Facilitating Bicycle and Transit Travel in University Circle and Cleveland Heights

A combined report for:

University Circle-Cleveland Heights Bicycle Network Study and University Circle-Cleveland Heights Missing Links Study









November 2013

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Acknowledgments

The University Circle-Cleveland Heights Bicycle Network Study and the University Circle-Cleveland Heights Missing Links Study are the result of collaboration among the City of Cleveland Heights, University Circle Inc., Northeast Ohio Areawide Coordinating Agency (NOACA), the Working Group, the Steering Committee, and participants in the public planning process meetings. Funding and support for this project was provided by NOACA's Transportation for Livable Communities Initiative Planning Grant Program. We thank all those who worked with us to realize these projects.

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Little Italy Redevelopment Corporation; Ray Kristosik
Museum of Natural History & GCBL Institute; David Beach
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Ohio Department of Transportation District 12; John Motl
University Circle Inc.; Debbie Berry
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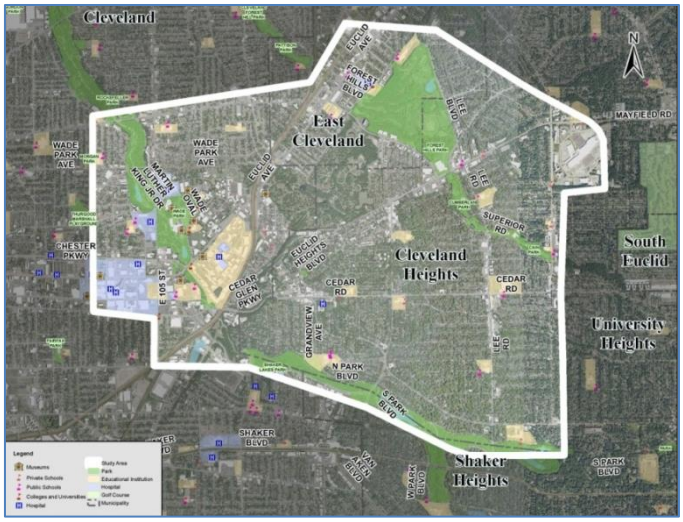
Veterans Administration Medical Center; David Bachman

Executive Summary

Project Overview

University Circle Inc. and the City of Cleveland Heights, as part of ongoing conversations about rapid employment growth and associated parking demands in University Circle, came to the realization that a study was needed to assess transportation needs and to encourage people who live in Cleveland Heights and work in University Circle to make the short trip by something other than single-occupant auto trips. This led to collaborative pursuit of the two TLCI planning grants. This ultimately resulted in the Northeast Ohio Areawide Coordinating Agency (NOACA) funding of two studies under the Transportation for Livable Communities Initiative (TLCI) program, both with the purpose of facilitating mode shift from automobile travel to alternate modes in the areas within and between University Circle and Cleveland Heights. The *University Circle-Cleveland Heights Bicycle Network Study* focuses on providing and improving bikeways while the *University Circle-Cleveland Heights Missing Links Study* looks at ways to enhance transit service in the University Circle-Cleveland Heights area. The Missing Links Study also examines two intersections for the express purpose of providing complete streets accommodations.



Study Area

The planning process was centered around a community engagement program that incorporated multiple levels of public involvement to obtain input to inform the plan development process. The Working Group was the core team ultimately responsible for plan development. The Steering Committee (key stakeholders) provided direction and guidance throughout the plan development process. The Transit Focus Group brought together transit service agencies and other key players to develop and assess potential transit service concepts. Finally, the studies incorporated a broad based level of outreach which sought to engage the general public. The general public provided ideas, input and feedback which were incorporated into the development of the plans. In addition, an interactive online survey allowed the project to reach beyond those who attended the project meetings to solicit input on many aspects of the planning concepts.

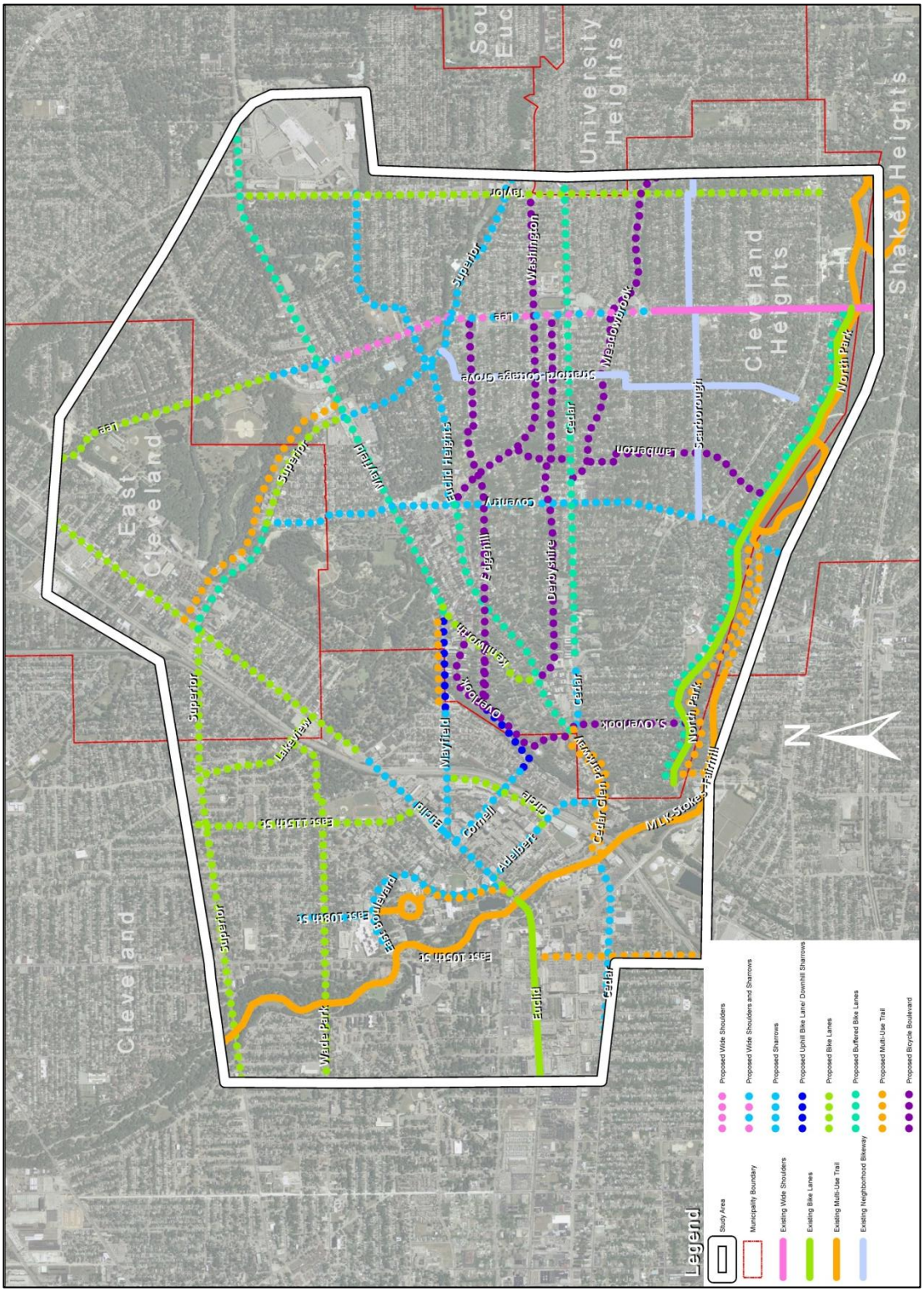
Bicycle Network Study Summary

The purpose of the University Circle-Cleveland Heights Bicycle Network Study is to develop a plan to facilitate bicycle travel within and between University Circle and Cleveland Heights to achieve the ultimate objectives of creating safer and more convenient routes for cyclists, thereby improving conditions for existing cyclists and enticing drivers out of their cars and for the relatively short trips within the study area that they are currently making by car. The study outlines a plan to incorporate bicycle facilities and treatments into the transportation network, connecting University Circle, Cleveland Heights and the adjacent communities with an effective bicycle network to facilitate bicycle travel.

The existing bicycle network in the study area provides a fairly limited number of bicycle facilities, creating a significant gap for bicycle travel in the study area. The Bicycle Network Study looked at the availability of bikeways in the study area, the existing quality and conditions of bicycle facilities, and bicycle-friendly streets. Subsequently, concepts for potential bicycle facilities and treatments were developed and evaluated. The plan recommendations are listed in the table below and illustrated in the following figure. The recommendations are driven by the traffic volume, road geometry, and topography as well as the need to create a comprehensive set of bicycle links between University Circle and Cleveland Heights.

BIKEWAY RECOMMENDATIONS	
BIKEWAY CORRIDOR	**FACILITY TYPE**
Superior (West of Euclid)	Bike Lanes
Superior (Euclid to Coventry)	Buffered Bike Lanes, Multi-Use Trail
Superior (Coventry to Mayfield)	Bike Lanes, Multi-Use Trail
Superior (Mayfield to Washington)	Sharrows
Euclid (West of MLK-Chester)	Existing Bike Lanes
Euclid (MLK to Adelbert)	Bike Lanes, Wayfinding
Euclid (Adelbert to E.123rd)	Sharrows
Euclid (E.123rd through East Cleveland)	Bike Lanes
Mayfield (Euclid to E.126th)	Sharrows
Mayfield (E.126th to Kenilworth)	Uphill Bike Lane/ Downhill Sharrows, Multi-Use Trail
Mayfield (Northeast of Kenilworth)	Buffered Bike Lanes
Circle - Adelbert - Cornell	Bike Lanes on Circle Sharrows on Cornell and Adelbert Sharrows on Adelbert Bridge
Wade Oval	Existing Multi-Use Trail
East Boulevard	Multi-Use Trail, Sharrows, Signage
E.105th Street	Multi-Use Trail
E.108th Street	Sharrows
E.115th Street	Bike Lanes
Lakeview	Bike Lanes, Signage
Wade Park	Bike Lanes
MLK-Stokes-Fairhill	Multi-Use Trail (*Cleveland Hts and Shaker Hts connections)*
Cedar Avenue (MLK-Fairhill To E.89th)	Sharrows, Signage
Cedar Glen Parkway (MLK to Euclid Hts)	Multi-Use Trails
Cedar (Euclid Heights to Fairmount)	Sharrows
Cedar (Fairmount to Taylor)	Buffered Bike Lanes
North Park (MLK to Coventry)	Buffered Bike Lanes, Multi-Use Trail
North Park (Coventry to Lee)	Buffered Bike Lanes, Existing Multi-Use Trail
Grandview-Bellfield-Delaware-S.Overlook	Bicycle Boulevard (Overlook)

BIKEWAY RECOMMENDATIONS	
BIKEWAY CORRIDOR	**FACILITY TYPE**
Euclid Heights (Cedar to Coventry)	Buffered Bike Lanes
Euclid Heights (Coventry to Taylor)	Sharrows
Coventry	Sharrows
Lee (North of Monticello)	Bike Lanes
Lee (Monticello to Whitehorn)	Sharrows
Lee (Whitehorn to Superior)	Wide Shoulders
Lee (Superior to Dellwood)	Wide Shoulders, Sharrows
Lee (Dellwood to North Park)	Existing Wide Shoulders
Taylor	Bike Lanes
Scarborough	Existing Neighborhood Bikeway
Stratford-Cottage Grove	Existing Neighborhood Bikeway
Meadowbrook	Bicycle Boulevard
Stillman-Derbyshire-Lamberton-Washington-Edgehill	Bicycle Boulevard
Kenilworth (Mayfield to Euclid Heights)	Bike Lanes
Edgehill (Murray Hill to Overlook)	Uphill Bike Lane/ Downhill Sharrows
Edgehill (Overlook to Kenilworth)	Bicycle Boulevard
Overlook (Kenilworth to Edgehill)	Bicycle Boulevard
Overlook (Edgehill to Cedar)	Bicycle Boulevard



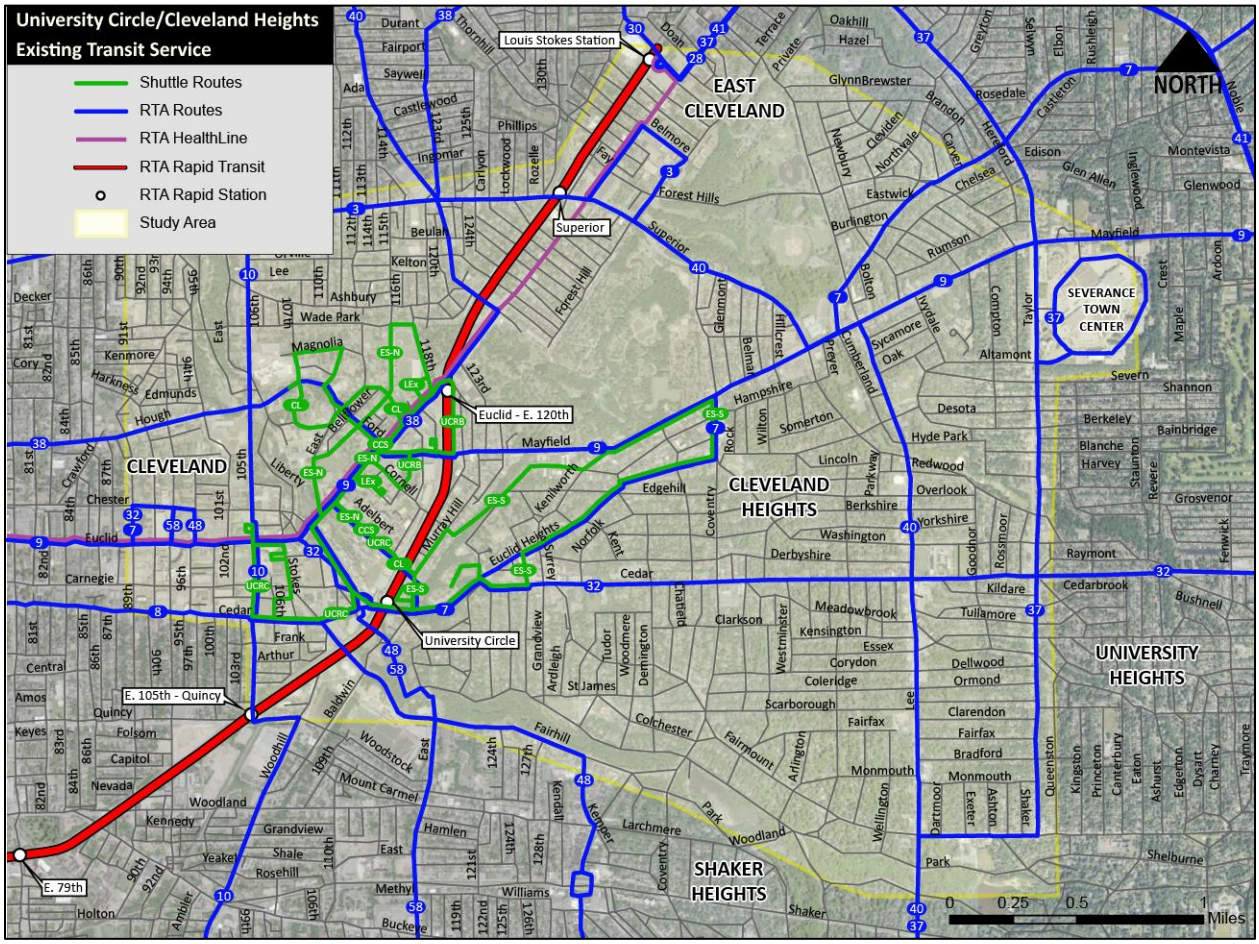
Bikeway Recommendations

Missing Links Study Summary

Transit Service

The purpose of the Missing Links Transportation Study is to enhance transit services and facilities to support mode shift away from auto travel between Cleveland Heights and the greater University Circle area. The study also examines two key intersections located along corridors that connect Cleveland Heights and University Circle for complete streets accommodations. These complete streets accommodations have the added intent of improving alternate mode travel.

An inventory of existing transit services and amenities was completed and documented; it includes services provided by RTA and the various campus shuttle services provided by University Circle institutions, as illustrated below.

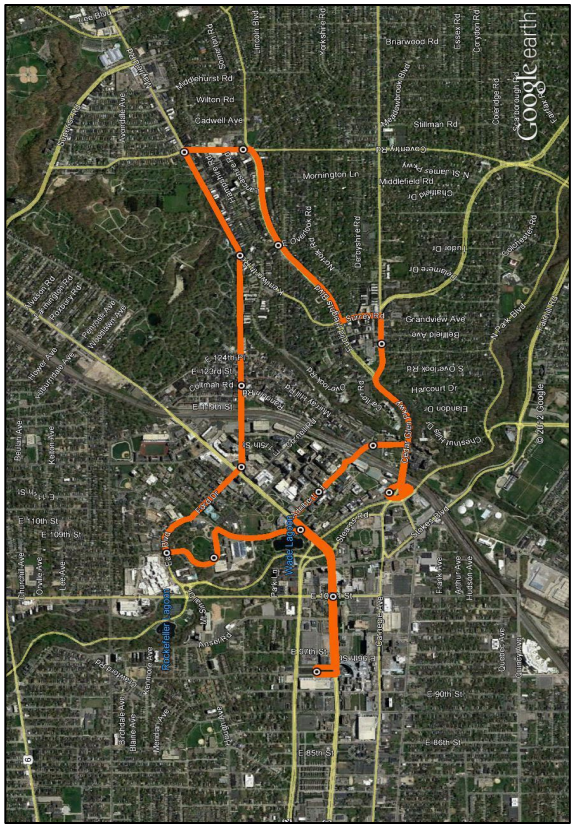


Existing Transit Service (August 2013)

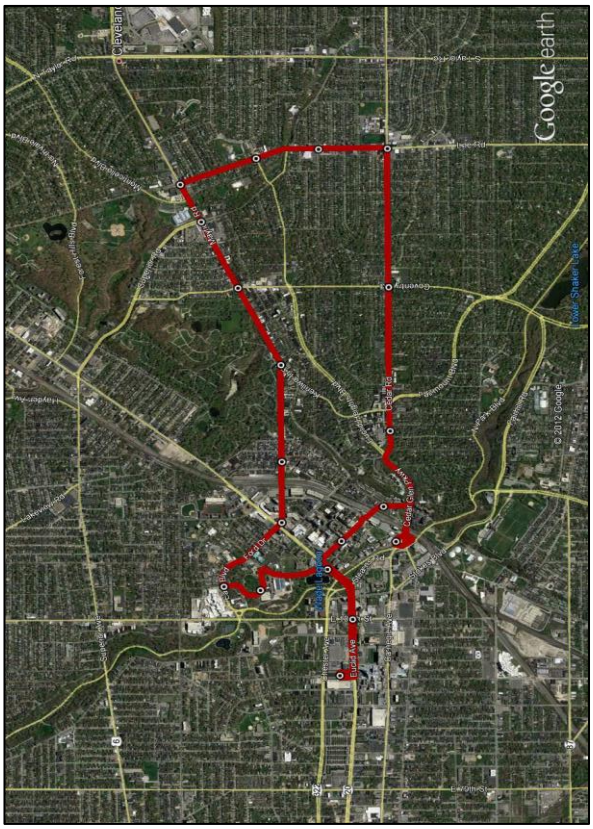
The Transit Focus Group met to develop and assess a variety of potential changes and enhancements to transit service in the study area. Additionally, the project team met one-on-one with transit service providers to obtain more detailed information on the transit services and potential opportunities to modify, combine, and otherwise enhance transit in the study area. Information obtained from the public outreach activities was also incorporated into the transit service planning process.

Based on the analysis of the existing transit services in the corridor and input from the Transit Working Group, stakeholders, and members of the public, a strategy that includes a new, branded shuttle bus service connecting Cleveland Heights and University Circle, and providing circulation within each location, together with a package of bus stop and web-based improvements, was proposed for implementation. Four potential shuttle bus route alignments were proposed, all with the characteristics shown in the table below.

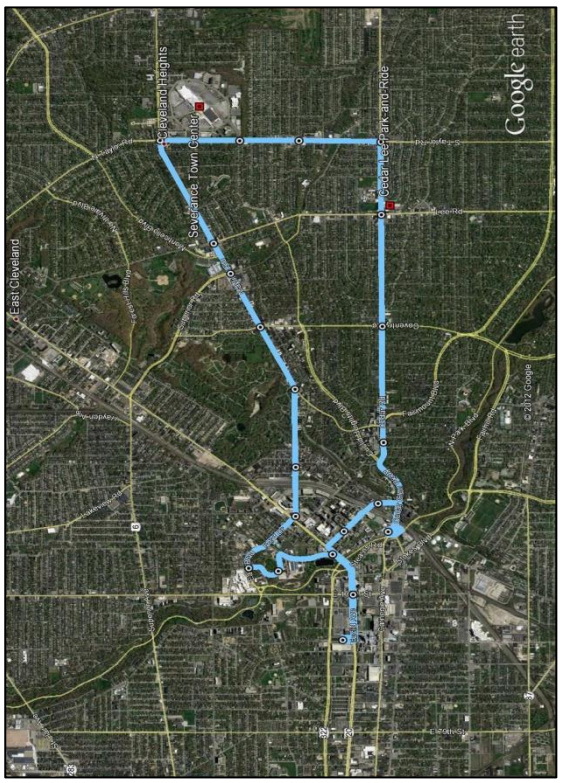
Shuttle Bus Service Characteristics			
Convenience	**Frequency**	**Speed**	**Amenities**
▪ Operates 18 hours/day (21 hours on Friday and Saturday) ▪ Operates daily	▪ 15 minute headways during peak times ▪ 30 minute headways during all other times	▪ Fewer stops improves travel speed	▪ Fewer stops allows for more improvements at stops ▪ Distinctive branding of buses/stops ▪ Real-time information ▪ Shelters, schedules and maps provided



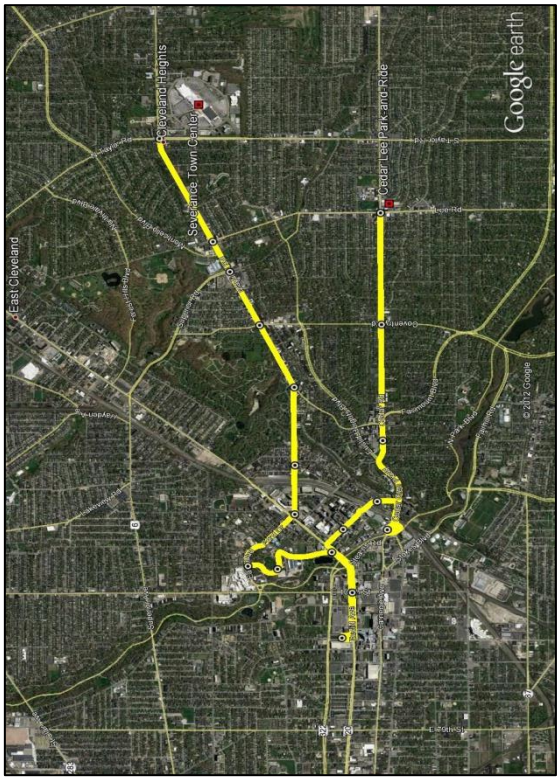
Bus Route Option 1



Bus Route Option 2



Bus Route Option 3



Bus Route Option 4

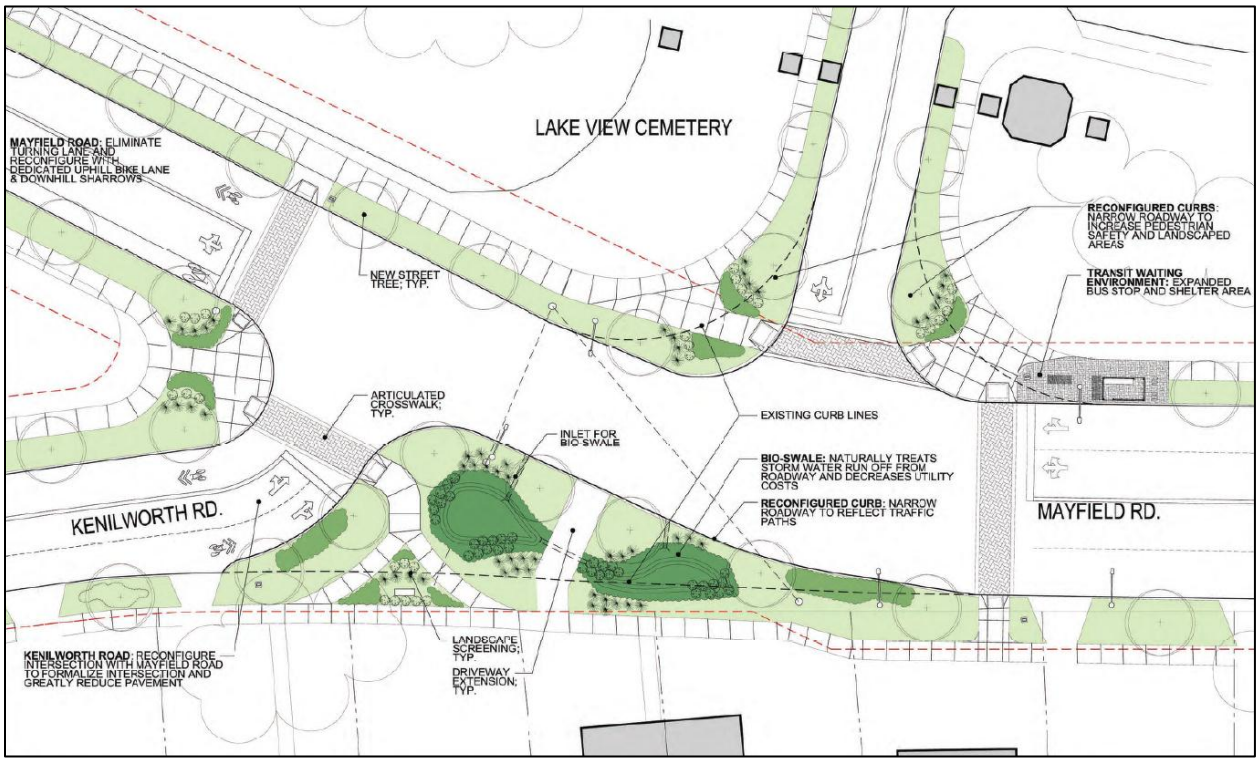
The four options were evaluated by members of the Transit Working Group, area stakeholders and members of the public, considering the potential trade-offs between the cost of operation and the potential benefits of serving various combinations of locations. Further analysis will be required to make a final determination on the option to be pursued; however, Option 2 appeared to have the optimal combination of benefits, with its ability to connect to important destinations in the corridor, its low operating cost, and the number of required buses due its relatively short alignment.

Complete Streets

The fundamental purpose of the two Circle-Heights studies is to facilitate alternate mode travel within and between Cleveland Heights and University Circle, with the ultimate goal of getting travelers out of their cars and onto their bicycles or using transit. Examination of the study area with this purpose in mind led to a concentrated focus at two intersection locations that present barriers to that purpose: the Edgehill Road/Overlook Road intersection and the Mayfield Road/Kenilworth Road intersection. These two intersections are located on two of the primary commuter routes between Cleveland Heights and University Circle and both are currently configured in a very auto-dominant manner.

These intersections were analyzed to determine potential modifications and enhancements to facilitate alternate mode travel. Traffic analysis was completed and intersection geometrics were evaluated. The two drawings on the next page illustrate the recommended improvements for these two intersections.

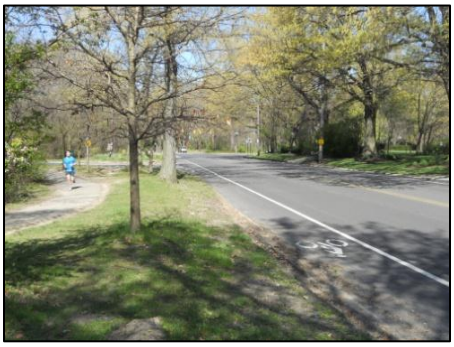
Proposed Reconfiguration of Edgehill/Overlook Intersection

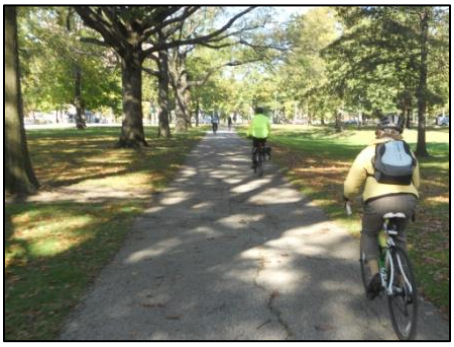


Preferred Reconfiguration of Mayfield/Kenilworth Intersection

1 Introduction

1.1 Background





University Circle Inc. and the City of Cleveland Heights, as part of ongoing conversations about rapid employment growth and associated parking demands in University Circle, came to the realization that a study was needed to assess transportation needs and to encourage people who live in Cleveland Heights and work in University Circle to make the short trip by something other than single-occupant auto trips. This led to collaborative pursuit of the two TLCI planning grants. This ultimately resulted in the Northeast Ohio Areawide Coordinating Agency (NOACA) funding of two studies under the Transportation for Livable Communities Initiative (TLCI) program, both with the purpose of facilitating mode shift from automobile travel to alternate modes in the areas within and between University Circle and Cleveland Heights. The *University Circle-Cleveland Heights Bicycle Network Study* focuses on providing and improving bikeways while the *University Circle-Cleveland Heights Missing Links Study* looks at ways to enhance transit service in the University Circle-Cleveland Heights area. The Missing Links Study also examines two intersections for the express purpose of providing complete streets accommodations.

The motivation behind these studies is driven by economic and environmental considerations and by physical constraints and existing service limitations. The University Circle neighborhood of Cleveland has seen tremendous growth over the past several years, reinforcing its role as a key employment center in the region. The residential population of Greater University Circle is also poised for growth, particularly within the "comfortable distance" of a bicycle commute of five miles. The historic layout of streets and compact built environment are ideally organized for alternative modes of transportation – transit, walking, and bicycling – but the facilities for these modes are deficient. These two studies, taken together, aim to capitalize on the historic fabric, existing links, and growing population base to decrease car use, increase transit use, and increase overall non-motorized connectivity in the Cleveland Heights and University Circle areas.

While these are two separately funded studies with slightly different focuses, they have common underlying purposes as well as their coincident study areas. The Circle-Heights Bicycle Network study focuses on enhancements to infrastructure to make bicycle travel easier. The Missing Links study developed options for enhanced bus transit service through the creation of an area-wide service. It is based on the combined resources of the agencies that currently provide transit service in the study area, as identified through work with the Transit Focus Group and input from community surveys.

Both studies look at improving transportation options for the communities that address community needs, focusing on short distance trips within and between Cleveland Heights and University Circle.

Public outreach and engagement efforts for the studies targeted the same populations. The combined program streamlined the process and efficiently engaged the steering committee, stakeholders and the public. The studies share a number of important project objectives, as listed below, which motivated the combined planning process.

Facilitating alternate mode travel within and between Cleveland Heights and University Circle.

Encouraging mode shift away from auto travel by improving alternate mode connections between Cleveland Heights and University Circle.

Supporting Cleveland Heights as a residential location for University Circle workers.

Supporting ongoing development of Cleveland Heights and University Circle by reducing parking demand and improving overall accessibility.

Although the plans were developed together, the two studies maintain their individual purposes, goals and objectives, as described in the following sections.

Cleveland Clinic Shuttle Buses


Case Western University Shuttle

RTA Bus Service

RTA HealthLine


Existing on street parking

Circle Link Shuttle Bus

1.2 Bicycle Network Study Overview

The purpose of the *University Circle-Cleveland Heights Bicycle Network Study* is to develop a plan to facilitate bicycle travel within and between University Circle and Cleveland Heights to achieve the ultimate objectives of creating safer and more convenient routes for cyclists, thereby improving conditions for existing cyclists and enticing drivers to bike for the relatively short trips within the study area that they are currently making by car. The study outlines a plan to incorporate bicycle facilities and treatments into the transportation network, connecting University Circle, Cleveland Heights and the adjacent communities with an effective bicycle network to facilitate bicycle travel. The plan incorporates the following goals:

Integrate and connect desired destinations with safe and convenient bicycle facilities to accommodate both transportation and recreation bicycle uses.

Establish an interconnected bikeway network that serves a diverse population of bicyclists with varying skill levels on a variety of roadways and rights-of-way.

Incorporate community desires as reflected in feedback from the public outreach program.

Establish bikeway connections to other alternate mode travel methods, specifically transit and pedestrian services and amenities.

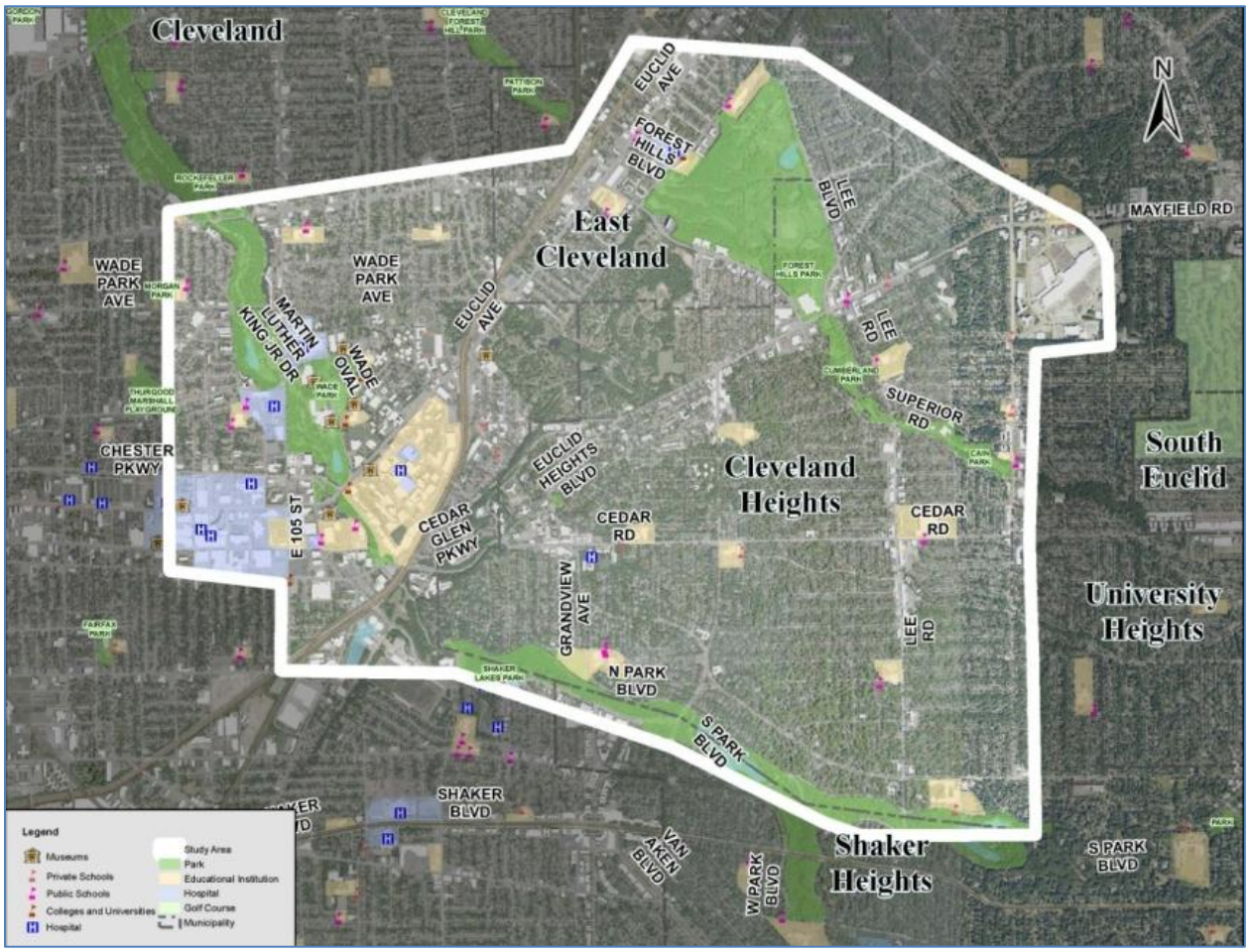
Establish connections with existing and planned recreational trails, such as Shaker Lakes, Forest Hills Park, Cain Park, Wade Park, Rockefeller Park, Lake Erie, and cultural and visitor destinations.

Minimize bicycle-vehicle conflicts and bicycle-pedestrian conflicts by separating travel mode facilities, where possible.

Incorporate local and regional alternate mode links, including existing and planned connections as identified in: NOACA's Bicycle Facility Priority Plan, City bikeway plans for Cleveland, Cleveland Heights, East Cleveland, and Shaker Heights, and Cleveland Heights Missing Links Study and Cedar-Fairmount Transportation Plan.

Enhance community identity as a bicycle-friendly area.

Enhance accessibility for low-income neighborhoods.



Study Area for Circle-Heights Bikeway and Missing Links Transportation Studies

1.3 Missing Links Transportation Study Overview

The purpose of the Missing Links Transportation Study is to enhance transit services and facilities to support mode shift away from auto travel between Cleveland Heights and the greater University Circle area. The study also examines two key intersections located along corridors that connect Cleveland Heights and University Circle for complete streets accommodations. These complete streets accommodations have the added intent of improving alternate mode travel. The following goals were established for the study:

Identify opportunities for mode shift to transit, with a focus on University Circle and Cleveland Heights employees, students and residents.

Provide transit service that effectively covers the study area and conveniently accommodates travelers with a system that is easily understandable and with minimal transfers.

Incorporate community and stakeholder desires as reflected in feedback from the public outreach program.

Incorporate complete streets enhancements at the Mayfield/Kenilworth and Edgehill/Overlook intersections.

2 Plan Development Process and Community Engagement

2.1 Plan Development Process

The concurrent development of these studies began with the forming the Working Group, defining and differentiating the purposes of each study, and setting goals (see Sections 1.2 and 1.3). Next, the Working Group identified and documented existing conditions of bicycle and transit facilities. In conjunction with the Steering Committee, they then developed conceptual alternatives for both bikeway corridor improvements and concepts for transit route enhancements and potential new service plans.

The project team solicited feedback on the plan concepts and alternatives from the public at a series of public meetings, through the use of an interactive online survey, and at informal open house style outreach at key stakeholder facilities. This combination of engagement techniques aimed to gather information from the broader public and ensured effective outreach and public input. The conceptual alternatives were then assessed and refined based on the study goals and objectives and the feedback. Recommendations were presented to the public at a second round of public meetings and public feedback was incorporated into the final recommendations.

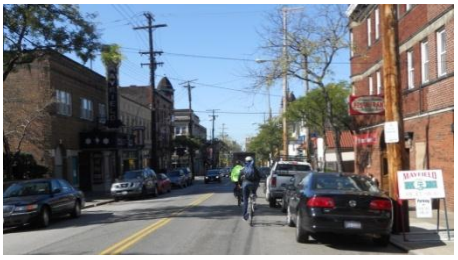
2.2 Community Engagement Program

The studies were developed from a foundation based on four levels of community engagement. This program was designed to facilitate concept development and to ease incorporation of ideas, feedback, and plan refinement.

The **Working Group** was the core team ultimately responsible for plan development. This includes understanding existing conditions, preparing and evaluation alternatives, developing recommendations, and providing information and engaging the Steering Committee at key intervals throughout the planning process. The Working Group was comprised of representatives from University Circle Inc., City of Cleveland Heights, GCRTA, City of Cleveland (Traffic Engineering and Planning divisions), Heights Bicycle Coalition, NOACA, and the consultant team.

The **Steering Committee** provided direction and guidance throughout the plan development process. They met three times during the planning process. They also helped with

Study Area Field View by Bicycle



Mayfield Road in Little Italy

Euclid Heights Boulevard

Euclid Avenue at Adelbert Road

Euclid Avenue at East Boulevard

community engagement and public outreach by spread the word about the projects, the survey, and the public meetings. The Steering Committee consisted of key stakeholders from a variety of public, private, and not-for-profit entities, including:

Bike Cleveland
Case Western Reserve University
City of Cleveland, Planning
City of Cleveland, Traffic Engineering
City of Cleveland Heights, Planning
City of East Cleveland
City of Shaker Heights, Planning
Cleveland Clinic
Cleveland Museum of Natural History and Green City Blue Lake Institute
Cuyahoga County Planning Commission
GCRTA
Heights Bicycle Coalition
Little Italy Redevelopment Corporation
NOACA
Ohio Department of Transportation, District 12
University Circle Inc.
University Hospitals
VA Medical Center

The third tier of community engagement focused solely on the transit component of the studies: The **Transit Focus Group** brought together the agencies that provide transit services in the study area and other key players to facilitate understanding of the existing transit services, to develop potential concepts to enhance (and potentially combine) transit services, and to assess the feasibility of the potential concepts. The following organizations and entities participated in the Transit Focus Group:

Case Western Reserve University, Campus Services
Case Western Reserve University, Planning
Case Western Reserve University, Sustainability
City of Cleveland, Traffic Engineering
City of Cleveland, Planning
City of Cleveland Heights, Planning
City of East Cleveland, Economic Development
City of Shaker Heights, Planning
Cleveland Clinic
Cleveland Museum of Natural History and Green City Blue Lake Institute
Cuyahoga County Planning Commission
GCRTA
Little Italy Redevelopment Corporation
NOACA
Standard Parking
University Circle Inc.
University Hospitals
VA Medical Center

Finally, the studies incorporated a broad level of outreach which sought to engage the general public. The **general public** provided ideas, input and feedback which were incorporated into the development of the plans. Due to the size and characteristics of the study area, duplicate public meetings were held in the University Circle area and in Cleveland Heights. Members of both communities were invited to participate in the public meetings. Additionally, an innovative online survey tool obtained input and feedback from members of the public through a series of interactive exercises that garnered quantitative, qualitative and spatial responses to questions about both the bicycle and transit networks in the study area. This survey was available online and accessible through UCI and Cleveland Heights' websites and it was also distributed via email to the Steering Committee organizations, so input was gathered from a wide range of interested citizens beyond those who were able to attend the public meetings.

2.3 Meetings

Meetings were held at each level of engagement from July 2011 through November 2012. Minutes for all meetings are provided in Appendix A: Public Engagement.

Meeting	Date
Circle-Heights Bikeway Plan Working Group Kick-Off Meeting	July 26, 2011
Circle-Heights Bikeway Plan Kick-Off Meeting	September 19, 2011
Missing Link Study Kick-Off Meeting	September 19, 2011
Steering Committee Meeting 1	February 21, 2012
Bikeway Alternatives Development	March 13, 2012
Steering Committee Meeting 2	March 30, 2012
Public Meeting 1	April 17-18, 2012*
Transit Focus Group Meeting 1	May 21, 2012
Steering Committee Meeting 3	September 9, 2012
Transit Focus Group Meeting 2	November 7, 2012
Public Meeting 2	November 29, 2012

** Identical meetings held over two days, one in Cleveland Heights and one in University Circle.*

Cleveland Heights Public Meeting #1

Cleveland Heights Public Meeting #1

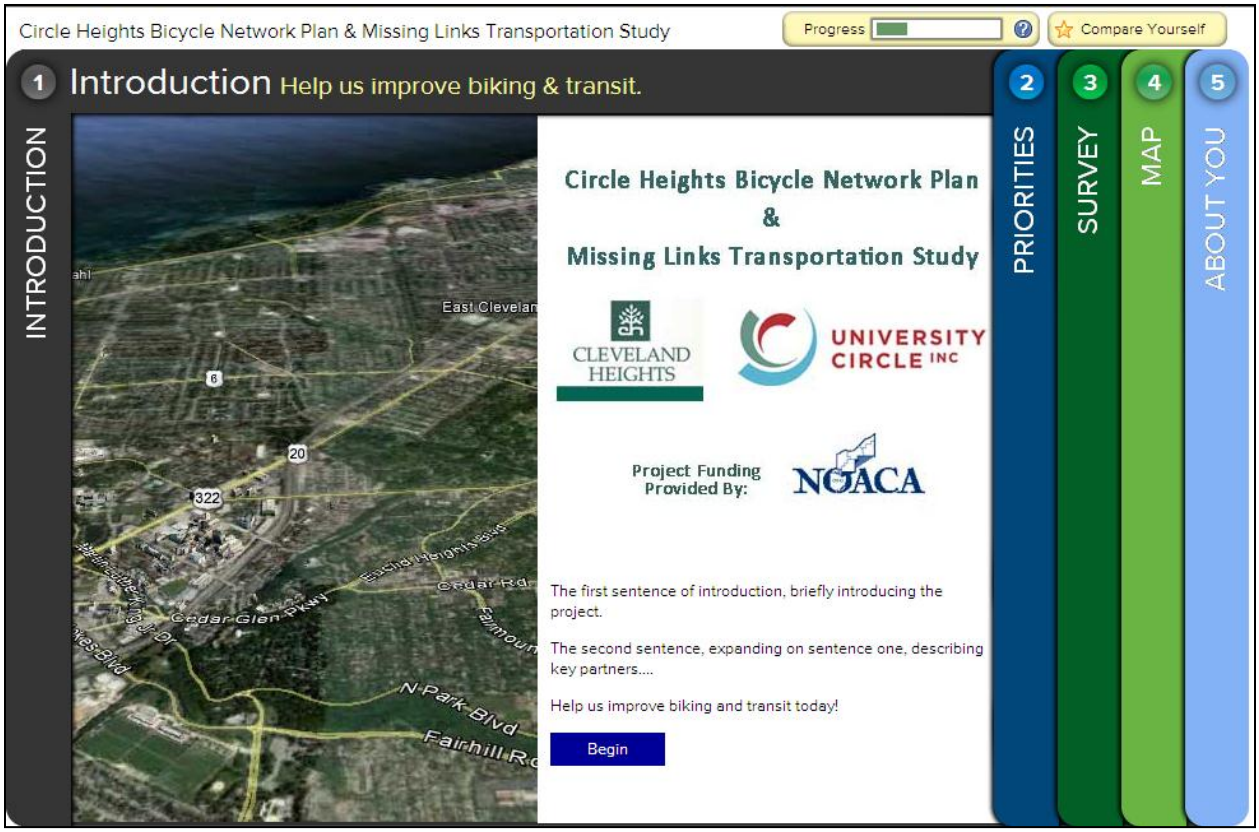
University Circle Public Meeting #1

University Circle Public Meeting #1

Informal drop-in events were held in public locations within the study area to gather feedback while the online survey was live, as a supplement to the public meetings. These events were held at CWRU/University Hospitals and at Cleveland Clinic on May 14 and 15, 2012, respectively. Additionally, transit focused one-on-one meetings were held with Cleveland Clinic, University Hospitals, CWRU, VA Medical Center, Standard Parking (transit service provider) and GCRTA to gain information on transit needs and transit service(s).

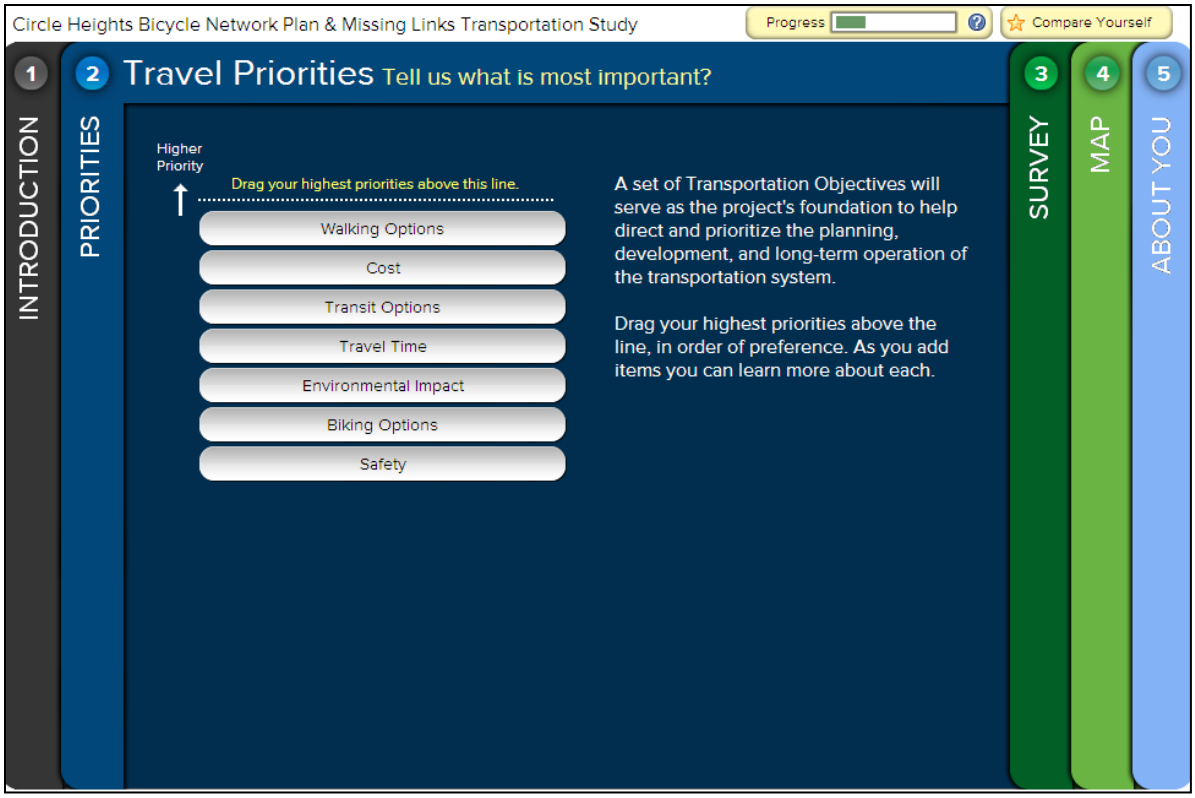
2.4 Survey

The University Circle-Cleveland Heights Bicycle Network Study and the Missing Links Transportation Study leveraged interactive online tools to gather information about transit usage, prioritization of bicycle and transit accommodations, and related relevant considerations. The survey specifically asked respondents to set travel priorities, to answer questions on bicycling in the study area, to map origins and destinations, and provide basic demographic information.

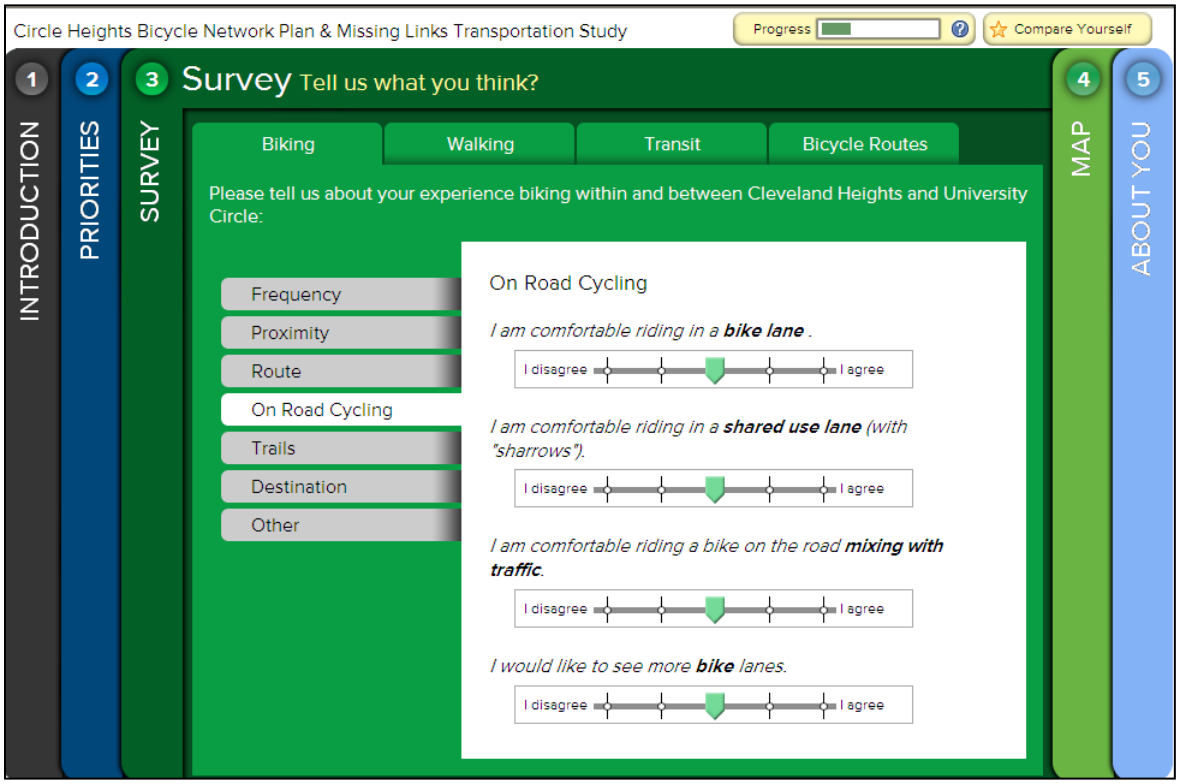


Online Survey Launch Page

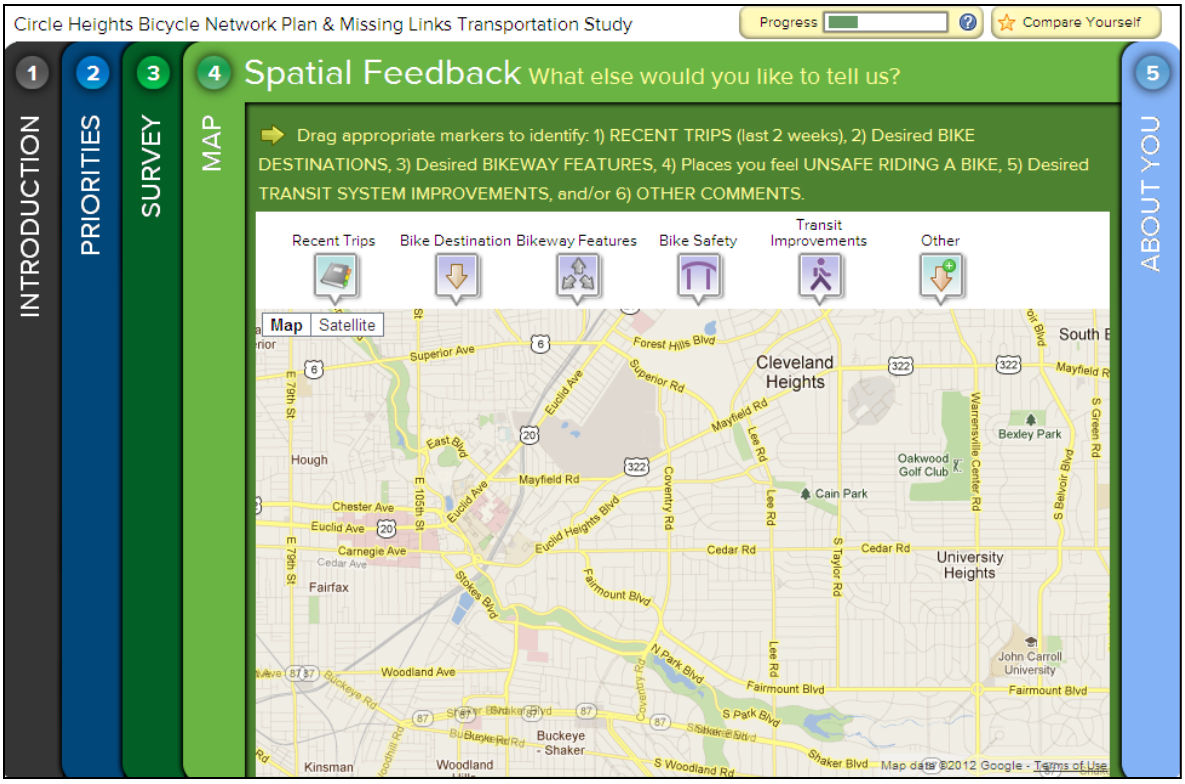
The images shown on the following pages provide examples of the survey questions. The survey questions in their entirety are provided in Appendix A.



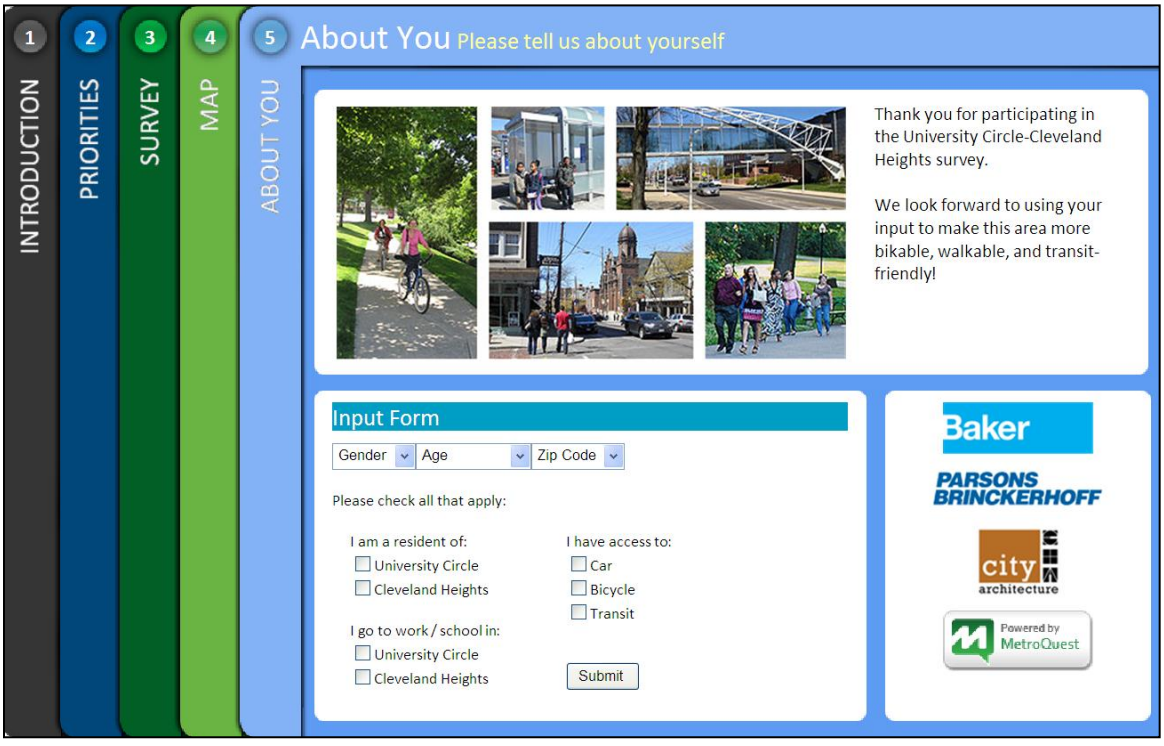
Survey: Ranking Travel Priorities



Survey: Biking, Walking and Transit Experiences



Survey: Providing Spatial Feedback via the Map Interface

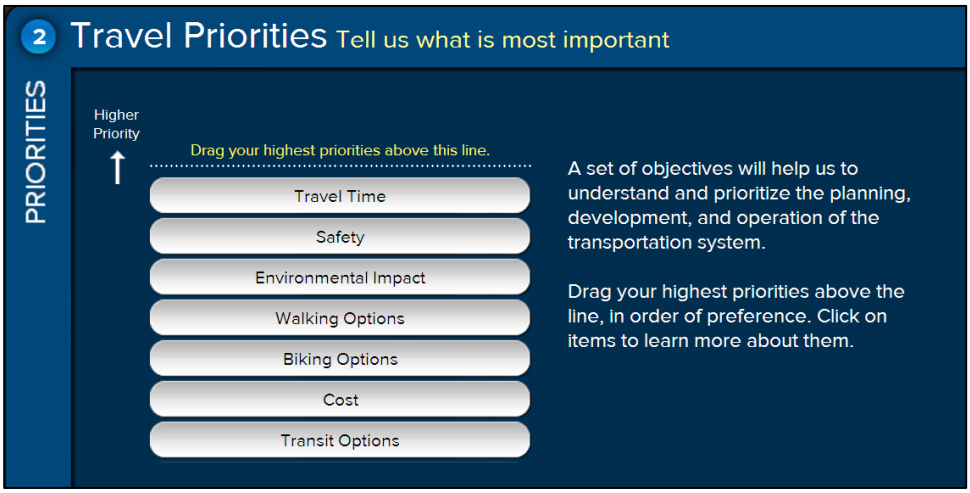


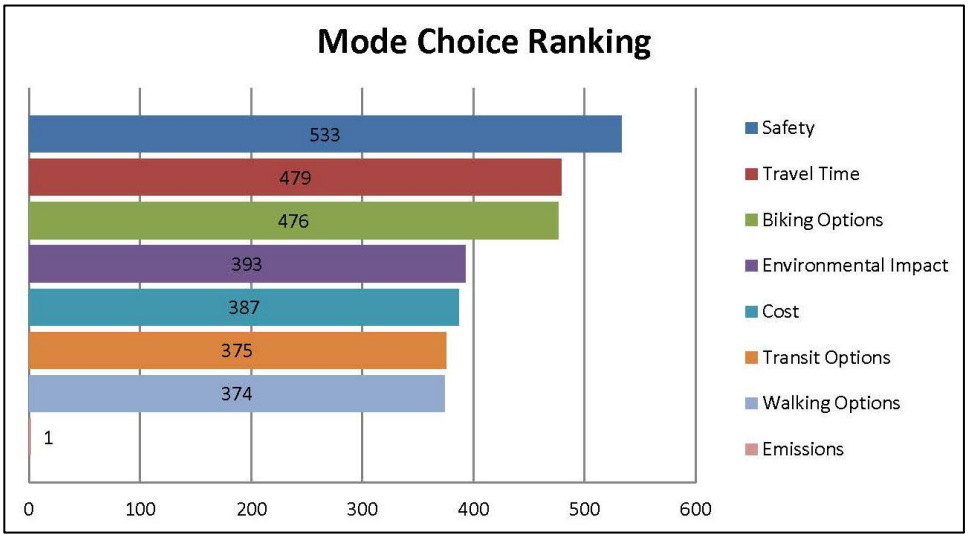
Survey: Providing Census Information

Survey Results

Over 730 people participated in the online survey. The ages of survey participants ranged from under 20 to 65 and over, with a fairly even distribution of participation across all age groups. The survey results indicated that while half of all participants lived close enough to work/school to commute via bicycle, more than half of all participants do not regularly bicycle to work/school. Similarly, individuals indicated they were within comfortable bicycling distance of entertainment, recreation, shopping, dining, and other destinations but most stated they did not feel safe bicycling to their destinations. The results substantiate the identified study goals validating the belief that the opportunity to increase non-vehicular travel is present, but will only be met by overcoming existing obstacles.

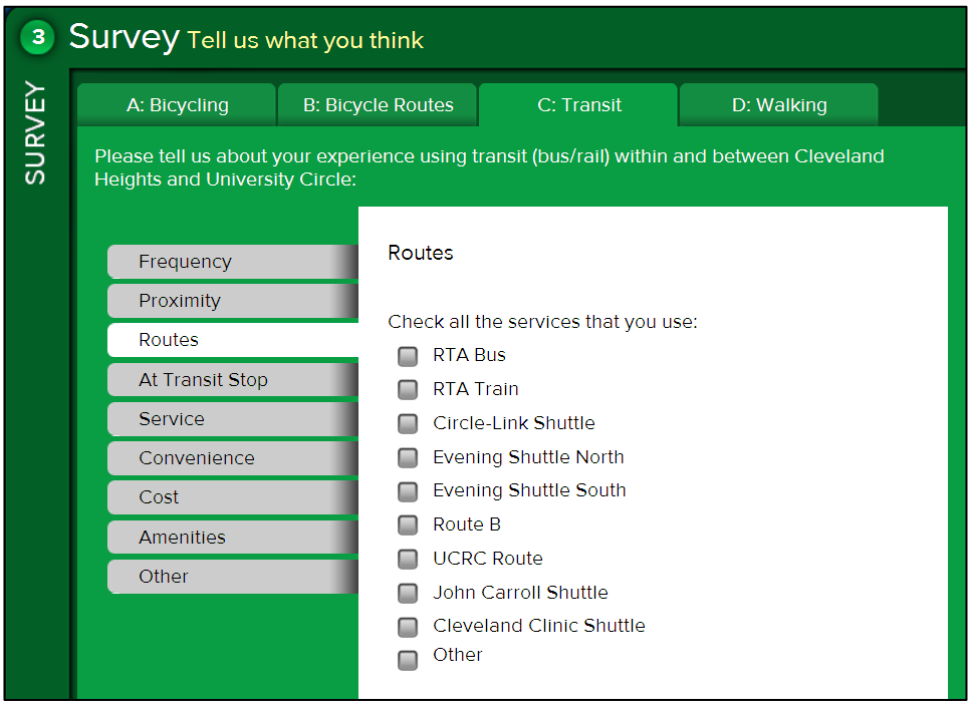
When looking at the prioritization portion of the online survey, participants ranked safety as their most important consideration when selecting a travel mode, followed closely by travel time and availability of convenient bike route options.

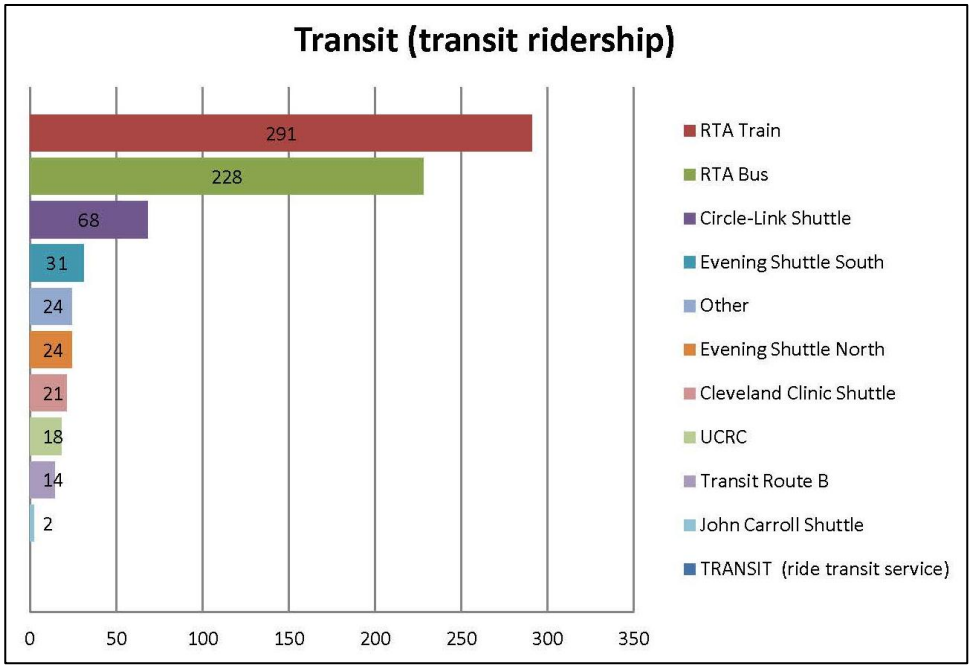




Survey: Prioritized Ranking of Considerations for Selection of Travel Mode

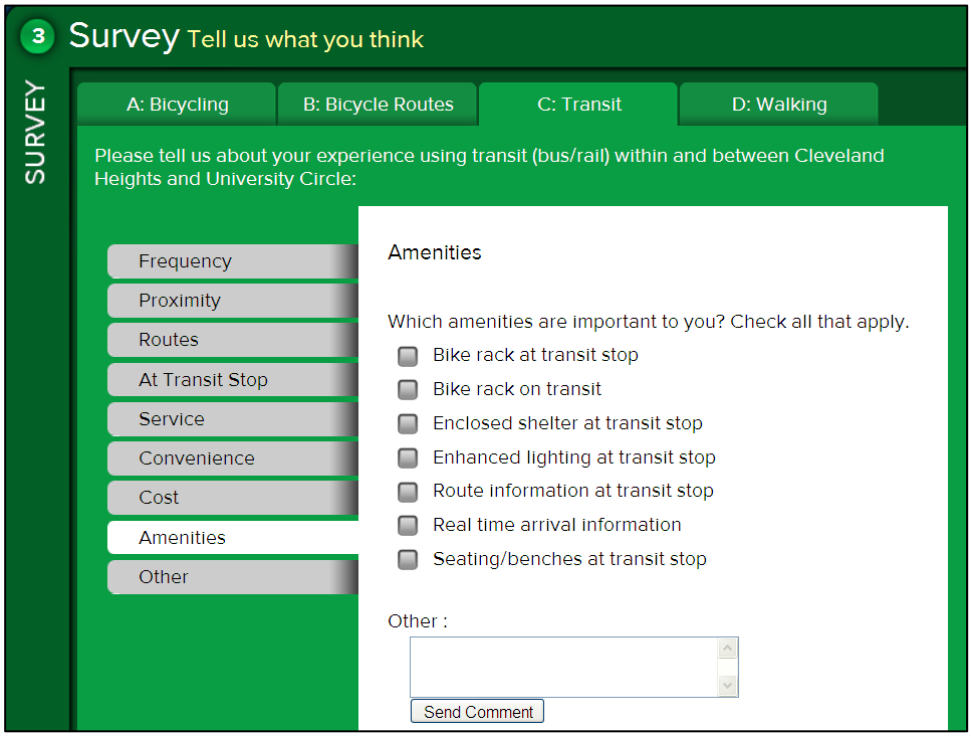
When asked about most used transit options, respondents identified RTA trains and RTA buses as the most heavily utilized. Use of specialized or employer-specific transit options ranked lower.

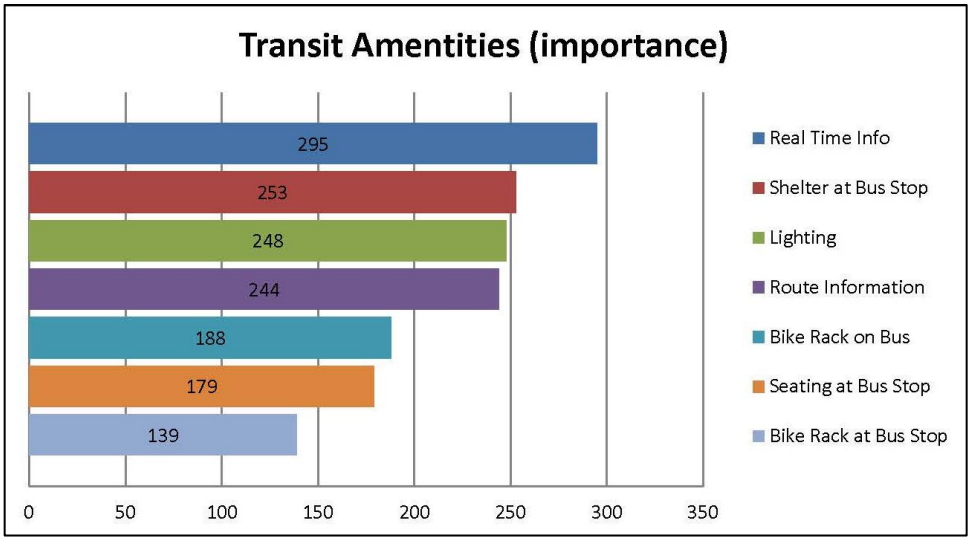




Survey: Transit Service Use

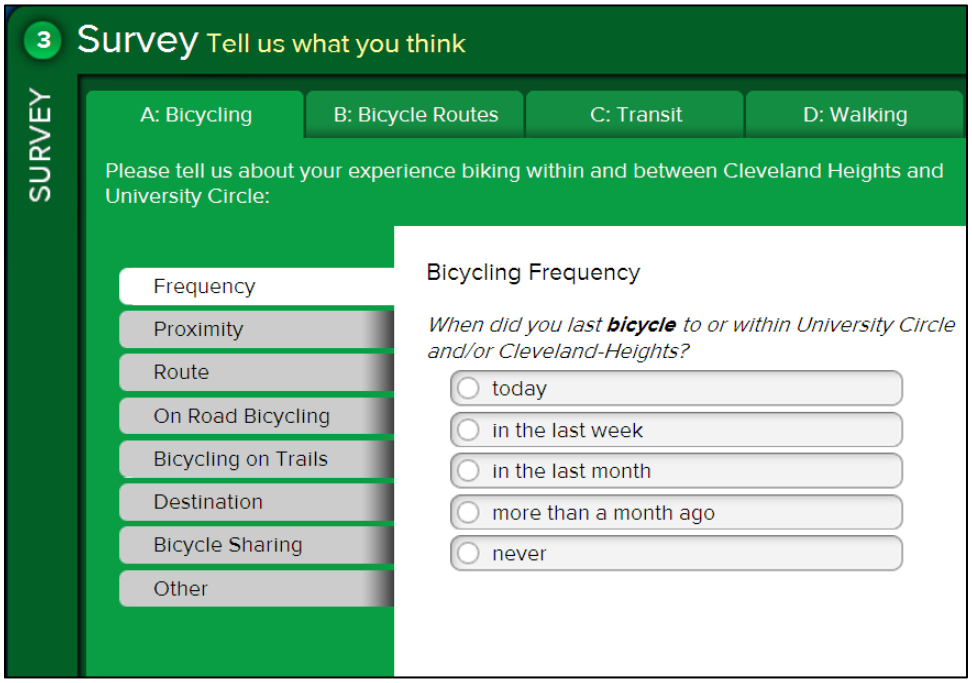
In looking at transit amenities, the most preferred amenity was real-time travel information, followed by shelters, lighting, and adequate route information. This indicates that riders seek transit amenities that enable them to make informed decisions on transit use and to make their experience at the transit waiting area feel safer and/or more comfortable.



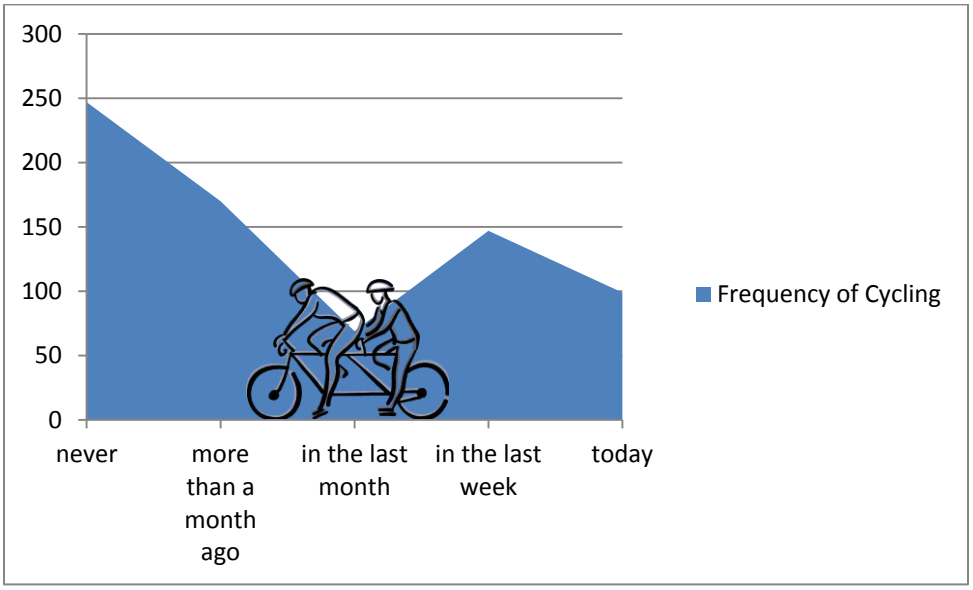


Survey: Prioritization of Transit Amenities

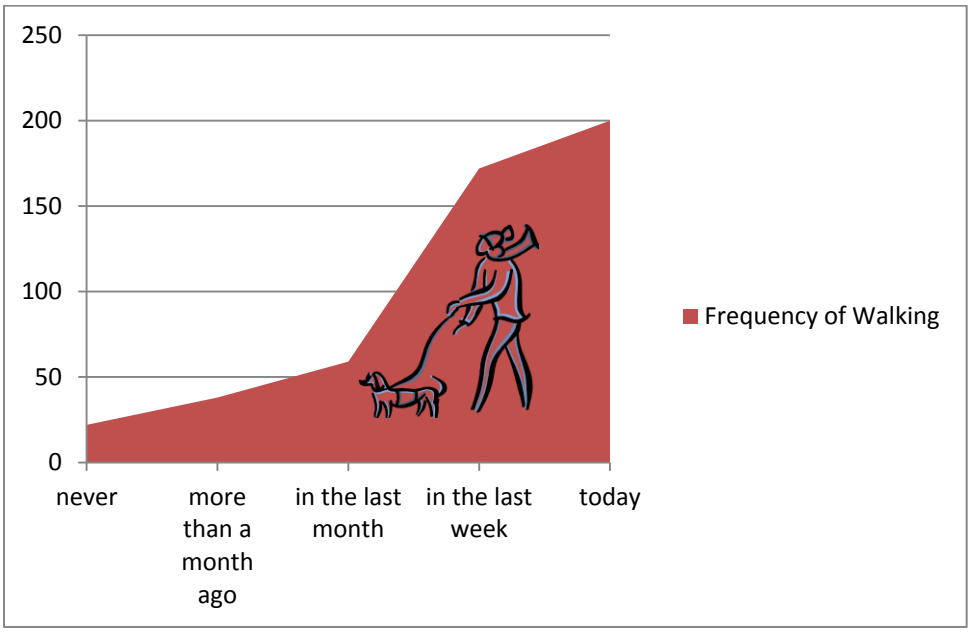
Survey participants had the opportunity to provide information on their frequency of travel using various transportation modes. Respondents' cycling, walking and transit use frequencies are shown in the graphs below. The survey results indicate that the frequency of cycling is comparatively lower than both walking and transit use. The greatest number of respondents (247 of 732) reported never having bicycled for transportation purposes. Walking was the most commonly used alternate travel mode, with the vast majority of respondents reporting that they had walked within the past week or today (372 of 491). Respondents indicated that their transit use was fairly infrequent (192 of 282 reported use more than a month ago or never), with most people (131 of 282) stating the last time they used transit was more than a month ago.



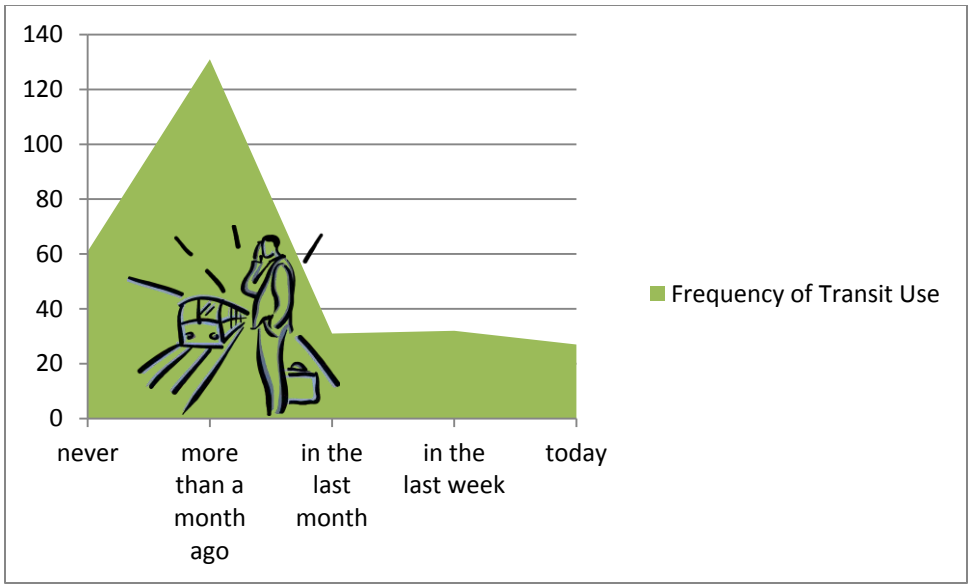
Survey: Example Query of Travel Frequency by Mode



Survey: Frequency of Bicycling as a Travel Mode



Survey: Frequency of Walking as a Travel Mode



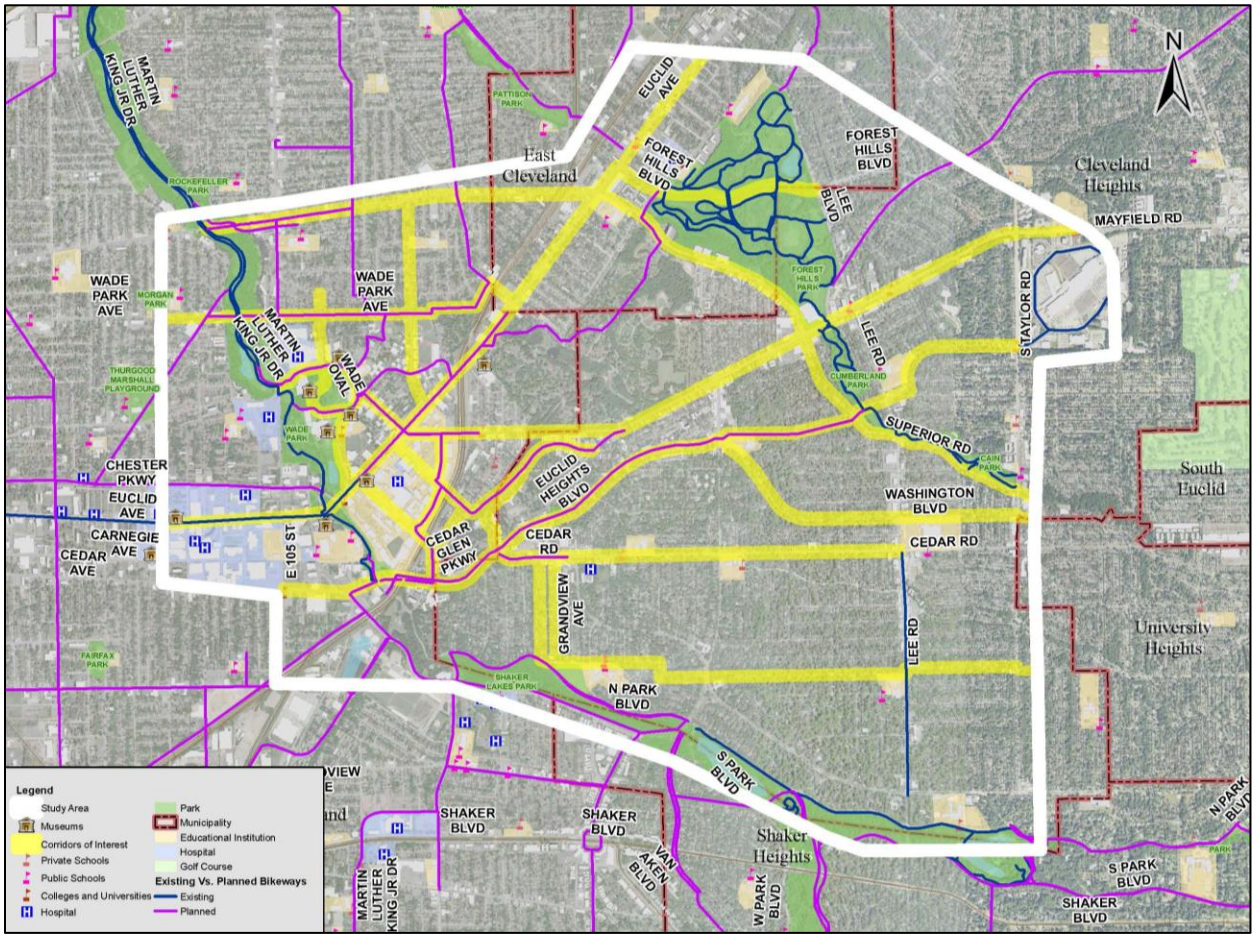
Survey: Frequency of Transit as a Travel Mode

3 Bicycle Network Study

As discussed in Section 1.2, the University Circle-Cleveland Heights Bicycle Network Study intended to lay the foundation for comprehensive, convenient, and efficient bicycle network improvements that will better connect University Circle, Cleveland Heights and adjacent communities.

3.1 Existing Conditions

The existing bicycle network in the study area, shown in the figure below, illustrates the fairly limited bicycle facility network (in blue). Euclid Avenue is a popular bikeway, having seen strong growth in bicycling activity since construction of the HealthLine corridor bike lanes. However, this on-street connection ends in University Circle. From that point, bikeways into the inner ring suburbs are largely limited to disconnected trails and isolated stretches of bicycle-friendly roadways. In Cleveland Heights, Shaker Heights, and adjacent Cleveland neighborhoods to the southeast, existing trails run through Forest Hill Park, along MLK Boulevard and Fairhill, and around the Shaker Lakes. Bicycle lanes exist on the ring road at Severance Town Center and along North Park Boulevard, and bicycle routes are identified on Monticello Boulevard, Belvoir Road, Lee Road, and Euclid Heights Boulevard. The corridors identified in yellow were the initial targets for bikeway corridors, identified at the start of the study process. Actual corridor recommendations evolved to a more extensive system.



Existing and Planned Bikeways and Potential Bikeway Corridors (October 2011)

The lack of bicycle facilities in Cleveland, East Cleveland, Shaker Heights, and Cleveland Heights creates a significant gap for bicycle travel between those communities and University Circle. To remedy this deficiency, the study identifies a number of potential bikeway corridors, shown in yellow, that were assessed as possible future bicycle corridors. These corridors focused on providing bicycle transportation routes between Cleveland Heights and University Circle through a variety of different facility types intended to accommodate cyclists of a range of abilities and preferences.

The Bicycle Network Study looked at the availability of bikeways in the study area, the existing quality and conditions of bicycle facilities, and bicycle-friendly streets. During a field view and bike ride in October 2011, the project team observed that bicycle traffic has to mix with vehicular traffic, and when bicycle facilities existed they were not well identified or clearly marked. Additionally, there are topographical challenges faced by both bicyclists and pedestrians, affectionately summed under the heading, “the big hill.” The images below illustrate some of the existing conditions bicyclists face in University Circle and Cleveland Heights.

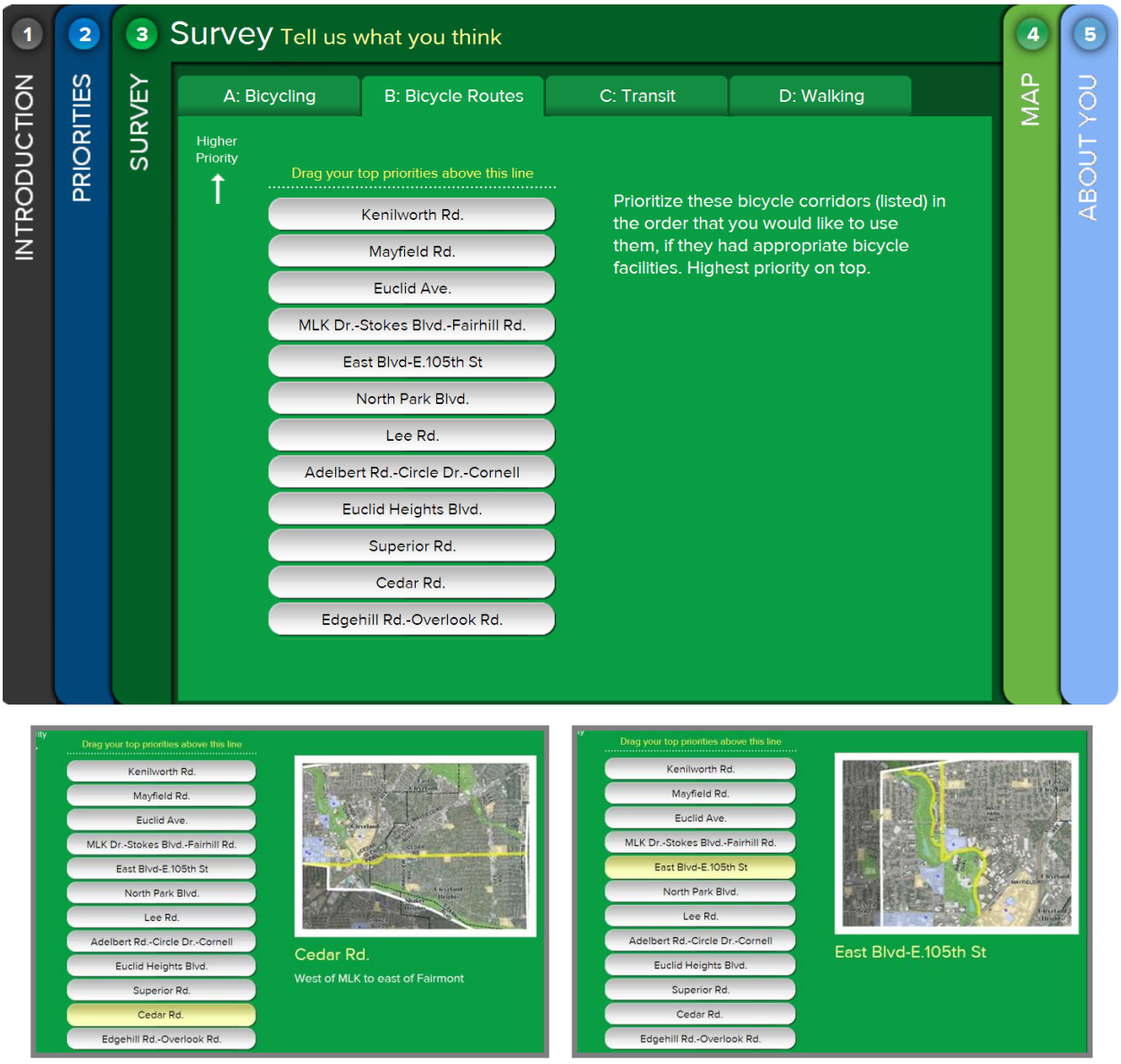
Bicycles Mixing with Vehicular Traffic: Superior (left), Mayfield (right)

Absence of Identified Bicycle Facilities: Cedar (left), Mayfield at Euclid (right)

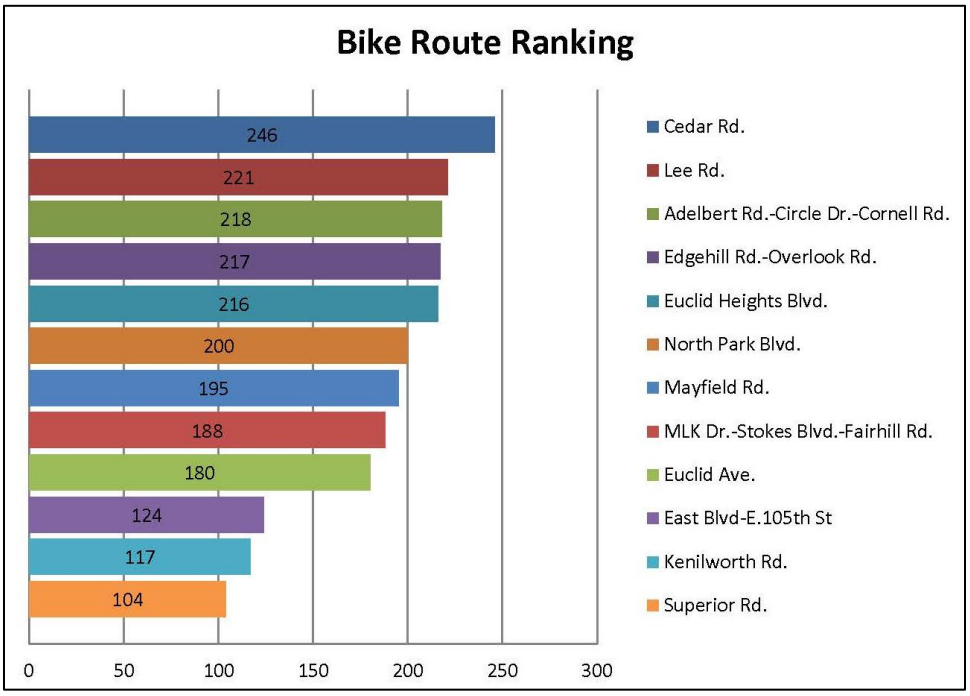
Topographical Challenges: Cedar Hill (left), Edgehill (right)

3.2 Public Input and Survey Results

As a part of the public participation effort described in Section 2, participants were asked to rank corridors based on their potential to serve as preferred bicycle routes. This ranking was meant to help prioritize the corridors of interest identified by the study team and to decipher where community priorities match observed gaps in the transportation network. As indicated in the graph below, there was little differentiation in ranking between many of the corridors, though Cedar Road was identified as the most preferred route. These results indicate the importance of providing bicycle accommodations on all of the identified corridors rather than a select few. For example, routes from Lee Road to Euclid Avenue were prioritized only slightly less than top-ranked Cedar Road and should be prioritized accordingly during implementation.



Survey: Bike Corridor Priorities



Ranking of Corridors Preferred for Bike Use and Bike Facility Enhancement

In addition to the bike route ranking, the online survey also asked questions intended to help the project team understand the current and potential bicycling patterns of people living and working in Cleveland Heights and University Circle. The responses showed that the majority of respondents agreed or strongly agreed with the statements "I live close enough to bicycle to school/work" (64%); "I live close enough to bicycle to shopping/dining" (80%); "I live close enough to bicycle to entertainment/recreation" (78%); and "I live close enough to bicycle to other destinations" (76%). However, a minority of survey respondents agreed or strongly agreed with the statements "I regularly bicycle to school/work" (33%). A follow-up question revealed that only 32% of participants agreed or strongly agreed that they feel safe bicycling to their destinations, which correlates with the observed lack of bicycle infrastructure in the study area.

The survey indicated a strong preference for and high level of personal comfort with dedicated bicycle infrastructure (trails and bike lanes). Nearly all participants (87%) stated they were comfortable bicycling on an off-road trail while 80% of participants agreed or strongly agreed that they were comfortable bicycling in a bike lane. Far fewer, but still a majority (52%), were comfortable cycling in semi-dedicated infrastructure, such as shared use lanes marked with "sharrows". and. Ratings dropped significantly when asked about comfort riding in mixed traffic with only 32% strongly agreeing or agreeing. When asked about the desire for more bicycle infrastructure in the study area, 87% of all participants stated they would like to see more on-road bicycle facilities. Additional facilities desired by respondents included safe bike parking accommodations, , [add others]. These survey results, coupled with traffic data, origin and destination data, observed cycling patterns, and research in best practices both from within and outside of Northeast Ohio informed the bikeway corridor recommendations in this study.

3.3 Corridor Descriptions and Bicycle Facility Recommendations

In developing bikeway concepts, the project team referenced design standards and guidance from the Ohio Manual on Uniform Traffic Control for Streets and Highways, 2009 Edition (OHMUTCD); the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities 1999; and the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide, April 2011 Edition.

Wide Shoulders

Developing bicycle facilities and bikeway plans also require recognition of bicycle user groups. Research indicates that very few bicyclists consider themselves "strong and fearless" (less than one percent). These users would ride no matter the conditions. The "enthused and confident" user group, which accounts for less than ten percent of bicyclists, is attracted to using bicycles for transportation even with limited infrastructure. Approximately 30% of the population fall into the "no way, no how" group who would never use a bicycle for transportation no matter the available infrastructure. The final group, and the majority of the population, falls into the category of "interested but concerned." These individuals would use a bicycle for transportation but are more cautious and prefer dedicated bicycle facilities. Where conditions allow these people to feel safe and where bicycling makes sense, they will ride. *("Four Types of Cyclists." Geller, Portland Office of Transportation, City of Portland)* This categorization aligns closely with the survey results conducted for this study, where people said they lived close enough to work/school (64%), recreation/entertainment (78%), shopping/dining (80%) or other destinations (76%) to travel by bicycle but did not, likely due to the lack of bicycle facilities.

Sharrows

Multi-Use Trail

Conventional Bike Lane

Given the differing needs of these bicycle user groups, the Bicycle Network Study proposes a series of bikeway recommendations ranging in intensity from simple signage to more intensive bicycle infrastructure like multi-use trails and bicycle boulevards. Potential bicycle facility treatments considered for the corridors include:

Buffered Bike Lane

- **Signs** – Increase awareness of the presence of bicyclists and of the legal rights of cyclists to operate in the vehicular right-of-way without requiring the reconfiguration of roadways or parking.
- **Sharrows** – Shared use markings in pavement to provide cyclists with positioning in the shared lane of traffic, accompanied by signage alerting vehicles of the potential presence and rights of bicyclists and encouraging predictability of bicycle movements on a shared use roadway.
- **Wide Shoulders** – Provide an attractive on-road bicycling option that fits within corridors with smaller rights-of-way.

Bicycle Boulevard

- **Multi-Use Trails** – Off-road trails for non-motorized use including bicycling, running, and walking.

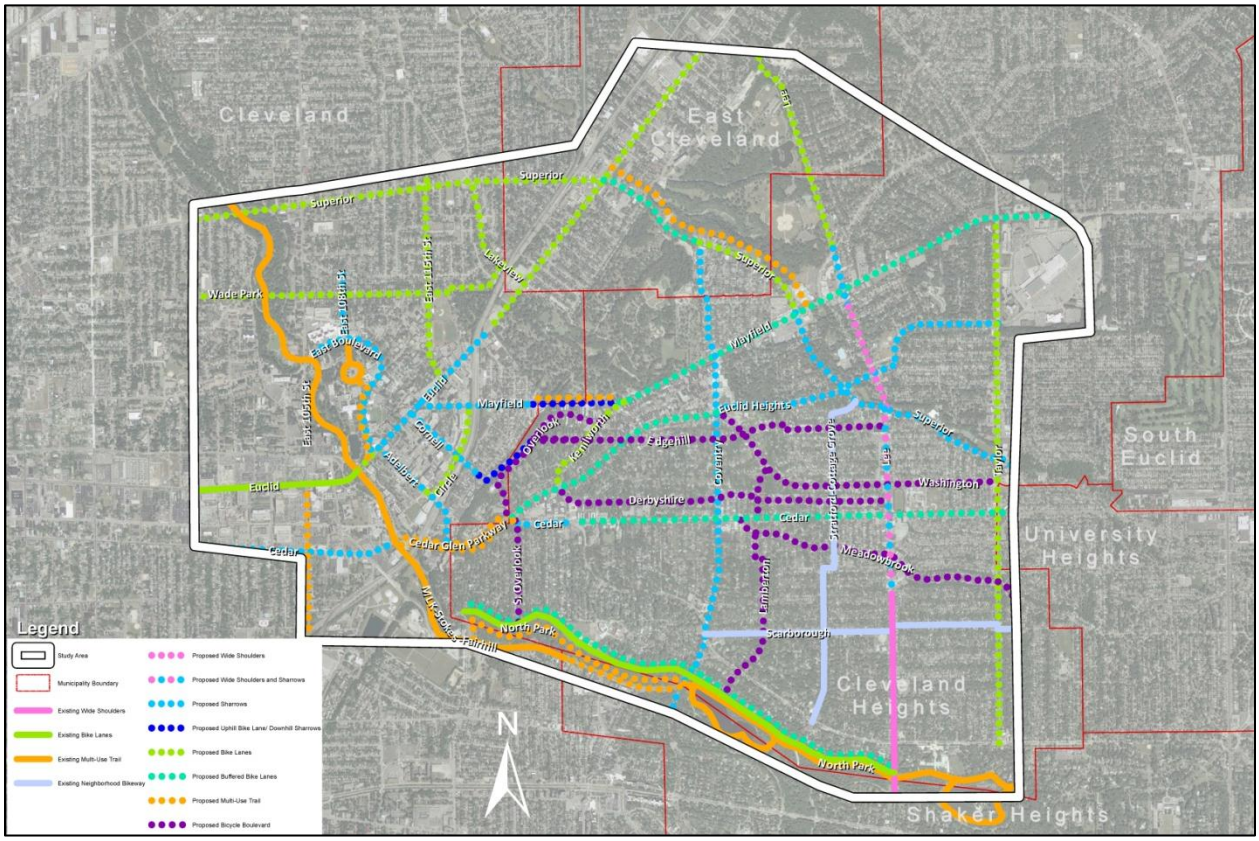
Conventional Bike Lanes – Designated exclusive space for bicyclists with pavement markings and signage.

Buffered Bike Lanes – Designated bike lanes with a striped space (buffer) between bicyclists and cars and/or on-street parking.

Bicycle Boulevards – Optimize street characteristics for bicycle traffic by discouraging cut-through vehicular travel while still allowing local travel. Bicycles are prioritized as the preferred travel mode on bicycle boulevards.

3.4 Bikeway Corridor Recommendations

The figure below illustrates the recommendations for each bikeway corridor within the study area. The bicycle facility recommendations are summarized in the table that follows and are described in greater detail in the subsequent text. Recommendations address both existing facilities and propose new facilities such as bike lanes, multi-use trails, wider shoulders, and the addition of sharrows and signage. The recommendations account for both near-term and long-term implementation, with the understanding that near-term interventions may provide valuable upgrades, but may not present the long-term ideal facility for a particular route. Long-term solutions, in many cases, will require further study and allocation of significant capital expenditures, both of which cannot be adequately accounted for within the scope of this study.



Existing (as of December 2012) **and Recommended Bicycle Facilities** (September 2013)

OVERVIEW OF BIKEWAY RECOMMENDATIONS		
BIKEWAY CORRIDOR	**FACILITY TYPE**	**RECOMMENDATIONS**
Superior West of Euclid	**Bike Lanes**	3-lane road with buffered bike lanes and no on-street parking.
Superior Euclid to Coventry	**Buffered Bike Lanes** and **Multi-Use Trail**	Provide buffered bike lanes with 2 travel lanes in each direction. *Note: On-street parking is prohibited in this section.* Widen sidewalk on northeast side of Superior to create a multi-use trail
Superior Coventry to Mayfield	**Bike Lanes** and **Multi-Use Trail**	Provide single travel lane with bike lanes and parking with bump outs. Cut into median to provide left turn lane, as needed. *Note: On-street parking is permitted in this section.* Widen sidewalk on northeast side of Superior to create a multi-use trail.
Superior Mayfield to Washington	**Sharrows**	Provide sharrows in travel lanes and related signage.
Euclid West of MLK-Chester	**Existing Bike Lanes**	No additional bicycle treatments.
Euclid MLK to Adelbert	**Bike Lanes** and **Wayfinding**	Provide WB bike lane by reconfiguring the roadway (narrowing travel lanes and/or reducing median width). Provide wayfinding signing to Harrison-Dillard Trail.
Euclid Adelbert to E.123rd	**Sharrows**	Provide sharrows in outside travel lanes and related signage.
Euclid E.123rd through East Cleveland	**Bike Lanes**	Provide bike lanes. Accommodate East Cleveland's future redevelopment and potential Red Line/HealthLine extension. Improve lighting.
Mayfield Euclid to E.126th	**Sharrows**	Implement accommodations consistent with TLCI study recommendations; provide sharrows and related signage through Little Italy.
Mayfield E.126th to Kenilworth	**Uphill Bike Lane/ Downhill Sharrows** and **Multi-Use Trail**	Provide uphill bike lane and downhill sharrows with related signage. Widen sidewalk on north side to create multi-use trail.

OVERVIEW OF BIKEWAY RECOMMENDATIONS		
BIKEWAY CORRIDOR	**FACILITY TYPE**	**RECOMMENDATIONS**
Mayfield Northeast of Kenilworth	**Buffered Bike Lanes**	Configure as 3-lane roadway with buffered bike lanes; no on-street parking.
Circle - Adelbert - Cornell	**Bike Lanes on Circle** **Sharrows on Cornell and Adelbert** **Sharrows on Adelbert Bridge**	Provide bike lanes on Circle Drive. Provide sharrows on Adelbert and Cornell with related signage. Provide sharrows on Adelbert Bridge to Cedar with related signage.
Wade Oval	**Existing Multi-Use Trail**	Provide bikeway and wayfinding signage.
East Boulevard	**Multi-Use Trail** and **Sharrows** and **Signage**	Widen sidewalk on west side of East Boulevard to provide a multi-use trail that connects with Harrison-Dillard Trail. Install sharrows between Euclid and E.108th with related signage. Provide bikeway and wayfinding signage.
E.105th Street	**Multi-Use Trail**	Implement the complete streets cross section as proposed by Opportunity Corridor. *Note: The current proposed configuration of the OC boulevard includes wide outside travel lanes for shared use with bicycle traffic together with a multi-use path on the south side of the road and a sidewalk on the north side.*
E.108th Street	**Sharrows**	Provide sharrows between Wade Oval and Ashbury with related signage.
E.115th Street	**Bike Lanes**	Provide bike lanes.
Lakeview	**Bike Lanes** and **Signage**	Provide bike lanes. Since Lakeview is in the City's Bikeway Master Plan as a neighborhood connector, bikeway signing should be provided.
Wade Park	**Bike Lanes**	Provide bike lanes. Assess the corridor beyond the limits of this study area for bike lane implementation to provide a cohesive bikeway corridor.
MLK-Stokes-Fairhill	**Multi-Use Trail** *add connections to Cleveland Heights and Shaker Heights bikeways*	Provide connections between the recently completed Lake-to-Lakes Trail section in Cleveland to the Shaker Lakes trail network and to North Park Boulevard. Additionally, provide connection to Inner Emerald Necklace Trail via MLK to the south at Fairhill.

OVERVIEW OF BIKEWAY RECOMMENDATIONS		
BIKEWAY CORRIDOR	**FACILITY TYPE**	**RECOMMENDATIONS**
Cedar Avenue MLK-Fairhill To E.89th	**Sharrows and Signage**	Defer to city's reconstruction project which will provide 3-lane roadway with sharrows with related signage for the eastbound and westbound travel lanes and parking on the eastbound side.
Cedar Glen Parkway MLK to Euclid Heights (Cedar Hill)	**Multi-Use Trails**	Provide bicycle facilities on both north and south sides of Cedar. Construct multi-use trail along south side (Top of Hill to Ambleside by Cleveland Heights, Ambleside to Lake-to-Lakes Trail by Cleveland). Widen sidewalk and relocate utilities on north side of Cedar to create a multi-use trail.
Cedar Euclid Heights to Fairmount	**Sharrows**	Implement treatments recommended by TLCI study; include sharrows in outside travel lanes with related signage.
Cedar Fairmount to Taylor	**Buffered Bike Lanes**	Provide buffered bike lanes with the conversion of Cedar to a 3-lane roadway.
North Park MLK to Coventry	**Buffered Bike Lanes** and **Multi-Use Trail**	Convert existing bike lanes to buffered bike lanes. Extend bike lanes to intersection with with MLK. Provide multi-use trail along south side of North Park, connecting to the Lake-to-Lakes Trail on Fairhill.
North Park Coventry to Lee	**Buffered Bike Lanes** and **Existing Multi-Use Trail**	Convert existing bike lanes to buffered bike lanes.
Grandview-Bellfield-Delaware-South Overlook	**Bicycle Boulevard (Overlook)**	Configure Overlook as bicycle boulevard and provide appropriate signage
Euclid Heights Cedar to Coventry	**Buffered Bike Lanes**	Provide buffered bike lanes adjacent to single travel lane; no on-street parking.
Euclid Heights Coventry to Taylor	**Sharrows**	Relocate sharrow markings to a position that is centered in the travel lanes and provide related signage.
Coventry	**Sharrows**	Provide sharrows (centered in the travel lanes) with related signage.
Lee North of Monticello	**Bike Lanes**	Convert current 4-lane road to 3-lane road with bike lanes/wide shoulders (based on available roadway width).

OVERVIEW OF BIKEWAY RECOMMENDATIONS		
BIKEWAY CORRIDOR	**FACILITY TYPE**	**RECOMMENDATIONS**
Lee Monticello to Whitehorn	**Sharrows**	Provide sharrows with related signing.
Lee Whitehorn to Superior	**Wide Shoulders**	Restripe with 11 ft travel lanes and wide shoulders (edgeline striping).
Lee Superior to Dellwood	**Wide Shoulders and Sharrows**	Provide wide shoulders wherever possible. In the Cedar-Lee District with on-street parking, reduce center turn lane width to widen travel lanes and provide sharrows with related signing for travel lanes where wide shoulders (edgeline striping) is not feasible.
Lee Dellwood to North Park and into Shaker Heights	**Existing Wide Shoulders**	Retain striped wide shoulders. *Note: Shaker Heights is pursuing conversion of Lee Road to a 3-lane roadway with a center turn lane and wide striped shoulders between South Park and City Hall, following approval of the **Lee Road Traffic Study and Corridor Plan** by Shaker Heights City Council on November 26, 2012.*
Taylor	**Bike Lanes**	The city plans to install bike lanes where possible. Four-lane sections should be converted to a 3-lane roadway with bike lanes (or wide shoulders). Sharrows (centered in the travel lanes) should be provided in the section(s) where bike lanes cannot be accommodated.
Scarborough	**Existing Neighborhood Bikeway**	No specific bikeway treatment is recommended but bikeway and wayfinding signage should be installed.
Stratford-Cottage Grove	**Existing Neighborhood Bikeway**	No specific bikeway facility treatment is needed but bikeway and wayfinding signage would be useful.
Meadowbrook	**Bicycle Boulevard**	Convert to bicycle boulevard and provide signage.
Stillman-Derbyshire-Lamberton-Washington-Edgehill (Connects to Edgehill-Overlook)	**Bicycle Boulevard**	Convert to bicycle boulevard and provide signage.
Kenilworth (Mayfield to Euclid Heights)	**Bike Lanes**	Reconfigure Kenilworth as a 2-lane roadway with bike lanes.
Edgehill Murray Hill to Overlook	**Uphill Bike Lane/ Downhill Sharrows**	Uphill bike lane and downhill sharrows.

OVERVIEW OF BIKEWAY RECOMMENDATIONS		
BIKEWAY CORRIDOR	**FACILITY TYPE**	**RECOMMENDATIONS**
Edgehill Overlook to Kenilworth	**Bicycle Boulevard**	Convert to bicycle boulevard and provide signage.
Overlook Kenilworth to Edgehill	**Bicycle Boulevard**	Convert to bicycle boulevard and provide signage.
Overlook Edgehill to Cedar	**Bicycle Boulevard**	Convert to bicycle boulevard and provide signage.

Superior Avenue (west of Euclid)

Superior is designated as US 6 to the west of Euclid Avenue. The roadway consists of four lanes at the Cleveland-East Cleveland boundary, widening to five lanes further west in the vicinity of E. 117th Street. The roadway varies in width. It is approximately 48 ft wide near Euclid Avenue in East Cleveland, narrowing to about 40 ft near E. 124th Street-Lakeview, and widening to approximately 50 ft near E. 117th Street. On-street parking is permitted in some areas. The City of Cleveland is completing a repaving project and expects to maintain the existing on-street parking with peak hour restrictions. Based on traffic volume data from the NOACA count map (1989-2003), this section of Superior carries approximately 13,500-16,000 vehicles per day (vpd). Ohio Department of Transportation (ODOT) traffic counts from 2011 show an Annual Average Daily Traffic (AADT) volume of 11,500 vpd on Superior west of Euclid.

Potential Bikeway Alternatives:

- **Bike Lanes**: It may be possible to reconfigure the roadway to provide bike lanes. This would require the reduction of capacity (fewer travel lanes) and on-street parking may be affected. A traffic study to understand traffic volumes on the roadway and to assess traffic operations would be needed to determine if the provision of bike lanes is feasible. Additionally, a parking study would be needed to assess parking demand and impacts. The alternatives listed below will fit within the section of Superior that is 48-50 ft wide:

  a) One travel lane in each direction, buffered bike lanes and parking on one side; no turn lanes.
  Parking (8 ft) | Buffered Bike Lane (2 ft +5 ft + 1-3 ft) | Travel Lanes (12 ft + 12 ft) | Buffered Bike Lane (3 ft + 5 ft)

  b) One travel lane in each direction, bike lanes, on-street parking on both sides.
  Parking (8 ft) | Bike Lane (4-5 ft) | Travel Lanes (12 ft + 12 ft) | Bike Lane (4- 5 ft) | Parking (8 ft)

  c) One travel lane in each direction, turn lanes at intersections, and buffered bike lanes; this configuration will not accommodate on-street parking.
  Buffered Bike Lane (5 ft + 1-2 ft) | Travel and Left Turn Lanes (12 ft + 12 ft + 12 ft) | Buffered Bike Lane (5 ft + 1-2 ft)

  d) One travel lane in each direction, turn lanes at intersections, on street parking, wide shoulders to accommodate bicycles.
  Parking (8 ft) | Shoulder (3-4 ft) | Travel and Left Turn Lanes (12 ft + 10 ft + 12 ft) | Shoulder (3-4 ft)

  e) Two travel lanes in each direction (10 ft), bike lanes (5 ft); no on-street parking and no left turn lanes.
  Bike Lane (4-5 ft) | Travel Lanes (4 x 10 ft lanes) | Bike Lane (4-5 ft)

- **Sharrows**: Provide sharrows in the outside travel lane, with consideration given to sections of the street where parking is permitted. Two travel lanes in each direction would be maintained.

  ***Recommendation**: There are competing demands for use of this corridor, including through vehicle travel, turning movements, on-street parking, and bicycle travel. It is important to work within the exiting curbs and recommends providing bike lanes in this corridor. The preference is for a 3-lane roadway with buffered bike lanes and no on-street parking (single travel lanes in each direction, and turn lanes at intersections, as needed), shown above as option c). This reconfiguration needs to be supported by traffic and parking studies. If on-street parking is necessary and turn lanes are required, then option d) is recommended. If on-street parking is necessary and turn lanes are not required, or are only needed at a few intersections, then option a) is recommend.*

Superior Road (Euclid to Coventry)

Superior is a 6-lane, median-divided roadway to the east of Euclid Avenue. It is approximately 70 ft wide with three 10 ft travel lanes in each direction separated by a 10 ft raised median; left turn bays are not provided. On-street parking is not permitted on Superior between Euclid and Coventry. Based on data from the NOACA count map (1989-2003), this section of Superior carries roughly 11,500 vpd.

Potential Bikeway Alternatives:

- **Multi-Use Trail**: Widen the sidewalk on the northeast side of Superior to create a multi-use trail (8-10 ft wide). This should fit within the existing right-of-way.
- **Bike Lanes**: Provide buffered bike lanes along the roadway edge (5+3 ft), maintain two travel lanes in each direction (11 ft), maintain median (10 ft). The on-street parking prohibition would be retained. A traffic study is not required based on exiting land use, available traffic data, and the expectation that the characteristics of the corridor will remain unchanged for the foreseeable future.
- **Sharrows**: Provide sharrows in the outside travel lane. Three travel lanes in each direction and the on-street parking prohibition would be maintained.

  ***Recommendation**: Provide buffered bike lanes along Superior between Euclid and Coventry. Additionally, construct a multi-use trail along the north side of Superior.*

Superior Road (Coventry to Mayfield)

Superior is a 6-lane, median-divided roadway to the east of Euclid Avenue. It is approximately 70 ft wide with three 10 ft travel lanes in each direction separated by a 10 ft raised median; left turn bays are not provided. On-street parking is permitted in designated areas between Coventry Road and Mayfield Road to accommodate the parking needs of the multi-unit apartment buildings. Based on data from the NOACA count map (1989-2003), this section of Superior carries between 8,000-11,000 vpd. The alternatives listed below will fit within the existing roadway without moving the curbs.

Potential Bikeway Alternatives:

- **Multi-Use Trail**: Widen the sidewalk on the north side of Superior to create an off-road multi-use trail. This should fit within the existing right-of-way.

- **Bike Lanes**: Provide a single travel lane in each direction (12 ft) with a parking lane along the curb (8 ft) and buffered bike lanes between the travel lane and parking lane (bike lane would be buffered on both sides, 3+5+2 ft). The presence of the parking lane could be reinforced with bump outs. Given the significant capacity reduction required to accommodate this configuration, traffic and parking studies should be completed to verify that the reduction in roadway capacity and resulting traffic operations are feasible. Although single travel lanes in each direction may be feasible, it is likely that left turn lanes would need to be provided to accommodate left turning vehicles; this could be done by cutting into the existing median; street lighting in the median would need to be addressed.
- **Sharrows with 4-Lane Road**: Provide two travel lanes in each direction (11 ft and 11 ft) with sharrows in the outside lane; convert the third travel lane to a parking lane (8 ft). The presence of the parking lane could be reinforced with bump outs. The feasibility of this alternative should be assessed with traffic and parking studies.
- **Sharrows with 6-Lane Road**: Maintain three travel lanes in each direction. Provide sharrows in the outside travel lane, with consideration given to sections of the street where parking is permitted. This treatment is not desirable because parking is permitted in the outside lane where the sharrows would likely be placed and the parking density does not appear to be enough to cause the middle lane to function as the de facto outside lane. A parking study could be conducted to validate this field observation.

***Recommendation**: Provide bike lanes with a single travel lane in each direction and parking with bump outs to reinforce the parking lane. Left turn lanes should be provided, as needed, by cutting into the existing median. A traffic study is needed to determine that this change in configuration will function acceptably. If a single travel lane is not feasible based on the results of the traffic study, bicycles should be accommodated by providing two travel lanes with on-street parking and bump outs, and sharrows in the outside travel lane. In addition, a multi-use trail should be provided on the northeast side of Superior.*

Superior Road (Mayfield to Washington)

This section of Superior Road is a 2-lane facility that serves as neighborhood connector and provides access to Cain Park. As such, bicycles should be given enhanced accommodations. This section of Superior carries roughly 8,000 vehicles per day, based on traffic volume data from the NOACA count map (1989-2003). Given the existing roadway configuration, it would be difficult to provide more than sharrows. A scenic, shaded multi-use trail is provided through Cain Park, connecting Lee and Taylor.

***Recommendation**: Provide sharrows and accompanying signage.*

Euclid Avenue (west of MLK-Chester)

This section of Euclid Avenue was rebuilt as a transit corridor with the construction of the Healthline bus rapid transit (BRT). The Euclid Avenue transit corridor includes the provision of an exclusive bus lane, a single travel lane and a bike lane in both the eastbound and westbound directions between MLK and E.22nd Street. No additional bikeway treatments are recommended.

***Recommendation**: No additional bicycle treatments are recommended.*

Euclid Avenue (MLK to Adelbert)

Euclid Avenue is designated as US 20. This section of Euclid Avenue includes bike lanes adjacent to the vehicular travel lanes; however, there are gaps in the continuity of the bike lanes. Specifically, there is a gap in the westbound bike lane between East Boulevard and the MLK-Chester intersection. The westbound bike lane should be contiguous and the gap could be filled in one of the following ways:

Potential Bikeway Alternatives:

- **Trail**: Construct a curb cut to allow bicyclists to easily access the sidewalk, essentially converting the existing sidewalk to a multi-use trail. This treatment would facilitate access to the Harrison-Dillard Trail.
- **Bike Lane (option 1)**: Narrow the westbound travel lanes and/or narrow the median to provide a westbound bike lane between Adelbert and the MLK/Chester intersection. This would include continuation of the westbound bike lane through the MLK/Chester intersection and connecting it to the HealthLine's westbound bike lane to the west.
- **Bike Lane (option 2)**: Widen Euclid Avenue to the north to add a westbound bike lane. This would include continuation of the westbound bike lane through the MLK/Chester intersection and connecting it to the HealthLine's westbound bike lane to the west.
- **Sharrows with Bike Box**: Paint sharrows centered in the travel lane and install a bike box in the westbound intersection approach.
- **Signage**: Provide wayfinding signing to Harrison-Dillard Trail

***Recommendation**: Provide a bike lane to fill the gap in the existing westbound bike lanes. Prior to widening Euclid, the existing roadway should be evaluated to determine if the pavement markings (lane striping) could be adjusted (narrowed) to accommodate a bike lane without widening the road. If not, modify the median rather than the north side of Euclid, if feasible. Additionally, provide wayfinding signage directing bicyclists to the Harrison-Dillard Trail.*

Note: Preliminary investigations indicate that westbound Euclid Avenue is approximately 28 ft wide along the southwest crosswalk at the Euclid/East intersection. This would allow for a 5 ft bike lane with two 11.5 ft travel lanes. Westbound Euclid is approximately 35 ft wide where the exclusive right turn lane is added. This would allow provision of a 5 ft bike lane with two 10 ft travel lanes and a 10 ft right turn lane. Roadway widths should be field-verified.

Euclid Avenue (Adelbert to E.123rd)

Euclid Avenue is designated as US 20. ODOT traffic counts from 2011 show that Euclid east of Adelbert has an AADT of approximately 19,000 vpd. This section of Euclid Avenue is a median-divided road with two travel lanes in each direction. Parking is permitted in designated areas in a series of parking bays, capped by sidewalk bumpouts. The only feasible bicycle treatment that fits within the constraints of this corridor without right-of-way acquisition and roadway reconstruction is provision of sharrows in the outside travel lanes.

***Recommendation**: Provide sharrows centered in the outside travel lanes, accompanied by appropriate shared use signage, beginning at the terminus of the eastbound bike lane at Adelbert. Additional bicycle connections should be explored within the Case Western Reserve University campus.*

Euclid Avenue (E.123rd through East Cleveland)

Euclid Avenue is designated as US 20. ODOT traffic counts from 2011 show that Euclid near E.123rd has an AADT of approximately 19,000 vpd. The City of East Cleveland is developing redevelopment plans for Euclid Avenue east of Lakeview. The existing 5-lane section is expected to be retained but on-street parking may no longer be required. Additionally, GCRTA is initiating a study to evaluate the potential extension of the Red Line and/or the HealthLine from Windermere Station, along Euclid Avenue through the City of East Cleveland, Cleveland's South Collinwood neighborhood and into the City of Euclid. The potential reconfiguration of Euclid Avenue should incorporate bicycle facilities with East Cleveland's redevelopment plans.

Potential Bikeway Alternatives:

- **Trail**: Create an off-road multi-use trail along Euclid. This may be viable if there are sufficient land bank opportunities for land acquisition. Such a trail would be consistent with the city's proposed trail connection to Forest Hill Park.
- **Bike Lanes**: Provide bike lanes as part of the future reconfiguration of Euclid Avenue with East Cleveland's redevelopment plans and the planned Red Line/HealthLine Extension Study. Consideration needs to be given to BRT transit operations along the corridor.
- **Sharrows**: Provide sharrows in the outside travel lane. This treatment is less desirable because it would require bicyclists to mix with Euclid Avenue traffic, a busy road and a transit corridor.

***Recommendation**: Provide bike lanes with the redevelopment of Euclid Avenue. Sharrows and appropriate signage should be provided only if it is not possible to accommodate bike lanes. Construction of a trail should be given serious consideration. Lighting should be improved with the anticipated future redevelopment of Euclid through East Cleveland.*

Mayfield Road (Euclid to E.126th)

Mayfield Road is designated as US 322. Mayfield Road from Euclid Avenue to E. 126th Street consists of one eastbound and one westbound travel lane. On-street parking is permitted in Little Italy (east of E. 120th Street and Random Road). Bicycle accommodations should be consistent with recommendations in the *Mayfield Road Streetscape Improvement Plan* (TLCI study, September 2009). Based on roadway characteristics and land use, the most viable means of accommodating bicyclists through Little Italy is through shared use of existing travel lanes and implementation of sharrows. This section of Mayfield carries roughly 10,000 vehicles per day, based on traffic volume data from the NOACA count map (1989-2003).

***Recommendation**: Implement accommodations consistent with the Mayfield Road TLCI study. Additionally, provide sharrows and accompanying signage through Little Italy.*

Mayfield Road (E.126th to Kenilworth)

Mayfield Road is designated as US 322. Mayfield Road to the east of E.126th Street is a 2-lane roadway; a second eastbound lane is added approximately 800 ft west of the Kenilworth intersection (where the hill flattens out). A traffic study was conducted as part of this project's partner project, the University Circle–Cleveland Heights Missing Links Study. Traffic operations at the Mayfield/Kenilworth intersection were evaluated to assess potential reconfiguration of the intersection to better accommodate bicyclists

and pedestrians without detrimental impacts to traffic operations. Mayfield Road is designated as US 322 so a 12 ft travel lane must be maintained in each direction. ODOT traffic counts from 2011 show that Mayfield east of E.126th has an AADT of approximately 13,000 vpd.

Potential Bikeway Alternatives:

- **Trail**: Widen the existing sidewalk on the north side of Mayfield Road to create a multi-use trail which would accommodate both bicyclists and pedestrians. This sidewalk is the only pedestrian link along Mayfield between Cleveland Heights and Little Italy because a sidewalk will not fit on the south side of Mayfield due to right-of-way and topographic constraints.
- **Bike Lanes**: The existing roadway is not wide enough to accommodate bike lanes on both sides of the road and widening the road is not feasible due to the narrow right of way, physical constraints, and the proximity of historic Lake View Cemetery.
- **Uphill Bike Lane and Downhill Sharrows**: An uphill bike lane (eastbound) and sharrows in the downhill lane (westbound) could be provided. The roadway width varies (approximately 28-29 ft wide), but the bike lane/sharrow configuration should fit without roadway widening (12 ft travel lanes and 4-5 ft bike lane). Roadway width should be field-verified.
- **Sharrows**: Provide sharrows in the travel lanes within the existing roadway configuration.

***Recommendation**: Provide an uphill bike lane and downhill sharrows on Mayfield. The curb-to-curb distance on Mayfield varies; if the roadway is not sufficiently wide in some areas to accommodate a 5 ft bike lane uphill, a wide shoulder lane should be provided on eastbound Mayfield to accommodate bicyclists. Additionally, the existing sidewalk on the north side of the road should be widened to create a multi-use trail. This trail would transition to a sidewalk at E.126th Street, with pedestrians remaining on the sidewalk while bicyclists would be directed into the roadway. Utilities and proximity to the cemetery may be issues. If creation of trail is not feasible due to these external constraints, the Edgehill-Overlook corridor could provide an acceptable alternate route for more timid bicyclists traveling between Cleveland Heights and Little Italy. As such, wayfinding signage should be provided along that route.*

Mayfield Road (northeast of Kenilworth)

Mayfield Road is designated as US 322. Mayfield Road is a 4-lane roadway to the east of its intersection with Kenilworth. On-street parking is permitted on the south side of the road, with peak hour restrictions. Mayfield Road widens to 5-lanes at Coventry, continuing to the east; parking is permitted in designated areas on both sides of the road. Mayfield west of Coventry carries approximately 18,000 vehicles per day and east of Coventry approximately 25,500 vehicles per day, based on traffic volume data from the NOACA count map (1989-2003). ODOT traffic counts from 2011 show that Mayfield has an AADT of approximately 16,000 vpd between Lee and Taylor. With those traffic volumes, capacity reductions are likely not feasible. Additionally, the existing on-street parking permitted in the outside lanes during off peak hours complicates the placement of sharrows.

Potential Bikeway Alternatives:

- **Buffered Bike Lanes**: The existing roadway could potentially be reconfigured as a 3-lane roadway with buffered bike lanes. This configuration would accommodate one travel lane in each direction with a center turn lane along with the buffered bike lanes. On-street parking would not be

permitted with this configuration. Traffic and parking studies would be needed to verify the feasibility of this alternative.

- **Bike Lanes**: Bike lanes (or wide shoulders) could be provided within the existing 4-lane roadway configuration if on-street parking is prohibited. A parking study would need to support this concept.
- **Signs**: Bikes May Use Full Lane signs could be installed as a minimal treatment to raise driver awareness to the presence of bicyclists.

***Recommendation**: Reconfigure Mayfield Road as a 3-lane roadway with buffered bike lanes. If a traffic study does not support capacity reduction on Mayfield, then the 4-lane configuration should be retained and bike lanes (or wide shoulders) should be provided. Both alternatives need to be supported by a parking study. If on-street parking must be retained, Bikes May Use Full Lane signs (R4-11) should be provided. Some stores and apartment buildings do not have off-street parking facilities so on-street parking is an important feature. Additionally, loading zones need to be provided. Accommodating parking needs in off-street locations will likely be a challenge as there may not be additional opportunities to easily create new off-street parking lots, however, it would be worth investigating.*

Circle Drive - Adelbert Road - Cornell Road

These three roads provide internal circulation through the campuses of University Hospitals and Case Western Reserve University. The intent is to provide bike lanes where possible, without widening the roads. Where the roads are too narrow for bike lanes, sharrows are recommended. Note: Circle Drive includes the proposed future roadway through the Lot 45 site located between Mayfield and Euclid, which is further detailed in the Uptown District TLCI Study.

Circle Drive: Between Adelbert and Cornell, Circle Drive is approximately 40 ft wide with on-street parking permitted on the east side. Bike lanes could be accommodated if the on-street parking is removed, otherwise sharrows could be provided. North of Cornell, Circle Drive is approximately 34 ft wide. Bike lanes could be accommodated with provision of a single travel lane in each direction. On-street parking needs should be assessed but will most likely need to be retained between Adelbert and Cornell.

Adelbert Road and Bridge: Adelbert north of Circle is a 3-lane roadway with one travel lane in either direction and a continuous turn lane; bike lanes cannot be accommodated but sharrows could be provided. Adelbert Bridge is 3 lanes wide with back-to-back left turn lanes at Murray Hill and Adelbert-Circle; bike lanes cannot be accommodated but sharrows or signage could be provided. Adelbert becomes Murray Hill Road and continues to Cedar as a 4-lane roadway; sharrows or signage could be provided because it is expected that the capacity is needed for vehicular traffic.

Cornell Road and Bridge: From the bridge northwest to Euclid, Cornell is a 3-lane roadway with one travel lane in either direction and a continuous turn lane; bike lanes cannot be accommodated but sharrows could be provided. Southwest of the bridge, Cornell is a 2-lane road with on-street parking permitted on the north side. Unless the parking is removed, bike lanes cannot be accommodated but sharrows or signage could be provided.

***Recommendation**: These roads are narrow with relatively low volumes of slow moving traffic, but still become congested during peak hours. The peak hour traffic generally respects bicyclist due to*

the "campus" feel of the neighborhood. However, with the characteristics discussed above and the substantial volume of pedestrian and bicycle traffic mixing with motorized vehicle traffic, it is important that bicycles be safely and appropriately accommodated within the travel lanes. As such, bike lanes should be provided along the length of Circle Drive between Cornell and Mayfield. Sharrows should be provided Adelbert (which becomes Murray Hill toward Cedar) and Cornell. Roadway widths on Circle Drive should be assessed and parking may be affected by the provision of bike lanes. With ongoing development in this area, it is important to monitor the ability of this roadway network to continue to effectively accommodate bicyclists. Additionally, it would be beneficial for Case Western Reserve University and University Hospitals provide bicycle and pedestrian connections between Adelbert and Cornell, likely utilizing the sidewalk between Adelbert and the Biomedical Research Building and Cornell Circle, as well as throughout the remainder of their campuses.

Wade Oval Drive

Wade Oval Drive is a 2-lane roadway with on-street parking permitted on one side of the street in designated areas. This road links the heart of the cultural institutions in University Circle, as it is surrounded by the Cleveland Botanical Garden, the Cleveland Museum of Art, the Cleveland Museum of Natural History, and the Western Reserve Historical Society. In addition, Wade Oval is bordered by Case Western Reserve University, Cleveland Institute of Music, and Cleveland Institute of Art facilities to the east and the Veterans Affairs Medical Center to the north. At its center, Wade Park includes a multi-use path. Wade Oval Drive is a relatively low-volume, low-speed facility and as such, bicyclists could easily travel along the roadway as well as on the multi-use path, if desired. Sharrows could be provided but are not necessary to facilitate bicycle travel.

***Recommendation**: Given the characteristics of this street and the presence of the existing multi-use trail, no specific bikeway treatments are needed, however, bikeway and shared use bike-ped signage should be added with the park (Wade Oval) to ensure safety for all users.*

East Boulevard

East Boulevard to the north of Euclid Avenue is a 2-lane roadway. On-street parking is permitted in designated areas on one or both sides of the street. Wide sidewalks are provided on both sides of East Blvd between Euclid and Hazel Drive. Standard sidewalks are present to the west and north. East Boulevard provides internal circulation for traffic traveling to and through the Wade Oval area. East Blvd north of Euclid carries approximately 8,000 vehicles per day, based on traffic volume data from the NOACA count map (1989-2003).

Potential Bikeway Alternatives:

- **Trail**: Widen the west sidewalk and sign for use as a multi-use trail. A wider facility would better accommodate a mix of bicyclists and pedestrians than the existing 8 ft wide sidewalk. The west side is preferable to the east side because there are fewer conflicts on the west side and it would provide a more contiguous path between Euclid Avenue, the Harrison Dillard Bikeway and Wade Oval.
- **Sharrows**: Provide sharrows in the existing travel lanes.

Note: The Trail and Sharrows alternatives could be implemented together to accommodate both on-road and off-road bicyclists.

***Recommendation**: A mix of bicycle facility treatments should be incorporated into this corridor. The sidewalk along west side of East Boulevard between Euclid and the traffic circle should be widened to 10 ft and signed as a multi-use trail. Additionally, sharrows should be painted in the roadway for the entire length of East Boulevard between Euclid and E.108th Street. A multi-use trail should be constructed on the north side of the road (along the VA Hospital property) to connect to the Harrison-Dillard Trail. Wayfinding and bikeway signage should be provided.*

E.105th Street

E. 105th Street is a north-south roadway that traverses the study area and provides a connection from Quincy at its south end to Glenville and, ultimately, Bratenahl at the north end. The identified alignment of Opportunity Corridor (OC) will connect the current terminus of I-490 at E. 55th Street with University Circle at E. 105th Street. The proposed OC roadway will be a complete street that terminates in the vicinity of Chester Avenue and includes wide outside travel lanes for shared use with bicycle traffic together with a multi-use path on the south side of the road and a sidewalk on the north side. E. 105th Street in the study area carries between 6,000-12,000 vehicles per day, based on traffic volume data from the NOACA count map (1989-2003).

***Recommendation**: Implement the complete streets cross section as proposed by the Opportunity Corridor study, with wide outside travel lanes for shared use with bicycle traffic together with a multi-use path on the south side of the road and a sidewalk on the north side.*

E.108th Street

This 2-lane, 2-block neighborhood street provides a direct connection to Wade Oval from Ashbury Avenue and the Glenville community to the north. E. 108th Street is a fairly low-volume road; based on traffic volume data from the NOACA count map (1989-2003), it carries approximately 6,000 vehicles per day. Given the low traffic volume, specific bicycle treatments are not necessary but sharrows could be provided to enhance the connection between Glenville and the Wade Oval area.

***Recommendation**: Provide sharrows and accompanying signage between Wade Oval and Ashbury.*

E.115th Street

E.115th Street provides a connection between Superior Avenue and Euclid Avenue, and the Case Western Reserve University campus to the south. It also connects two shopping centers and grocery stores, parks and an elementary school. This roadway feels residential and is fairly low volume with less than 4,000 vehicles per day, per the NOACA count map (1989-2003). As a result, this roadway would be comfortable to most bicyclists without additional treatments, however, bike lanes or sharrows could be provided.

***Recommendation**: Given that this corridor provides a good north-south connection between destinations in both the Glenville and University Circle communities, bike lanes should be provided. However, provision of bike lanes must be supported by a parking study, since they would require*

prohibition of on-street parking between Wade Park and Superior. If it is determined that bike lanes are not feasible due to parking demand, then sharrows and accompanying signage should be provided.

Lakeview Road

Lakeview Road is a 2-lane facility that provides a connection between Lakeview Cemetery (located east of Euclid Avenue) and Superior Avenue and points to the north-northwest. Parking is permitted on one side of the street, in designated areas. It is primarily residential and it is not a busy arterial. Lakeview carries approximately 5,000-6.000 vehicles per day between Euclid and Superior, per the NOACA count map (1989-2003), and thus provides a comfortable route for bicycle travel. Additionally, Lakeview is included on the City's Bikeway Master Plan as a "neighborhood connector." Although, this roadway would be comfortable to most bicyclists without additional treatments, additional treatments may be appropriate given that it is on the bikeway plan and can connect several neighborhoods and community assets.

***Recommendation**: Provide bike lanes. Additionally, since Lakeview is included in the City's Bikeway Master Plan as a neighborhood connector, bikeway signing should be provided. Provision of bike lanes must be supported by a parking study and sufficient roadway width must be available. If bike lanes are not feasible based on the parking study results, sharrows and accompanying bike route signage should be provided.*

Wade Park Avenue

Wade Park Avenue is an east-west corridor located to the north of Wade Oval that connects the CWRU campus with residential areas to the west. Wade Park is a wide, 2-lane road that carries approximately 4,500 vpd west of E. 105th Street and 6,000 vpd east of E. 105th Street, per the NOACA count map (1989-2003). It provides a real opportunity for a significant east-west bicycle facility connection in this area, and it is identified as a neighborhood connector on the City's Bikeway Master Plan. Additionally, Wade Park is scheduled for resurfacing in the City's 5-year capital plan.

Potential Bikeway Alternatives:

- **Bike Lanes**: Bike lanes could be provided within the existing travel lanes. This would require prohibition of on-street parking.
- **Sharrows**: Sharrows could be provided in the travel lanes within the existing roadway configuration; this would allow on-street parking to remain.

***Recommendation**: Given the potential of the Wade Park corridor to provide a significant east-west bicycle connection, bike lanes should be provided with a 2-lane or 3-lane roadway configuration, pending available roadway width. A parking study is needed to support the elimination of on-street parking. It is anticipated that parking could be eliminated within the study area because the residences have driveways. In addition, the section to the west of E. 105th Street (beyond the limits of this study area) should be assessed and a cohesive plan for Wade Park should be developed. If parking can be removed, bike lanes could be provided from E. 118th to E. 66th Streets.*

MLK-Stokes-Fairhill

Bicycle travel along the MLK-Stokes-Fairhill corridor is now facilitated via the Lake-to-Lakes Trail, an off-road route recently completed by the City of Cleveland. This trail connects to the Harrison-Dillard Trail at the Carnegie intersection. A connection between the Lake-to-Lakes Trail and North Park Boulevard should be provided as well as extension of the trail to connect into Shaker Heights and the Shaker Lakes. (Note: Shaker Heights is currently pursuing completion of the trail between E. 127th Street and the Shaker Lakes.) Additionally, future connections south on MLK into other Cleveland neighborhoods should be accommodated, per Cleveland's Bikeway Master Plan. MLK-Stokes-Fairhill is a one-way pair divided by a median park that includes Doan Brook. It carries between 6,000-18,500 vehicles per day eastbound and 12,000-17,000 vehicles per day westbound, based on traffic volume data from the NOACA count map (1989-2003).

> ***Recommendation**: The Working Group recommends provision of a connection between the Lake-to-Lakes Trail and North Park Boulevard, as well as a connection into Shaker Heights and the network of trails around Shaker Lakes, and south along MLK into additional Cleveland neighborhoods. They also recommend provision of wayfinding signage along the MLK-Stokes-Fairhill bikeway corridor.*

Cedar Avenue (MLK-Fairhill To E.89th)

Cedar Avenue to the west of MLK-Stokes is a 4-lane road that transitions to a 3- and 2-lane road to the west with on-street parking in designated areas. Based on traffic volume data from the NOACA count map (1989-2003), this section of Cedar carries between 9,000-9,500 vehicles per day in the vicinity of the Cleveland Clinic. With ongoing growth and development at and around the Cleveland Clinic's main campus, it is likely that traffic volumes will grow. This section of Cedar is currently under reconstruction by the City of Cleveland.

> ***Recommendation**: This Plan defers to the City's project, which will construct a 3-lane roadway with parking on the eastbound side. Sharrows will be painted for bicyclists in the eastbound and westbound travel lanes, accompanied by "Bikes May Use Full Lane" signs. The City will monitor the corridor for bike use before determining if additional bicycle facilities are warranted.*

Cedar Glen Parkway (Cedar Hill, MLK to Euclid Heights)

Cedar Glen Parkway is a 6-lane roadway between the MLK and Euclid Heights (Top of the Hill) intersections. It is approximately 60 ft wide with six 10 ft travel lanes for the upper part of the hill, widening to approximately 75 ft near the University Cedar RTA station. On-street parking is not permitted. Based on traffic volume data from the NOACA count map (1989-2003), Cedar Glen carries approximately 43,000 vehicles per day. Given the traffic volumes, the six travel lanes must be maintained.

Potential Bikeway Alternatives:

- **Trail**: Provide a multi-use path on the south side of Cedar within the former street car right-of-way. (Note: This trail was proposed in the Cedar-Fairmount Transportation and Streetscape Plan TLCI Study)
- **Trail**: Widen north sidewalk to accommodate a multi-use path. This will require relocation of some utility poles.

- **Bike Lane + Sharrows**: Widen travel lanes to 12 ft, provide downhill sharrows in outside lane and uphill bike lane along curb lane. curb lane. (Note: Wider travel lanes would likely result in increased vehicle speeds.)
- **Trail**: Construct a grade-separated elevated trail on the north side of Cedar. The trail would start at grade near the Top of the Hill intersection, hang along the edge of the bluff and taper down with the existing topology to the Ambleside-Murray Hill intersection. Right-of-way and property ownership must be investigated to assess the potential cost and impact of this alternative.

***Recommendation**: Cleveland Heights is in the process of building a multi-use trail on the south side of Cedar from the Top of the Hill intersection to Ambleside. This trail should be continued through Cleveland to connect with the Lake-to-Lakes Trail. That is the first priority. Next, the north sidewalk should be widened and the utility poles should be relocated to create a multi-use path on the north side of Cedar. In addition, a grade-separated elevated trail along the ridge on the north side of Cedar should be constructed If funding is available and if it fits in the CWRU bicycle and pedestrian plan.*

Cedar Road (Euclid Heights to Fairmount)

This section of Cedar Road consists of six travel lanes within the 60 ft roadway. The City of Cleveland Heights is planning to implement a streetscape enhancement concept contained within *Cedar-Fairmount Transportation and Streetscape Plan* (TLCI study, November 2009). Based on traffic volume data from the NOACA count map (1989-2003), Cedar- carries approximately 23,000 vehicles per day in this section.

***Recommendation**: Implement the treatments recommended in the Cedar-Fairmount Transportation and Streetscape Plan TLCI study. This includes provision of sharrows in the outside travel lanes with related signage.*

Cedar Road (Fairmount to Taylor)

Cedar Road to the east of Fairmount is a 4-lane roadway. Left turn lanes are not provided and left turns are prohibited at some intersections during peak hours to improve capacity and traffic operations. Parking is prohibited along Cedar Road, except for a small amount just west of the Taylor intersection. Based on traffic volume data from the NOACA count map (1989-2003), this section of Superior carries approximately 13,000-16,000 vehicles per day. Given the configuration of the corridor and the available right-of-way, the alternatives were developed to fit within the existing curb lines. Reduction of capacity may be feasible so potential reduction to a 3-lane roadway should be evaluated with a traffic study. Alternatives that could be accommodated within the existing 4-lane roadway are:

Potential Bikeway Alternatives:

- **Buffered Bike Lanes**: A traffic study could be conducted to evaluate the feasibility of reconfiguring Cedar as a 3-lane roadway with buffered bike lanes.
- **Striped Wide Shoulders**: Although standard 5 ft bike lanes will not fit within the existing 50 ft roadway width, the current 12.5 ft travel lanes could be narrowed to 11 ft and 3 ft shoulders could be painted along the curbs. Although not standard bike lanes, these wide shoulders would facilitate bicycle travel, consistent with the current configuration of Lee Road between North Park and the library.

- **Sharrows**: Provide sharrows in the outside travel lanes.
- **Alternate Bicycle Routes**: In addition to providing a bicycle facility treatment along Cedar, it may be desirable to provide alternate routes for more cautious bicyclists. Derbyshire and Meadowbrook could both be designated as bicycle routes, designated on bikeway mapping and with appropriate signing, but without any specific bicycle facility treatment.

  ***Recommendation**: Provide buffered bike lanes with the conversion of Cedar to a 3-lane roadway. This reconfiguration must be supported by a traffic study.*

North Park Boulevard (MLK to Coventry)

North Park is a 2-lane road with bike lanes. Although the bike lanes accommodate bicyclists to the west of Coventry, field observations and the worn dirt trail show the existing presence of pedestrians and off road bicyclists, indicating a desire for continuation of the multi-use trail from the Shaker Lakes (east of Coventry) to the west to connect with MLK. Based on traffic volume data from the NOACA count map (1989-2003), this section of North Park carries approximately 11,000 vehicles per day.

***Recommendation**: There is sufficient width to convert North Park's bike lanes to buffered bike lanes. This would provide greater protection to the bicyclists as well as traffic calming effects. Additionally, the bike lanes on the western section of North Park end just east of MLK and should be extended to reach that intersection. Further, a multi-use trail should be added to the south side of North Park west of Coventry, to connect the Shaker Lakes multi-use trail east of Coventry with the Lake-to-Lakes trail on Fairhill. This connection is critical to network connectivity; without it, bicyclists are faced with riding contraflow to traffic on MLK which is one-way in this area, or riding on the sidewalk which has no pedestrian ramp and is in poor condition. It would also be appropriate to transition the buffered bike lanes to the multi-use trail that connects to the Lake-to-Lakes Trail. Note: There is a pinch point on North Park that may constrict trail access in the vicinity of Roxboro Middle School. If a structural solution is not feasible, the roadway could be narrowed at this location and the trail could run along existing pavement. There is excess pavement width in this area.*

North Park Boulevard (Coventry to Lee)

North Park is a 2-lane road with bike lanes. The Shaker Lakes multi-use trail runs along the south side of North Park between Lee and Coventry. Based on traffic volume data from the NOACA count map (1989-2003), this section of North Park carries approximately 3,500-10,000 vehicles per day.

***Recommendation**: The travel lanes are wide so the bike lanes should be converted to buffered bike lanes. This would provide greater protection to the bicyclists as well as traffic calming effects.*

Grandview-Bellfield-Delaware-South Overlook

These north-south neighborhood streets connect Cedar with North Park and provide a variety of options for bicycle travel.

Grandview Avenue: This is a fairly narrow street and on-street parking is permitted on the east side. It connects with Cedar at a signalized intersection and provides connectivity to points north via Surrey.

Bellfield Avenue: This is a fairly narrow street that terminates at Cedar and North Park with non-signalized T-intersections. On-street parking is permitted on the east side.

Delaware Drive: This street is wider than Grandview and Bellfield. Like Bellfield, it terminates at Cedar and North Park with non-signalized T-intersections and on-street parking is permitted on the east side.

South Overlook Road: This street is wider than Grandview and Bellfield. Like Grandview, it meets Cedar at a signalized intersection, facilitating crossing of Cedar and access to the Top of the Hill intersection and points beyond.

Potential Bikeway Alternatives:

- **One-Way Pair with Contraflow Bike Lane and Sharrows**: Select two adjacent roads (i.e., Delaware and South Overlook) and convert them to one-way roads for auto travel. The remaining space between the curbs would be used to provide a bike lane and on-street parking with bump outs. The bike lane would be contraflow (opposing the direction of vehicle travel). Bicycles traveling in the same direction as motorized vehicles could be accommodated with sharrows. With the two streets acting as a one-way pair, a bike lane would be provided for both directions of travel: northbound bikes on the southbound street and southbound bikes on the northbound street.
- **Bicycle Boulevard**: A bicycle boulevard prioritizes bicycle travel over other travel modes through a variety of treatments. With the roadway widths on these residential streets, a bicycle boulevard could be established by providing on-street parking with bump outs, with the remaining narrow travel lane marked with sharrows. Two way travel by motorized vehicles would be permitted but it would feel fairly constrained, encouraging slow traffic speeds and limited vehicular use. Additional traffic calming could be implemented by providing alternate side of the street parking at intervals along the street.
- **Bicycle Route Signing**: Bicycle travel could be encouraged without changing the configuration of the existing roadways through the use of signage. The roads are fairly narrow and carry relatively low volumes of traffic.

  ***Recommendation**: Configure South Overlook as a bicycle boulevard. This treatment could also continue on Overlook north of the Cedar/Euclid Heights intersection, which would provide an enhanced bicycle boulevard connection from North Park, across Cedar, and into the neighborhood adjacent to the Edgehill/Overlook intersection. Additionally, wayfinding and additional signage should be provided to clearly communicate this bicycle priority route.*

Euclid Heights Boulevard (Cedar to Coventry)

Euclid Heights Boulevard is a four-lane, median divided roadway between Cedar and Coventry; on-street parking is permitted. Euclid Heights provides a connection between residential neighborhoods in Cleveland Heights and the primary access routes to University Circle and downtown Cleveland via Cedar Glen Parkway. Based on traffic volume data from the NOACA count map (1989-2003), Euclid Heights carries 11,000-12,000 vpd between Coventry and Derbyshire, increasing to almost 19,000 vpd approaching Cedar Hill. Provision of pavement markings for bicycle travel in the median-divided section is complicated by the on-street parking which is sporadic in use.

- **Multi-Use Trail**: Provide a trail in the existing median. Traffic analysis to develop and assess appropriate traffic controls at cross street median breaks would be required. Impacts of cross streets could be minimized by eliminating some of these median openings and reducing cross street access. Construction of a multi-use trail would likely be a fairly high-cost alternative, as compared to bike lanes and sharrows.
- **Buffered Bike Lanes**: Remove on-street parking and provide buffered bike lanes. A traffic and parking study would be needed to support this reconfiguration.
- **Sharrows**: Sharrows could be provided in the outside travel lanes, with attention given to areas with on-street parking. This would serve as an alternative to buffered bike lanes, if that treatment is not feasible.

***Recommendation**: Given the connectivity of Euclid Heights and its anticipated desirability as a bikeway, this road should be reconfigured as a 2-lane road with buffered bike lanes. This reconfiguration must be supported by traffic and parking studies. If conversion is not feasible, sharrows should be provided.*

Euclid Heights Boulevard (Coventry to Taylor)

Euclid Heights Boulevard becomes a 2-lane road east of Coventry and continuing east to Lee and Taylor. This section of Euclid Heights provides a connection between residential neighborhoods in Cleveland Heights. Based on traffic volume data from the NOACA count map (1989-2003), Euclid Heights carries 7,000-9,000 vpd in this section. Sharrows are currently provided along this corridor and given the roadway width, there is not an opportunity to provide bike lanes.

***Recommendation**: Given the existing roadway width, the existing sharrows are an appropriate bikeway treatment and should be retained. However, the sharrow placement should be modified to a location that is centered in the travel lanes. Additionally, given its function as a collector roadway, related signage should be provided along Euclid Heights.*

Coventry Road

Coventry Road is a 4-lane, median-divided roadway south of Fairmount and it is a 2-lane roadway to the north. Traffic volumes along the Coventry corridor are approximately 9,000-12,000 vpd in Cleveland Heights, based on traffic volume data from the NOACA count map (1989-2003). Although on-street parking is not prohibited on the median-divided section, it is uncommon. As such, sharrows could be provided in the outside travel lanes south of Fairmount. The sharrows currently provided between Fairmount and Euclid Heights could be extended through Superior and out to Mayfield. This is an appropriate bikeway treatment through the residential areas as well as in the Coventry commercial district. North of Mayfield, sharrows should be placed to accommodate the on-street parking.

***Recommendation**: Provide sharrows along Coventry, centered in the travel lanes, with associated signage.*

Lee Road (north of Monticello)

North of Monticello, Lee Road is a 4-lane road and on-street parking is permitted in the outside lanes. Pending the results of parking and traffic studies, this section of Lee Road could be converted to a 3-lane road with bike lanes (or wide shoulders if there is not sufficient width for bike lanes). Provision of bike lanes will require the prohibition of on-street parking. Based on traffic volume data from the NOACA count map (1989-2003), traffic volumes for this section of Lee range from 4,000-7,000 vpd.

> ***Recommendation**: Convert Lee Road north of Monticello to a 3-lane road with bike lanes (or wide shoulders, depending on available roadway width). A traffic and parking study must support this conversion.*

Lee Road (Monticello to Whitehorn)

Lee Road is a 4-lane roadway with on-street parking in the commercial district between Monticello and Whitehorn. Bicycles could be accommodated in this section through the use of sharrows in order to maintain on-street parking for the commercial area. Based on traffic volume data from the NOACA count map (1989-2003), traffic volumes for this section of Lee range from 8,500-10,000 vpd.

> ***Recommendation**: Provide sharrows on Lee Road between Monticello and Whitehorn.*

Lee Road (Whitehorn to Superior)

Lee Road is a 2-lane roadway through a predominantly residential area between Whitehorn and Superior. There is a desire to provide more than sharrows through this section of Lee Road. Based on traffic volume data from the NOACA count map (1989-2003), traffic volumes for this section of Lee range from 9,500-11,500 vpd.

> ***Recommendation**: Restripe the 2-lane section of Lee road with 11 ft travel lanes and wide shoulders (edgeline striping), as possible.*

Lee Road (Superior to Dellwood)

Lee Road transitions to a commercial district south of Superior, with 2-lanes and on-street parking in some areas. From Cedar south to Dellwood (Cedar-Lee area), it is predominantly a 3-lane roadway with on-street parking. There is a desire to provide more than sharrows through this section of Lee Road where possible. Based on traffic volume data from the NOACA count map (1989-2003), traffic volumes for this section of Lee are roughly 12,000 vpd.

> ***Recommendation**: Provide wide shoulders wherever possible in this section. In areas with on-street parking (Cedar-Lee District), reduce the center turn lane width to allow for wider travel lanes with sharrows added to the travel lanes. Unfortunately, there is insufficient space to provide both bike lanes (or wide shoulders) and parking in this area, and on-street parking is viewed as critical to maintaining the economic health of the commercial district.*

Lee Road (Dellwood to North Park)

Lee Road is a 3-lane section with wide shoulders between the Cleveland Heights city line near North Park and the Cedar-Lee District at Dellwood, just north of the library. Additional bicycle accommodations are not needed in this section. Based on traffic volume data from the NOACA count map (1989-2003), traffic volumes for this section of Lee range from 11,500-14,500 vpd. ODOT traffic counts from 2011 show that Lee carries approximately 11,000 vpd north of Fairmount.

> ***Recommendation**: The fairly recent reconfiguration of this section of Lee, with the 3-lane roadway and wide shoulders, is an appropriate treatment to accommodate bicyclists within the constraints of the existing roadway width. The city of Shaker Heights is planning to similarly reconfigure Lee from North Park to the south.*

Taylor Road

Between Fairmount and Cedar, Taylor is a 2-lane north-south roadway with on-street parking permitted on the east side. Based on traffic volume data from the NOACA count map (1989-2003), Taylor carries between 6,500-16,500 vpd. Between Cedar and Euclid Heights, Taylor widens to four travel lanes. On-street parking is provided intermittently in the outside travel lane on the northbound side (blocking the right lane); on-street parking is also provided on the southbound side, but it is shadowed (bump outs) and does not block traffic. The city is preparing for a project to add bike lanes where possible (by Severance Circle) and between Fairmount and Silsby.

> ***Recommendation**: The Plan defers to the city's project to provide bike lanes where possible on Taylor. Existing 4-lane sections should be converted to 3-lanes and bike lanes or wide shoulders should be added, depending on the available width, In the other sections, sharrows should be provided.*

Scarborough Road

Scarborough Road is a 2-lane facility that serves as an east-west neighborhood connector between (and parallel to) Fairmount Boulevard and Cedar Road. Cross streets are generally all-way stop controlled. Parking is permitted on one side of the street. With the east-west connectivity and what is expected to be low traffic volumes, Scarborough provides a good bikeway connection. Supplemental pavement markings to accommodate bicycle travel are not necessary. Provision of pavement markings is complicated by the on-street parking which is sporadic in use but of value to the neighborhood.

> ***Recommendation**: Scarborough provides a very good east-west bicycle connection. Due to the characteristics of the corridor, with parking on one side of the street and randomly parked cars, supplemental pavement markings would not be appropriate. However, bikeway and wayfinding signage would be useful.*

Stratford-Cottage Grove

These two roads function as neighborhood collectors, providing good north-south connectivity on roads with low traffic volumes. They are 2-lane roadways and parking is permitted on one side of the street.

Cross streets are generally all-way stop controlled. Parking is permitted on one side of the street. Supplemental pavement markings to accommodate bicycle travel are not necessary.

***Recommendation**: The Stratford-Cottage Grove corridor provides a very good north-south bicycle connection. Although supplemental pavement markings are not appropriate, bikeway and wayfinding signage would be useful.*

Meadowbrook Road

Meadowbrook is a 2-lane roadway that bisects the residential area located between Cedar and Silsby. This road is quite comfortable for bicycling but could benefit from specific bicycle facility provisions.

Potential Bikeway Alternatives:

- **Bike Lanes**: Bike lanes or buffered bike lanes (depending upon roadway width) could be provided. This would likely require prohibition of on-street parking, so a parking study should be conducted prior to implementation.
- **Advisory Bike Lanes**: Advisory bike lanes could be provided, but Meadowbrook is winding and includes many two-family homes lacking convenient off-street parking so many vehicles park on the street. Introduction and implementation of advisory bike lanes in Cleveland Heights may be more well-received at another location.
- **Bicycle Boulevard**: A bicycle boulevard prioritizes bicycle travel over other travel modes through a variety of treatments. Depending upon the desired treatments, a traffic study and likely a parking study would be needed.
- **Bicycle Route Signing**: Bicycle travel could be accommodated without changing the configuration of the existing roadways through the use of signing. Meadowbrook functions as a neighborhood collector and carries relatively low traffic volume.

Advisory Bike Lanes are a treatment that provides bike lanes on low-volume roads that do not have enough room for standard bike lanes. These roads do not have a striped centerline (ADT < 6,000 vpd) and the roadway space is shared between bicycles and motorized vehicles. This treatment has been implemented in Minneapolis, following examples in the United Kingdom and the Netherlands.

http://www.bikewalktwincities.org

***Recommendation**: Reconfigure Meadowbrook as a bicycle boulevard to prioritize bicycle travel over that of motorized vehicles. This treatment would provide a bicycle boulevard connection from North Park, across Cedar, and into the neighborhood by the Edgehill/Overlook intersection. Additionally, wayfinding signage should be provided.*

Derbyshire-Lamberton-Washington-Edgehill (neighborhood north of Cedar)

This series of roads provides an alternative to Cedar as a way to get to the Edgehill/Overlook area and University Circle without having to travel on busy roads like Mayfield, Cedar, Fairmount or MLK. It would be optimal to provide bike lanes or advisory bike lanes on these roads or configure them as bicycle boulevards. Note that provision of bike lanes would require prohibition of on-street parking.

> ***Recommendation**: Reconfigure the roadways to create a bicycle boulevard that runs roughly parallel to and north of Cedar Road. Provide signage.*

Kenilworth Road (Mayfield to Euclid Heights)

Kenilworth Road is currently configured with one eastbound lane and two westbound lanes. To better accommodate bicycle travel, Kenilworth could be reconfigured as a 2-lane road with bike lanes. The bike lanes may need to terminate before the Mayfield/Kenilworth intersection to provide an appropriate northbound approach configuration (refer to complete streets analysis in Section 4 of this document). Kenilworth-Derbyshire reconfigured as a 2-lane roadway would likely function acceptably between the Mayfield/Kenilworth and Euclid Heights/Derbyshire intersections. Intersection performance should be evaluated at the Kenilworth/Overlook and Kenilworth/Edgehill signalized intersections to determine appropriate approach configurations. However, based on the traffic volume data that is available for the Mayfield/Kenilworth and Euclid Heights/Derbyshire intersections, we expect that the Kenilworth/Overlook and Kenilworth/Edgehill intersections would function adequately with single lane approaches on Kenilworth. Given the data and analysis included in the Cedar-Fairmount TLCI study, the existing configuration of the Euclid Heights/Derbyshire intersection should remain. Based on data from the NOACA count map (1989-2003), Kenilworth carries roughly 8,000-9,000 vpd.

> ***Recommendation**: Convert Kenilworth to a 2-lane roadway with bike lanes, pending positive support from a traffic study.*

Edgehill Road (Murray Hill to Overlook)

Edgehill Road between Overlook and Murray Hill is a steep 2-lane road that connects Cleveland Heights with University Circle and is located roughly half in the City of Cleveland and half in the City of Cleveland Heights. On-street parking is permitted on the north (downhill) side in front of the residential units in Cleveland toward the bottom of the hill, but is not permitted in the Cleveland Heights section. Edgehill is roughly 36 ft wide. This corridor consistently ranks among the highest volume bicycle routes in NOACA's semi-annual counts.

Potential Bikeway Alternatives:

- **Bike Trail**: Provide a trail connection between the south side of the Edgehill/Overlook intersection and Murray Hill to create a direct connection to/from Little Italy. The trail would require a series of switch-backs to reduce the slope of the trail. Property acquisition would also be necessary.
- **Bike Lanes**: The existing roadway is not wide enough to accommodate bike lanes on both sides of the road without removal of on-street parking. On-street parking is needed in front of the homes on Edgehill to the east of Murray Hill. Widening the road to accommodate bike lanes and parking is not feasible due to right of way and topographic constraints.

- **Bike Lane & Sharrows**: An uphill bike lane (eastbound) and sharrows in the downhill lane (westbound) could be provided within the existing roadway width.
- **Sharrows**: Provide sharrows in the travel lanes within the existing roadway configuration.

***Recommendation**: On-street bicyclists should be accommodated with an uphill bike lane and downhill sharrows on Edgehill. Based on NOACA bicycle counts, this very busy bicycle corridor serves many cyclists and pedestrians. NOACA has consistently recorded the highest bicycle usage east of the Cuyahoga River at this location since 2010 and the numbers are growing. This location must be a high priority for safely and effectively accommodating bicyclists. Due to the transition between municipalities on this road, the recommended improvements should be coordinated between the City of Cleveland and the City of Cleveland Heights.*

Edgehill Road (Overlook to Kenilworth)

Edgehill Road between Overlook and Kenilworth is a wide, 2-lane road that traverses a residential neighborhood with single-family homes. Currently, on-street parking is permitted on both sides of the street. The existing roadway width is approximately 36 ft.

Potential Bikeway Alternatives:

- **Bicycle Boulevard**: This section of Edgehill could be configured as a bicycle boulevard, where priority is given to bicycle travel. Motorized vehicles would be permitted but their travel would be accommodated as a lower priority to bicycle travel by modifying the corridor to facilitate bicycle travel and impede vehicular travel. This alternative should be supported by a traffic and parking study. parking study.
- **Buffered Bike Lanes**: The existing roadway could be configured with two travel lanes and buffered bike lanes if on-street parking is removed. Although a parking study may not be necessary, the neighborhood should be engaged to help determine the acceptability of removal of on-street parking.
- **Bike Lanes**: Standard bike lanes with parking on one side of the street could be provided as an alternative to buffered bike lanes. On-street parking could be accommodated on one side of the street.
- **Sharrows**: Provide sharrows in the travel lanes within the existing roadway configuration. On-street parking would be retained on both sides of the street.

***Recommendation**: Reconfigure this section of Edgehill as a bicycle boulevard. If a bicycle boulevard is not feasible (or is not supported by the community), buffered bike lanes or bike lanes with on-street parking on one side of the street should be provided, pending results of a parking study. Based on NOACA bicycle counts, this is a very busy bike corridor that serves many bicyclists and pedestrians.*

Overlook Road (Kenilworth to Edgehill)

Overlook Road is a 2-lane residential roadway between Kenilworth and Edgehill. On-street parking is permitted on both sides of the street. Given the high-density residential land use in this section, the on-street parking should be retained. With the low traffic volumes, a bicycle boulevard should be considered for this corridor. A traffic study may be needed.

***Recommendation**: Reconfigure Overlook as a bicycle boulevard between Kenilworth and Edgehill. Provide appropriate signage.*

Overlook Road (Edgehill to Cedar)

Overlook Road is a 2-lane roadway between Edgehill and Cedar. On-street parking is permitted for most of this section, but is used more on the southern end than the rest of the corridor. With the fiarly low traffic volumes and given the recommendations for surrounding corridors that connect with this one, a bicycle boulevard should be considered for this corridor. A traffic study may be needed.

***Recommendation**: Reconfigure Overlook as a bicycle boulevard between Edgehill and Cedar. Provide appropriate signage.*

3.5 Study Area-Wide Considerations

In addition to the recommendations for bikeway facility types, all proposed bikeway corridors should include bike route and wayfinding signing. Sharrows will be installed in accordance with AASHTO and OMUTCD standards, specifically with respect to appearance and placement of sharrow symbols. The corridors identified in this study should be included in the City of Cleveland and City of Cleveland Heights bikeway plans. Corridors classified as Existing Neighborhood Bikeway facilities should be identified as such on bikeway maps. Additionally, across the study area and where practical, bicycle amenities should be incorporated. UCI is already working with its constituents to install bicycle racks in University Circle, and Cleveland Heights Bicycle Coalition has a program to "adopt a bike rack." "adopt a bike rack." The City of Cleveland Heights, three Cleveland Heights special improvement district organizations and numerous businesses and institutions have installed convenient bike parking. The City in 2012 instituted a short- and a long-term bike parking requirement for new buildings and bicyclist shower facilities for new office buildings as well. Bicycle racks should continue to be placed at key origin and destination locations to encourage bicycling. Additionally, the City of Cleveland is assessing the feasibility of a bike sharing program. If it is feasible, placement of bike sharing facilities on or near the study area and the recommended bikeway facilities within the identified corridors could further promote mode shift to bicycling in Cleveland Heights and University Circle.

4 Missing Links Study

The Missing Links Study analyzes missing links within the public transit systems that serve Cleveland Heights and University Circle to improve the quality, comfort and convenience of alternate transportation modes. The study is a comprehensive analysis of transit connectivity between Cleveland Heights and University Circle. In the TLCI grant application, the study sponsors describe the conditions of transit service, bicycling facilities, and sidewalks as deficient. It also asserts that Cleveland Heights and University Circle would benefit from a mode shift away from cars. Among the benefits of the potential improvements are the economic and environmental benefits of reducing parking lot and parking garage construction in University Circle, resulting in a "green dividend" for University Circle workers and students living in Cleveland Heights, increasing the desirability of Cleveland Heights as a place to live and do business, and improving access between workforce and places of employment. Additionally, parking in University Circle is in high demand and there are limited opportunities to expand and only through the high cost of parking structures.

Desired Outcomes:

Facilitate alternate mode travel between Cleveland Heights, University Circle, and the adjacent communities.

Encourage mode shift away from auto travel.

Project Focus:

Enhance connections between Cleveland Heights and University Circle by:

- Improving general transit circulation and transit opportunities for travel between and within Cleveland Heights and University Circle
- Improving student access to businesses, activities, housing opportunities in Cleveland Heights
- Improving access for residents of Cleveland Heights to University Circle businesses, institutions, entertainment and activities

Support Cleveland Heights as a residential location for University Circle workers

Support ongoing development of Cleveland Heights and University Circle by:

- Reducing transportation costs for individuals
- Reducing parking infrastructure costs for organizations
- Reducing parking footprint

4.1 Existing Conditions

The first step in assessing the need for potential future transit service is to conduct a thorough inventory of the existing transit service and amenities. This section documents existing transit services and amenities in the University Circle and Cleveland Heights areas, identifying any 'missing links' (or holes) in current transit services. This section is divided into two sub-sections: Existing Transit Service and Existing Transit Amenities. Existing Transit Service describes services provided in the University Circle and Cleveland Heights areas, including services provided by RTA and the various campus shuttle services provided by University Circle institutions. Existing Transit Amenities identifies the transit amenities and technologies available to riders in the study area.

The study area covers portions of the communities of Cleveland, East Cleveland, Cleveland Heights, Shaker Heights and University Heights. It includes numerous educational, medical services, cultural, entertainment and other activity centers with the campuses of CRWU, Cleveland Institute of Art, University Hospitals of Cleveland, Cleveland Clinic Foundation, Severance Hall, the Cleveland Museum of Art, the Natural History Museum, Cleveland Botanical Garden, the Severance Town Center, Little Italy, Coventry, Cedar-Lee and Cedar-Fairhill shopping and entertainment districts, Lake View Cemetery, and Forest Hill Park.

Existing Transit Service

Transit service in the study area is offered by RTA and various University Circle institutions. As shown in Figure 4-1, RTA provides service throughout the study area while campus area services are focused around the CWRU, University Hospitals, and Cleveland Clinic campuses, with one route extending east as far as the Coventry Road shopping/entertainment area.

RTA service in University Circle and Cleveland Heights consists of the Rapid Red Line (heavy rail), the HealthLine (bus rapid transit) and 16 bus routes. As shown in Table 4-1, RTA services are provided throughout the day with high frequencies every day of the year. A few RTA services within the study area operate 24 hours a day. While RTA services provide transit options for travel within the study area, most of the lines and routes pass through the area and are headed to destinations outside of the study area. This is principally the case with routes that pass through Cleveland Heights and/or University Circle bound for downtown Cleveland, or crosstown bus routes passing through the area, as they travel through Cuyahoga County. None of the routes focus solely on connecting Cleveland Heights to University Circle; however, a number of routes provide circulation within or between these two communities as they travel between their terminus points outside of the study area. Several of the routes bypass or skirt the edges of University Circle as they travel from Cleveland Heights to the major arterials destined for downtown Cleveland.

In addition to RTA's transit service, University Circle and Cleveland Heights are served by seven shuttle-bus routes provided by CWRU, University Hospitals, and University Circle, Inc. As shown in Table 4-1, these shuttle services are offered daily from early morning to late evening at varying levels of service frequency. The campus area transit network is compact and tailored, primarily, to meet the transportation needs of the students and employees at both CWRU and University Hospitals.

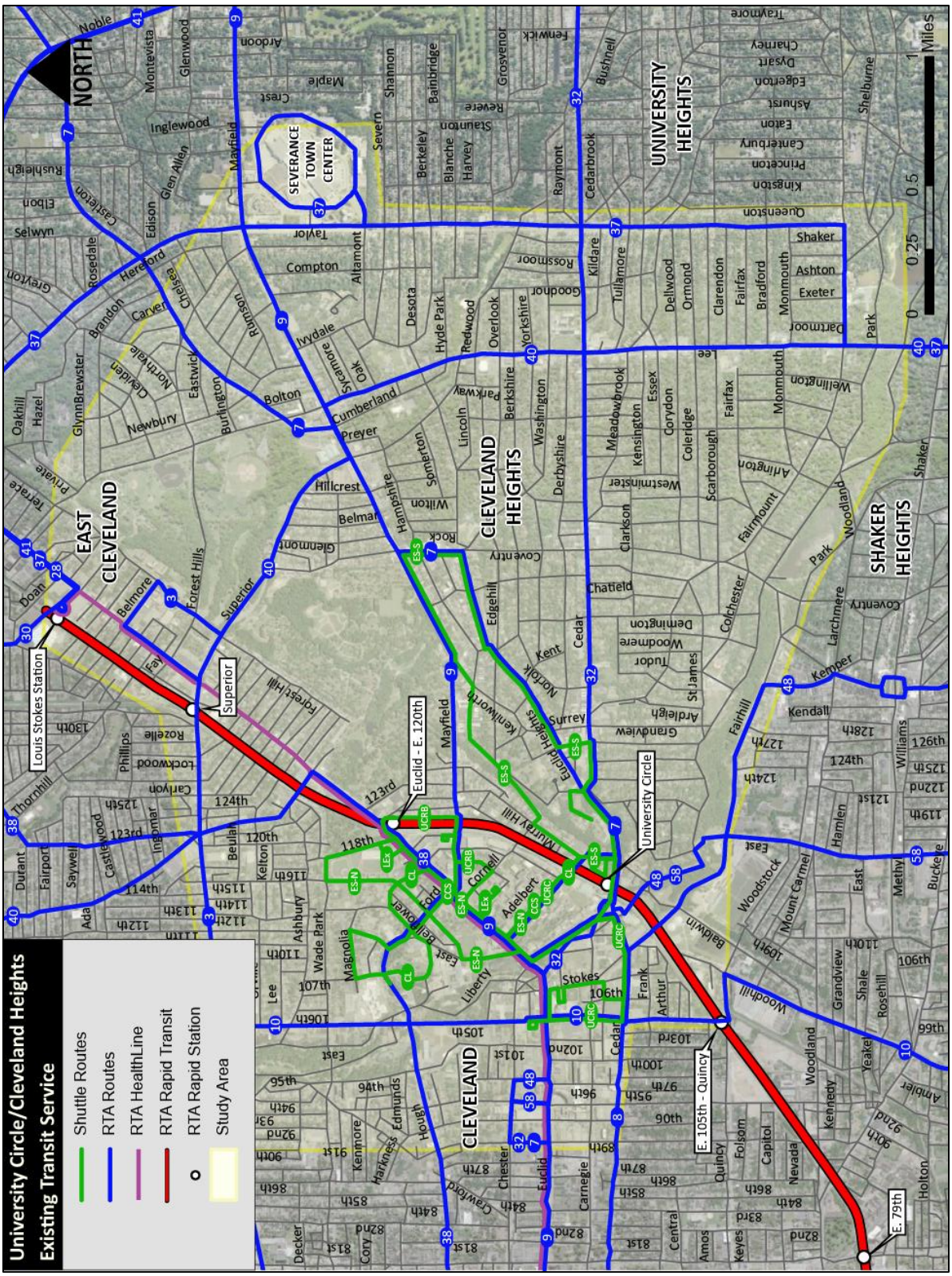


Figure 4-1: Existing Transit Service (August 2013)

			Weekday					Weekend			
RTA Route	Boardings (2012)	Operator	AM Peak (min)	Mid-day (min)	PM Peak (min)	Evening	Service Span	Saturday (min)	Service Span	Sunday (min)	Service Span
Red Line (West)	4,299,598	RTA	7	15	7	15	3:27a - 1:38a	15	3:57a - 1:38a	15	3:57a - 1:38a
Red Line (East)		RTA	15	15	15	15	3:17a - 1:41a	15	3:47a - 1:41a	15	3:47a - 1:41a
HealthLine	4,629,200	RTA	7	7	6	15 - 30	24 Hours	15-30	24 Hours	15-30	24 Hours
3	1,538,257	RTA	10 - 15	20	15	30	24 Hours	20 - 30	24 Hours	30	24 Hours
7	250,032	RTA	30	45	30	60	4:37a - 11:26p	60	5:49a - 11:12p	60	5:49a - 11:12p
8	233,888	RTA	35	35	35	35	5:14a - 1:28a	60	5:41a - 12:34a	60	6:10a - 11:32p
9	661,241	RTA	15	45	20	60	4:11a - 2:19a	60	5:12a - 12:04a	60	5:12a - 12:04a
10	1,513,905	RTA	12 - 15	15	15	30	24 Hours	30	24 Hours	30	24 Hours
28	1,374,599	RTA	12	15	12	20	24 Hours	30	24 Hours	30	24 Hours
30	758,246	RTA	15	25	15	30	24 Hours	45	24 Hours	60	24 Hours
32	480,384	RTA	30	45	30	60	4:10a - 12:10a	60	4:28a - 11:42p	60	4:28a - 11:42p
37	573,066	RTA	30	60	30	60	4:51a - 10:51p	60	5:30a - 10:53p	60	5:29a - 6:53p
38	377,854	RTA	40	60	40	60	5:05a - 12:52a	60	6:10a - 12:50a	60	6:22a - 12:50a
40	944,651	RTA	40	40	40	60	3:35a - 1:46a	60	4:27a - 1:35a	60	4:28a - 12:35a
41	1,343,902	RTA	25	30	25	35 - 45	3:23a - 1:23a	40	4:49a - 12:27a	60	6:02a - 9:47p
48/48A	919,981	RTA	15	20	15	20 - 45	3:43a - 2:10a	45 - 60	4:14a - 1:31a	60	5:25a - 12:46a
58	162,583	RTA	45	45	45	N/A	6:10a - 7:29a	N/A	N/A	N/A	N/A
Circle Link	N/A	CWRU	23	23	23	N/A	6:15a - 5:30p	18	6:15a - 5:30p	35	12:00p - 5:30p
UCRC	N/A	CWRU	20	20	20	20	6:15a - 7:00p	N/A	N/A	N/A	N/A
Case Commuter	N/A	CWRU	15	15	15	15	6:00a - 9:00p	N/A	N/A	N/A	N/A
Evening Shuttle - North Loop	N/A	CWRU	N/A	N/A	20	20	5:15p - 12:30a M-TH 5:15p - 2:30a Fr	20	5:15p - 2:30a	20	5:15p - 12:30a
Evening Shuttle - South Loop	N/A	CWRU	N/A	N/A	25	25	5:15p - 12:30a M-TH 5:15p - 2:30a Fr	25	5:15p - 2:30a	25	5:15p - 12:30a
Lerner Express	N/A	CWRU	N/A	N/A	Unknown	N/A	3:45p - 6:30p	N/A	N/A	N/A	N/A
Route B	N/A	CWRU	16	16	16	16	5:45a - 12a	N/A	N/A	N/A	N/A

Table 4-1: Existing Transit Service Characteristics (August 2013)

The routes that serve the University Circle and Cleveland Heights study area are summarized below:

Rapid Red Line

RTA's Rapid Transit Red Line is a heavy rail route between Cleveland Hopkins International Airport and the Louis Stokes Transit Center at Windermere. It has five stations within the study area including the East 105th-Quincy, University Circle, Euclid-East 120th, Superior and Louis Stokes (Windermere) Stations. RTA will reconstruct and substantially improve the University Circle Station over the next several years, while the Euclid-East 120th Street station is to be closed and replaced by a new station at Mayfield Road in Little Italy. The rail line provides riders boarding at University Circle area stations options for travel to Windermere, downtown Cleveland, the west side of Cleveland, and the airport. Passenger boardings for stations located in the study area are presented in Table 2. The rapid station at University Circle is the most central to the study area and is second to Windermere in terms of annual passenger boardings at almost 350,000.

The Red Line is in service between 3:15am and 1:40am daily with 7-minute peak period headways between Terminal Tower and the airport and 15-minutes between Louis Stokes (Windermere) Station and Terminal Tower. During off peak, headways are set at 15-minutes along the entire route.

Station	Annual Boardings (Oct. '11-Sep. '12)
East 105th-Quincy	109,894
University Circle	349,209
Euclid-East 120th	74,511
Superior	189,310
Louis Stoke-Windermere	537,790

Table 4-2: RTA Red Line Rapid Station Boardings

HealthLine

RTA's Health Line is a bus rapid transit line that operates along Euclid Avenue between Tower City/Public Square in downtown Cleveland and the Louis Stokes Rapid Station at Windermere. Within the study area, it operates along Euclid Avenue, transitioning from center dedicated lanes to shared curb lanes in the area around East 105th Street and Euclid Avenue. Service operates 24-hours a day, seven days a week with 7-minute peak and 15-30 minute off-peak headways. The HealthLine experienced the highest number of boarding of any route operating to/from the study area with 4.5 million passenger boardings in 2011.

Route 3

RTA's Route 3 is a radial fixed-route bus line that runs along Superior Avenue between East Cleveland and Public Square/Tower City in downtown Cleveland. It operates along Superior Avenue, near the northern edge of the study area. Service is provided 24-hours a day with headways ranging from 15 to 30 minutes depending on the time and day. Route 3 experiences the second highest number of

boardings of any bus route that operates within or through the study area (third of any route). Route 3 experienced 1.6 million boardings in 2011, the majority of them occurring outside the study area.

Route 7

RTA's Route 7 is a radial fixed-route bus line that operates between the Richmond Town Square in Richmond Heights and Euclid Avenue/East 89th Street in University Circle through Cleveland Heights and South Euclid. It runs through the study area, from East 89th Street and along Euclid Avenue, Euclid Heights Boulevard, Mayfield Road, and Monticello Road. Service is provided between 5am and 11pm (shorter hours on weekends) with headways ranging from 30 to 60 minutes depending on the time and day.

Route 8

RTA's Route 8 is a radial fixed-route bus line that operates between the University Circle Rapid Station in University Circle and Public Square/Tower City in downtown Cleveland along Cedar Avenue and Prospect Street. Within the study area, it operates to/from the University Circle Rapid Station along Cedar Avenue. Service on this route is offered between 5:15am and 1:30am (shorter hours on weekends) with frequencies set at 35-minutes throughout the day.

Route 9

RTA's Route 9 is a radial fixed-route bus line that operates between Mayfield/SOM Center in Mayfield Heights and the University Circle Rapid Station in University Circle through Cleveland Heights, South Euclid, and Lyndhurst. It provides limited peak period service extending from the University Circle Rapid Station to Public Square/Tower City in downtown Cleveland. Within the study area, Route 9 operates to/from the University Circle Rapid Station along Martin Luther King/Stearns Road, Euclid Avenue, and Mayfield Road. During peak periods, it also runs along Euclid Avenue between Tower City/Public Square in downtown Cleveland and the University Circle Rapid Station. Service operates between 4am and 2am daily (shorter hours on weekends) with headways ranging from 15 to 60 minutes depending on the time and day.

Route 10

RTA's Route 10 is a crosstown north-south, fixed-route bus line that operates between the Dupont Loop in northern Cleveland and the Turney-Ella Loop in southern Cleveland, with limited peak period service extending from southern Cleveland to the Mittal Steel Yard in Newburgh Heights. Within the study area, Route 10 operates along East 105th Street through the east side of Cleveland. Service is provided 24-hours a day, seven days a week, with headways ranging from 15 to 30 minutes depending on the time of day. Route 10 has the highest ridership of any bus route that operates to/from the study area (second of any mode). The route experienced almost 1.5 million passenger boardings in 2011.

Route 28

RTA's Route 28 is a radial fixed-route bus line that operates between East 276th Street/Tungsten in Euclid and the Louis Stokes Rapid Station in East Cleveland through (northeast) Cleveland. Within the study area, Route 28 operates to/from the Louis Stokes Rapid Station before leaving the study area via Euclid Avenue. Service operates 24-hours a day, seven days a week with headways ranging from 12 to 20 minutes depending on the time of day.

Route 28 has the third highest ridership of any bus route that operates to/from the study area (4th of any mode). The route experienced 1.25 million passenger boardings in 2011, with the majority of them occurring outside the study area.

Route 30

RTA's Route 30 is a radial fixed-route bus line that operates between the Shoregate Shopping Center in Willowick and the Louis Stokes Rapid Station in East Cleveland through (northeast) Cleveland and Euclid. Within the study area, Route 30 operates to/from the Louis Stokes Rapid Station before leaving the study area via Euclid Avenue. Service operates 24-hours a day, seven days a week with headways ranging from 15 to 30 minutes depending on the time and day.

Route 32

RTA's Route 32 is a radial fixed-route bus line that operates between Ursuline College in Lyndhurst and Euclid Avenue/East 89th Street in eastern Cleveland along Cedar Avenue through Cleveland Heights and University Heights. Within the study area, Route 32 operates to/from the University Circle Area and along Cedar Avenue. Service operates between 4:30am and 12:30am on weekdays, with shorter service periods on weekends. Headways range from 30 to 60 minutes depending on the time and day.

Route 37

RTA's Route 37 is a crosstown north-south fixed-route bus line that operates between Euclid Hospital in Euclid and Severance Town Center in Cleveland Heights. It provides limited peak period service extending from the Severance Town Center in Cleveland Heights to the Chagrin/East 159th Street Loop in Shaker Heights. Within the study area, Route 37 operates along Taylor Road with small deviations to the Louis Stokes Rapid Station and Severance Town Center. During peak periods, it continues on Taylor Road from the Severance Town Center to Fairmount Boulevard before entering Shaker Heights. Service operates between 5am and 11pm daily with headways ranging from 30 to 60 minutes depending on the time and day.

Route 38

RTA's Route 38 is a radial fixed-route bus line that operates between the East 129th Street Loop in East Cleveland and Public Square/Tower City in downtown Cleveland. Within the study area, Route 38 operates along E. 123rd Street, Lakeview Road, Euclid Avenue, Ford Road, Mt. Sinai Drive, and Hough Avenue. Service operates between 5am and 1am on weekdays, with shorter service periods on weekends. Headways range from 40 to 60 minutes depending on the time and day.

Route 40

RTA's Route 40 is a crosstown north-south fixed-route bus line that operates between Southgate Transit Center in Maple Heights and Taft Street/Eddy Road in (northeast) Cleveland through East Cleveland, Cleveland Heights, Shaker Heights, and Bedford. Within the study area, Route 40 operates on Superior Road, Mayfield Road, and Lee Road. Service is provided between 3:30am and 1:45am on weekdays, with shorter service periods on weekends. Headways range from 40 to 60 minutes depending on the time and day.

Route 41

RTA's Route 41 is a crosstown north-south fixed-route bus line that operates between Emerald Valley (Glenwillow) and the Louis Stokes Rapid Station in East Cleveland through Cleveland Heights, South

Euclid, University Heights, Shaker Heights, Warrensville Heights, North Randall, Maple Heights, Bedford Heights, and Solon. Within the study area, the route operates to/from the Louis Stokes Rapid Station before leaving the study area via Euclid Avenue. Service is provided between 3:30 am and 1:30am on weekdays, with shorter service periods on weekends. Headways range from 25 to 45 minutes depending on the time and day.

Route 48/48A

RTA's Routes 48 and 48A are crosstown fixed-route bus lines that operate between Marymount Hospital in Garfield Heights and the Cleveland Clinic in University Circle. Within the study area, the route operates to/from the University Circle area along Stokes Boulevard, Martin Luther King Drive and Fairhill Road. Service is provided between 3:45am and 2:00am on weekdays with shorter service periods on weekends. Headways range from 15 to 45 minutes depending on time and day. Route 48A operates during weekday daytimes only.

Route 58

RTA's Route 58 is a crosstown north-south fixed-route bus line that operates between the Cleveland Clinic in University Circle and E. 131st Street and Miles Avenue in Cleveland. Within the study area, the route operates to/from the University Circle area and along Euclid Avenue, Adelbert Road, Cedar Glen Parkway.

Route 821 (no longer in service)

RTA's Circulator Route 821 was a crosstown-fixed route bus line that operated between Severance Town Center in Cleveland Heights and the University Circle Rapid Station in eastern Cleveland, as shown in Figure 4-2. When it was in service, Route 821's alignment was located wholly within the study area. Service was provided between 6:40am and 7:10 pm on weekdays, with a shorter service period on Saturdays and no service on Sundays. The headways were set at 30 minutes. Route 821 was suspended due to low ridership and high costs in September of 2009.

Route 823 (no longer in service)

RTA's Circulator Route 823 was a crosstown-fixed route bus line that operated between Shaker Square in Cleveland and Coventry Road/Euclid Heights Boulevard in Cleveland Heights, as shown in Figure 4-3. When it was in service, Route 823 operated along Coventry Road within the study area. Service was provided between 7:10am and 7:35pm on weekdays, with a shorter service period on Saturdays and no service on Sundays. The headways were set at 30 minutes. Route 823 was suspended due to low ridership and high costs in December of 2007.

Circle Link

University Circle's Circle Link is a fixed-route shuttle bus line that operates between Wade Oval and the University Circle Rapid Station. Its circuitous route operates wholly within the study area, serving the CWRU and University Hospitals campuses, multiple other University Circle institutions, and visitor destinations, as shown in Figure 4-4. Service operates between 6:15am and 5:30pm on weekdays, with shorter service periods on weekends. The headway is 18 minutes.

University Circle Route C

University Circle's Route C (UCRC) is a fixed-route shuttle bus line that operates between East 105th Street and Adelbert Road. It serves the CWRU campus, designated parking lots west of the campus, and

the University Circle Rapid Station, as shown in Figure 4-5. Service operates between 6:15am and 7:00 pm weekdays only with 20-minute headways.

Case Commuter

CWRU's Case Commuter is a fixed-route shuttle bus line that operates between Adelbert Road and East 118th Street, as shown in Figure 4-6. It serves the CWRU and University Hospitals campuses, including the residential areas and parking lots located immediately north of the campus, and the athletic center on the eastern edge of the campus. Service operates between 6:00am and 9:00pm on weekdays only with 15-minute headways.

Evening Shuttles

CWRU's Evening Shuttle-North Loop is a fixed-route shuttle bus line that operates between the University Circle Rapid Station and E. 118th Street. It serves the CWRU campus and the University Circle Rapid Station, as shown in Figure 4-7. Service operates between 5:15pm and 12:30am Sunday-Thursday and until 2:30am on Fridays and Saturdays, with 20 minute headways and some seasonal adjustments for off-peak periods.

CWRU's Evening Shuttle-South Loop is a fixed-route shuttle bus line that serves the areas immediately south and east of the CWRU campus between the University Circle Rapid Station and Coventry Road, as shown in Figure 4-8. This route serves the campus, residential areas south and east of the campus, and the University Circle Rapid Station. Service operates between 5:15pm and 12:30am Sunday-Thursday and until 2:30am on Fridays and Saturdays with 25-minute headways and some seasonal adjustments for off-peak periods.

Lerner Express

The Lerner Express is a fixed-route shuttle bus line that serves Parking Lot 46 and University Hospitals' Lerner Tower, running along Euclid Avenue, as shown in Figure 4-9. Service operates between 3:45pm and 6:30pm on weekdays only with no set headway.

University Circle Route B

University Circle's Route B (UCRB) is a fixed-route shuttle bus line that operates between University Hospital Drive and E. 119th Street. It serves the CWRU and University Hospitals campuses, including large parking facilities on the east end of the campus and in Little Italy, as shown in Figure 4-10. Service operates between 5:30am and 12:00 midnight on weekdays only with 16 minute headways.

Existing Service Analysis

With multiple agencies offering service, the western side of the study area receives more transit service than the eastern side. The concentration of activity centers on the west side of the study area and the opportunity for passenger feed from the HealthLine and Red Line Rapid greatly contributes to the volume of transit service that operates in this part of the study area, as shown in Figure 4-2. The three bus routes with the highest levels of boardings in 2011 (RTA Routes 3, 10, and 28) all operate exclusively on the western side of the study area. In addition, of the five routes that offer 24-hour a day service (HealthLine, Routes 3, 7, 10, 28, and 30), only Route 7 offers round-the-clock service to the eastern portion of the study area.

Transit travel within the study area can prove to be difficult as many of the routes that operate to/from the study area continue outside of the boundary. Several of these routes only skim the edge of the study area before continuing to another part of the region. Of the four routes that operate through the entire length of the study area (Routes 7, 9, 37, and 40) only one route (Route 9) has a peak frequency at 15-minutes or better. The other three routes serve the study area with peak frequencies at 30 or 40-minutes. As shown in Figure 4-3, a circulator (Route 821) was once offered that traversed the study area; however, it was eliminated by RTA (along with the other circulator routes in the region) due to low ridership and high cost. While the existing shuttle services provide free transit service within the study area, their use is predominantly geared toward CWRU students, staff and faculty, and University Hospitals staff and visitors, limiting its utility to other potential transit riders in the study area. The primary exception is Circle Link, which is available for broader public use, but again only serves a concentrated area in the University Circle portion of the study area.

There is an apparent hole in transit coverage in the southern area of the study area from Cedar Road and Martin Luther King Drive east to Lee Road, with little to no transit service available to residents in this area. The three routes that create the border of this area have headways of 30-minutes or more. RTA previously offered circulator service (Route 823) that cut through this area via Coventry Road, as shown in Figure 4-3. As with Route 821, Routes 32x, 42, and 823 were eliminated due to low ridership and high cost. Routes 32x and 42 operated along Fairmount Boulevard between South Euclid and University Circle.

Other areas, including the residential neighborhoods to the north of the CWRU campus and the neighborhoods around Euclid Avenue in the northern part of the study area, could also be described as holes in terms of transit coverage, as they have very little transit service. These areas are among the most densely populated residential neighborhoods in the study area, with several apartment buildings and multi-family homes, but it is served by only four fixed-route bus lines that provide limited connectivity within the study area.

The area west of Lee Road and south of Mayfield Road of the study area boundary could also be described as a hole in terms of transit coverage with very little transit service. During off-peak hours, only Routes 32 and 40 serve the area south of Mayfield Road; Route 37 south of Severance Town Center does not operate outside of daytimes on weekdays. With peak period headways of 30 minutes on all three routes, this area does not have many opportunities for connectivity to other locations within the study area. This area once had a circulator (Route 821) that provided transit service throughout this area, but lost service when the circulator was cut due to high costs.

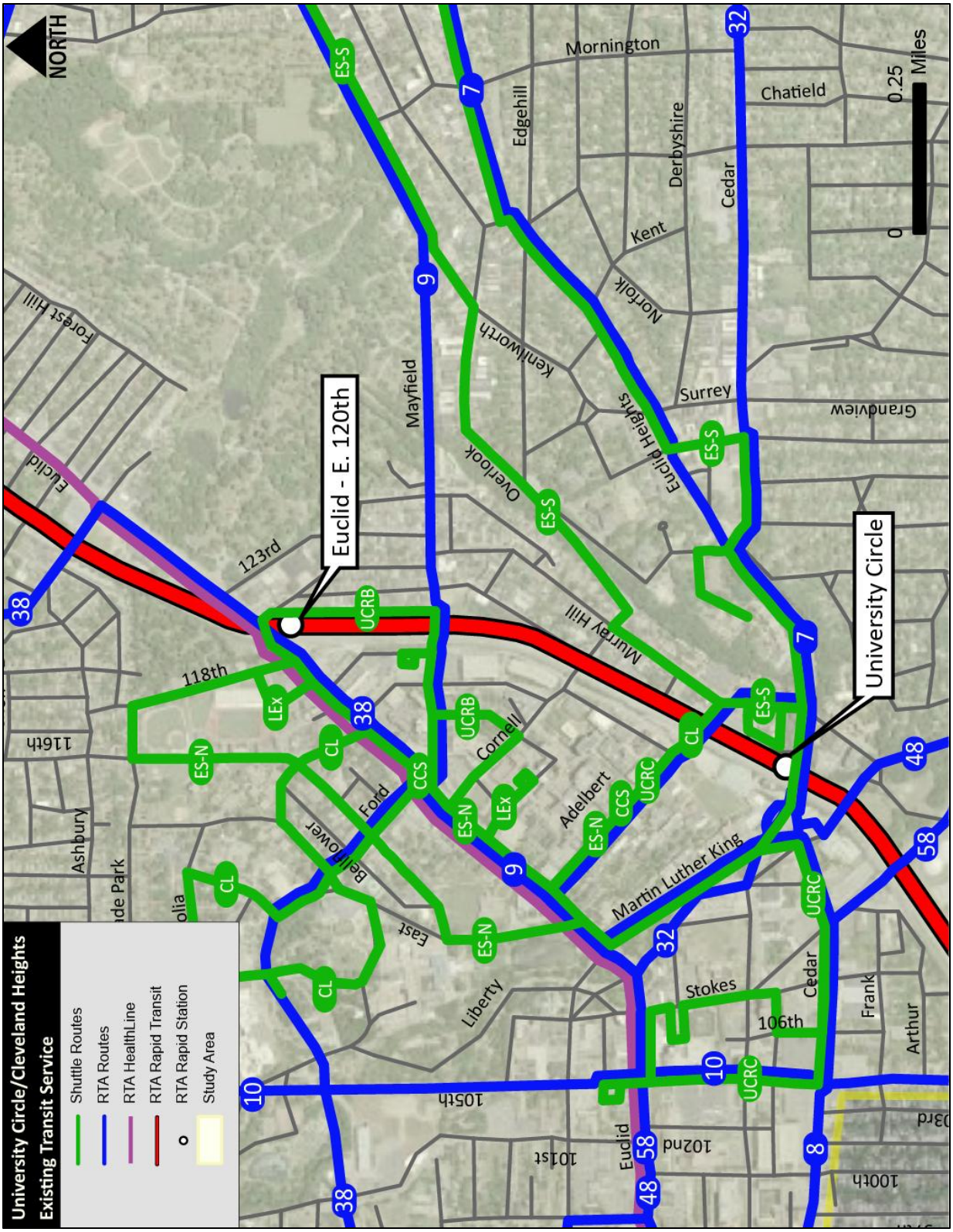


Figure 4-2: Western Study Area Existing Transit Service

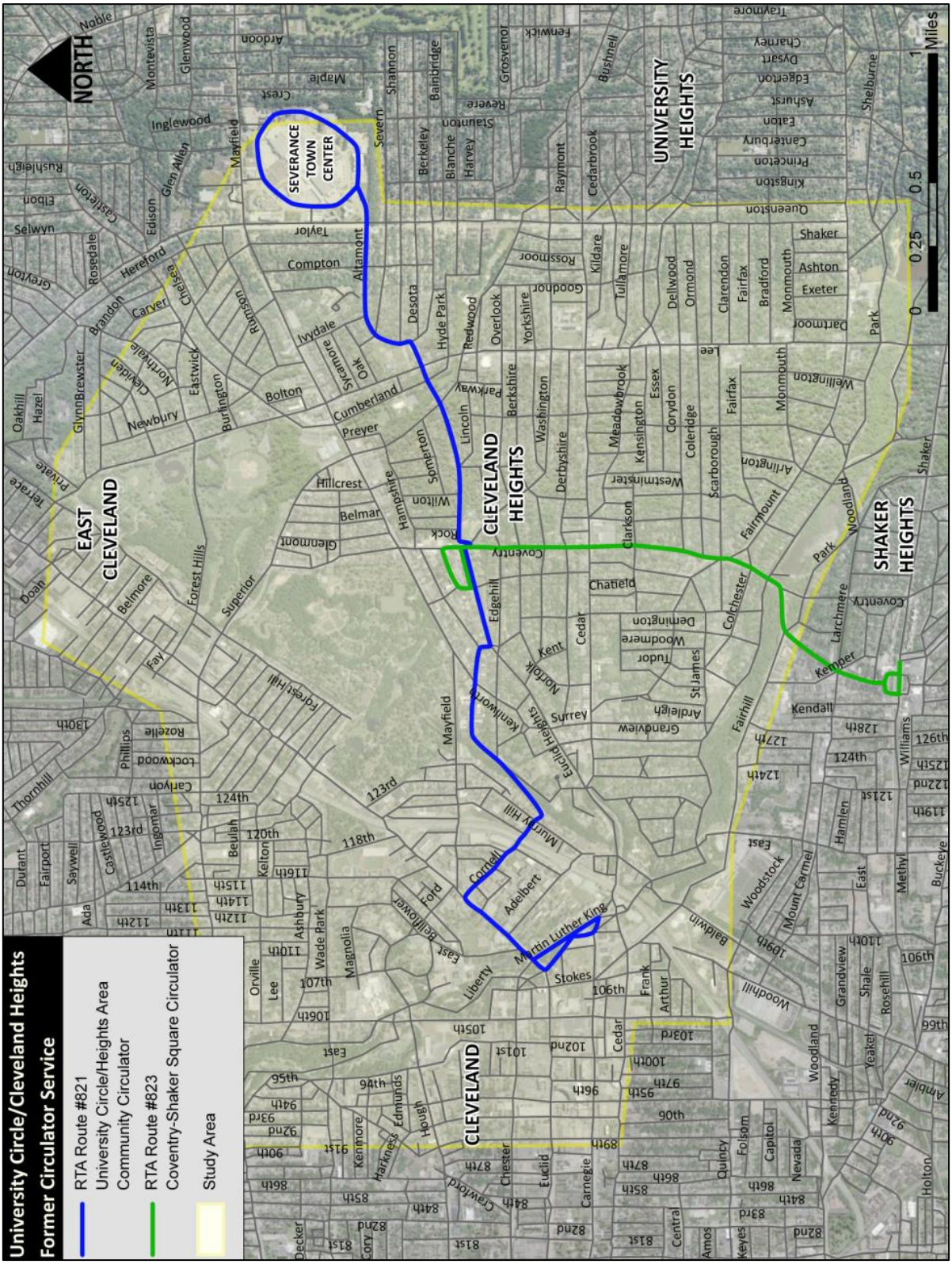


Figure 4-3: Former Circulator Service

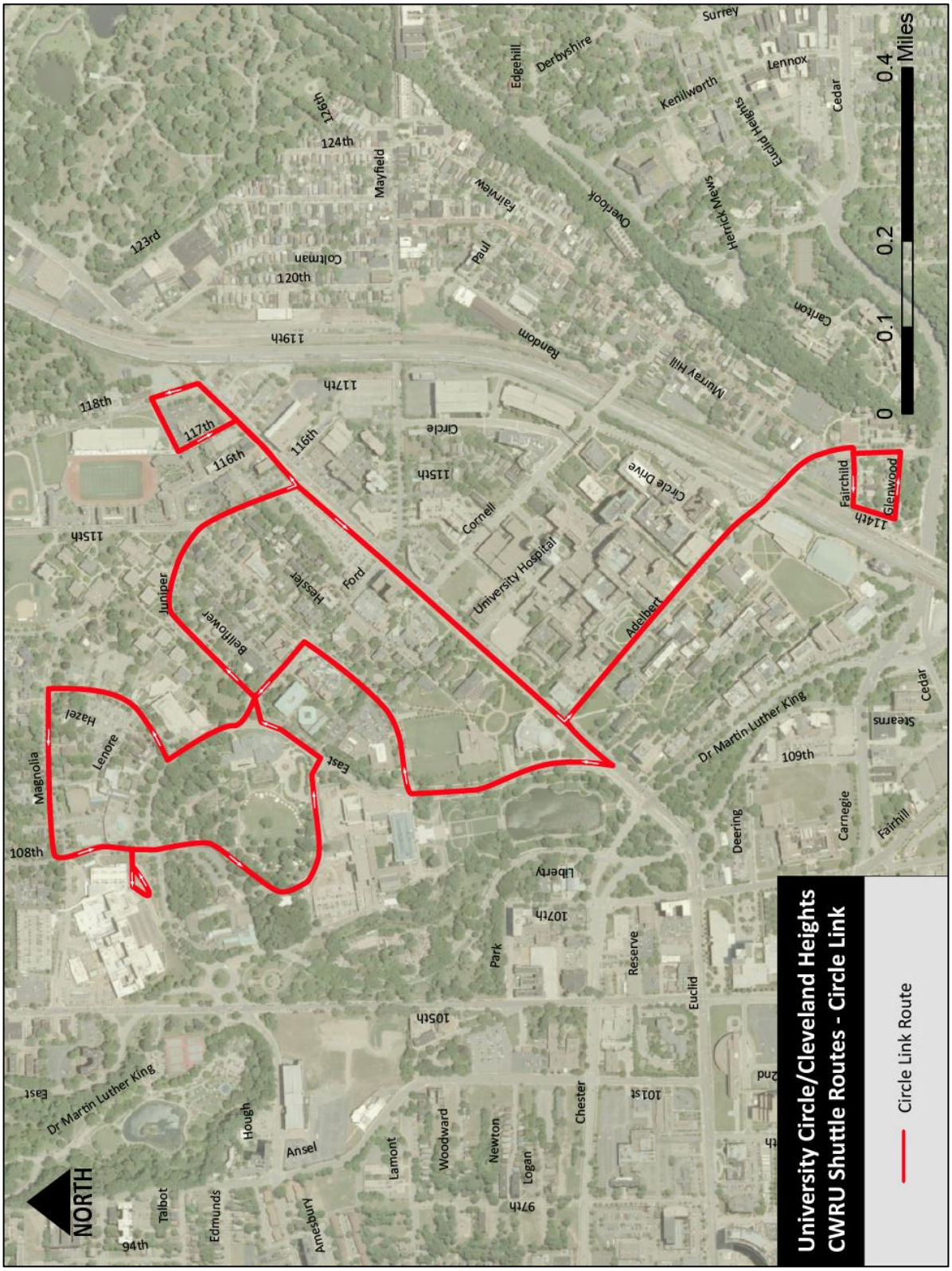


Figure 4-4: University Circle's Circle Link

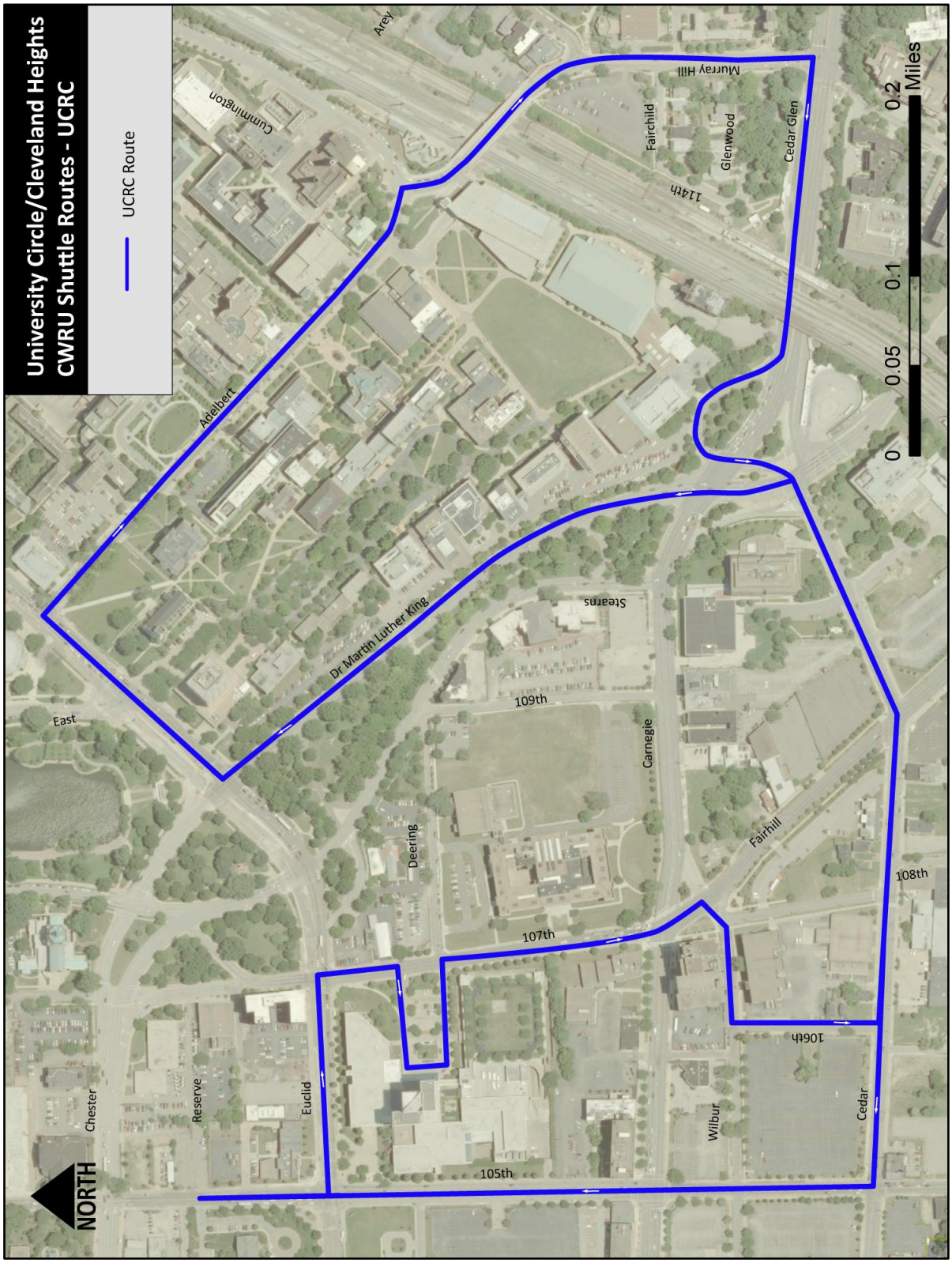


Figure 4-5: University Circle's UCRC Route

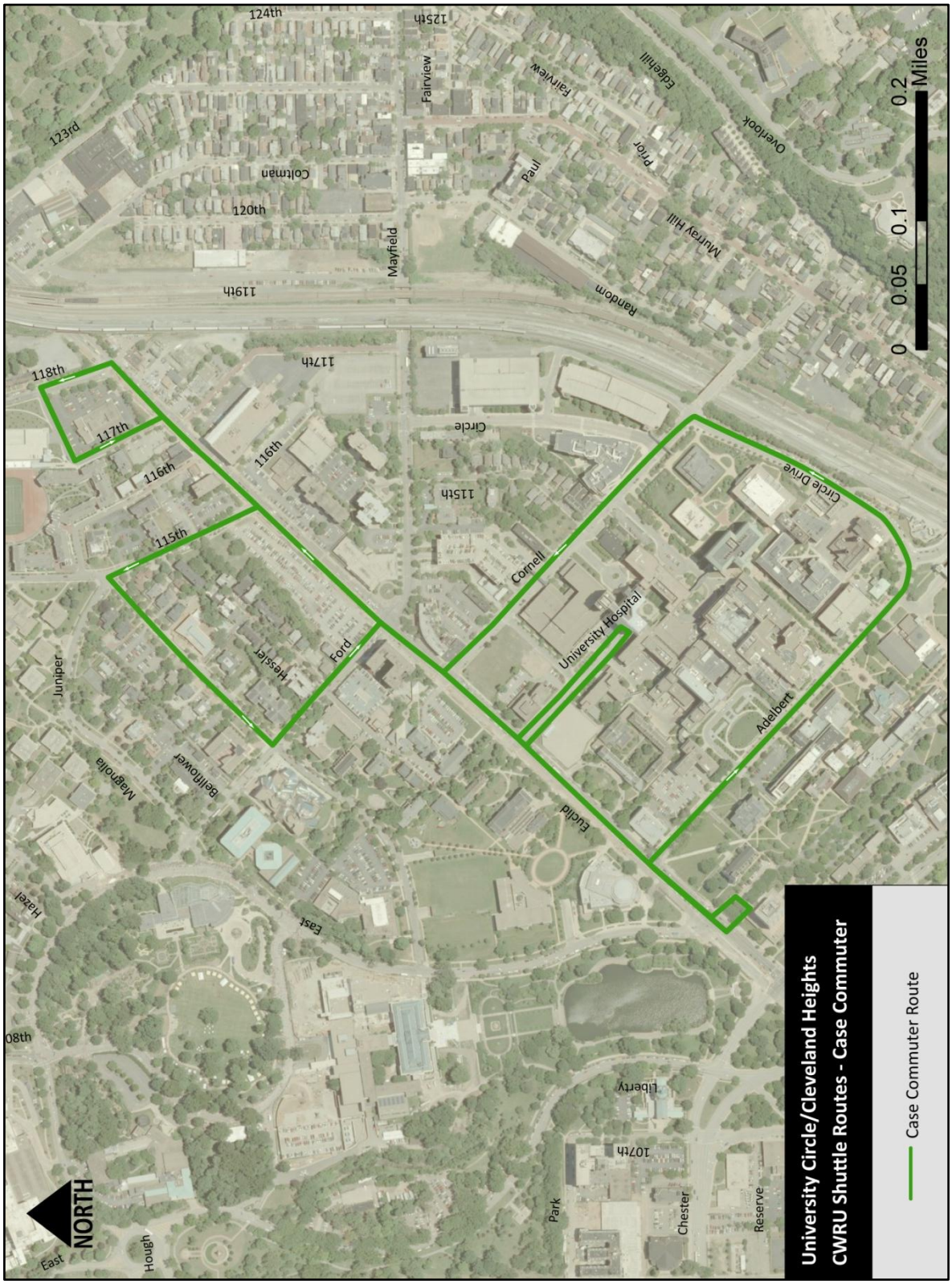


Figure 4-6: Case Commuter Route

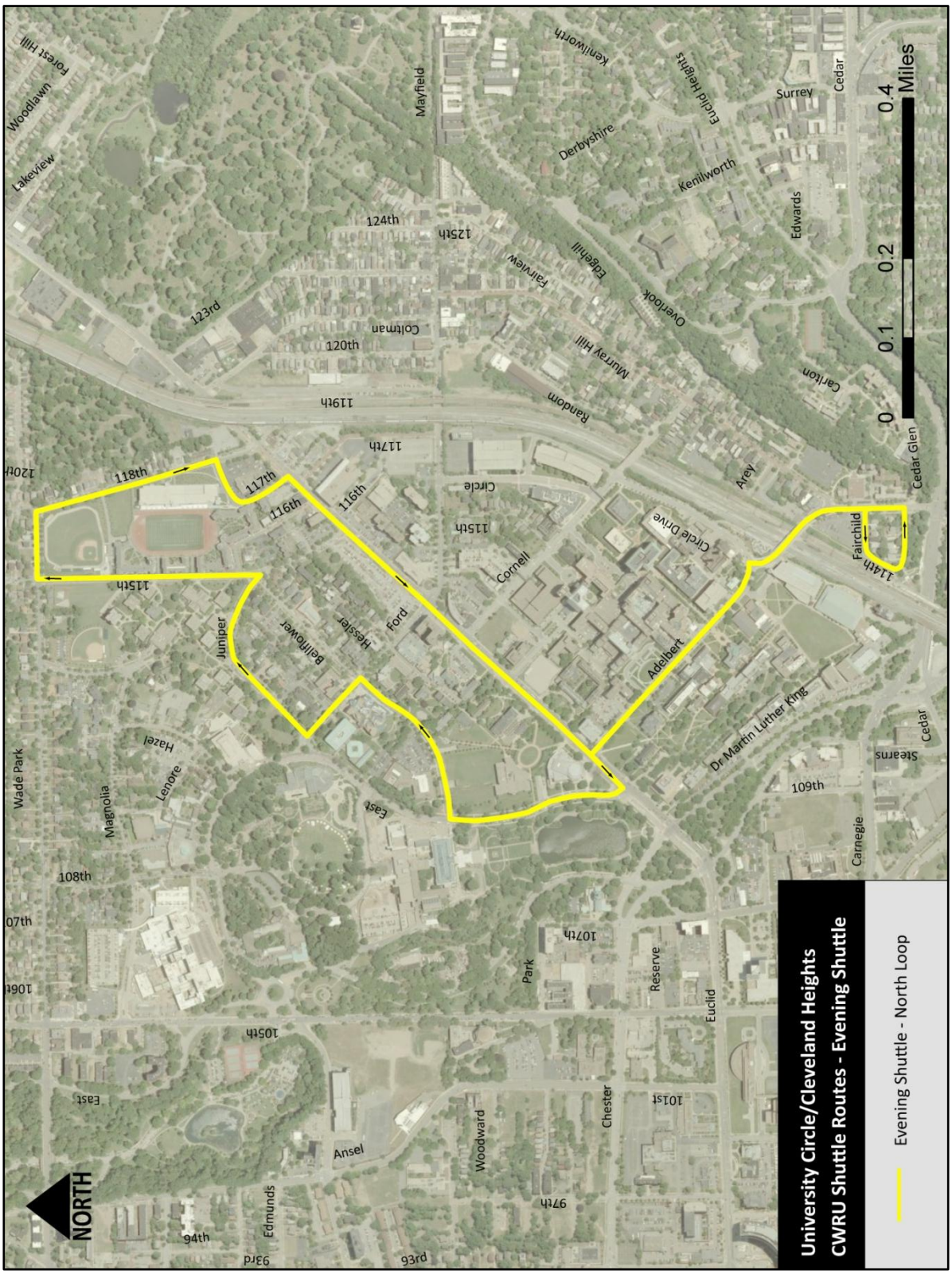


Figure 4-7: Evening Shuttle – North Loop

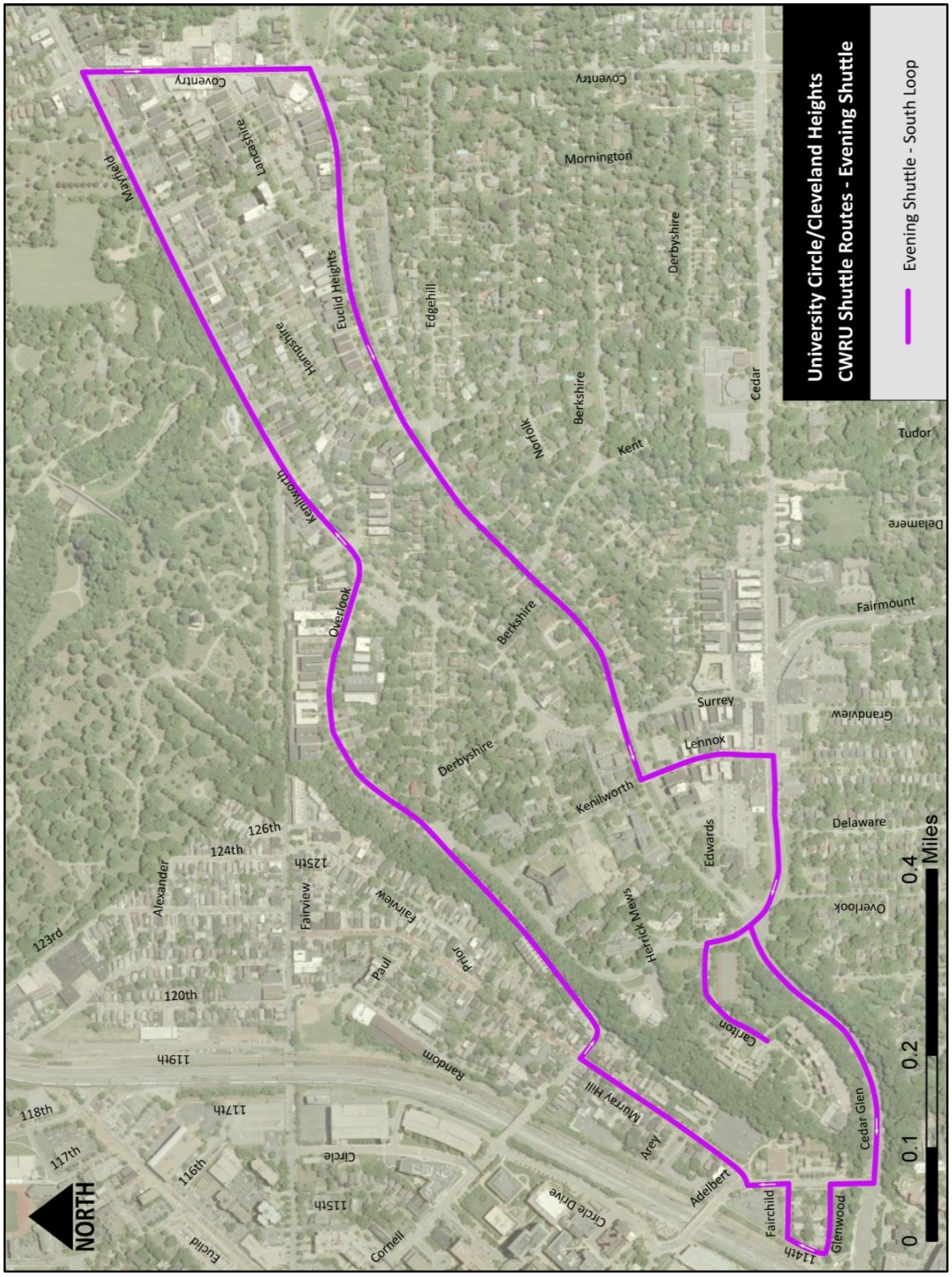


Figure 4-8: Evening Shuttle – South Loop

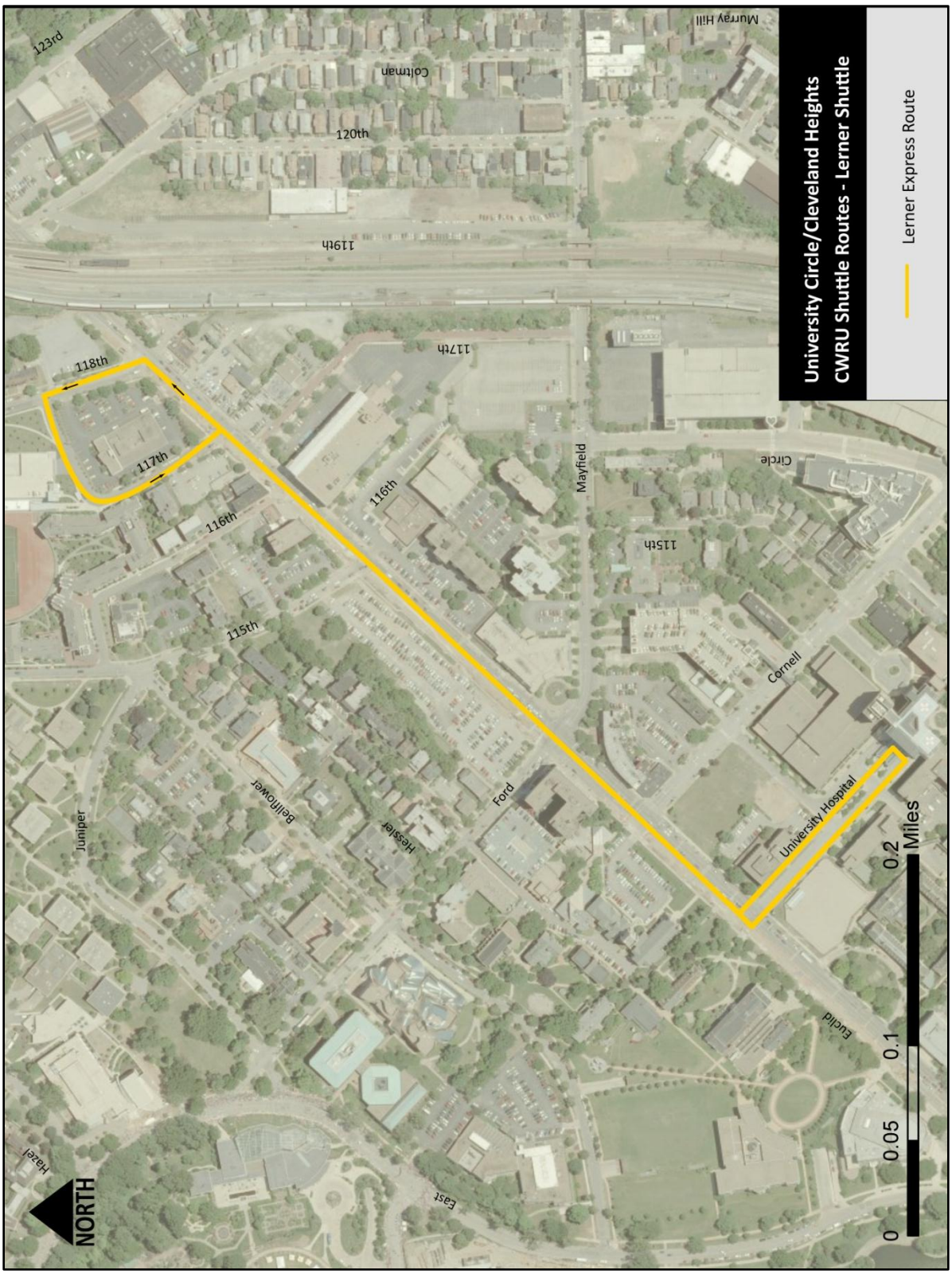


Figure 4-9: Lerner Express Route

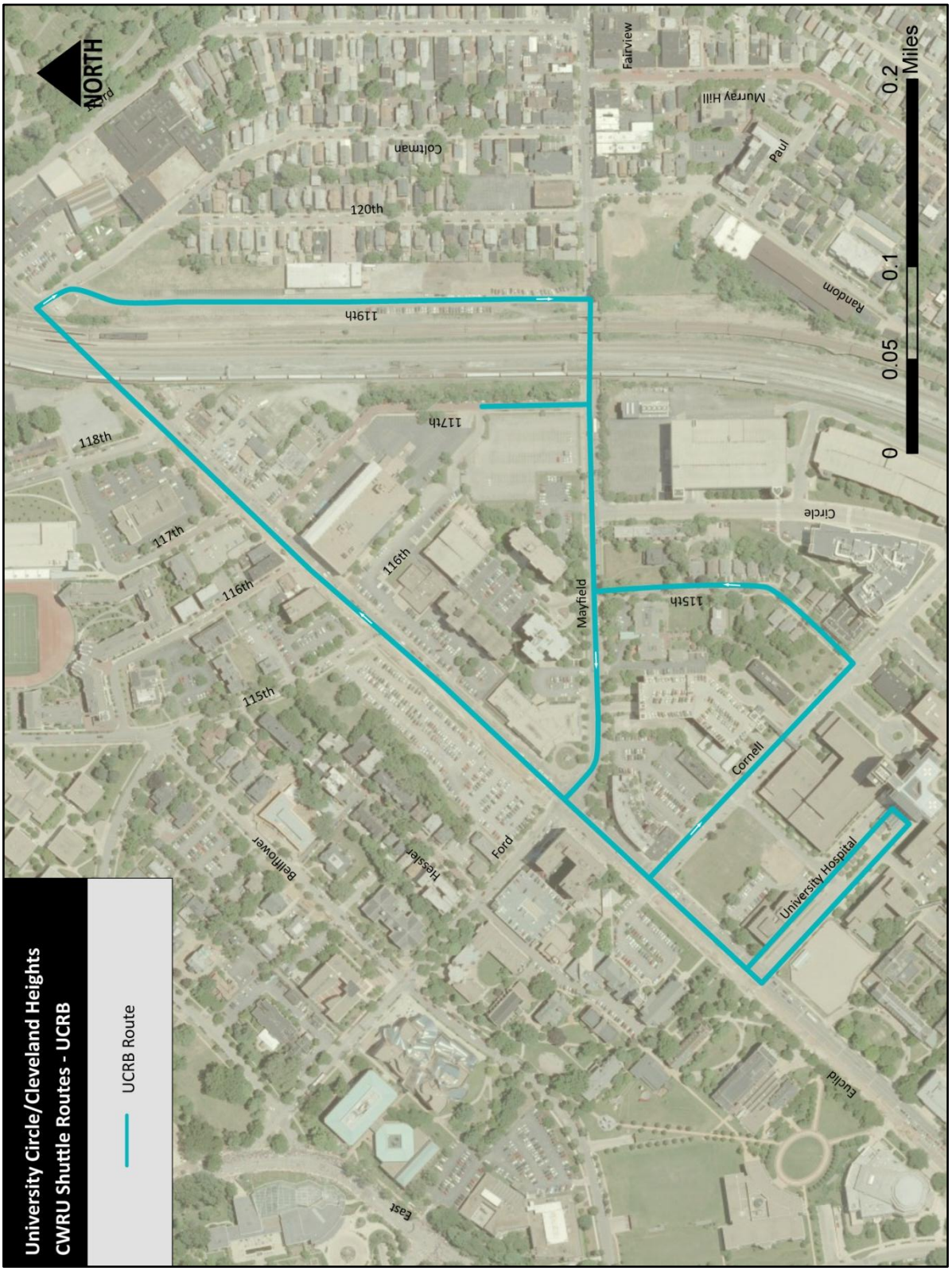


Figure 4-10: UCRB Route

Existing Transit Amenities

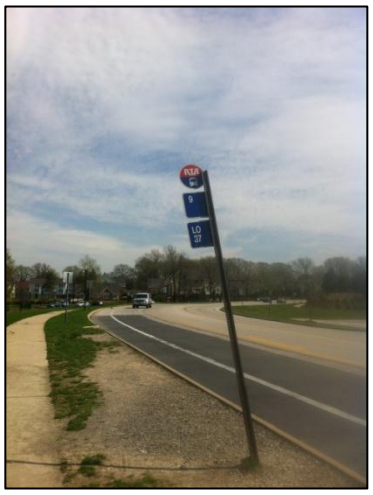
Passenger transit amenities in the area are provided and maintained by RTA and the owners of the campus shuttle system. Each transit service has its own branded amenities. While several RTA and campus routes overlap in the University Circle area, there is very limited collaboration or amenity sharing between the two transit providers. The gallery of images highlights some passenger amenities available in the study area.

With its large network and variety of modes in the study area, RTA provides a number of passenger amenities to help passengers identify RTA stops and routes. The following is a brief description of the various passenger transit amenities RTA makes available to its riders:

RTA Bus Marker

RTA Bus stop markers

Bus stop markers are the most common transit amenity provided by RTA; they are regularly placed throughout the study area. Markers are attached to various structures, including utility poles. They identify stops along a roadway but do not identify the routes that stop at the location.



RTA Bus Stop Sign

RTA Bus Stop Signs

Bus stop signage is the second most prevalent transit amenity provided by RTA, after bus stop markers. Signs are strategically placed at stops served by multiple routes. These signs are much larger than markers and identify the various routes that stop at these locations.

RTA Bus Shelters

Bus shelters are located sporadically throughout the study area, placed mainly at major intersections and on streets with heavy traffic, including Cedar and Mayfield Roads. Bus shelters accommodate seating for a few riders and standing room for a few more. Most of the shelters exhibit little, if any, RTA branding, with the exception of the signage indicating the routes that serve the respective bus shelter. Improvements in bus shelters have begun with the construction of two solar-powered bus shelters constructed by the City of Cleveland Heights through the use of RTA's Transit Waiting Environment funding. These are maintained by the City of Cleveland Heights and are located at the intersections of Mayfield Road/ Coventry Road and Mayfield Road/Warrensville Center Road along RTA Route 9.

RTA Bus Shelter

RTA Health Line Stations

Health Line stations are similar to bus shelters but are architecturally designed to fit the Health Line's branding program. Stations west of Stokes Boulevard are elevated to provide platforms with level boarding onto the bus and they sit adjacent to bus-only lanes. Shelters east of Stokes Boulevard are located curb-side with vehicles sharing a lane with

regular traffic. All stations include ticketing kiosks (allowing for pre-paid fares) to facilitate speedy boarding. The stations also include LED screens that advise passengers the current time and real-time bus information updated with NextConnect input. Stations are located throughout the Euclid Avenue corridor. All stations feature neighborhood maps, colorful branding, benches, shade trees, bike racks, and waste bins, with those in UCI's service area also including recycle bins. RTA Health Line stations are shown in Figures 20 and 21.

HealthLine Station

RTA Rapid Stations

Five Red Line Rapid stations are located in the study area. They have long platforms and provide seating for transit riders. Station lobbies contain ticketing kiosks that facilitate speedy boarding. LED screens are available at all stations but they do not currently provide real-time train information; rather, printed schedules are provided at the station lobbies. Construction of the new University Circle station began in fall of 2012 and is scheduled to be completed by fall 2014. Ground will be broken in 2013 on the new Little Italy-University Circle station at Mayfield Road. This station will replace the East 120th Street station by 2015.

RTA Rapid Station

As mentioned, the campus shuttle network is far less expansive than RTA's. The transit amenities are basic, consisting of bus stop signage and an occasional bus shelter, only a few of which include additional features. The transit amenities listed below are made available to campus area riders. The location of the amenities located throughout the study area is shown in Figure 4-11.

Shuttle Bus Stop Signs

Bus stop signage is the principal amenity used in the campus area to identify its transit route network. Each route has its own branded signage which is strategically placed at the stops of each respective shuttle bus route shelter, making it easy for the rider to identify which shuttle bus serves that location.

Shuttle Bus Stop

Shuttle Bus Shelters

Bus shelters are used sporadically within the campus shuttle network. They are located primarily at activity centers, including areas with several student dormitories, major parking facilities and the University Circle Rapid Station. Placement is focused on areas where several shuttle bus routes serve the same location. Some of the shelters include LED screens that provide real-time bus information.

Shuttle Bus Shelter

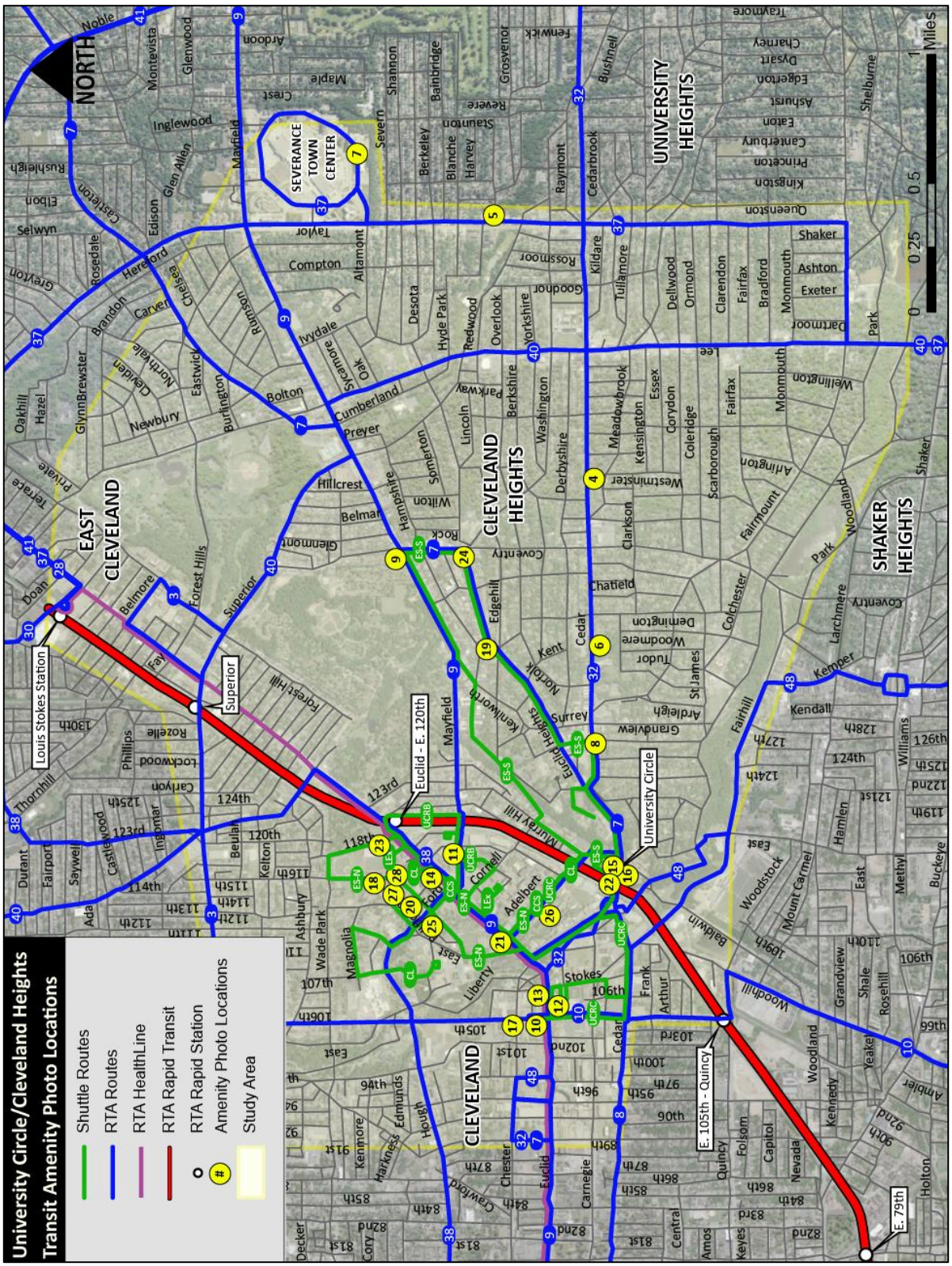


Figure 4-11: Transit Amenity Locations

4.2 Public and Stakeholder Input

The Missing Links Study launched in February 2012 with the first Joint Project Steering Committee meeting for the two studies. The first set of public meetings was held in April 2012. The Missing Links component presented the theory that while transit is present in the study area, it does not necessarily provide cohesive and convenient service to riders. If a transfer is required for a transit trip, the automobile is more likely to be the travel mode of choice. Identifying transit alternatives that would enhance existing service(s) and to provide more cohesive coverage was presented as the primary purpose of the study. The interactive online survey was a component of and complement to the public meeting. The common themes that emerged from the public meeting and survey responses are listed below. Responses to some of the survey questions are shown in Figure 4-12. *(Note: Survey respondents were asked to rank their level of agreement with a statement between 1: I disagree, and 5: I agree).*

Most respondents live, work, and shop close enough to use transit, but that most do not use it

Transit is less convenient than driving, biking, or walking

Transit service is not frequent enough

Transit stops lack sufficient information for potential riders

Safety at transit stops is a concern

Many would consider using transit if fares were lower or free

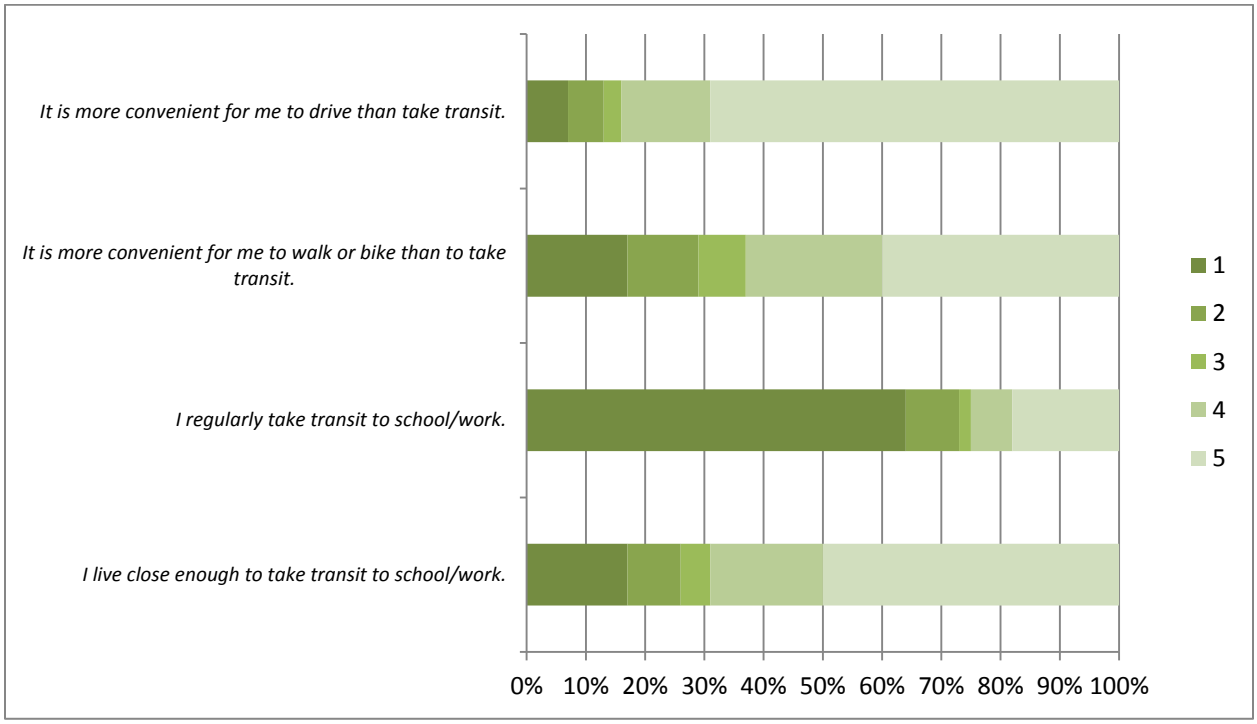


Figure 4-12: Survey Results for Representative Transit Questions

In May 2012, the first Transit Focus Group meeting was held to brainstorm ways to discuss current issues and to create a friendlier, more effective and cohesive transit system to serve the study area. Ideas were generated on fostering inter-agency cooperation and collaboration, and improving transit amenities and infrastructure. The main theme that emerged from the focus group meeting was the improvement of the rider experience, from providing real-time bus/train information to improving bus stops/shelters (i.e., providing lighting at night, trash receptacles, installing bike racks at bus stops/shelters, and providing better signage to better distinguish bus stops). The concept of implementing a new shuttle route to improve connections and travel within the study area was discussed. Subsequent meetings of the Transit Focus Group and key stakeholders were held to further develop and refine transit service concepts.

Key employers in University Circle were interviewed to understand their perspective and insights on the transportation and transit issues facing the area. The employers interviewed include University Hospitals, CWRU, VA Medical Center, and Cleveland Clinic. The common themes from the interviews were:

The three hospitals and CWRU all subsidize all or some parking costs for their employees, in the case of CWRU, for their students, and in the case of the hospitals, for patients and visitors. The hospitals noted that they have disciplinary problems with employees related to their using visitor lots, which are usually located nearer to the hospital facilities than are the assigned employee lots. In addition, all of the institutions own and/or operate parking facilities on their property. University Hospitals and CWRU, in particular, expressed a desire to reduce the footprint used by parking on their constrained sites. All are examining methods to reduce parking costs.

Existing parking policies create a disincentive to using transit, because most employees and students experience a lower out-of-pocket cost to park than to use transit, and do not consider other costs related to driving (such as the cost of fuel, insurance, or wear-and-tear on the vehicle) in their evaluation of the relative costs of driving and using transit. This disincentive is directly caused by the subsidy that the institutions provide for parking. However, all of the institutions cited potential recruiting and retention issues as a reason for continuing to provide the subsidy.

Hospitals indicated that they have multiple shifts whose needs are not met by traditional peak-period transit services, and that hospital shift times do not line up well with the peak operating times of the transit system. For example, University Hospitals has major shift changes for its medical staff that occur at 7 AM, 4 PM and 11 PM (in addition to a normal 8 AM-5 PM shift for administrative staff). These first two shift times occur about 1 hour before the peak operating time of the transit system, and are out of sync with the possible arrival times of the commuter express services that currently serve downtown Cleveland provided by Greater Cleveland RTA, Akron METRO and Laketran. The 11 PM peak period is only served by a low level of evening Greater Cleveland RTA bus and rail service. Additional service at those time periods would be necessary to effectively serve the medical worker market in University Circle area.

All of the employers are looking for additional parking availability, and all currently use off-site parking to a greater or lesser extent. University Hospitals and CWRU use University Circle routes to connect their employees and students to this remote parking, while the Clinic uses its own circulator system to connect its employees to its own remote parking lots and decks. The cost of these circulators and the security that is required to protect employees, visitors, students and their property at these remote lots is a further expense to the institutions that they would like to avoid if possible.

The hospitals advised that they would be willing to consider participating in jointly subsidizing transit service that addresses their parking and transportation needs.

Stakeholder sentiment regarding existing University Circle routes leaned away from replacing existing routes with a new service that also serves Cleveland Heights. However, the institutions indicated that support of a new service would be considered if it meets their needs. When considering the proposed service recommendations, the institutions did not commit themselves to supporting the service, but said that they would be willing to discuss the matter further with UCI and Cleveland Heights.

Representatives from RTA were interviewed, in addition to their participation in both the Working Group and Steering Committee meetings throughout the planning process. Per RTA staff, RTA operated a shuttle route that connected University Circle to Cleveland Heights as part of its program in the 2000s. RTA provided circulator service in a number of Cleveland neighborhoods and suburban communities. The route in the study area operated primarily along Euclid Heights Boulevard between the Cedar-University Rapid Station and Severance Town Center, essentially providing a coverage route halfway between RTA's Route 9 (operating on Mayfield Road) and Route 32 (operating on Cedar Road). This route was discontinued in September 2009, citing low ridership low ridership (this low ridership was likely due, in part, to the more than 30 minute headway on the route). RTA has not considered implementing new circulator services since the circulator program was discontinued, but RTA has offered to partner with communities by providing transit vehicles to communities who are able to support their operation and maintenance. No communities have yet partnered with RTA for such a program; however, this option remains available for operation of new circulator service connecting University Circle and Cleveland Heights. RTA also discussed the potential for using their Transit Waiting Environments program to support stop and shelter improvements in the study area.

The study team also interviewed representatives of Standard Parking, the operator of the Circle Link and other shuttle and circulator buses that are currently operating in University Circle. This interview provided a wealth of useful information concerning the demographics and transportation needs of the study area, the volume of potential service between Cleveland Heights and University Circle, and the cost of providing contract bus service, which was used in developing the operating cost estimates for this study. Standard Parking expressed interest in integrating its existing NextBus real-time information system with RTA's NextConnect real-time information system, seeing it as key to the success of any future service. The company indicated openness to working with Cleveland Heights and University Circle institutions to develop a new service, including the possibility of using RTA vehicles operated by Standard Parking employees.

A second set of public meetings was held In November 2012 where the survey results and shuttle concepts were presented and public feedback was solicited. This feedback is included in the appendices and in the broader transportation section of the report. Respondents were supportive of the proposed improvements to transit service, but comments received were secondary to those related to bicycle and pedestrian improvements.

4.3 Transit Recommendations

Based on the analysis of the existing transit services in the corridor and input from the Transit Working Group, stakeholders, and members of the public, a strategy that includes a new, branded shuttle bus service connecting Cleveland Heights and University Circle, and providing circulation within each location, together with a package of bus stop and web-based improvements, was proposed for implementation. Four potential shuttle bus route alignments were proposed. The characteristics of each of these proposed improvements are discussed below and presented in Table 3.

Shuttle Bus Service Characteristics			
Convenience	**Frequency**	**Speed**	**Amenities**
▪ Operates 18 hours/day (21 hours on Friday and Saturday) ▪ Operates daily	▪ 15 minute headways during peak times ▪ 30 minute headways during all other times	▪ Fewer stops improves travel speed	▪ Fewer stops allows for more improvements at stops ▪ Distinctive branding of buses/stops ▪ Real-time information ▪ Shelters, schedules and maps provided

Table 4-3: Shuttle Bus Service Characteristics

Shuttle Bus Routes

Each shuttle bus route option would operate 18 hours per day on Sundays through Thursdays and 21 hours on Fridays and Saturdays, to ensure that the service is available for hospital shift changes and peak demands at other institutions in University Circle, and to provide service for those traveling within Cleveland Heights and between University Circle and Cleveland Heights during Friday and Saturday late evenings and nights. The proposed service would operate seven days a week and would operate in both the clockwise and counter-clockwise directions, to promote convenience and reduce travel time and distance for passengers. Headways for each of the alternatives would be set at 15 minutes during peak times (5:30AM-9:30AM; 2:30PM-6:30PM) and 30 minutes during off peak periods, to maximize the convenience of the routes. The peak times for the headways were constructed to meet the variety of shift start/end times of the hospitals. The routes would be configured to have only a small number of stops, to improve travel speed and allow for a high level of passenger amenities at each stop. The following are the four shuttle route options:

Option 1 is a loop that extends from University Circle to Coventry Road in Cleveland Heights. This option has the shortest routing of the four options, at 7 miles, and a round trip cycle time of approximately 40 minutes. The alignment is shown in Figure 4-13. From University Circle, the route would head east on Mayfield Road, south on Coventry Road, west on Euclid Heights Boulevard, south on Surrey Road, west on Cedar Road and Cedar Glen Parkway to the University Circle Rapid Station. From the Rapid Station, it would travel back on Cedar Glen Parkway heading east, then north on Adelbert Road, east on Euclid Avenue to the Cleveland Clinic. From the Cleveland Clinic, it would travel back on Euclid Avenue heading west to East Boulevard to serve the museums on Wade Oval Drive, back onto East Boulevard, and onto Ford Drive back to Mayfield Road where it would complete another trip around the loop. Another set of buses would also operate the route in the reverse direction.

During peak times, six vehicles would be required to operate the service with only four vehicles required during off-peak times. The estimated annual cost to operate Option 1 is approximately $1.635 million. The breakdown of the operations costs associated with Option 1 is presented in Table 4-4. The cost estimates are based on the assumptions below. Assumptions regarding route length and travel speed vary according to the option tested.

- The operating cost of bus service would be $50 per hour, which is a price quoted for service by Standard Parking and is the approximate amount that they charge to provide the existing UCI services. This price includes the use of vehicles, fuel, operator (driver) and vehicle storage. It does not include costs related to provision of marketing materials (such as schedules or brochures) or the equipping or maintenance of bus stops or shelters.
- Operation from 5 AM to 11 PM Sunday through Thursday, and from 5 AM to 2 AM on Friday and Saturday.
- Operation at 15 minutes, bi-directional headway from 5:00 AM to 10:00 AM and from 2 PM to 8 PM, Monday through Friday.
- Operation at 30 minutes, bi-directional headway at all other times.
- Operation 259 days per year.

Option 1 would serve the following locations:

Louis Stokes VA Medical Center
Western Reserve Historical Society
Cleveland Museum of Natural History
Cleveland Museum of Art
Cleveland Institute of Art
CWRU Kevin Smith Library
Severance Hall
Cleveland Clinic
Cleveland Children's Museum
University Hospitals
CWRU Case Quad
CWRU Health Sciences Campus
Cedar Fairmount
Little Italy
Coventry
Cedar-Fairmount
Cleveland MOCA/Uptown
CWRU North Campus
Cleveland Botanical Gardens
Cleveland Institute of Music

OPTION 1

Time Period	Estimated Speed (miles per hour)	One-Way Distance (miles)	One-Way Travel Time (minutes)	One-Way Cycle Time (minutes)	Frequency	Required Vehicles (for bidirectional service)	Begin Time	End Time	Daily Revenue Hours	Days of Operation	Annual Revenue Hours	Cost per Revenue Hour	Annual Cost
Monday - Friday AM	11.7	7.0	36	39.6	15	6	5:00	10:00	30.0	255	7650.0	$50	$382,500
Monday - Friday Midday	11.7	7.0	36	39.6	30	4	10:00	14:00	16.0	255	4080.0	$50	$204,000
Monday - Friday PM	11.7	7.0	36	39.6	15	6	14:00	20:00	36.0	255	9180.0	$50	$459,000
Monday - Friday Evening	11.7	7.0	36	39.6	30	4	20:00	23:00	12.0	255	3060.0	$50	$153,000
Friday Late Night	11.7	7.0	36	39.6	30	4	23:00	2:00	12.0	52	624.0	$50	$31,200
Saturday Service	11.7	7.0	36	39.6	30	4	5:00	2:00	84.0	52	4368.0	$50	$218,400
Sunday Service	11.7	7.0	36	39.6	30	4	5:00	23:00	72.0	52	3744.0	$50	$187,200
												TOTAL:	**$1,635,300**

Table 4-4: Operational Cost Estimate for Option 1

Option 2 is a loop that extends from University Circle to Lee Road in Cleveland Heights. At 8.9 miles, it has the second longest alignment of the four options, and a round trip cycle time of approximately 45 minutes, shown in Figure 4-14. From University Circle, the route would head east on Mayfield Road,

south on Lee Road, west on Cedar Road and Cedar Glen Parkway to the University Circle Rapid Station. From the Rapid Station, it would travel back on Cedar Glen Parkway heading east, then north on Adelbert Road, east on Euclid Avenue to the Cleveland Clinic. From the Cleveland Clinic, it would travel back on Euclid Avenue heading west to East Boulevard to serve the museums on Wade Oval Drive, back onto East Boulevard, and onto Ford Drive back to Mayfield Road where it would complete another trip around the loop. Another set of buses would also operate the route in the reverse direction.

During peak times, six vehicles would be required to operate the service with only four vehicles required during off-peak times. The estimated annual cost to operate Option 2 is also approximately $1.635 million. The breakdown of the operations costs associated with Option 2 is presented in Table 4-5.

Option 2 would serve all the locations listed for Option 1 and the following additional destinations:

Cleveland Heights Community Center/Senior Center
Cedar-Lee District

OPTION 2

Time Period	Estimated Speed (miles per hour)	One-Way Distance (miles)	One-Way Travel Time (minutes)	One-Way Cycle Time (minutes)	Frequency	Required Vehicles (for bidirectional service)	Begin Time	End Time	Daily Revenue Hours	Days of Operation	Annual Revenue Hours	Cost per Revenue Hour	Annual Cost
Monday - Friday AM	13.1	8.9	41	44.9	15	6	5:00	10:00	30.0	255	7650.0	$50	$382,500
Monday - Friday Midday	13.1	8.9	41	44.9	30	4	10:00	14:00	16.0	255	4080.0	$50	$204,000
Monday - Friday PM	13.1	8.9	41	44.9	15	6	14:00	20:00	36.0	255	9180.0	$50	$459,000
Monday - Friday Evening	13.1	8.9	41	44.9	30	4	20:00	23:00	12.0	255	3060.0	$50	$153,000
Friday Late Night	13.1	8.9	41	44.9	30	4	23:00	2:00	12.0	52	624.0	$50	$31,200
Saturday Service	13.1	8.9	41	44.9	30	4	5:00	2:00	84.0	52	4368.0	$50	$218,400
Sunday Service	13.1	8.9	41	44.9	30	4	5:00	23:00	72.0	52	3744.0	$50	$187,200
												TOTAL:	**$1,635,300**

Table 4-5: Operational Cost Estimate for Option 2

Option 3 is a loop that serves extends from University Circle to Taylor Road in Cleveland Heights. It has the longest alignment of the four options, at 10.4 miles, and a round trip cycle time of approximately 52 minutes, shown in Figure 4-15. From University Circle, the route would head east on Mayfield Road, south on South Taylor Road, west on Cedar Road and Cedar Glen Parkway to the University Circle Rapid Station. From the Rapid Station, it would travel back on Cedar Glen Parkway heading east, then north on Adelbert Road, east on Euclid Avenue to the Cleveland Clinic. From the Cleveland Clinic, it would travel back on Euclid Avenue heading west to East Boulevard to serve the museums on Wade Oval Drive, back onto East Boulevard, and onto Ford Drive back to Mayfield Road where it would complete another trip around the loop. Another set of buses would also operate the route in the reverse direction.

During peak times, eight vehicles would be required to operate the service with only four vehicles required during off-peak times. The estimated annual cost to operate Option 3 is approximately $1.823

million, making it the most costly to operate of the four shuttle options. The breakdown of operations costs associated with Option 3 is presented in Table 4-6.

Option 3 would serve all the locations listed for Options 1 and 2 and the following additional destinations:

Severance Town Center
Severance Park-and-Ride Lot
Cedar-Lee Park-and-Ride Lot

OPTION 3

Time Period	Estimated Speed (miles per hour)	One-Way Distance (miles)	One-Way Travel Time (minutes)	One-Way Cycle Time (minutes)	Frequency	Required Vehicles (for bidirectional service)	Begin Time	End Time	Daily Revenue Hours	Days of Operation	Annual Revenue Hours	Cost per Revenue Hour	Annual Cost
Monday - Friday AM	13.3	10.4	47	51.5	15	8	5:00	10:00	40.0	255	10200.0	$50	$510,000
Monday - Friday Midday	13.3	10.4	47	51.5	30	4	10:00	14:00	16.0	255	4080.0	$50	$204,000
Monday - Friday PM	13.3	10.4	47	51.5	15	8	14:00	20:00	48.0	255	12240.0	$50	$612,000
Monday - Friday Evening	13.3	10.4	47	51.5	30	4	20:00	23:00	4.7	255	1198.5	$50	$59,925
Friday Late Night	13.3	10.4	47	51.5	30	4	23:00	2:00	12.0	52	624.0	$50	$31,200
Saturday Service	13.3	10.4	47	51.5	30	4	5:00	2:00	84.0	52	4368.0	$50	$218,400
Sunday Service	13.3	10.4	47	51.5	30	4	5:00	23:00	72.0	52	3744.0	$50	$187,200
												TOTAL:	**$1,822,725**

Table 7: Operational Cost Estimate for Option 3

Option 4 is the only option not designed as a loop but as a rotated "U". It extends from University Circle to both Taylor Road on its north end and Lee Road on its south end in Cleveland Heights. Option 4 has the second shortest alignment of the four options, at 8.6 miles, and a round trip cycle time of approximately 45 minutes, shown in Figure 4-16. From University Circle, the route would head east on Mayfield Road to Mayfield Road and Taylor Road, its northern terminal point; it would then turn around and head back towards University Circle along the same routing. From Mayfield Road, it would turn north on Ford Drive and serve the museums on Wade Oval Drive, to East Boulevard heading south, turn west on Euclid Avenue to the Cleveland Clinic. From the Cleveland Clinic, it would travel back on Euclid Avenue heading east to Adelbert Road, and east on Cedar Glen Parkway to serve the University Circle Rapid Station. From the Rapid Station, it would head back on Cedar Glen Parkway and Cedar Drive heading east to the corner of Cedar Drive and Lee Road, the southern terminal point. Another set of buses would also operate the route in the reverse direction.

During peak times, six vehicles would be required to operate the service with only four vehicles required during off-peak times. The estimated annual cost to operate Option 4 is approximately $1.635 million. The breakdown of the operations costs associated with Option 4 is presented in Table 4-7.

Option 4 would serve all of the locations listed for Options 1, 2, and 3.

OPTION 4

Time Period	Estimated Speed (miles per hour)	One-Way Distance (miles)	One-Way Travel Time (minutes)	One-Way Cycle Time (minutes)	Frequency	Required Vehicles (for bidirectional service)	Begin Time	End Time	Daily Revenue Hours	Days of Operation	Annual Revenue Hours	Cost per Revenue Hour	Annual Cost
Monday - Friday AM	12.6	8.6	41	44.9	15	6	5:00	10:00	30.0	255	7650.0	$50	$382,500
Monday - Friday Midday	12.6	8.6	41	44.9	30	4	10:00	14:00	16.0	255	4080.0	$50	$204,000
Monday - Friday PM	12.6	8.6	41	44.9	15	6	14:00	20:00	36.0	255	9180.0	$50	$459,000
Monday - Friday Evening	12.6	8.6	41	44.9	30	4	20:00	23:00	12.0	255	3060.0	$50	$153,000
Friday Late Night	12.6	8.6	41	44.9	30	4	23:00	2:00	12.0	52	624.0	$50	$31,200
Saturday Service	12.6	8.6	41	44.9	30	4	5:00	2:00	84.0	52	4368.0	$50	$218,400
Sunday Service	12.6	8.6	41	44.9	30	4	5:00	23:00	72.0	52	3744.0	$50	$187,200
												TOTAL:	**$1,635,300**

Table 8: Operational Cost Estimate for Option 4

The four options were evaluated by members of the Transit Working Group, area stakeholders and members of the public, considering the potential trade-offs between the cost of operation and the potential benefits of serving various combinations of locations. Further analysis will be required to make a final determination on the option to be pursued; however, Option 2 appeared to have the optimal combination of benefits, with its ability to connect to important destinations in the corridor, its low operating cost, and the number of required buses due its relatively short alignment.

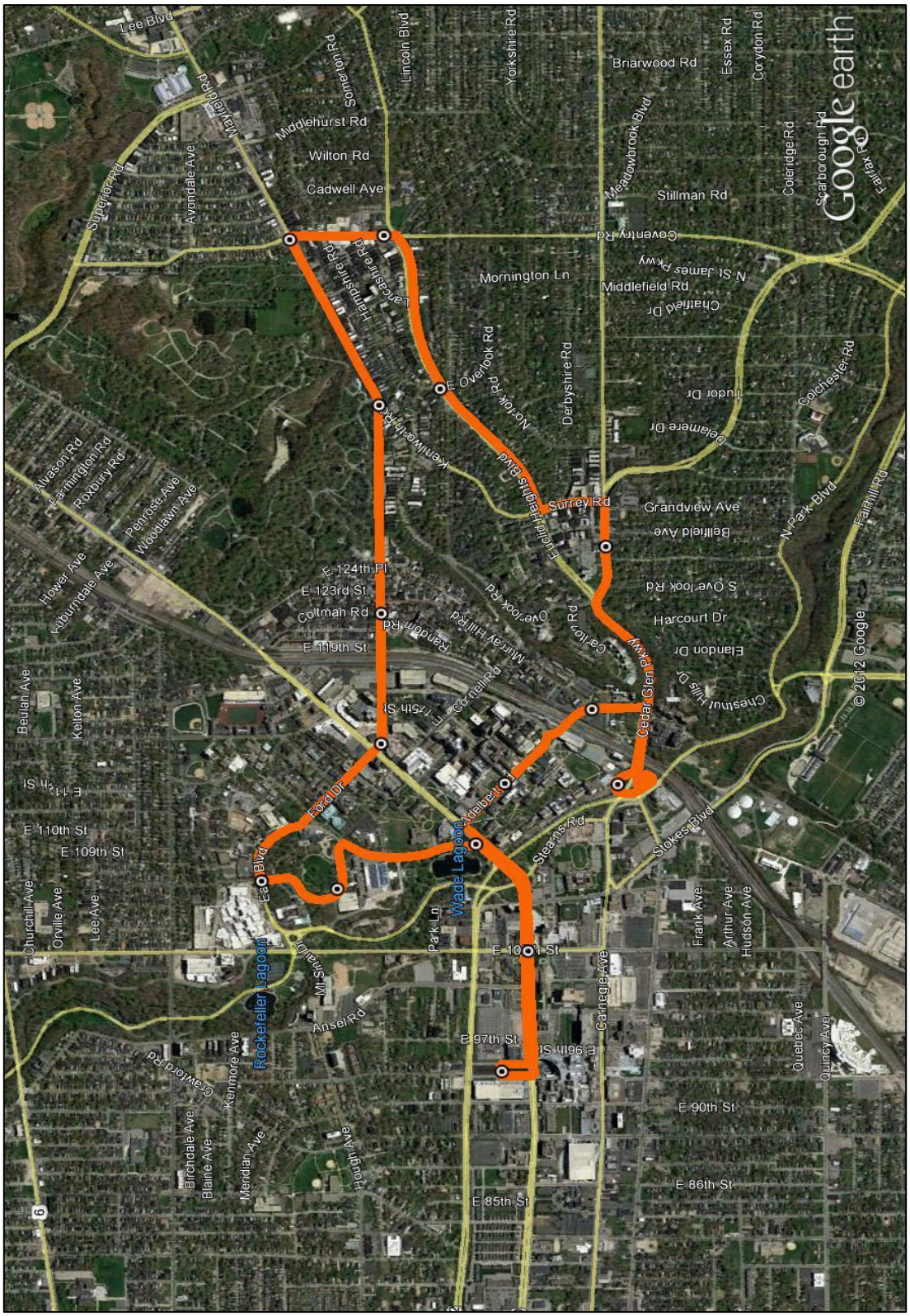


Figure 4-13: Option 1 Bus Route

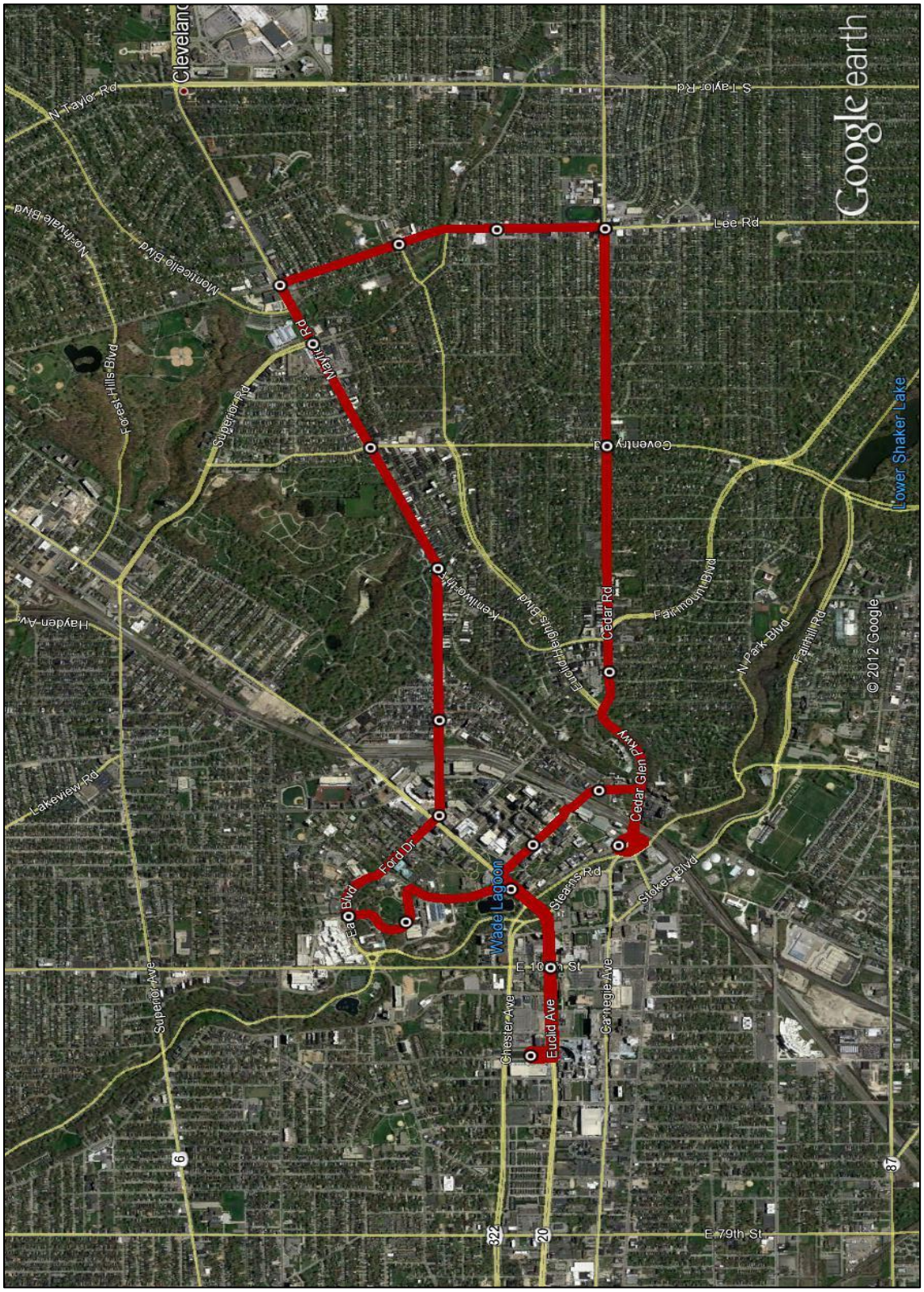


Figure 4-14: Option 2 Bus Route

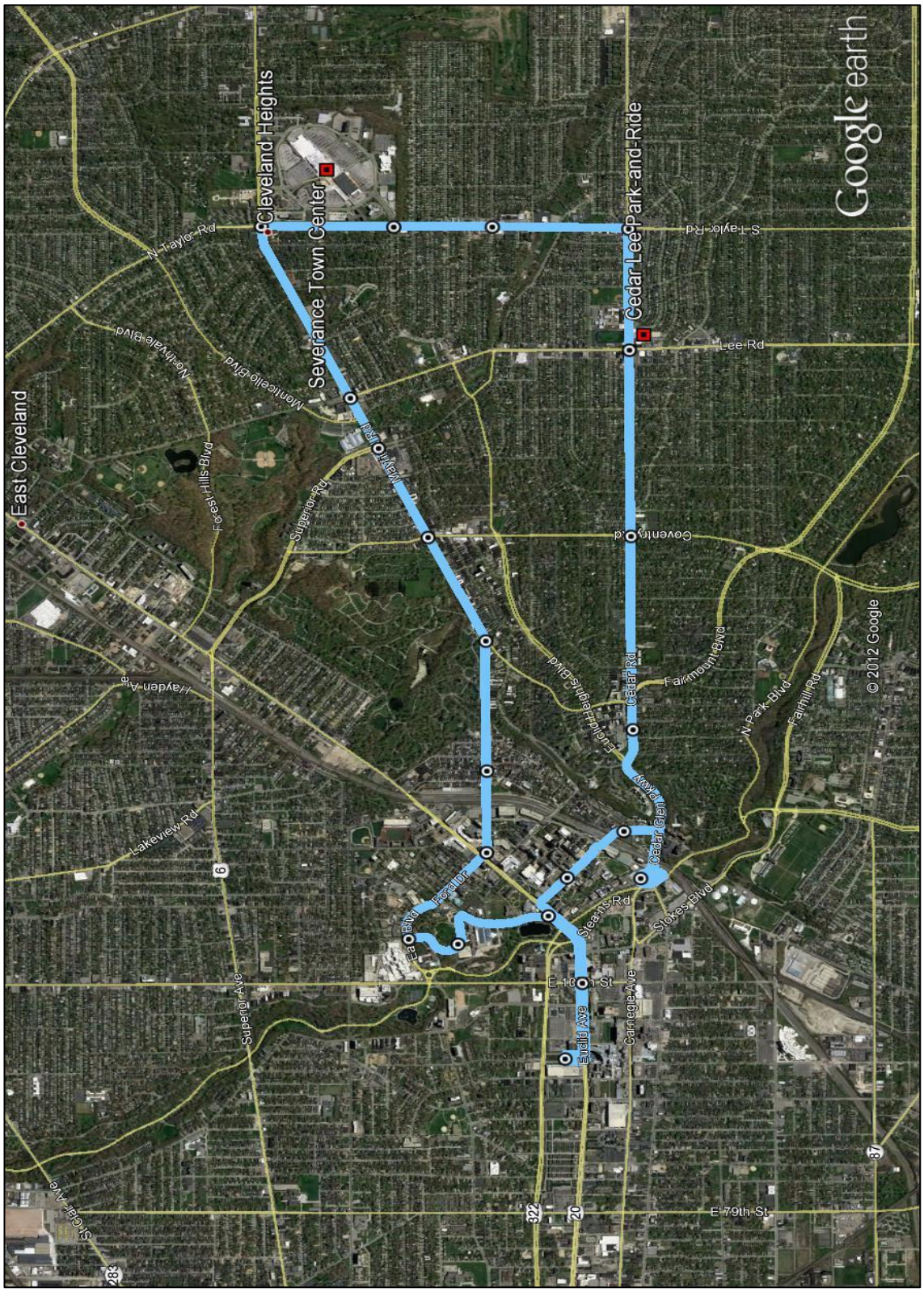


Figure 4-15: Option 3 Bus Route

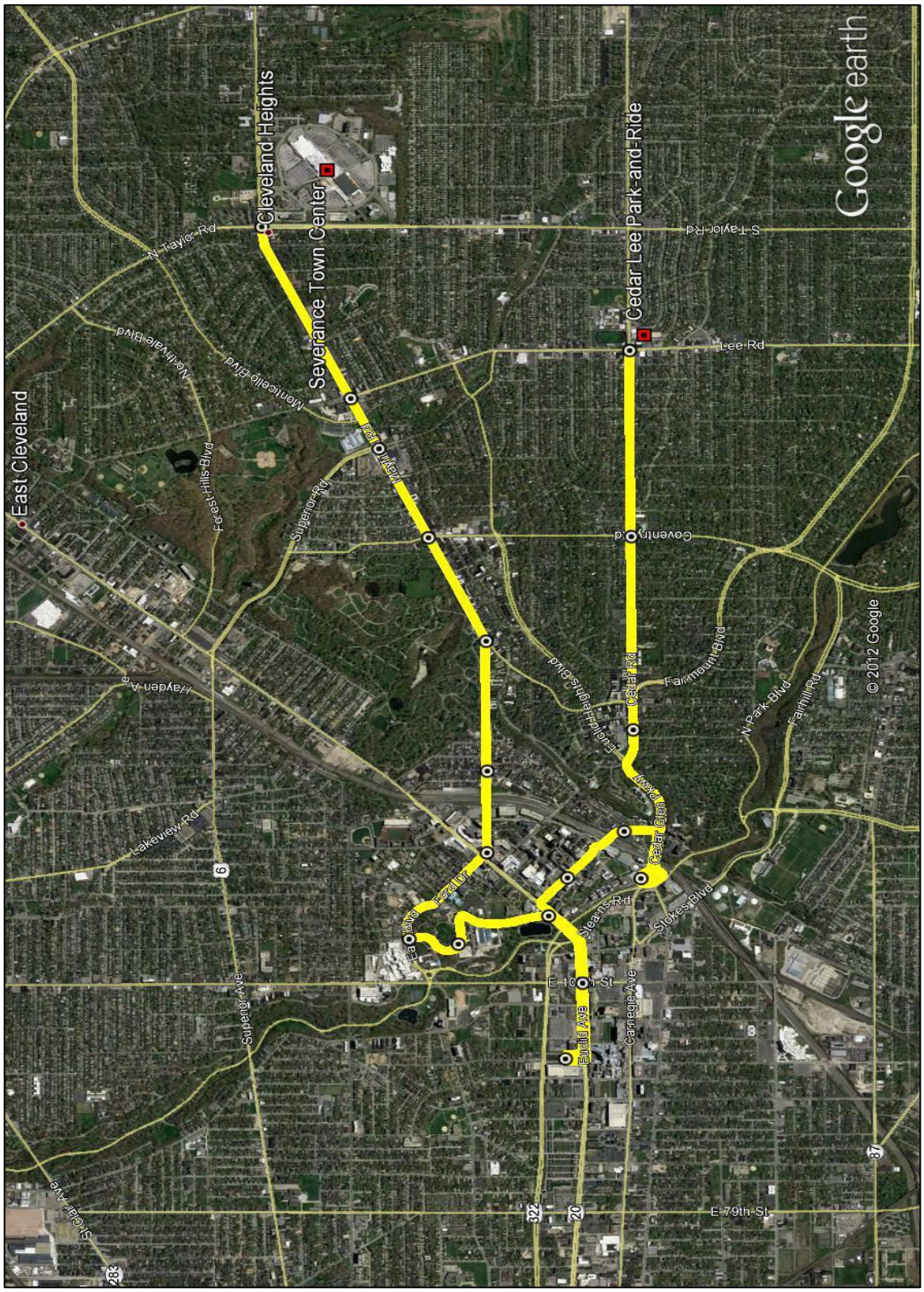


Figure 4-16: Option 4 Bus Route

Bus Stop Amenities

The level of passenger transit amenities in the study area provided by RTA and the campus shuttle services meets only the most basic needs of transit users in the area. Amenities for some infrastructure are considered near state-of-the-art, principally in the Euclid HealthLine Corridor. In other areas, the level and quality of infrastructure is sufficient to allow transit users to find their buses, but provide minimal comfort and does not appear to promote transit use among current non-users. In locations where RTA bus stop markers are used heavily, replacing them with signage that feature more detailed route and schedule information should be considered to provide a better level of information to its riders who are unfamiliar with the current system. In addition, the LED screens available at both RTA HealthLine and Rapid Stations should be programmed to provide real-time bus information to provide an even higher level of information to its riders. Information containing description of new transit technologies is included in the appendix.

The proposed recommendations include bringing each of the shuttle stops to a uniformly high level of amenities, to provide customers with a reasonable level of safety, comfort and information at each shuttle bus stop. These amenities would include a shelter, real-time bus arrival information, and a branding scheme that ties together the vehicles, shelters, stops, schedules, maps, and other promotional and informational materials pertaining to the shuttle route as shown in Figure 4-17.

Figure 4-17: Shuttle Bus Stop and Amenities

4.4 Implementation

Project Definition: At the conclusion of the study, four circulator alignment options were shown, and a preferred option had not been identified. Three of the options are effectively the same in terms of operating cost and the number of vehicles needed to operate the service. However, the full implementation of transit improvements in the area will include improvements at bus stops, and the number of stops varies significantly between alternatives. The first step in implementing improvements is to define the project, and the first step in defining the project is to identify a preferred alignment—either one of the four alignments identified in this study, or another alignment that can be agreed upon between Cleveland Heights, UCI and other stakeholders and funding partners. The project definition also should make a determination about what entity will operate the service, whether Cleveland Heights, UCI, RTA or some other entity, and whether the service will be operated by a contract operator or directly by one or more of the public agencies. The definition includes a number of other elements, including the branding scheme, proposed improvements at stops/shelters, implementation/refinement of real time bus arrival information, signal prioritization at selected intersections, and proposed cooperative marketing of the service with area businesses, employers and visitor destinations. These and other potential technologies and amenities to support public transit are described in detail in the transit technologies appendix. The composition of the project should be agreed upon by the potential funding partners and stakeholders before funding can be sought. Detailed operating and capital cost estimates should be developed for the proposed package of services and improvements.

Funding: After project definition, the next key element is funding. In addition to the City of Cleveland Heights, there are a number of potential funding partners for the project who would benefit from the project and have expressed openness to discussing participating financially or by providing in-kind services (such as vehicles), including CWRU, the hospitals, and RTA. Once firm estimates of the

cost for operating service, purchasing vehicles and the cost of other capital investments such as stop improvements and signal priority systems are in place, the project partners should convene a meeting of these potential stakeholders to determine their interest in financially supporting the project and their level of financial participation. Should funding gaps remain, a number of potential funding sources, including Federal Congestion Mitigation-Air Quality (CMAQ) and Enhancement Grants, distributed through NOACA, offer potential funding for both capital improvements and short-term (3 years) operating assistance. Other potential competitive funding programs include grants from RTA's Transit Waiting Environments (TWE) program and the Ohio Department of Transportation's Transportation Review Advisory Council (TRAC) program.

Project Startup: Once funding is secured, development of the project can progress on a number of tracks. Physical improvements such as shelters, stop improvements and real time bus arrival information systems must be designed, procured, and constructed, ideally though not necessarily before the opening of the branded service. Transit signal priority, if it is part of the program, will require coordination with RTA, traffic engineers from the cities, ODOT, and the Cuyahoga County Engineer prior to procurement and implementation. A branding consultant may be hired at this or an earlier point to develop a branding scheme for the buses, stops, shelters, and promotional materials, and implementation of the branding scheme should begin prior to initial operation of the service. Likewise cooperative marketing programs should be finalized prior to service opening. Finally, a strong promotional program should be implemented before and during the early operation of the service to insure strong public awareness of the new service prior to opening.

4.5 Complete Streets

Complete Streets design takes into account all users of an intersection or roadway. By approaching design from this perspective, pedestrians, bicyclists, public transportation users, and motorists are all considered and accommodated, resulting in a better balance of modal access, and providing safe and effective transportation alternatives for all users.

The fundamental purpose of the two Circle-Heights studies is to facilitate alternate mode travel within and between Cleveland Heights and University Circle, with the ultimate goal of getting travelers out of their cars and onto their bicycles or using transit. Examination of the study area with this purpose in mind led to a concentrated focus at two intersection locations that present barriers to that purpose: the Edgehill Road/Overlook Road intersection and the Mayfield Road/Kenilworth Road intersection. These two intersections are located on two of the primary commuter routes between Cleveland Heights and University Circle and both are currently configured in a very auto-dominant manner. Evaluating these intersections to determine ways to improve alternate mode accommodations is therefore an important component in achieving the studies' fundamental goal.

Edgehill/Overlook Intersection

Pedestrian Crossing South Side of Edgehill/Overlook Intersection

Edgehill/Overlook Intersection

The Edgehill/Overlook intersection is located within a residential area on the western edge of Cleveland Heights at its Cleveland border. The intersection is near the top of the hill that climbs from Murray Hill into Cleveland Heights. Edgehill and Overlook are two-lane roads. They are popular corridors for bicycle and pedestrian traffic, in spite of the auto-dominant configuration of the Edgehill/Overlook intersection, as Edgehill and Overlook connect residences in Cleveland Heights directly with Case Western Reserve University, University Hospitals and Little Italy in University Circle. Based on NOACA's annual bicycle count data, this intersection is one of the highest volume intersections for bicycle use in Northeast Ohio.

Edgehill/Overlook North Approach

Edgehill/Overlook is a three-way stop-controlled intersection; the southbound approach to the intersection is not required to stop. There is no apparent sight distance or other functional or geometric constraint to justify this atypical intersection control. The Edgehill/Overlook intersection has an excessive amount of pavement, more than what is necessary to accommodate vehicular turning movements. This encourages higher than necessary vehicle speeds. It also results in longer than necessary crosswalks, with the associated exposure of pedestrians to motorized vehicles. Additionally, there are striped right turn bypass lanes on the eastbound and westbound approaches. The

Edgehill/Overlook East Approach

eastbound approach is geometrically constrained, resulting in a tight right turn from eastbound Edgehill to southbound Overlook. The right turn bypass lane on westbound Edgehill is not necessary based on vehicle volumes. On-street parking is permitted near the intersection on all but the west leg of the intersection.

Mayfield/Kenilworth Intersection

Mayfield/Kenilworth Intersection

Mayfield/Kenilworth is a signalized intersection located along a regional connector (Mayfield Road, US 322) that links University Circle with Cleveland Heights and the eastern suburbs beyond. Kenilworth serves the residential areas between Cleveland Heights' Coventry and Cedar-Fairmount Districts. Mayfield/Kenilworth is a wide, signalized intersection.

Mayfield/Kenilworth Looking West

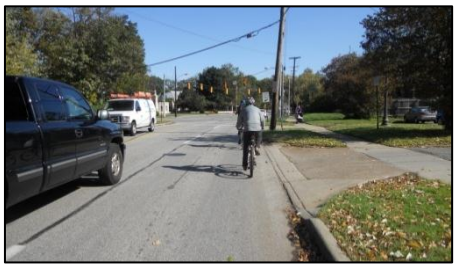
Mayfield Road is a two-lane road as it travels through Little Italy. The eastbound approach widens to two eastbound lanes approximately 800 ft west of the intersection and there is one westbound lane. . Mayfield Road is a four-lane road to the east of the intersection. On-street parking is permitted on the south side of the road, with peak hour restrictions. Kenilworth Road is a three-lane road with two lanes to the northeast and one lane to the southwest.

Mayfield/Kenilworth Looking Southwest

The Mayfield/Kenilworth intersection is fairly large to incorporate the access to Lakeview Cemetery within the signalized intersection. Although Mayfield Road turns at the intersection, it is treated as the through movement.

Traffic Analysis

Traffic operations were assessed to evaluate intersection capacity and determine the feasibility of potential changes to intersection capacity and configuration to better accommodate bicyclists and pedestrians at these two intersections. Detailed information on the traffic analysis is provided in Appendix E.



Mayfield/Kenilworth Looking East
(south side of intersection)

Edgehill/Overlook Intersection

Traffic analysis of the existing conditions at the Edgehill/Overlook intersection show that the eastbound (uphill) traffic on Edgehill experiences fairly long delays during the PM peak hour (LOS F, 107 sec approach delay). Converting the intersection to an all-way stop significantly improves its performance as well as operational safety. Conversion to an all-way stop creates a standard traffic control condition where all vehicles approaching the intersection are required to stop. This will improve operational safety for all modes of travel at the intersection. In addition, bicycle and pedestrian

Mayfield/Kenilworth Looking East
(north side of intersection)

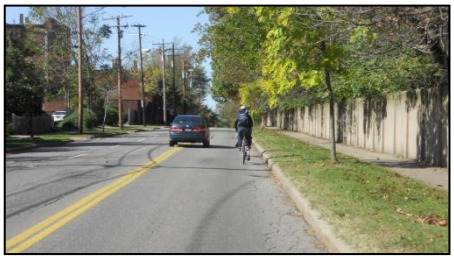
accommodations can be enhanced by reducing the paved area within the intersection. The intersection is currently configured with much more pavement than is needed for safe and efficient intersection function. Pavement is only needed in the area that is traversed by vehicles; the excess pavement can be put to alternate use to better balance the needs of all transportation modes as well as provide sustainable stormwater management opportunities. The recommended reconfiguration of the Edgehill/Overlook intersection is illustrated below. This reconfiguration with the all-way stop control improves traffic safety by stopping all approaching vehicles and it reduces the paved area making it feel much less auto-dominant. This will calm traffic, shorten pedestrian crossing distances, and more safely accommodate pedestrians and bicyclists. The areas where pavement is removed could then be retrofitted to incorporate sustainable stormwater management treatments in ideal locations to capture rainwater as it flows downhill from the north, south and east into the intersection area. The proposed intersection reconfiguration incorporates the bicycle facility recommendations on Overlook and Edgehill by accommodating the uphill bike lane and downhill sharrows on the west leg of Edgehill and the recommended bicycle boulevard configurations on the remaining three legs.

Figure 4-18: Proposed Reconfiguration of Edgehill/Overlook Intersection

Figure 4-19: Proposed Reconfiguration of Edgehill/Overlook Intersection

Mayfield/Kenilworth Intersection

The capacity analyses results for the existing configuration of the Mayfield/Kenilworth intersection show that it operates efficiently for motorized vehicles. However, it is a large intersection and it may be possible to reconfigure it in a manner that would better serve bicycles and pedestrians while still effectively accommodating vehicles. Current barriers include:



Mayfield Road at Crest of Hill, Looking West

Narrow sidewalks on south side of Mayfield Road

Long crossing distance on Mayfield Road

More pavement than is needed to accommodate vehicles traveling through the intersection

Large, rather undefined intersection area

Mayfield Road Approaching Little Italy

Traffic analyses were completed for selected potential concepts that would modify the intersection's geometry. Considerations included pedestrian treatments, configuration of both Mayfield and Kenilworth, and modifications to on-street parking. The results of the analysis led to the refinement of two potential concepts, illustrated below. Both concepts incorporate the following features:

Reconfiguration of curb lines to calm traffic and reduce paved area to only what is needed to safely accommodate motorized vehicles

Enhanced pedestrian amenities, including crosswalk treatments and countdown pedestrian signal heads

Provision of uphill bike lanes west leg of Mayfield

Expanded bus stop and shelter area

Addition of green space for stormwater retention and bio-swale to naturally treat stormwater runoff

The main difference between Concept A and Concept B is the alignment of Kenilworth. Concept A maintains the existing alignment, but narrows the pavement on the approaches. Concept B realigns the Kenilworth approach to intersect Mayfield at a right angle. Based on evaluation of the two concepts by the Working Group, Steering Committee, and with input from the public, Concept B is preferred. It more effectively defines the intersection and accommodates non-motorized travel modes.

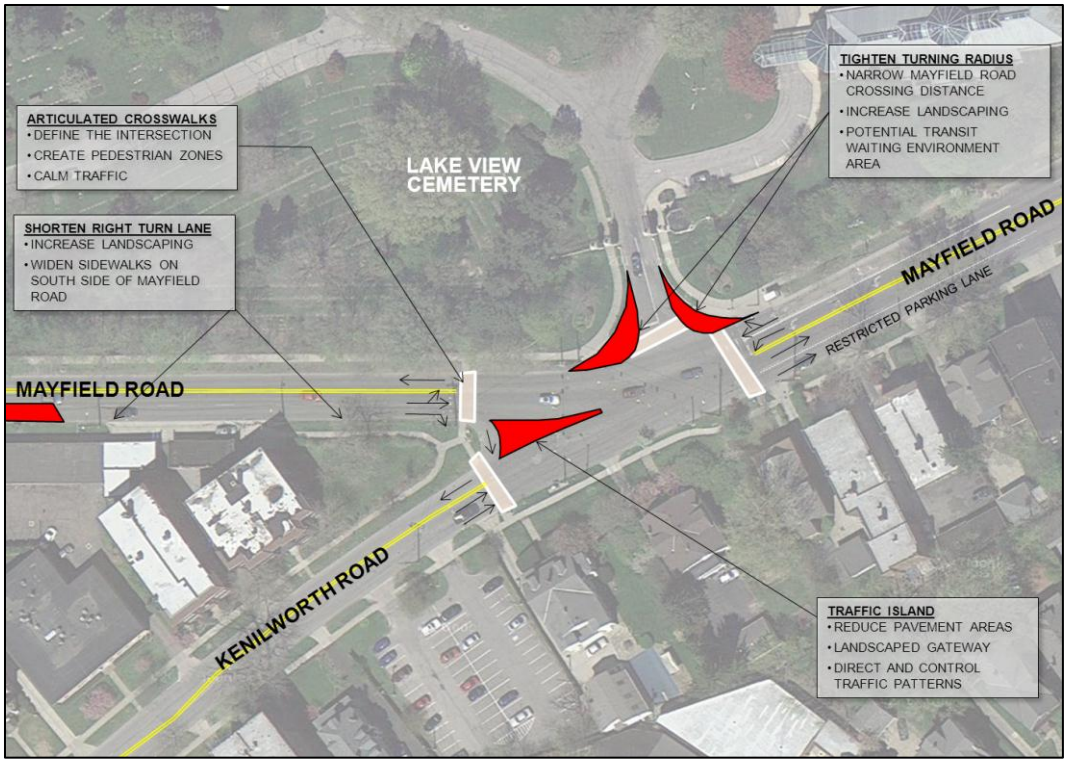


Figure 4-20: Concept A – Mayfield/Kenilworth Intersection Reconfiguration

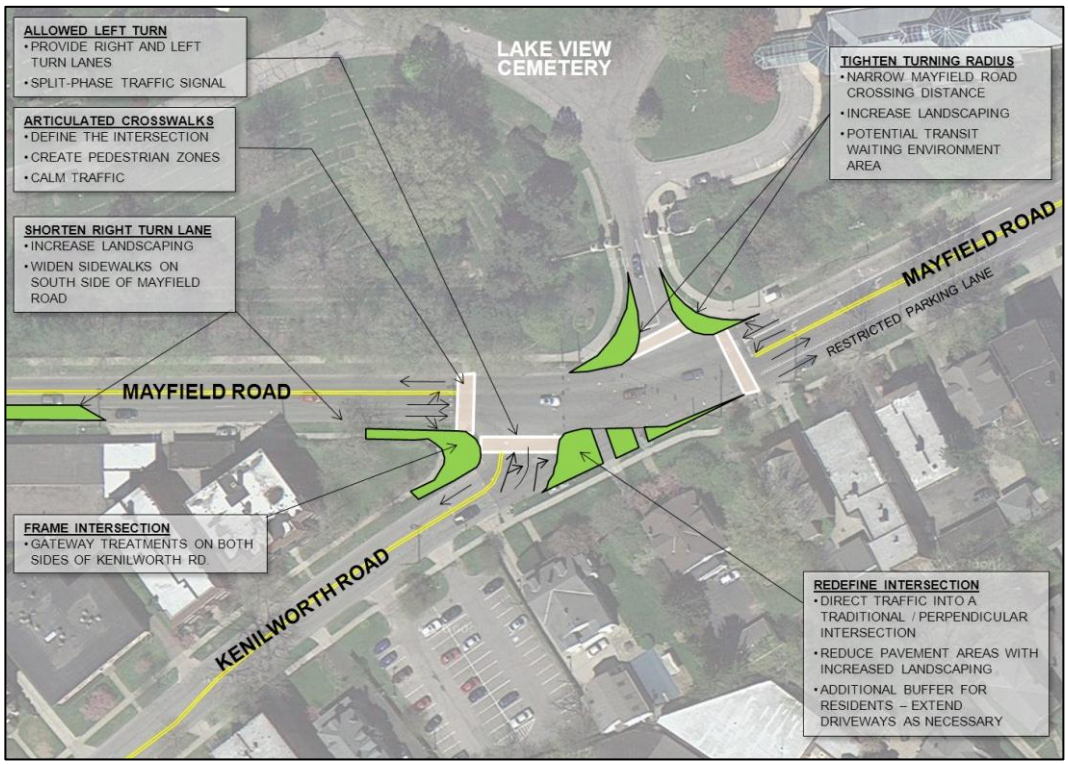


Figure 4-21: Concept B – Mayfield/Kenilworth Intersection Reconfiguration

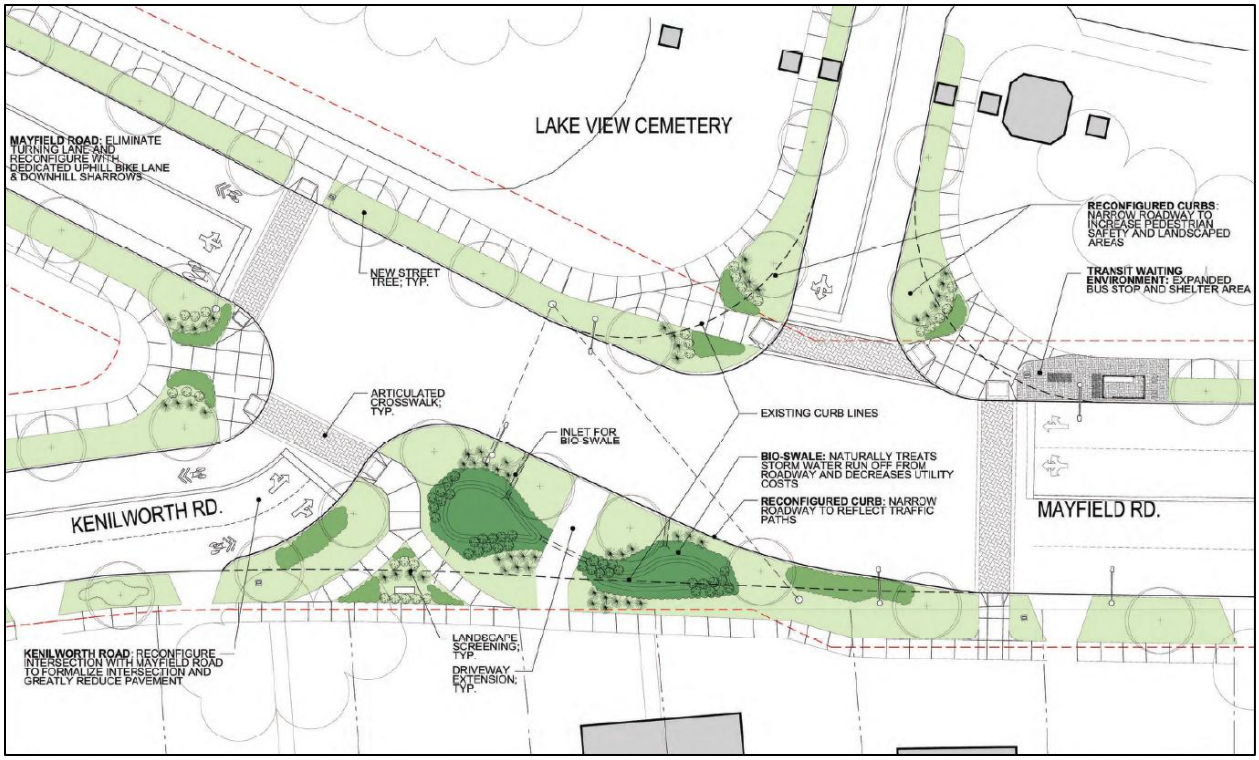


Figure 4-22: Preferred Reconfiguration of Mayfield/Kenilworth Intersection

Figure 4-23: Proposed Mayfield/Kenilworth Intersection Reconfiguration