of the arrival of transit can also be a useful tool in addressing concerns about transit increasing property values. An inclusive strategy to maintaining housing affordability should include identifying communities that may be at risk of displacement.

Successful TOD, while station specific, should also consider uses at other stations up and down the line to assure that station area development is complimentary. Planning early for TOD can help communities to understand the potential for TOD up and down the transit corridor. This approach leverages the unique assets and opportunities at each station and can help to assure that a market for one use is not overprescribed. A connected series of unique destination and attractions at each station along a transit corridor can also drive transit use.





# 3. Review of Relevant Studies and Plans



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## 3. Review of Relevant Studies and Plans

Existing studies and data sources help provide the foundation on which the BRT Study is being conducted. A wide range of studies, plans, and data sources have been compiled and reviewed for the applicability and relevance to the BRT Study. To maintain relevance to the BRT Study, plans and studies produced only within the last ten years (since 2012) were reviewed. These are derived from primarily public sources, although a few privately sponsored initiatives were reviewed as well. The studies and plans cover a variety of geographic and issue-focused areas.

On the most localized level, plans and studies sponsored by the numerous officially designated neighborhoods in Cincinnati provide a range of insights and recommendations that directly involve BRT and/or public transit or other recommendations, such as zoning, land use, street improvements, and pedestrian/bike access. They have an indirect, but relevant, bearing on the BRT planning and alternatives analysis process. Similarly, a canvass of planning, land use, and economic development studies was conducted for the six local political jurisdictions in which at least one of the study corridors is located:

- Cincinnati
- Mount Healthy
- North College Hill
- Norwood
- Silverton
- Sycamore Township

As by the far the largest jurisdiction, the City of Cincinnati has conducted large-scale and detailed planning studies and initiatives. Hamilton County also has planning and development responsibilities, primarily in assisting local communities.

On a regional level, the responsibilities of the region's Metropolitan Planning Organization, the Ohio Kentucky Indiana Regional Council of Governments (OKI), include the prioritization and distribution of federal transportation funds, some of which are awarded and programmed to SORTA, and cover or impact the four BRT corridors.

Finally, a handful of non-governmental entities – including the Cincinnati USA Chamber, the University of Cincinnati Economics Center, and REDI Cincinnati- have also produced various studies and initiatives that have been reviewed for the relevance to and impact on the BRT Study.



## SORTA

SORTA has undertaken and continues to develop a series of plans, programs, and initiatives that either led to, have an impact on, or help support the BRT Study, as illustrated in Figure 3-1.

Figure 3-1. SORTA Studies and Plans



## REINVENTING METRO

SORTA's largest planning and strategic initiative is *Reinventing Metro*, described by SORTA "as a plan of action to significantly improve transit service within the Cincinnati Metropolitan Region." Development of the plan, which was completed in 2018, was a multi-year effort and coordinated with numerous public and private sector entities that included Hamilton County, the City of Cincinnati, and the Cincinnati USA Regional Chamber. Reinventing Metro formed the basis of Issue 7, the Hamilton County sales tax issue that passed in 2021, providing SORTA with a dedicated and expanded revenue source. Although the pandemic slowed efforts somewhat, SORTA has been aggressive in fulfilling the goals of the plan by implementing an array of improvements including:

- New crosstown routes
- More frequent service
- More late night and weekend service, including 24/7 service on key routes
- New passenger amenities such as shelters
- Alternative services such as Mobility on Demand

One of the major components of the plan is the implementation of a regional BRT Network. Six corridors were originally considered, as shown in Figure 2, four of which have been advanced for further study: Glenway Avenue, Hamilton Avenue, Reading Road, and Montgomery Road. These corridors are currently served by local routes (33, 17, 43, and 4, respectively) that, with a few exceptions (primarily between downtown and Uptown) serve these alignments in their entirety. The BRT component of Reinventing Metro is described in greater detail in Section 5.

Reinventing Metro compared the six corridors based on a range of indicators including existing ridership, frequency (headway), current travel speed, population density, transit dependent population, jobs, affordable housing, trip generators, new development, and economic development potential. The capital costs of the rail right-of-way (ROW) options were estimated to be significantly higher than either of the four arterial corridors, while current ridership in those corridors is much lower than along the arterial corridors. As a result, the rail ROW corridors - the Oasis Line and a combination of segments of the Oasis Line and Blue Ash Line - were dropped from further development at this time.





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## FASTOPS PROJECT

SORTA recently undertook an analysis to determine the potential for optimizing or balancing bus stop locations to shorten travel times, enhance passenger comfort and convenience, improve schedule reliability, and improve operations. Called FASTops, the analysis began in 2018 and included a robust community and rider engagement program to determine if certain underutilized bus stop locations could be eliminated while maintain passenger convenience and access.

A pilot program was enacted in 2018 and full implementation was completed in 2019 and has been considered a success, with no detrimental impact on ridership and a positive impact on operations and reliability.

FASTops has an indirect but important bearing on the BRT Study. BRT stations are typically spaced every about one-half mile- significantly wider than typical local bus stop spacing which riders and the community are used to. This may help with rider understanding of the benefits of more widely spaced stations and acceptance of this BRT design feature.

## MOBILITY ON DEMAND

One of the major recommendations of Reinventing Metro was the development of “mobility on demand” (MOD) services. As described in SORTA’s report, *Mobility on Demand Service Development and Recommendations*, June 2022, MOD service “is meant to serve localized mobility (e.g., home to grocery store) and to provide connections to the fixed route network for longer trips (e.g., home to mobility hub to catch fixed route bus downtown). MOD is designed to work in areas in which fixed route service may not be logistically feasible because of street network constraints or lack of density, where customers have limited mobility access to bus stops, or where necessary infrastructure is not available for safe and convenient access to bus stops.”

The MOD study included an extensive community outreach program and detailed demographic and gap analyses which can serve as a planning resource for the BRT Study. The analyses led to the identification of nine initial neighborhood MOD zones, shown in Figure 3-2.

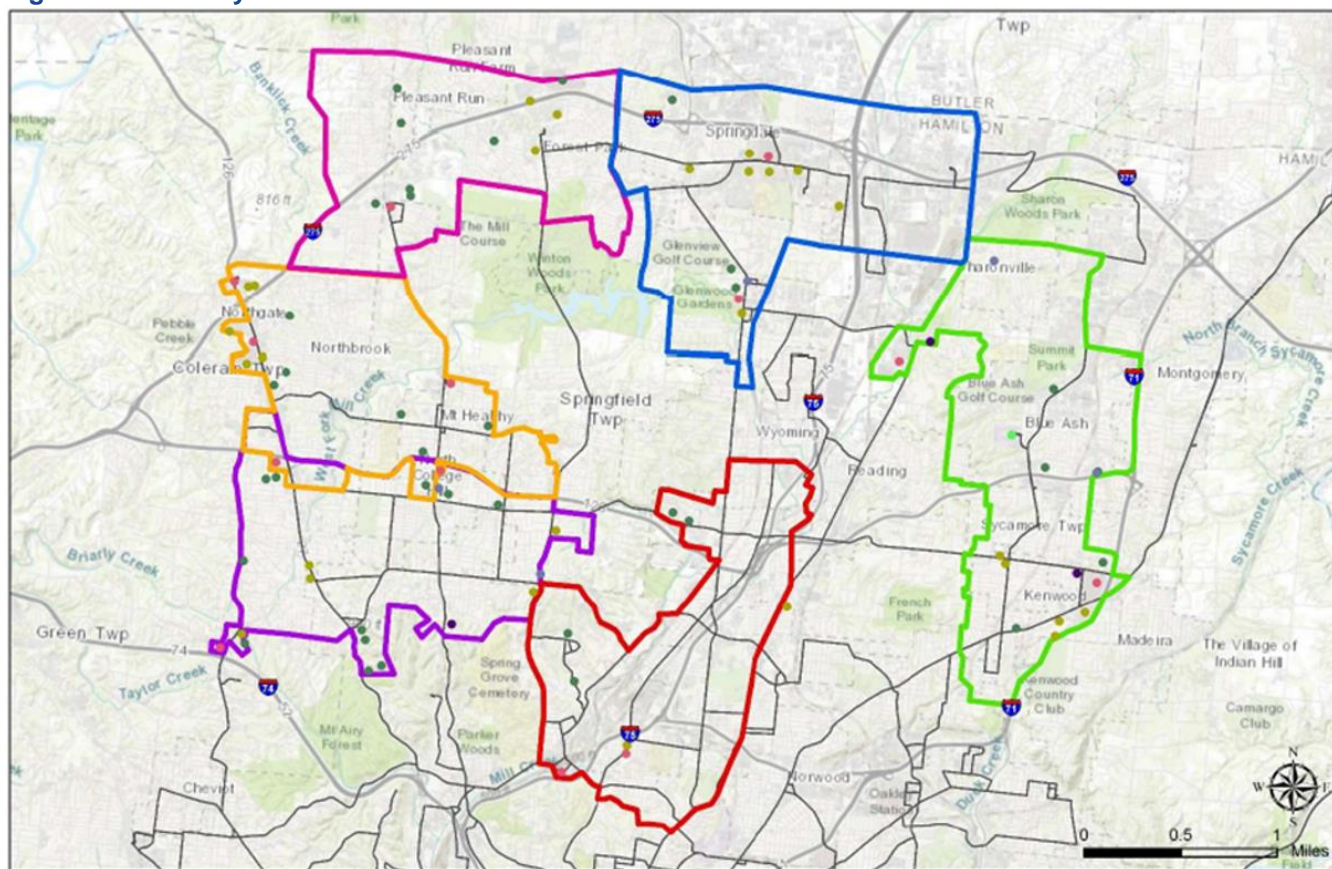
Portions of the BRT Study corridors are located within some of the six zones, described by their color coding on the map:

- Purple zone - covers a portion of the the Hamilton Avenue Corridor in College Hill and the southern portion of North College Hill. The zone extends as far west as Cheviot Road (encompassing a segment of Colerain Avenue) and east to Winton Road.
- Orange zone – located just to the north of the purple zone, it covers a portion of the Mailton Avenue Corridor in Mt. Healthy, including business district and Hilltop Plaza, and the northern portion of North College Hill. The zone extends to the northwest, serving the upper portion of Colerain Avenue.
- Magenta zone - located well north of the Hamilton Avenue corridor, serving neighborhoods on both side of I-275 including a significant portion of Forest Park.
- Blue zone – located north of the Reading Road Corridor, it serves Springdale, Tri-County ,and Sharonville areas.



- Green zone – covers the northern portion of the Montgomery Road Corridor including the Kenwood area. It extends north to cover Montgomery, Blue Ash, and Sharonville.
- Red zone – covers the west side of the Reading Road corridor from North Avondale to Roselawn, extending north in Reading and west to the neighborhoods of Carthage and Winton Hills.

**Figure 3-2. Mobility on Demand Zones**



## Cincinnati Neighborhoods and Outlying Communities

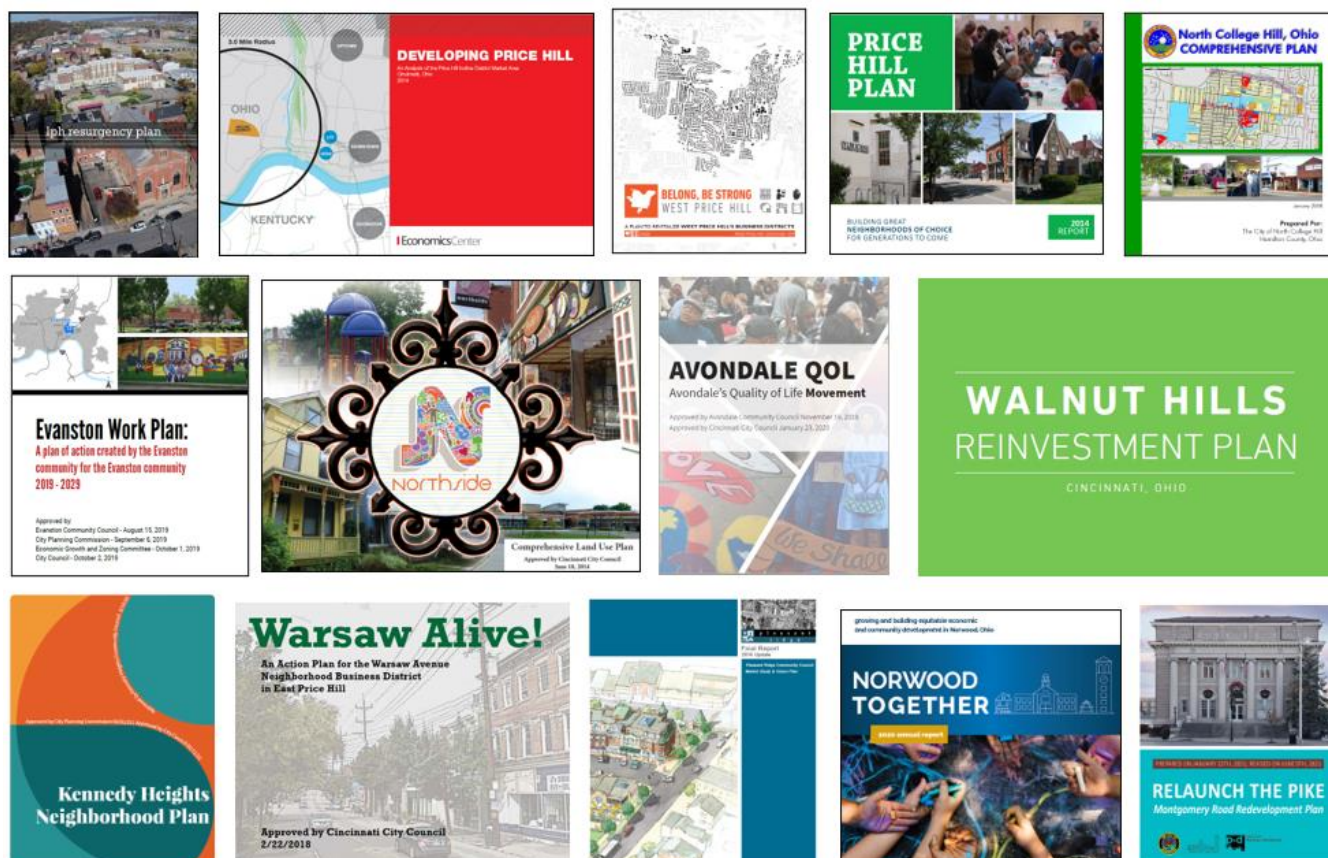
Most but not all of the neighborhoods located along the four BRT study corridors have developed community or business district plans, often with support of the City of Cincinnati as illustrated in Figure 3-3. This section identifies the focus of each plan, potential consideration of public transit (including possible mention of public transit and BRT) and other recommendations such as streetscape improvements, enhanced walkability, mixed land uses, and business district revitalization that can have a positive and synergistic impact on future BRT. Other recommendations, such as parking, traffic, and signals, also may have an impact on BRT accommodations and design.

Along with a discussion of the relevance of each plan and study, the tables in this section list each neighborhood by corridor in the outward direction from downtown Cincinnati. They identify each plan, whether they explicitly mention transit and BRT, and the planning and development factors unique to



each area. At the conclusion of this section, a comprehensive listing and summary of all neighborhood plans is provided.

**Figure 3-3. Cincinnati Neighborhood and Outlying Community Plans**



## GLENWAY AVENUE CORRIDOR

The Glenway Avenue corridor encompasses five distinct neighborhoods. It is wholly contained within Cincinnati city limits. Table 3-1 identifies the plans and aspects of those plans relevant to and impacting BRT.

**Table 3-1. Glenway Avenue Corridor Neighborhood Plans**

Neighborhood	Plan	Mentions/Endorses BRT and/or Improved Transit Connections	Other Factors Potentially Impacting BRT Development and Design
Downtown	No current plan		
Queensgate	No current plan		
Lower Price Hill	Lower Price Hill Resurgency Plan, 2018	No	<p>Prioritizes pedestrian-friendly, mixed-use development at 8<sup>th</sup> and State streets, a potential BRT station stop, which could positively impact ridership and connectivity.</p> <p>Recommends widening sidewalks, which could help accommodate a station and enhance connectivity.</p>





Neighborhood	Plan	Mentions/Endorses BRT and/or Improved Transit Connections	Other Factors Potentially Impacting BRT Development and Design
East Price Hill	Warsaw Alive: An Action Plan for the Warsaw Avenue Business District, 2018	Partially: recommends partnership with SORTA to ensure adequate transit service	<p>Recommendations include traffic calming, sidewalk bump-outs, 24-hour parking on the north side of Warsaw, 1 lane in each direction and a middle turn lane that can impact BRT design opportunities.</p> <p>Recommendations also include more off-street parking, which may relieve pressure on on-street parking requirements for business and allow for possible BRT ROW treatments.</p>
	Developing Price Hill: An Analysis of the Price Hill Incline District Market Area	No	<p>Recommends enhancements to the Incline District business area which is adjacent to the Glenway corridor.</p> <p>Additional development may potentially generate ridership and impact station location decisions.</p>
West Price Hill	Belong. Be Strong West Price Hill: A Plan to Revitalize West Price Hill's Business Districts, 2022	Yes: recommends collaboration with ODOT and Cincinnati DOTE to evaluate BRT on Glenway	Recommendations include traffic calming techniques to improve pedestrian safety, speed reductions, and smart traffic technology that can impact potential BRT ROW and priority treatments.
Price Hill (combined initiatives encompassing Lower, East, and West Price Hill)	Price Hill Will: Price Hill Plan, 2014	Yes: recommends working with SORTA to establish BRT on Glenway.	<p>Recommendations include focusing economic development along major nodes along Glenway that may be conducive to ridership generation and impact station location decisions.</p> <p>Recommendations also include a transit circulator in Price Hill that could potentially enhance first/last mile access to BRT.</p>

**Key Glenway Avenue corridor takeaways:**

- The Price Hill Will and West Price Hill plans and initiatives overtly support the study and application of BRT along Glenway.
- The plans recommend pedestrian, sidewalk, and safety improvements that could help access to BRT.
- Development is encouraged to concentrated in nodes along Glenway, which can positively impact ridership and influence station locations.
- On-street parking in the older business districts will be an important issue during the conceptual BRT design process.

**HAMILTON AVENUE CORRIDOR**

The Hamilton Avenue and Reading Road corridors share the same alignment from downtown to Uptown, diverging at Jefferson Avenue and Dr. Martin Luther King, Jr. Drive (MLK). Along this common segment, it traverses portions of the downtown, Over-the-Rhine, Mt. Auburn, Clifton Heights-University Heights-Fairview (CUF), Corryville, and Heights neighborhoods in Cincinnati. Beyond Uptown, the Hamilton Avenue corridor runs through the Clifton, Northside, and College Hill neighborhoods in Cincinnati and the communities of North College Hill and Mount Healthy.



The University of Cincinnati (UC) is a major landmark and activity center along the Hamilton Avenue corridor. UC does not currently have a campus master plan; implementation of the previous master plan is largely completed although individual projects and improvements are ongoing.

Table 3-2 identifies the plans and aspects of those plans relevant to and impacting BRT.

**Table 3-2. Hamilton Avenue Corridor Neighborhood and Community Plans**

Neighborhood	Plan	Mentions/Endorses BRT and/or Improved Transit Connections	Other Factors Potentially Impacting BRT Development and Design
Downtown	No current plan		
Over-the-Rhine	No current plan		
Mt. Auburn	No current plan		
CUF	No current plan		
Corryville / The Heights	University Impact Area Solutions Study: A Strategic Plan for the Neighborhoods Surrounding the University of Cincinnati, 2016	Yes: recommends conduct of a feasibility study that looks at the overall viability of a streetcar or transportation connection to the Uptown area.  Also recommends expansion of options for a more efficient and connective transit system including exploration of crosstown and limited stop routes, and to expand, improve, and market the utilization of transit	Recommendations include creation of a safe and integrated pedestrian network (that can facilitate access to BRT), enhancements to pedestrian and bicycle safety.  Recommendations also include further investigation of on-street and off-street parking. On-street parking is a factor in BRT design.
Clifton	No current plan		
Northside	Northside Comprehensive Land Use Plan, 2014	Yes: plan states that “planning for additional transit options could pave the way for BRT or a potential streetcar line along Hamilton Avenue.”	Recommendations include working with Cincinnati DOTE on traffic calming, including along the northern portion of Hamilton Ave. within Northside.
College Hill	No current plan		
North College Hill	In development		
Mt. Healthy	No current plan		

**Key Hamilton Avenue corridor takeaways:**

- The University area (Corryville and Heights) and Northside neighborhoods support BRT or a BRT-like transit connection along the corridor and to downtown.
- These same areas are also encouraging traffic calming and pedestrian access and safety improvements that can help facilitate BRT operations and access to BRT stations.
- Little or no consideration to transit or BRT is formally given to other areas along the corridor, including the neighborhoods and communities north of Northside. Existing neighborhood and community comprehensive plans are outdated and do not address transit.



## READING ROAD CORRIDOR

The Reading Road and Hamilton Avenue corridors share the same alignment from downtown to Uptown, diverging at Jefferson and MLK. Along this common segment, it traverses portions of the downtown, Over-the-Rhine, Mt. Auburn, Clifton Heights-University Heights-Fairview (CUF), Corryville, and The Heights neighborhoods in Cincinnati. Beyond Uptown, the Reading Road corridor traverses the Avondale, North Avondale, Paddock Hills, Bond Hill, and Roselawn neighborhoods. The corridor is wholly contained within Cincinnati city limits.

UC is a major landmark and activity center along the Reading Road corridor. It does not currently have a campus master plan; implementation of the previous master plan is largely completed, although individual projects and improvements are ongoing.

Although it is not included as part of a formal or official plan, the Uptown Consortium - comprised of University of Cincinnati, Cincinnati Children’s Medical Center, and other major institutions in the Uptown area - has been developing an “Innovation Corridor” along Reading Road on both sides of MLK. The Innovation Corridor represents a major redevelopment of this area and includes major new facilities:

- Digital Futures Complex: 180,000 sq. ft office and research building
- UC Gardner Neuroscience Institute: 114,000 sq. ft. outpatient center
- National Institute of Occupational Safety & Health (NIOSH) research facility
- The Node: mixed use development with office, retail, and residential
- Uptown SMART Center: a multimodal facility including a parking garage and meeting point for Metro buses, Uptown area shuttles, bikeshare, and other mobility options. SORTA is coordinating with the Uptown Consortium on project development and funding. The planned location is one block west of Reading Road.

The neighborhood plans and aspects of those plans impacting BRT are described in Table 3-3.

**Table 3-3. Reading Road Corridor Neighborhood Plans**

Neighborhood	Plan	Mentions/Endorses BRT and/or Improved Transit Connections	Other Factors Potentially Impacting BRT Development and Design
Downtown	No current plan		
Over-the-Rhine	No current plan		
Mt. Auburn	No current plan		
CUF	No current plan		
Corryville/ The Heights	University Impact Area Solutions Study: A Strategic Plan for the Neighborhoods Surrounding the University of Cincinnati, 2016	Yes: recommends conduct of a feasibility study that looks at the overall viability of a streetcar or transportation connection to the Uptown area.  Also recommends expansion of options for a more efficient and connective transit system including exploration of crosstown and limited	Recommendations include creation of a safe and integrated pedestrian network (that can facilitate access to BRT), enhancements to pedestrian and bicycle safety. Recommendations also include further investigation of on-street and off-street parking. On-street parking is a factor in BRT design.





Neighborhood	Plan	Mentions/Endorses BRT and/or Improved Transit Connections	Other Factors Potentially Impacting BRT Development and Design
		stop routes, and to expand, improve, and market the utilization of transit	
Corryville Avondale	MLK-Reading Road Corridor Study, 2014	Partially: the study's guiding principles include improvement of access to Uptown through transit coordination, establishment of a regional and neighborhood shuttle system; support of a transit hub (development currently underway of a facility that could be served by BRT).	Recommendations include improvements that would support easy and safe access to BRT including enhanced pedestrian and bicycle infrastructure, better definition of urban street edges, and enhanced amenities including covered shelters along landscaped street edges.  Additional recommendations include 3 11' travel lanes, options for on-street parking during off-peak hours, and a 22' center median on MLK- all of which would impact the flexibility of BRT alignment and priority design.
Avondale	Avondale's Quality of Life Movement, 2019	Partially: community goals include improved access to Uptown through transit	Recommendations include improved pedestrian and bicycle connectivity, which can enhance access to BRT.
North Avondale	No current plan		
Paddock Hills	No current plan		
Bond Hill	No current plan		
Roselawn	No current plan		

**Key Reading Road corridor takeaways:**

- The University area neighborhoods (Corryville and The Heights and, less overtly, Avondale) support BRT or a BRT-like transit connection along the corridor and to downtown.
- The same areas are also encouraging traffic calming and pedestrian access and safety improvements that can help facilitate BRT operations and access to BRT stations.
- Little or no consideration is formally given to BRT on other areas along the corridor, including the neighborhoods and communities north of Avondale. Existing neighborhood and community comprehensive plans are outdated and do not address transit.

**MONTGOMERY ROAD CORRIDOR**

The Montgomery Road corridor traverses several Cincinnati neighborhoods and three other independent local jurisdictions: Norwood, Silverton, and Sycamore Township. Norwood is wholly surrounded by the City of Cincinnati. The Cincinnati neighborhoods south of Norwood are downtown, Mt. Auburn, Walnut Hills, and Evanston; between Norwood and Silverton they are Pleasant Ridge and Kennedy Heights. Xavier University is a major landmark and activity center along the Montgomery Road corridor. Xavier has completed implementation of its campus master plan; there is no new master



plan at this time. Table 3-4 identifies the plans and aspects of those plans from the neighborhoods and communities along the corridor relevant to and impacting BRT.

**Table 3-4. Montgomery Road Corridor Neighborhood and Community Plans**

Neighborhood	Plan	Mentions/Endorses BRT and/or Improved Transit Connections	Other Factors Potentially Impacting BRT Development and Design
Downtown	No current plan		
Over-the-Rhine	No current plan		
Mt. Auburn	No current plan		
Walnut Hills	Walnut Hills Reinvestment Plan, 2016	Yes: notes that early investment in transit (such as Metro*Plus) could be the precursor to increased transit investment such as BRT or streetcar technologies.  Also recommended premium mobility services.	Transit and potentially BRT supportive recommendations include: prioritize human safety ahead of auto travel speeds; develop streets conducive to walking, biking, and transit; and focus development at Peebles Corner, Lincoln-Melrose at Gilbert, and Buena Vista-MLK at Gilbert (all along the BRT corridor).  Bus-specific recommendations include: focus bus stop investments on Gilbert, bump-outs for bus stops, real-time arrival and departure information, pair bus stops with crosswalks and bike racks, and placemaking at bus stops.
Evanston	Comprehensive Plan Update, 2020	No	Recommendations include a branded streetscape on Montgomery Rd.
Norwood	Relaunch the Pike: Montgomery Road Redevelopment Plan, 2021	Partially: recommends that City of Norwood collaborate with SORTA about possible enhancements to existing routes to include Metro*Plus.	Recommendations include features that may be conducive to BRT alignments and operations such as promoting pedestrian oriented development, and applying a pedestrian oriented overlay zone,  Other recommendations involve traffic flow and would impact possible BRT alignments and priority treatments, including: center turn lanes along specific segments, permanent on-street parking along certain segments, and a planted median in the vicinity of Surrey Square and near the Norwood Lateral.
Pleasant Ridge	Pleasant Ridge Market Study and Vision Plan, 2016	No	Recommends that future develop promote higher density and mixed use in-fill, which may be conducive to ridership generation and influence station locations.  Also recommended restricting peak hour parking as a means to create dedicated turning lanes and additional lane capacity.
Kennedy Heights	Kennedy Heights Neighborhood Plan	No	Transit-related recommendations are numerous but focus on bus stops including enhancement of safety and comfort, adequate lighting, benches, and branding.
Silverton	Comprehensive Plan Update	No	Notes recent improvements to the Montgomery Rd. streetscape that have enhanced walkability and



Neighborhood	Plan	Mentions/Endorses BRT and/or Improved Transit Connections	Other Factors Potentially Impacting BRT Development and Design
			connectivity. Recommended a branded streetscape on Montgomery.
Sycamore Township	No current plan		

Key Montgomery Road corridor takeaways:

- Positive support for BRT or BRT-type service is apparent in Walnut Hills but less so along other segments of the corridor.
- Streetscape and focused development at key nodes in several neighborhoods and communities can help attract riders and enhance connectivity to BRT.
- Various traffic-related recommendations may pose design challenges to BRT in terms of potential dedicated ROW and priority treatments.

## SUMMARY

Neighborhood and community plans and studies vary greatly in terms of focus, issues, and priorities. Many of the neighborhoods and communities along the study corridors have plans that date as far back as the 1970s which have not been updated. Others are very recent and reflect recent transit initiatives in Cincinnati and surrounding communities and, in a few instances, discuss and endorse BRT or comparable high capacity, premium service.

Although many neighborhood plans may not directly address BRT or public transit, most do promote urban design, urban development, streetscape, and traffic projects that are traditionally considered favorable to the use of transit and, by extension, future BRT. These treatments and recommendations include:

- Focused development at major nodes along the BRT corridors.
- High density and mixed-use development that will draw more riders and activity and, by extension, generate ridership.
- Enhanced infrastructure to promote walkability and connectivity, which can help generate ridership and extend the reach of a BRT line.
- Treatments to enhance comfort and safety at bus stops such as lighting, seating, and landscaping.

Several of the plans also focus on traffic-related improvements. In some instance the emphasis is to slow down traffic to improve safety. In other instances, however, the improvements are intended to move more traffic and more efficiently through the use of center turn lanes, landscaped medians, and on-street parking policies. These factors will have a significant bearing on the ability of BRT to incorporate exclusive lanes and priority treatments.





## City of Cincinnati and Hamilton County

The City of Cincinnati's Comprehensive Master Plan, *Plan Cincinnati*, is now ten years old, having been adopted by Cincinnati City Council in 2012. There is no update currently underway. Although Plan Cincinnati pre-dates the emergence of BRT as a viable and popular high-capacity transit mode, it includes a comprehensive array of socio-demographic data. Its recommendations designed to promote the expansion and usage of public transit and guide urban design and development in ways that are conducive to generating transit ridership and accessibility to potential future transit investments such as BRT.

More recently, the City of Cincinnati adopted a **Green Cincinnati Plan**, which also includes recommendations, albeit at a high and aspirational level, that would foster use of public transit and, by extension, a future BRT network.

Hamilton County's planning initiatives are more limited and tend to be focused on assisting local communities with development of comprehensive, land use, and other specialized community plans

Both plans and reports are illustrated in Figure 3-4.

**Figure 3-4. City of Cincinnati and Hamilton County Plans**



### PLAN CINCINNATI

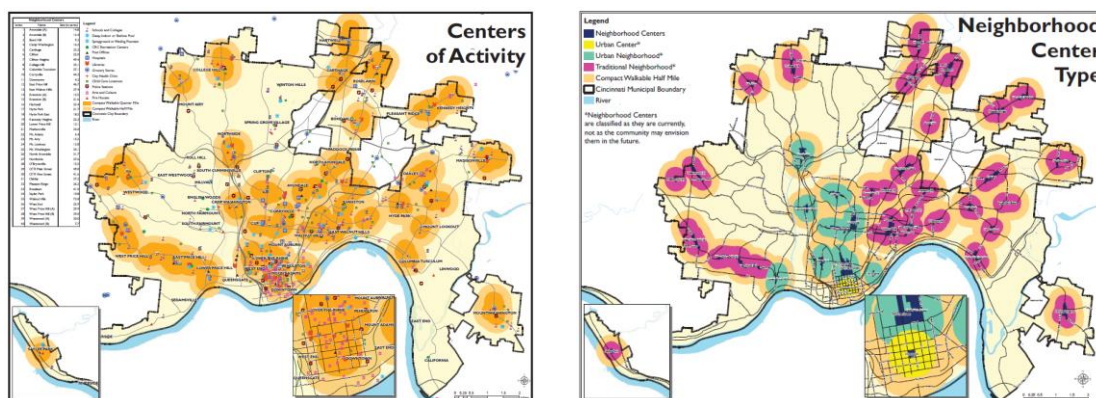
Some of the demographic information and mapping developed for Plan Cincinnati is being updated as part of the BRT Study. Examples of mapping relevant to the BRT Study are shown in Figure 3-5. They illustrate centers of activity and neighborhood centers by type, many of which are located along the four BRT Study corridors.

The 2012 Plan Cincinnati is extensive but contains a wide range of general recommendations instead of specific projects such as a transit line like BRT. As such, the plan focuses on broad principles, goals, and strategies. It starts with six Livability Principles:

1. Promote more transportation choices.
2. Promote equitable, affordable housing.
3. Enhance economic competitiveness.
4. Support existing communities.
5. Coordinate and leverage federal policies and investment.
6. Value communities and neighborhoods.



**Figure 3-5. Plan Cincinnati Centers of Activity and Neighborhood Center Types**



Goals 1 and 6 relate most directly to the BRT Study

Under the “promote more transportation choices” principle, more specific guiding policy principles that related to transit in general and to corridor-based transit (such as BRT) include:

- Be aggressive and strategic in future growth and development.
- Preserve or create a pedestrian-scaled city.
- Spend funds more strategically.
- Preserve our resources and facilitate sustainable development.

Guiding geographic principles that relate to the BRT Study include:

- Focus revitalization on existing corridors of activity, including Glenway, Hamilton, Reading, and Montgomery
- Business district parking should be located behind buildings.
- Link centers of activity where appropriate.

More specific strategies that relate to the BRT Study include:

- Develop an efficient multi-modal transportation system that supports neighborhood vitality.
- Develop a regional transportation system that emphasizes public transit.
- Coordinate transit-oriented development into City codes by incentivizing density and mixed uses around transit hubs.
- Improve crosstown connections.
- Plan, design, and implement a safe and sustainable transportation system.

In the 10-year period that followed the adoption of Plan Cincinnati, several of its recommendations were implemented by the City, a form-based code being the most significant instrument of change. The form-based code encourages mixed uses, higher density development, and pedestrian-oriented design that can be conducive to facilitating transit ridership. Other entities, such as SORTA with its implementation of new crosstown routes, have also implemented specific improvements that meet the principles and goals of the plan.

## **GREEN CINCINNATI PLAN**

The 2018 Green Cincinnati Plan set a broad range of goals and targets to improve air and water quality along with other environmental factors. BRT can help the City achieve several of its goals:



- Increase the number of passenger miles traveled by public transit by 25% in 2035.
- Encourage corporate sponsorship of transit passes and infrastructure.
- Improve neighborhood walkability by improving sidewalk connectivity and pedestrian safety, especially in low-income neighborhoods.
- Increase public transit and increase transit funding.
- Increase connectivity and cohesion with multimodal transportation options.
- Create a transit link between Downtown and Uptown.

Most of the Plan’s goals are at a high level and lack specific implementation or funding strategies. The final goal, addressing a transit link between Downtown and Uptown, most directly applies to the BRT Study, as the Hamilton and Reading corridors would individually, or combined, create such a link.

The Plan states that an “extension of a transit link to Uptown is a cost intensive recommendation which has the potential to dramatically alter the ability of residents to easily travel across multiple neighborhoods in Cincinnati. The recommendation carries the potential to improve neighborhood connectivity between the Central Business District, Avondale, Clifton, Clifton Heights, University Heights and Fairview (CUF), Corryville, and parts of Mt. Auburn.”

BRT was not specifically considered for this link; the Plan includes a cursory look at possible rail or aerial tram-type systems. However, a BRT connection could accomplish the same goal. The Plan states that its analysis “does not attempt to factor in potential property value shifts, a potential for sustained increase in ridership or the significant business opportunities that the transit link provides.”

## HAMILTON COUNTY PLANNING + DEVELOPMENT

Hamilton County does not have a countywide land use or transportation plan. Documentation of efforts and activities of the County’s Planning + Development department are included in its most recently published *Annual Report (2020)*. The department’s activities include involvement in the City of Norwood Redevelopment Plan (Montgomery Road) and the Village of Silverton’s Interim Comprehensive Plan Update. Countywide initiatives such as comprehensive land use, growth management, and public transit are not addressed.

## Business Sector

Various local business sector entities have conducted analyses and sponsored initiatives and studies that provide various levels of background data and information that do not specifically address BRT but can have an impact on planning of and support for a BRT network. The Cincinnati USA Regional Chamber has been most involved in the development of a more regional and convenient transit system, including support for Issue 7. The Chamber’s and other business sector efforts are illustrated in Figure 3-6.





Figure 3-6. Business Sector Plans and Studies



## CINCINNATI USA REGIONAL CHAMBER: THE CONNECTED REGION

The Cincinnati USA Regional Chamber has been in the forefront of organizing and leading the business community, and the region as a whole, to focus on the need to improve public transit and support initiatives to implement an enhanced regional system. As described in the initiative’s website, [www.theconnectedregion.com](http://www.theconnectedregion.com), the Chamber describes that it has “spent the last five years engaging with our community, studying the data, and traveling to cities across the country to understand what it will take to create a transportation system that helps businesses grow, attracts talent to our region, and provides people with access to opportunity.”

The Chamber is partnering with three other entities as part of The Connected Region initiative: REDI Cincinnati, the Cincinnati Business Committee (CBC), and the Cincinnati Regional Business Committee. As part of its development of a vision for regional public transit, the Chamber identified five guiding principles:

- Invest in the future of public transit.
- Improve and maintain our infrastructure.
- Drive innovation and future-oriented investments and projects.
- Provide people with transportation choices that fit their needs.
- Align regional transportation decision-makers toward the vision.

Although the Chamber has not prepared a report detailing its analytics, it has prepared or engaged with various resources to aid the region, and the business community in particular, in promoting The Connected Region’s vision. In addition to SORTA’s Reinventing Metro program, these are:

**Federal Transportation Funding Analysis & Forecast: Infrastructure Funding and Strategic Planning – Task 1 Report, June 10, 2022.** The Chamber commissioned this study to determine how much funding the Cincinnati region can expect from the recent Infrastructure Investment and Jobs Act, also known as the Bipartisan Infrastructure Law (BIL) that was enacted in 2021. The analysis determined that:

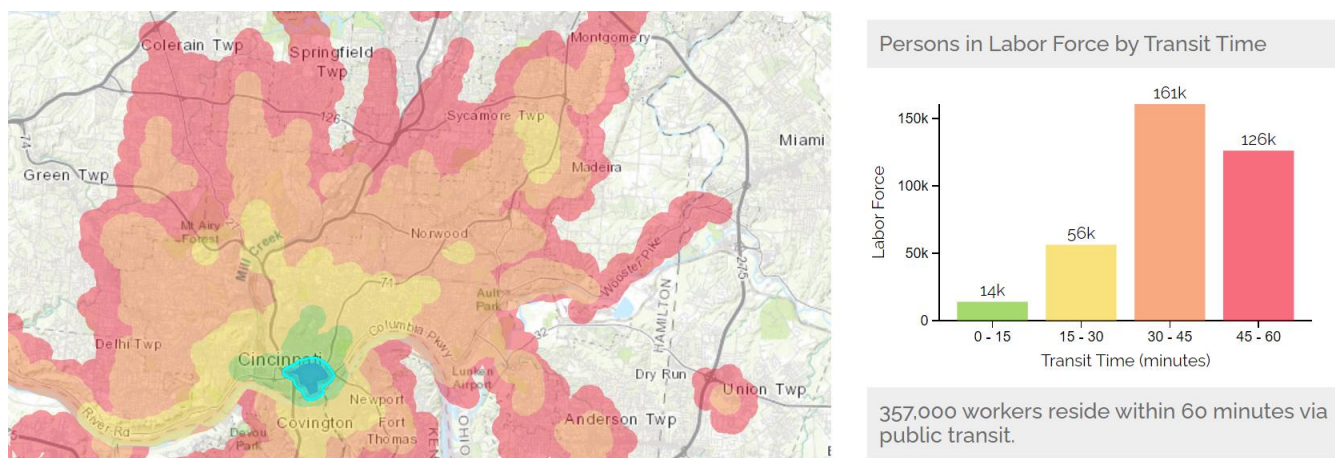


- The region would have been allocated approximately \$250 million in federal transportation funds per year with a continuation of existing funding levels under the Fixing America's Surface Transportation (FAST) Act.2
- The region can expect allocations of approximately \$300 million under BIL, representing a 25% increase in baseline funding (i.e., funding that is distributed by formula).
- Formula programs were increased between 20% and 30% on average (in line with expected distributions to the region), but discretionary programs, which are available nationally and award funding through competitive grants, increased by orders of magnitude – approximately 300% more money is available each year in discretionary transportation funds than in previous years.

The results appear to be favorable for potential federal funding of a BRT project, contingent on a favorably score project under FTA's CIG program.

**Job Hubs Cincy Region.** This interactive tool has been developed by the Ohio Kentucky Indiana Regional Council of Governments (OKI) for use by the business community and the community at large. It enables the user to select among an array of pre-determined existing and job clusters and identify the “travel shed”- how many people in a given area can access the job center in 15, 30, 45, and 60-minute increments, and illustrate the results geographically. This tool may have value in the alignment and station location process of the BRT Study. An example, focusing on the downtown Cincinnati job cluster, is shown in Figure 3-7.

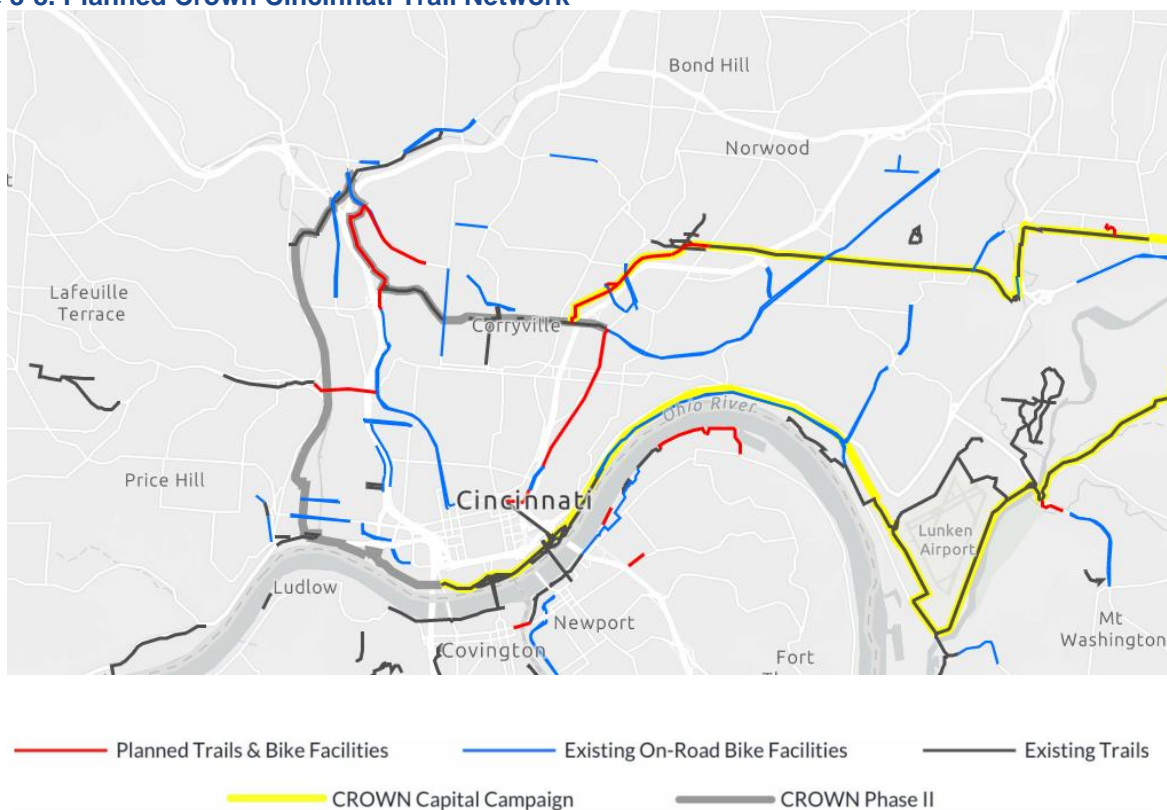
**Figure 3-7. Job Hubs Cincy Region Example – Downtown Cincinnati**



**Crown Cincinnati.** A public-private partnership, Crown Cincinnati is an advocacy group promoting “The Crown”: a 34-mile multi-use trail connecting several Cincinnati neighborhoods and communities in the region. This organization lobbies for funding and support to develop the trail network that touches the four BRT corridors at different locations. The Hamilton and Reading corridors would be most extensively connected to the Crown trail network, which includes lanes along Central Parkway and the Wasson Way trail. A map of the planned Crown network is shown in Figure 3-8.



**Figure 3-8. Planned Crown Cincinnati Trail Network**



## REDI CINCINNATI

REDI Cincinnati is a public-private partnership created to promote the Cincinnati region as a great place to do business, and specifically to attract and retain business in the Cincinnati region. Its founder level investors include the City of Cincinnati, Hamilton County, the University of Cincinnati, Duke Energy, Procter & Gamble, and major banks. REDI Cincinnati does not have a plan or demographic/mobility database. Its 2021 annual report does not reference public transit in general or BRT in particular.

## UNIVERSITY OF CINCINNATI ECONOMICS CENTER

The University of Cincinnati's Economics Center is frequently engaged by public and private entities to analyze economic conditions and trends, and to conduct benefit-cost analyses of major projects. It recently prepared a regional employment forecast, *Jobs Outlook 2028: Data and Insights on Job Growth in the Cincinnati Region 2018-2028*. The document provides a broad perspective but does not forecast jobs by geographic area or corridor.

## CINCINNATI MOBILITY LAB

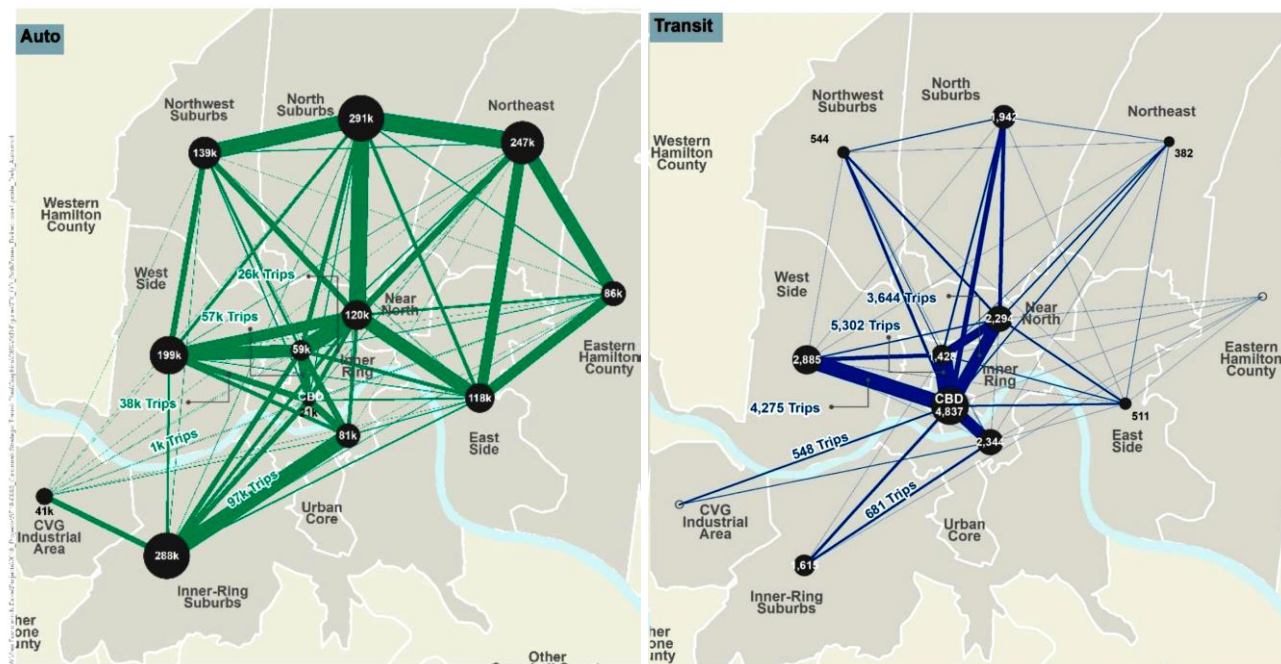
In 2018, Uber partnered with the City of Cincinnati and the Ohio Kentucky Indiana Regional Council of Governments (OKI) to create a partnership called the Cincinnati Mobility Lab to develop "innovative transportation strategies" for the region. SORTA and the Transit Authority of Northern Kentucky (TANK) were cooperating entities. Uber was the lead entity in this initiative and hired a consulting firm to conduct an analysis of auto, transit, and transportation network company (TNC, i.e. Uber) travel patterns. The outcome was the *Cincinnati Strategic Planning Study*, released in 2020.





Travel pattern data was regional in scope but provides a readily discernable snapshot of major travel patterns and corridors, as illustrated with examples in Figure 3-9.

**Figure 3-9. Desire Lines for Daily Subregional Auto and Transit Person Trips**



The study includes a selection of selected transit performance data, such as average speeds for Metro Route 4, as provided by SORTA, and a geographical representation of systemwide on-time performance.

The study's conclusions, however, are significantly narrower in scope than the original stated aims of the project. It includes two different sets of recommendations:

The first is the creation of three TNC subregional pilot areas using Uber and/or similar services to fill mobility gaps where fixed route service is either limited or, due to the street network, unable to cover the area. While the focus of these pilot zones is in outlying suburban areas, one area closer to the urban core, and relating to the BRT corridors, is an Avondale-North Avondale zone, as shown in Figure 3-10. The zone boundaries are similar to the Avondale MOD zone identified in SORTA's recently completed Mobility on Demand Study. The location of this zone straddles the Reading Road corridor. A mobility service in this area would have the potential to enhance access to BRT.

The second recommendation focuses on curbside management, involving transit stops, delivery zones, parking, and TNC waiting zones, many of which are in competition for curbside space in busy areas. The concept, illustrated in Figure 4-11, lays out a hierarchy of curbside spaces in an attempt to accommodate all users while minimizing conflicts. Implementation of this program would be the responsibility of the City of Cincinnati (and the local jurisdictions in other communities). Competition for curbside space in Cincinnati primarily occurs on downtown and Uptown. All four BRT corridors are impacted; because the Hamilton Avenue and Reading Road corridors also serve downtown, both may benefit from the better designed and coordinated strategy offered in the study.



Figure 3-10: Cincinnati Mobility Lab Recommended Avondale – North Avondale Mobility Zone (Showing Key Destinations)

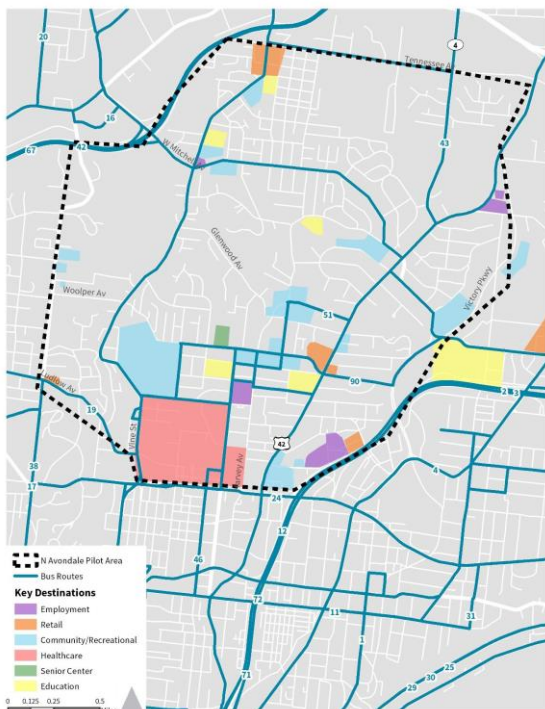
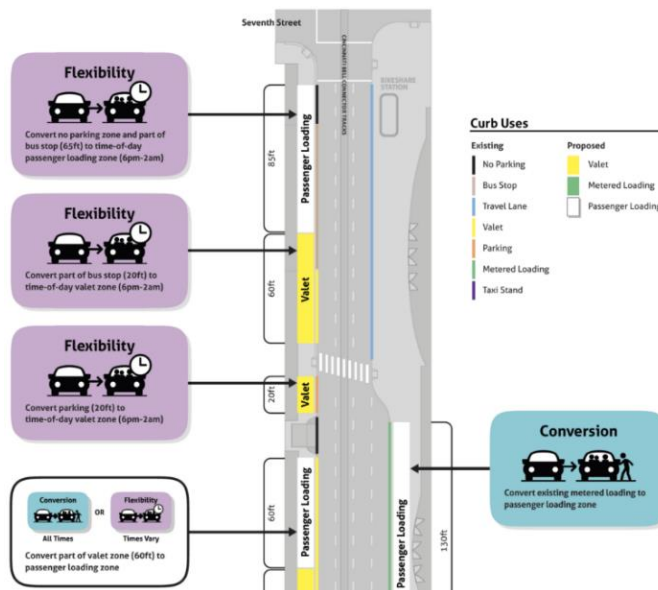


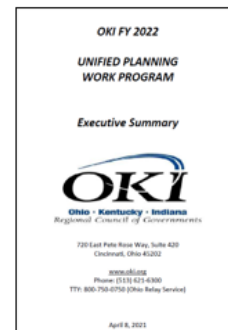
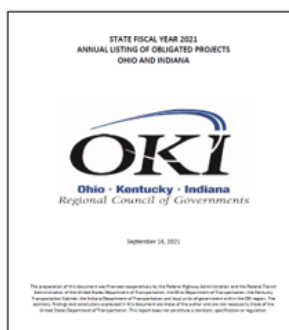
Figure 3-11: Cincinnati Mobility Lab Conceptual Curb Management Layout



## Metropolitan Planning Organization (OKI)

OKI serves as the Metropolitan Planning Organization (MPO) for the Southwest Ohio-Northern Kentucky-Southeast Indiana region. As MPO, OKI directs federal transportation funds to counties, communities, and agencies including SORTA. OKI does not typically take an active role in the planning of regional or localized transit projects but helps coordinate these investments and guide funding through its various programs, as illustrated in Figure 3-12.

Figure 4-12. OKI Plans and Programs





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## 2050 METROPOLITAN TRANSPORTATION PLAN

OKI's Metropolitan Transportation Plan was approved by the OKI Board of Directors in 2020. It pre-dates the passage of BIL, on the federal level, and Issue 7, on the local level. The plan provides an outline of federal and state funding sources for transportation including:

- FTA Section 5307 formula funds for operations
- FTA Section 5309 discretionary funds for capital projects including buses
- FTA Section 5339 funds to purchases buses and construct bus-related facilities
- Congestion Mitigation Air Quality (CMAQ) flexible funding originating from the Federal Highway Administration (FHWA)
- U.S Department of Transportation (USDOT) BUILD grants (subsequently replaced by the RAISE program) for transportation infrastructure
- Credit assistance programs such as TIFIA

The plan estimated future funding levels (Ohio) over the course of the 30-year 2020-2050 period:

- Multimodal discretionary projects: \$4.9 billion
- Transit capital: \$0.8 billion
- Transit operating: \$1.6 billion

This funding availability directly impacts the development of SORTA's BRT network, which is eligible for funding from several programs in addition to the FTA CIG program.

## FY 2022 UNIFIED PLANNING WORK PROGRAM

OKI's annual Unified Planning Work Program (UPWP) identified the initiatives that OKI staff and others intend to pursue in the upcoming year. For the current program, activities that relate to the BRT study include:

- SORTA Planning Studies: Continuation of planning and design for the Walnut Hills Transit Center (Montgomery Road BRT corridor), North College Hill Transit Center (Hamilton Avenue BRT corridor). And Uptown SMART Hub (Reading Road BRT corridor).
- Continued development of a long- range Strategic Plan (Reinventing Metro).

## FY 2021 ANNUAL LISTING OF OBLIGATED PROJECTS: OHIO

This annual list identifies projects that have been allocated funding. The projects that involve or impact the BRT Study corridors include:

- Hamilton Avenue BRT corridor: pedestrian improvements on US 127 including bump outs, new signage and markings, and associated improvements.
- Montgomery Road BRT corridor: pavement rehabilitation on the Gilbert Avenue bridge over Eggleston Avenue, resurfacing portions of US 22, signal upgrades, and signal timing analysis in Norwood.

There are no projects along the Glenway Avenue and Reading Road BRT corridors in the current listing.



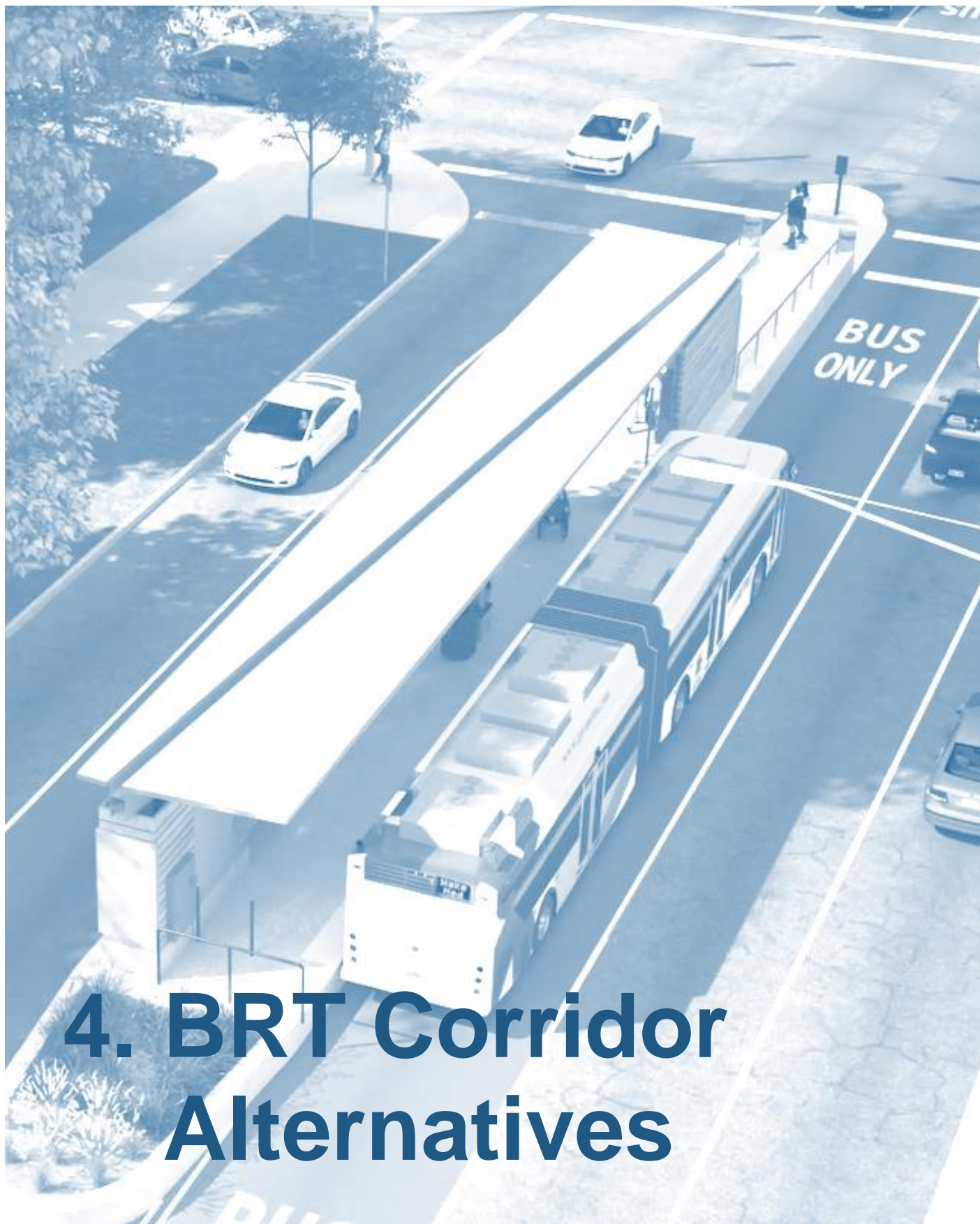


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## 2022 DRAFT PROJECT LIST FOR FUTURE FUNDING

Several projects and project costs along the four BRT corridors are included on the current list. These include:

- Glenway Avenue BRT corridor:
  - Intersection improvements and turn lanes on Glenway Avenue between Overlook and Boudinot (\$10.7m)
  - SORTA BRT (Phase 1a) (\$121.25 million)
- Hamilton Avenue BRT corridor:
  - Uptown multi-use path on MLK between Clifton and Burnet (\$7.24 million)
  - SORTA BRT (\$173.80 million)
- Reading Road BRT corridor:
  - Uptown multi-use path on MLK between Clifton and Burnet (\$7.24 million)
  - Upgrade traffic operations in Burnet Ave. between Reading Road and Forest Avenue by adding turn lanes, street widening, and parking restrictions (\$10.14 million)
  - Add left and right turn lanes on Harvey Avenue between MLK and Forest (\$10.14 million)
  - Add left turning lanes with intersection and pedestrian improvements between Victory Parkway and Galbraith Road and between Elsinore and Burnet (\$26.06 million)
  - Widen to Reading Rd. to 3 lanes in each direction between Clinton Springs and Paddock (\$7.24 million)
  - SORTA BRT (Phase 1b) (\$121.25 million)
- Montgomery Road BRT corridor:
  - SORTA BRT (\$173.80 million)
- Regional:
  - New SORTA Crosstown Transit Centers (\$28.53 million)
  - SORTA Transit Stop Shelters and Benches (\$5.94 million)
  - SORTA Alternative Energy Fleet (\$58.84 million)
  - Upgrade and expand traffic signal system citywide (Cincinnati) (\$5.94 million)



# 4. BRT Corridor Alternatives



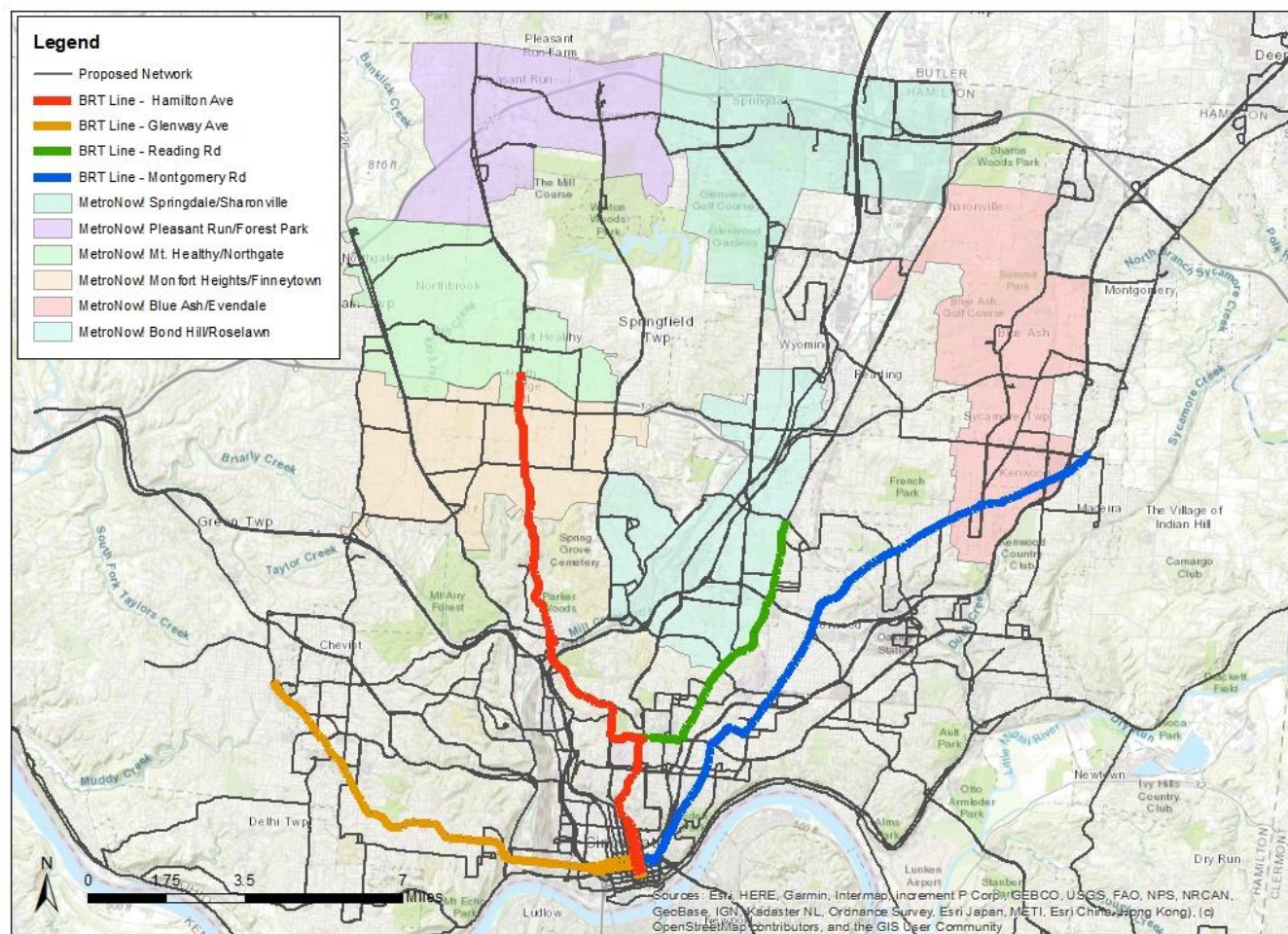


# 4. BRT Corridor Alternatives

## Reinventing Metro Concept

The Reinventing Metro plan, completed in 2019, included a BRT network as part of its recommended service and financial plan. BRT was analyzed along six corridors. Two of the six corridors – using portion of the SORTA-owned Oasis Line and Blue Ash Lines – were dropped from further consideration due to low projected ridership and compatibility issues with existing freight rail operations. The remaining four corridors – Glenway Avenue (orange), Hamilton Avenue (red), Reading Road (green), and Montgomery Road (blue) - shown in Figure 4-1 form the basis of this study. The map also includes SORTA’s planned Mobility on Demand (MetroNow) zones.

Figure 4-1. Reinventing Metro Proposed BRT Network





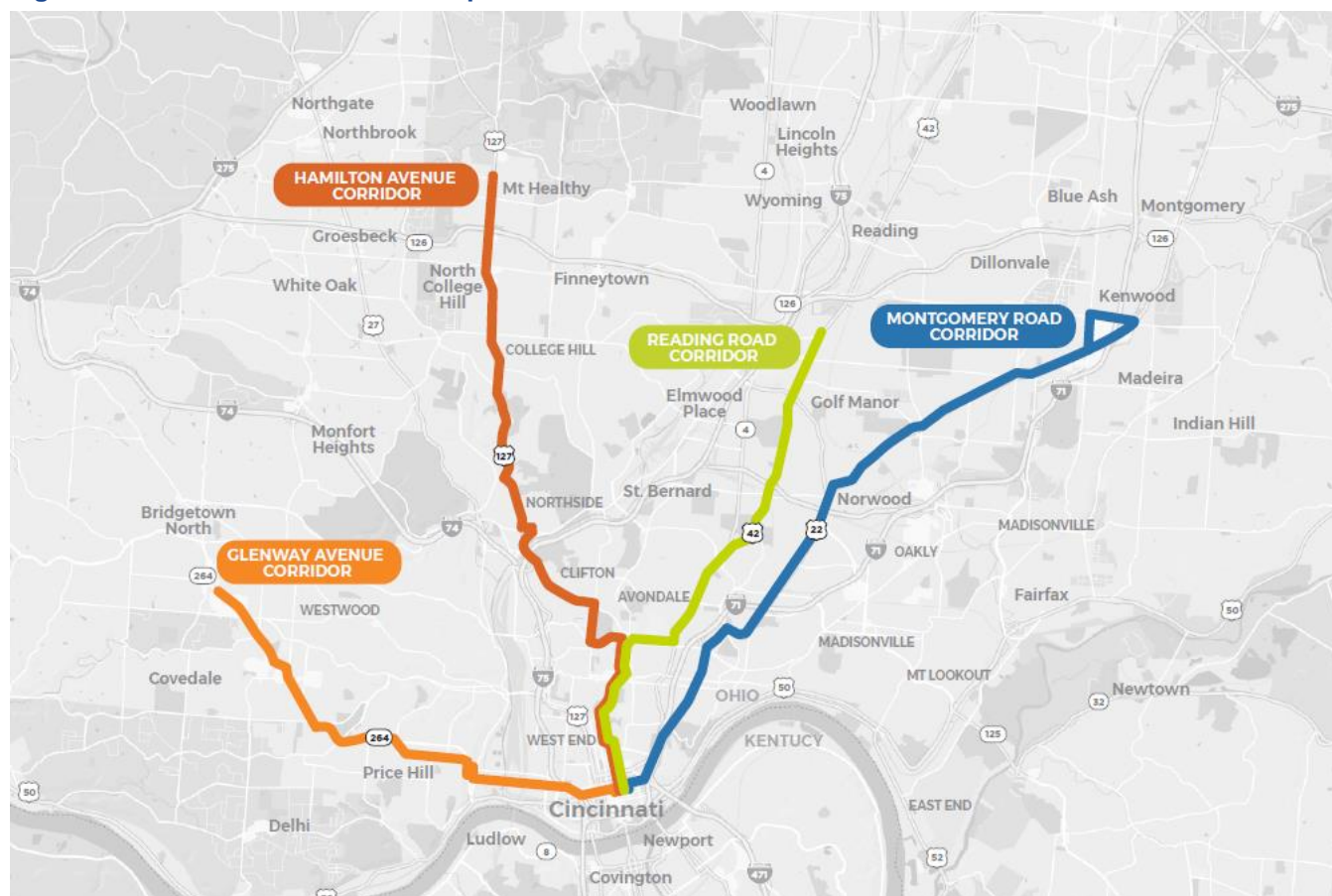


## Corridor Refinement

At the outset of this study, minor modifications were made to the corridors, thereby establishing the planning, evaluation, and conceptual design parameters for each. The modifications involved the terminus locations for analysis purposes, as shown in Figure 4-2:

- Glenway Avenue Corridor terminus: Western Hills Plaza vicinity (Glenway Crossing Transit Center, not shown on the map, was also included in the corridor study area.)
- Hamilton Avenue Corridor terminus: Hilltop Plaza, Mt. Healthy
- Reading Road Corridor terminus: Roselawn
- Montgomery Road Corridor terminus; Kenwood Towne Center, Sycamore Township

**Figure 4-2. Refined Corridors for Step 1 Evaluation**





## Comparative Corridor Demographic Assessment

The four corridors are compared against Hamilton County averages in terms of population and other demographic attributes.

### POPULATION

Figure 4-3 shows population density distribution in Hamilton County. Each of the four corridors serves areas with relatively high densities. The Hamilton Avenue and Reading Road corridors traverse the highest density neighborhoods between Vine Street and Central Parkway, including the downtown, Over-the-Rhine, and Uptown neighborhoods. High densities continue to the northeast along portions of the Reading Road and Montgomery Road corridors, including North Avondale and Norwood. Northwest of Uptown, the Hamilton corridor exhibits moderate densities with the exception of the high density College Hill neighborhood. To the west, much of the Glenway Avenue corridor runs through or is adjacent to areas of high population density.

Figure 4-3. Population Density

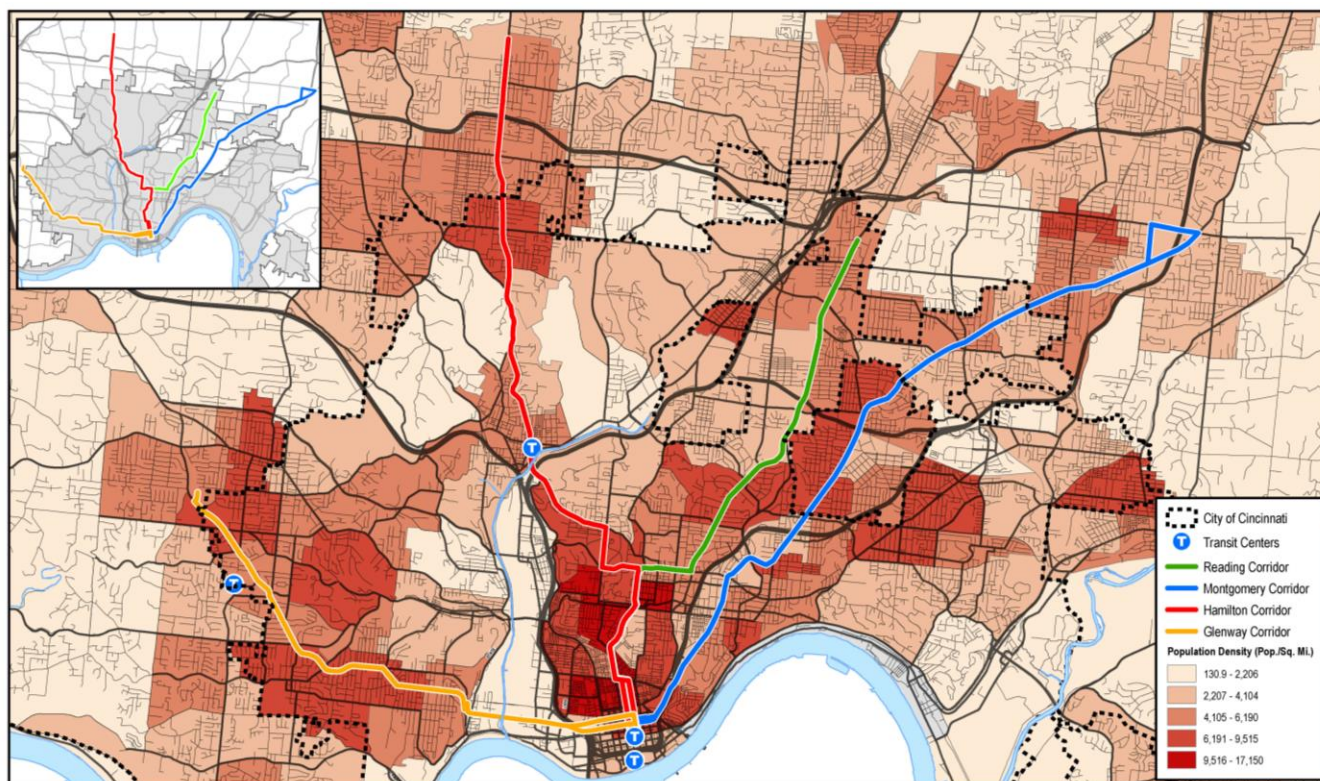
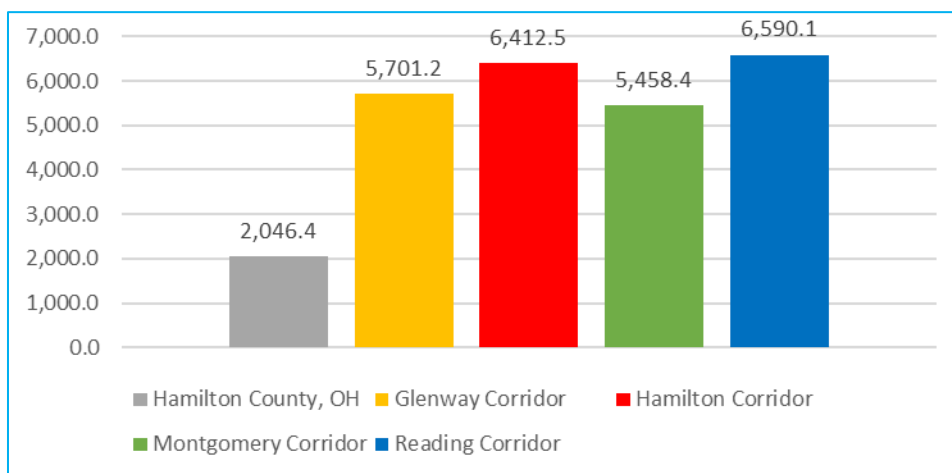


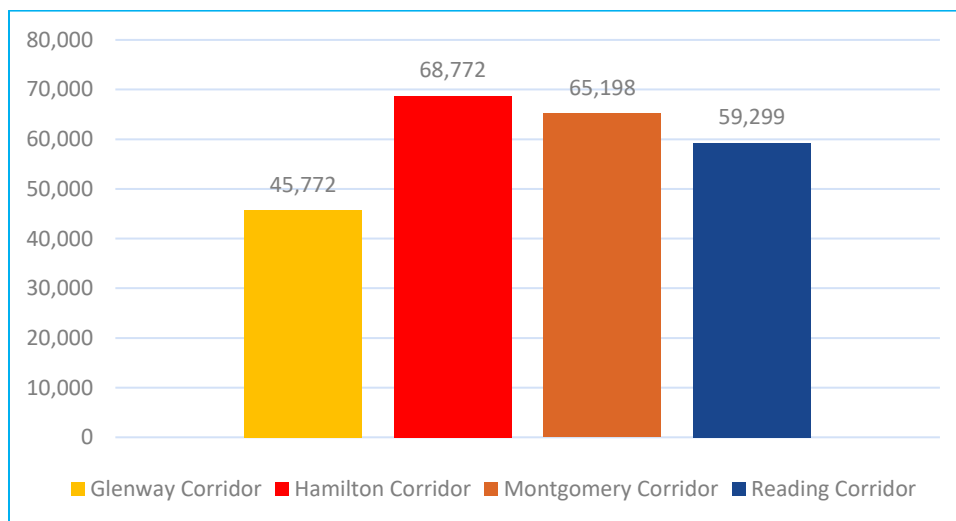
Figure 4-4 compares the population density of each corridor relative to Hamilton County. The Hamilton Avenue and Montgomery Road corridors exhibit the highest population density with about 6,500 persons per square mile each. They are closely followed by the Glenway Avenue and Reading Road corridors, with about 5,700 and 5,460 persons per square mile, respectively. These high density levels are significantly higher – about triple the density - than the Hamilton County average of about 2,000 persons per square mile. In terms of total population, the Hamilton corridor is the highest, with nearly 68,000 residents, followed in descending order by the Montgomery Road, Reading Road, and Glenway Avenue corridors (Figure 4-5). Corridor length is a partial factor in the total population.



**Figure 4-4. Population Density Comparison (Person per Square Mile)**

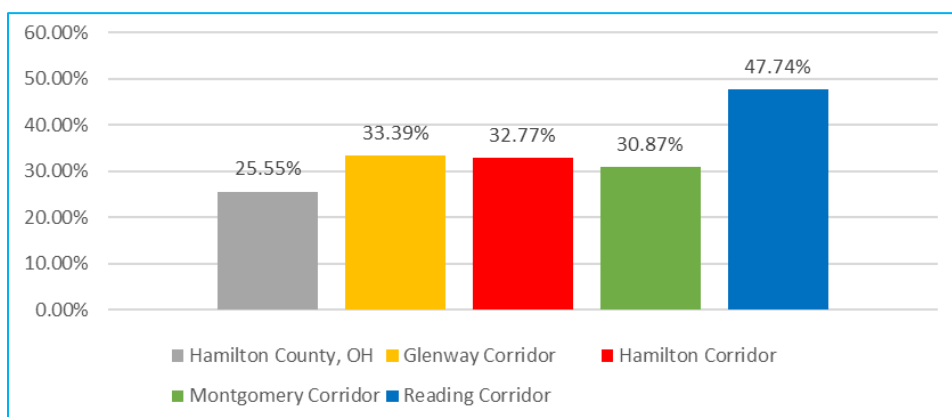


**Figure 4-5. Corridor Population**



Figures 4-6 and 4-7 show the percentage of population in each corridor and the county as whole who identify themselves as Black or African American and Hispanic or Latino, respectively.

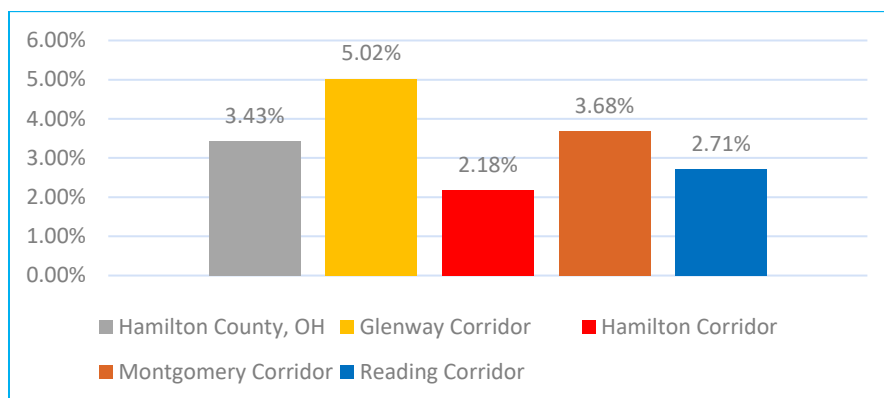
**Figure 4-6. Percentage of Population Identified as Black or African American**







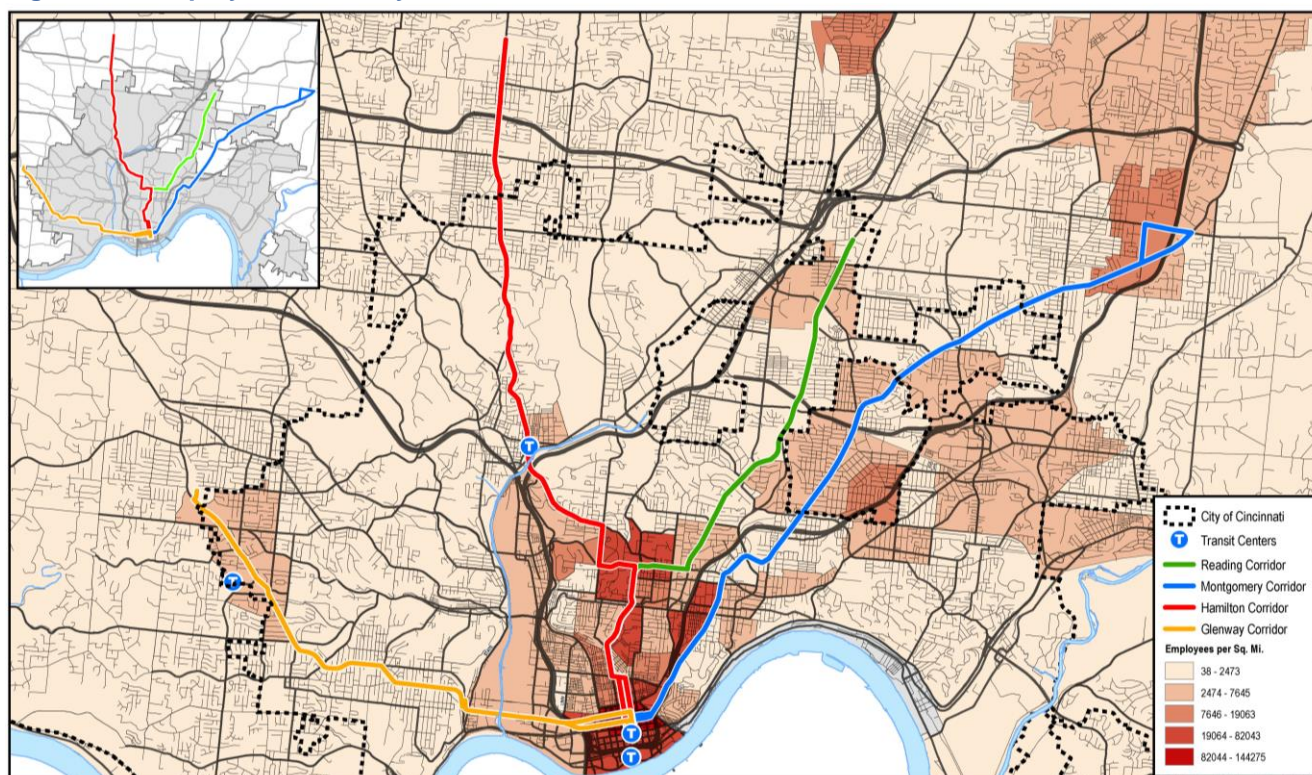
**Figure 4-7. Percentage of Population Identified as Hispanic or Latino**



## EMPLOYMENT

Figure 4-8 illustrates employment density in Hamilton County and along the corridors. The urban core is by far the most densely populated area in terms of employment, focused on downtown and the Uptown area. Outside the core and along the corridors, the most significant employment areas are Kenwood/Sycamore Township (Montgomery Road corridor), Roselawn (Reading Road corridor), (Norwood (Montgomery Road corridor), Western Hills (Glenway Avenue corridor), Clifton (Hamilton corridor), and Northside (Hamilton Avenue corridor). With the exception of the Lower Mill Creek/Queensgate area west of downtown, the Oakley-Madisonville areas on the east side, Blue Ash-Montgomery area to the northeast, and Sharonville area to the north, the majority of employment sites in Hamilton County are located along or close to the four study corridors.

**Figure 4-8. Employment Density**

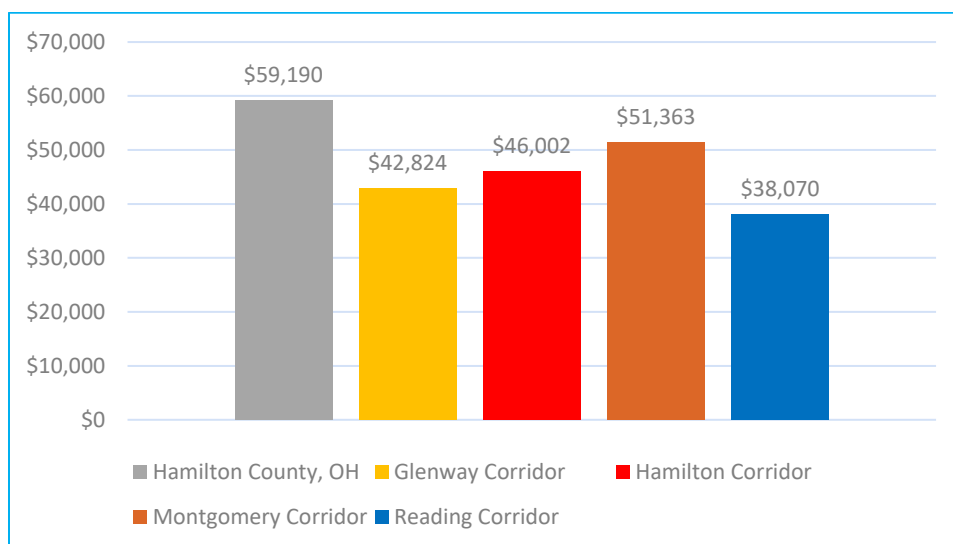




## INCOME

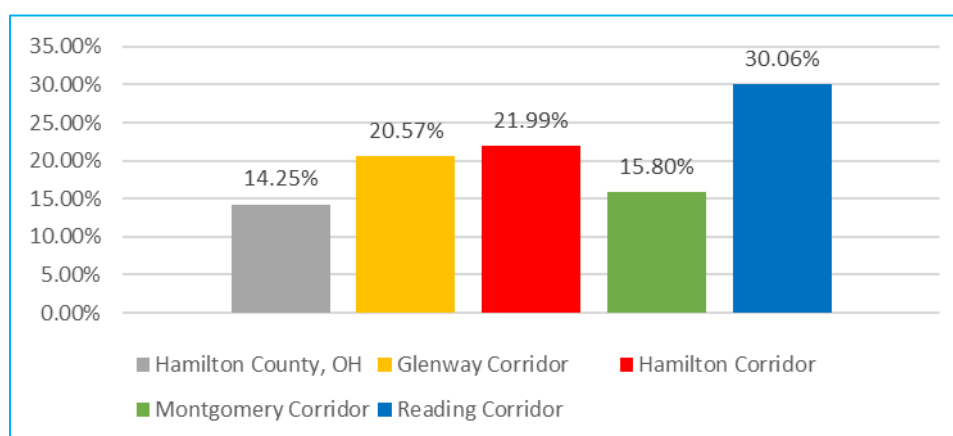
Median household income is shown in Figure 4-9. All four corridors are below the Hamilton County average of about \$59,000. The Reading Road corridor is the lowest at \$38,000 while the Hamilton Avenue corridor is the highest, at about \$51,000- still 13% lower than the countywide average.

**Figure 4-9. Median Household Income**



Very low income households in each corridor are measured by the percentage of households below the federal poverty limit, as shown in Figure 4-10. The Reading corridor has the highest proportion of households below the poverty limit, at 30%, double the countywide average. The Montgomery Road corridor has the lowest proportion of very low income households, at nearly 16%. The Hamilton Avenue and Glenway Avenue corridors are both just above 20%.

**Figure 4-10. Percentage of Households Below Federal Poverty Limit**



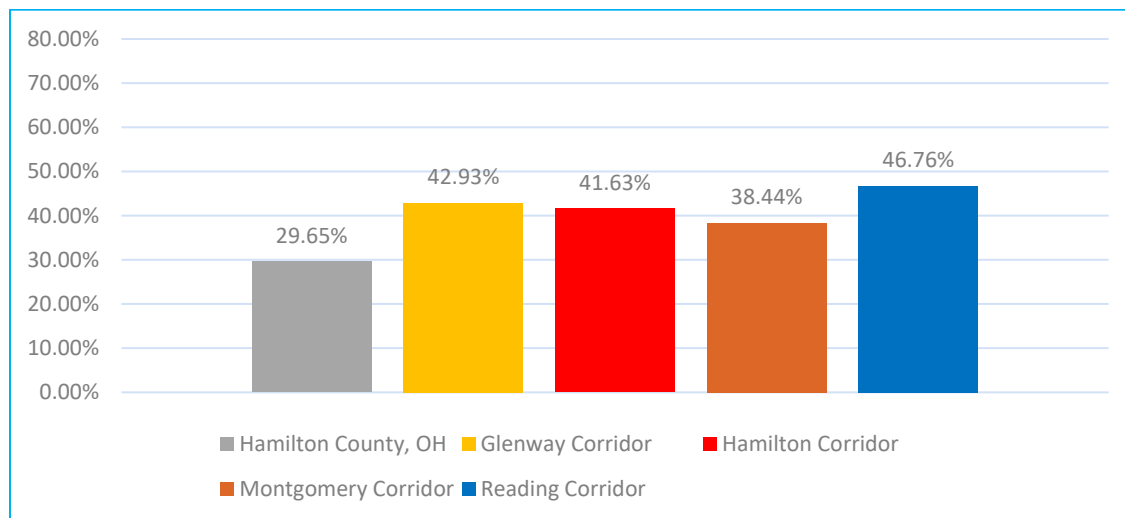
## AUTO OWNERSHIP

The percentages of total households and renter households with either no vehicle or only one vehicle are shown in Figures 4-11 and 4-12, respectively. Household vehicle ownership is significantly lower in the study corridor than it is for all of Hamilton County. Nearly half of all households in the Reading Road

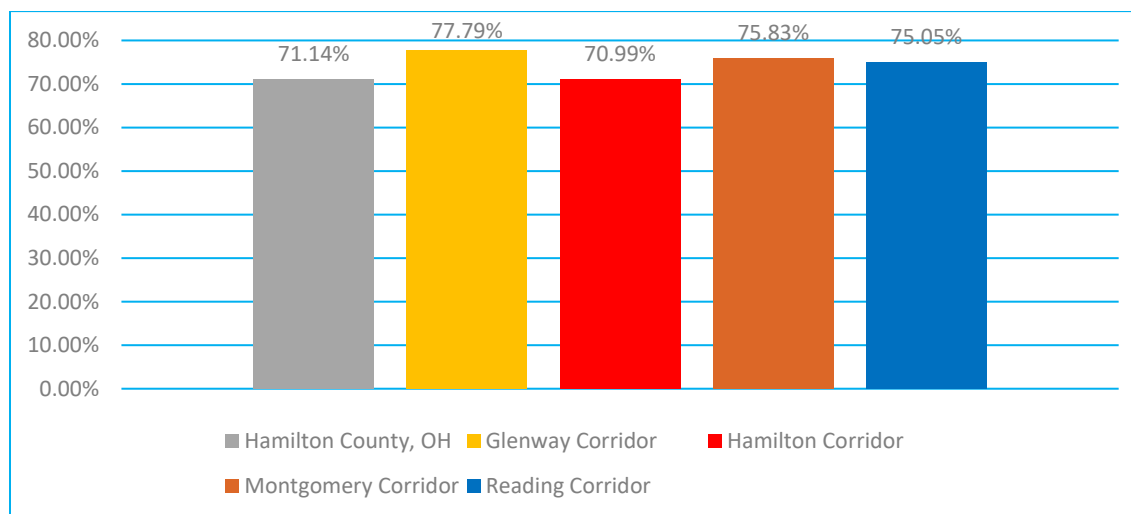


corridor have one or no cars available while the other three corridors range from 38% (Montgomery Road corridor) to nearly 43% (Glenway Avenue corridor). In terms of renter households, the percentage of zero and one car households is similar to or slightly greater than the county average of 71%.

**Figure 4-11. Percentage of Total Households with One or No Vehicle**



**Figure 4-12. Percentage of Renter Households with One or No Vehicle**



## Corridor Profiles

Land use, transit usage, and potential TOD site observations for each corridor are explored on the following pages.





The Glenway Avenue Corridor extends from the intersection of Glenway Avenue (SR 264) and Westbourne Drive in Bridgetown to downtown Cincinnati.

#### LENGTH

Approximately 9 miles

#### PRIMARY ROADS TRAVELED

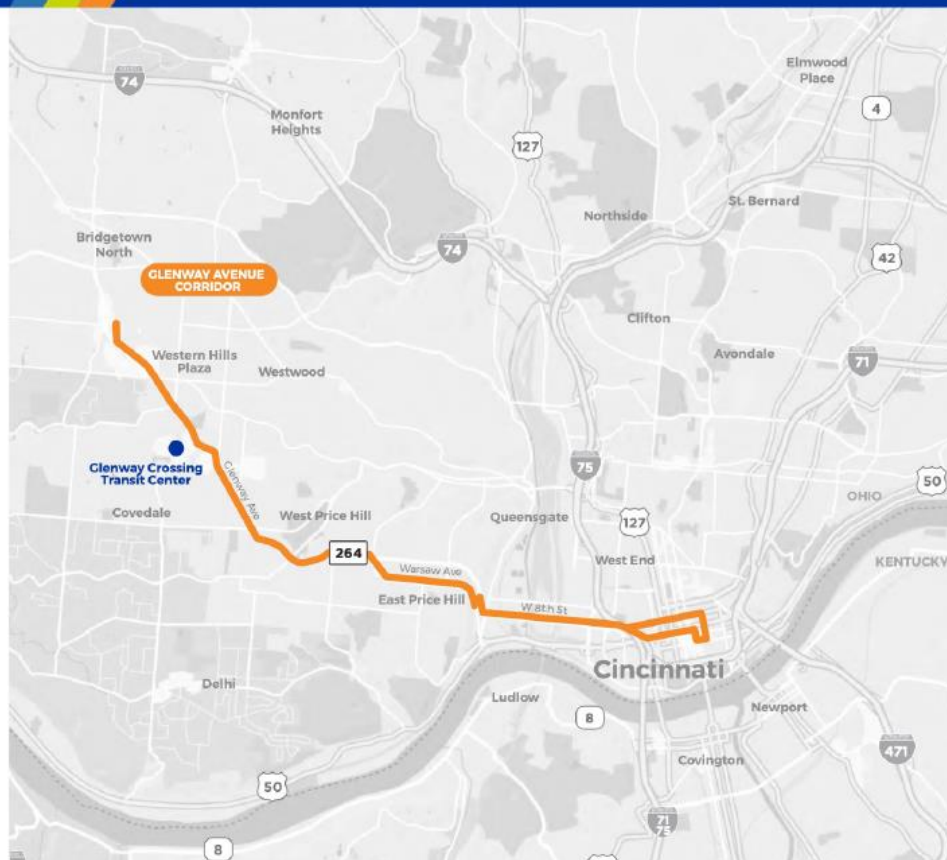
- Glenway Avenue
- Warsaw Avenue
- West 8th Street

#### COMMUNITIES SERVED

- Bridgetown
- Covedale
- Westwood
- West Price Hill
- East Price Hill
- Lower Price Hill
- Queensgate
- Downtown

#### EXISTING METRO ROUTES ALONG CORRIDOR

Route 33



## GLENWAY AVENUE CORRIDOR DESCRIPTION

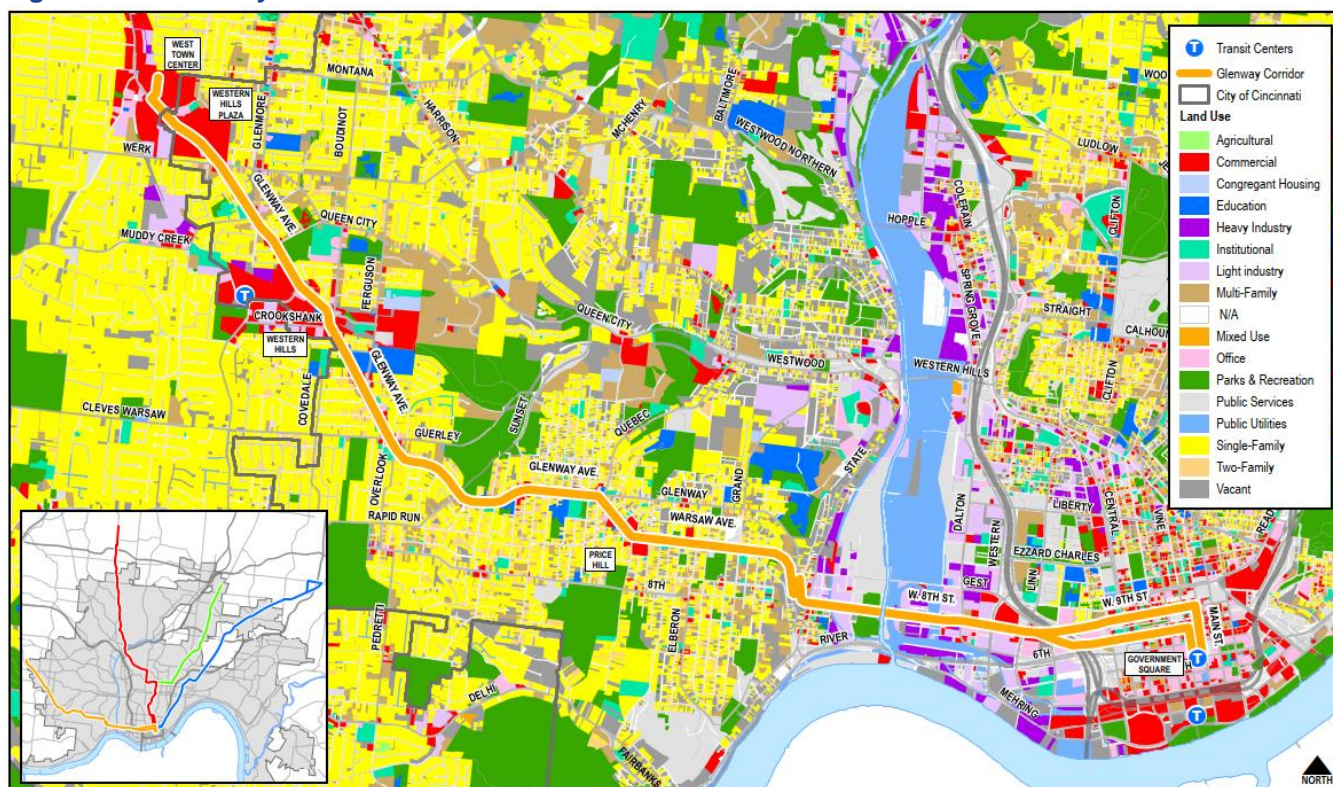
The Glenway Avenue corridor serves a portion of the west side of Cincinnati. The corridor is wholly located within the City of Cincinnati and borders on Green Township to the west. In downtown, the corridor alignment primarily runs along Eighth Street westbound from Main Street and Seventh Street eastbound to Walnut Street. West of downtown, the alignment operates bi-directionally on two-way streets. Between downtown and the Lower Price Hill area, the eastern portion of Eighth Street serves the Queensgate area while the western portion consists of an elevated viaduct, with few intersecting streets, above the Mill Creek and Queensgate rail yards. The Lower Price Hill business district sits at the end of West Eighth Street at the base of Price Hill. The alignment climbs Price Hill via a double hairpin turn in Glenway Avenue, Wilder Avenue, and Warsaw Avenue. It proceeds up the hill via Warsaw Avenue which eventually levels off and proceeds westbound through the Price Hill neighborhood. The alignment transitions from Warsaw Avenue to Glenway Avenue. At this point the alignment remains on Glenway Avenue, proceeding west and northwest to the Western Hills area and ending in the vicinity of Western Hills Plaza at Parkcrest Lane. The corridor also encompasses the Glenway Crossing Transit Center, located on Glencrossing Way near Anderson Ferry Road, about 0.3 miles west of Glenway Avenue.



## LAND USE

Figure 4-13 identifies land uses along the Glenway corridor and vicinity. The central segment of the alignment, in Price Hill and Lower Price Hill, is largely residential with small commercial areas and older neighborhood business districts interspersed along the way. The western portion of the alignment, in the Western Hills area, is largely commercial, characterized by shopping centers, big box retailers, and strip malls. The eastern segment, in the Queensgate area, is primarily industrial.

**Figure 4-13. Glenway Avenue Corridor Land Use**



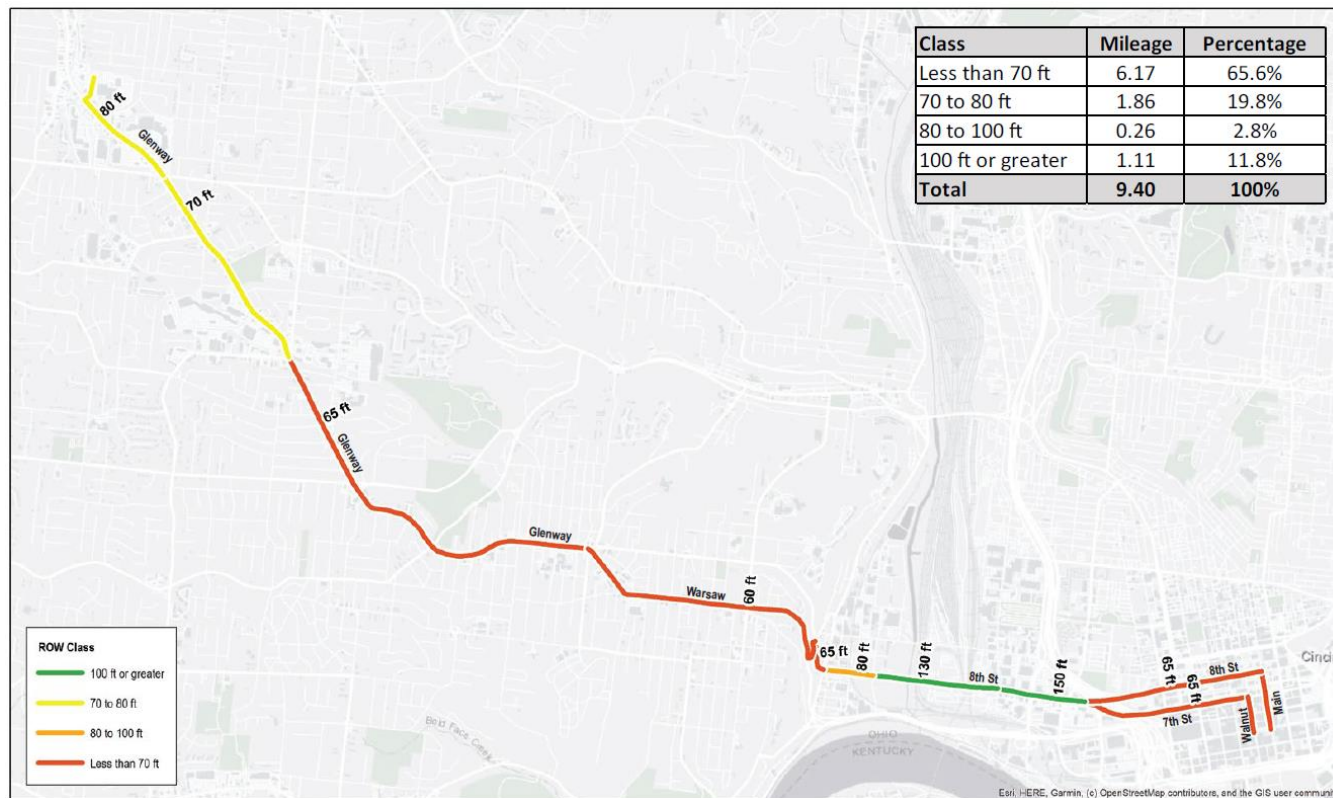
## RIGHT OF WAY

As shown in Figure 4-14, the widest portion of the Glenway Corridor is West Eighth Street in Queensgate between downtown and Lower Price Hill. The narrowest is West Eight Street in the Lower Price Hill business district, near State Street. Portions of Warsaw and Glenway avenues have on-street parking on both sides and a single travel lane in either direction. Some homes on East Price Hill pre-date the automobile and lack driveways, necessitating residents and guest to park on the street





Figure 4-14. Glenway Avenue Corridor ROW



## TRANSIT

Route 33 is the primary local route serving the Glenway corridor. Service frequencies on Route 33 and the other routes that serve significant portions (1 or more miles outside downtown) of the corridor are provided in Table 4-1.

Two routes serve significant portions of the Glenway Avenue corridor:

- 33 Western Hills-Glenway: entire length of corridor
- 32 Price Hill: West Eighth Street between downtown and Lower Price Hill: Glencrossing Way

In addition to Routes 32 and 33, several other routes serve the Glenway Crossing Transit Center in the western portion of the corridor: 37 Western Hills-Martin Luther King-Oakley Crosstown, 38 Glenway Crossing-Uptown Commuter Service, 41 Glenway Crossing-Oakley Crosstown, 64 Glenway Crossing-Westwood, and 65 Western Hills-Northside Crosstown.





**Table 4-1. Routes Serving Glenway Avenue Corridor**

Route	Mileage on BRT Corridor	Wkdy AM Peak	Wkdy Midday	Wkdy PM Peak	Wkdy Evening	Sat	Sun
33 Western Hills - Glenway	8.6	15	20	15	20	20	20
32 Price Hill	3.4	15	20	15	30	40	45

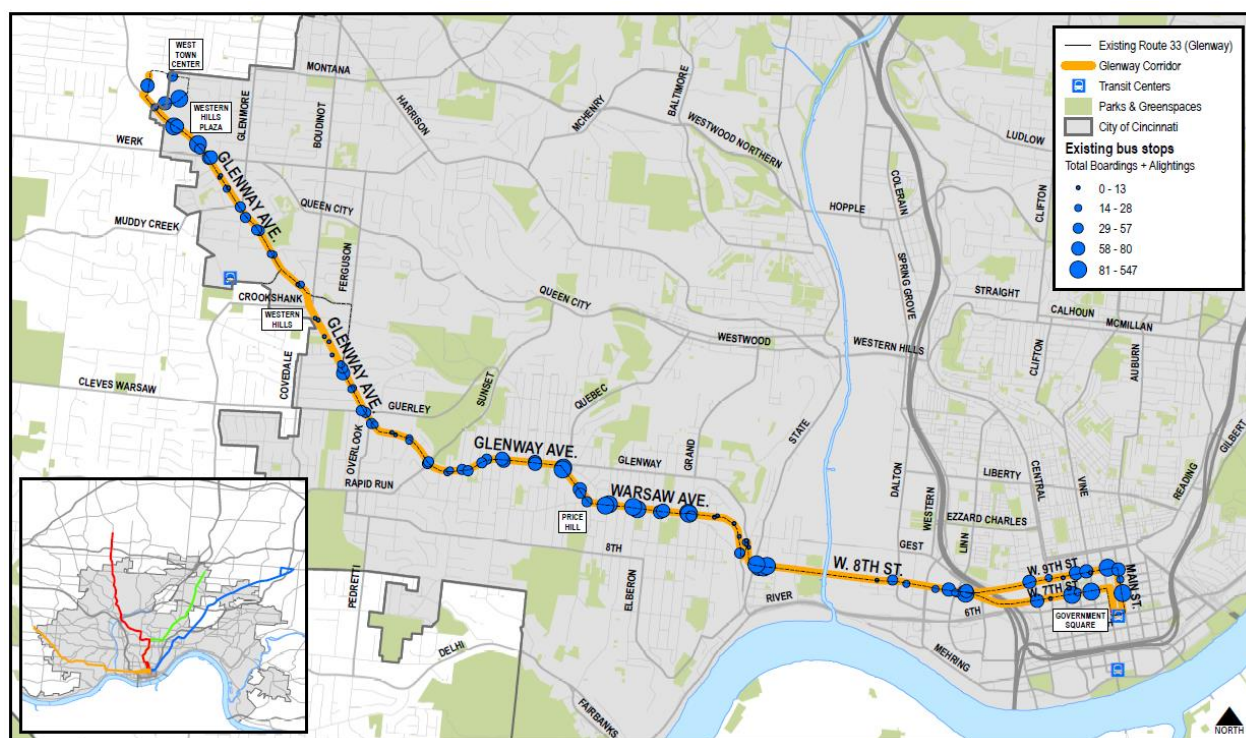
Ridership on Routes 32 and 33 is shown in Table 4-2.

**Table 4-2. Ridership on Routes Serving Glenway Avenue Corridor**

Route	Weekday	Saturday	Sunday
33 Western Hills - Glenway	4,356	2,430	1,763
32 Price Hill	1,556	622	463

Boardings and alightings, as shown in Figure 4-15, are strongest along the mixed residential-neighborhood commercial areas along Warsaw and Glenway avenues in Price Hill and Lower Price Hill. West of this segment, ridership drops until the alignment reaches Western Hills Plaza and adjacent retail centers, where activity picks up. There is additional activity in downtown and in the industrial area just west of I-75. The Glenway Crossing Transit Center, shown in Figure 4-16, sees substantial ridership activity.

**Figure 4-15. Glenway Avenue Corridor Current Transit Boardings and Alightings**





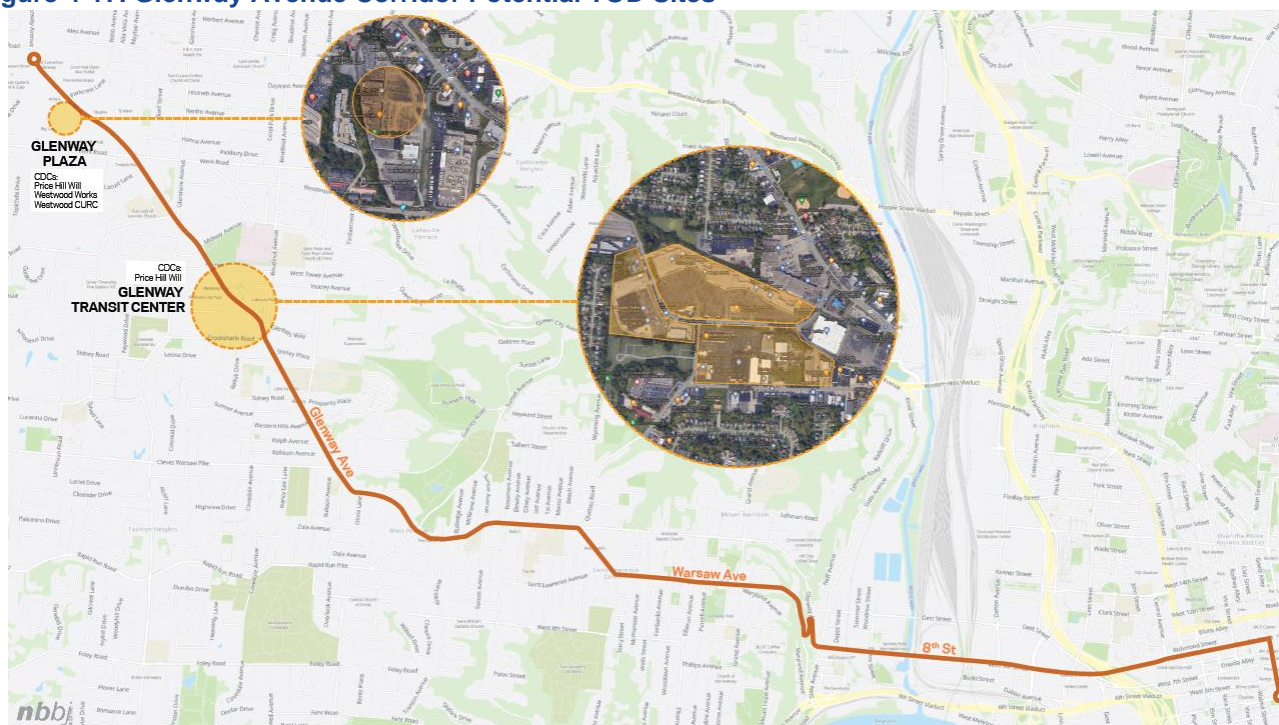
**Figure 4-16. Glenway Crossing Transit Center**



## TOD POTENTIAL

A high level observation of potential TOD sites is shown in Figure 4-17. Two sites appear to be of sufficient size to potentially support future TOD: the Glenway Crossing Transit Center and the Glenway Plaza area.

**Figure 4-17. Glenway Avenue Corridor Potential TOD Sites**







The Hamilton Avenue Corridor extends from the Hamilton Avenue (US 127) and Ronald Reagan Cross County Highway (SR 126) interchange in Mt. Healthy to downtown Cincinnati. It would serve the Uptown area, Cincinnati State, the University of Cincinnati, and multiple hospitals and other medical facilities.

#### LENGTH

Approximately 12 miles

#### PRIMARY ROADS TRAVELED

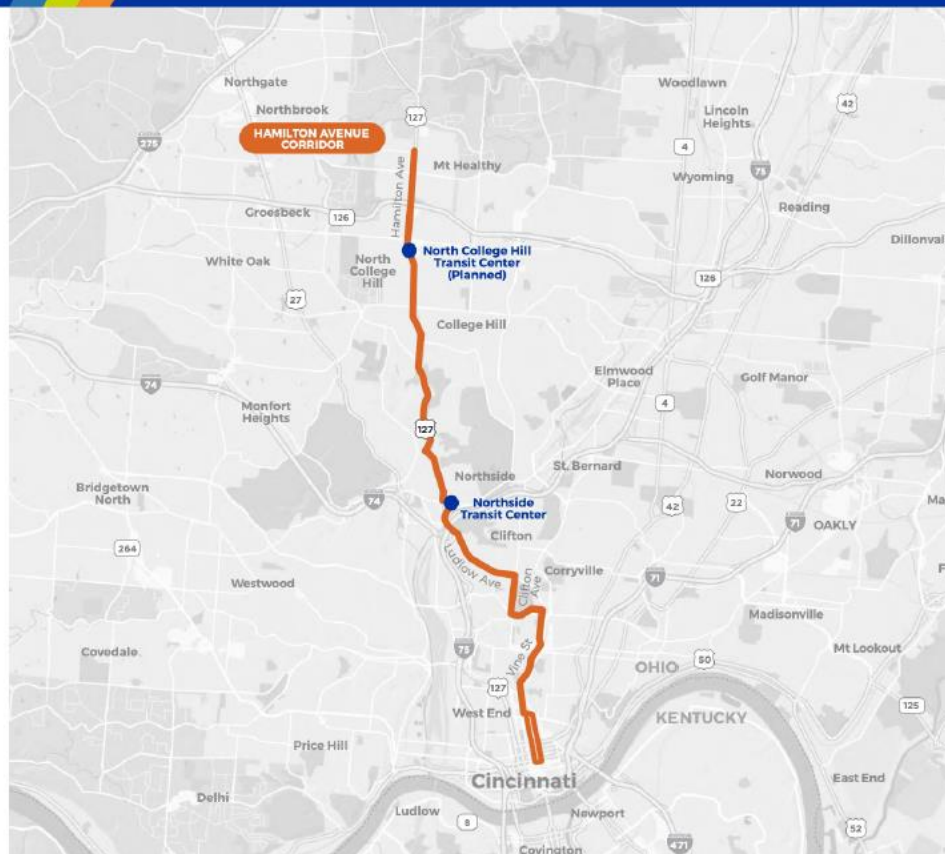
- Hamilton Avenue
- Ludlow Avenue
- Clifton Avenue
- Vine Street

#### COMMUNITIES SERVED

- College Hill
- Northside
- Clifton
- CUF (Clifton Heights, University Heights, Fairview)
- Corryville
- Mt. Auburn
- Over-the-Rhine (OTR)
- Downtown

#### EXISTING METRO ROUTES ALONG CORRIDOR

- Route 17 (Clifton Avenue, between MLK and OTR)
- Route 15 (Mt. Healthy to Northside)
- Metro\*Plus (MLK to downtown)
- Route 46 (William Howard Taft/ E. McMillan to downtown)
- Route 78 (MLK to downtown)



## HAMILTON AVENUE CORRIDOR DESCRIPTION

The Hamilton Avenue corridor runs generally north-northwest from downtown. It is the longest of the four corridors, at about 12 miles. It also runs through portions of three different political jurisdictions: Cincinnati, North College Hill, and Mt. Healthy. In the urban core, the alignment runs northbound on Main Street and southbound on Walnut Street in downtown and Over-the-Rhine (OTR). Starting at Walnut and Liberty streets, the alignment runs bi-directionally on two-way streets to its outer terminus. North of OTR, the alignment climbs the hill to reach the Uptown area, crossing Calhoun and McMillan streets which are served by crosstown Route 31. The alignment proceeds north on Jefferson Avenue, with the University of Cincinnati (UC) campus on the west side of Jefferson and the Corryville (“Short Vine”) business district and neighborhood on the east side. At the intersection of Jefferson and Dr. Martin Luther King, Jr. Drive (MLK), the Uptown medical district is located immediately to the northeast. The alignment proceeds west on MLK, along which the 22-acre Environmental Protection Agency (EPA) research center is located, along the northern edge of the UC campus and southern edge of Burnet Woods Park. The alignment then turns north on Clifton Avenue, alongside the western edge of the park and serving the TriHealth Good Samaritan Hospital on the west side of the avenue. At the Clifton neighborhood business district, the alignment proceeds west on Ludlow Avenue. Cincinnati State Technical and Community College is located adjacent to Ludlow Avenue.

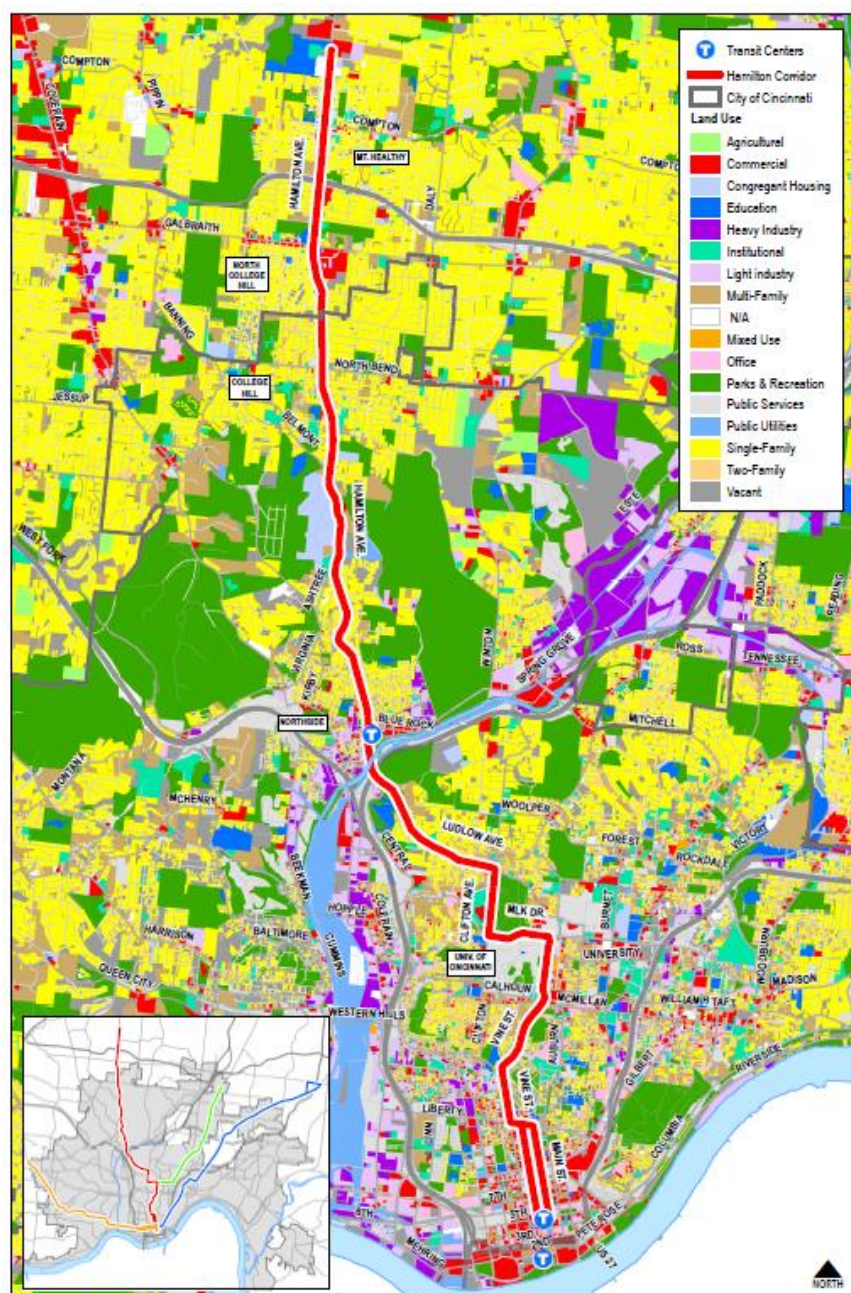




After crossing over I-75 via the Ludlow Viaduct, the alignment serves the Northside Transit Center, the second largest transfer hub in the Metro fixed route system and the largest hub outside downtown. The remaining and longest portion of the Hamilton corridor alignment runs on Hamilton Avenue through the Northside and College Hill neighborhoods in Cincinnati and the cities of North College Hill and Mt. Healthy. SORTA is in the process of working with the City of North College Hill on a transit center in the vicinity of Hamilton Avenue and Galbraith Road. The outlying northern terminus is Hilltop Plaza in Mt. Healthy.

## LAND USE

Figure 4-18. Hamilton Avenue Corridor Land Use



Land uses along the Hamilton corridor are illustrated in Figure 4-18. Residential is the primary land use with several neighborhood business districts and commercial centers - including the Corryville, Clifton, Northside, College Hill, North College Hill, and Mt. Healthy business districts – interspersed along the way. There is limited industrial land use, primarily in Northside.

Downtown and the Uptown area in Cincinnati are the region's two largest employment and activity centers, with tens of thousands of jobs and the focus point for significant regional travel for jobs, medical services, education, retail, sports, recreation, and entertainment.

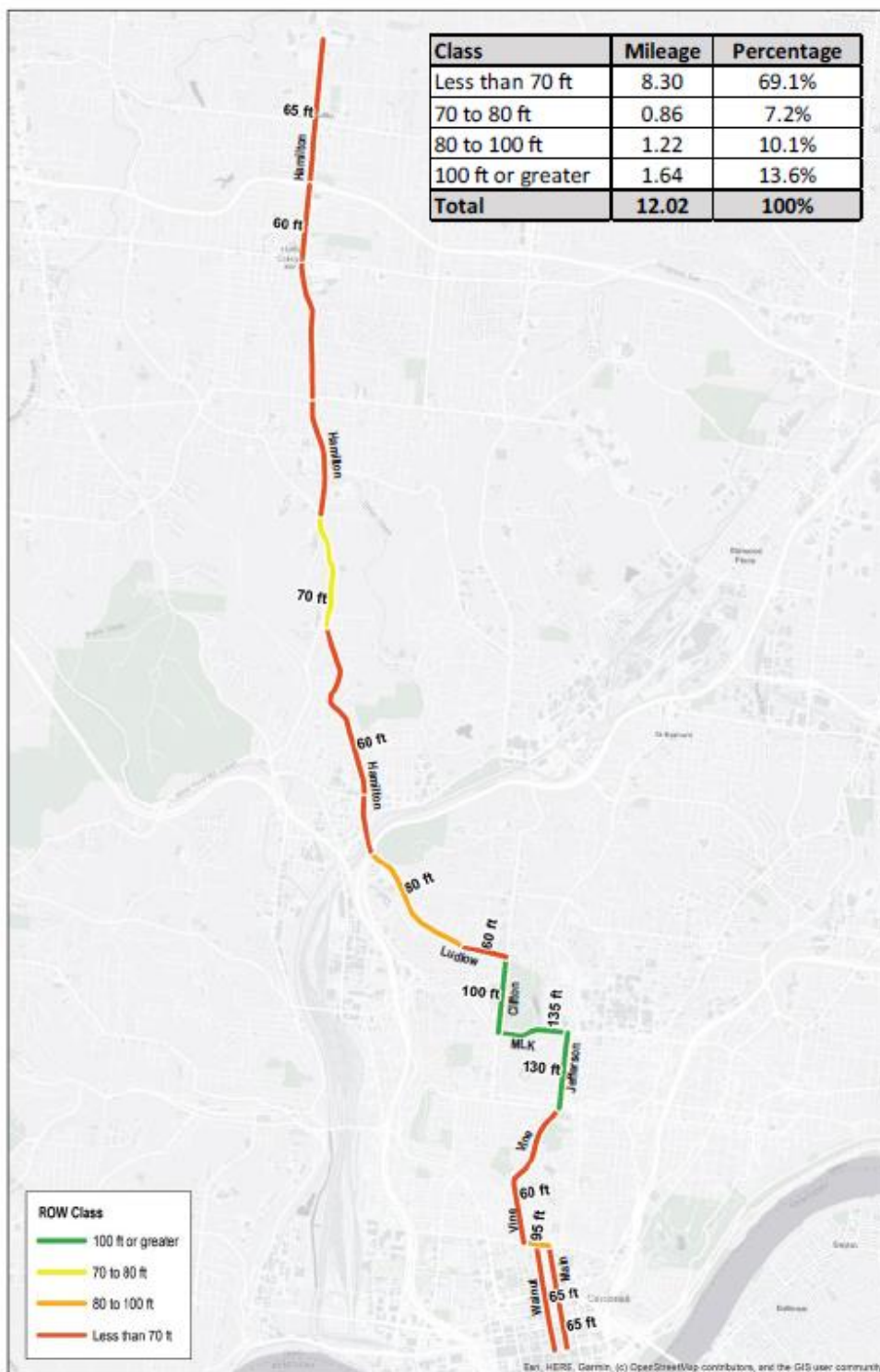
In between downtown and Northside, OTR is an increasingly densely populated residential and dining/entertainment area, anchored by Findlay Market, a regional destination food and entertainment destination.

As in OTR, the older commercial districts on Northside and College Hill are experiencing new and renovated development and housing.



## RIGHT OF WAY

Figure 4-19. Hamilton Avenue Corridor ROW



The widest street segments along the Hamilton Avenue corridor, as shown in Figure 4-19, are in the Uptown area- specifically, Jefferson Avenue on the east side of the UC campus, MLK on the northern edge of campus, and Clifton Avenue alongside Burnet Woods Park between MLK and Ludlow Avenue. Ludlow Avenue, from west of the Clifton business district to Cincinnati State, also has substantial width. On-street parking is prevalent on Vine Street up the hill, Ludlow Avenue in the Clifton business district, and Hamilton Avenue in the Northside business district.



## TRANSIT

Portions of several Metro fixed routes currently operate along portions of the Hamilton Avenue Corridor between Uptown and Mt. Healthy. The most significant are Routes 17 Hamilton Avenue and Route 15 Mt. Healthy Commuter Service. Service frequencies are listed in Table 4-3; total route ridership is shown in Table 4-4.

Current service along the corridor that follows the proposed BRT alignment for 1 mile or more (excluding routes that overlap only in downtown) consists of:

- 17 Hamilton Avenue: from Martin Luther King, Jr. Drive (MLK) to the Mt. Healthy terminus via Clifton Avenue, Ludlow Avenue, and Hamilton Avenue serving Uptown, Clifton, Northside, College Hill, North College Hill, and Mt. Healthy.
- 15 Mt. Healthy Commuter Service: weekday peak period only service on Hamilton Avenue between Northside and the Mt. Healthy terminus, serving Northside, College Hill, North College Hill, and Mt. Healthy.
- 51 Hyde Park-Uptown-Glenway Crossing Crosstown: MLK, Clifton Avenue, Ludlow Avenue between Uptown and Northside.
- 19 Colerain Avenue-Northgate: Ludlow Avenue through Clifton between Uptown and Northside.

**Table 4-3. Routes Serving Hamilton Avenue Corridor**

Route	Mileage on BRT Corridor	Wkdy AM Peak	Wkdy Midday	Wkdy PM Peak	Wkdy Evening	Sat	Sun
17 Hamilton Avenue	8.87	10	15	10	20	20	20
15 Mt. Healthy Commuter Service	6.12	20	--	20	--	--	--
51 Hyde Park – Uptown – Glenway Crossing Crosstown	2.97	15	30	15	30	60	60
19 Colerain Avenue - Northgate	1.81	25	25	25	50	30 day 45 eve	30 day 45 eve

**Table 4-4. Ridership on Routes Serving Hamilton Avenue Corridor**

Route	Weekday	Saturday	Sunday
17 Hamilton Avenue	4,469	2,678	2,014
51 Hyde Park – Uptown – Glenway Crossing Crosstown	2,343	1,150	838
19 Colerain Avenue - Northgate	2,316	1,589	1,137
15 Mt. Healthy Commuter Service	174	--	--

The Northside Transit Center, located a half block east of Hamilton Avenue between Spring Grove Avenue and Blue Rock Street, is the second largest transfer point in the Metro system and the largest





outside downtown (Figure 4-20). It was designed to accommodate standard 40-ft. buses as well as 60-ft. articulated buses. In addition to Routes 15, 17, 19, and 21, four other routes serve the transit center, providing transfer connections to west side and east side neighborhoods:

- 16 Mt. Healthy-Spring Grove
- 27 Northside-Casey
- 51 Hyde Park-Uptown-Glenway Crossing Crosstown
- 65 Western Hills-Northside Crosstown

**Figure 4-20. Northside Transit Center**

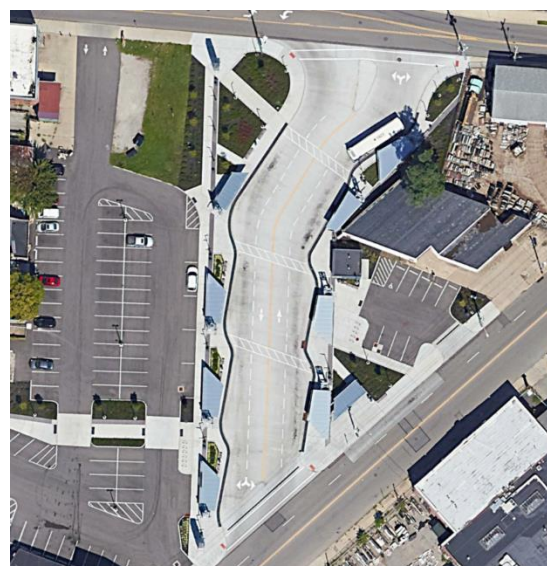
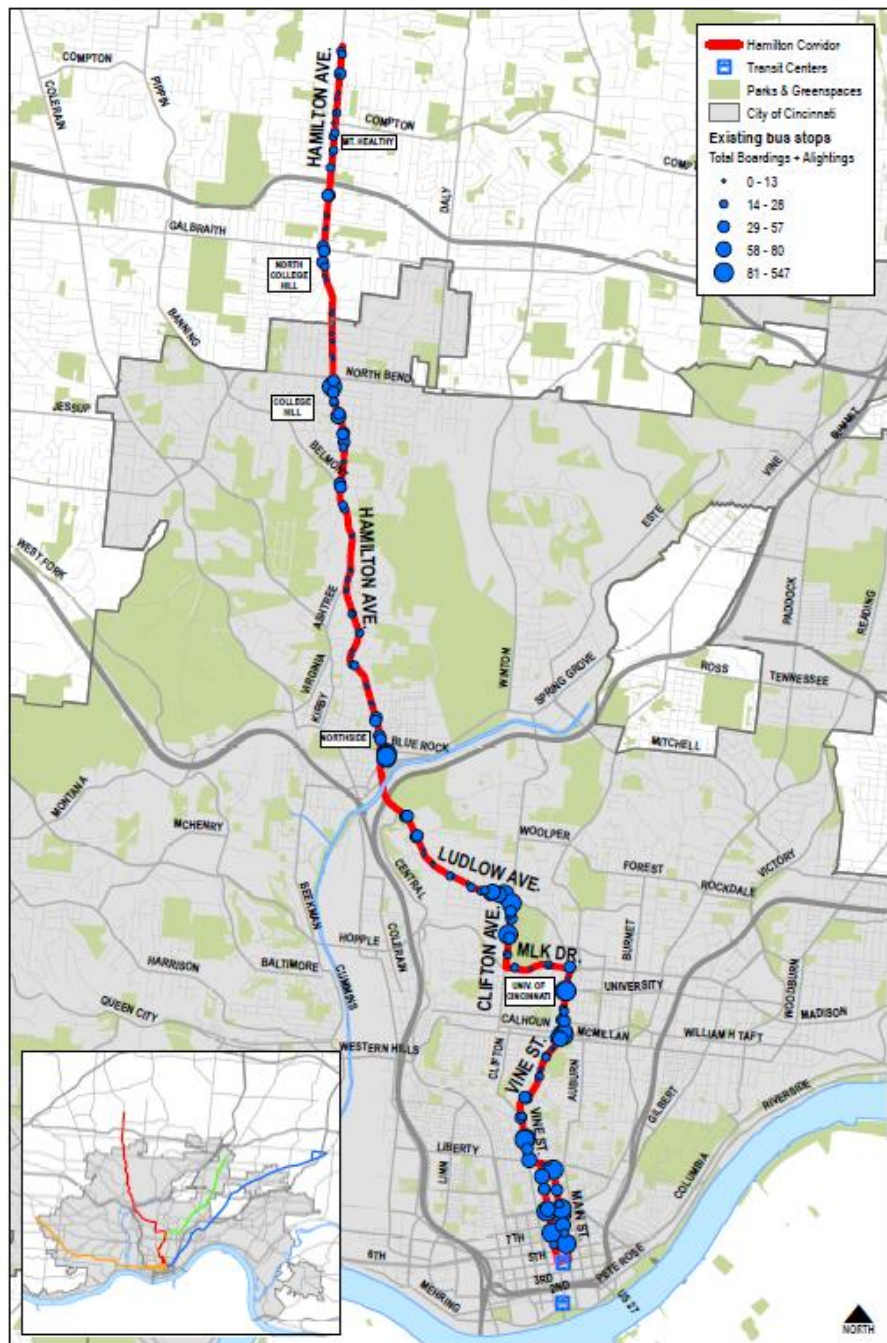




Figure 4-21. Hamilton Avenue Corridor Current Transit Boardings and Alightings



As shown in Figure 4-21, ridership activity along the corridor is very strong and steady between and within downtown, OTR and the uptown area. The primary local route in the corridor is Route 17, which runs along Clifton and Hamilton avenues, currently extending north and west of the BRT corridor terminus in Mt. Healthy. Route 17's alignment differs from the BRT alignment in the uptown area, operating on Clifton Avenue between downtown and MLK – on the west side of the UC campus - instead of the BRT alignment on Vine, Jefferson, and Clifton. Other routes serve various portions of the Hamilton corridor, including Metro\*Plus and Routes 46 and 78 between downtown and uptown, Route 39 on MLK and Ludlow, and Route 15X on Hamilton.

Ridership activity is also strong in Northside, including at the Northside Transit Center (Figure 4-19) and in College Hill, especially at North Bend Road. Activity levels are lower but steady north of this point.

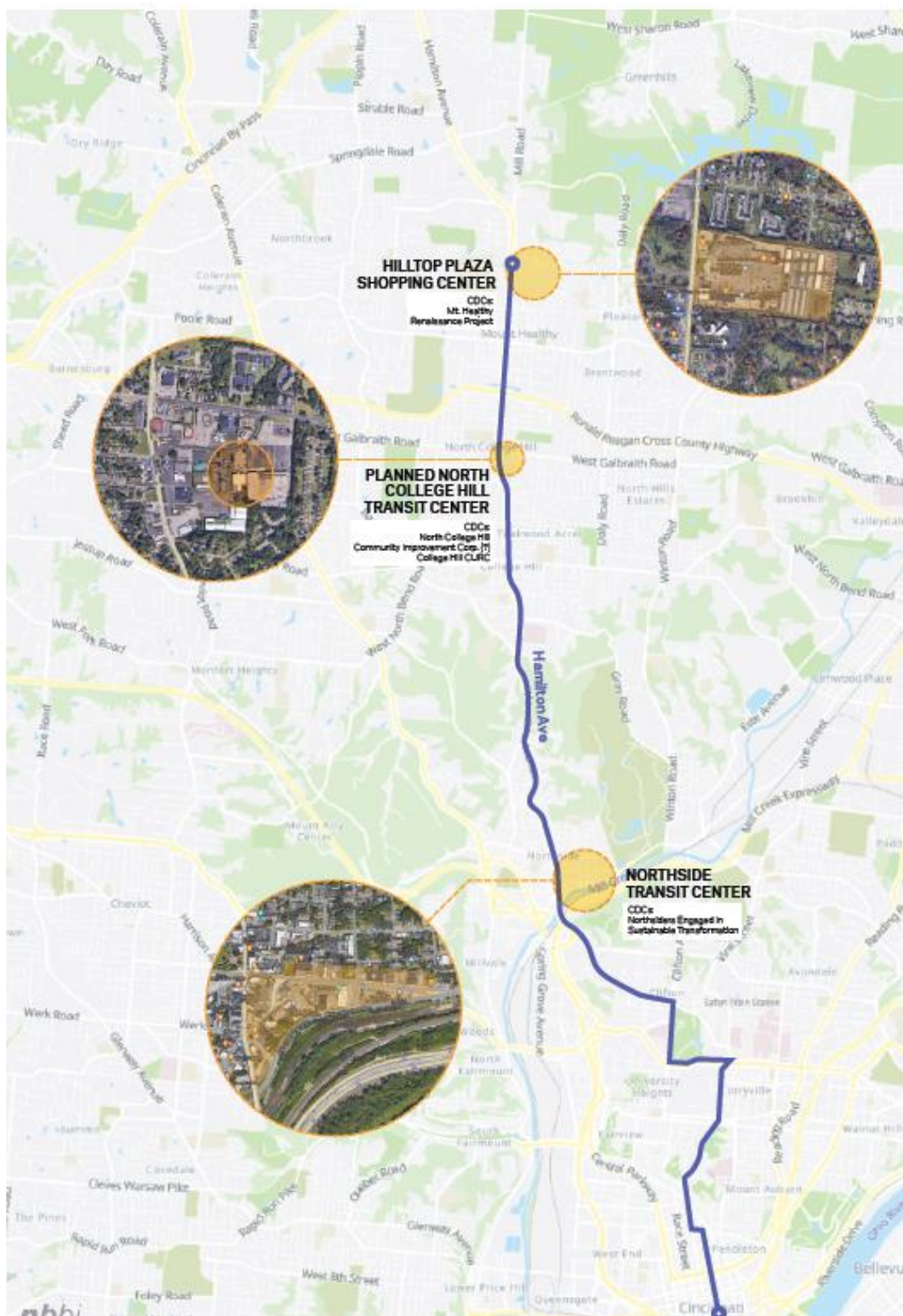




## TOD POTENTIAL

A high level observation of potential TOD sites is shown in Figure 4-22. Three sites appear to be of sufficient size to potentially support future TOD: in the vicinity of the Northside Transit Center, the future site of the North College Hill Transit Center, and Hilltop Plaza.

**Figure 4-22. Hamilton Avenue Corridor Potential TOD Sites**







The Reading Road Corridor extends from the intersection of Reading Road (US 42) and SR 561/Seymour Avenue to downtown Cincinnati. It would serve the Uptown area, the University of Cincinnati, and multiple hospitals and other medical facilities.

#### LENGTH

Approximately 12 miles

#### PRIMARY ROADS TRAVELED

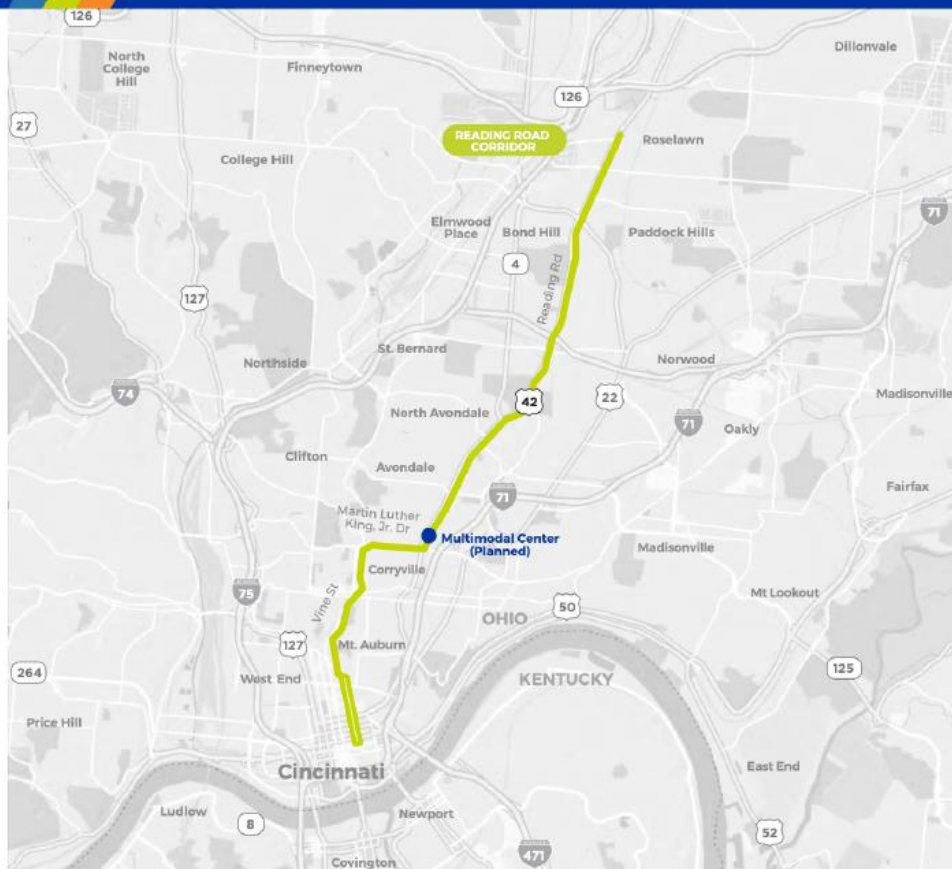
- Reading Road
- Martin Luther King, Jr. Drive (MLK)
- Vine Street

#### COMMUNITIES SERVED

- Golf Manor
- Roselawn
- Bond Hill
- Paddock Hills
- North Avondale
- Avondale
- Corryville
- CUF (Clifton Heights, University Heights, Fairview)
- Mt. Auburn
- Over-the-Rhine (OTR)
- Downtown

#### EXISTING METRO ROUTES ALONG CORRIDOR

- Route 43 (Seymour Avenue to MLK Avenue)
- Metro\*Plus (Burnet Avenue to downtown)
- Route 46 (William Howard Taft/ E. McMillan to downtown)
- Route 78 (MLK to downtown)



## READING ROAD CORRIDOR DESCRIPTION

The Reading Road corridor is situated entirely within the City of Cincinnati. The alignment between downtown and the uptown area is the same as the Hamilton corridor: northbound on Main Street and southbound Walnut Street in downtown and OTR and bi-directional on Liberty Street, Vine Street, and Jefferson Avenue to MLK up the hill and within uptown. At the intersection of Jefferson and MLK, the Reading Road corridor alignment turns east on MLK and proceeds north on Reading Road from uptown to the outlying terminus in Roselawn.

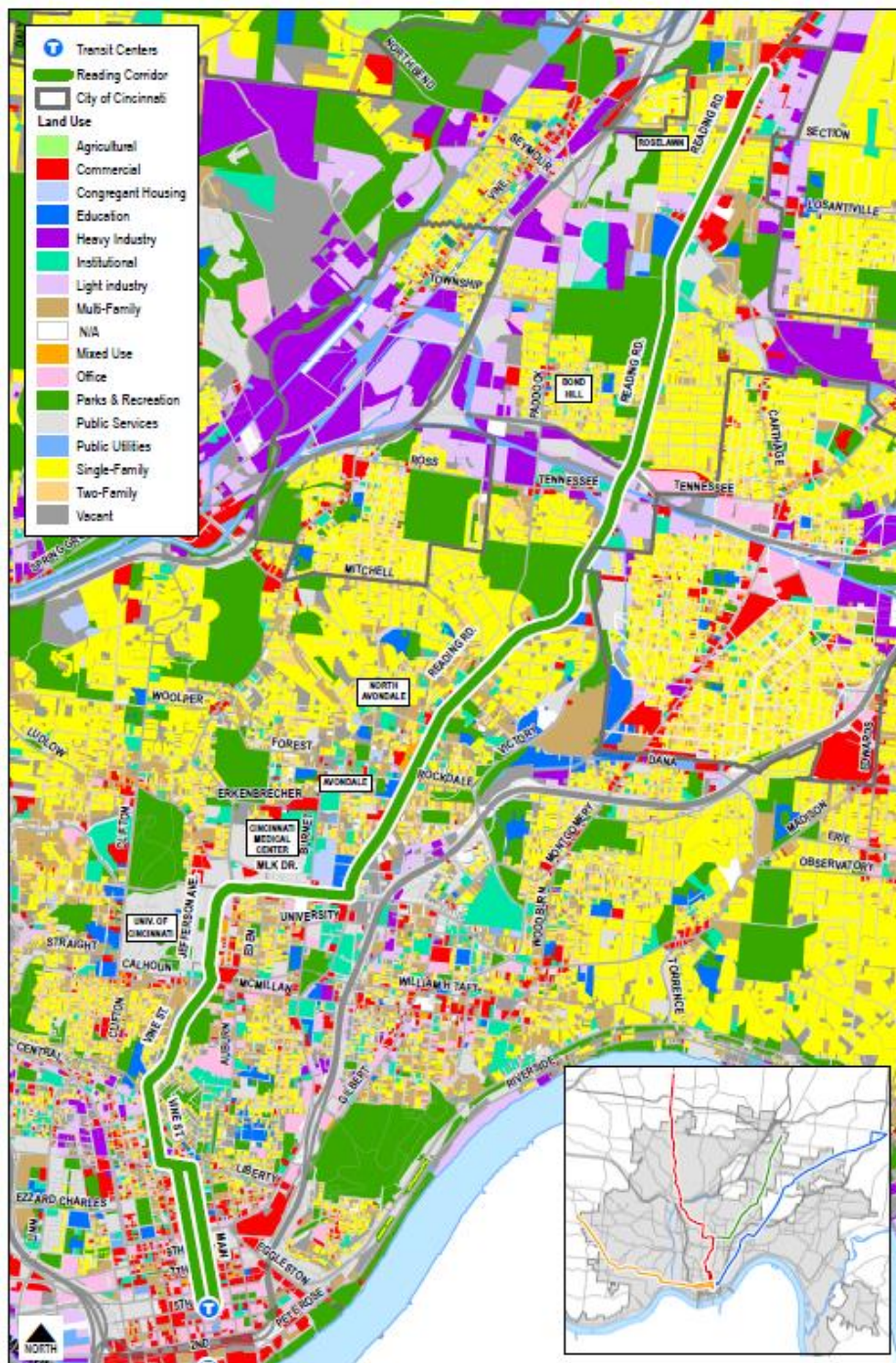
## LAND USE

Land use along the Reading corridor is illustrated in Figure 4-23. At the southernmost portion, downtown and the Uptown area in Cincinnati are the region's two largest employment and activity centers, with tens of thousands of jobs and the focus point for significant regional travel for jobs, medical services, education, retail, sports, recreation, and entertainment. The corridor directly serves several major medical centers, including University Medical Center and Cincinnati Children's Hospital Medical Center, along with related facilities and institutions including a major new facility for the National Institute of Occupational Safety and Health (NIOSH) currently under development at the



intersection of Reading Road and MLK. In addition, development of an Innovation District in this area is already underway.

**Figure 4-23. Reading Road Corridor Land Use**



In between downtown and Northside, OTR is an increasingly densely populated residential and dining/entertainment area, anchored by Findlay Market, a regional destination food and entertainment destination.

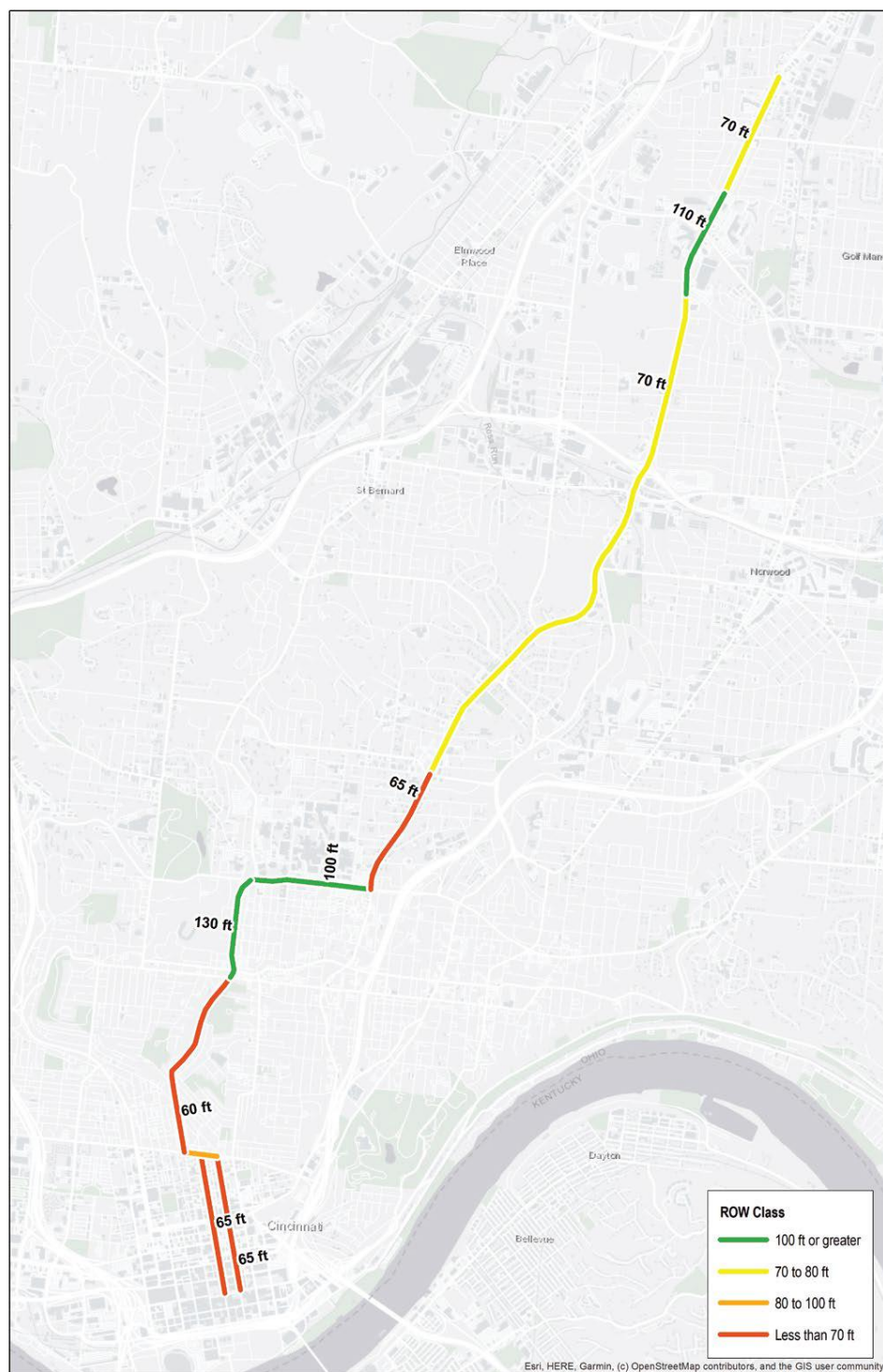
North of the uptown area, the corridor is primarily residential through the Avondale, North Avondale, Paddock Hills, Bond Hill, and Roselawn neighborhoods. Interspersed along the way are a series of neighborhood business districts. Two of the largest are the Avondale Town Center, which was recently redeveloped as a mixed use center, and the Roselawn business district. In between, in the vicinity of Reading Road and Summit Avenue is a commercial zone that includes Woodward High School and Midpoint Crossing, a large mixed use development planned on a currently vacant site.





## RIGHT OF WAY

Figure 4-24. Reading Road Corridor ROW



Along the Reading Road Corridor, as shown in Figure 4-24, the widest street segments are on Jefferson Avenue, between the UC campus and Corryville (“Short Vine”) business district, MLK along the southern edge of the Uptown medical district, and a short stretch of Reading Road at the intersection with the Norwood Lateral. Portion of Vine Street and Reading Road also include on-street parking, partly for residents and partly for businesses





## TRANSIT

Portions of several Metro fixed routes currently operate along portions of the Reading Road Corridor. The most significant are Routes 90 Metro\*Plus and Route 43 Reading Road.

Current service along the corridor that follows the proposed BRT alignment for 1 mile or more (excluding routes that overlap only in downtown) consists of:

- 90 Metro\*Plus: from the Cincinnati riverfront and downtown, through Uptown, to the Avondale neighborhood.
- 43 Reading Road: between Avondale and the Reading Road Corridor BRT terminus in Roselawn, and in Downtown on Walnut and Main streets.
- 46 Avondale: between Over-the-Rhine and Uptown via Vine Street; Burnet Avenue in Uptown; Main and Walnut streets downtown.
- 51 Hyde Park-Glenway-Uptown Crosstown: crosstown service on Martin Luther King, Jr. Drive (MLK) and Burnet Avenue in Uptown; Reading Road between Gholson and Dana avenues in Avondale and North Avondale.
- 38 Glenway Crossing-Uptown: crosstown service along (MLK) and a Burnet Avenue between MLK and Erkenbrecher Avenue in Uptown.
- 78 Springdale-Vine-Lincoln Heights: Vine Street and Jefferson Avenue between Over-the-Rhine and Uptown.
- 24 Anderson-Uptown: crosstown service on Jefferson Avenue and MLK in Uptown.

Mileage within the corridor and service frequencies are shown in Table 4-5.

**Table 4-5. Routes Serving Reading Road Corridor**

Route	Mileage on BRT Corridor	Wkdy AM Peak	Wkdy Midday	Wkdy PM Peak	Wkdy Evening	Sat	Sun
90 Metro*Plus	6.33	15	15	15	30	--	--
43 Reading Road	5.43	10	10	10		20 day 30 eve	20 day 30 eve
46 Avondale	1.68	25	25	25	30	35	35
51 Hyde Park – Uptown – Glenway Crossing Crosstown	1.52	15	30	15	30	60	60
38 Glenway Crossing - Uptown	1.45	45	--	45	--	--	--
78 Springdale – Vine – Lincoln Heights	1.43	20	30	20	30	30 day 40 eve	30 day 40 eve
24 Anderson - Uptown	1.00	10-20	40	10-20	30	40	40

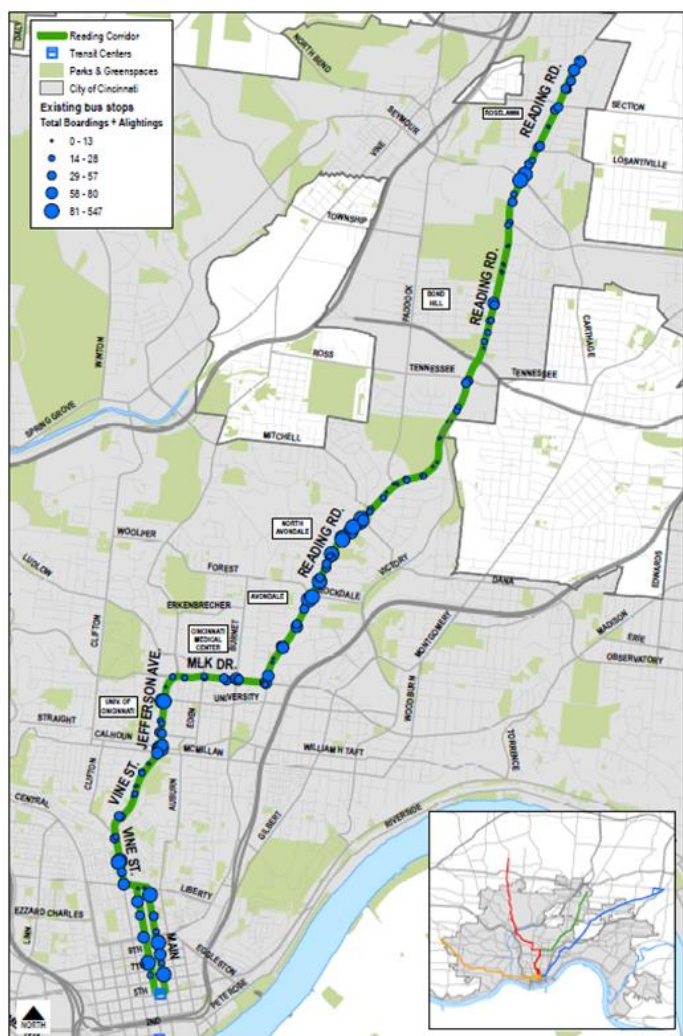
Table 4-6 shows average weekday, Saturday, and Sunday ridership on the seven routes that serve 1 mile or more of the Reading Road Corridor. The totals are for the entire length of the route, not just the segment within the corridor.



**Table 4-6. Ridership on Routes Serving Reading Road Corridor**

Route	Weekday	Saturday	Sunday
43 Reading Road	5,024	1,175	938
51 Hyde Park – Uptown – Glenway Crossing Crosstown	2,343	1,150	838
78 Springdale – Vine – Lincoln Heights	2,080	1,301	1,027
46 Avondale	1,818	1,175	938
90 Metro*Plus	1,783	--	--
24 Anderson -Uptown	1,189	652	347
38 Glenway Crossing - Uptown	79	--	--

**Figure 4-25. Reading Road Corridor Current Transit Boardings and Alightings**



Reading Road ridership activity is shown in Figure 4-25. Reading Road is served by Route 43, which operates along the BRT corridor between MLK and Roselawn, extending north of the outlying BRT terminus. The existing Route 43 does not follow the BRT corridor through uptown and OTR but remains on Reading Road between MLK and downtown.

Ridership activity is very strong and steady along the entire corridor. There is significant ridership between and within downtown, OTR and the uptown area. North of uptown, ridership activity is very high in Avondale and North Avondale. Between Mitchell Avenue and the Norwood Lateral, ridership drops off somewhat. Other routes serve various portions of the Hamilton corridor, including Metro\*Plus and Routes 46 and 78 between downtown and uptown, Route 39 on MLK and Ludlow, and Route 51 in uptown and Avondale.

There are currently no neighborhood transit centers located along the corridor outside downtown; however, SORTA is working with the Uptown Consortium on development of an Uptown Multimodal Center that would serve Metro fixed routes, including BRT, and the several shuttle services operated by UC and the medical centers. A specific location has not yet

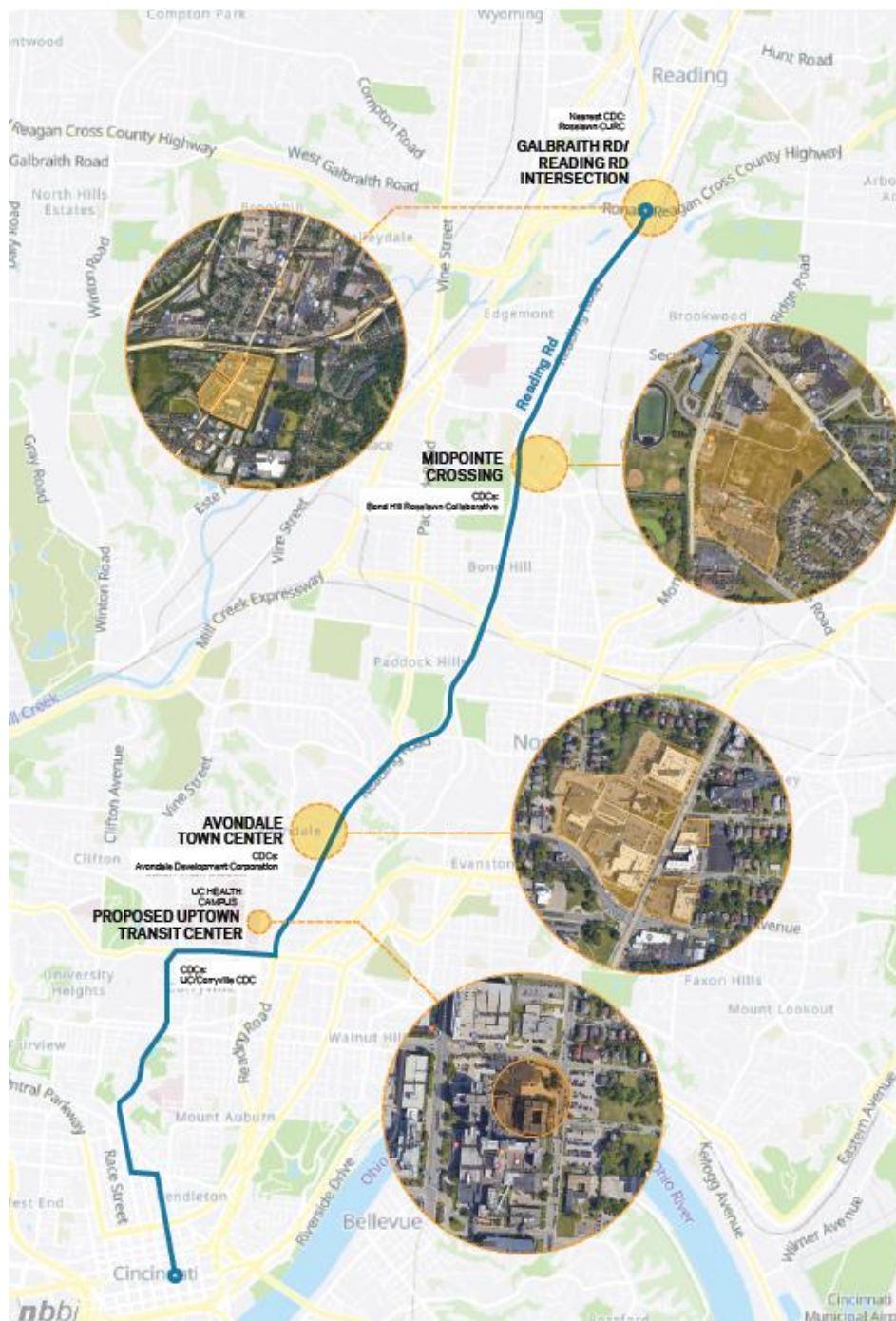
been fixed but is anticipated to be in the vicinity of Reading Road and MLK.



## TOD POTENTIAL

A high level observation of potential TOD sites is shown in Figure 4-26. Four sites appear to be of sufficient size to potentially support future TOD: in the vicinity of the planned Uptown Multimodal Center, the Avondale Town Center area, Midpoint Crossing, and the area south of Cross County Highway and Galbraith Road along Reading Road. The latter site is located beyond the current proposed Roselawn terminus of the BRT line.

**Figure 4-26. Reading Road Corridor Potential TOD Sites**







The Montgomery Road Corridor extends from US 22/Montgomery Road at E. Galbraith in Kenwood to downtown Cincinnati. It would serve portions of the Uptown area and Xavier University.

**LENGTH**  
Approximately 13 miles

**PRIMARY ROADS TRAVELED**

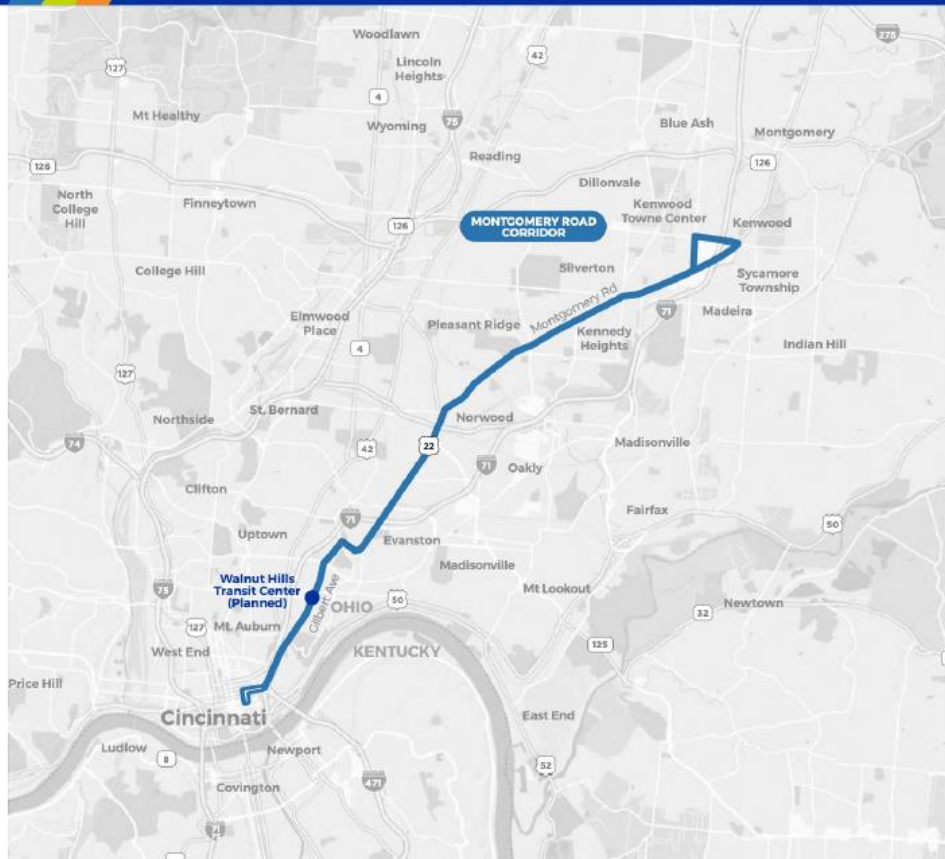
- Montgomery Road
- Gilbert Avenue

**COMMUNITIES SERVED**

- Kenwood
- Kennedy Heights
- Silverton
- Pleasant Ridge
- Norwood
- Evanston
- Walnut Hills
- Pendleton
- Downtown

**EXISTING METRO ROUTES ALONG CORRIDOR**

- Route 3
- Metro\*Plus (from Kenwood Road to Dana Avenue)



## MONTGOMERY ROAD CORRIDOR DESCRIPTION

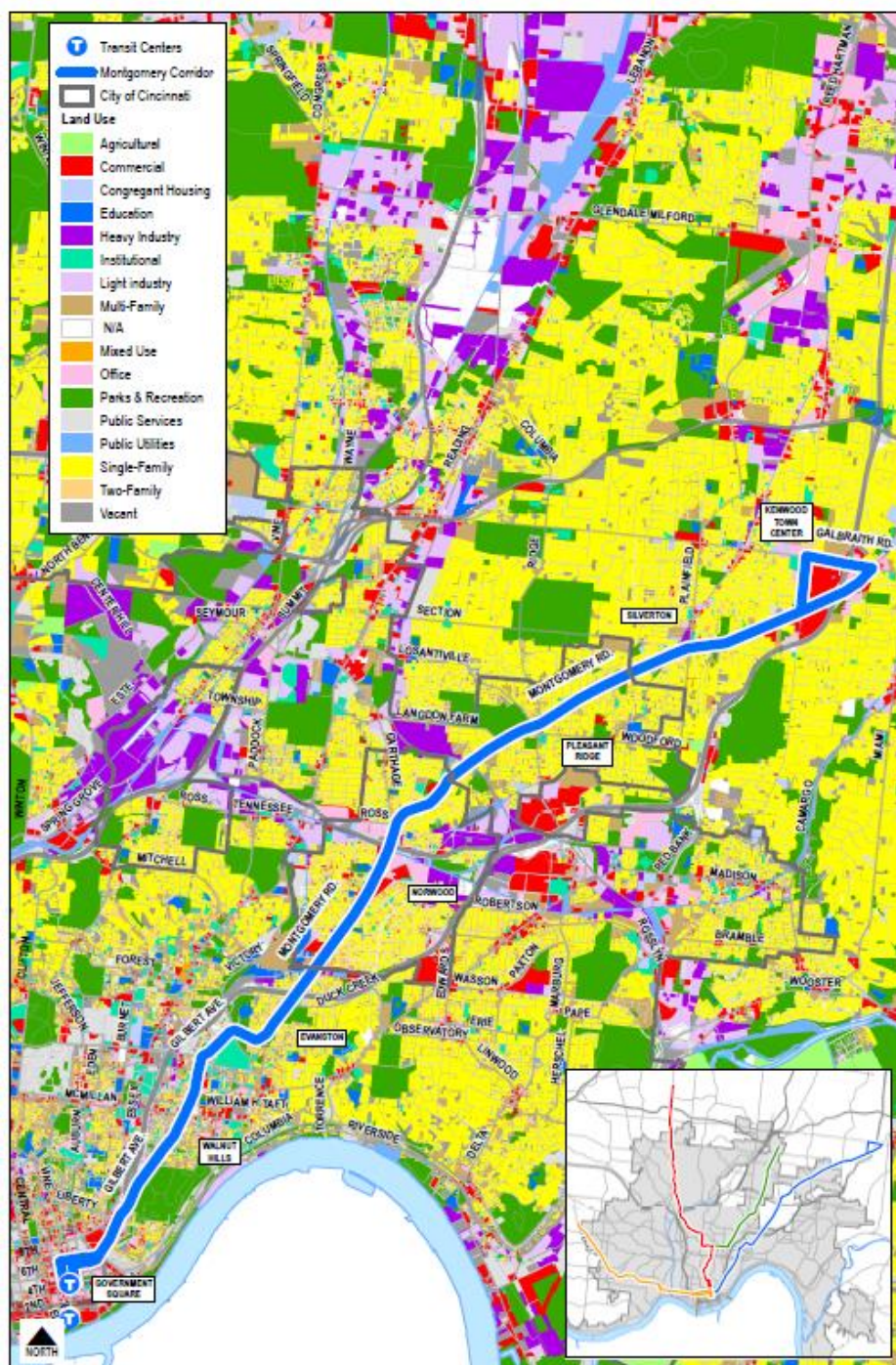
The Montgomery Road corridor extends from downtown Cincinnati northeast to Sycamore Township. In addition to the township and the City of Cincinnati, it also extends through the cities of Norwood and Silverton.

The southern third of the corridor alignment runs along Gilbert Avenue from the east side of downtown through the Walnut Hills neighborhood. Both are densely populated neighborhoods. Walnut Hills has experienced significant revitalization and new development in recent years; Silverton has not. Gilbert Avenue merges into Montgomery Road in Silverton. Xavier University is located just west of Montgomery Road in this area. North of Silverton, the corridor runs through Norwood and re-enters Cincinnati at the Pleasant Ridge neighborhood. The corridor continues through the Kennedy Heights neighborhood, Silverton, and Sycamore Township. The outlying terminus is in the Kenwood area.



## LAND USE

Figure 4-27. Montgomery Road Corridor Land Use



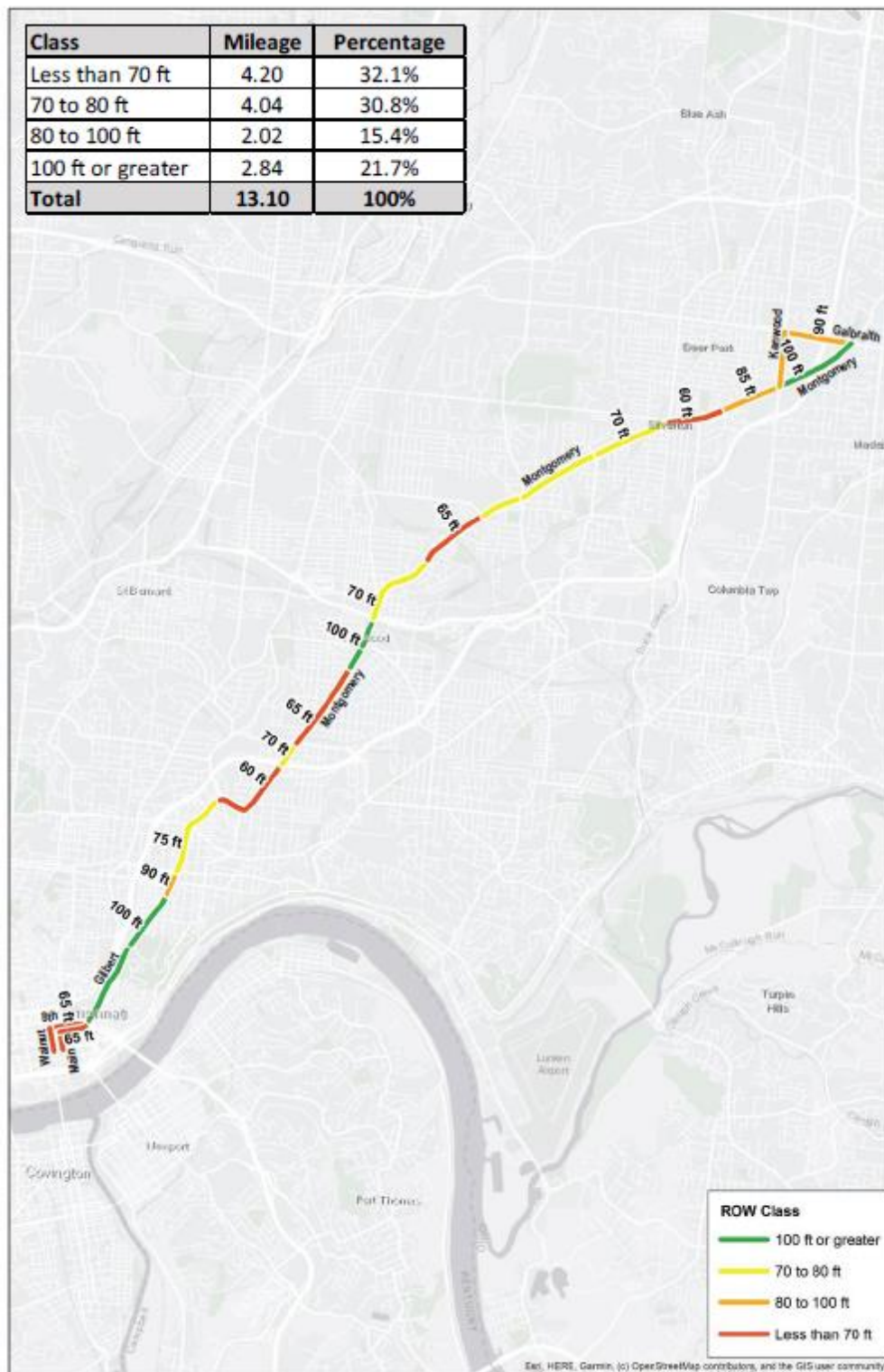
Residential land uses predominate the Montgomery Road corridor, as illustrated in Figure 4-27, although a significant amount of commercial uses are present as well. Most prominent is the Kenwood area, which features the Kenwood Towne Center, a major regional shopping mall. There are additional strip malls and businesses in this area. Montgomery Road within Norwood is also a large commercial zone that includes the Surrey Square shopping center. In addition, traditional neighborhood business districts are located in Walnut Hills, Pleasant Ridge, and Silverton. Some industrial uses are located in Norwood near the interchange with the Norwood Lateral. In addition to Xavier University, institutional uses include Jewish Hospital in Kenwood. A major entertainment facility and employment center, the Hard Rock Casino, is located near the southern end of the corridor on Gilbert Avenue.





## RIGHT OF WAY

Figure 4-28. Montgomery Road Corridor ROW



As shown in Figure 4-28, roadway widths along the Montgomery Road vary greatly by segment and alternate frequently. The narrowest portions outside downtown tend to be in business districts (Norwood, Pleasant Ridge, and Silverton). The longest segment wider than 100 feet is along Gilbert Avenue between downtown and Walnut Hills. On-street parking is prevalent along several sections of the corridor.





## TRANSIT

Portions of several Metro fixed routes currently operate along portions of the Reading Road Corridor. As shown in Table 4-7, the most significant are Routes 4 Blue Ash-Kenwood and 90 Metro\*Plus.

Current service along the corridor that follows the proposed BRT alignment for 1 mile or more (excluding routes that overlap only in downtown) consists of:

- 4 Blue Ash - Kenwood: Entire length of corridor along Gilbert Avenue and Montgomery Road through Walnut Hills, Silverton, Norwood, Pleasant Ridge, Kennedy Heights, Silverton, and Sycamore Township.
- 11 Erie Avenue – Hyde Park: on Gilbert Avenue between downtown and Walnut Hills.
- 3 Montgomery Job Connection: Between Lester and Plainfield roads in Pleasant Ridge and Silverton.
- 51 Hyde Park – Uptown - Glenway Crossing Crosstown: Between Dana and Smith avenues on Montgomery Road in Norwood.

**Table 4-7. Routes Serving Montgomery Road Corridor**

Route	Mileage on BRT Corridor	Wkdy AM Peak	Wkdy Midday	Wkdy PM Peak	Wkdy Evening	Sat	Sun
4 Blue Ash-Kenwood	11.30	20	20	20	20	25	25
90 Metro*Plus	7.05	15	15	15	30	--	--
11 Erie Avenue-Hyde Park	2.25	10	20	10	20	15	15
3 Montgomery Job Connection	1.87	4 trips	--	3 trips	--	--	--
51 Hyde Park – Uptown – Glenway Crossing Crosstown	1.16	15	30	15	30	60	60

Ridership on the five routes that serve all or significant portions of the Montgomery Road corridor is listed in Table 4-8.

**Table 4-8. Ridership on Routes Serving Montgomery Road Corridor**

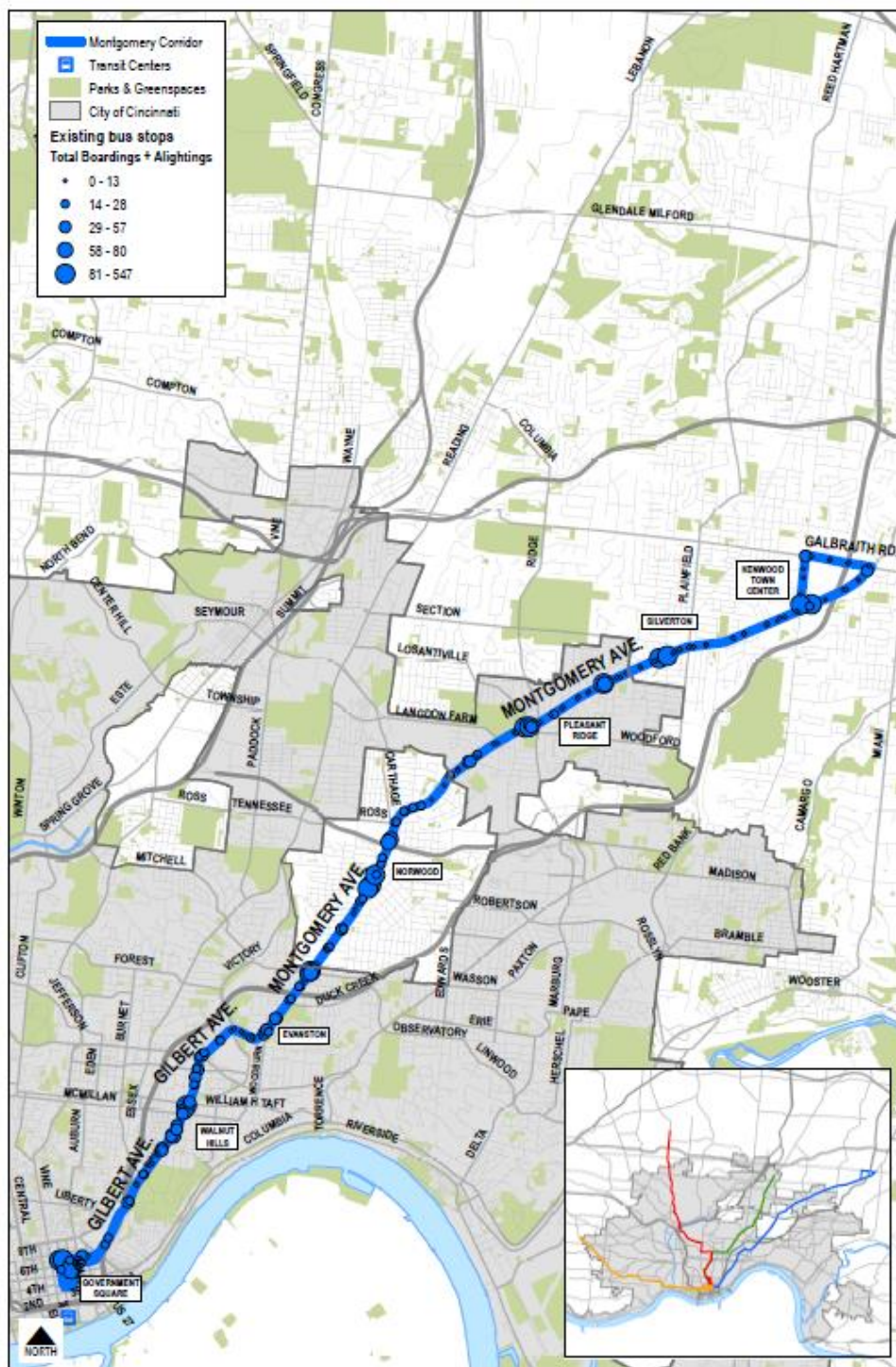
Route	Weekday	Saturday	Sunday
4 Blue Ash-Kenwood	2,745	2,241	1,689
11 Erie Avenue-Hyde Park	2,683	1,251	927
51 Hyde Park – Uptown – Glenway Crossing Crosstown	2,343	1,150	838
90 Metro*Plus	1,783	--	--
3 Montgomery Job Connection	Included with Route 4	--	--



Ridership activity along the Montgomery Road corridor is generally steady throughout its entire length as shown in Figure 4-29. It is served by Route 4 for its entire length. The portion of the corridor between Silverton and Sycamore Township is also served by the Metro\*Plus route. In addition, portions of

**Figure 4-29. Montgomery Road Corridor Current Transit Boardings and Alightings**

Routes 3 and 51 serve smaller segments of the corridor.



Outside downtown, ridership activity is heaviest along Gilbert Avenue within Walnut Hills and Evanston and in Norwood south of the Norwood Lateral. Ridership activity is somewhat lower north of this point but there are significant ridership activity nodes in the centers of Pleasant Ridge and Kennedy Heights. The Kenwood area is also a major transit generator.

There are currently no neighborhood transit centers along the Montgomery Road corridor. However, SORTA is currently planning a transfer facility in Walnut Hills, historically one of the busiest transfer points in the system and a major interface location between Route 4 and the crosstown Route 31.

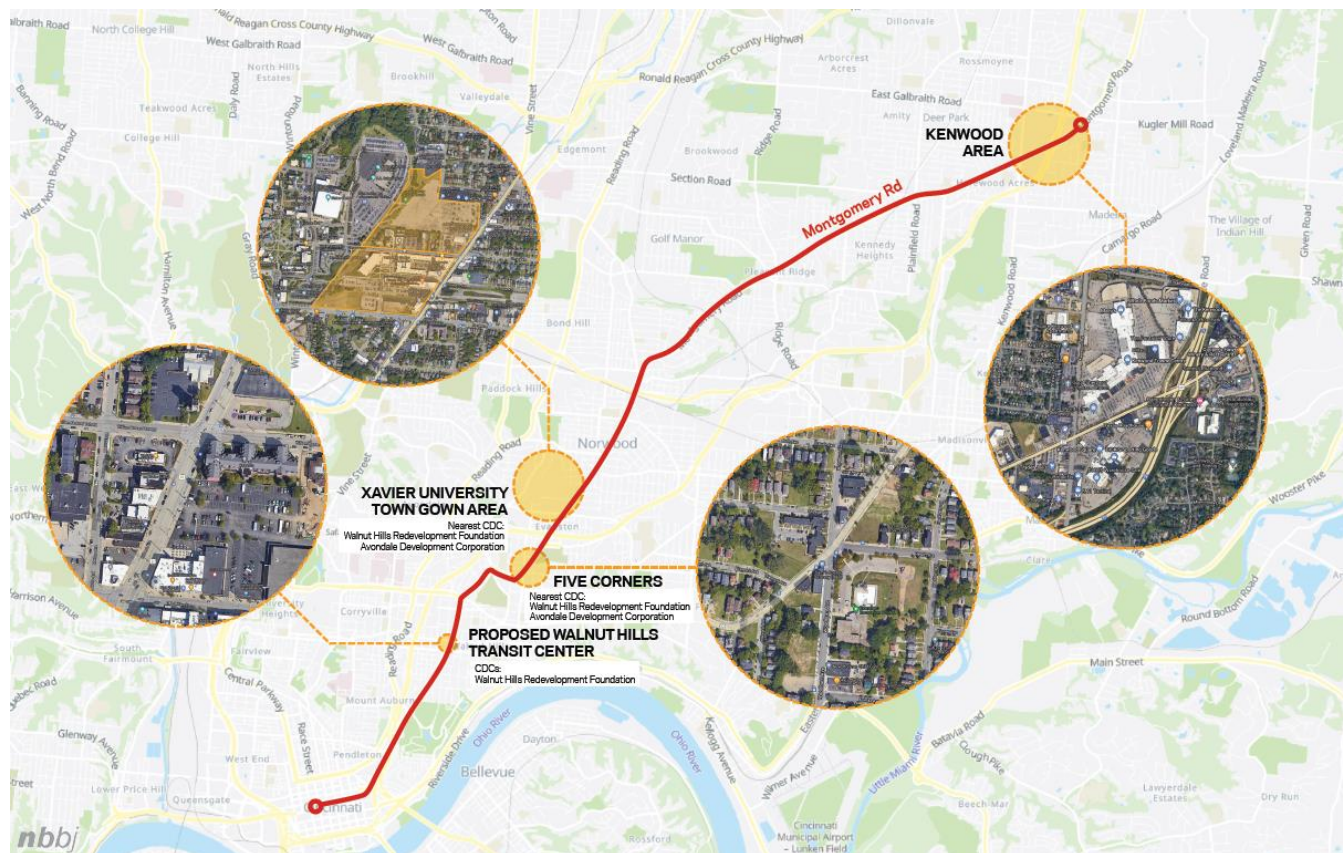




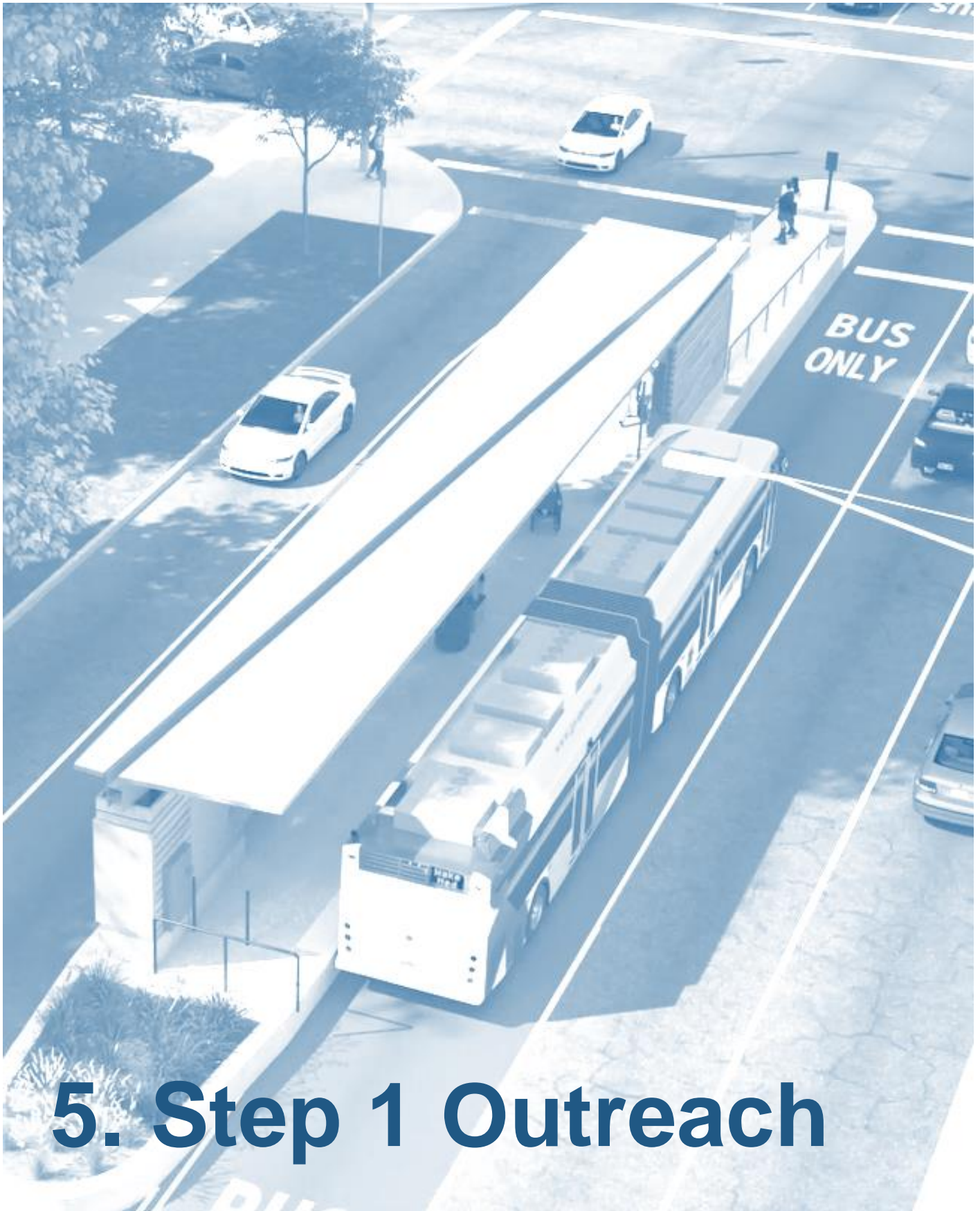
## TOD POTENTIAL

A high level observation of potential TOD sites is shown in Figure 4-30. Four sites appear to be of sufficient size to potentially support future TOD: in the vicinity of the planned Walnut Hills Transit Center, the Five Corners area in Silverton, between Montgomery Road and Xavier University (“Town Gown Area”), and the Kenwood area.

**Figure 4-30. Montgomery Road Corridor Potential TOD Sites**







# 5. Step 1 Outreach



## 5. Step 1 Outreach

The Step 1 outreach program aimed to educate and excite the public, SORTA staff, regional stakeholders, and existing and potential transit users about the BRT concept, and to engage them in the BRT corridor evaluation and analysis process. As described in Section 1, a series of tactics was used to communicate the project and obtain public and stakeholder input.

### Public Meetings

A series of eight public meetings were in October 2022. The purpose of the meetings was to introduce the BRT concept to the public and gather input on the four route alternatives being considered.

Six of the meetings were held in-person at locations along the four proposed corridors (Glenway, Hamilton, Reading, and Montgomery) and along a Metro service route. The project team selected locations with an eye toward engaging as many current and potential users as possible, as well as reaching into underserved populations:

- Cincinnati Action Agency (Reading Road Corridor), October 3
- Avondale Branch Library (Reading Road Corridor), October 11
- Evanston Recreation Center (Montgomery Road Corridor), October 12
- Price Hill Branch Library (Glenway Avenue Corridor), October 13
- College Hill Recreation Center (Hamilton Avenue Corridor), October 17
- Clifton United Methodist Church (Hamilton Avenue Corridor), October 19

All of the in-person meetings were held in late afternoon and early evening hours. The meetings were held open-house style; visitors could come at their convenience any time during the meeting hours.

Information boards highlighting the features and benefits of BRT and illustrating each of the four corridors were positioned around the room, and a project fact sheet was provided to each attendee. Participants were also invited to review table-sized, detailed maps of the proposed corridors and use post-it notes to leave comments or suggestions regarding route alternatives, proposed station locations, or other topics that they wanted the project team to consider. Before leaving, participants were also asked to complete a Public Input Survey. The survey could be completed either online or by filling out a hardcopy version of the survey provided by the project team.

Two of the public meetings were held virtually, both on October 18, 2021. One was held midday and the other was held in the late afternoon, early evening. The meetings were held using a Zoom webinar format. Participants accessed the meetings by clicking on a link posted prominently on the project website or by logging into Facebook and watching the meetings via SORTA's Facebook Live feed; no pre-registry was needed to participate.

The virtual meetings consisted of a presentation delivered by project team members followed by a question and answer session that continued until all questions and comments were shared and addressed.

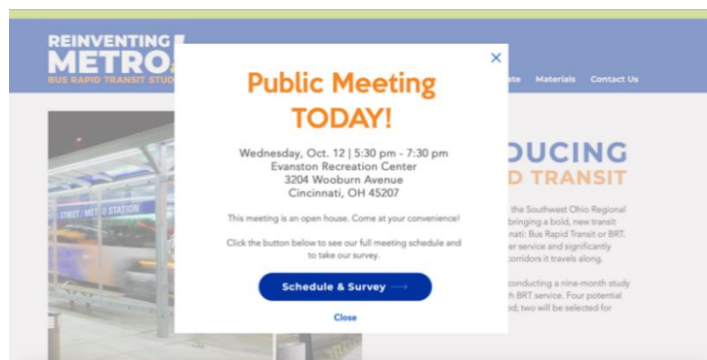


## NOTIFICATION

The in-person and virtual public meetings were publicized in several ways (shown in Figure 5-1):

- News release and media advisory
- Project website
- Metro website
- Social media
- Texts
- Email communications
- Flyer campaign
- In-bus recorded announcements
- Yard signs and sandwich boards
- Announcements at SORTA Board meetings

Figure 5-1. Public Meeting Publicity



## PUBLIC MEETING REACH

Approximately 50 people attended in the in-person public meetings. WCPO Channel 9 attended the meeting at the College Hill Recreation Center and aired multiple stories about the BRT Study and input opportunities which expanded the reach of these sessions significantly. Approximately 50 people also participated in the two virtual sessions. Another 370 people were reached through broadcasting the virtual meetings on Metro's Facebook Live channel. After the meetings concluded, a recording of one of the virtual sessions was posted on Metro's YouTube site. As of April 12, 2023, the YouTube video was viewed 148 times.

Examples of display boards shown at the meetings are shown in Figure 5-2. Photos of the public meetings are shown in Figure 5-3.





Figure 5-2. Step 1 Public Meeting Display Boards

### REINVENTING METRO BUS RAPID TRANSIT STUDY

## REINVENTING METRO OBJECTIVES

In spring 2020, Hamilton County voters approved Issue 7 to provide new funding for improved and expanded transit service and transit-related infrastructure.

With this boost, SORTA is bringing to life its Reinventing Metro plan and bringing exciting new transit innovations to help grow the regional economy and better connect communities to jobs, education, health care, and entertainment.

**REINVENTING METRO OBJECTIVES**

### REINVENTING METRO BUS RAPID TRANSIT STUDY

## INTRODUCING BUS RAPID TRANSIT

Reinventing Metro is bringing a bold, new transit innovation to Hamilton County: Bus Rapid Transit (BRT).

BRT is a high-quality, bus-based travel option that combines the fast and efficient characteristics of rail transit with the flexibility of traditional bus service.

BRT will bring a faster-than-ever, comfortable, and efficient public transportation option to Metro riders.

### REINVENTING METRO BUS RAPID TRANSIT STUDY

## BENEFITS OF BUS RAPID TRANSIT

BRT will elevate our local public transportation system to the next level. Through streamlined access and travel, BRT will help passengers get to jobs and other destinations more quickly, comfortably, and reliably. And by reducing greenhouse gas and local air pollutant emissions, BRT offers an environmentally sustainable alternative for local travel.

**SOCIAL**

- Reduced travel times due to fewer stops and shorter wait times
- Universally accessible due to enhanced BRT stations and same level boarding, no ramps, steps, or lifts needed
- Comfortable, reliable service

**ENVIRONMENTAL**

- Reduces traffic congestion
- Reduces vehicle emissions and improves air quality
- Reduces noise

**ECONOMIC**

- Offers the speed and efficiency of rail but is less expensive
- Can encourage transit-oriented development
- Can attract revitalization, new jobs, new retail, and affordable housing

### REINVENTING METRO BUS RAPID TRANSIT STUDY

## A MORE COMFORTABLE, CONVENIENT RIDE

**ENHANCED BUS STATIONS**  
BRT passengers wait at attractive shelters with comfortable seating, lighting, and fare purchase kiosks.

**WI-FI**  
BRT stations have free Wi-Fi for passengers to connect to while waiting for the next bus.

**ADA-ACCESSIBILITY**  
BRT stations and vehicles are fully ADA-accessible, allowing easy entry for wheelchairs, mobility scooters, strollers, and other similar means of personal travel.

**SAME LEVEL BOARDING**  
BRT platforms are raised to allow same level entry into the vehicle, no ramps, steps, or lifts needed.

**REAL-TIME ARRIVAL INFORMATION**  
BRT bus arrival information is displayed on monitors in stations, available on the web, and via a smartphone app.

**BICYCLE ACCOMMODATIONS**  
BRT vehicles can accommodate bicycles, either inside or on the front of the bus.

### REINVENTING METRO BUS RAPID TRANSIT STUDY

## YOUR VOICE MATTERS

Feedback received will be used to help make decisions about where to launch BRT and what service will look like.

Make sure your voice is heard! Multiple input opportunities will be available:

- Online surveys
- Public meetings
- Virtual meetings
- Focus groups
- Email via our website
- Meetings with interest groups and organizations (upon request)

Stay up-to-date on our progress and public input opportunities at: [MetroBRTStudy.com](http://MetroBRTStudy.com)

### REINVENTING METRO BUS RAPID TRANSIT STUDY

## NEXT STEPS

**FALL 2022**

- Evaluate Proposed Corridors
  - Assess BRT service in peer cities
  - Conduct technical analyses
  - Gather community input
- Recommend two corridors to advance

**WINTER/SPRING 2023**

- Develop service concepts (routes, stations, frequency, hours of operation)
- Develop cost and ridership estimates
- Gather community input
- Select preferred route, station, and service alternatives

**2023 - 2027**

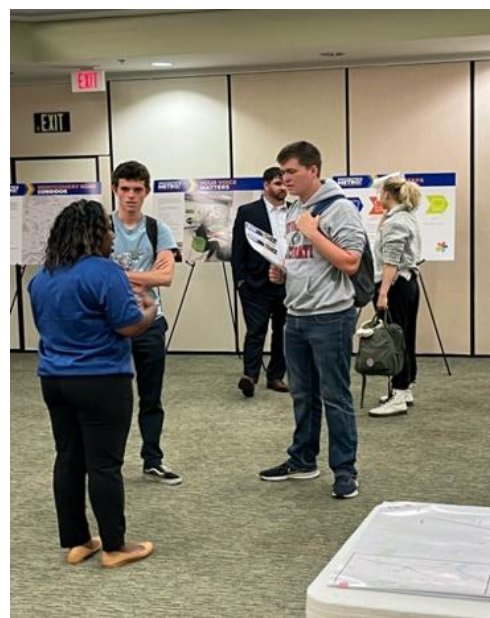
- Complete detailed design & engineering (2023 - 2025)
- Construction (2025 - 2027)

**2027**

- Begin BRT service



Figure 5-3. Step 1 Public Meetings



## RESULTS

Overall, participants in the public meetings were very positive. Observed reactions ranged from curious to enthusiastic, and many long conversations were held with project team members. Most participants were excited about the prospect of BRT, and hopeful that it will greatly enhance Metro’s service offerings. Speed and frequency were forefront in survey respondents’ minds, with 65% indicating that reducing travel time was the feature “very important,” and 84% marking “service every 10-15 minutes” as one of their top three preferred features.





## Survey

The project team developed a survey to help assess and understand the public's perception of and interest in BRT, service features, and service corridor preferences. Two versions of the survey were created:

- Online Survey – Developed using the Alchemer online survey platform, this version of the survey contained 15 questions which asked how respondents use Metro's services; if they live near one of the proposed corridors and if so, which one; asked about respondent's priorities for BRT service; explored respondents' level of interest regarding various BRT features; asked respondents' preferences regarding the proposed service corridors and what destinations they think should be included; and invited participants to sign up to receive project updates via email.
- Abbreviated Survey – This hardcopy survey was an abbreviated version of the online survey and included just seven questions, most of which mirrored the questions asked on the longer, online survey: Metro riding habits, if they lived near a proposed corridor, which of the proposed corridors interest them most, which features are they most interested in, and which destinations they think should be included. The abbreviated survey also provided space for respondents to submit additional comments.

Links to the online survey were promoted through pop-up boxes on the project website and provided on the homepage, the Study page, and Participate page of the MetroBRTStudy website. Anybody visiting the site using either the URL, QR codes including on notification materials, links provided information materials and notification materials were presented with a link to the survey as soon as they arrived on the MetroBRTStudy website. Links to the survey were also included in social media posts, email communications, Go-Metro website, and texts. The abbreviated survey was designed to be printed out and distributed at the pop-up events and community council events. Copies were also distributed at the in-person public meetings.

## RESULTS

Key learnings included:

- Approximately 79% of respondents ride Metro at least one in a while. Forty-two percent ride Metro at least several times a week.
- Reducing travel time was very important to 65% of respondents; 30% thought it was somewhat important.
- Features that online survey respondents were most interested in included frequent service, dedicated bus lanes and smart traffic signals. Inclusion of these features in Metro's new BRT service would probably or definitely encourage 88% of respondents to seek out opportunities to use BRT.
- Comfort and convenience features that online survey respondents were most interested in were real-time travel information, enhanced bus stations, and Wi-Fi. Inclusion of these features in Metro's new BRT service would probably or definitely encourage 87% of respondents to seek out opportunities to use BRT.
- Features that abbreviated survey respondents were most interested in were similar to the online respondents: frequent service, dedicated bus lanes, and real-time information displays.
- Of the combined pool of both online and abbreviated survey respondents, the Hamilton corridor received the highest level of interest (39%). This number reflected the fact that a high level of respondents lived on or within walking distance of the Hamilton corridor.

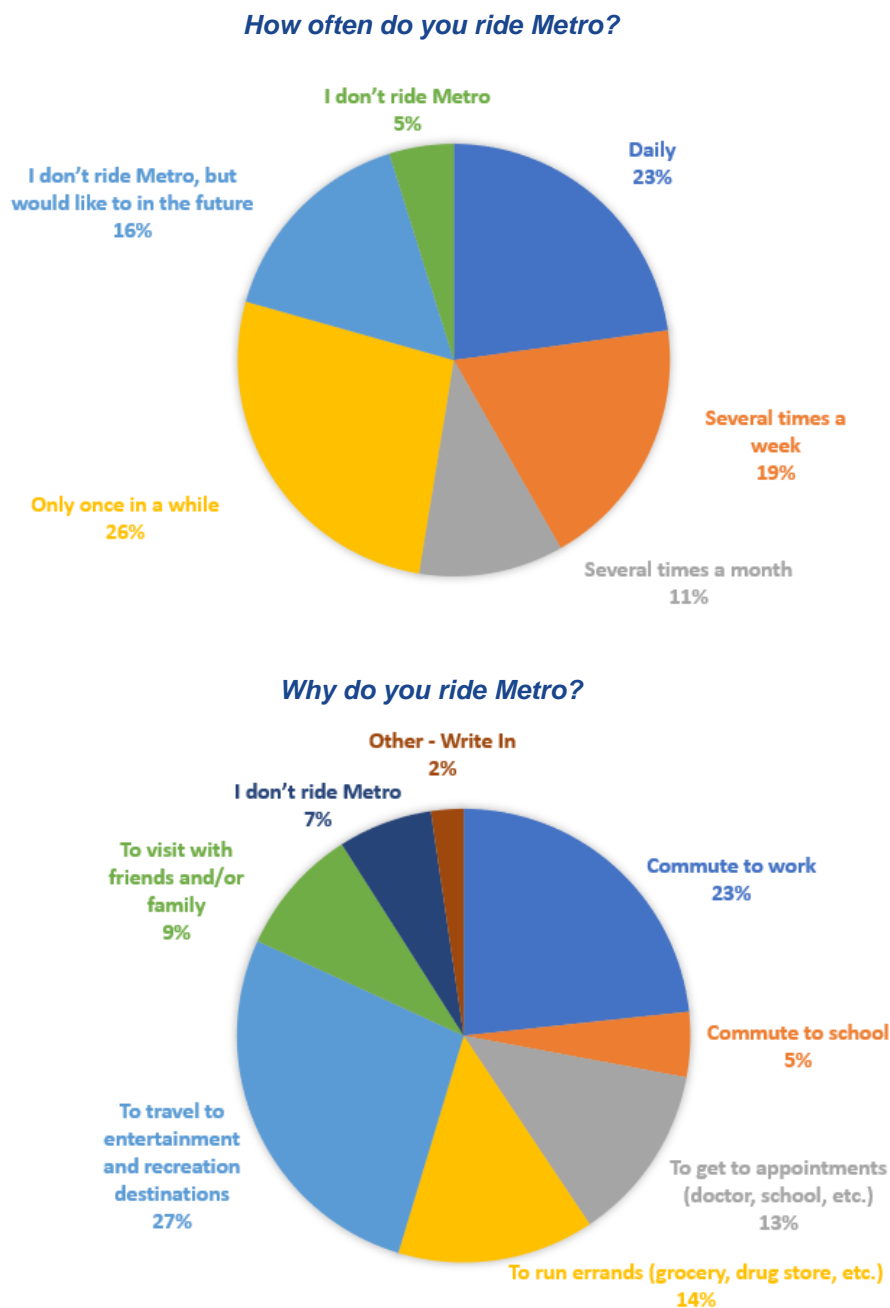




- When asked about future routes, 25% suggested a crosstown route and 19% suggested a route on the east side of town (east of I-71)

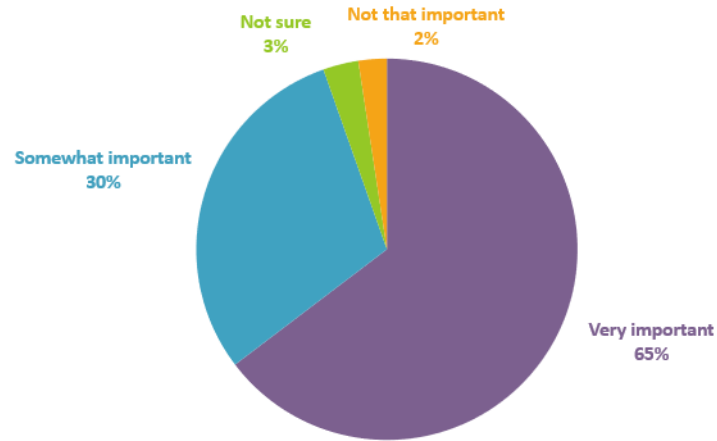
Selected survey results are illustrated in Figure 5-4.

Figure 5-4. Step 1 Survey – Selected Responses

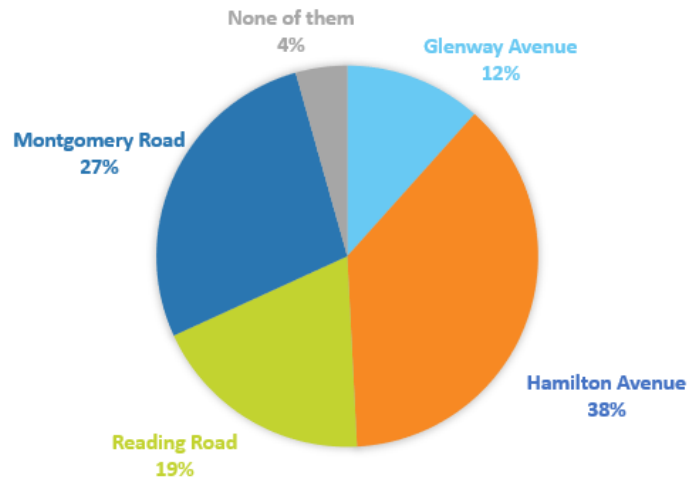




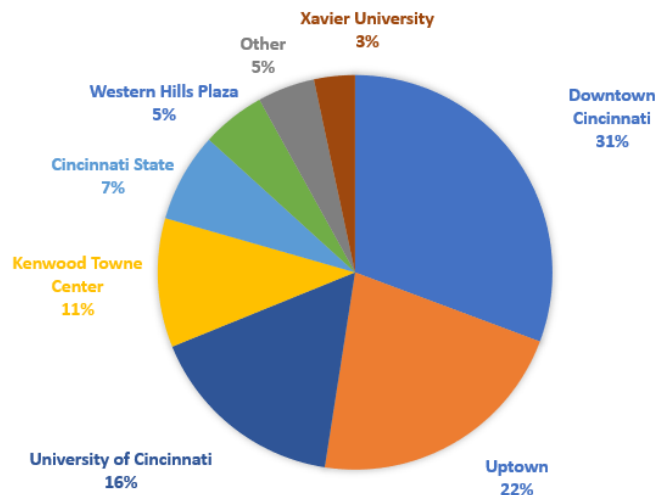
**How important to you is reducing travel time when riding Metro?**



**Which two corridors interest you the most?**



**What destinations should be included along the first two BRT corridors?**





## Community and Pop-Up Events

To maximize the awareness and engagement of Cincinnati community members, the outreach strategy also focused on connecting with people where they live, work, and play. The locations for the pop-up events were selected to ensure engagement with transit users, non-transit riders, students, older adults, persons with disabilities, minorities, and low-income persons. The goal was to provide an environment that encouraged dynamic two-way communication and promoted constructive feedback.

Scheduled events and opportunities to engage with the community along the four proposed corridors were identified through internet searches along with recommendations from members of the Stakeholder Advisory Committee and other supporters. Once the pop-up events were selected, vetted, and scheduled, they were posted on the BRT website and published through SORTA's social media and newsletters. Most of these events were also advertised by the event sponsors.

BRT Fact Sheets with a QR code to the BRT website were distributed to drive community members to the public meetings and the full survey on the website. An abbreviated paper survey was used to collect feedback during the events. Posters with a map of the proposed corridors and BRT information were displayed during each of the pop-up events.

Sixteen pop-up events were held in each of the four proposed BRT corridors between September and December 2022:

- Fountain Square Car-Free Day Cincinnati (Downtown for all 4 corridors), September 22
- West Price Hill Meet and Greet at the Dunham Recreation Complex (Glenway Avenue Corridor), November 5
- Corryville Peace Ball tournament and hiring fair at the Corryville Rec Center (Hamilton Avenue and Reading Road corridors), November 5
- Mount Healthy Farmer's Market (Hamilton Corridor), November 6
- Xavier University Commuter Services group meeting (Montgomery Corridor), November 7
- Greater Cincinnati Region Paratransit Coordination meeting at the OKI Regional Council of Government (Downtown for all four corridors), November 16
- TriHealth Good Samaritan Hospital Cafeteria (Hamilton Avenue and Reading Road corridors), November 17
- Coca-Cola Holiday Caravan at Washington Park (Hamilton Avenue and Reading Road corridors), November 17
- Findlay Market (Hamilton Avenue and Reading Road corridors), Community Resource Tent, November 18-20.
- Books by the Banks (regional book festival), Duke Energy Convention Center (Downtown for all four corridors), November 19
- Santa Maria Community Services staff meeting, Joe Williams Family Center (Glenway Corridor), November 21
- Flat Iron Café, 1833 Sycamore Street (Reading Road Corridor), December 9
- The 86 coffee shop, 2900 Jefferson Avenue (Hamilton Avenue and Reading Road corridors), December 9
- Pleasant Ridge Montessori Handmade Market (Montgomery Road Corridor), December 10
- East Price Hill Jingle and Mingle, 3301 Price Avenue (Glenway Corridor), December 11

Photos from some of the Step 1 community and pop-up meetings are shown in Figure 5-5.





Figure 5-5. Step 1 Community and Pop-Up Meetings





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## RESULTS

The community members generally expressed support for excitement about BRT and potential corridor enhancements. They were particularly enthusiastic about the proposed safety improvements.

Additional comments included:

- Local buses along all four proposed corridors are sometimes too full to allow any additional passengers on board.
- The newer and larger (articulated) buses were welcomed.
- Elevated boarding platforms were viewed favorably.
- Some concerns were expressed about the constrained street network and the impact of a BRT lane on their businesses and on-street parking.
- Several suggestions were made for other transit service improvements such as additional sidewalks, bus shelters, and lighting.

## Community and Local Jurisdiction Council Meetings

Cincinnati has distinct and diverse neighborhoods led by active community councils. Each of the community council presidents and executive leadership of the communities outside the City of Cincinnati, who were members of the Stakeholder Advisory Committee, were asked to include the BRT project in one of their meeting agendas. A standard presentation was developed for each of the corridors. Members of SORTA's Strategic Planning, Development and Innovation Department attending the meetings to present the information and respond to questions.

Nine community council presentations were made between September and December 2022:

- Avondale Community Council Board meeting (via Zoom), September 6
- Avondale Community Council General meeting (via Zoom), September 20
- College Hill Community Council, October 25.
- Bond Hill Community Council (via Zoom) November 3
- Village of Golf Manor Council, November 14
- Northside Community Council, November 21
- Norwood City Council, November 22
- Pleasant Ridge Community Council, December 6
- Sycamore Township Trustee Meeting, December 6

## RESULTS

The most common feedback from these meetings was appreciation for being involved early in the planning process. There were also inquiries about potential economic development and safety enhancements. These meetings also provided a resource for learning about future community plans and scheduled roadway improvements.



## SORTA Staff Engagement

This effort was designed to ensure that all SORTA staff were aware, informed, engaged, and given the opportunity to participate in the BRT study activities. This foundational step enhanced community participation as employees were involved and prepared to drive community engagement. Many SORTA employees interact with passengers daily. Early communication with employees provided the BRT planning team with input from the people who best understand current customers and the neighborhoods through which they travel. This also helped these staff members become project champions within the communities.

SORTA Staff Engagement was conducted over the course of five days between September 22 and September 28, 2022. Multiple teams were dispatched to the employee breakrooms at four Metro locations - administrative office (Huntington Building), Queensgate operating facility, Bond Hill operating facility, and Access Operations Center - to facilitate in-person conversations and conduct the survey. Staff were notified about the events via the company newsletters and advertisements on the digital display monitors.

A survey questionnaire was developed to gather vital information from staff in five key focus areas:

- Prioritization/ranking (highest to lowest) of the four proposed BRT transit corridors
- Key destinations
- Would the respondent use BRT when it is introduced and why or why not
- Respondent's home address
- Respondent's use of currently use and why or why not

Employees were provided with various methods to complete the survey. This included paper surveys, tablets, and a QR code that they could scan and use on their phones. However, most used a paper survey method. A fact sheet with the public meetings dates and locations and a QR code to the BRT website and full survey was provided during the engagement events as well.

Photos from the Step 1 SORTA staff engagement activities are shown in Figure 5-6.

### RESULTS

Overall, SORTA staff were excited about the BRT project and appreciated being a part of the planning effort. Staff at the Queensgate facility Center are responsible for fixed routes in two of the proposed corridors while Bond Hill staff operate fixed routes traveling on the other two proposed corridors. These staff members (drivers, supervisors, and mechanics) were somewhat partial to the routes they operate. However, they did offer insights into each corridor and demonstrated awareness and support for the corridors that they did not operate. Several operators at both locations noted that buses along Glenway Avenue are typically full all the time. They added that all routes along these corridors need additional transit services.

In addition to one-on-one discussions, 323 employee surveys were collected. Based on the prioritized selection by each survey respondent, Glenway Avenue received a cumulative high overall percentage (highest + high priority) with 61.3%, Reading Road with 57.5%, Hamilton Avenue with 51.4% and Montgomery Road received the lowest prioritization with 30.8%.

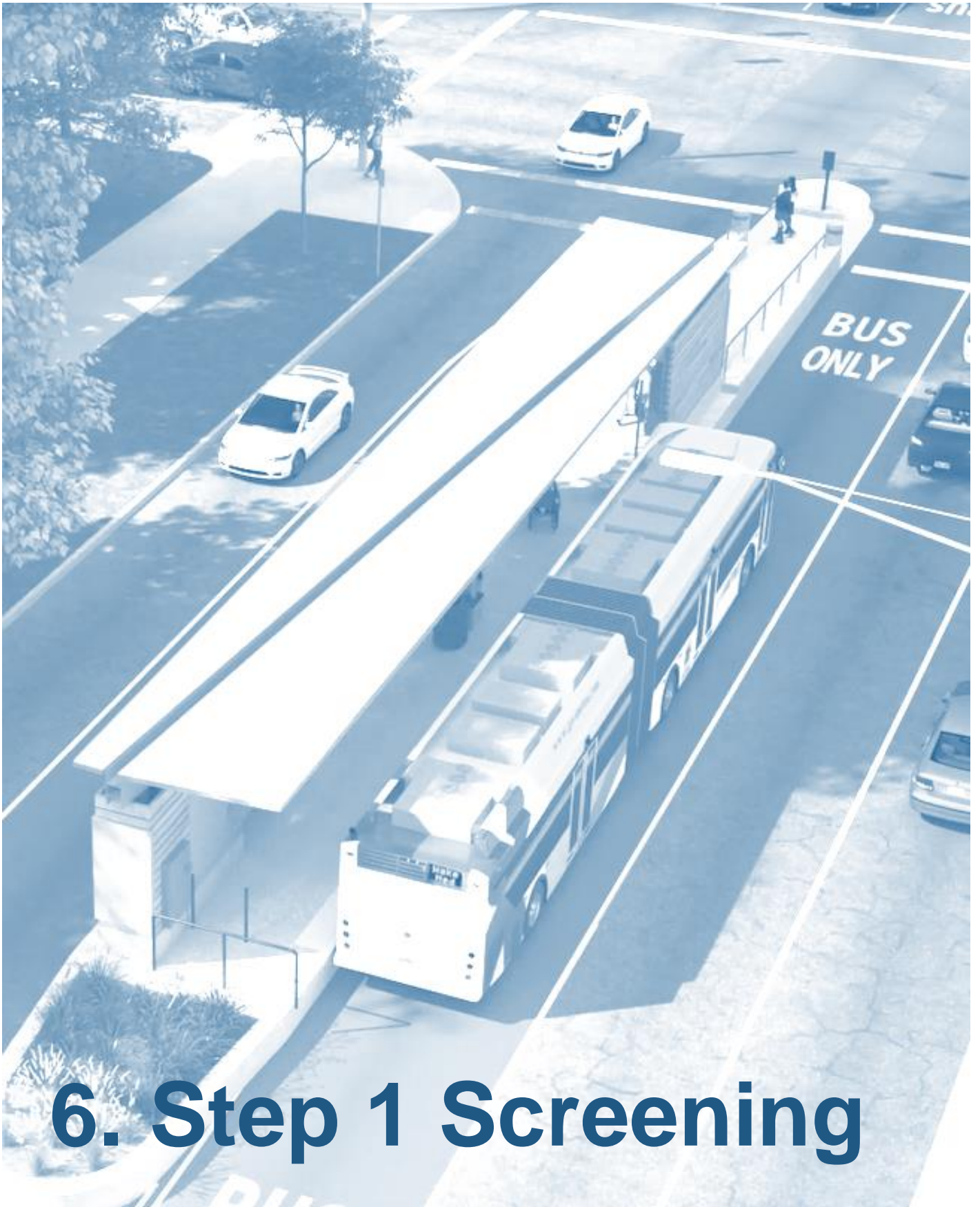




Figure 5-6. Step 1 SORTA Staff Engagement



When asked if they would ride the BRT line when introduced, 74% of employees responded “Yes” while 26 % responded “No.” Employees who responded “Yes” attributed their positive responses to faster service to destinations, time savings, better reliability, and convenience. Those who responded “No” attributed their responses to a lack of bus service near their homes, their preference to drive, and the lack of convenience.



# 6. Step 1 Screening

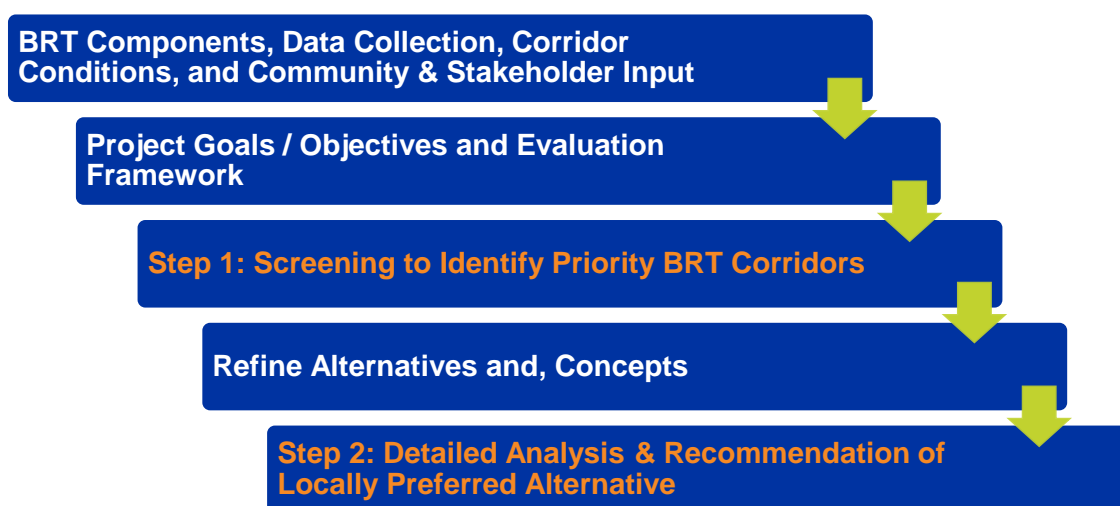


## 6. Step 1 Corridor Screening

### Background

The development of appropriate solutions and next steps for each corridor was conducted as two-step process. Step 1 established goals that informed the analysis approach and methodology for the study. Evaluation of candidate corridors served as a “fatal flaw” assessment to identify the two corridors that were advanced to conceptual design and a detailed Step 2 analysis.

Figure 6-1. Alternatives Analysis Process



### Evaluation Framework

The evaluation framework illustrated in Figure 6-2 represents the structure for development of detailed evaluation criteria and metrics to assess potential benefits / impacts as well as inform decision-making.

Figure 6-2. Alternatives Evaluation Framework



Project goals and objectives were the basis of the analysis framework to ensure successful integration of BRT infrastructure within the community fabric in support of sustainable service improvements and connecting opportunities.





The alternatives development and analysis processes began by establishing appropriate expectations prior to the definition of alternatives, including the level of investment to designate and approach to preservation or conversion of right of way for transit priority operations.

BRT alternatives were developed as combinations of capital and service operating components shown in Table 6-1.







**Table 6-1. Capital and Operating Components**

Capital Components	Service Components
Alignment & routing	Logical termini
Technology (fare collection & Intelligent Transportation Systems, ITS)	Frequency and span
Guideway and transitway assumptions	Station/Stop spacing
Station locations and amenities	Connectivity and interoperability

## Goals and Objectives

Industry best practices - complemented by their collective experience in the development of long range and regional high-capacity transit system plans - and available transportation and land use network data were used to develop six preliminary goals and accompanying objectives. SORTA vetted the project goals with the community and stakeholder groups for concurrence and refinement during Step 1. These goals (Table 6-2) and their objectives represent the desired outcomes of the project. This section profiles and outlines opportunities and externalities related to each study goal.

**Table 6-2. Alternatives Evaluation Framework**

	<b>Attract Riders and Increase Mode Share</b>
	<b>Improve Transit Speed and Reliability</b>
	<b>Enhance Transportation Network Connectivity</b>
	<b>Provide Equitable Access to Frequent Services</b>
	<b>Ensure Constructability and Built Environment</b>
	<b>Support Economic Development</b>



Each study goal and objective is summarized as follows:

## GOAL 1: ATTRACT RIDERS AND INCREASE MODE SHARE

**Objective: Identify priority corridors that have highest ridership potential and maximize FTA Capital Improvement Grant (CIG) program funding opportunities.**

- Provides a clear cost-benefit of investment in each corridor that allows SORTA to gauge potential ridership, operations and maintenance costs and capital costs.
- Identifies areas in all corridors for future multimodal infrastructure improvements which support ridership and provide access to services.



## GOAL 2: IMPROVE TRANSIT SPEED AND RELIABILITY

**Objective: Identify priority corridors where travel time and reliability can be most improved.**

- Enhances BRT competitiveness with car trip times and identify potential areas where investments are most useful to the overall transit network.
- Assesses traffic conditions and congestion within corridors to determine critical locations and choke points where transit trips currently experience the most delay.
- Identify appropriate concepts for transit speed and reliability capital improvements as well as additional studies that may be required to determine potential impacts and develop appropriate alternatives.



## GOAL 3: IMPROVE TRANSPORTATION NETWORK CONNECTIVITY

**Objective: Identify and enhance priority corridors that maximize service to regional travel markets, transit facilities and network services.**

- Ensures overall usefulness to riders by assessing corridors with highest potential ridership from cross-town and complementary service to future BRT.
- Identifies corridor connectivity to places and existing bus routes to ensure overall system productivity, rider connectivity, and service quality.
- Further understanding of existing ridership and travel patterns throughout each corridor, including opportunities to implement complementary policies and programs supporting transit-oriented communities.





## GOAL 4: PROVIDE EQUITABLE ACCESS TO FREQUENT SERVICES

**Objective: Identify priority corridors that maximize equitable access to high quality, frequent transit service and support further development of those corridors.**

- Prioritize capital investments that serve groups of people that have been traditionally marginalized.
- Ensure frequent corridors serve low-income populations and households without a personal car that depend on transit to get to work, go to school, and access health care and other services.
- Identify areas with community exposure to high environmental burden and highest exposition to particulate matter and prioritize the implementation of cleaner transit corridors.



## GOAL 5: ENSURE CONSTRUCTABILITY AND COMPATIBILITY WITH THE BUILT ENVIRONMENT

**Objective: Identify priority corridors that are most conducive to installation of dedicated transitways or other transit priority treatments.**

- Provides recommendations on suitable locations for new installations of BRT infrastructure (smart traffic signals, BRT stations, designated travel lanes, and etc.)
- Evaluates built environment and its impact on BRT running schedule, as well as other existing routes along the corridor.
- Ensures construction viability that avoids the inconvenience of road widening or land acquisition.



## GOAL 6: SUPPORT ECONOMIC DEVELOPMENT

**Objective: Identify priority corridors that have maximum economic redevelopment opportunities and policies in place.**

- Identify areas along the corridors where SORTA can seek to develop TODs to boost ridership and support community goals of walkability and vibrancy.
- Assist in seeking partnerships with employers and destinations along corridors to connect people and jobs.



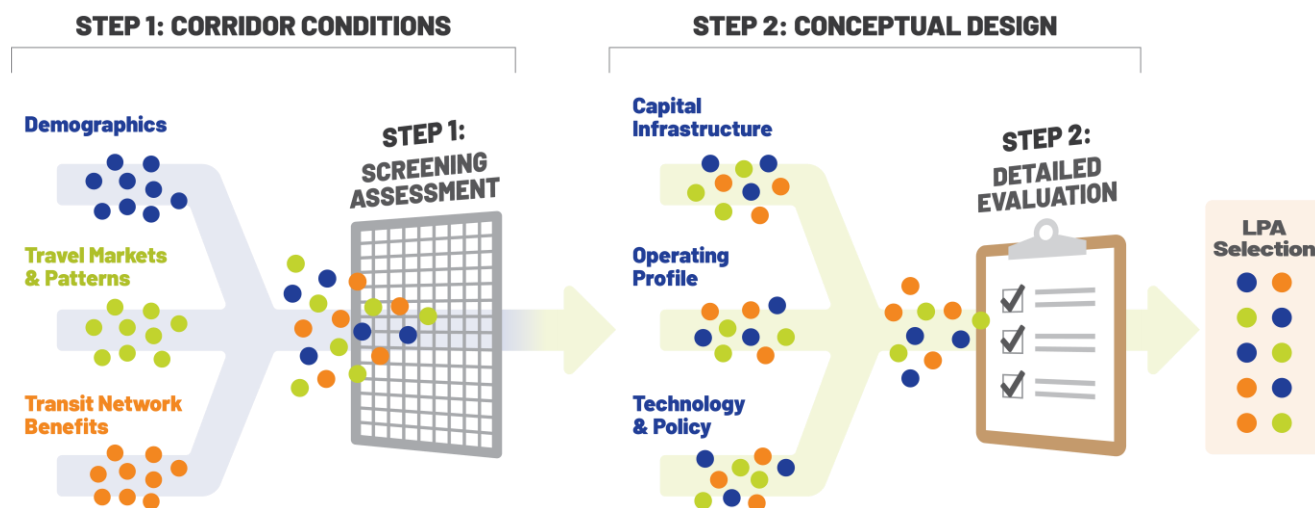




## Two-Step Screening Process

Using the project goals, available information, and data analysis tools the study developed a two-step process (Figure 6-3) using data-driven criterion and metrics to effectively prioritize corridors. Examples of overall system impacts considered included but were not limited to SORTA's adopted transit network performance goals and service targets, BRT program vision and community outcome expectations, as well as the evolving regional and agency understanding and vision of equity.

Figure 6-3. Two-Step Screening Process



### STEP 1 ALTERNATIVES SCREENING

The first step of the evaluation process was the screening of the four candidate corridors to identify the top two priority corridors for development of BRT concepts and project implementation plans. Screening relies on a comparative assessment of key indicators towards “readiness” for BRT investments in the candidate corridors, such as but not limited to travel market and development trends, existing transit performance, and traffic/roadway conditions. The assessment also sought to identify potential critical constraints and fatal flaws prohibitive to BRT implementation, as well as potentially enabling transit priority infrastructure opportunities or supportive plans and projects.

Data sets used to inform Step 1 decision making were sourced from existing SORTA transit operational performance reporting, regionally adopted travel demand modeling outputs, as well as travel data observed and collected for the study.

### ALTERNATIVE REFINEMENT AND BRT CONCEPT DEVELOPMENT

Following identification of the priority two corridors through the Step 1 screening, the project team developed BRT capital infrastructure and service operating assumptions for the two recommended BRT corridors. BRT concepts for each corridor include potential station areas and specific transit priority treatment opportunities (bus lanes, queue jumps, signal priority and intelligent transportation systems, ITS).



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## STEP 2: DETAILED EVALUATION AND RECOMMENDATION

In Step 2, the BRT corridors are developed in greater detail including conceptual design plans, capital cost, and operating cost.

The results of Step 2 development identify a technically supported BRT alternative for each corridor. The recommended alternative was presented to regional stakeholders for comment, prior to the SORTA Board of Directors for adoption as the LPA and advancement into Project Development (PD).

Data sets informing detailed evaluation include forecasts of future (horizon year) conditions with BRT in service and estimates of potential costs to construct and operate. BRT and network performance are calculated using industry best practices, tools, and standards applicable to transit service in the Cincinnati area.

## Step 1 Screening Indicators and Results

A set of Step 1 intuitive indicators of potential corridor readiness for BRT service were developed using available data points including:

- Existing corridor and fixed route ridership
- Existing fixed route service frequencies and run time data
- Corridor demographic data
- Corridor infrastructure and traffic conditions
- Corridor travel market data and trip generators
- Existing and planned land uses
- Jurisdictional boundaries and intermodal facilities

Using available data, identified screening criteria of both qualitatively and quantitatively measurable corridor conditions and features, illustrated in Figure 6-4, were identified to inform the likelihood a corridor would meet the stated goals of the BRT program. Criterion may satisfy aspects of more than one goal and may include use of different metrics and different data points at the steps of the evaluation process, as appropriate, to inform decision making.

Although quantitative data was collected and compared among candidate corridors, the assessment of corridor conditions and readiness was largely qualitative in nature. Corridors were assessed “high-”, “moderate-”, or “low-” performing for each respective criterion, representing significant and meaningful differences in the possible constraints or opportunities for BRT implementation.

The scoring rubric establishes thresholds for associated metrics and rated them from 5 (highest) to 1 (lowest) according to their performance. If a criterion was composed of multiple relevant metrics or data points, an average score of those metrics served as the “total score” of that criterion. Several of the criterion required normalization to account for differences in corridor length and provide an accurate (apples-to-apples) comparison of each corridor across metrics.



Figure 6-4. Step 1 Screening Criteria

STEP 1 CRITERION	STUDY GOALS					
	GOAL 1 Attract riders and increase mode share	GOAL 2 Improve Transit Speed and Reliability	GOAL 3 Transportation Network Connectivity	GOAL 4 Equitable Access to Frequent Services	GOAL 5 Constructability & Built Environment	GOAL 6 Support Economic Development
Traffic conditions and congestion		✓			✓	
Roadway conditions, geometry, and capital improvements		✓			✓	
Equity metrics - intersecting boundaries, communities				✓		
Potential to improve transit delay and hotspots		✓		✓		
O-D travel markets and travel flows	✓		✓			
Existing corridor ridership (include shared segments)	✓					
Third party boundaries, facilities of inter-jurisdictional control					✓	
Existing transit frequency / utilization	✓			✓		
Transit Center / Intermodal connectivity			✓			
Land uses and pop/emp density	✓					✓
Major / Regional activity centers	✓					✓
Transit supportive policies and TOD						✓





## TRAFFIC CONDITIONS AND CONGESTION

This criterion assesses the traffic conditions and vehicular congestion on each corridor by analyzing two metrics: traffic flow and intersection delay. Traffic flow is determined by examining the vehicles per hour per lane of signalized urban corridor roadway segments (vehicles/hour/lane). Higher vehicle/hour/lane figures means that there is a larger volume of cars present on average in the peak period—corresponding to low traffic flow. High volume of cars on the road results in lower capacity for additional vehicles on roadway segments and translates to congestion. When single occupancy vehicles are the dominant mode in the transportation network, the roadway system becomes stressed and congested. Encouraging travelers to use BRT (mode share) can un-clog existing networks and lead to a healthier system that works better for more people, more of the time.

The data used in this analysis, shown in Table 6-3, included City of Cincinnati and OKI peak period traffic volumes.

**Table 6-3. Traffic Conditions and Congestion Rubric**

Rating		Traffic Flow Threshold	Intersection Delay Threshold
H	5	95% of corridor has capacity	95% of intersections
		80% < x < 95%	80% < x < 95%
M	3	65% < x < 80%	65% < x < 80%
		50% < x < 65%	50% < x < 65%
L	1	0% to 50% of corridor has capacity	0% to 50% of intersections

The **Traffic Flow** scores corridors according to their total percentage of roadway that has capacity (average of corridor segments with less than 600 vehicles/lane/hour); corridors with a higher percentage of roadway segments with capacity earned a higher score.

The **Intersection Delay** assesses corridors according to their total percentage of intersections with no dedicated left turn phasing on the mainline (% of traffic signals with no dedicated left turn phasing on the mainline). Signalized left turns are an indicator of high cross-street volumes and longer signal phases to move higher volumes of vehicles. Corridors with a higher percentage of intersections without dedicated left turn lanes earn a higher score based on the thresholds established in the rubric.

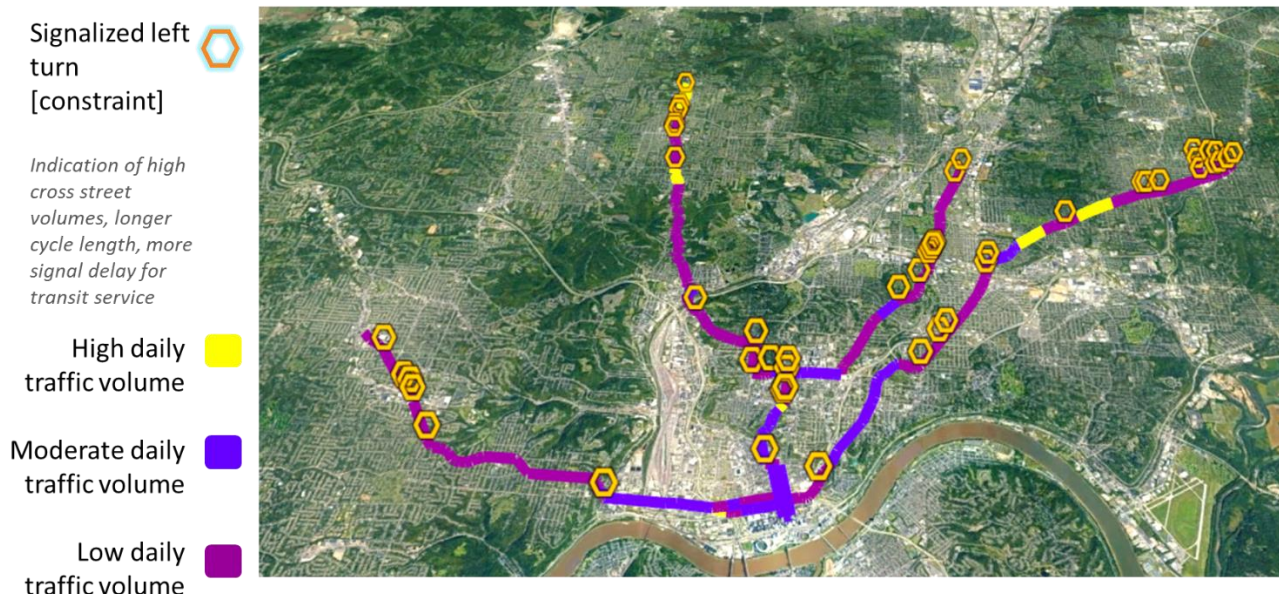
**Table 6-4. Traffic Conditions and Congestion Scoring**

Corridor	Traffic Flow Score	Intersection Delay Score	Average Score
Glenway	2	4	2.7
Hamilton	2	3	2.3
Montgomery	2	2	2.0
Reading	3	2	2.7



As illustrated in Figure 6-5, the Reading Road and Glenway Avenue corridors experience the best conditions in terms of traffic flow and intersection delay. All four corridors are impacted by traffic and adding BRT with dedicated lanes to these corridors would provide a reliable alternative to driving and could result in a healthier transportation ecosystem, as a whole.

**Figure 6-5. Traffic Conditions and Congestion**



## ROADWAY CONDITIONS, GEOMETRY, AND CAPITAL IMPROVEMENTS

Analysis of corridor roadway conditions, geometry, and capital improvements helped to identify which corridors will potentially require the most investment as it pertains to right of way acquisitions, roadway modifications, and reallocation of assets like parking. The scoring rubric for this criterion establishes thresholds for three metrics:

- Length of corridors with 2+ travel lanes in each direction
- Length of corridors with on-street parking
- Length of corridors having various public right-of-way widths

Corridors with lower potential impacts to these facilities will score higher, closer to the maximum score of 5, while corridors that are discovered to have a high impact, meaning investment in high capacity transit would be more disruptive, will score lower.

The data used in this analysis included City of Cincinnati roadway data as well as consideration of future planned infrastructure improvements.

**Table 6-5. Roadway Conditions, Geometry, and Capital Improvements Rubric**

Rating		2+ Travel Lane Threshold	On Street Parking Threshold	ROW Width Threshold
H	5	x > 90% with 2+ lanes	0% to 20% with parking	100 ft or greater
		75% < x < 90%	20% to 40%	



Rating		2+ Travel Lane Threshold	On Street Parking Threshold	ROW Width Threshold
<b>M</b>	<b>3</b>	50% < x < 75%	40% to 60%	
		0% < x < 50% with 2+ lanes	60% to 80%	Less than 70 ft
<b>L</b>	<b>1</b>	n/a	80% to 100% with parking	n/a

The **2+ Travel Lane** metric scores corridors according to their total percentage of roadway where two or more (2+) travel lanes are present during peak hours. Corridors with a higher percentage of roadway where 2+ lanes are more likely to have capacity to convert space to transit only use and earn a higher score.

The **On-Street Parking** metric looks at the total percentage of roadway in which on-street parking is present and permitted during peak hours. On-street parking obstructs bus access to curbs and potential station areas, requiring more disruptive solutions to place BRT station platforms. Corridors with lower percentage of roadway segments with on-street parking score higher in this metric.

The **Right-of-Way (ROW) Width** of corridors was scored using City of Cincinnati GIS records of public right-of-way to measure the average ROW width within similar segments of each corridor. Corridor widths were identified in ranges shown below, and the length of corridor (%) at each ROW range was assigned a point value. The weighted average width (score) of each corridor was then calculated, with the higher average representing typically wider ROW that may be candidate for implementation of bus only lanes.

- Less than 70 ft (2 pts)
- 70 to 80 ft (3 pts)
- 80 to 100 ft (4 pts)
- 100 ft or greater (5 pts)

The Reading Road corridor is the “most ready” corridor in terms of space available, to receive investment in BRT. This corridor has the most readily available space in terms of travel lanes throughout the corridor. Of the four corridors, Reading would have the lowest impact on traffic, though impact to all corridors would likely be substantial in result of adding of dedicated bus lanes. The maps provide a visual comparison of a high-scoring route (Reading Road) and low-scoring (Hamilton Avenue) in terms of ROW width.

**Table 6-6. Roadway Conditions, Geometry, and Capital Improvements Scoring**

Corridor	% Parking Score	2+ Lanes Score	ROW Score	Average Score
Glenway	3	5	2.6	3.5
Hamilton	3	5	2.7	3.6
Reading	4	5	3.1	4.0
Montgomery	4	4	3.3	3.8

Notably, the analysis of ROW width is inclusive of ROW owned by the city, county, or state and not of “available ROW” or building-to-building, undeveloped land. A future ROW impact analysis will provide a more granular assessment of available space and help to identify opportunities along the two selected corridors.





This criterion evaluates how each corridor serves disadvantaged and minoritized populations by creating a weighted index based on the following six metrics:

- Percent of people of color
- Percent of households with an annual income below \$50,000
- Percent of people under 18 years of age
- Percent of households with access to no more than one personal car
- Percent of limited-English-speaking households
- Concentration of particulate matter 2.5

The process to calculate each corridor's equity index defined below aims to capture the concentration of the populations of interest (represented by the six indicators above) within a quarter mile of the corridor.

**Table 6-7. Equity Index Rubric**

Rating		Normalized Equity Index
H	5	$x > 5$
M	3	$4.5 < x < 4.75$
L	1	$x < 4.25$

Each of the six equity metrics was scored from 1 to 10 based on its correspondent decile across all Hamilton County census tracts. For example, the 10% census tracts with the lowest percentage of people of color score 1, while the 10% census tracts with the highest percentage of people of color score 10. Then, the equity index for each census tract results from calculating the weighted average of the six metrics (scored from 1 to 10), as explained previously.

Lastly, a quarter of a mile buffer was defined along the corridor to compute the intersection with the census tracts (Figure 6-6). the corridor's normalized equity index is obtained by averaging all the census tracts' equity index intersected by the corridor and adjusted by each census tract's population density.

**Table 6-8. Equity Index Scoring**

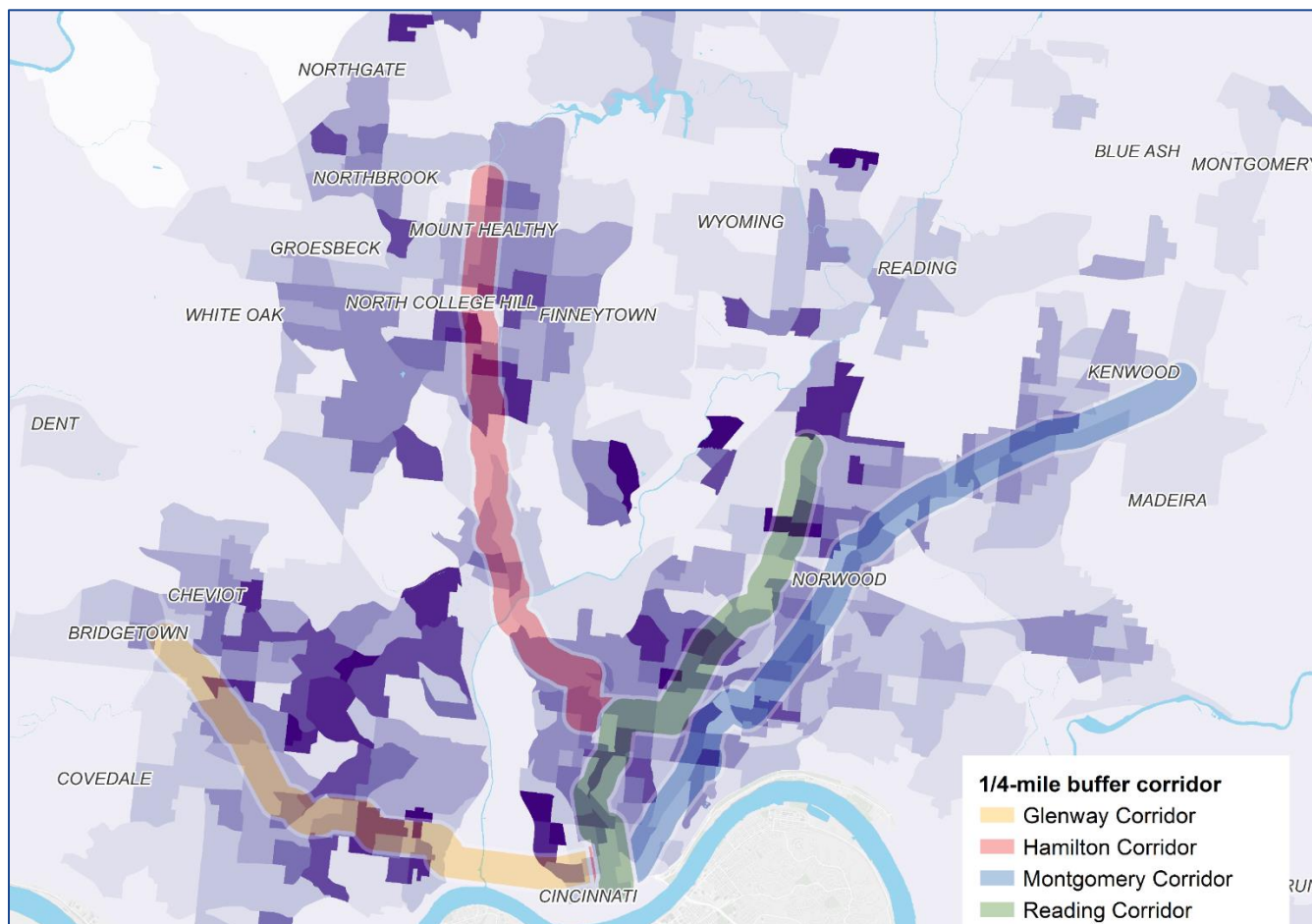
Corridor	Normalized Equity Index	Equity Index Score
Glenway	4.5	2
Hamilton	4.8	3
Reading	5.0	5
Montgomery	4.4	2

The highest normalized score was received by the Reading Road corridor which serves some tracts with the highest individual equity index near Bond Hill and Avondale neighborhoods. The lower-scoring



corridors are Glenway Avenue and Montgomery Road, primarily because their alignment crosses some low-densely populated areas reducing their likelihood of serving populations in need. Although a large concentration of equity communities are present west of I-75, they are often located further away from the proposed BRT corridor and not reflected by the quarter-mile capture area.

**Figure 6-6. Equity Index Map**



## POTENTIAL TO IMPROVE TRANSIT DELAY

This criterion assesses the consistency in travel speeds and schedule adherence for current fixed routes in candidate corridors to identify potential transit delay hotspots. The results of this analysis also inform BRT conceptual design needs and contributes to smarter scheduling of future BRT service.

The final score for each corridor is the average of two metrics in this analysis: length of high delay segments, and the potential for speed reliability improvement score. Analysis took SORTA automatic vehicle location (AVL) records for the month of June 2022 and General Transit Feed Specification (GTFS) datasets from SORTA 2022 summer bid period for the following routes:

- Glenway: Route 33
- Hamilton: Routes 15X, 17
- Reading: Route 43
- Montgomery: Routes 4, 2X (north of Lester Road), Metro\*Plus (north of I-71)



**Table 6-9. Potential to Improve Transit Delay Rubric**

Rating		Scheduled Speed Reliability	High Delay Segment (% of Corridor)
H	5	20%+ slower than schedule	$x < 5\%$
			$5\% < x < 10\%$
M	3	10% to 20% slower than schedule	$10\% < x < 15\%$
			$15\% < x < 20\%$
L	1	0% to 10% faster than schedule	$20\% < x < 25\%$

The **high delay segment** was calculated and mapped for hotspot identification using existing fixed route time points. The average running speeds between stop points were compared with the respective scheduled running speeds. Two sets of speeds were analyzed: weekday PM peak outbound speeds, and weekday midday inbound speeds. When the average running speed along one segment was slower than most of the other segments, this segment was identified as “High Transit Delay Locations”, and the total lengths of these segments were summarized and compared to the corridor total lengths.

For fair comparison, segments of transit delay in Downtown were excluded from this analysis.

The **running speed reliability** score measures the variance between scheduled and actual running speed. The corridor will receive a higher score if the difference between scheduled and actual running speed is larger, only when the actual speed is slower than the scheduled speed. A higher score also implies more potential and greater needs for speed and reliability investments. This score considered both the weekday PM peak outbound speed variance and weekday midday inbound speed variance.

**Table 6-10. Potential to Improve Transit Delay Scoring**

Corridor	High Delay Percentage Score	Improvement Score	Average Score
Glenway	3	5	4
Hamilton	4	2	3
Reading	3	2	2.5
Montgomery	5	1	3

The Glenway Avenue corridor has the most moderate delay locations percentage, and the highest potential for transit speed and reliability investments while the Montgomery Road corridor has the lowest percentage of delay locations, but the lowest speed and reliability potentiality for improvements and investments.



## ORIGIN-DESTINATION TRAVEL MARKETS

This criterion identifies corridors with the potential to serve a larger market by estimating the number of people traveling through each corridor. This origin and destination analysis aims to understand the total travel flow between geographies within the respective Glenway Avenue, Hamilton Avenue, Reading





Road, and Montgomery Road corridors. Each corridor was divided into segments according to natural and physical barriers impacting the existing roadway network, as well as land use and development patterns. Recognizing that not all transit trips are job related or heading to the urban core, segments were intended to represent communities along the corridor that may have similarly realistic travel trends from one area of the corridor to another.

The Glenway Avenue, Reading Road, and Montgomery Road corridors were divided into four segments each; because of its length, the Hamilton Avenue corridor was divided into six segments. The census tract origin and destination pairs were transformed into the segment-to-segment travel flows by adding the trips of each census tract assigned to each corridor segment. However, longer corridors are more likely to have more total trips. For this reason, each total travel market normalized to obtain total daily trips per mile.

**Table 6-11. Travel Markets Rubric**

Rating		Average Daily Trips per Mile
H	5	$x > 1,800$
M	3	$1,400 < x < 1,600$
L	1	$< 1,200$

This analysis uses the number of trips generated (origins) and attracted (destinations) for each census tract in Hamilton County. Only the census tracts within an origin and destination pair present within one quarter mile (1/4 mi) of each corridor were selected.

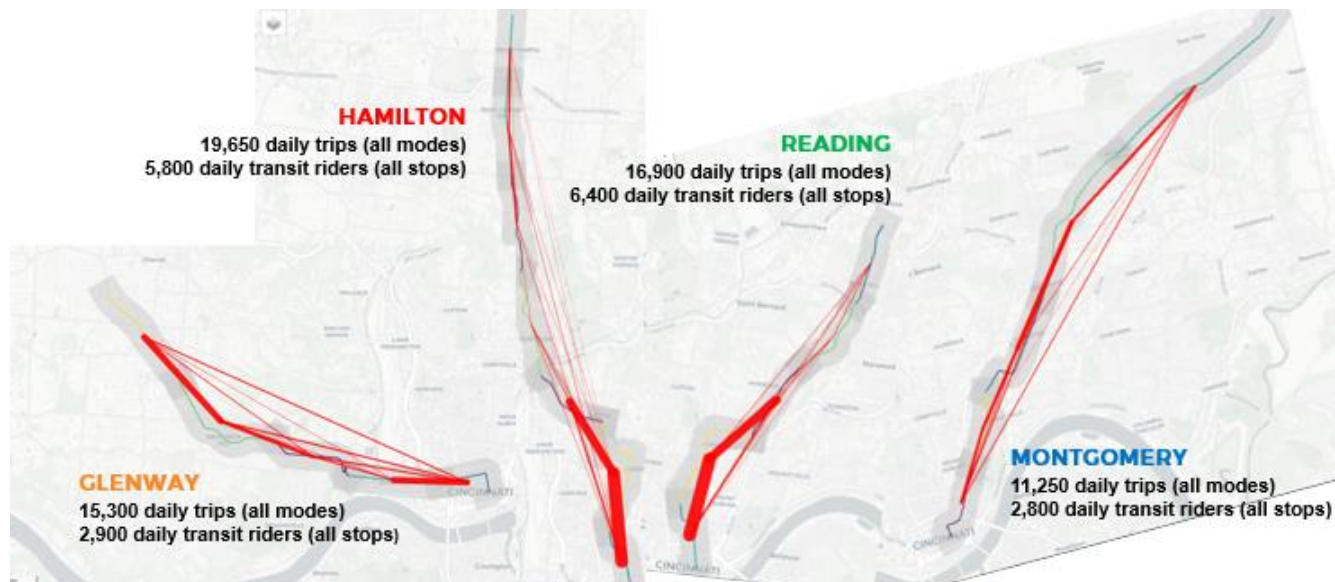
The total travel market of each corridor is the sum of the travel flows of each of its segments. As shown in Figure 6-7, the Hamilton Avenue corridor has the largest travel with nearly 20,000 daily trips, followed by Reading Road with 16,800 and Glenway Avenue with 15,300. The Montgomery Road corridor has the lowest travel market with 11,200 daily trips.

The Reading Road corridor exhibits the highest potential travel market, with about 2,000 trips per mile. Glenway Avenue and Hamilton Avenue follow closely with about 1,600 trips per mile. Montgomery scores the lowest because it has the lowest total travel market and is also the longest corridor, resulting in approximately 920 trips per mile. For visual comparison, the following maps represent a high-scoring corridor (Hamilton Avenue ) and a low-scoring corridor (Montgomery Road). Thickness of the red lines corresponds number of trips daily trips. Thicker lines represent segments with more trips.

The Reading Road corridor benefits from the major drivers of the University of Cincinnati, Downtown, and Cincinnati Children’s Hospital. Most trip segments occur in the southern half of the corridor. A large volume of trips occur between Avondale Town Center and Downtown.



**Figure 6-7. Origin-Destination Travel Markets**



**Table 6-12. Travel Markets Scoring**

Corridor	Average Daily Trips per Mile (rounded)	Travel Market Score
Glenway	1,630	4
Hamilton	1,695	4
Reading	1,985	5
Montgomery	920	1

## EXISTING CORRIDOR RIDERSHIP

This criterion identifies existing ridership activities that were captured by each corridor’s buffer. Higher ridership score implies more rider activities for proposed corridors. The data input for this criterion was the average daily ridership by trip and stop for the month of July 2022.

Ridership is defined as the average of boardings and alightings. If a bus stop from the list is within the 1,000 feet buffer of a corridor, ridership of this stop is counted towards the overall corridor ridership.

**Table 6-13. Existing Corridor Ridership Rubric**

Rating	Total Ridership
H	5 $x > 6,500$
M	3 $3,500 < x < 5,000$
L	1 $< 2,000$



**Table 6-14. Existing Corridor Ridership Scoring**

Corridor	Existing Ridership Score
Glenway	2
Hamilton	4
Reading	4
Montgomery	2

The Hamilton Avenue and Reading Road corridors capture twice the ridership, respectively, as the Glenway Avenue and Montgomery Road corridors. After corridor length normalization, these two corridors still receive higher scores than Glenway Avenue and Montgomery Road. The Reading Road corridor has the highest score for normalized ridership, with 845 riders per mile. High ridership nodes along the Hamilton Avenue corridor include College Hill, Northside, the University of Cincinnati, Ludlow Avenue business district in Clifton, Over-the-Rhine, and Downtown. The Reading Road corridor has consistently high ridership from end to end, with major ridership nodes being the Roselawn business district, the intersection of Seymour Avenue and Reading Road, North Avondale, and Avondale (population centers), the medical district, the UC, Over-the-Rhine, and Downtown.



### THIRD PARTY BOUNDARIES AND JURISDICTIONS

This criterion assesses each corridor by the number of jurisdictions and third parties required to coordinate to implement BRT. It is important to consider jurisdictions and stakeholders when developing high capacity transit as each jurisdiction has different interests and consensus building between communities can often delay projects and lead to capital costs increases. Analysis for this criterion uses municipal jurisdictional boundaries (Figure 6-8) and proposed corridor extents as data inputs. The scoring rubric establishes thresholds for two metrics: length outside of the City of Cincinnati and total jurisdictions. Projects spanning multiple municipal jurisdictions are more at risk for potential schedule and cost impacts, third party agreements, and other coordination requirements.

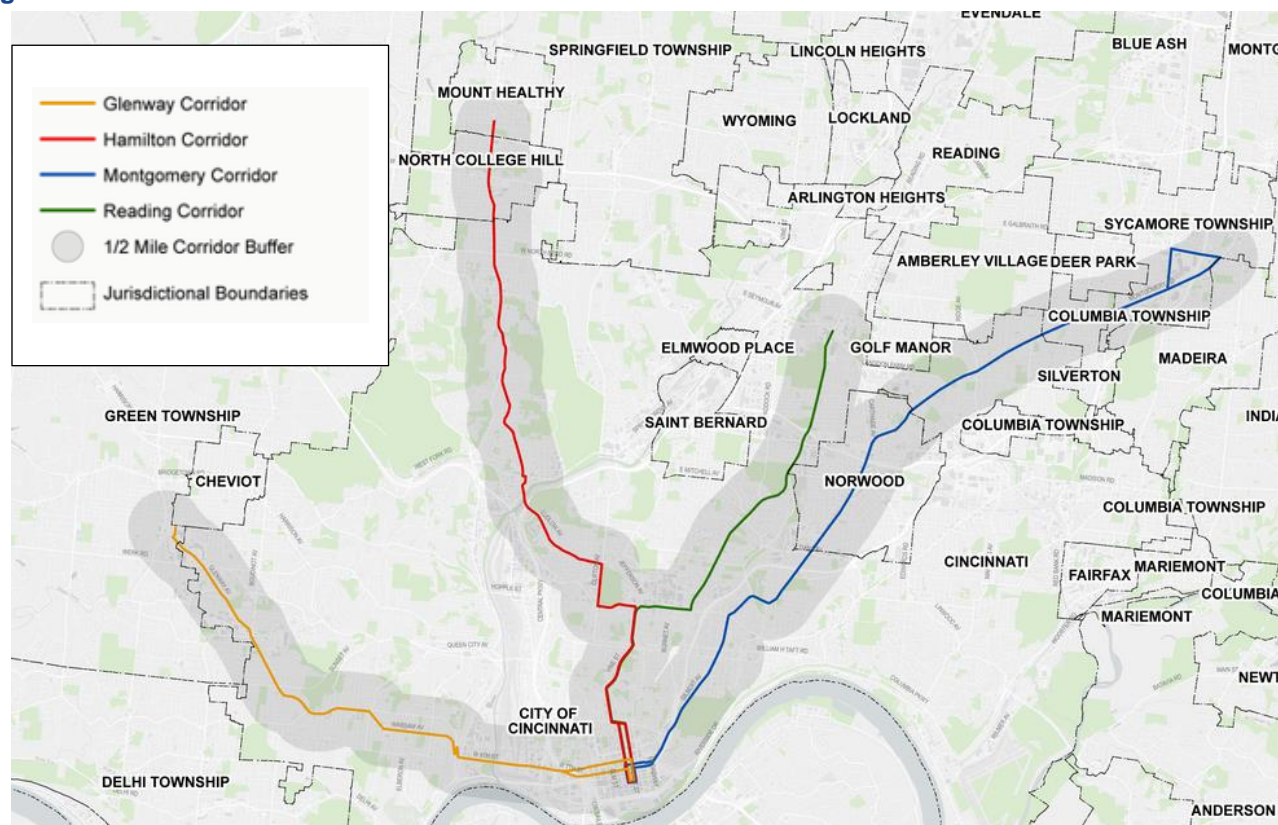
**Table 6-15. Third Party Boundaries and Jurisdictions Rubric**

Rating		Length outside City of Cincinnati Threshold	Jurisdiction Threshold
H	5	$x < 10\%$	$x = 1$
M	3	$25\% < x < 40\%$	$3 < x < 5$
L	1	$x > 55\%$ outside	$x > 5$





**Figure 6-8. Jurisdictional Boundaries**



**Table 6-16. Third Party Boundaries and Jurisdictions Scoring**

Corridor	Length Outside of City of Cincinnati Score	Jurisdiction Score	Average Score
Glenway	5	4	4.5
Hamilton	4	3	3.5
Reading	5	4	4.5
Montgomery	2	1	1.5

The **Length Outside of the City of Cincinnati** scores each corridor according to the linear distance that exists within the jurisdiction of the City of Cincinnati. Corridors with a lower percentage of right of way outside of the City’s jurisdiction score higher, with the highest possible score being less than 10% outside of the City. Less than 2% of the Reading Road corridor and less than 3% of the Glenway Avenue corridor length were outside of the City.

The **Jurisdiction** metric scores the corridors according to the total number of jurisdictions they operate within. A higher score in this metric corresponds to a lower total number, with the highest possible score of 5 meaning the corridor operates within only one jurisdiction. Both corridors are within only two jurisdictions. The Glenway Avenue is in almost entirely within the boundaries of Cincinnati and with a small portion at the proposed terminus in Green Township. The Reading Road corridor traverses both Cincinnati and Norwood.



## EXISTING TRANSIT FREQUENCY AND UTILIZATION

Analysis of total daily trips along each corridor help to identify corridors with more bus trip allocations. Corridors achieving higher scores in this section would have higher rider activities and higher potentiality of smarter bus trip savings.

The data used in this analysis is GTFS datasets from SORTA 2022 summer bid period. For each corridor, the daily scheduled trips are summarized for weekday trips using the following route list:

- Glenway Route 21, 32, 33, 50, 51, 64
- Hamilton Routes 15, 16, 17, 19, 24, 46, 78, Metro\*Plus
- Reading Route 16, 17, 19, 24, 43, 46, 78, Metro\*Plus
- Montgomery Routes 2X, 3, 4, 11, Metro\*Plus

The total daily trips are normalized by corridor length according to the rubric below.

**Table 6-17. Existing Transit Frequency and Utilization Rubric**

Rating		Normalized Trips
<b>H</b>	<b>5</b>	$x > 100$
<b>M</b>	<b>3</b>	$30 < x < 100$
<b>L</b>	<b>1</b>	$x < 30$

The Reading Road corridor has 946 total weekday trips, the highest among all corridors. At 8.5 miles long, the Reading Road corridor is the shortest of the four corridors. When normalized by mile, the corridor has over 111 weekday trips per mile- nearly twice the next highest, Hamilton, which has approximately 62 weekday trips per mile.

**Table 6-18. Existing Transit Frequency and Utilization Scoring**

Corridor	Ridership Score
Glenway	3
Hamilton	4
Reading	5
Montgomery	3



## TRANSIT CENTER AND INTERMODAL CONNECTIVITY

This criterion assesses each corridor’s connectiveness and utility to the rest of the Metro fixed route system. Measuring the utility of each corridor to the rest of the system helps to identify which corridors will be most helpful to riders living on crosstown routes, or further from the main trunks of the Glenway Avenue, Hamilton Avenue, Reading Road, and Montgomery Road. “Two-seat riders,” or riders whose trip requires a transfer, are very important to a successful system. Also included in this criterion are assessments of access to microtransit overlays and existing SORTA facilities such as operations centers, maintenance garages, and transit centers (existing and proposed future). Analysis for this



criterion used 2022 SORTA fixed route system data. The scoring rubric for this criterion establishes thresholds for three metrics: microtransit zones, existing and planned facilities, and crosstown routes per mile.

Because Downtown Cincinnati is well connected, walkable, and several of the corridors share much of their alignment there, connections in the downtown core were not counted. The geography that was discounted for each corridor is roughly McMicken Avenue and Liberty Street to the north, I-471 to the east, I-75 to the west, and the Ohio River to the south.

**Table 6-19. Transit Center and Intermodal Connectivity Rubric**

Rating		Microtransit Threshold	Facility Threshold	Crosstown Route per Mile Threshold
<b>H</b>	<b>5</b>	4+	5+	2.5+
		3		$2 < x < 2.5$
<b>M</b>	<b>3</b>	2	$2 < x < 4$	$1.5 < x < 2$
		1		$1 < x < 1.5$
<b>L</b>	<b>1</b>	0	$x < 2$	$x < 1$

The **Microtransit Threshold** metric scores corridors according to the total number of MetroNow (microtransit) zone overlays they operate within. Corridors with a higher total number earn a higher score.

The **Facility** metric scores corridors according to the total number of existing and future SORTA transfer facilities within one-quarter mile (1/4 mile) of the corridor. Corridors with a higher total number earn a higher score.

The **Crosstown Route** metric scores corridors according to the total number of crosstown routes (or routes that do not have one route-end serving Downtown) they connect to within one-quarter mile (1/4 mile) of the corridor. Opportunities for crosstown and regional connectivity offered by potential BRT service in corridors with a higher total number earn a higher score.

**Table 6-20. Transit Center and Intermodal Connectivity Scoring**

Corridor	Microtransit Overlays Score	SORTA Facilities Score	Crosstown Routes Score	Average Score
Glenway	1	3	4	2.7
Hamilton	4	3	3	3.3
Reading	2	5	2	3.0
Montgomery	2	3	2	2.3

The Hamilton Avenue and Reading Road corridors provide the most utility in terms of microtransit connectivity, facilities serviced, and crosstown routes served, systemwide. Although the Glenway Avenue corridor scores highly in crosstown routes, with 2.2 per mile, it serves the fewest existing and planned SORTA facilities, and is not within any microtransit overlay. Across the board, the Hamilton Avenue scores highly. The Reading Road corridor serves the most existing and planned SORTA facilities with five total.





## LAND USES, POPULATION, AND EMPLOYMENT

This criterion analyzes both the population and employment of communities directly served by the corridors. Corridors serving communities with higher densities of land use types (on average higher coverage of homes and jobs), were rated higher. Data used for this criterion included 2020 American Community Survey (ACS) 5-Year Estimates, and 2022 Esri demographic data for employment data.

The population and employment data for each corridor were calculated by intersecting census block groups with the half-mile buffer of the corridor. Then, the 2020 served population density (per square mile) of each corridor was compared with Hamilton County population density. To observe employment along corridors, 2022 daytime worker population was compared with the total worker population of Hamilton County to determine their comparative performance. These two percentages were compared with the scoring rubric to determine population and employment scores separately. The final score for this criterion is the average of the two metrics.

**Table 6-21. Land Uses / Population / Employment Density Rubric**

Rating		Population Density Percentage (vs. Hamilton County)	Worker Density Percentage (vs. Hamilton County)
H	5	$x > 300\%$	$x > 27\%$
M	3	$300\% < x < 250\%$	$27\% < x < 23\%$
L	1	$X < 250\%$	$X < 23\%$

**Table 6-22. Land Uses / Population / Employment Density Scoring**

Corridor	Population Score	Employment Score	Average Score
Glenway	3	1	2.0
Hamilton	5	5	5.0
Reading	5	5	5.0
Montgomery	3	3	3.0

The Hamilton Avenue and Reading Road corridors have the highest scores for population and employment. Both corridors serve the Uptown and UC, a major employment, residential, and activity center in the city. Reading Road has a strong supply of multifamily housing types all throughout the corridor. The Hamilton Avenue corridor has major population centers in Clifton Heights-University Heights (CUF), Northside, and North College Hill. The sprawling on-ramps and overpasses of I-75/Brent Spence Bridge and Queensgate rail yard isolate the West End from the rest of the city, hampering the development potential, make walking and biking inhospitable, and contributing to its underperformance.



## MAJOR / REGIONAL ACTIVITY CENTERS

Successful high capacity transit features a strong mix of ridership drivers dispersed along the corridor. This criterion assesses each corridor on their service connectivity to major and regional activity centers. This analysis uses 2022 activity centers data provided by SORTA.

**Table 6-23. Major / Regional Activity Centers Rubric**

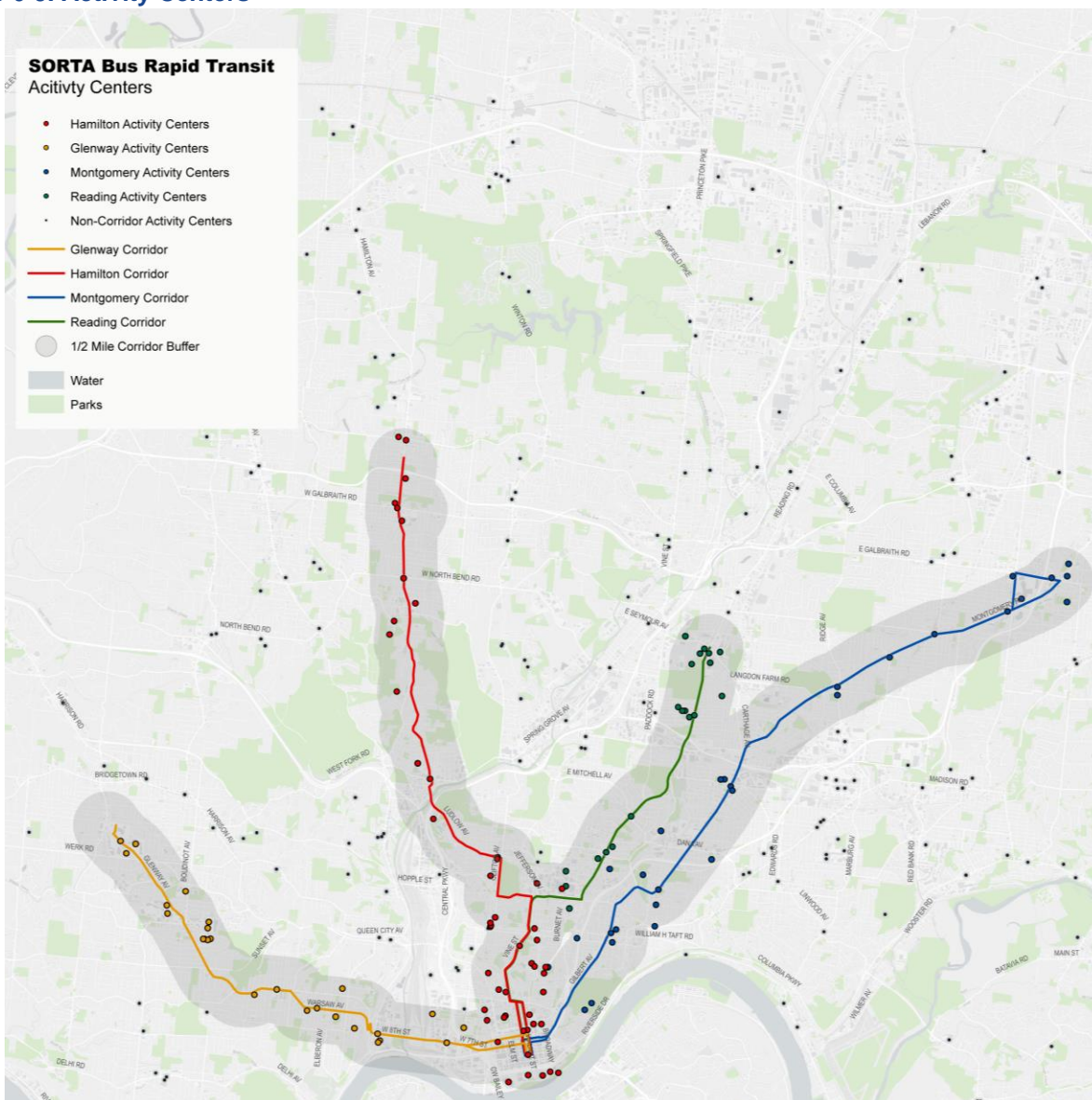
Rating		Activity Centers per Mile Threshold
H	5	$x > 5$
M	3	$3 < x < 5$
L	1	$1 < x < 2$

For the purposes of this study, “trip generators” are defined as areas clusters of employment or shopping (malls, strip malls, etc.), entertainment, government services, job centers, museums, neighborhood business districts (town centers, downtowns, main street areas, and etc.), and parks (Figure 6-11). Activity centers that were included in this measure include grocery stores, medical centers, high schools and universities, major stadiums, recreation centers, and other unique local trip generators. Corridors with a higher number of activity centers per mile score higher in this criterion.

The Reading Road corridor scored the highest in this metric with a score of 5 out of 5 with an average of six activity centers per mile. The Hamilton Avenue and Glenway Avenue corridors each have the next most per mile with over 4.2 activity centers per mile. A major driver of ridership for Metro is Cincinnati Public Schools which relies on the agency for bus service. The corridors serving the most schools are Reading Road (14) and Hamilton Avenue (10). Hamilton Avenue and Reading Road also both serve UC which is one of the largest ridership nodes in the city. The Reading Road and Hamilton Avenue corridors also both serve the most hospitals, seven and nine, respectively. Glenway Avenue serves the most grocery stores and second most trip generators. While the two highest scoring corridors have nearly the same total number of activity centers along their respective corridors (Reading Road, with 51 total and Hamilton Avenue, with 50 total), the Reading Road corridor is nearly three miles shorter in length. This means that the density of activity centers within walking distance (1/4-mile) of the Reading Road corridor is substantially stronger than all others in this study.



**Figure 6-9. Activity Centers**



**Table 6-24. Major / Regional Activity Centers Scoring**

Corridor	Activity Centers per Mile Score
Glenway	4
Hamilton	4
Reading	5
Montgomery	3





## TRANSIT SUPPORTIVE POLICIES AND TRANSIT ORIENTED DEVELOPMENT

This criterion assesses the TOD opportunities along each corridor. While there are several opportunities along each corridor for infill development that can support economic development in respective communities traversed. However, there are only a limited number of large sites that could provide the footprint for greenfield development or redevelopment that would support a viable TOD investment and critical mass at station nodes in support of BRT. Data for this analysis came from field observations and review of various development plans along the corridors.

**Table 6-25. Transit Supportive Policies and TOD Rubric**

Rating		TOD Threshold
H	5	5+
		4
M	3	3
		2
L	1	<1

The **TOD Threshold** metric examines the availability of large plots of developable land along each corridor. A score of 1 corresponds to an area within the corridor that is a large contiguous parcel that supports TOD, potential for neighborhood growth which may necessitate a future TOD, and struggling or vacant businesses with large, underutilized lots. A score of one-half (0.5) corresponds to an area within the corridor that has fragmented parcels that may support limited TOD, and limited room for growth around the TOD. A score of zero (0) is indicative of a major node within the corridor that has small or fragmented parcels that are not feasible for TOD, neighborhood uses that are not aligned with (or not in need of) TOD, and existing uses/businesses that are thriving and unlikely to relocate.

**Table 6-26. Transit Supportive Policies and TOD Scoring**

Corridor	Total Score
Glenway	1.5
Hamilton	2
Reading	3
Montgomery	1

The Reading Road corridor is observed to have more areas throughout the corridor that might have higher readiness for transit-oriented development, with four potential TOD sites identified proximate to the corridor: Avondale Town Center, the future Uptown Multimodal Center, Midpoint Crossing, and underdeveloped land near the intersection of Galbraith Road and Reading Road. The Hamilton Avenue corridor identified slightly more transit-supportive development opportunities than both the Montgomery Road and Glenway Avenue corridors.



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## STEP 1 EVALUATION SUMMARY

The Reading Road and Hamilton Avenue corridors are the highest rated in aggregate. These two corridors have a shared alignment between the two strongest trip drivers of Downtown and Uptown (University of Cincinnati and medical center district). The Reading Road corridor also provides direct connectivity through equity and justice communities in Avondale and Bond Hill.

As a result, the Reading Road and Hamilton Avenue corridors have been advanced for further development as BRT Corridors in Step 2.

Although the communities of west Cincinnati also experience historic equity and justice issues, the Glenway Avenue corridor provides less direct connectivity to equity communities due to topography and development patterns. The lower density of residents, as well as the lower number of activity centers and jobs located directly along Glenway Avenue and Montgomery Road, led to Reading Road and Hamilton Avenue corridors being the strongest candidates to advance for conceptual design and potential grant funding application. The Glenway Avenue and Montgomery Road corridors would both benefit from corridor enhancement projects and should continue to be evaluated for high capacity transit opportunities in the future.

As a result, the Glenway Avenue and Montgomery Road corridors will be considered for further development as Enhanced Corridors to include a range of service, safety, and passenger amenity improvements.

The scoring is summarized in Table 6-27. In-depth profiles of the four corridors, focusing on strengths and weaknesses of each, follow.



**Table 6-27. Step 1 Evaluation Summary and Criterion Scoring**

Criterion	Glenway	Hamilton	Reading	Montgomery
 Traffic conditions and congestion	★★★★☆	★★★★☆	★★★★☆	★★★★☆
 Roadway conditions, geometry, and capital improvements	★★★★☆	★★★★☆	★★★★☆	★★★★☆
 Equity Index metrics - intersecting boundaries, communities	★★★☆☆	★★★★★	★★★★☆	★★★★☆
 Potential to improve transit delay and hotspots	★★★★☆	★★★★☆	★★★★☆	★★★★☆
 O-D travel markets and travel flows	★★★★☆	★★★★★	★★★★☆	★★★☆☆
 Existing ridership (include shared segments)	★★★☆☆	★★★★☆	★★★★☆	★★★★☆
 Third party boundaries, facilities of inter-jurisdictional control	★★★★☆	★★★★☆	★★★★☆	★★★☆☆
 Existing transit frequency / utilization	★★★★☆	★★★★★	★★★★☆	★★★★☆
 Transit Center / Intermodal connectivity	★★★★☆	★★★★☆	★★★★☆	★★★★☆
 Land uses and pop / emp density	★★★★☆	★★★★★	★★★★★	★★★★☆
 Major / Regional activity centers	★★★★☆	★★★★★	★★★★☆	★★★★☆
 Transit supportive policies and TOD	★★★☆☆	★★★★☆	★★★★☆	★★★☆☆
<b>Total score out of 60</b>	<b>36</b>	<b>43</b>	<b>49</b>	<b>28</b>

## Outcomes and Future Corridor Development

Outcomes and results for each of the four corridors is described on the following pages.





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## READING ROAD BRT CORRIDOR

The Reading Road corridor was the highest performing alternative with a score of 49 out of 60.

### Corridor Strengths:

Step 1 metrics and findings in support of BRT implementation in the Reading Road corridor included:

- The most capacity to accommodate dedicated bus lanes when compared to the other three corridors.
- There are over 16,800 daily trips occurring along the proposed BRT route (almost 2,000 per mile).
- Nearly 7,200 daily transit trips (on average) have at least one portion of their ride on the corridor.
- Provides direct service to communities with high equity index values in Bond Hill and Avondale.
- The corridor only enters one other jurisdiction outside the City of Cincinnati, Norwood.
- Existing routes along the Reading corridor altogether operate the most bus trips per day.
- Serves high percentage of workers, connecting with 27.14% of jobs in the Hamilton County.
- Serves the second highest number of most grocery stores, hospitals, recreation centers, schools, and universities.

### Next Step:

The Reading Road Corridor is advanced to Step 2 for further development as a BRT Corridor.

## HAMILTON AVENUE BRT CORRIDOR

The Hamilton Avenue Corridor was the second highest performing corridor with a score of 43 out of 60.

### Corridor Strengths

Step 1 metrics and findings in support of BRT implementation in the Hamilton Avenue corridor included:

- A total population of over 68,700 (> 8.4%) of the population of Hamilton County—the highest among all corridors.
- Over 19,600 daily trips occur within segments the corridor (about 1,700 per mile).
- Over 6,300 daily transit trips (on average) have at least one portion of their ride on the corridor.
- Connects with other routes at 20 different points outside of Downtown.
- Connects with three planned MetroNow microtransit zones.
- Serves the highest share of jobs of all corridors, connecting with over 27% of employers in the county.
- Serves the most grocery stores, hospitals, recreation centers, schools, and universities of all corridors.

### Next Step:

The Hamilton Avenue Corridor is advanced to Step 2 for further development as a BRT Corridor.



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## GLENWAY AVENUE ENHANCED CORRIDOR

The Glenway Avenue Corridor was the third highest performing corridor, with a score of 36 out of 60.

### Corridor Strengths:

Step 1 metrics and findings in support of eventual corridor enhancements in the Glenway Avenue corridor included:

- Over 15,300 daily trips occur within segments of the corridor (over 1,600 per mile).
- Connects with over 20% of employers and 5% of residents in the county.
- Connects with other routes at 21 different points outside of Downtown, most among all corridors.
- Virtually the entire corridor is within the City of Cincinnati (97%), simplifying coordination during design and construction.
- Second highest concentration of trip generators including employment/shopping centers, schools, hospitals, grocery stores, and entertainment/recreation destinations.

### Corridor Challenges:

- Does not connect with any planned MetroNow microtransit zones.
- On-street parking is present along 52% of the corridor.
- 66% of the corridor has less than (<) 70 feet of ROW.
- Buses experience the most significant speed and reliability issues, collectively along segments for over one mile (11%) of the corridor.
- Limited opportunities for major transit-oriented land redevelopment, with especially poor transit supportive land uses in Queensgate.

### Next Step:

The Glenway Avenue corridor is identified as an Enhanced and Future BRT Corridor.

## MONTGOMERY ROAD ENHANCED CORRIDOR

The Montgomery Road Corridor was the lowest performing alternative with a score of 28 out of 60.

### Strengths

Step 1 metrics and findings in support of eventual corridor enhancements in the Montgomery Road corridor included:

- Connects with over 25% of employers and 8% of residents in the county.
- Over 11,200 total daily trips across all modes on the corridor (over 900 per mile).
- Widest overall right-of-way amongst all corridors, with nearly 68% of the corridor having greater than 70 feet of right-of-way.
- Over eight miles of the corridor has no on-street parking.
- The least areas currently experiencing challenges with transit speed and reliability.

### Corridor Challenges:

- Lowest daily transit riders (3,200) among all corridors and the longest corridor at 12.2 miles.
- Connects with the fewest routes per mile outside of Downtown (1.2 routes per mile).
- Approximately 42% of the corridor currently experiences traffic volumes at or above capacity.
- Crosses into five other jurisdictions outside the City of Cincinnati, indicating potential for additional coordination during design and construction.



- Serves the lowest concentrations of activity centers and trip generators among all corridors.

**Next Step:**

The Montgomery Road corridor is identified as an Enhanced and Future BRT Corridor.

**FUTURE DEVELOPMENT**

Figure 6-10 illustrates the future development direction of the four study corridors.

**Figure 6-10. BRT and Enhanced Corridor Network**

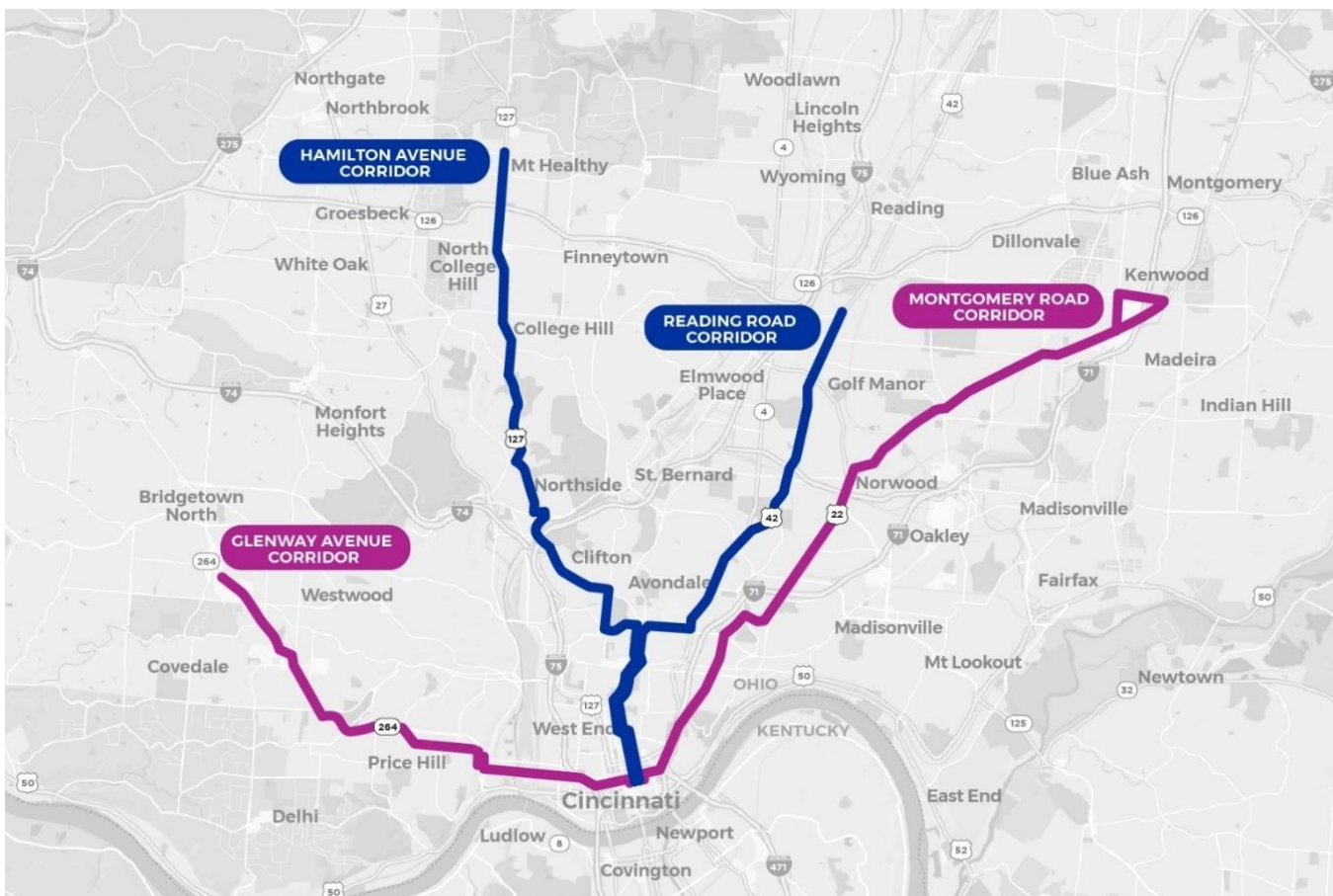


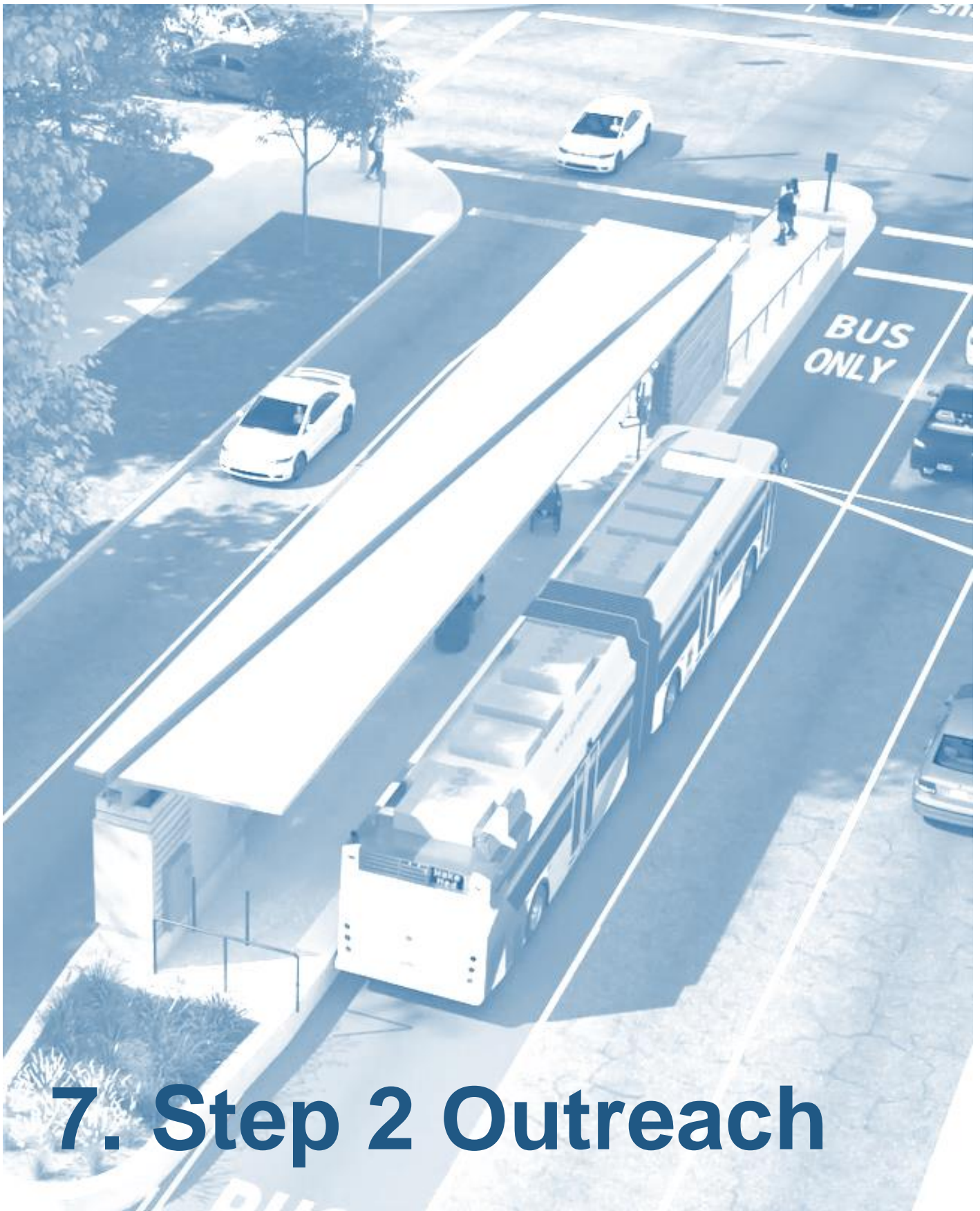
Table 6-28 identifies the types of improvements that would be undertaken to achieve development as a BRT Corridor or Enhanced Corridor.





**Table 6-28. Improvements by Corridor Type**

<b>BRT Corridor</b>	<b>Enhanced Corridor</b>
Reading Road Hamilton Avenue	Glenway Avenue Montgomery Road
Stations spaced every ½-1 mile to facilitate shorter travel times Prominent stations with passenger amenities, real-time info, level boarding, and neighborhood-compatible design Shared high-frequency Downtown-Uptown segment Bus-only and bus-priority lanes in key segments to improve travel speed Signal priority at key intersections to improve reliability Pedestrian access improvements Advance Transit-Oriented Development planning	More bus shelters & enhanced passenger amenities, lighting, and real-time info Pedestrian access improvements Signal priority at key intersections to improve reliability Improved weekend service Additional transit center development Explore Transit-Oriented Development opportunities Future inclusion in regional BRT network



# 7. Step 2 Outreach



## 7. Step 2 Outreach

On January 17, 2023, Metro announced that based on the results of technical studies and public input received, the Reading Road and Hamilton corridors would receive the region’s first BRT service. Although the Glenway Avenue and Montgomery Road corridors would not be receiving BRT initially, Metro also announced that it will be developing plans to provide enhanced services along those corridors as part of the overall BRT project.

To help communicate these messages and continue building excitement and engagement in the BRT planning process, the team prepared a public outreach strategy for Step II that would build upon and expand the outreach efforts initiated in Step 1. The tasks performed as part of this effort are summarized below. Copies of associated materials are provided in the appendices, as noted.

### Information Dissemination and Publicity

The corridor determination information was first shared with the Stakeholder Advisory Committee on January 17, 2023, with a news release distributed that day following the internal announcement. The team then began planning for public workshops (in-person and virtual), municipal and community council presentations, and community event appearances. A media release was also issued on February 13, 2023, to inform the public of opportunities to participate in this step of the study to help determine bus station locations in the first two corridors, bus station amenities, potential development needs, and route connections.

The project website was updated to include relevant information for Step 2 outreach efforts and offered a link to a virtual version of the in-person workshop. Visitors could also watch and listen to a virtual public meeting via a link to the YouTube video.

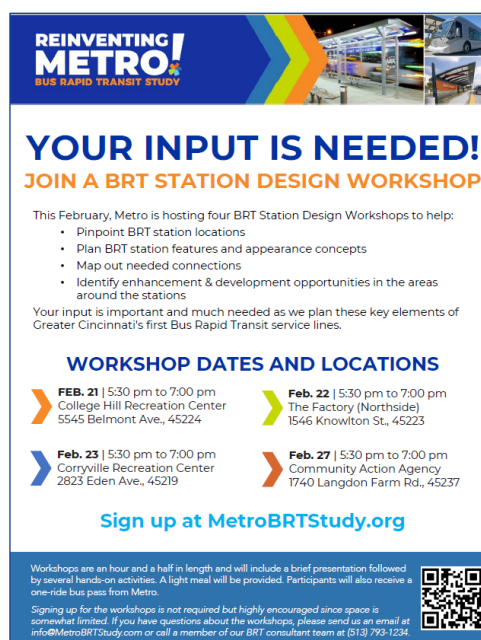
As in Step 1, all information was shared via Metro social media and email newsletters, as well as text notifications to riders. Social posts were also boosted to promote the workshop events.

### Community Design Workshops

A key element of Step 2 outreach was an in-person charette-style workshop program. Four community design workshops were held in February 2023 at locations along the two recommended BRT corridors:

- College Hill Recreation Center (Hamilton Avenue Corridor), February 21
- The Factory at Northside (Hamilton Avenue Corridor), February 22
- Corryville Recreation Center (Hamilton Avenue and Reading Road Corridors), February 23

Figure 7-1. Step 2 Community Design Workshop Flyer







- Community Action Agency, Bond Hill (Reading Road Corridor), February 27

Each workshop consisted of two components: an introductory overview presentation and a series of interactive activity stations designed to collect public input around four topic areas: station locations, station features, potential connections, and TOD opportunities. A selection of display boards is shown in Figure 7-2.

Figure 7-2. Step 2 Community Design Workshop Display Boards



Participants were provided complimentary light meals and bus passes. Workshops were publicized via a press release, BRT and SORTA website updates, email communications, social media, and digital advertising.

In-person workshop attendance exceeded expectations. Pre-registration for each session was excellent, with walk-ins adding to those numbers. Each session welcomed at least 25 guests, with two (College Hill and Northside) gathering a crowd of more than 40 persons. Participants were enthusiastic and engaged project team members with questions and comments at each activity station. Many provided insights on the type of development desired around specific station locations, as well as





multiple preferences for station amenities, including real-time bus arrival information. Photos from the workshops are shown in Figure 7-3.

**Figure 7-3. Step 2 Community Design Workshops**







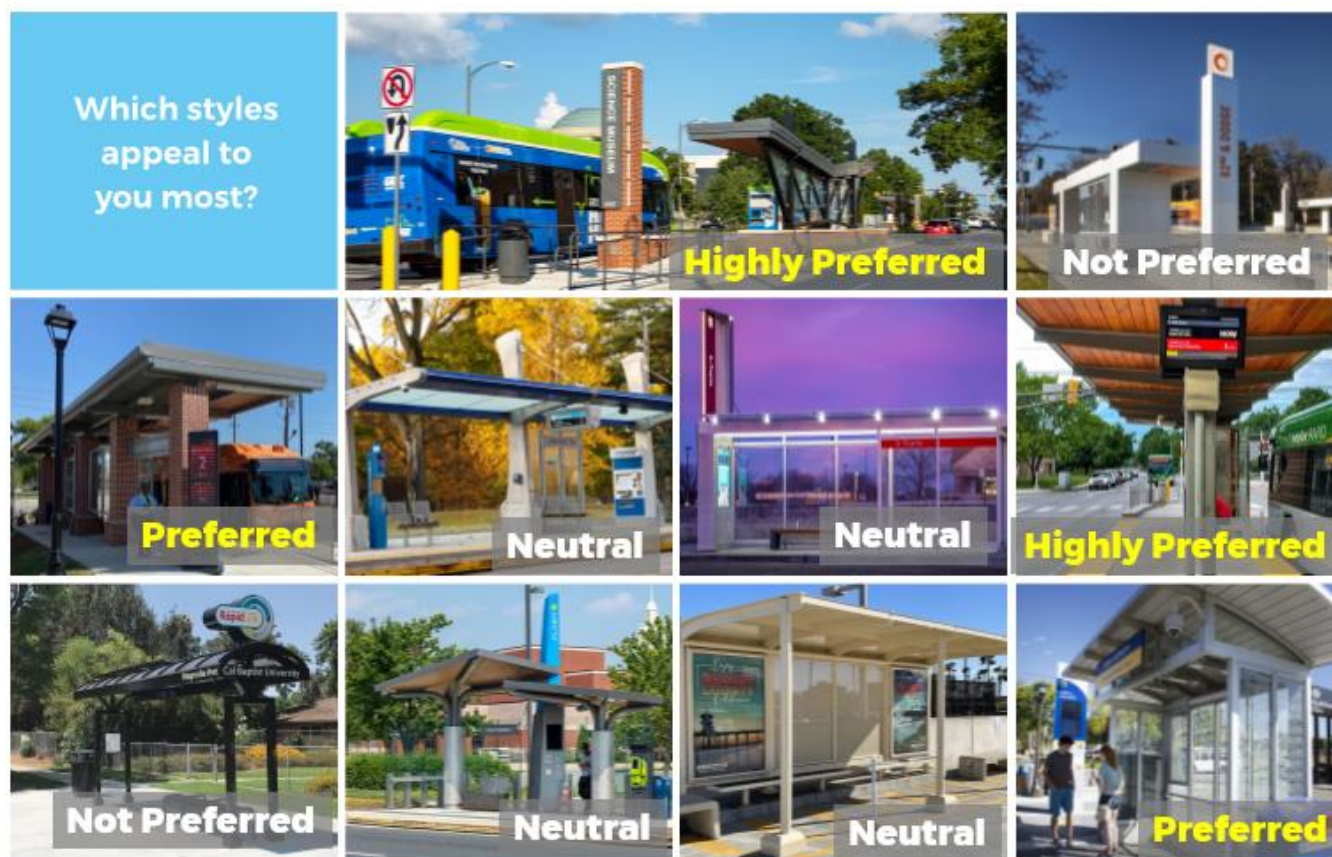
## RESULTS

The results of the four community design workshops are summarized as follows:

- Attendees exhibited a high level of enthusiasm about BRT and the study process.
- There is general consensus on the proposed station locations.
- Suggestions were provided for a few additional station locations.
- Some attendees felt that the University of Cincinnati would be better served with the BRT running on Clifton Avenue instead of Jefferson Avenue.
- Many felt that shelter designs should be neighborhood-appropriate, especially given the number of historic districts along the corridors.
- Traffic calming is a significant issue in some neighborhoods. How does BRT work with traffic calming techniques?
- Crosstown connections and linkages are desired.
- Additional corridors should be considered for BRT in the future.

Attendees were asked to rate their preference on station design types, as illustrated in Figure 7-4. The use of historically compatible materials such as brick and wood received the most favorable responses.

**Figure 7-4. Step 2 Community Design Workshop Station Design Preferences**



Attendees were also asked to express their preferences as to the type of features and development that they would like to see at station locations. Table 7-1 highlights the station areas that received the most favorable responses for different features, activities, and development.





**Table 7-1. Community Design Workshop Station Area Development Preferences**

Amenities, Features and Type of Station Area Development	Station Locations Rated Highly for Amenities, Features and Development
Housing	Uptown Multimodal Center, Northside Transit Center, College Hill Station
Retail	Government Square, Findlay Market Station, Vine-Calhoun-McMillan Station, University of Cincinnati Station, Uptown Multimodal Center, Avondale Town Center Station, Northside Transit Center, College Hill Station, North College Hill Transit Center
Grocery / Pharmacy	Avondale Town Center, Northside Transit Center, College Hill Station
Daycare	University of Cincinnati Station, College Hill Station, North College Hill Transit Center
Mixed Use	Vine-Calhoun-McMillan Station, Uptown Multimodal Center, Avondale Town Center Station, Clifton Business District Station, Northside Transit Center, College Hill Station, North College Hill Transit Center, Cross County Station, Mt. Healthy Station, Hilltop Plaza Station

Mixed use and retail were cited as preferred development and the largest number of stations. The Uptown Multimodal Center and Northside Transit Center were most commonly cited as areas with potential for adjacent development and amenities.

## Virtual Workshop / Online Survey

To ensure as many community members as possible had the opportunity to provide input, a virtual workshop was created using the Public Input online survey tool. Offered between February 20 and March 20, 2023, the virtual workshop garnered 395 visits and 97 completed sessions, including 309 total comments.

The virtual workshop translated each of the four workshop stations into an online discussion with embedded open answer and multiple-choice questions that allowed participants to provide feedback on the information being shared. The tool also featured interactive mapping exercises. Content and questions reflected that of the in-person workshops and incorporated four simple questions about the enhancements that should be planned for the Glenway Avenue and Montgomery Road corridors.

A link to the survey was provided on the Metro and BRT Study websites; a QR code was on display at in-person workshops and pop-up events linking people to the project website and online survey.

**Figure 7-5. Step 2 Virtual Workshop Webpage**

**Southwest Ohio Regional Transit Authority (SORTA) - Cincinnati Metro**

## BUS RAPID TRANSIT STATION DESIGN VIRTUAL WORKSHOP

Thank you for participating in our virtual Bus Rapid Transit (BRT) Station Design Workshop! Your input is important and will be used to help shape the concepts we're preparing for Greater Cincinnati's first BRT lines.

Our goal for this workshop is to gather feedback from the public that will help us develop preliminary plans for the BRT stations - where they will be, what they will look like - and identify the type of development communities are interested in having around the stations.

In addition to this virtual experience, we're also currently hosting several in-person workshops. If you'd like to know more about those, visit the Participate page of our [MetroBRTStudy.com](https://MetroBRTStudy.com) website. Below are links to materials we're sharing at the in-person workshops; the rest of the information and activities on this site are the same as what you'd find at the in-person sessions.

[BRT Handout](#)

Please continue to scroll down to begin. If you have any questions or need assistance with survey, please send an email to [info@MetroBRTStudy.com](mailto:info@MetroBRTStudy.com) or call us at (513) 793-1234.

**Overview**   BRT Corridors   Station Locations   Station Design   Station Areas   Connections   Thank you

### OVERVIEW

As part of its continued implementation of Reinventing Metro, the Southwest Ohio Regional Transit Authority (SORTA)/Metro is bringing BRT to Greater Cincinnati and Hamilton County. BRT is a high-quality, bus-based travel option that combines the speed, efficiency, and comfort of rail transit with the flexibility of traditional bus service.

Following a program of in-depth study and public input, Metro has identified Hamilton Avenue and Reading Road as the first two corridors that will be used to introduce BRT to our region. Now, the project team is developing a preliminary plan for the stations that will serve its initial BRT lines.



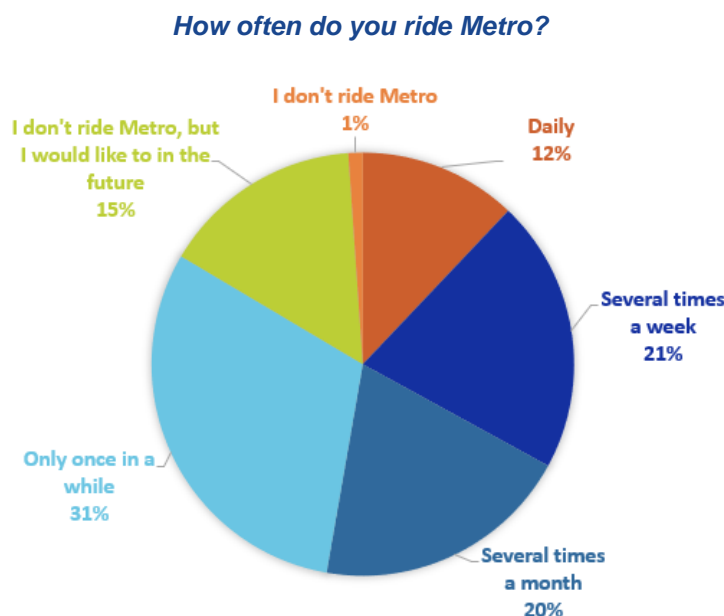
## RESULTS

A summary of results include:

- 48% reported they would most likely use the Hamilton Avenue corridor with 41% responding they would use the combined Uptown/Downtown segment and 16% saying they would use the Reading Road corridor.
- For the proposed bus station location along Hamilton Avenue, the stations with the highest “strongly agree” percentages were the Northside Transit Center (68%), the Clifton Business District Station (66%) and the Cincinnati State Station (54%). Several attendees proposed additional stop locations for consideration.
- For the proposed bus station locations along the Reading Road corridor, those with the highest “strongly agree” responses were the proposed Uptown Multimodal Center on Burnet (61%), followed by the Avondale Town Center Station (46%), and Reading-Dana Station (42%). Several additional points for consideration were also offered.
- For the proposed bus station locations along the combined Uptown/Downtown corridor, the ones with the highest “strongly agree” percentage responses were Findlay Market Station (75%), Riverfront Transit Center (70%), University of Cincinnati Station (70%), and Vine-McMillan-Calhoun Station (69%).
- In terms of station design, modern stations with brick or wood features received the highest responses. In terms of station features, ambient lighting, security cameras, and emergency call boxes received responses of 69% or more in favor.
- Participants also provided details on the type of transit-oriented development desired at each station location which are detailed in the Technical Report Appendix.

Selected survey results are illustrated in Figure 7-6.

**Figure 7-6. Step 2 Survey – Selected Responses**

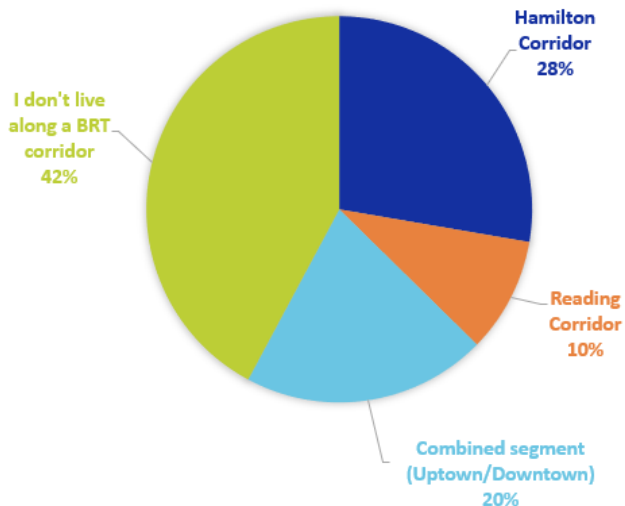




### What is your interest in Metro's new BRT service?

61%	I would like to ride Metro more often	54 ✓
34%	I frequently ride Metro	30 ✓
15%	I occasionally ride Metro	13 ✓
13%	Other	11 ✓
0%	I am a Metro employee	0 ✓

### Do you live along or near one of Metro's planned BRT corridors? If so, which one?



### Which of the BRT corridors will you most likely use?

48%	Hamilton Corridor	39 ✓
41%	Combined segment (Uptown/Downtown)	34 ✓
16%	Reading Corridor	13 ✓
11%	All	9 ✓
10%	Not sure yet	8 ✓
9%	I don't think I will use them	7 ✓





As with the in-person community design workshops, virtual workshop participants were asked to rate their preferences on station design types, as shown in Figure 7-7. The results generally track with the results from the in-person workshops, with a preference toward natural materials such as brick and wood.

**Figure 7-7. Step 2 Community Design Workshop Station Design Preferences**



## Community and Pop-Up Events

Pop-up events were scheduled throughout the two selected BRT corridors in February 2023 to obtain feedback on the proposed station locations. The event participants were also encouraged to participate in one of the community workshops.

Community members were asked to place a “thumbs up” sticker on the poster where they liked the location of the proposed BRT stations. They were also given the opportunity to note any additional station they felt should be considered.

It is estimated that the study’s outreach team met with over 700 community members during pop-up events held along the selected BRT corridors. A Metro bus was made available at Washington Square during Mittenfest to encourage people to come on board and learn about BRT. Photos of some of the events are shown in Figure 7-8. The pop-up events were held in February 2023 at the following locations:



- University of Cincinnati Professional and Technical Career Fair, Campus Recreation Center (Hamilton Avenue and Reading Road corridors), February 7
- Pre-Valentine's Shopping Event, College Hill Recreation Center (Hamilton Avenue Corridor), February 11
- Art on Vine, Rhinegeist Brewery, Over-the-Rhine (Hamilton Avenue and Reading Road corridors), February 12
- Cincinnati Works Community Resource Fair, Avondale Business Center (Reading Road Corridors), February 15
- TriHealth Good Samaritan Hospital (Hamilton Avenue Corridor) , February 17
- Bond Hill Meet and Greet, Bethany House (Reading Road Corridor), February 17
- Mittenfest, Washington Park, Over-the-Rhine (Hamilton Avenue and Reading Road corridors), February 18
- Saturday Morning Vibes Cereal Bar, Avondale (Reading Road Corridor), February 19
- Findlay Market's Sweet & Savory Stroll (Hamilton Avenue and Reading Road corridors), February 19
- University of Cincinnati Medical Center (Hamilton Avenue and Reading Road corridors), February 20
- The Christ Hospital, Mt. Auburn (Hamilton Avenue and Reading Road corridors), February 21

**Figure 7-8. Community Meetings and Pop-Ups**





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## RESULTS

Participants were generally interested and excited about the prospect of BRT were engaged on issues such as station locations and potential station features. They were generally supportive of the proposed station locations.

Some participants indicated that additional station locations should be considered, including:

- Walmart on Reading Road in Evendale (north of the planned Reading Road Corridor terminus)
- Hamilton Avenue at Ashtree Drive (Hamilton Avenue Corridor)
- New Prospect Church on Summit (near the Reading Road Corridor)
- Reading Road between Sherman Avenue and Tennessee Avenue (Reading Road Corridor).
- Reading Road at Wyoming Avenue/West Benson Street (north of the planned Reading Road Corridor terminus)

## Community and Local Jurisdiction Council Meetings

Each of the community councils along the selected BRT corridors and the Enhanced Transit corridors was asked to add a SORTA agenda item to an upcoming regularly scheduled meeting. At each meeting at which the study team was invited, the BRT corridor selection process was described and community members were asked to offer feedback on the station locations and amenities. They were also encouraged to participate in the BRT workshops and go to the BRT website for the virtual workshop. A standard presentation was crafted for each of the selected BRT and Transit Enhancement Corridors. Members of SORTA's Transit Planning, Development, and Innovation Department volunteered to present.

The project team was asked to present at 15 Community Council meetings between February and April 2023:

- Downtown Cincinnati Residents Council (Hamilton Avenue and Reading Road corridors), February 14
- CUF (Clifton Heights-University Heights-Fairview) Neighborhood Association (Hamilton Avenue and Reading Road corridors), February 21
- Village of Golf Manor (Reading Road Corridor), February 27
- Northside Community Council (Hamilton Avenue Corridor), February 28
- College Hill Community Council (Hamilton Avenue Corridor), February 28
- Over-the-Rhine Community Council (Hamilton Avenue and Reading Road corridors), March 6
- Clifton Town Meeting Board (Hamilton Avenue Corridor), March 6
- Avondale Community Council Board (Reading Road Corridor), March 7
- North Avondale Neighborhood Association (Reading Road Corridor), March 14
- Avondale Community Council General Meeting (Reading Road Corridor), March 21
- Norwood City Council (Montgomery Road Corridor), March 28
- Pleasant Ridge Community Council (Montgomery Road Corridor), April 4
- Sycamore Township Board of Trustees (Montgomery Road Corridor), April 4
- Evanston Community Council Executive Board (Montgomery Road Corridor), April 13
- Kennedy Heights Community Council (Montgomery Road Corridor), April 18

A photo from the February 14<sup>th</sup> Downtown Residents Council presentation is shown in Figure 7-9.





**Figure 7-9. Downtown Residents Council Presentation**



## RESULTS

Community Council members expressed similar excitement about the BRT project. The focus tended to be more toward economic development and safety.

## SORTA Staff Engagement

A second round of SORTA staff engagement was conducted to share the initial results of the study and demonstrate that staff comments and suggestions were considered.

SORTA newsletters and advertisements on digital display monitors were used to notify staff that the study team would be on site. A poster was developed to introduce the BRT concept and illustrate the selected corridors for this initial BRT project. The poster also illustrated potential transit enhancements for the Glenway Avenue and Montgomery Road corridors. A second poster displayed the selected BRT corridors and the proposed station locations.

SORTA staff engagement was conducted over the course of four days in February 2023 at various times each day:

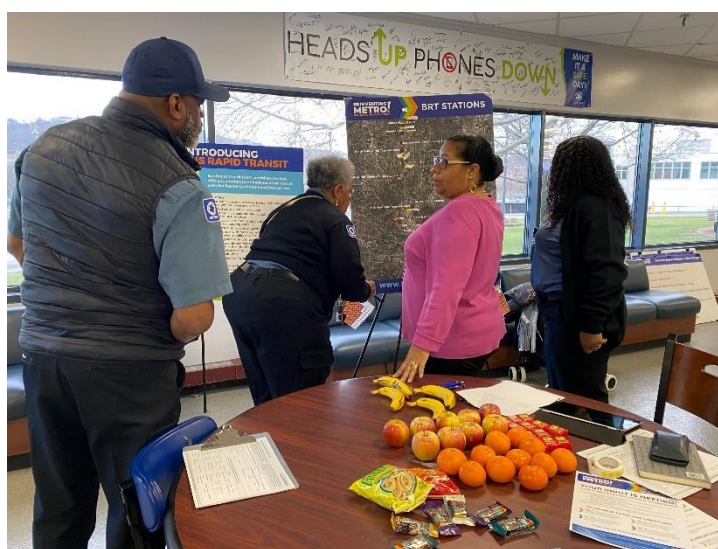
- SORTA administrative office (Huntington Building), February 17 and 21
- Queensgate operating facility, February 18 and 21
- Bond Hill operating facility, February 18 and 20
- Access Operations Center, February 21

Photos from the Step 2 SORTA staff engagement events are shown in Figure 7-10.

Staff were asked to provide their feedback on the proposed station locations and the features that should be included at the BRT stations. Staff were also informed of and asked to participate in the BRT community design workshops. This level of staff involvement assisted to increase community engagement.



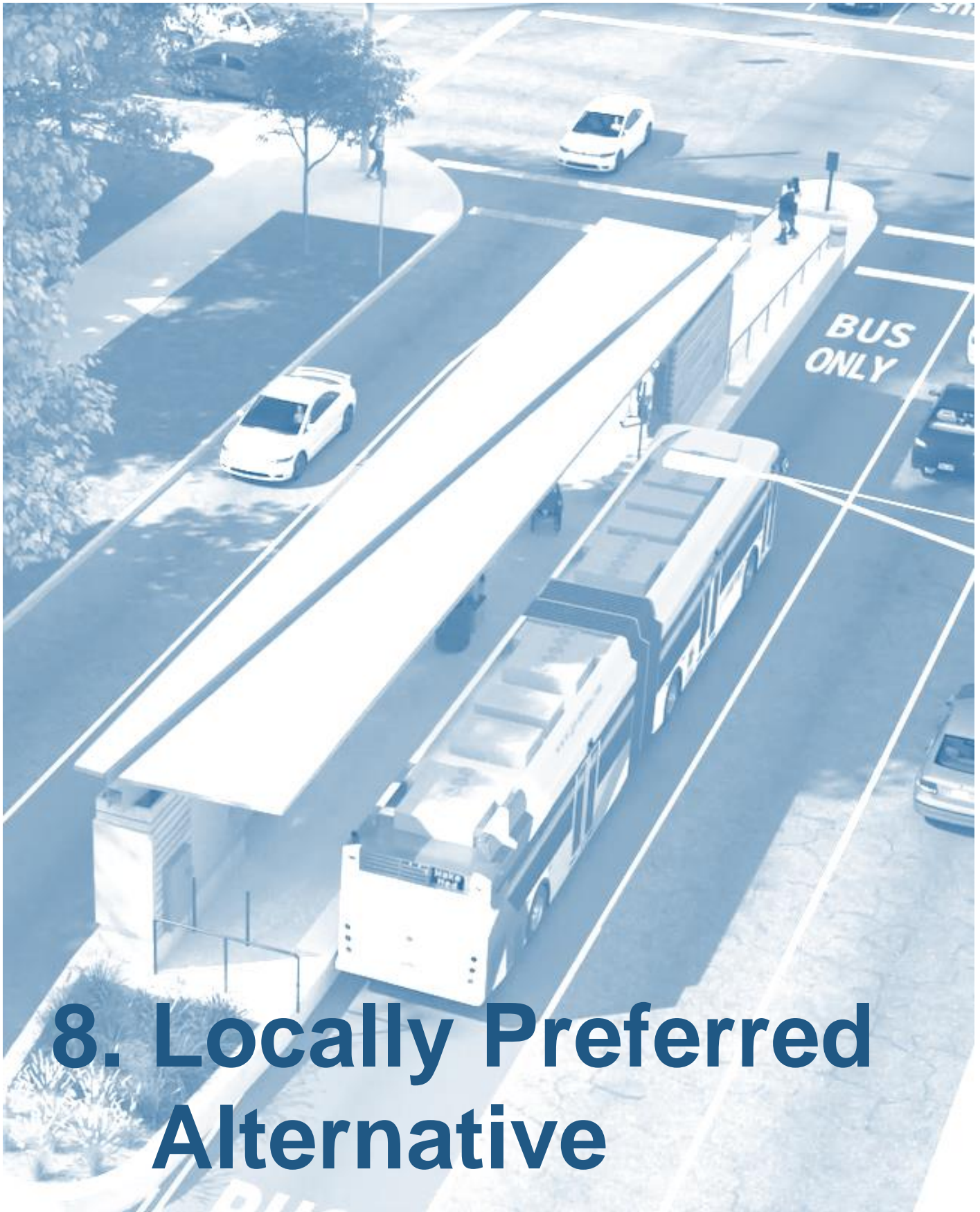
Figure 7-10. Step 2 SORTA Staff Engagement



## RESULTS

Overall, SORTA staff were pleased with the selection of the Hamilton Avenue and Reading Road corridors for BRT development and the concepts for transit enhancements along the Glenway Avenue and Montgomery Road corridors.





# 8. Locally Preferred Alternative





## 8. Locally Preferred Alternative

The alignments and stations that comprise the Locally Preferred Alternative (LPA) for the Reading Road Corridor and Hamilton Avenue Corridor BRT lines are shown in Figure 8-1.

Figure 8-1. Reading Road and Hamilton Avenue BRT LPA Corridors





# Alignments

## MODIFICATIONS FROM INITIAL CONCEPT

During the Step 2 process that resulted in 10% design plans, two significant alignment modifications were made:

- **Extension to Riverfront Transit Center**

The alignments of both corridors were extended slightly south of the original terminus, Government Square, located on Fifth Street between Walnut and Main streets, to the Riverfront Transit Center, which is located three blocks to the south, below Second Street. This extension allows both BRT lines to better serve The Banks development south of Second Street along with the sports, recreation, and cultural attractions along the central riverfront that include Great American Ballpark (Cincinnati Reds), Paycor Stadium (Cincinnati Bengals), the National Underground Railroad Freedom Center, and Smale Riverfront Park. All are regional destinations and host several major events throughout the year.

The alignment to access and exit the Riverfront Transit Center involves use of Third Street between Central Avenue at its western end and Broadway at its eastern end.

- **Burnet and Forest Instead of MLK and Reading**

On the Reading Road Corridor in the uptown area, the alignment was shifted from the intersection of MLK and Reading Road to portions of Burnet and Forest avenues. This alignment shift avoids a highly congested segment of MLK in the vicinity of Reading Road and the entrance and exit ramps at I-71. It also allows the BRT line to better serve, and shorten walking distances to, some of the major medical institutions in the vicinity including Cincinnati Children's Hospital Medical Center.

In addition, SORTA has been working with the Uptown Consortium, which represents the major institutions in the uptown area including the University of Cincinnati and the medical centers, to develop an Uptown Multimodal Center. This facility would serve Metro routes in the area, accommodate a BRT station, and provide direct connections to the numerous shuttle services operated by the uptown area institutions. The prospective location of the Uptown Multimodal Center has been along Burnet Avenue opposite Albert Sabin Way, although a final location has not yet been determined.

## READING ROAD CORRIDOR

The outlying northern terminus of the Reading Road corridor is in the Roselawn Business District, in the vicinity of the existing Valley Center (shopping center) located between Section and Summit roads. From the outlying terminus, the BRT line proceeds south along Reading Road through the Roselawn, Bond Hill, Paddock Hills, North Avondale, and Avondale neighborhoods.

In Avondale, the line proceeds west on Forest Avenue, then south on Burnet Avenue to MLK through the heart of the Uptown medical district. At Burnet and MLK, the line proceeds west on MLK to Jefferson Avenue, where it turns south to merge with the Hamilton Avenue Corridor alignment.



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## HAMILTON AVENUE CORRIDOR

The outlying northern terminus of the Reading Road corridor is at the Hilltop Plaza shopping center in the northern portion of Mt. Healthy. The shopping center is currently used as an off-street layover and turnaround point for Route 17 local trips.

From Hilltop Plaza, the alignment proceeds south on Hamilton Avenue through Mt. Healthy, North College Hill and the Cincinnati neighborhoods of College Hill and Northside. In the Northside neighborhood business district, the alignment turns east on Blue Rock Street and south through the off-street Northside Transit Center. Exiting the transit center, the alignment proceeds southwest on Spring Grove Avenue and then southeast on Ludlow Avenue.

In the Clifton neighborhood business district, the alignment turns south from Ludlow Avenue to Clifton Avenue. At MLK, the alignment proceeds east, then turns south on Jefferson Avenue to merge with the Reading Road Corridor alignment.

## COMBINED SEGMENT

The Reading Road and Hamilton Avenue BRT lines share a common alignment between MLK and downtown Cincinnati. Proceeding southbound, the alignments head south on Jefferson, merging onto Vine Street through the CUF and OTR neighborhoods. In OTR, the alignment turns east on Liberty Street for one block before turning south in Walnut Street through OTR and downtown. At this point the one way street system in OTR and downtown require that the alignment use a one way street pair instead of running bi-directionally on the same street.

In downtown the alignments proceed east on Fifth Street, south on Sycamore Street, west on Third Street, and south on Central Avenue, where it runs eastbound through the transit center to the BRT station.

From the southern terminus of the BRT lines at the Riverfront Transit Center, the alignments proceed east, turning north on Broadway and west in Second Street. At Main Street, the alignments proceed north on Main Street, turning west on Liberty Street, resuming bi-directional operations at Liberty and Walnut streets.

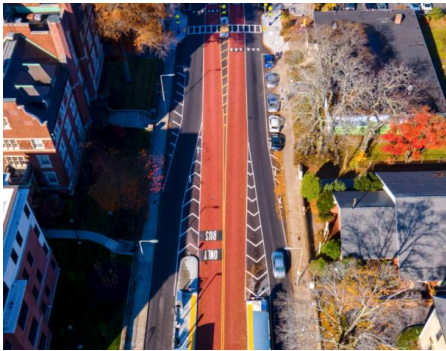



## Running Ways

The Reading Road and Hamilton Avenue BRT lines will operate in a variety of running way, or lane treatments. The five treatments are described in Table 8-1.






**Table 8-1. Running Way/Lane Treatments**

Treatment	Description	Example
<p>BRT-Only Center Lane: 2 Lanes</p>	<p>Two lanes, one in each direction, dedicated for exclusive bus operation. Non-BRT traffic is prohibited from operating in the BRT-only lanes except where permitted for left turns at select signalized intersections.</p> <p>Lanes can be delineated with red pavement, red striping, or other pavement treatments.</p>	
<p>BRT-Only Center Lane: 1 Lane</p>	<p>One lane, in only one direction, dedicated for exclusive bus operation. Non-BRT traffic is prohibited from operating in the BRT-only lanes except where permitted for left turns at select signalized intersections.</p> <p>Lanes can be delineated with red pavement, red striping, or other pavement treatments.</p> <p>Buses in the other direction without BRT-only lanes typically operate in mixed traffic.</p>	
<p>BAT Lanes: Both Sides</p>	<p>Bus and Turn Lanes on both sides (curbside) of the street providing priority for buses but allowing non-BRT traffic to use the lanes only to turn into and out of curb cuts and not for through travel.</p>	
<p>BAT Lane: 1 Side</p>	<p>Bus and Turn Lanes on one side (curbside) of the street providing priority for buses but allowing non-BRT traffic to use the lanes only to turn into and out of curb cuts and not for through travel. Buses in the non-BRT side operate in mixed traffic</p>	



Treatment	Description	Example
Mixed Traffic	No lane priority; BRT buses operate in the same lanes as other traffic	

Figures 8-2 and 8-3 illustrate the running way priority treatments for the Reading Road and Hamilton Avenue corridors, respectively. The segments are also listed in Table 8-2.

**Table 8-2. Priority Lane Treatments by Segment**

Segment	Priority Treatment
<b>Reading Road Corridor</b>	
Valley Center (Roselawn) to Burnet-MLK	BAT Lanes – Both Sides
Burnet-MLK to MLK-Jefferson	BRT-Only Center Lane – 1 Lane
<b>Hamilton Avenue Corridor</b>	
Hilltop Plaza (Mt. Healthy) to Hamilton-Pullan	BAT Lanes – Both Sides
Hamilton-Pullan to Ludlow-Cincinnati State	Mixed Traffic
Ludlow-Cincinnati State to Ludlow-Cornell	BRT-Only Center Lane – 2 Lanes
Ludlow-Cornell to Ludlow-Clifton	Mixed Traffic
Ludlow-Clifton to MLK-Jefferson	BRT-Only Center Lane – 2 Lanes
<b>Combined Segment</b>	
MLK-Jefferson to Vine-Calhoun	BRT-Only Center Lane – 2 Lanes
Vine-Calhoun to Vine-Clifton	BAT Lane -1 Side
Vine-Clifton to Liberty-Walnut	Mixed Traffic
Liberty-Walnut to Fifth-Main-Fifth (southbound)	BAT Lane -1 Side
Fifth-Main to Central-Riverfront Transit Center	Mixed Traffic
Central-Broadway (Riverfront Transit Center)	BRT-Only Center Lane – 2 Lanes
Riverfront Transit Center-Broadway to Fifth-Walnut	Mixed Traffic
Fifth-Main to Liberty-Walnut (northbound)	BAT Lane -1 Side



Figure 8-2. Running Way Treatments – Reading Road Corridor

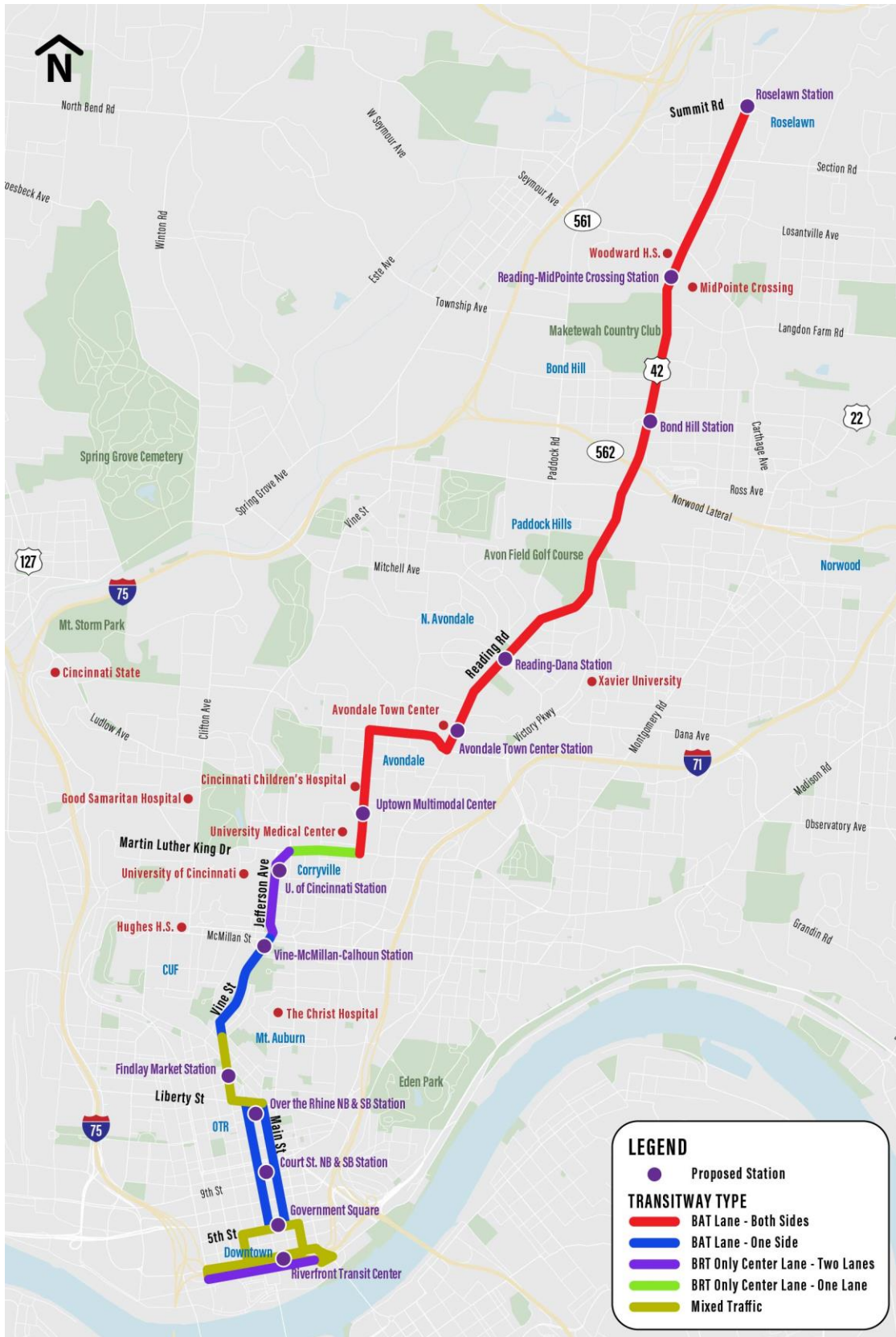
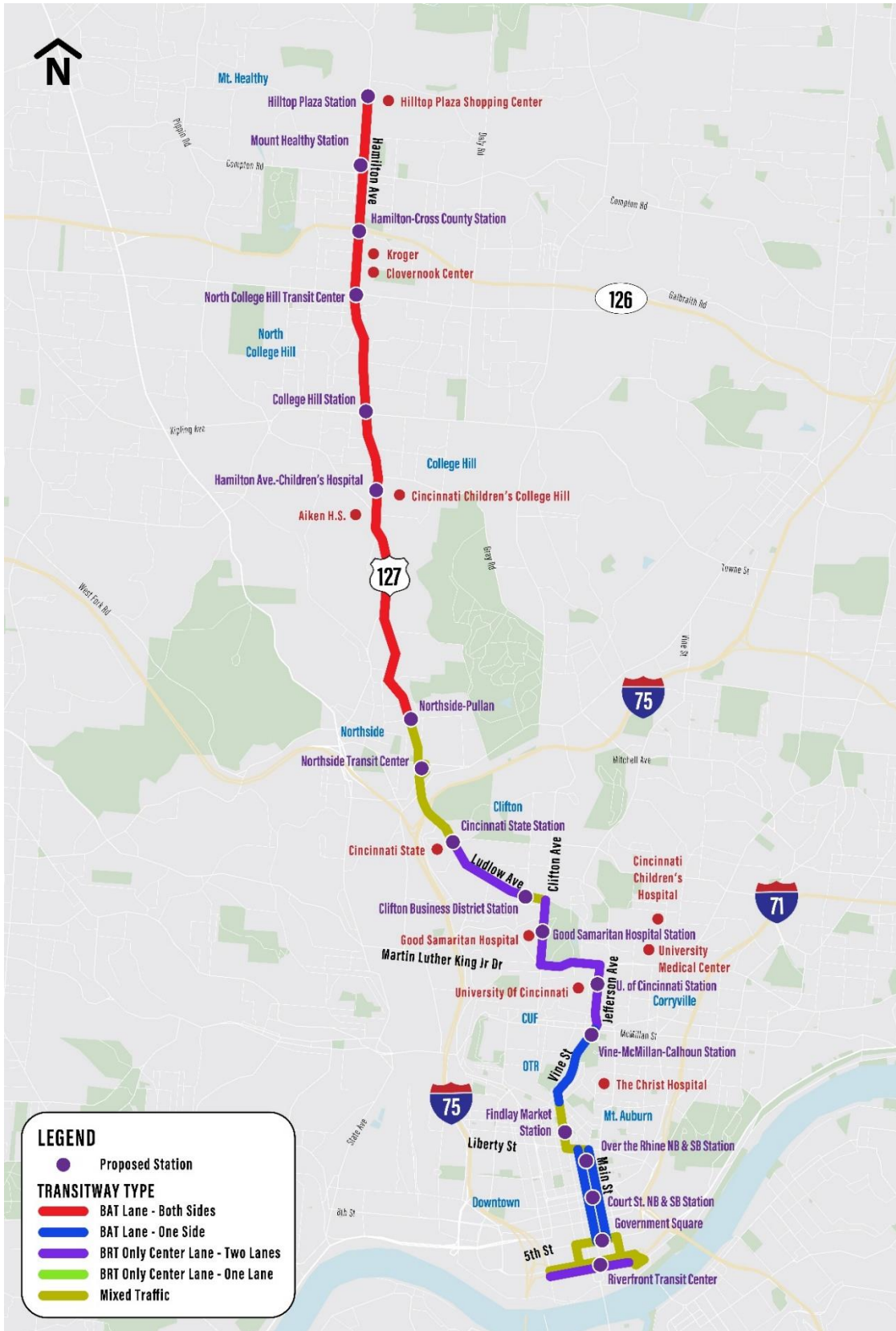






Figure 8-3. Running Way Treatments – Hamilton Avenue Corridor





## Transit Signal Priority

TSP applications will be included at all signalized intersections to help facilitate BRT through and turning movements. TSP will facilitate BRT operations by minimizing lengthy delays at intersections. It is not anticipated that TSP will be utilized in the downtown Cincinnati area on Main and Walnut streets, as TSP would not provide significant benefit downtown as compared to other locations along the corridors.

There is one instance where a bus-only signal will facilitate BRT bus turning movement where general traffic is currently prohibited from making a left turn: the intersection of Vine Street southbound to Liberty Street eastbound. A BRT bus-only signal will minimize delay while allowing the alignment to provide a station at Vine and Elder streets, a few blocks to the north, to serve Findlay Market and vicinity.

An example of TSP illustrating how buses on the Hamilton Avenue Corridor can move efficiently through the intersections at Jefferson Avenue and MLK, is shown in Figures 8-4 and 8-5. Buses receive a transit-only signal, similar to that used with rail systems, that are very different from the standard red-green-yellow signals used for motorists. Buses are allowed to proceed only when the white bar changes from horizontal to vertical. As a result, traffic is held for a few seconds, allowing buses to cross and intersection or turn onto another street while all other traffic is briefly held back.

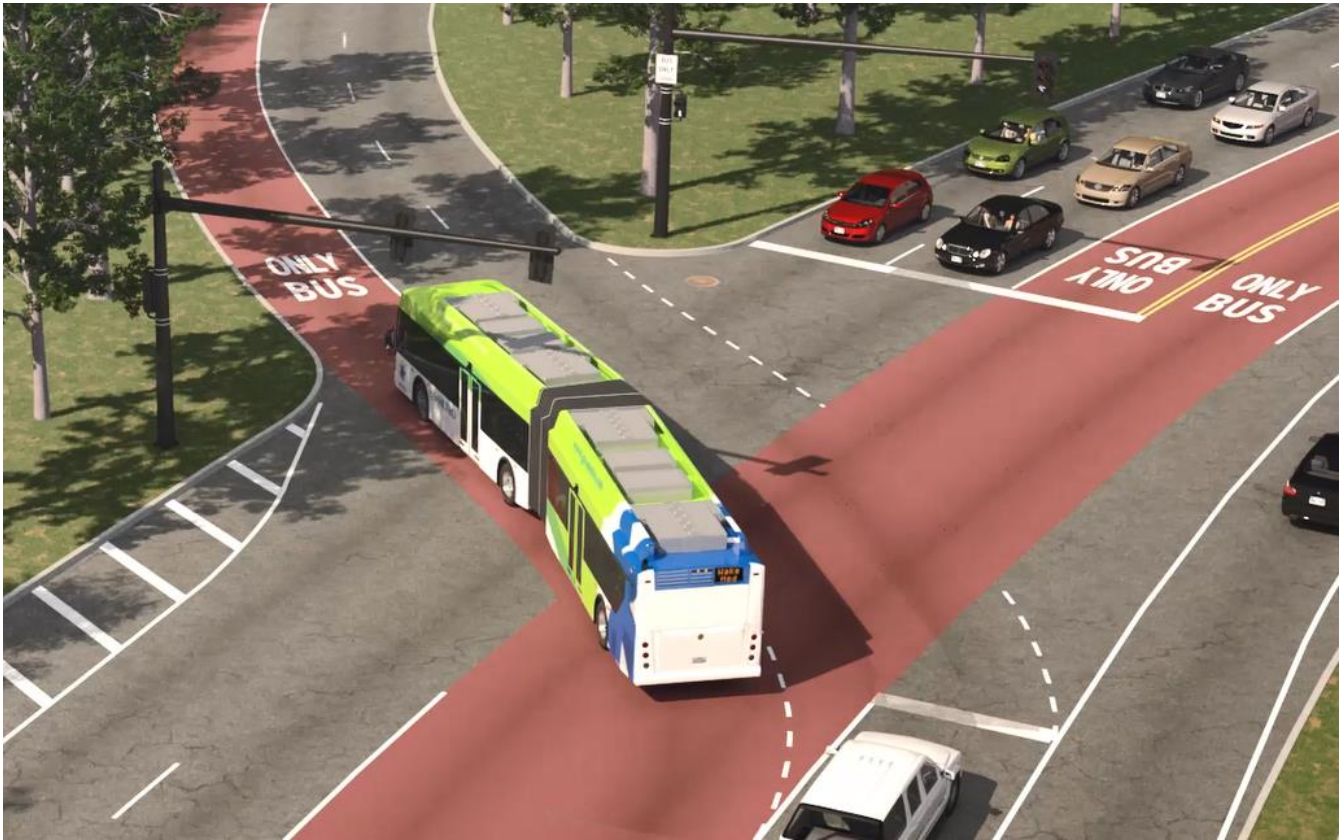
**Figure 8-4. Transit Priority Signals**







Figure 8-5. Transit Signal Priority Concept – Jefferson at MLK







# Stations

## LOCATION AND SPACING

Table 8-3 lists the station locations – and distance between stations - for each corridor and the combined segment. Excluding the portion of the alignment between Government Square and the Riverfront Transit Center, average spacing between stations on both corridors, including the combined segment, is 0.7 miles. Spacing ranges between 0.4 miles and 2.0 miles.

**Table 8-3. Station Locations and Spacing**

Station	Location	Distance from Previous Station
<b>Reading Road Corridor</b>		
Roselawn	Valley Center: Reading Road between Summit and Section roads	--
Midpointe Crossing	Reading Road at Woodward High School-Midpointe Crossing entrance roads	0.9 mi
Bond Hill	Reading Road at Northcutt Avenue	0.4 mi.
Reading-Dana	Reading Road at Dana Avenue	1.8 mi.
Avondale Town Center	Reading Road at Lexington Avenue	0.6 mi.
Uptown Multimodal Center	Burnet Avenue at Albert Sabin Way	1.2 mi.
University of Cincinnati	Jefferson Avenue at University Avenue	0.9 mi.
<b>Hamilton Avenue Corridor</b>		
Hilltop Plaza	Hamilton Avenue south of Meredith Drive	--
North College Hill	Hamilton Avenue at Hill Avenue	0.5 mi.
Cross County	Hamilton Avenue at Centeridge Avenue (Kroger supermarket, south of Cross County Highway)	0.7 mi.
North College Hill Transit Center	Hamilton Avenue at Goodman Avenue	0.5 mi.
College Hill	Hamilton Avenue at North Bend Road	1.0 mi.
College Hill-Children's Hospital	Hamilton Avenue at Belmont Avenue	0.6 mi.
Northside-Pullan	Hamilton Avenue at Pullan Avenue	2.0 mi.
Northside Transit Center	Between Blue Rock Street and Spring Grove Avenue	0.5 mi.
Cincinnati State	Ludlow Avenue at Cincinnati State Entrance Drive	0.7 mi.
Clifton Business District	Ludlow Avenue at Middleton Avenue	0.9 mi.
Good Samaritan Hospital	Clifton Avenue at South Entrance Drive	0.5 mi.
University of Cincinnati	Jefferson Avenue at University Avenue	0.9 mi.
<b>Combined Segment</b>		
Vine-Calhoun/McMillan	Vine Street between Calhoun and McMillan streets	0.4 mi.



Station	Location	Distance from Previous Station
Findlay Market	Vine Street at Elder Street	1.0 mi.
Over-the Rhine (southbound)	Walnut Street at 14 <sup>th</sup> Street	0.4 mi.
Court Street (southbound)	Walnut Street at Court Street	0.4 mi.
Government Square (southbound)	Fifth Street between Walnut and Main streets	0.4 mi.
Riverfront Transit Center	Below Second Street between Vine and Walnut streets	1.3 mi
Government Square (northbound)	Fifth Street between Walnut and Main streets	1.1 mi.
Court Street (northbound)	Main Street at Court Street	0.4 mi
Over-the-Rhine (northbound)	Main Street at 14 <sup>th</sup> Street	0.4 mi

## DESIGN

Station design will be conducted in the detailed design phase following this study. The following two conceptual renderings, however, provide a sense of scale and features. Figure 8-6 shows a concept for a station along a segment of center-running BRT-only lanes segment; Figure 8-7 shows a concept for a curbside platform station along a BAT lane segment.

## COMPONENTS

Station components will also be determined in the detailed design phase of the project but based on typical BRT practices shown in Section 2 and the public input obtained during the Step 2 outreach program described in Section 7, the following features are likely to be included in station design:

- Raised platform
- Tactile warning strip
- Rub rail or equivalent for precision docking
- Shelter/canopy
- Seating/leaning rails
- Real time arrival information display
- Ticket and pass vending machine
- Lighting
- BRT line and system maps
- Station identification pylon/kiosk
- Security cameras
- Emergency communications
- Neighborhood wayfinding and information
- Opportunities for public art
- Full Americans with Disabilities Act (ADA) accessibility



Figure 8-6. BRT Station Concept - Center BRT-Only Lanes



Figure 8-7. BRT Station Concept – Curbside BAT Lanes







## Station-to-Station Running Times

An initial estimate of travel times between stations was developed based, in part, on an assessment of existing bus travel times in the corridor and the potential positive impact that dedicated lanes – BAT and center running - along with TSP - could have. Initial estimates for the Reading Road Corridor are shown in Table 8-4; estimates for the Hamilton Avenue Corridor are shown in Table 8-5.

**Table 8-4. Reading Road Corridor - Initial Station-to-Station Running Time Estimates**

Southbound			Northbound		
From	To	Average Travel Time	From	To	Average Travel Time
Potential Reading-Cross County Station	Roselawn	3:19	Government Square	Court Street	2:40
Roselawn	Midpointe Crossing	3:39	Court Street	Over-the-Rhine	1:09
Midpointe Crossing	Bond Hill	3:31	Over-the-Rhine	Findlay Market	3:46
Bond Hill	Reading-Dana	6:27	Findlay Market	Vine-McMillan-Calhoun	5:32
Reading-Dana	Avondale Town Center	2:29	Vine-McMillan-Calhoun	University of Cincinnati	1:36
Avondale Town Center	Uptown Multimodal Center	4:09	University of Cincinnati	Uptown Multimodal Center	3:31
Uptown Multimodal Center	University of Cincinnati	5:27	Uptown Multimodal Center	Avondale Town Center	3:03
University of Cincinnati	Vine-McMillan-Calhoun	2:30	Avondale Town Center	Reading-Dana	2:06
Vine-McMillan-Calhoun	Findlay Market	5:04	Reading-Dana	Bond Hill	4:04
Findlay Market	Over-the-Rhine	2:13	Bond Hill	Midpointe Crossing	2:27
Over-the-Rhine	Court Street	2:02	Midpointe Crossing	Roselawn	2:45
Court Street	Government Square	2:45	Roselawn	Potential Reading-Cross County Station	2:12



**Table 8-5. Hamilton Avenue Corridor - Initial Station-to-Station Running Time Estimates**

Southbound			Northbound		
From	To	Average Travel Time	From	To	Average Travel Time
Hilltop Plaza	Mt. Healthy	1:55	Government Square	Court Street	2:40
Mt. Healthy	Hamilton Avenue-Cross County	3:02	Court Street	Over-the-Rhine	1:09
Hamilton Avenue-Cross County	North College Hill Transit Center	1:36	Over-the-Rhine	Findlay Market	3:46
North College Hill Transit Center	College Hill	4:42	Findlay Marker	Vine-McMillan-Calhoun	5:32
College Hill	Hamilton Avenue-Children's Hospital	2:25	Vine-McMillan-Calhoun	University of Cincinnati	1:36
Hamilton Avenue-Children's Hospital	Northside-Pullan	6:38	University of Cincinnati	Good Samaritan Hospital	3:12
Northside-Pullan	Northside Transit Center	1:25	Good Samaritan Hospital	Clifton Business District	1:58
Northside Transit Center	Cincinnati State	2:19	Clifton Business District	Cincinnati State	2:44
Cincinnati State	Clifton Business District	1:59	Cincinnati State	Northside Transit Center	2:38
Clifton Business District	Good Samaritan Hospital	1:48	Northside Transit Center	Northside-Pullan	1:25
Good Samaritan Hospital	University of Cincinnati	4:38	Northside-Pullan	Hamilton Avenue-Children's Hospital	4:48
University of Cincinnati	Vine-Calhoun-McMillan	2:30	Hamilton Avenue-Children's Hospital	College Hill	2:01
Vine-Calhoun-McMillan	Findlay Market	5:04	College Hill	North College Hill Transit Center	3:06
Findlay Market	Over-the-Rhine	2:13	North College Hill Transit Center	Hamilton Avenue-Cross County	1:27



Southbound			Northbound		
Over-the-Rhine	Court Street	2:02	Hamilton Avenue-Cross County	Mt. Healthy	2:22
Court Street	Government Square	2:45	Mt. Healthy	Hilltop Plaza	1:36

Travel times between Government Square and the Riverfront Transit Center are not included in the tables; the current proposed alignment is in mixed traffic (except for the portion with the Riverfront Transit Center itself) with no travel time gain.

These estimates will be refined in the next phase of project development.

## Operating Characteristics

BRT requires a high frequency of service to accommodate expected ridership attracted to the convenience of the service. High frequency also minimizes wait time, which is factored in overall travel time of BRT users. As a result, the conceptual operating plan for the Reading Road and Hamilton corridors, as shown in Table 8-6, is 10 minutes throughout the day on weekdays, including AM and PM peak periods and the midday and evening off-peak periods. After 9 pm, service frequency would widen from 10 to 15 minutes.

Weekend and holiday frequencies would range from 15 to 20 minutes. Overnight or 24 hour local service is not proposed at this time. Existing local service in both corridors currently operates 24/7.

**Table 8-6. Proposed Service Frequency**

Time Period	12 am – 4 am	4 am – 9 am	9 am – 3 pm	3 pm – 6 pm	6 pm – 9 pm	9 pm – 1 am
Frequency	--	10-20 min.	10 min.	10 min.	10 min.	15-20 min.

Table 8-7 presents the amount of service provided by each line based on the 12 am – 1 am span of service and headways described above.

SORTA intends to maintain a level of underlying local service along both corridors that will provide service to all existing bus stops. The design of the network will be undertaken in the next phase of project development.

**Table 8-7. Estimated Revenue Hours**

Time Period	Reading Corridor	Hamilton Corridor	Total
Estimated Weekday Revenue Hours	160	190	350
Estimated Annualized Revenue Hours	48,000	57,000	105,000





# Vehicles

## VEHICLE TYPE AND SIZE

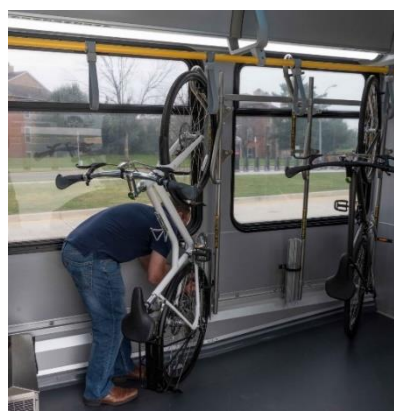
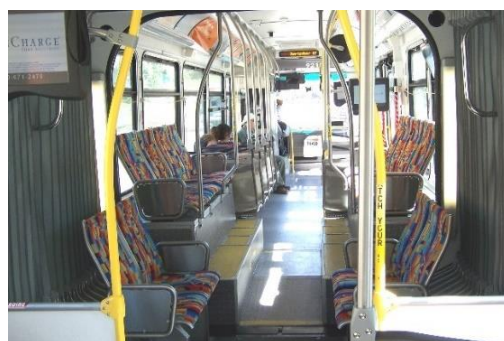
The BRT lines require a different type of bus than currently found in SORTA’s fixed route fleet to accommodate high passenger loads, wheelchair positions, on-board bike storage, and additional passenger amenities. As a result, 60-ft articulated buses designed to provide those amenities will be used. They will feature low floors and be designed to facilitate precision docking at stations to eliminate the need for ramps or bridgeplates, thereby minimizing the amount of time needed for boarding and alighting. Because pre-paid, off-board fare payment systems will be used, passengers will be able to enter the buses by any of the doors, not just the front door near the operator.

The most significant and unique characteristics of the BRT buses are doors on both sides of the bus. This allows maximum design flexibility for the Reading Road and Hamilton Avenue BRT lines, future extensions, and additional BRT lines to apply center platform stations where BRT-only lanes can be accommodated in the center of a street.

In addition, SORTA expects that its BRT fleet will be zero emission, using either battery electric buses (BEBs) or fuel cell electric buses (FCEBs) which are powered by hydrogen.

Examples of the type of BRT bus to be used on the Reading Road and Hamilton Avenue lines are shown in Figure 8-8.

**Figure 8-8: Articulated BRT-Style Buses**





## FLEET REQUIREMENT

The vehicle requirement for the BRT lines are shown in Table 8-8. Vehicle requirements are based on the maximum service period, which is typically during the AM and PM peak periods. In the case of the Reading Road and Hamilton Avenue BRT lines, midday and evening frequencies are the same as the traditional peak. The total vehicle requirement reflects the need to include spare buses in the fleet to accommodate buses that are taken out of service for repairs or maintenance. In addition, there will be instances when additional buses must be placed in service to accommodate high passenger volumes due to special events. FTA allows a maximum 20% spare ratio, which is reflected in the estimated total vehicle requirement. A case can be made for exceeding the 20% maximum since the BRT stations are designed to accommodate low floor buses and buses with doors on both sides. SORTA would be unable to use existing local buses to supplement the existing BRT fleet as they are incompatible with at least three of the planned stations which will be designed to accommodate left side doors.

The vehicle requirement estimate is also based on conventional diesel-electric hybrid buses. If SORTA chooses to pursue BEBs, the requirement may be higher based on their operating range, manufacturer, and charging needs. Opportunity chargers would also be located at the northern and southern terminus points of both lines, helping to extend range during layover periods. Currently, the range of BEBs is less than conventional buses, although battery performance (range) is expected to improve as it has for the last several years. A detailed analysis of range and charging requirements would be conducted in the next phase of project development. If SORTA chooses to pursue FCEBs (hydrogen buses), their range is similar to that of conventional buses and fleet size requirements would not required further refinement.

**Table 8-8. Estimated Vehicle Requirements**

Time Period	Reading Corridor	Hamilton Corridor	Total
Peak Vehicle Requirement	8	9	17
Total Vehicle Requirement	10	11	21

## Operating and Maintenance Cost Estimate

Table 8-9 presents the estimated operating and maintenance costs of the Reading Road and Hamilton Avenue corridors. Costs are fully allocated, as required by FTA for CIG evaluation purposes. Given the magnitude of a new rapid transit system, fully allocated costs take into account the operations, maintenance, and administrative costs that would be incurred.

Operating and maintenance costs will be further refined as development of the project progresses. The cost estimates shown in the table are for the BRT lines only and do not take into account the offsets that would result from any reductions in existing local service in each corridor. The new BRT service will render the existing level of local service in both corridors redundant and unnecessary. SORTA will retain some level of underlying local service but presumably not at the level currently provided. Given the complexity of the existing local system and SORTA's ongoing efforts to continue to reinvent the Metro system to take into account the benefits of the rapid transit lines, the design of the underlying local service was still under consideration as of the completion of the BRT Study; an initial service program will be developed in mid-2023 with the financial offsets for both corridors estimated at that time.



**Table 8-9. BRT Operating and Maintenance Cost Estimate (Exclusive of Local Service Cost Reductions)**

	Reading Corridor	Hamilton Corridor
FY 2021 (Audited Current Year)	\$8,514,111	\$10,006,275
Opening Year (2027-2028)	\$11,022,415	\$12,954,178

## Capital Cost Estimate

The capital cost estimate, shown in Table 8-10, is based on the 10% design plans prepared as part of this study. The format follows FTA Standard Cost Categories (SCC) spreadsheet, which divides costs into 10 general categories; within each category, sub-categories provide further details or components. The Reading Road and Hamilton Avenue BRT projects involve seven of FTA’s ten categories (the others involve cost for rail systems and are not applicable to this project).

As listed in the table, the capital cost of the Reading Road corridor encompasses the entire corridor between Roselawn and downtown Cincinnati. The capital cost of the Hamilton Avenue corridor encompasses the portion from the split point from the Reading Road corridor, at Jefferson and MLK to the outer terminus in Mt. Healthy. The exception is for buses, which are allocated to each corridor based on their service from downtown to their outer terminus locations.

Capital costs do not include a new operating and maintenance facility. SORTA has indicated that its existing facilities, in Queensgate and Bond Hill, are well situated and have capacity to accommodate the BRT buses and any related infrastructure. The capital costs also do not include charging or fueling infrastructure for zero emission buses.

Unit costs are based on current and recent comparable projects throughout the U.S. and more localized costs for construction. Each category includes contingencies, as does the project total. Total costs are shown in current and in estimated Year of Expenditure (YOE) dollars.

**Table 8-10. Capital Components and Conceptual Level Cost Estimate**

Cost Category	Reading Corridor Includes Common Segment	Hamilton Corridor	Total
<b>Length by Lane Type</b>			
Length (Miles)	10.10	8.90	19.0
Lane Miles	20.20	17.80	38.0
Exclusive Guideway Miles	0.60	1.93	2.53
Exclusive Guideway Lane Miles	1.20	3.87	5.07
BAT Lane Total Miles	6.40	5.45	11.85
BAT Lane Miles (Lane Miles)	12.70	10.90	23.60
Mixed Traffic Total Miles	3.10	1.53	4.63
Mixed Traffic Lane Miles	6.20	3.06	9.26





Cost Category	Reading Corridor Includes Common Segment	Hamilton Corridor	Total
<b>SCC 20 Stations, Stops, Terminals, Intermodal</b>			
Total BRT High Investment Stations	17	18	35
Center Platforms	1	2	3
Side Platforms	16	16	32
Station Cost	\$7,650,000	\$8,100,000	\$15,750,000
<b>Subtotal</b>	<b>\$7,650,000</b>	<b>\$8,100,000</b>	<b>\$15,750,000</b>
<b>Subtotal plus 40% Allocated Contingency</b>	<b>\$10,710,000</b>	<b>\$11,340,000</b>	<b>\$22,050,000</b>
<b>SCC 40 Sitework &amp; Special Conditions</b>			
Exclusive Lane Miles Requiring New Roadway Construction	0.90	0.30	1.2
Exclusive Lane Miles Requiring New Roadway Construction Cost	\$2,092,180	\$727,215	\$2,819,395
Exclusive/Mixed Lane Miles Requiring Milling / Resurfacing (Lane Miles)	39.0	33.0	72.0
Exclusive/Mixed Lane Miles Requiring Milling / Resurfacing Cost	\$14,738,352	\$12,547,546	\$27,285,898
Exclusive/Mixed Lane Miles Requiring Striping (Lane Miles)	39.0	33.0	72.0
Exclusive/Mixed Lane Miles Requiring Striping Cost	\$11,000,000	\$9,075,000	\$20,075,000
Sidewalk Reconstruction (Miles)	0.8	0.3	1.1
Sidewalk Reconstruction Cost	\$192,582	\$76,022	\$168,604
Percent Allocated to Other Conditions (Utilities, Environmental, Mitigation, Landscaping, Bike/Ped)	30%	30%	30%
Percent Allocated to Other Conditions	\$2,295,000	\$2,430,000	\$4,725,000
<b>Subtotal</b>	<b>\$30,318,113</b>	<b>\$24,855,784</b>	<b>\$55,173,897</b>
<b>Subtotal plus 40% Allocated Contingency</b>	<b>\$41,482,982</b>	<b>\$34,798,097</b>	<b>\$76,281,079</b>
<b>SCC 50 Systems – TSP, Signals, Fare Collection, Communications</b>			
Stations with Real Time Information	17	18	35
Real Time Information Cost	\$442,000	\$468,000	\$910,000
Stations with Off-Board Fare Collection	17	18	25
Off-Board Fare Collection Cost	\$2,210,000	\$2,340,000	\$4,550,000
New Traffic Signals	1	1	2
Traffic Signals Cost	\$200,000	\$200,000	\$400,000



Cost Category	Reading Corridor Includes Common Segment	Hamilton Corridor	Total
Traffic Signals Requiring Modification	43	37	80
Modified Traffic Signals Cost	\$1,075,000	\$925,000	\$2,000,000
Intersections with Queue Jumps	8	6	14
Queue Jumps Cost	\$320,000	\$240,000	\$560,000
<b>Subtotal</b>	<b>\$4,247,000</b>	<b>\$4,173,000</b>	<b>\$8,420,000</b>
<b>Subtotal plus 40% Allocated Contingency</b>	<b>\$5,692,600</b>	<b>\$5,842,200</b>	<b>\$11,534,800</b>
<b>SCC Right-of-Way (ROW) – Land, Existing Improvements</b>			
ROW Along Corridor	Reading:15% Combined: 5%	15%	varies
ROW Cost	\$2,550,623	\$3,728,368	\$6,278,991
<b>Subtotal</b>	<b>\$2,550,623</b>	<b>\$3,728,368</b>	<b>\$6,278,991</b>
<b>Subtotal plus 15% Allocated Contingency</b>	<b>\$2,933,216</b>	<b>\$4,287,623</b>	<b>\$7,220,839</b>
<b>SCC 70 Vehicles</b>			
New Vehicles Required (Articulated)*	10	11	21
Vehicles Cost	\$12,500,000	\$13,750,000	\$26,250,000
<b>Subtotal</b>	<b>\$12,500,000</b>	<b>\$13,750,000</b>	<b>\$26,250,000</b>
<b>Subtotal plus 40% Allocated Contingency</b>	<b>\$17,500,000</b>	<b>\$19,250,000</b>	<b>\$36,750,000</b>
<b>SCC 80 Professional Services</b>			
Percentage Allocated	45%	45%	45%
Cost	\$18,996,801	\$16,707,853	\$35,704,654
<b>Subtotal</b>	<b>\$18,996,801</b>	<b>\$16,707,853</b>	<b>\$35,704,654</b>
<b>Subtotal plus 40% Allocated Contingency</b>	<b>\$26,595,521</b>	<b>\$23,391,134</b>	<b>\$49,986,655</b>
<b>Subtotal Categories 10-80</b>			
<b>Subtotal Categories 10-80</b>	<b>\$104,914,319</b>	<b>\$98,909,053</b>	<b>\$203,823,372</b>
<b>Other Adjustments</b>			
SCC 90 – Unallocated Contingency	35%	35%	35%
<b>Total Project Cost</b>	<b>\$141,634,331</b>	<b>\$133,527,222</b>	<b>\$275,161,553</b>
<b>Year of Expenditure (YOE) Cost</b>	<b>\$147,030,599</b>	<b>\$138,614,609</b>	<b>\$285,645,208</b>
<b>Cost Per Lane Mile YOE</b>	<b>\$14,557,485</b>	<b>\$15,574,675</b>	

\*Vehicles are allocated for the Reading Road and Hamilton Avenue corridors based on service from their respective outer terminus locations to downtown Cincinnati.



## Traffic Impacts

An analysis using Synchro, a commonly used and accepted traffic analysis software, was performed for the current year (2023) on the Reading Road and Montgomery Road BRT corridors for existing and proposed lane configurations. Traffic movements were counted throughout February 2023 at key intersections within the study area, and existing timings of these intersections were applied to the AM and PM peak hours of 7:45-8:45 am and 4:30-5:30 pm, respectively.

The proposed design for the Reading Road and Hamilton Avenue corridors involves a mix of exclusive lanes and BAT lanes, which will reduce capacity for non-BRT traffic in some areas. Table 8-11 identifies intersections and segments that will be most significantly impacted by the accommodation of BRT. For lane segments, the issue areas are identified by time of day (AM or PM) and in the direction of travel impacted. The initial traffic impacts data will help inform the design of the BRT corridors, including traffic signalization and intersection geometry, starting in the second half of 2023.

**Table 8-11. Significant Traffic Impact Locations**

	Reading Road Corridor	Hamilton Avenue Corridor
Intersections	Reading Road at Section Road Reading Road at Seymour Avenue Reading Road at Tennessee Avenue MLK at Short Vine Street	Ludlow Avenue at Central Parkway MLK at Clifton Avenue
Segments	Reading Road at Section Road (Southbound-PM) Reading Road at Seymour Avenue (Southbound-AM) Reading Road at Norwood Lateral southbound ramps (Eastbound-AM) Reading Road at Tennessee Avenue (Northbound-PM) Reading Road at Clinton Springs Road (Northbound-PM) MLK at Burnet Avenue (Southbound-AM) MLK at Short Vine (Westbound-PM) MLK at Jefferson Avenue (Northbound-PM)	Hamilton Avenue at SR 126 westbound ramps (Southbound-PM) Hamilton Avenue at SR 126 eastbound ramps (Northbound-PM) Hamilton Avenue at Galbraith Road (Southbound-PM) Ludlow Avenue at Central Parkway (Northbound & Northbound-PM) MLK at Clifton Avenue (Westbound-PM)

## Environmental Considerations

A review of environmental “red flags” was conducted for the Reading Road and Hamilton Avenue corridors. The review looked at potential areas of impact related to the built, social, and natural environment that will be evaluated in greater detail during the National Environmental Policy Act (NEPA) phase of the project.

The review utilized secondary source mapping and a windshield field review. General project mapping based on existing land uses within a 250-foot buffer of each corridor was developed.





## OVERALL ISSUES / POTENTIAL RED FLAGS

The corridors are mostly within existing roadway right-of-way (ROW); therefore, areas of concern are focused in the vicinity of the proposed stations. The categories that have a higher potential for impacts include known historic properties and districts, Section 4(f) resources (both recreational and cultural resources), regulated and hazardous materials, visual quality, environmental justice and underserved populations, and traffic.

**Historic Properties and Historic Districts** - Both corridors run through or are adjacent to known National Register of Historic Places (NRHP) properties and historic districts (HD). The Section 106 process will need to be completed during the NEPA phase since cultural resources are present in the study area. Any impacts to cultural resources will also need to be evaluated for potential Section 4(f) use.

**Section 4(f) Recreational Issues** - Both corridors are adjacent to publicly owned parks. Any work completed adjacent to or within park property boundaries will need to be evaluated for potential Section 4(f) use. Access to recreational Section 4(f) resources would also need to be considered during construction.

**Regulated / Hazardous Materials** - Impacts related to regulated or hazardous materials would be focused on gas stations and underground storage tanks that are adjacent to the corridors, and more specifically, proposed BRT stations. This is an issue if deep excavation occurs.

**Visual Quality** – As station design progresses, the potential visual impacts of BRT would be reviewed in the NEPA document.

**Environmental Justice / Underserved Populations** – Both corridors run through concentrations of environmental justice populations. Public outreach and engagement activities related to these groups will be reported in the NEPA document.

**Traffic** - Coordination with traffic impacts will be reported in the NEPA document.

## READING ROAD CORRIDOR

Table 8-12 lists potential environmental issues and factors along the Reading Road Corridor.

**Table 8-12. Environmental Issue Areas – Reading Road Corridor**

Category	Presence / Issue
Land Use or Public Institution/Resource	<p>The following notable land uses are along the corridor:</p> <ul style="list-style-type: none"> <li>▪ Woodward High School</li> <li>▪ Maketewah Country Club</li> <li>▪ St. Aloysius Orphanage/Church</li> <li>▪ Avon Fields Golf Course</li> <li>▪ Paddock Hills Recreation Area</li> <li>▪ Hirsch Recreation Complex</li> <li>▪ South Avondale Elementary School</li> <li>▪ Rockdale Academy/Elementary School</li> </ul>



Category	Presence / Issue
	<ul style="list-style-type: none"> <li>▪ Various churches</li> <li>▪ UC Health</li> <li>▪ Cincinnati Children's Hospital Medical Center</li> </ul>
Public Parks	<ul style="list-style-type: none"> <li>▪ Passive park/Park &amp; Ride at Section Road</li> <li>▪ Lower Millcrest Park</li> <li>▪ Bond Hill Recreation Center</li> <li>▪ Sherman Recreation Area</li> <li>▪ Seasongood Square Park</li> <li>▪ Dr. Martin Luther King, Jr. Park</li> <li>▪ Fleishmann Gardens</li> </ul>
Known Historic Districts and Properties	<ul style="list-style-type: none"> <li>▪ NRHP District: Cincinnati Street Gas Lamps on east side of Reading Road south of Section Road (not adjacent to corridor)</li> <li>▪ NRHP Properties: 12</li> </ul>
Hazardous Materials/ Regulated Materials	<ul style="list-style-type: none"> <li>▪ Gas stations near proposed stations</li> <li>▪ Electrical Substations</li> <li>▪ No deep excavation expected for proposed stations</li> </ul>
Natural Resources	A potential concern where new stations would be in new ROW and potential for cutting trees that may disturb habitat
Underserved Populations Concentrations	Avondale, Bond Hill, Uptown, and Roselawn neighborhoods
Noise and Vibration	BRT does not produce new noise or vibration over existing bus routes
Air	Improved air quality anticipated due to less stopping and use of zero emission buses
Floodplain	None
Energy	BRT would consume same or less energy as existing bus route
Utilities	Present along the corridor; potential concern in areas of new ROW for a station

Several of the proposed BRT stations are at locations where an existing bus stop is located. Potential environmental red flags were noted at the following proposed stations along the Reading Road corridor.

- Woodward High School: check for previous cleanup of adjacent sites
- Dana Avenue/Shuttlesworth: Church and funeral home at this location; public park at corner (Seasongood Square)

## HAMILTON AVENUE CORRIDOR

Table 8-13 lists potential environmental issues and factors along the Hamilton Avenue Corridor.



**Table 8-13. Environmental Issue Areas – Hamilton Avenue Corridor**

Category	Presence / Issue
Land Use or Public Institution/Resource	<p>The following notable land uses are along the corridor:</p> <ul style="list-style-type: none"> <li>▪ Clovernook School for the Blind</li> <li>▪ Various churches</li> <li>▪ North College Hill Middle/High School</li> <li>▪ College Hill Business District</li> <li>▪ Cincinnati Children’s Satellite Campus</li> <li>▪ Northside Business District</li> <li>▪ Cincinnati State Technical and Community College</li> <li>▪ University of Cincinnati</li> </ul>
Public Parks	<ul style="list-style-type: none"> <li>▪ Heritage Park and Heritage Park Trail</li> <li>▪ Laboiteux Woods</li> <li>▪ Hoffner Recreation Area (Blue Rock Road)</li> <li>▪ Mill Creek Valley Conservancy District</li> <li>▪ Mt. Storm Park</li> <li>▪ Bowdle Park</li> <li>▪ Dunore Park</li> <li>▪ Burnet Woods</li> </ul>
Known Historic Districts and Properties	<ul style="list-style-type: none"> <li>▪ NRHP Districts: Cincinnati Street Gas Lamps (Clifton); Hoffner HD (Northside)</li> <li>▪ NRHP Properties: 10</li> </ul>
Hazardous Materials/ Regulated Materials	Gas stations at proposed stations; substations; no deep excavation expected
Natural Resources	A potential concern where new stations would be in new ROW and potential for cutting trees that may disturb habitat
Underserved Populations Concentrations	College Hill, Mt. Healthy, and Northside neighborhoods
Noise and Vibration	BRT does not produce new noise or vibration over existing bus routes
Air	Improved air quality anticipated due to less stopping and use of zero emission buses
Floodplain	Crosses floodway in Northside associated with Mill Creek; crosses at one location in North College Hill
Energy	BRT would consume same or less energy as existing bus route
Utilities	Present along the corridor; potential concern in areas of new ROW for a station

Several of the proposed BRT stations are at locations where an existing bus stop is located. Potential environmental red flags were noted at the following stations along the Hamilton Avenue Corridor:

- Centeridge Avenue/Kroger: Kroger Fuel Center adjacent to stops
- Goodman Avenue: UDF convenience store and fuel station





- North Bend Road: former gas stations but new development
- Northside Transit Center: Hoffner HD
- Cincinnati State College: on-street bike lane
- Middleton/Ludlow Ave: Cincinnati Street Gas Lamps Historic District and one NRHP property
- Clifton Avenue/Good Samaritan Hospital: adjacent to Burnet Woods public park

Several of the proposed BRT stations are at locations where an existing bus stop is located. Potential environmental red flags were noted at the following proposed stations along the Reading Road corridor.

## COMBINED SEGMENT

Table 8-14 lists potential environmental issues and factors along the combined segment between uptown and downtown.

**Table 8-14. Environmental Issue Areas – Combined Segment**

Category	Presence / Issue
Land Use or Public Institution/Resource	<ul style="list-style-type: none"> <li>▪ Rothenberg Preparatory Academy</li> <li>▪ Various churches</li> <li>▪ University of Cincinnati</li> <li>▪ Fountain Square</li> </ul>
Public Parks	<ul style="list-style-type: none"> <li>▪ Inwood Park</li> <li>▪ Hollister Recreation Area (construction)</li> <li>▪ Findlay Playground</li> <li>▪ Walnut Playground</li> </ul>
Known Historic Districts and Properties	<ul style="list-style-type: none"> <li>▪ NRHP Districts: OTR HD; West Fourth Street HD; Ninth Street HD; Lytle Park HD (may not be adjacent)</li> <li>▪ NRHP Properties; Multiple properties in Cincinnati CBD</li> </ul>
Hazardous Materials/ Regulated Materials	No
Natural Resources	No
Underserved Populations Concentrations	OTR and CUF (Uptown) neighborhoods
Noise and Vibration	BRT does not produce new noise or vibration over existing bus routes
Air	Improved air quality anticipated due to less stopping and use of zero emission buses
Floodplain	Yes- near southern end of corridor along the Ohio Riverfront
Energy	BRT would consume same or less energy as existing bus route
Utilities	Present along the corridor; potential concern in areas of new ROW for a station



All of the proposed BRT stations are at locations where an existing bus stop is located along the common section of both corridors. The stations are located within the OTR historic district; East Fourth Street HD; and runs adjacent to multiple NRHP structures and local landmarks. No other red flags were noted for stations in the areas where the two corridors overlap.

## Future Design Considerations

During the course of this study, various potential design modifications were identified for consideration in the detailed design phase. Some of these considerations were derived from the community and stakeholder outreach program; others from the 10% design process. The resulting future design consideration do not impact the overall design program for the Reading Road and Hamilton Avenue BRT corridors, but have the potential to improve operations, ridership, passenger convenience, and physical fit:

- **Alignment between Government Square Station and Riverfront Transit Center Station**

The configuration of the Riverfront Transit Center requires that buses enter and exit only at the ends of the facility, at Central Avenue on its west side and Broadway on its east side. This causes a relatively lengthy alignment, in mixed traffic between Government Square and the Riverfront Transit Center. A potential alternative is to serve the Riverfront Transit Center at the Second Steet level, where stairways and elevators are available. This could result in a shorter and faster alignment in this area. The need for a layover location in this area, which is the southern terminus of both lines, is a significant consideration.

- **Alternative Downtown and Over-the-Rhine Alignment**

Main and Walnut streets in downtown and OTR are heavily trafficked with minimal opportunities for priority treatments. Sycamore Street, which runs parallel to Main and Walnut to the east, experiences lower traffic levels and is two way in OTR, may be a potential alternative.

- **Potential MLK-Eden Station in Uptown**

On the Reading Road Corridor, two stations serve medical center district: University of Cincinnati (at Jefferson and University avenues) and the Uptown Multimodal Center (Burnet Avenue opposite Albert Sabin Way). The latter station directly serves Cincinnati Children's Hospital Medical Center but is less convenient to the medical centers located to the west, such as the Veterans Administration (VA) facility. For some passengers, accessing the VA from the University station may not be convenient as it requires crossing MLK, a wide, busy, and not pedestrian friendly roadway. A station located at MLK and Eden Avenue would be more centrally located for many of the uptown medical centers but is a challenging location in terms of traffic impacts.

- **Uptown Multimodal Center Location**

SORTA has been working in recent years with the Uptown Consortium on development of a transportation center that would serve Metro routes in the area as well as the numerous shuttle services operated by various uptown institutions. A site on the east side of Burnet Avenue opposite Albert Sabin way had been previously identified. This location works well as a Reading Road Corridor BRT station serving Children's Hospital and other medical facilities in the vicinity. However, the Uptown Consortium is looking at other locations, focusing near the intersection of MLK and Reading Road as part of the new Innovation District.



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- **Bond Hill Station Location**

A location three blocks north of the current Northcutt Avenue site, at Dale Road, may provide opportunity for small-scale TOD and revitalization of the small Bond Hill neighborhood business district.

- **Midpointe Crossing Station Location**

The plan for Midpointe Crossing is still under consideration by the developer and may influence the site for a station.

- **Reading Road Corridor Terminus and Potential Extension**

Although Reinventing Metro and the area considered as part of this study ends in Roselawn, an extension of under a mile could take the Reading Road line closer to the Cross County Highway and potentially better opportunities for TOD, park & ride, and turnaround/layover.

- **Northside-Pullan Station Location**

Various attendees at the community design workshops held in early 2023 suggested that the intersection of Hamilton Avenue and Chase Avenue may be a better location for a station north of the Northside Transit Center.

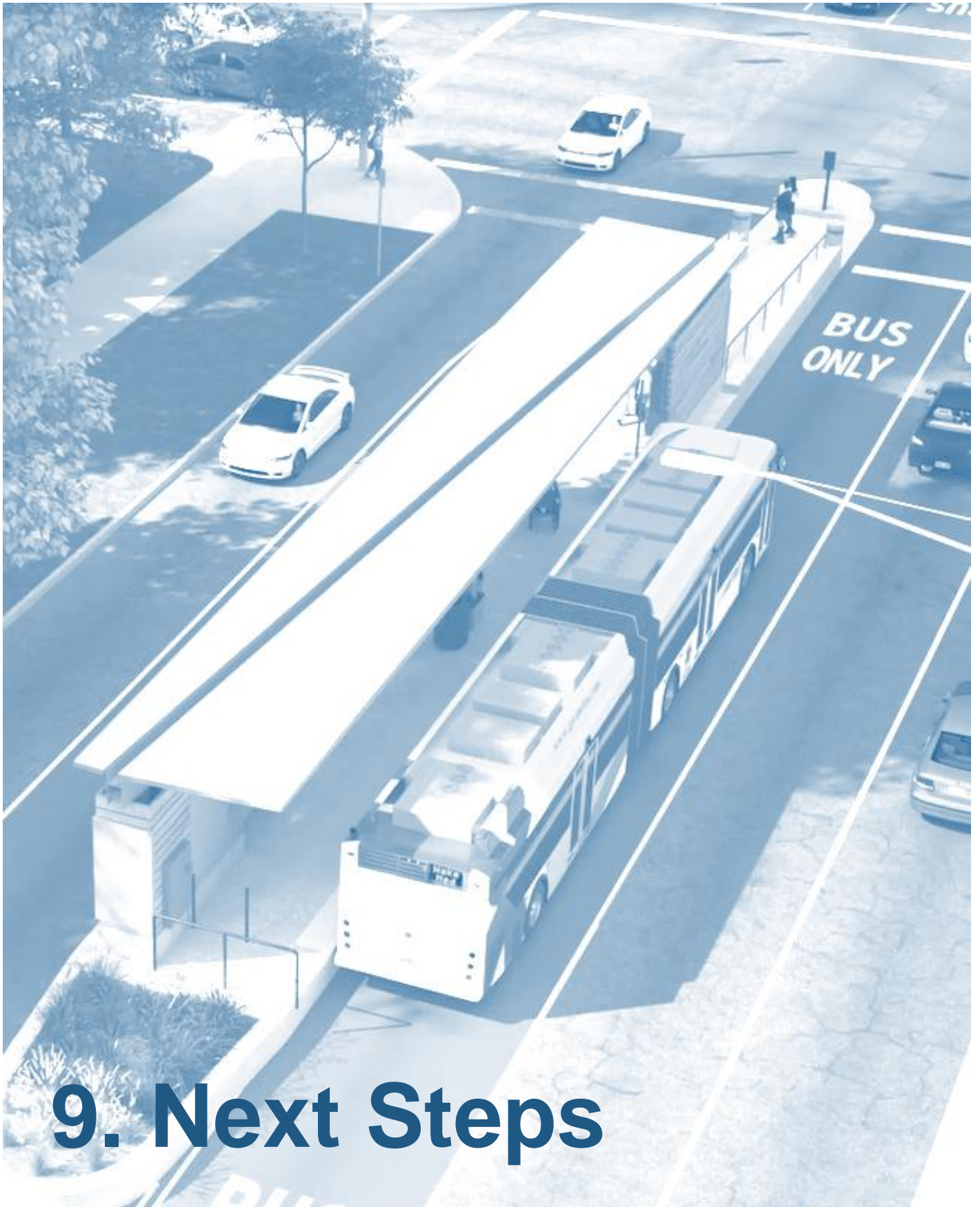
- **Potential Hamilton Avenue-Ashtree Drive Station**

At about two miles, the longest spacing between stations is on the Hamilton Avenue corridor between the Northside-Pullan and College Hill Children's Hospital Station. Some attendees of the community design workshops suggested that a station be added near the halfway point, in the vicinity of Ashtree Drive, where a small low-income housing complex is located.

- **North College Hill Transit Center Location**

SORTA is working with the City of North College Hill to secure a suitable site for a transit center in the vicinity of Hamilton Avenue and Galbraith Road, which would also serve as a BRT station.





# 9. Next Steps



## 9. Next Steps

The following actions and activities will be conducted by SORTA as the BRT corridors enter the next phase of project development:

### **Approval and Adoption of the LPA**

The SORTA Board of Trustees approved the LPA in February 2023, allowing SORTA to advance the project into the project development and environmental review phase in coordination with FTA.

### **National Environmental Policy Act (NEPA)**

Projects that anticipate the use of federal funds for further development are subject to the requirements of the National Environmental Policy Act (NEPA). The first step in this process is to complete a Class of Action (COA) Determination in coordination with the FTA. Based upon the preliminary environmental analysis completed as part of the planning phase, it is anticipated that FTA will determine that the COA will be a Documented Categorical Exclusion (DCE). This determination and approval are expected in mid-2023, allowing SORTA team to complete the DCE process in 2024.

### **Request Entry into FTA Capital Investment Grant (CIG) Program**

It is anticipated that this project will be funded, in part, through FTA's Capital Investment Grant (CIG) Program. Of FTA's three CIG eligibility categories, the Reading Road Corridor and Hamilton Avenue Corridor are expected to qualify as Small Starts projects. FTA requires that the sponsoring agency (SORTA) request entry into the program. It is anticipated that this process will be completed and that FTA will approve the project to enter the Project Development (PD) phase by mid-2023. SORTA must provide an estimate of PD costs and demonstrate that it has non-CIG funding available for Project Development work.

The criteria are divided into two categories: Project Justification and Project Commitment

A minimum of a medium ranking for both Project Justification and Financial Commitment is required to achieve an overall project rating of medium to be eligible for a CIG. To achieve at least a medium Financial Commitment rating, SORTA must demonstrate that it is in good financial condition based on audited statement and has a reasonable plan to commit local share funding and lay out the reasonableness of its financial plan.

### **Project Development**

SORTA facilitated achievement of this timetable by conducting this study prior to a request to enter the CIG program. Achievement will also be facilitated with a DCE determination, which allows environmental analysis per NEPA requirements to be completed in 2024.

Preliminary engineering completed during the NEPA process will form the basis of the final design. The results of this phase include final plans, specifications, a bid package for construction and vehicle procurement plan. The project's design and financial plan are expected to be refined during the engineering phase, resulting in a final project scope, schedule, budget, and 20-year capital and operating plan for its construction and ongoing operations and maintenance.



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