





Moving Greater University Circle

Transportation and Mobility Plan

October 2015

UNIVERSITY CIRCLE

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Acknowledgments

Moving Greater University Circle is a collective effort of stakeholders. The City of Cleveland Planning Commission is the project sponsor. The Northeast Ohio Areawide Coordinating Agency (NOACA) is the manager of the Transportation for Livable Communities Initiative (TLCI) and is the second public agency partner for the study. University Circle, Inc. is the project manager and study cosponsor. The Project Team thanks each of these stakeholders plus all members of the Core Advisory Committee, the Project Steering Committee, and the many members of the public who provided insight and feedback throughout the project.

Core Advisory Committee

- Case Western Reserve University
- Cleveland City Planning Commission
- Cleveland Division of Traffic Engineering
- Cleveland Clinic Foundation
- Cleveland Museum of Natural History
- Cleveland VA Medical Center
- Greater Cleveland Regional Transit Authority
- Northeast Ohio Areawide Coordinating Agency
- University Circle Inc.
- University Hospitals Health System

Steering Committee

All Core Committee, plus:

- Cleveland Museum of Art
- Cleveland Sight Center
- Judson Services
- Maximum Accessible Housing of Ohio
- Musical Arts Association
- Museum of Contemporary Art
- Ronald McDonald House
- University Circle Police Department
- University Circle United Methodist Church
- Western Reserve Historical Society

Consultant Project Team

- Nelson\Nygaard Consulting Associates, Inc.
- City Architecture
- TMS Engineers, Inc.
- Bongorno Consulting

Primary Funders

- Northeast Ohio Areawide Coordinating Agency
- The George Gund Foundation

**A full list of UCI Action Plan donors can be found on page 140 in the appendix.*

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UNIVERSITY CIRCLE

Introduction

Walking and biking in University Circle

University Circle is a city within a city. It is the second largest employment center in the region and boasts a diverse residential population and some of the most prominent health care, educational and cultural institutions in the state. Supporting these active and interesting land uses is a multi-modal transportation network where people walk, bike, drive, and utilize a variety of transit options.

The Greater University Circle area is also changing, with growing workforce, resident, and visitor populations traveling to, within, and through the area every day. The Moving Greater University Circle Transportation & Mobility Study is one component of the district's forward thinking approach harnessing the energy of this growth and positioning the transportation system to serve all users now and into the future. This report provides two sets of recommendations for improved access and mobility for the district, presented as a series of Strategy and Place profile sheets:

- **Strategies**: Best practices on how the individual components of the multimodal transportation network can support University Circle as a great place; and
- **Places**: Conceptual recommendations for 11 Study Area intersections identified through crash data and community input as difficult to traverse.

Working with the area stakeholders, components of the following four intersection recommendations have been prioritized for immediate implementation to reduce conflicts between drivers, walkers, cyclists, and transit riders (see Figures 1-4):

1. Martin Luther King Jr. Drive at Carnegie Avenue;
2. Euclid Avenue at Ford Drive/Mayfield Road;
3. Euclid Avenue at E. 115th Street; and
4. Euclid Heights Boulevard at Cedar Road.

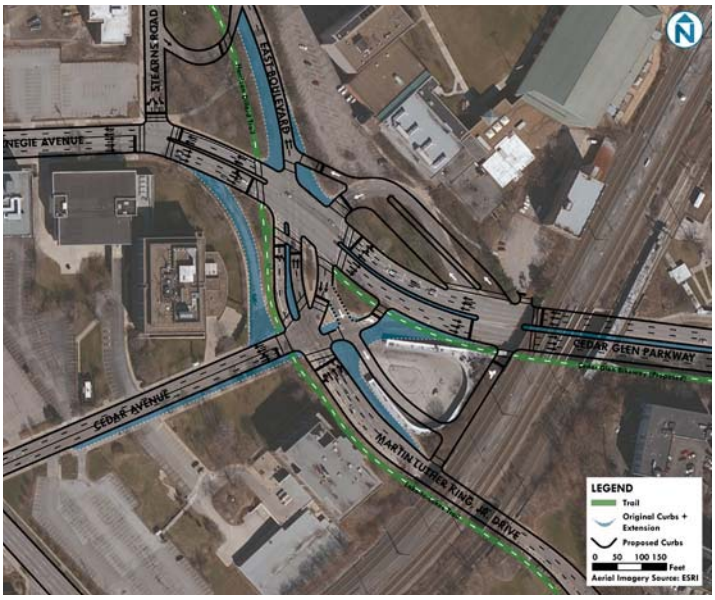


Figure 1: Martin Luther King Jr. Drive at Carnegie Avenue

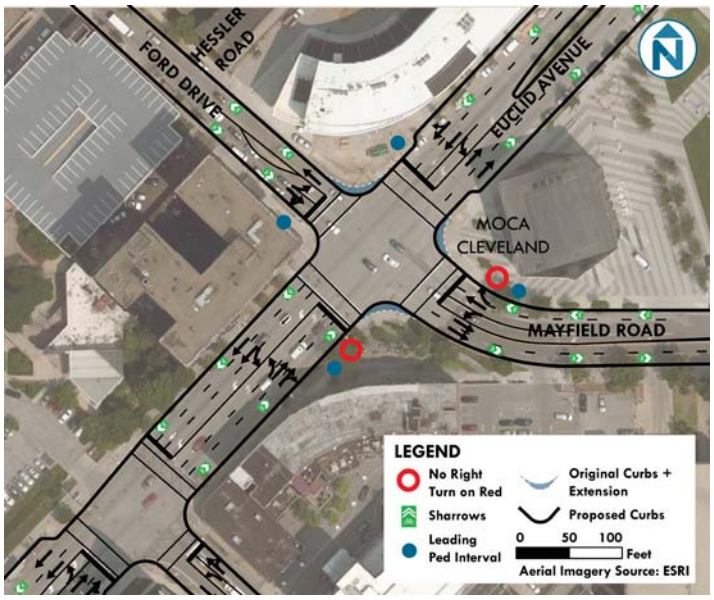


Figure 2: Euclid Avenue at Ford Drive/Mayfield Road

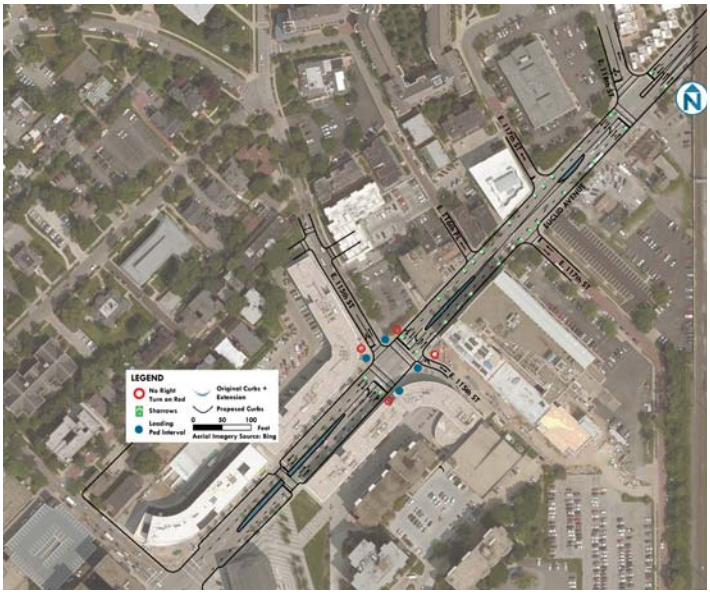


Figure 3: Euclid Avenue at East 115th Street

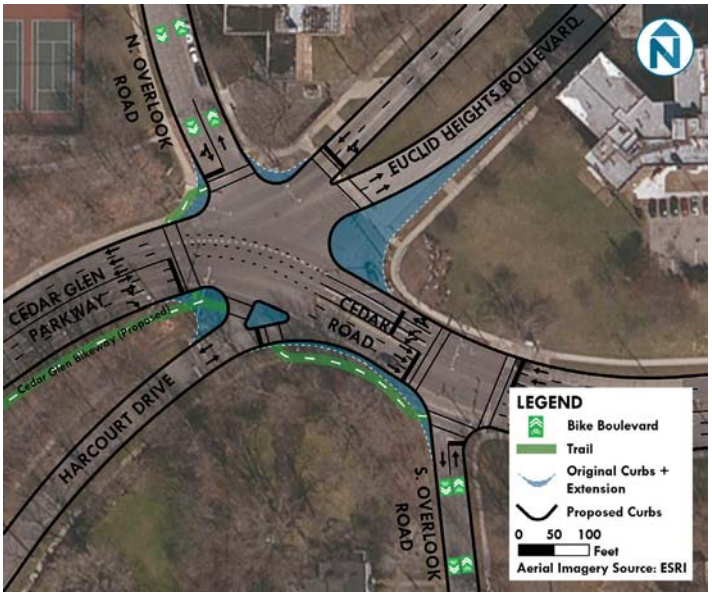


Figure 4: Euclid Heights Boulevard at Cedar Road

Recommendations at three additional sites received significant support and should be coordinated with concurrent activities or planning efforts:

- The combined intersections between Euclid and Chester Avenues, from Stokes Boulevard to Martin Luther King Jr. Drive;
- South Wade Park; and
- The Case Western Reserve University North Campus area (generally between East Boulevard and E. 115th Street.

The mobility focus area recommendations identified above are one component of the Moving Greater University Circle project, detailed on the next page.

About MGUC

Moving Greater University Circle is a three-part study and implementation plan that will help assess areas of need and opportunity in University Circle's transportation system. The study will identify short and long-term strategies for effective transportation management and will outline a clear path for impactful short and long-term steps to address our shared transportation issues. Moving Greater University Circle has three primary components:

1. The District Parking Study examined existing and projected supply and demand in the study area and was completed in December 2014. The resulting Parking Management Plan focused on opportunities for collaborative management of the district's parking facilities, including improved information systems, ease of access, and establishment of a "park once" scheme for the neighborhood. Transportation demand management (TDM) strategies were also highlighted as an important method for ensuring the most efficient use of existing supply.
2. This report documents the Transportation & Mobility Plan, which examined the multi-modal transportation systems, patterns, choices, and challenges that confront people as they travel to, through and within the study area. Two rounds of public engagement were conducted in October 2014 and April 2015 and included surveys, focus groups, open houses, walking audits, and an online interactive mapping tool. Feedback from these sessions generated a focus on 11 "mobility focus areas" for improvements to key travel corridors and intersections utilizing 10 core mobility strategies.
3. The Transportation Management Implementation Plan will synthesize recommendations from the first two components and establish a series of short and long-term goals, metrics, action steps, and organizational responsibilities, based on stakeholder feedback and partner buy-in. Launched in June 2015, this phase of work includes a thorough scan of best practices from peer communities around the United States and examination of applications in the local context.

The Transportation & Mobility Plan was led by a Steering Committee that included 20 institutional and public sector partners, a list of which is provided in the full report. The consulting team was led by Nelson\Nygaard Consulting Associations, with support from City Architecture and Bongorno Consulting, LLC. Funding for the plan was provided by NOACA's Transportation for Livable Communities Initiative and the George Gund Foundation.

STRATEGIES

The following Strategy sheets outline the principles through which University Circle can continue to develop its multimodal network, welcoming people and development while minimizing impacts to the district's transportation network. These Strategies include opportunities for all modes to contribute to the network. The Strategies recognize that transportation is intrinsically related to land use, so also address how streets and properties can be used for non-transportation purposes. The Strategies also incorporate the recommendations from the Phase 1 Parking and Demand Management component of the Moving Greater University Circle Plan.

Recommended Strategies include:

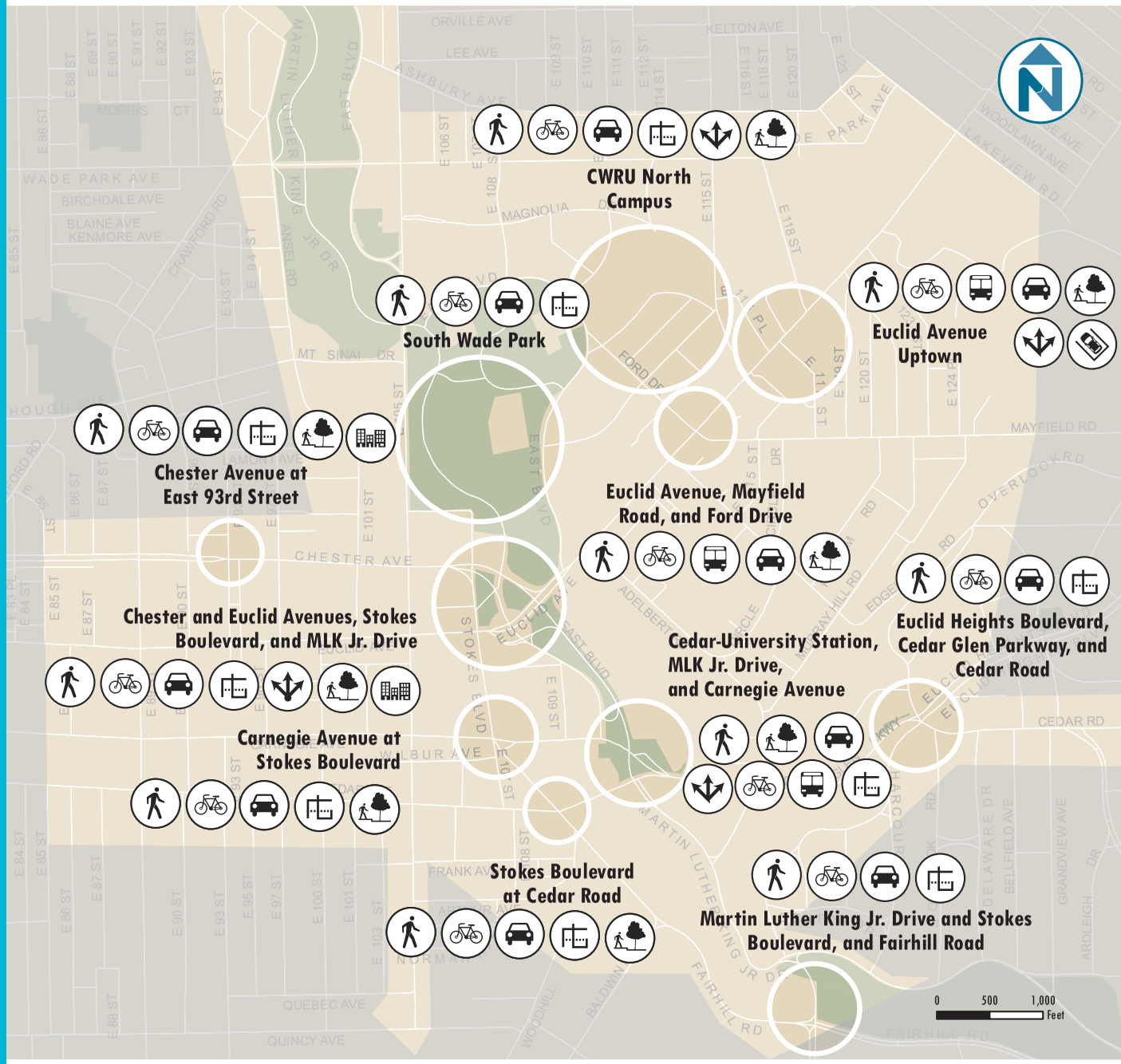
- Walking First
- Connectivity
- Bicycle Friendly
- Transit Accessible
- Safe & Reliable Auto Access
- Legible District
- Dynamic Streets
- Smart Parking
- Transportation Demand Management
- Real Estate Development

Each Strategy sheet includes:

- A Goal to guide the Transportation & Mobility Plan and a Rationale for how that Goal can be achieved through the Strategy
- An introduction to the Strategy;
- The issues identified by participants throughout the MGUC process which the Strategy addresses;
- Prior Plans and Policies identified for University Circle which the Strategy supports; and
- Sample Tools showing examples and best practices of how the Strategy can be implemented.

Strategy Map

- Walking First
- Bicycle Friendly
- Transit Accessible
- Safe & Reliable Auto Access
- Connectivity
- Legible District
- Dynamic Streets
- Smart Parking
- Transportation Demand Management
- Real Estate Development



Walking First

Goal

Adopt a "walking first" policy and design a safe connected environment for every person.

Rationale

Walking First and Universal Design go hand in hand; removing the barriers to on-street travel by those with limited physical mobility creates "walkable" spaces for everyone.

About

- **Safety for 8 to 80**

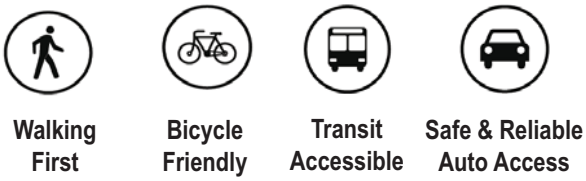
  Residents and visitors strongly advocated for a transportation network in which everyone – from the very young to the very old – could safely move about and access the many destinations, services, and amenities of University Circle.

  Everyone, regardless of age or physical ability, needs safe, connected, and easily navigable walking environments. Walking First is about making sure the on-street walking environment is supportive for everyone; whether they're walking from home to the store, getting off their bike to lock up at a bicycle corral, parking their car and walking the last block to the office, or traveling by wheelchair to the train station.

- **Universal Design**

  The core concept of Universal Design, where the design of a place is accessible by people of all ages and abilities, is the basis of the *Americans with Disabilities Act of 1990*. Moving beyond ADA, Universal Design is about creating a barrier free environment, and specifically in transportation, a barrier free walking environment.

Related Issues



Walking paths on Case Western University campus

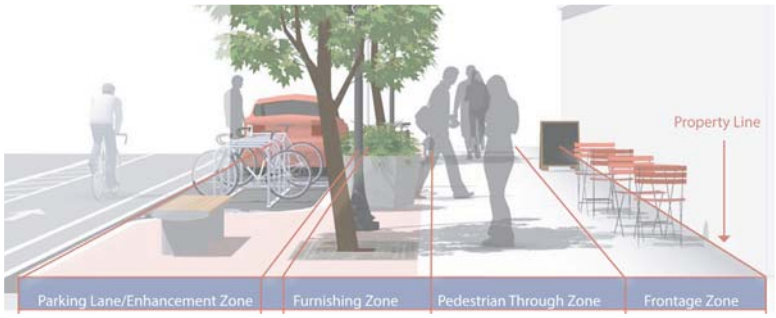
As more accessible housing and support facilities are developed in University Circle through the work of *Maximum Accessible Housing of Ohio* and others, the surrounding transportation network should support the mobility needs for people with the full range of physical abilities, including those with more limited visual or auditory abilities. As the *Cleveland Sight Center* emphasizes, vision loss does not mean an end to active lifestyles.

Components of an inclusive on-street environment include wide pedestrian through zones clear of obstructions, level crossings, curb ramps, pedestrian refuges, auditory pedestrian crossing signals, wayfinding signs visible to those in wheelchairs and legible to those with vision impairments, are a few ways to achieve an inclusive on-street environment serving everyone regardless of their physical ability.

Prior Plans/Policies

- Cleveland Complete and Green Streets Ordinance & Typologies Plan (2013)
- Connections 2035 - Northeast Ohio's Long-Range Transportation Plan (2013)
- Facilitating Bicycle and Transit Travel in University Circle and Cleveland Heights (2013)
- Intesa Transportation Impact Study and Shared Parking Analysis (2012)
- Uptown District – Cleveland, OH: A Transportation and Neighborhood Redevelopment Plan (2010)
- Mayfield Road Streetscape Improvement Plan (2009)
- MLK/East 105th Traffic Circle & Roadway Reconfiguration (2007)
- East 120th Street Station Master Plan (2007)
- University Circle – Shaping the Future (January 2000)

Tools



Elements of a Sidewalk Corridor
Cleveland Complete and Green Streets Typologies Plan, 2013

Walkway Zones

The zone system is used to organize pedestrian space and has been clearly outlined in the *Cleveland Complete and Green Streets Typologies Plan*. The sidewalk corridor comprises at least four zones between the curb or road edge and the property line:

- Frontage Zone
- Pedestrian Through Zone
- Furnishing Zone
- Edge Zone
- Parking Lane/Enhancement Zone (optional)

Zone	Frontage	Pedestrian Through	Furnishings	Edge	Parking Lane & Enhancement
					
	Space for sidewalk cafes, awnings, vendors, doorway openings. On streets with front lawns without fences, the frontage zone is effectively 0'.	Space for pedestrian travel. Keep clear of obstructions and maintain a direct, straight path.	Paved or planted area for pedestrian amenities, trees, or street infrastructure (fire hydrant, signs, utilities).	Border between the throughway or furnishing and the roadway. Includes drainage.	This fifth zone is for on-street parking or bus stops. Curb extensions, bus bulbs and bicycle parking can be added to this zone.
Dimensions	1.5 - 4'	6 - 15' Match size to demand.	6 - 15' Match size to demand.	0.5' 1.5' if on-street parking is present.	5 - 8'

Crosswalk Design

Stripe crosswalks at all legs of intersections and at midblock locations connecting destinations where safe to cross. Align crosswalks with the most direct pedestrian crossing.

- Crosswalks should be at least 10' wide at all locations and 20' wide in areas of high pedestrian activity.
- Set the vehicle stop bar at least 5' back from the crosswalk.
- Illuminate crosswalks with pedestrian-scale lighting.
- Crosswalks alone do not ensure pedestrian safety; on roads with high vehicle volumes or numerous travel lanes, pair crossings with pedestrian signals.
- When decorative materials such as brick are used to pattern the crossing, apply a high visibility stripe to each side to ensure motorists can see the crosswalk.
- Utilize styles, colors, and materials that are easily visible and durable through cold, wet winters.

Elements of a Crosswalk

Curb Ramp

Curb Ramps

Curb ramps benefit all users, especially those in wheelchairs, people pushing strollers or luggage, and children on bicycles.

- Install two ramps per corner with a 2' wide truncated dome warning strip meeting ADA requirements.
- The grade from sidewalk to street level should not exceed 8.33 percent except in special cases, with a cross slope no greater than 2 percent.
- The ramp itself (not counting the flared sides) should be wider than 3'.
- If it is necessary to construct the entire corner as a ramp, install raised detectable objects at each edge to guide those with visual impairments.

Curb Extensions

- Shortening pedestrian crossings, improving pedestrian visibility and calming traffic can be achieved with the addition of curb extensions.
- Curb extensions can be used at crossing adjacent to on-street parking, so pedestrians waiting to cross can be seen by drivers and are not obscured by parked cars.
- Extensions also shorten the overall length of the crossing.
- As a gateway, curb extensions can be used to slow vehicles as they approach intersections or indicate an entrance to a slower neighborhood.
- To mitigate overly wide corners curb extensions can reduce corner radii (see Corner Design).

Curb Extension

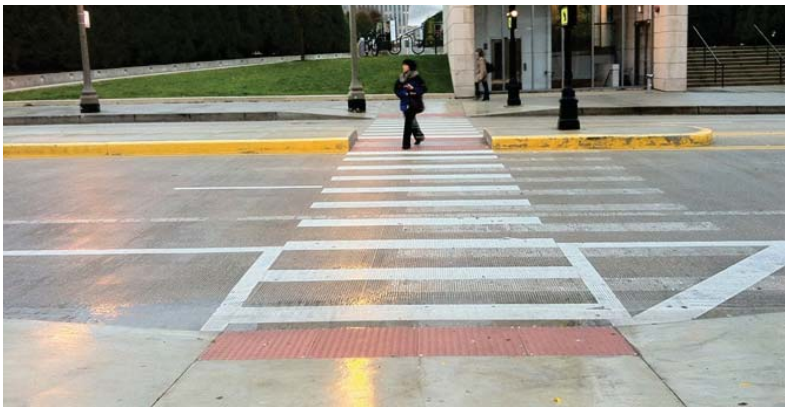
Medians provide pedestrian refuge mid-crossing

Medians

Median islands shorten the pedestrian crossing and accommodate slower pedestrians. Median islands can take the form of medians running down the length of the road or as crossing islands and can be used at intersections or midblock.

- Install minimum 6' wide medians at crossings of four lanes or wider, ideally eight to 10 feet wide. The 6' minimum width accommodates people with a bicycle or stroller.
- Extend the median tip to the edge of the curb, with a cut through equal to the width of the crosswalk for level crossings.
- Include bollards or other features to protect people waiting.

Medians can become places with the addition of seating and landscaping



Crossings can be accommodated with median cut throughs

Crossing Signals

Install pedestrian signals at all vehicle signals in tandem with crosswalks. Fixed-time signals, which automatically turn the pedestrian signal to WALK with the vehicle green cycle, are preferable to pedestrian push-button activation of crossing signals, as they consistently allow crossing opportunities.

- Length of WALK Phase - Configure signals for a walking speed of 3 feet per second on streets of 40 feet or less. Configure signals for a walking speed of 2.5 feet per second on streets wider than 40 feet.
- Leading Pedestrian Intervals, provide a minimum of 5 seconds at the beginning of each WALK phase where motorists cannot make any movements.
- Install pedestrian signals at all high traffic intersections.
- Make pedestrian signals automatic rather than push-button controlled.
- Install audible WALK signals to assist pedestrians with visual impairments.
- Limit all-pedestrian WALK phases to intersections with high pedestrian populations and pedestrian desire lines that follow a diagonal crossing.

Speed Hump

Speed Humps

- Raised traffic calming devices that are 3 to 4 inches high, 12 to 15 feet wide to fully span travel lanes and 3 to 6 feet long.
- Speed humps may be referred to as speed bumps but they are frequently broader in width and cover a larger portion of the roadway than typical speed bumps.
- Speed humps are used to slow traffic to 10 to 15 miles per hour.

Raised Crossing & Speed Tables

- Raised crossings and speed tables provide level crossings for individuals with mobility issues and encourage drivers to slow when approaching pedestrian crossings.
- Raised crossings, like speed humps, should not be implemented on streets with city buses, rather curb extensions and other lane narrowing traffic calming strategies should be employed to slow traffic.
- Raised crossings can provide level mid-block access pedestrians or to link trails and paths.
- Speed tables are used to slow traffic and span the entire intersection, slowing traffic both approaching and through the intersection (see "Appendix: Speed Tables Memorandum").

Raised crossing

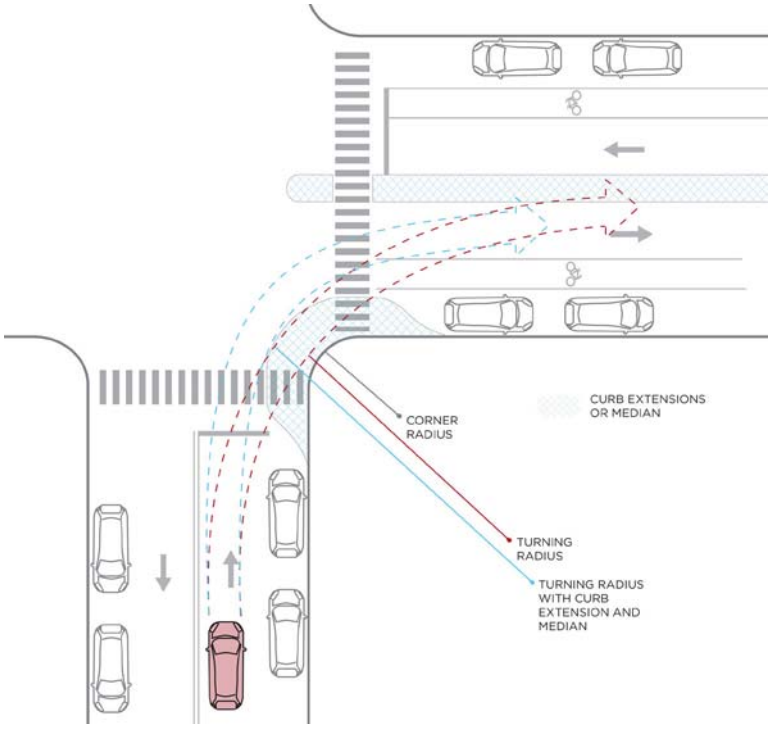
Corner Design

Corner design is critical to safe streets, as it establishes driver turning speeds, pedestrian crossing distances, and sight lines. Turning radius is the path of a vehicle's wheels, and curb radius is the actual radius of the curb. Corner design is dictated by the design vehicle used to create an intersection. Use the smallest design vehicle that frequently turns at an intersection to keep intersections compact.

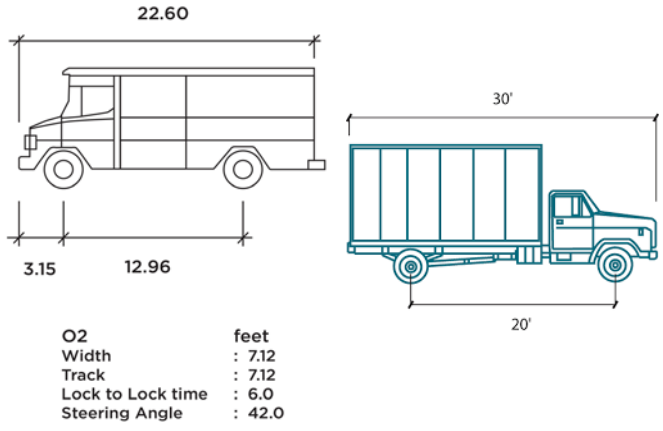
- Limit vehicle turning speeds to 15 mph by restricting turning, or effective, radius.
- On neighborhood and local streets use a curb radius of 10'.
- Adopt a design vehicle: the DL-23. The size of a delivery truck, the DL-23 is the most common larger vehicle that will turn onto University Circle streets.
- On larger streets like Cedar Glen Parkway, use the SU-30 design vehicle.

Turn Lanes

- Dedicated right turn lanes are to be avoided because they widen the roadway and facilitate higher turning speeds. Before one is installed a traffic network analysis should be performed to determine if the turns may be accommodated elsewhere or spread through the network.

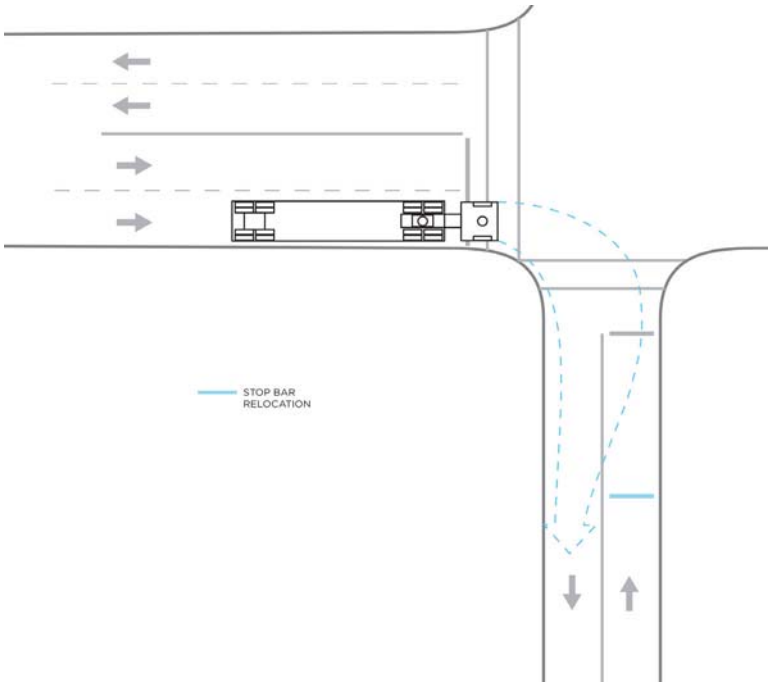


Reduced turning radius with curb extensions slows vehicles and provides greater pedestrian visibility at corners with on-street parking



DL-23 Design Vehicle

SU-30 Design Vehicle



Infrequent truck traffic can swing into opposing lanes to make turns, paired with a recessed stop line.

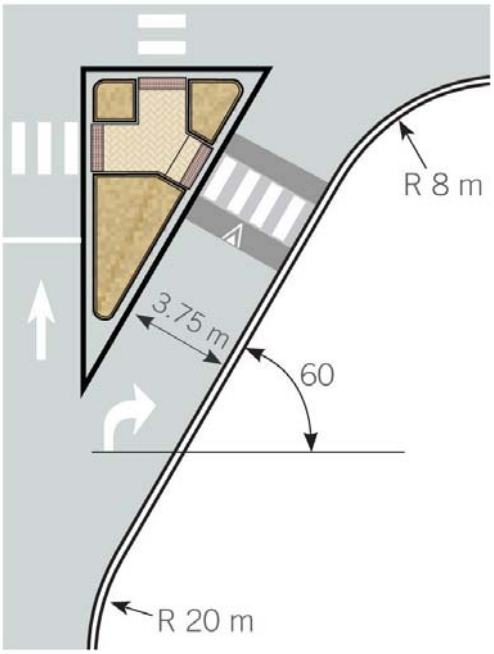
Corner Design (continued)

Slip Lanes

Slip lanes (pork chop islands) are mitigation measures for overly wide and angled intersections. While their use is not encouraged, a well-designed slip lane is preferable to an expanse of asphalt.

Design decisions for slip lanes are made as follows:

1. Minimize intersection size.
2. Analyze the traffic network to determine if the turn can be made elsewhere and/or if the turns can be redistributed throughout the network.
3. Turns for large vehicles can be restricted.
4. If a slip lane is used, stop control and a raised crosswalk is preferred.



Slip Lane Design

Connectivity

Goal

Increase access for all modes by connecting gaps in the transportation network through the provision of additional links.

Related Issues

Walking First | Bicycle Friendly | Transit Accessible | Safe & Reliable Auto Access

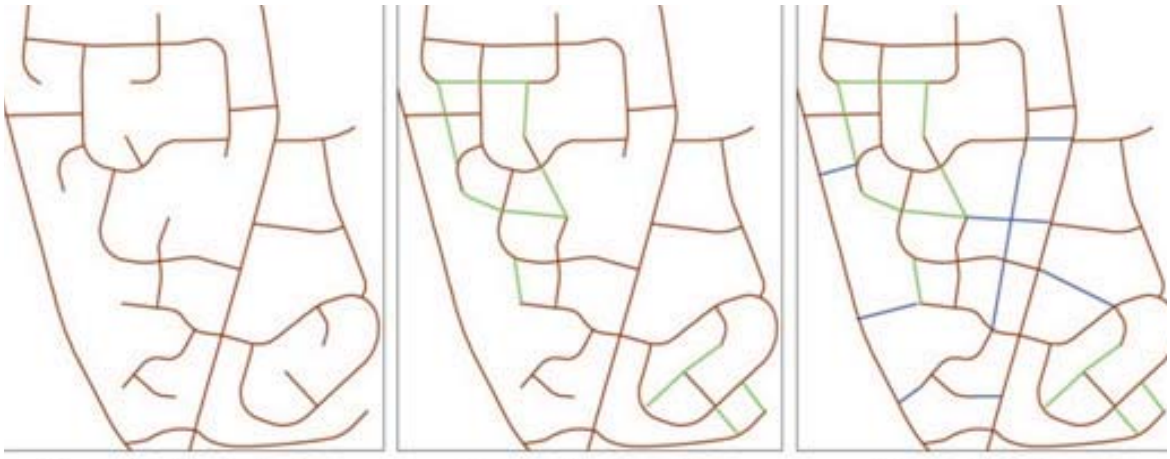
Rationale

High connectivity creates a more accessible and resilient transportation network, because people can take more direct routes between destinations and have more route options. Well-connected street networks have benefits such as improved EMS response time, lower vehicle miles of travel, and less congestion.

About

Connected Transportation Networks

Connectivity refers to the density of connections in path or road networks and the directness of links. Well-connected street networks have short links, many intersections, and minimal dead-ends or cul-de-sacs. The example below takes a typical street network and shows how to improve its connectivity. First, pedestrian connections (in green) are added within the local areas off the main roads. Then full streets are added (blue), improving the connectivity index from 1.12 at the start to 1.4 – a walkable community.



Improving a street network's connectivity

Prior Plans/Policies

- The Cleveland Opportunity Corridor Project (2014)
- Fairfax Strategic Investment Plan 2014 – 2019 (2014)
- Cleveland Complete and Green Streets – Typologies Plan (2013)
- Cleveland Bikeway Master Plan (2013)
- Uptown District – Cleveland, OH: A Transportation and Neighborhood Redevelopment Plan (2010)
- MLK / East 105th Traffic Circle and Roadway Reconfiguration (2007)
- E. 120th Street Station Master Plan (2007)
- Upper Chester Neighborhood Plan (2007)

Tools

Pedestrian-only paths can connect neighborhood streets

Improving Connections

- Increasing connectivity does not necessarily involve building roads. Use the space between buildings to make connections with high permeability for people on foot or on a bicycle, but low permeability for cars.
- Street ends can be extended with trails and paths that connect neighborhoods.

Wide alley in Cambridge, Massachusetts

Small streets can increase connectivity

Shared Use Paths

- Shared use paths and trails are physically separated from travel lanes by an open space or barrier and usually designed for two-way travel of bicycles and pedestrians.
- The Harrison – Dillard Bikeway and Lake-to-Lakes Trail are the key multiuse trails in University Circle. Minimizing crossings with large arterials, improving signage or adding raised crossings described under the Walking First strategy can improve safe access along the entire trail.
- Pavement medallions can guide bicyclists where trails cross sidewalks or leading up to arterial and roadway crossings.

Harrison - Dillard Bikeway

Indianapolis Cultural Trail

Standards

Adopting metrics that create connected networks can be woven into zoning and design standards. Some typical applications might include:

- Average intersection spacing: 200-400 feet
- Maximum intersection spacing: 600 feet
- Maximum spacing between pedestrian/bicycle connections/crossings: 350 feet
- Maximum block size: 5-12 acres

UNIVERSITY CIRCLE

Bicycle Friendly

Goal

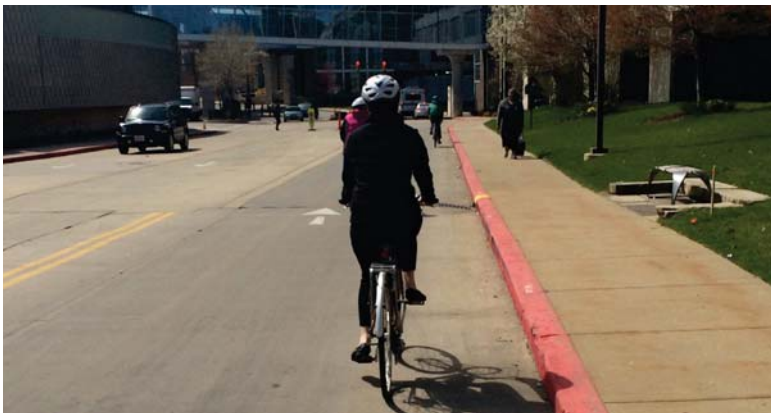
Encourage cycling by creating a bicycle friendly environment with clearly defined routes coordinated with regional cycling networks.

Related Issues

Bicycle Friendly | Connectivity | Smart Parking | Real Estate Development

Rationale

Bicycling is one of the most environmentally friendly transportation options, producing zero emissions. For every 1% of auto travel replaced by bicycling, emissions decrease by 2-4%. Multimodal streets have also been linked to improvements in economy. A shopping corridor study found that people who bike spend more money per month shopping than those who drive, supporting increased retail sales.[1] Numerous studies have also linked regular cycling to mental and physical health benefits.[2]



Bicycling in University Circle is common though few bicycle routes are marked

About

- **Last Mile Trips**

  Bicycles can help people travel the last mile from transit to their destination, if bicycle connections between transit hubs and major destinations are available. Bike share service provided at transit hubs and popular destinations can help connect that last mile.

- **Bike share**

  Bike share allows for individuals to access bicycles without the need to own a personal bike and has been shown to increase commuter bicycling rates. Bike share can provide access to bicycles for people of varied incomes if priced appropriately and cash payment alternatives are provided.

- **Latent Demand for Cycling**

  Bicycling provides a convenient means of travel for short trips of 1 to 3 miles in length. Half of the trips made in the United States total less than three miles, thus cycling can become the mode of choice for a large percent of transportation needs.

- **Cleveland Bikeway Implementation Plan[3]**

  The Cleveland Office of Sustainability's Bikeway Implementation Plan highlights streets in University Circle to receive bicycle infrastructure in the near future:
  - Quincy Avenue (2014 - 2015)
  - Wade Park Avenue (2014 - 2015)
  - Hough Avenue (2016 - 2017)

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Prior Plans/Policies

- Facilitating Bicycle & Transit Travel in University Circle & Cleveland Heights (2013)
- Cleveland Bike Share Feasibility Study (2013)
- Cleveland Complete & Green Streets (2013)
- Cleveland Typologies Plan (2013)
- Connections 2035 (2013)
- Cleveland Bikeway Master Plan (2013)
- Uptown District: Transportation and Neighborhood Redevelopment Plan (2010)
- Mayfield Road Streetscape Improvement Plan (2009)
- MLK/East 105th Traffic Circle and Roadway Reconfiguration (2007)
- East 120th Street Station Master Plan (2007)
- University Circle – Shaping the Future (2000)

Tools

Family-friendly bicycle boulevard

On-Street Bicycle Travel

Bicycle Boulevards

Combined with traffic calming strategies like speed humps, speed tables, and curb extensions, bicycle boulevards prioritize bicycle traffic over motor vehicle traffic using signage and pavement markings. Bicycle boulevards are best for neighborhoods with low traffic volumes.

Sharrows

Along Cornell Road, pavement markings indicate a shared lane environment for bicycles and automobiles. Sharrows are ideal on low volume streets when lane widths are less than 11 feet, to encourage motorists to yield to cyclists, or greater than 15 feet, to allow motorists to pass without encroaching[4]. Sharrows can also be implemented on higher volume streets where existing roadway dimensions do not allow for a dedicated bike lane. Sharrows should be centered in the travel lane and at least 4 feet from on-street parking lanes[5].

Sharrow placed in center of lane

On-Street Bicycle Travel (continued)

On-street lane
A dedicated bicycle facility delineated by striping, signage and pavement markings adjacent to the motor vehicle travel lane. Similar to Euclid Avenue west of Stokes Boulevard, lanes should be a minimum of 6 feet wide.

On-street bicycle lane

Edgehill Road in Cleveland Heights
Photo Credit: Green City Blue Lake

On-street lane with buffer
Along Edgehill Road in Cleveland Heights a conventional on-street bicycle lane has a designated buffer space that separates the bicycle lane from motor vehicle travel lanes. This buffer provides greater shy distance from traffic and when placed adjacent to on-street parking can encourage bicyclists to travel outside the door zone. Lanes should be a minimum of 6 feet wide with a 3 to 4 foot buffer.

Cycle tracks
Cycle tracks are one-way or two-way bicycle facilities separated from motor vehicle travel lanes by bollards, parking, curbs and/or medians. One-way cycle tracks are 5 to 7 feet or wider on high volume corridors and 12 feet or wider for two-way cycle tracks.

Curb separated, two-way protected bike lane with green markings at driveway entrances

Motorists stop in advance of the bicycle box

Bicycle Box
At intersections, provide cyclists space to manoeuver and prepare for turns by placing painted bicycle boxes between the stop bar and crosswalk.

Bicycle Parking

- Like the highly visible bike racks outside of Happy Dog on Euclid Avenue, bicycle parking encourages more bicycle trips.
- Cleveland's Zoning Code requires a ratio of 1:20 bike parking per vehicle spaces and specifies its placement near building entrances.
- For residential uses, provide bike parking inside the building for long-term storage and overnight security. This is required for new development. The City of Cleveland's Ordinance Chapter 344.08 includes this as a requirement in the Midtown Overlay District, which should be similarly adopted for the University Circle service area.
- For commuter uses, provide bike parking either inside the building (for all-day storage) or visible, covered parking (for shorter-term storage). Providing lockers and access to showers also increases bicycle usage to/from key work places.
- Adding covers to existing and new parking can also further protect bicycles from snow and rain by adding covers.
- In Cleveland, the Bike Box program is recycling shipping containers into covered bicycle parking for curbside parking spaces.

Bike Box provides low cost sheltered bicycle parking by reusing shipping containers

Covered Bicycle Parking with bicycle repair station and inner tube vending machine

Bicycle pump next to campus bicycle parking at Washington University (St. Louis, MO)

Bicycle Services

- Additional bicycling amenities can be incorporated along with bicycle parking. For example, Washington University (St. Louis, MO) provides bicycle pumps next to their bicycle racks.
- Bicycle repair stations can be integrated with bicycle parking at sheltered locations including vending machines for bicycle inner tubes and shared tools.
- Provide commuter bike stations to accommodate commuter demand to/from smaller work places. Modeled after the Cleveland Bike Rack at East 4th Street, these bike stations should provide secure bicycle parking, individual shower/changing facilities, lockers, bicycle rentals and minor bicycle repairs.

Bike Share

- Bike share launched in the district in October 2014 with a Zagster station at the heart of University Circle on Cornell Road, southeast of Euclid Avenue.
- Recommended density of bike share stations range from 10-15 stations per square mile[6] to 25 per square mile.[7]
- Bike share can support transit and "park once" opportunities by expanding the reach of people throughout the district without the need to transfer transit services or repark to visit multiple destinations.[8]
- To help those without access to credit cards offer the opportunity to purchase a bike share memberships using cash through a Transportation Management Association (TMA) or another agency. For example, Arlington County (VA), in partnership with the regional TMA, has begun accepting cash payments for memberships to the popular Capital Bikeshare system at their commuter pass stores.

Zagster Bikeshare is available in a variety of Cleveland neighborhoods, including downtown, Ohio City, and University Circle.
Photo Credit: Bob Perkoski

Zagster Bike Share hub in University Circle
Photo Credit: University Circle Inc.

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UNIVERSITY CIRCLE

Transit Accessible

Goal

Create an environment (physical and operational) where transit accommodates a significant portion of all trips.

Rationale

Transit encourages circulation within University Circle, allows people living in University Circle to reach jobs outside the district, and for residents of all neighborhoods to access employers in University Circle. Transit also connects other parts of the region to University Circle's health care, educational and cultural institutions, retail, and entertainment without requiring space for moving and parking cars.

About

HealthLine

Cleveland's HealthLine on Euclid Avenue is commonly cited by other cities across the nation as the best practice for bus rapid transit (BRT). The line connects University Circle's major institutions with downtown Cleveland and has driven increasing investment in the district. With nearly $6 billion in development along the corridor since 2005, the BRT line accomplished what more expensive light rail systems have achieved at a fraction of the cost and on a shorter timeline.[1] The investment in transit on Euclid transformed $200 million in public investment into several billion dollars of economic growth for University Circle and the City of Cleveland.[2] This investment in transit generated a 30-fold economic investment in the city by private enterprises.[3]

Red Line Improvements

RTA is in the process of relocating the East 120th Street station to the bustling and densely populated Little Italy neighborhood, providing greater access to the heart of retail and commercial activity in Uptown and Little Italy.[3] Additional investment has been made to simplify bus and rail connections at the University-Cedar Station. The project relocates bus bays closer to the rail station, renovates the station and brings the station and bus terminal into full compliance with ADA guidelines to ease access for those with limited mobility.[4]

Related Issues

- Transit Accessible
- Walking First
- Smart Parking
- Real Estate Development

Cleveland's successful HealthLine

Economic Benefits

Transit users can generate more business than local drivers. A shopper survey along Columbus Avenue in San Francisco's Cole Valley found that transit users and walkers spend $36 on average for each visit to the corridor compared to the drivers, who spend $52. But those who take transit and walk visit local business more than twice as often, generating upwards of $72 in retail purchases over the same period of time. With more frequent visits, transit riders and walkers spent $252 to $360 per month along the corridor, compared to $208 per month for the average driver[5].

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Prior Plans/Policies

- Facilitating Bicycle & Transit Travel in University Circle & Cleveland Heights (2013)
- Cleveland Complete & Green Streets (2013)
- Uptown District: A Transportation and Neighborhood Redevelopment Plan (2010)
- Mayfield Road Streetscape Improvement Plan (2009)
- MLK/East 105th Traffic Circle and Roadway Reconfiguration (2007)
- Connecting Cleveland 2020 Citywide Plan (2007)
- East 120th Street Station Master Plan (2007)
- Transit 2025: Long Range Plan of the Greater Cleveland Regional Transit Authority (2004)
- University Circle – Shaping the Future (2000)

Tools

Far-side bus bulb

Bus Bulbs

- Optimal placement of stops is at far-side bus bulbs, allowing the bus to clear signals before stopping for passengers.
- Bus bulbs allow for greater passenger waiting space and can ensure clear walkway zones for pedestrians traveling along the street.

Stop Amenities

Bus stops should include all the components that encourage people to be confident the bus will arrive, including:

- Shelter for waiting passengers
- Benches for those with limited mobility to rest.
- Lighting should illuminate the sidewalk, placing lighting at 10-15 feet above the sidewalk. Use LED if possible as it casts off a more inviting light.
- Waste management/trash cans.
- Transit information, route maps, schedules, and walking maps to nearby destinations.
- Countdown clocks for real-time arrival information at BRT and rail lines.
- Bike racks

Sheltered bus station on Euclid Avenue

Getting to Transit by Foot or Bike

- The tools outlined for crossings and safe sidewalk design under Walking First can improve access to transit for all ages and abilities by improving walking access to transit.
- Crossings near transit stops and hubs should at a minimum include sufficient width to accommodate curb ramps and pedestrian signals at signalized intersections.
- Improve or add wayfinding (see Legible District)

Walking First design enhances transit access

Bike share can extend the reach of transit

- Ensure connectivity for bicyclists to accommodate the first or last mile trip to rapid transit and expand the reach of transit through key bicycle facilities to major destinations.
- Provide secure covered bicycle parking adjacent to major transit hubs.
- Add bike share at major terminals, transit hubs and major destinations in University Circle.

Additional Tools

- Three key factors from University Circle's previous "Missing Links" study to support transit are:
  1. Availability and accuracy of information (real time and static)
  2. Provision of on-board amenities for longer trips (wifi, comfortable seats, etc.) and
  3. Demand for direct (one seat) service to University Circle from suburban/exurban hubs.

Endnotes

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3. http://www.sustainablecommunitiesleadershipacademy.org/resource_files/documents/the-cleveland-healthline.pdf
4. http://www.riderta.com/majorprojects/littleitalyuc
5. http://www.riderta.com/majorprojects/cedaruniversity

UNIVERSITY CIRCLE

Safe and Reliable Auto Access

Goal

Balance safe and reliable vehicular flow with needs for greater multimodal access.

Rationale

The majority of travel through University Circle is by private automobile. Providing a reasonable and reliable travel time and safe roadway network is critical to maintaining and improving University Circle's function as a multimodal district. Many of the multimodal recommendations in this report stand to improve safety for drivers by clarifying movements and addressing frequent points of conflict.

About

- **Traffic Controls**

  Traffic signals organize multimodal movements at intersections. Reducing complexity and establishing regular patterns of vehicle, bicycle, pedestrian and transit movements makes it easier for drivers to navigate University Circle.

  Simplifying traffic signals through coordinated signal networks, shortening cycles, and providing predictable movements for all roadway users can reduce conflicts and delay at intersections.

- **Visibility**

  Increasing visibility of people walking or bicycling can make it easier to drive and reduce crashes. Leading Pedestrian Intervals (LPIs) can also make it easier for drivers to see crossing pedestrians, reducing conflicts between drivers and pedestrians at intersections, and improving auto access.

  Incorporate vehicle wayfinding to provide visible and easy to follow paths to key destinations and parking facilities (see Legible District strategy). Utilize styles, colors, and materials that are easily visible and durable through cold, wet winters.

Related Issues

Safe & Reliable Auto Access

Connectivity

Vehicular wayfinding and traffic controls help organize multimodal movements at intersections

- **Reliability**

  Safe vehicle operations translate into reliable auto trips. Intersections that limit unique turning movements reduce the potential conflicts between vehicles; intersections that provide enough space without excess width, provide efficient vehicle flow without encouraging speeds dangerous to other drivers or modes.

Prior Plans/Policies

- Cleveland Opportunity Corridor Project: Final Environmental Impact Statement (2014)
- Uptown District: A Transportation and Neighborhood Redevelopment Plan (2010)
- Cedar-Fairmount Transportation & Streetscape Plan (2009)
- Mayfield Road Streetscape Improvement Plan (2009)
- MLK / East 105th Traffic Circle and Roadway Reconfiguration: Technical Memorandum (2007)

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Traffic Signals

- Reduce delay for drivers after optimizing the signal timings for safe pedestrian crossings and shortening signals to 60-90 seconds to increase signal turnover.
- Use fixed signals for the pedestrian phase rather than actuated push buttons to provide a predictable signal environment for drivers and pedestrians.
- Use coordinated signals to ensure a consistent and safe traffic speed for all users.

Wayfinding is also useful for directing pedestrians and cyclists

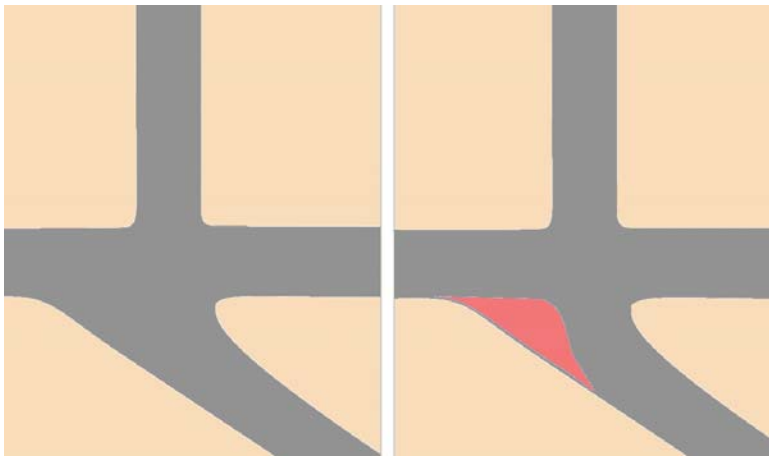
Curb extensions help drivers see pedestrians around parked cars

Visibility

- Install curb extensions at crossing next to on-street parking so drivers can see people waiting to cross.
- Install lighting at a height of 10 – 15 feet so the roadway, bicyclists, and people walking are visible to those driving after dark.
- Install Leading Pedestrian Intervals (LPIs) at key intersections to minimize conflicts between pedestrians and drivers at busy intersection to give slower walkers time to cross.

Curb Alignment

- Align the curb. Using curb extensions make the curb line predictable for drivers so they can respond appropriately to changes in roadway widths and lane offsets.
- Use roadway markings to define through travel patterns for drivers and bicycle lanes from one side of the intersection to the other, especially where curb lines shift or roadways narrow.



Aligning the curb at this Y-interchange simplifies intersection movements for drivers

Goal

Integrate the online social space of University Circle with the real world destination.

Rationale

Linking the visual message of University Circle's online presence and on-the-ground information supports a connected district. Opportunities to provide navigation information at key junctures in trips can smooth the transitions between multiple modes, highlight nearby activities and destinations, and reinforce the district's "park once" strategy. Strengthening the links between physical maps and digital tools creates low-cost opportunities to share real-time information about activities and businesses in the district.

About

- **Sense of Place**

  As part of this study's outreach, online tools were used to work with the community and understand how they perceive, access, and experience University Circle. This process is a small part of digital placemaking, using technology to create a sense of place guided by the local community.[1] Digital placemaking extends beyond community engagement to online perceptions about a place. Distinguishing the University Circle District as a unique place is a key mission of University Circle. University Circle can create greater connectivity between diverse neighborhoods by using digital spaces, like UniversityCircle.org and local media, to articulate the uniqueness of the entire district.

Related Issues

Connectivity | Real Estate Development | Smart Parking

University Circle wayfinding signage

- **Orientation**

  Orienting oneself to the surrounding environment can help encourage walking and visiting nearby destinations. Signage, maps and graphic design can help people navigate their surroundings at a glance; this process is called wayfinding. Effective vehicular wayfinding can reinforce "park once" behavior, navigate more safely and reduce overall vehicle trips (see ""Safe and Reliable Auto Access"). In Vancouver, British Columbia, 82% of people said that after consulting wayfinding maps they are much more likely to walk than drive and repark.[2] University Circle currently has wayfinding maps and signage throughout the district but they vary in their look, feel and usability. Slight changes can unify and enhance these tools to increase their effectiveness in guiding travelers in the district to their destinations and encourage proximate opportunity by communicating activities along the way.

Integrating Digital Placemaking

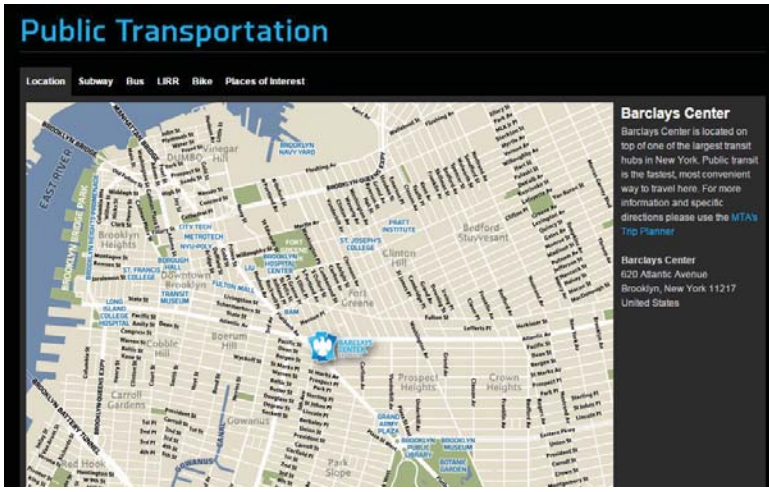
- University Circle, Inc. maintains an extensive online presence through the UniversityCircle.org website and social media, providing information on events, institutions, and activities throughout the district. This should be expanded to include a "one-stop" on-line transportation/travel information clearinghouse, as well as via smartphone application.

- Working with local stakeholders, promote online resources through new employee orientation materials, resident welcome packets, and at local businesses.

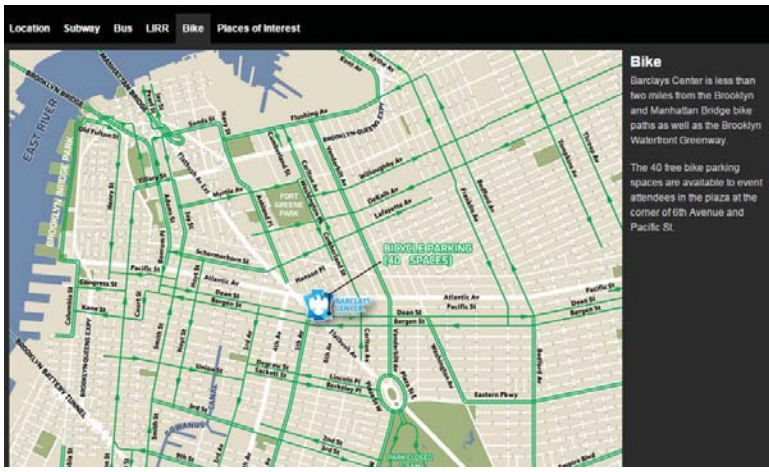
- Encourage people to explore the district by foot. Use route suggestions tailored to transit, biking, and walking with emphasis on the proximity to popular destinations.

- Use language that reinforces the transit accessible nature of the district and link to trip planners from RTA or popular mapping services, "Public transit is the fastest, most convenient way to travel here. For more information and specific directions please use the [RTA's Trip Planner]." [3]

- Highlight parking facilities that cater to Park Once alternatives, like visitor parking or daily pass facilities to cater to tourists and day-trippers through University Circle's current parking map.



Barclays Center's Interactive Getting Here portal encourages travel by transit and the proximity of popular destinations



Emphasize bicycle connections and bicycle parking capacity through the Getting Here portal
Barclays Center Interactive Map

Wayfinding is placed right next to the bus stop

Wayfinding 2.0

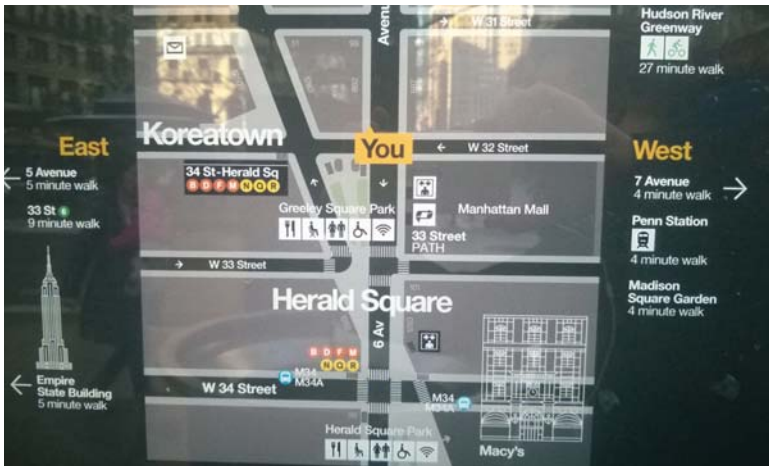
- Let people know where they are right when they've stepped off the bus, out of their car, or parked their bicycle, and how to make the last bit of their trip on foot.

- Place wayfinding signs and maps at intersections, bus stops, bicycle parking, and key decision points. Expand this program of physical kiosks at additional key locations throughout University Circle.

Wayfinding 2.0 (continued)

- Provide estimates of how log to reach destinations by foot, with signs from transit hubs to major institutions every ¼ mile.
- Use QR codes on wayfinding signage to provide digital directions for routes directly linking to walking route directions on visitor's mobile phones.
- Rotate current maps to create "heads up" wayfinding, the map rotation is oriented to the way people are standing while viewing the map. In Vancouver, 87% of people found the format easy to use.[4]
- Integrate photos or building outlines of iconic places viewable on the horizon on wayfinding maps. Visitors can use this visual language to orient themselves when they take their eyes off the map and begin their walk.
- Take the opportunity to promote special events on wayfinding maps and information posts. Use language such as, "Find out what's going on in University Circle today @inthecircle on Twitter or UniversityCircle.org"
- Create a cohesive sense of place. Use a common wayfinding base map throughout the district and use iconic banners to highlight unique neighborhoods, particularly at gateways or transition points between neighborhoods in the district.
- Visitors will become comfortable using a consistent map and be able to identify neighborhoods.

Walk [Your City] signs in Rochester, NY provide walking directions through QR Codes for mobile routing



Heads up wayfinding map with iconic buildings and nearby destinations with estimated walking times

Integrate iconography to communicate neighborhood identity within the University Circle District

Endnotes

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Dynamic Streets

Goal

Reassess road space allocation to reveal opportunities to increase and enhance open space, landscaping, tree canopy, stormwater management, sidewalks, bicycle lanes, and transit access.

Rationale

Right-of-way is a valuable space that has traditionally been given over primarily to vehicles. Offering more transportation choice and varied public space through reallocations of public right-of-ways can provide improved accessibility, ecological benefits, and place making opportunities for users in University Circle.

About

- **Perceived Roadway Capacity**

  Volumes of traffic often feel higher than they actually are. This is due to issues such as speed (higher speeds feel like higher volumes), platooning due to long signal spacing, or signal timings that add to motorist delay. As a general rule, signalized roadways can carry between 800 and 1,000 vehicles per hour. Roads throughout University Circle have more than enough capacity to handle the number of cars using them. For example, the capacity of Stokes Boulevard exceeds peak hour use.

- **Integrate with Walking First Design**

  Rather than maintain surfaces that contribute to storm runoff, like asphalt or concrete, many of tools like curb extensions, medians, shared use paths and bus bulbs discussed previously can be opportunities to create green streetscapes.

Related Issues

Euclid Avenue and Mayfield Road Plaza

- **Safety Benefits**

  The Federal Highway Administration analyzed the improved safety resulting from street reallocations of four to three lane conversions, in several cities in California and Washington. The analysis showed a 19% decrease in total crashes.[1]

- **Economic Benefits**

  On York Boulevard in Los Angeles, a 4-lane road was transformed into a boulevard with bicycle lanes, curbside parking, and travel lanes in both directions with a center turning lane. Where street space was reallocated, sales taxes increased for businesses by 27% and produced twice as much sales tax revenue than businesses where street reallocation did not occur. Over 80% of surveyed customers view the new bike lanes as beneficial.[2]

Prior Plans/Policies

- Cleveland Complete and Green Streets – Typologies Plan (2013)
- Project Clean Lake: Green Infrastructure Plan (2012)
- Mayfield Road Streetscape Improvement Plan – Reconnecting Communities through a Vibrant Main Street (2009)
- MLK/East 105th Traffic Circle and Roadway Reconfiguration (2007)
- Connecting Cleveland 2020 Citywide Plan (2007)
- East 120th Street Station Master Plan (2007)

Tools

4 to 3 lane Road Diet with bicycle lanes and bioswales at curbline

Space for Alternatives to Driving

- 4 to 3 lane conversions or road diets can be used to make space for bicyclists where travel lanes are underutilized by motor vehicles.
- The buffered bike lane on East 72nd Street where the road diet provided a connection for bicyclists from Erie's lakefront to the St. Clair neighborhood is a successful road diet by reallocating underused travel lanes to create space for safer bicycling.
- Underutilized roadway capacity can also provide space for transit lanes and still maintain enough capacity for automobiles on arterial corridors. The Euclid Avenue bus lanes for the HealthLine were implemented along segments with lower traffic, less than 15,000 average daily vehicles.

Plazas

- Build upon the plaza successes at Euclid Avenue & Mayfield Road by adding plazas where there are slip lanes or overly large curb radii.
- Plazas transform underutilized areas of roadways into active public spaces and energize surrounding businesses by attracting foot traffic.
- Retail sales have shown marked increases along streets with plazas installed. A single plaza in Brooklyn generated a 172% increase in retail sales in the neighborhood compared to 18% across the borough. Other plazas in the city have shown increases of 14% in sales at fronting businesses and have shown to increase pedestrian traffic by 75%.[3]

Euclid Avenue & Mayfield Road Plaza

Parklets

- Parklets are valuable public spaces that are smaller than plazas, but can transform one or two parking spots and create space for seating, dining, and relaxation.
- The most successful parklets are adjacent to frequent community destinations and include both seating and landscape elements.
- Parklets can be combined with bicycle parking, sidewalk cafés, and curb extensions with sufficient clearance from crossings (8 to 10 feet).
- They can be permanent or semi-permanent installations. Seasonal programs have been instituted in Philadelphia and Chicago for semi-permanent parklet installations.

Seasonal Parklet on Philadelphia's 43rd Street
Philadelphia Mayor's Office of Transportation and Utilities

Columbus Day Parade on Mayfield Road
Photo Credit: Lisa DeJong

Summer Streets - Ciclovia Event

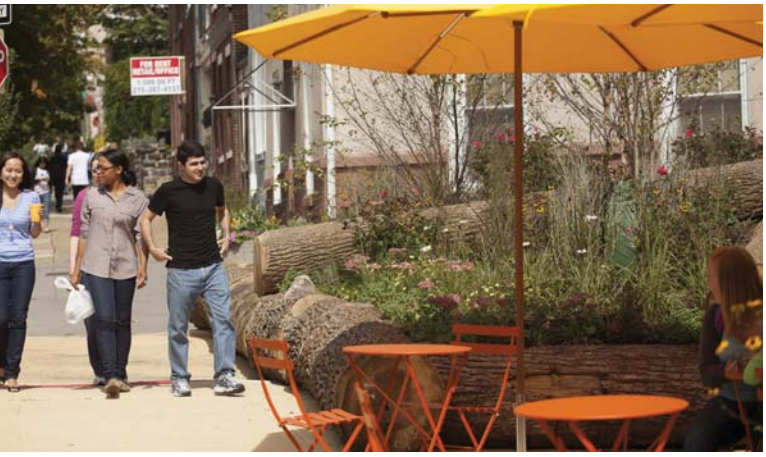
Temporary Street Closures

- Temporary street closures can accommodate large cultural or community events during off peak hours or on weekends.
- Mayfield Road in Little Italy is a key Festival Street, closing to accommodate large parades and events for the surrounding community.
- Temporary street closures like open streets or Ciclovia events, are typically weekend street closures that encourage bicycling, walking and recreational uses along large boulevards or parkways.
- These open street events encourage physical activity and can be a great opportunity to promote healthy lifestyles and active transportation.
- Temporary street closure events in the University Circle area have included Walk+Roll along Martin Luther King Jr. Drive, Hessler Street Fair, and Parade the Circle and Criterium bike races around Wade Oval.

Bioswales

- Bioswales are planted depressions used to promote the absorption of stormwater runoff. The depressed areas of bioswales pool water to manage stormwater runoff at its source.
- Bioswales can take the place of traditional landscaping and if native winter hardy plants are used can decrease maintenance costs.
- Bioswales can be incorporated into curb extensions were drainage is a concern.

Bioswales within curb extensions create sustainable streets



Replace traditional landscaping with rain gardens at plazas

Rain Gardens

- Like bioswales, rain gardens absorb water in planted depressions; however they are much larger in size and have sloping features to allow more rainwater to drain.
- Sandy Boulevard, in Portland, Oregon, is lined by five distinct rain garden plazas creating a distinct streetscape for the business district and vibrant public spaces.

Permeable Pavement

- Porous pavement and asphalt are similar to traditional pavement, however, the material filters water through small pores in the asphalt to a gravel bed underneath before reaching groundwater.
- Permeable pavement provides the smooth service that allows those with mobility issues to access shared use paths.

Permeable Pavers on Hessler Court

Endnotes

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UNIVERSITY CIRCLE

Smart Parking

Goal

Focus on transformational opportunities to achieve balance between parking supply and demand.

Rationale

Support more growth throughout University Circle with less parking. Optimizing the utility of existing parking resources and increasing use of driving alternatives will reduce how much total parking is required to realize University Circle's vision for robust growth and vitality. Completing a virtuous circle, reducing parking infrastructure will leave more real estate and investment dollars available for higher and better uses.

About

With significant parking capacity and multimodal options available throughout the area, parking supply need not be a barrier to the economic success and growth of the University Circle area (see "MGUC Phase 1 - District Parking Study"). Strategic parking management can address locational and temporal supply constraints, and better distribute demand among all available resources.

Optimize Existing Capacity

- Make existing capacity more apparent
- Maintain availability at all times/locations
- Expand resource sharing
- Get more local trips out of each parking action

Support/Promote Park Once

- Make it easier to get around all of University Circle without driving/re-parking.

Reduce Demand (see Transportation Demand Management Strategy)

- Tap into growing demand for non-driving mobility
- Non-driving mobility is cheaper to accommodate, honors health mission of largest area institutions.

Related Issues

Connectivity

Smart Parking

Safe & Reliable Auto Access

Visible, covered bike parking at main entrances encourages bicycling.

Prior Plans/Policies

- Moving Greater University Circle: Phase I (2014)
- CWRU Campus Parking Plan (2014)
- Connections 2035 - Northeast Ohio's Long-Range Transportation Plan (2013)
- Intesa Transportation Impact Study and Shared Parking Analysis – Cleveland, OH (2012)
- East 120th Street Station Master Plan (2007)

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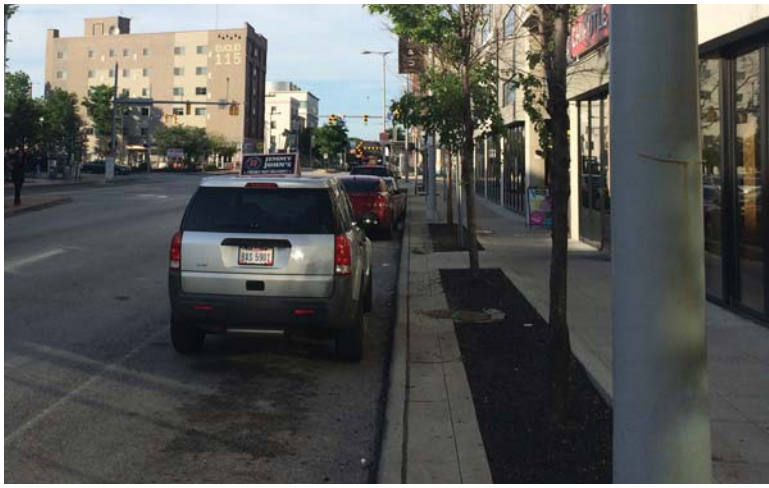
Price for Consistent Availability

- Charge based on on-street parking demand. If spaces are always full, they are under-priced.
- Build in responsiveness. Demand is dynamic, prices must be changeable to be effective.
- Break out of the 9-5. Curbside demand is gravitating toward evenings, with ample morning availability. Shift pricing schedules to protect evening availability, provide morning perk, and emphasize that pricing is about management, not revenue.
- Re-examine time limits. Effective pricing should reduce/eliminate their necessity.



Maintain a small portion of available parking at the curb

Reduce frustration with parking meters by using low cost Pay-by-Phone technology

Improve Parking Experience

- Use technology to make parking easier to find, pay for, and think less about.
- Make paying for parking consistent and easy.
- Introduce a single Pay-by-Phone option to provide an alternative, cashless payment option that works for all options.
- Use Pay-by-Phone to provide remote expired-time alerts and options to pay for more time without returning to the space.
- Work with the City of Cleveland to develop a pilot Parking Benefits District (PBD) to return parking revenue to local improvements within Uptown, Little Italy, and/or all of University Circle.

Improve Curbside Performance

- Expand and meter short-term parking within the Euclid and Mayfield commercial corridors.
- Ensure signage promote opportunities, not just restrictions.
- Use signage to promote off-street alternatives to on-street options for those seeking lower cost/more time.
- Showcase higher-capacity curbside uses. Find strategic locations for innovative uses that reflect the vision for the area — parklets, bike parking, bike sharing, and public valet stations.

Strategic transformation of parking to parklets can catalyze local businesses

Expand Park Once Success

Most cultural institutions accommodate Park Once use of their on-site facilities, freeing their visitors to explore all of University Circle independent of their cars. Several additional public facilities offer the same. The benefits of this can be expanded by:

- Promoting the walkable proximity of the growing variety of area destinations.
- Ensuring that the Circle Link functions as, and is perceived to be, a visitor-focused shuttle between these destinations.
- Embracing bike mobility, including bike share and pedicabs, as an additional visitor-friendly option for connecting to University Circle destinations.
- Making better use of drop-off bays to make remote parking options more viable for large groups, families, the elderly, and visitors with mobility challenges.
- Expanding and coordinating Public Valet to develop a multi-station system that can straddle cultural and commercial centers of University Circle.
- Cross-Promoting area destinations, e.g. $1 off parking with a receipt from a local restaurant; or free drink or appetizer with a paid admission to a cultural institution.

Little Italy's successful Public Valet

CircleLine Shuttle

Promote Driving Alternatives

- Promote transit alternatives whenever providing How to Get Here information
- Offer incentives, like reduced admission fees, free drink/appetizer, or gift shop/cafe discounts with proof of payment
- Highlight the new and newly-renovated Red Line stations serving University Circle
- Promote bike share as a new resource for moving between destinations.
- Pursue opportunities to embrace and promote multimodal accessibility at key points of entry into the district.

UNIVERSITY CIRCLE

Transportation Demand Management

Goal

Improve non-driving mobility among residents and commuters

Rationale

Local vehicle-ownership and drive-alone-commute rates will continue to largely determine how much auto infrastructure University Circle needs to grow. Developing a consolidated, universally-accessible Transportation Demand Management (TDM) program will be essential to achieving more growth with less parking.

About

Raise Employer Programs to District-Level

Make driving alternatives more market-competitive, and available to more area employees, through coordinated and sustained TDM programs.

Improve Public and Employee Health

There is a unique opportunity in University Circle to link district-wide TDM efforts to reduce vehicle emissions and promote active transportation to the core mission of several, large area employers.

Related Issues

- Connectivity
- Real Estate Development
- Smart Parking

University Circle Bus Stop

Prior Plans/Policies

- Moving Greater University Circle: Phase I (2014)
- CWRU Campus Parking Plan (2014)
- MGUC Parking and TDM Report, Districtwide Best Practices (2015)

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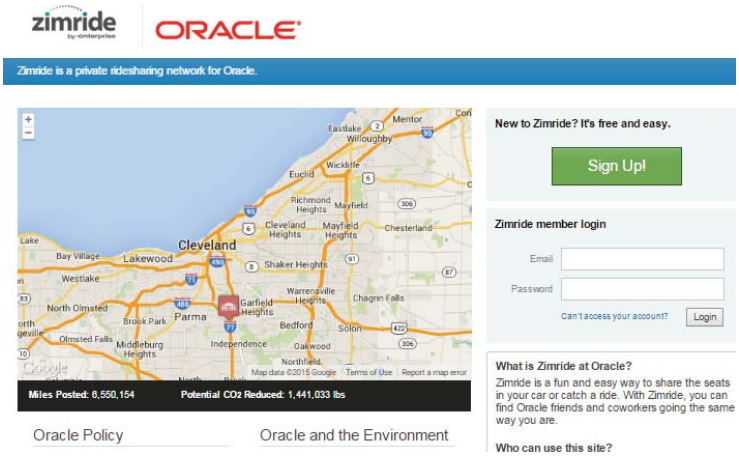
Parking Cash-Out & Daily Parking

- Pay commuters not to drive. Convert parking-cost subsidies to cash incentives to not drive. Often referred to as a Cash-out program, this has proven successful in reducing parking demand among CMNH employees.
- Charge drivers each time they park. Attaching a cost to each driving commute will make pay-as-you-go options like transit more market-competitive.

Daily parking charges can be applied to student and employee ID cards



Oracle's Employee Ridesharing Portal through Zimride

Carpooling 2.0

- Ridesharing can be a more flexible alternative to carpooling by allowing for ridesharing amongst a wider pool of riders and drivers, commonly within institutions or organizations.
- Assist ongoing efforts to establish a closed-network rideshare matching service, which employee surveys indicate would attract more commuters to ridesharing.
- Pursue supportive strategies for increasing rideshare commuting, including ride-matching, discounted rideshare parking, and preferential rideshare parking.

Car-Sharing 2.0

- Expand access to car-share vehicles to accelerate growth of carless households.
- Explore opportunities for new car-sharing models to reduce area fleet needs.
- Ensure synergies between traditional and fleet-based programs to maximize vehicle numbers and distribution across University Circle.

The City of Chicago in partnership with Zipcar developed a FlexFleet for city services

Deep Transit Discounts

- Promote and expand the existing RTA Student U-Pass Program.
- Work with RTA on options for developing a commuter-focused universal pass program.
- Work with area employers to promote the wider adoption of direct-subsidy benefits, perhaps similar to the current University Hospitals benefit.

Encourage employees and students to use public transit

CircleLink Shuttle

Commuter Shuttles

- Improve shuttle connections to nearby Cleveland Heights and Shaker Square and direct transit service to more distant ODOT and RTA park & ride lots.
- Create park and ride opportunities through expanded transit to suburban campuses of existing University Circle employers.
- Explore vanpool programs in coordination with area transit agencies and local employers.

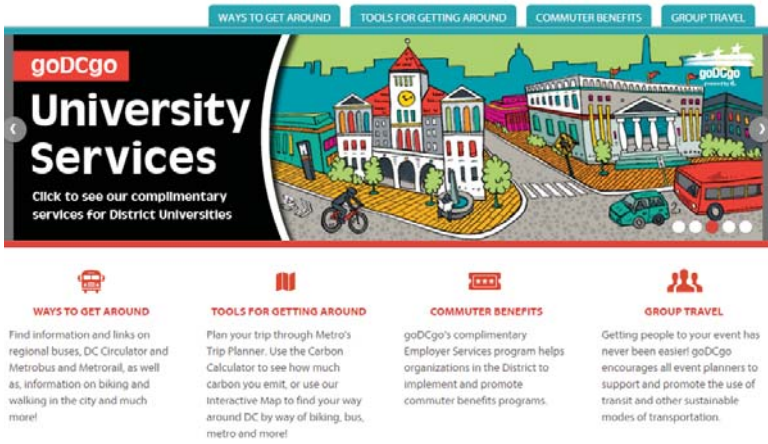
Parking Perks for Alt. Mode Users

- Allow commuters who forego a standard parking permit occasional access to prime, visitor parking facilities.
- Reserve the best spaces in any facility for carpool and vanpool participants.
- Place bike parking in prominent, convenient locations.
- Promote and expand “guaranteed-ride-home” programs, which provide an occasional subsidized ride to commuters who use alternative modes.
- Encourage local employers to provide shower and locker facilities for bicycle commuters.

Parking access gate in University Circle

Universal TDM Access

- Take advantage of all the best practices currently offered by individual employers to create a suite of benefits to be offered to all.
- Improve the suite of options provided, the effectiveness of their marketing and promotion, and their reach across all employers in the district.
- This will provide better access to non-driving commute benefits and incentives for small-business employees.
- A one-stop information center (either on-line or via phone) would provide all University Circle stakeholders with consistent information to make informed choices about their travel options.
- Market the complete suite of travel options and incentive programs described above, so everyone knows what is available when making their travel decisions.



goDCgo markets district-wide alternatives

UNIVERSITY CIRCLE

Real Estate Development

Goal

Leverage new development opportunities, and use mobility goals to shape future real estate development.

Rationale

New development can help catalyze economic activity within University Circle. By applying the best mobility standards to new development, University Circle can become a leader in accessible and sustainable urban growth. Likewise, forward-thinking mobility strategies can help the district grow more sustainably with increased density and a healthy mixture of land uses.

About

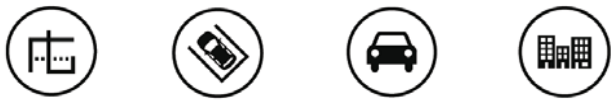
- **Land Use and Zoning**

Mixed land use districts like University Circle require less parking since access between, work, school and recreation can be met by alternative modes to driving or by Park Once strategies.

Current zoning and parking guidance is provided by the City of Cleveland. Cleveland has recognized the multimodal nature of mixed-use districts by adopting parking guidance and access management guidance specific to these areas. Many efforts throughout the area, including the Connecting Cleveland Citywide Plan, UCI's Shaping the Future vision plan, and the Vibrant NEO regional plan, offer guidance on creating a range of land use types that encouraging multimodal access and maximize the efficiency of the networks supporting new development.

The following New Development Tools outline current guidance and highlight opportunities to grow multimodal access in University Circle.

Related Issues



Mixed-Use Districts encourage Park Once and multimodal transportation

Prior Plans/Policies

- City of Cleveland Code of Ordinances, Part IIIB, Title VI
- Shaping the Future of University Circle, 2000

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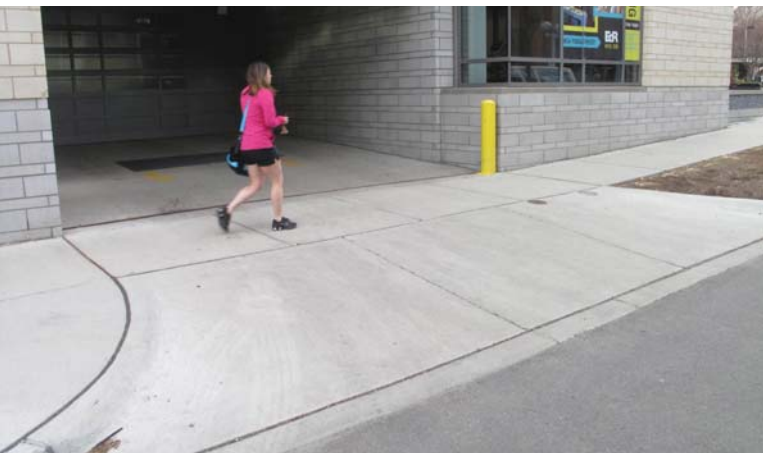
Parking Minimums & Maximums

Current Guidance

- Cleveland Zoning Code requires a minimum amount of accessory off-street parking spaces (Chapter 349.01).
- Mixed-Use District Zoning Code amendments set parking minimums to 50% of original requirements and parking maximums of 100% to 120% of the original code minimums for retail spaces and shared parking arrangements. The Midtown Overlay District (Chapter 344.08) is an example of this approach, which could be extended to University Circle.
- Accessory off-street parking minimum requirements do not apply to the Central Business District (Chapter 349.11).

Opportunities

- Encourage the adoption of parking maximums for all new development.
- Explore the opportunity to eliminate minimum off-street accessory parking requirements like the CBD designation.
- Where parking is constructed above the maximum standard, all parking should be "unbundled" — identification of space use or ownership is a separate and optional cost item for all building occupants.
- Require all new developments to provide a Transportation Demand Management Plan that balances parking demand with other access options.



Ramp driveways up to sidewalk level and use sidewalk pavement materials across the driveway

Access Management

Access management focuses on controlling the location, spacing, and design of entrances. The presence of driveways on streets creates conflict points between through-moving vehicles and those attempting to turn into and out of adjacent driveways. Access management can also preserve more on-street spaces and minimize vehicle conflicts with people walking or cycling, and transit movements.

Current Guidance

- Vehicle access from side streets are to be located at the rear of the building or in areas least disruptive to pedestrian or vehicular traffic.
- If no other alternatives exist, only one entry to/from Euclid Avenue is permitted.

Opportunities

- Encourage access points and driveways to be designed with the sidewalk dominant over the driveway.

Active Uses

All parking structures should contain or be wrapped by active, sidewalk-oriented, commercial or residential land uses at the sidewalk level.

Current Guidance

- Currently the City of Cleveland does not provide guidance on active ground floor uses for parking structures.

Opportunities

- Local stakeholders and developers have taken the lead to develop active uses around parking.
- Uptown developments have also successfully employed this design.

Wrap parking with active uses

Indoor bicycle parking

Bicycle Parking

Current Guidance

- One bicycle parking space for every 20 automobile spaces (Chapter 349.15).
- All new car parking should include bicycle parking, up to a maximum of 24 bicycle spaces required (Chapter 349.15).
- For commercial uses, bicycle parking must have the same protection from weather as car parking and include secure racks or lockers (Chapter 349.15).

Opportunities

Develop clear guidance for bicycle parking that focuses on cyclists' needs rather than auto parking:

- Siting near building entrances
- Design for indoor and outdoor parking
- Quantity, creating a tiered approach to bicycle parking requirements based on development size.

Disallow Surface Lot Development

Prohibit the development of surface lots within the district.

Current Guidance

- The City Planning Commission prohibits the development or expansion of surface lots in the "Designated Downtown Area Districts" (Chapter 349.14)
- Surface parking lots in residential districts are allowed if they benefit the community (Chapter 349.13).

Opportunities

- Continue to discourage surface lot development and if necessary wrap the parking with attractive landscaping and fencing or with active uses, e.g. The Warehouse District's "Small Box" shipping container retail shops.

PLACES

The following Place sheets apply the concepts described in the Strategy sheets to identify transformative improvements for 11 key mobility locations throughout University Circle. The locations were identified via direct observation, crash data and community input as difficult to traverse for one or more modes. Each Place identified represents a location within the Study Area where identifiable mobility enhancements can be predicted to have significant impact.

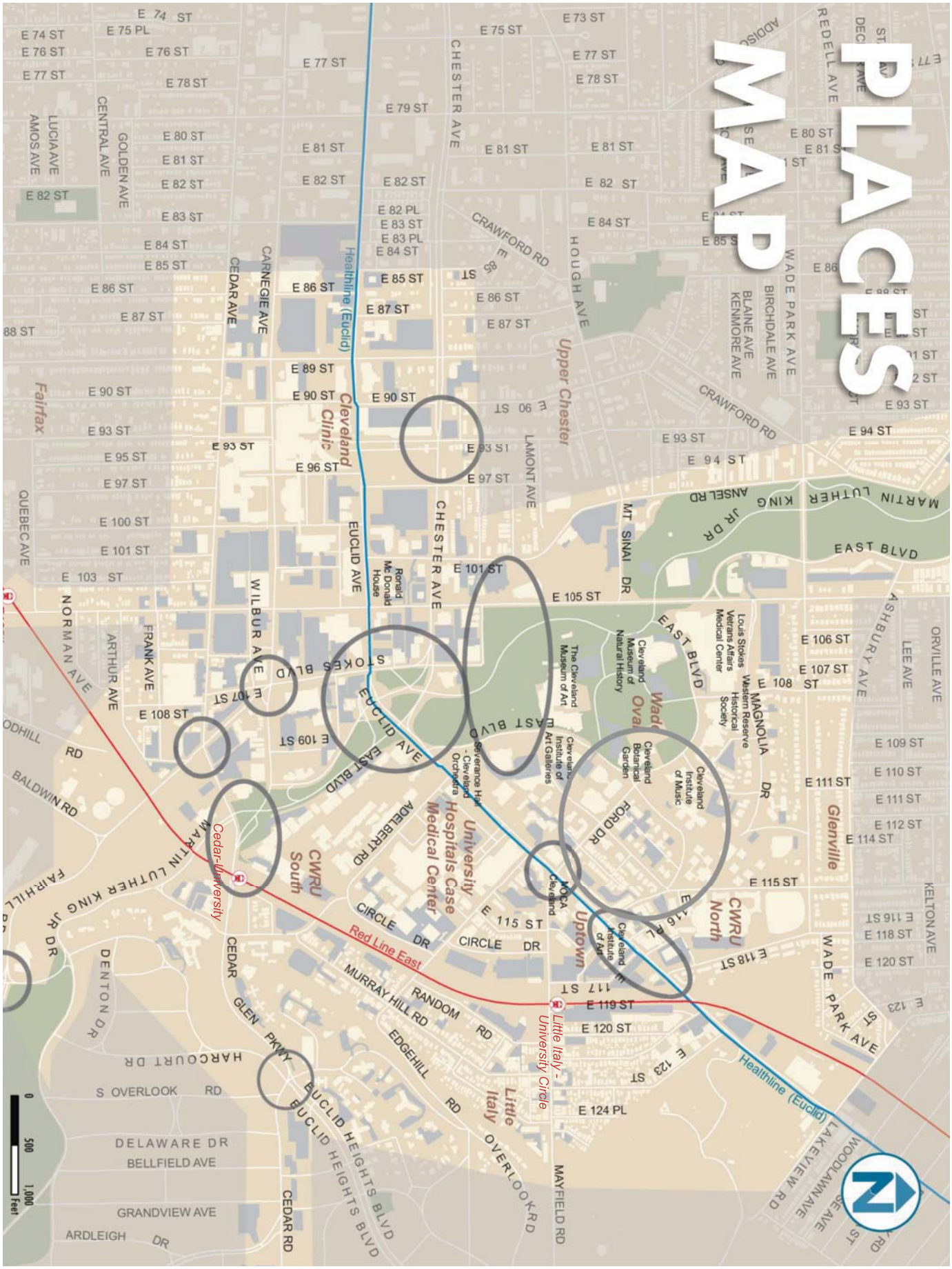
The Place Sheets are intended to provide an easily referenced set of recommendations specific to each focus area for mobility improvements that can be implemented over time, starting with the 4 high-priority locations on page 1.

Place recommendations are provided for:

- Chester Avenue and East 93rd Street
- South Wade Park
- Chester and Euclid Avenues, Stokes Boulevard, and Martin Luther King Jr. Drive
- Carnegie Avenue and Stokes Boulevard
- Stokes Boulevard and Cedar Road
- Cedar-University Station, Martin Luther King Jr. Drive, and Carnegie Avenue
- Euclid Heights Boulevard, Cedar Glen Parkway, and Cedar Road
- Martin Luther King Jr. Drive, Stokes Boulevard, and Fairhill Road
- Euclid Avenue, Mayfield Road, and Ford Drive
- CWRU North Campus
- Euclid Avenue Uptown

Each Place sheet includes:

- The Issues identified by the community that occur at that location, including identification of crash patterns;
- Primary Opportunities from the physical configuration or other planning efforts underway in the District;
- Recommendations based on the project's Principles and Strategies;
- Aerials showing existing and proposed conditions;
- Order of magnitude cost estimates for capital investments (not including design/engineering). Further estimating is required to identify final project costs. ($ = <$50K, $$ = $50K - $100,000, $$$ = $100K - $150K, $$$$ = >$150K)
- Where applicable, summaries of analysis of vehicle operations, including:
  - Existing and projected vehicle Level of Service, based on changes to intersection operations plus anticipated growth from development; and
  - The number of vehicle lanes needed to accommodate the peak period vehicle volume.
  - Full results of the traffic analysis, including anticipated developments, are presented in the appendix.
- Community feedback on the recommendations, collected through Open Houses, Focus Groups, and an on-line survey tool, and any changes incorporated based on this feedback.


PLACES MAP
Cleveland Clinic
Hospitals Case Medical Center
University Circle
Uptown
CWRU South
CWRU North
Little Italy
Glenville
Fairfax
Upper Chester
Wade Oval
Healthline (Euclid)
Red Line East
Cedar-University
Little Italy - University Circle
CHESTER AVE
EUCLID AVE
CEDAR AVE
CARNEGIE AVE
HOUGH AVE
CRAWFORD RD
LAMONT AVE
MT SINAI DR
EAST BLVD
MARTIN LUTHER KING JR DR
ANSEL RD
WADE PARK AVE
CIRCLE DR
MURRAY HILL RD
RANDOM RD
EDGEHILL RD
OVERLOOK RD
MAYFIELD RD
CEDAR RD
BUCLID HEIGHTS BLVD
GLEN PKWY
DENTON DR
HARCOURT DR
S OVERLOOK RD
DELAWARE DR
BELLFIELD AVE
GRANDVIEW AVE
ARDLEIGH DR
NORMAN AVE
ARTHUR AVE
FRANK AVE
WILBUR AVE
STOKES BLVD
QUEBEC AVE
BALDWIN RD
FAIRHILL RD
ADELBERT RD
FORD DR
MAGNOLIA DR
ASHBURY AVE
LEE AVE
ORVILLE AVE
KELTON AVE
WOODLAWN AVE
LAKEVIEW RD
BIRCHDALE AVE
BLAINE AVE
KENMORE AVE
REDELL AVE
LUCIA AVE
AMOS AVE
CENTRAL AVE
GOLDEN AVE
Ronald McDonald House
Cleveland Museum of Natural History
The Cleveland Museum of Art
Cleveland Institute of Art Galleries
Cleveland Botanical Garden
Cleveland Institute of Music
Severance Hall - Cleveland Orchestra
MOCA Cleveland
Louis Stokes Veterans Affairs Medical Center
Western Reserve Historical Society
0
500
1,000
Feet

UNIVERSITY CIRCLE

Chester Avenue and East 93rd Street

Issues & Community Views

Walking First

Safe & Reliable Auto Access

Bicycle Friendly

Connectivity

Dynamic Streets

Real Estate Development

Opportunities

- **Cleveland Clinic/CWRU Health Education Campus expansion**
  Future development will increase trips by all modes in the area
- **Placemaking and open space**
  Programming the open space between the road and new buildings could increase pedestrian activity and promote a sense of place.
- **Coordination with upcoming projects**
  3rd Precinct Redevelopment, CWRU Master Plan, Upper Chester development, and other projects will dramatically change the land use and access needs in this area.

Recommendations

Walking First & Dynamic Streets

- Establish safer, more visible Chester Ave. crossings for pedestrians by reducing travel lanes, installing a median, and providing ADA curb ramps.
- Add bioswales to medians for drainage

Bicycle Friendly

- Ensure north/south bicycle connections to Upper Chester development. This intersection had one bike crash in 2011.
- Expand east/west bicycle connections between the CCF and Health Education campuses and points north and east.

Chester Avenue at East 93rd Street, looking west

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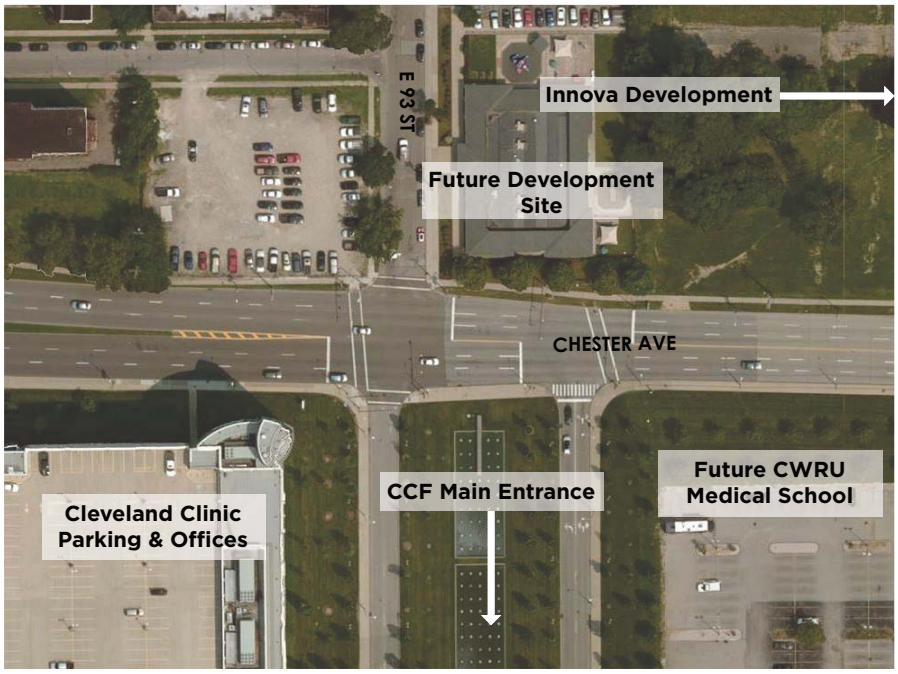
- **Put Chester Avenue on a road diet**
  Chester Avenue currently has six through lanes, three in each direction. Reducing this to four lanes and a turn lane/median can actually improve traffic flow by giving turning vehicles a place to wait and reducing weaving. The proposed road diet could stretch as far east as Stokes, but that there will need to be planning coordination alongside the Opportunity Corridor Project.

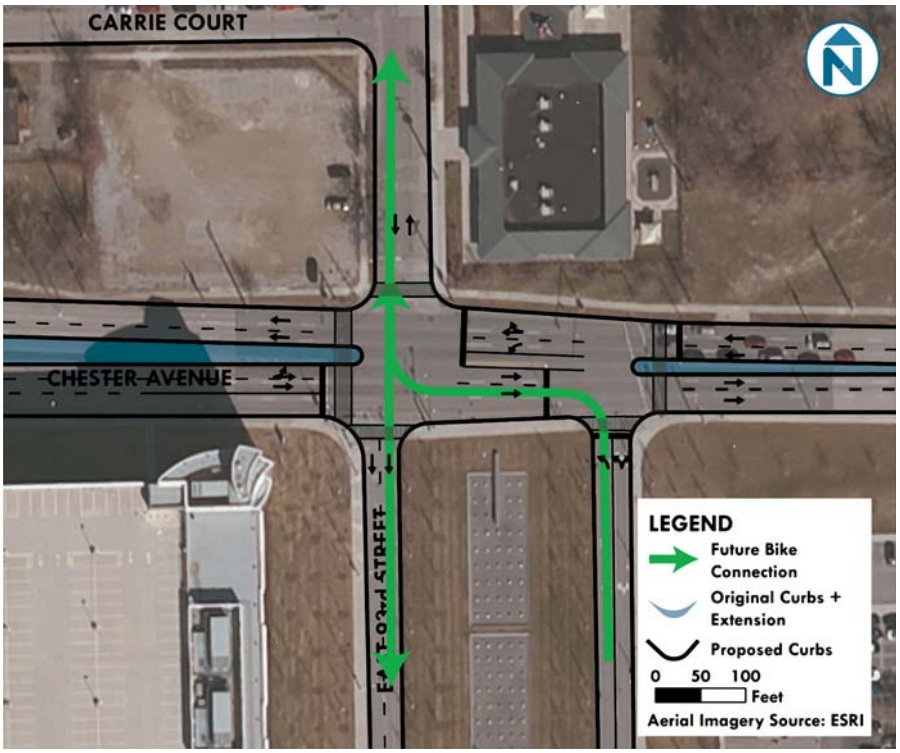
- **Provide median pedestrian refuges**
  Extend the medians past the crosswalk and create a protected area for pedestrians to wait while crossing Chester Avenue. This allows pedestrians with limited mobility to safely rest or wait before completing the crossing. Medians can also contain bioswales to promote drainage.

- **Provide bicycle connection to Upper Chester**
  Ensure north/south bicycle connections to Upper Chester, to points north, east and west supported in the Upper Chester Neighborhood Plan.

Capital Cost Estimate
$$



Existing



Proposed

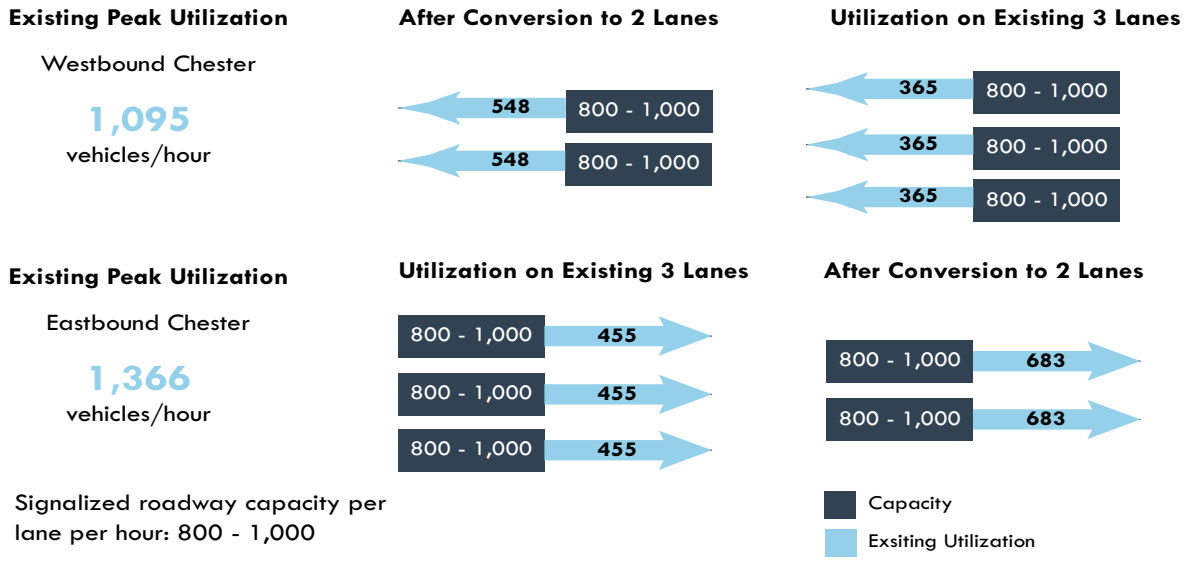
Median Pedestrian Refuge (New York, NY)

Intersection Vehicular Operations[1]

Existing LOS		Projected LOS	
AM	**PM**	**AM**	**PM**
C	B	C	C

Community Feedback on Proposals

- Strong support for the median island as a traffic calming method and aid to pedestrian at intersections along Chester.
- Support for general pedestrian and bicycle improvements in the area was strong as a reaction to the current conditions and with an eye on future development slated for the area.
- Bike lanes were not supported by the majority of respondents and were removed from the primary recommendations, though they could be further explored in the future.
- Demand for increased shuttle service to this area, which will be explored in a second study by project partners.



1 Signalized roadway capacity assumptions from FHWA. (1998). HOV Systems Manual (No. 414). Washington D.C.: Transportation Research Board. Retrieved from http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_414.pdf

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South Wade Park

Issues & Community Views

Walking First
"Hazardous pedestrian crossing because of turners."

Bicycle Friendly
"East Blvd. is hazardous...cars travel far too quickly, parking on both sides greatly increases the risk of being 'doored'."

Safe and Reliable Auto Access
"The design of East Boulevard lends itself to cars traveling above the speed limit."

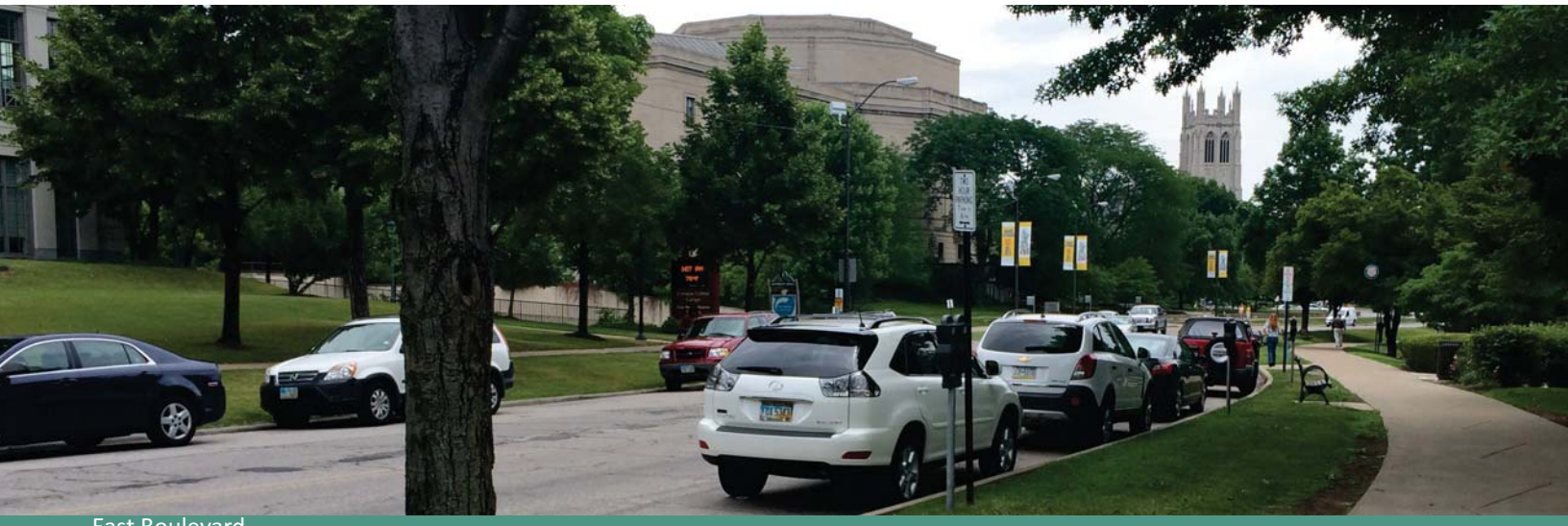
Opportunities

- **Cultural and recreational amenities**
  Wade Park's cultural institutions are assets for University Circle and the region. Improving access by all transportation modes allows more people to take advantage of these destinations.
- **Coordination with upcoming projects**
  3rd Precinct Redevelopment, CWRU Master Plan & Connector Project.

Recommendations

Walking First & Dynamic Streets
- Create a new east-west pedestrian and bicycle connection, between E. 105th Street and East Boulevard, south of the Cleveland Museum of Art.
- Install both horizontal (curb extensions) and vertical (speed tables) traffic calming measures at crossings.

Bicycle Friendly
- Improve access to and around Wade Park with new bicycle connections.



East Boulevard

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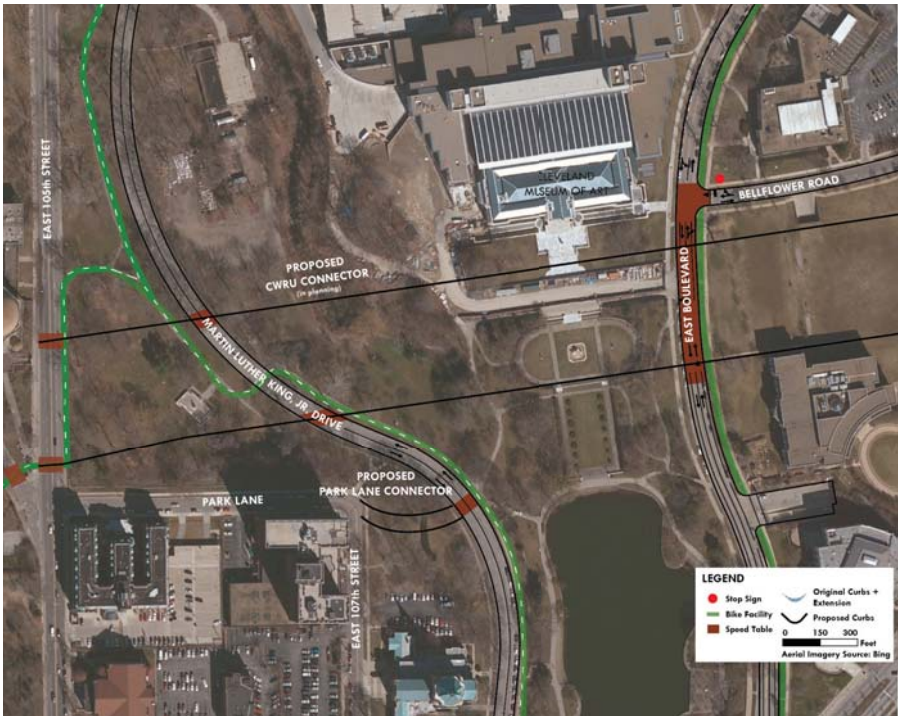
- **Install bike facility on East Boulevard**
  Bike lanes or an off-road multi-use path between Euclid Avenue and Bellflower Road will improve connections between the CWRU North and South campuses and new development to the west, as well as to the wider region (specific location and type of treatment will require additional planning).

- **Create a new east-west connection**
  Bold new pedestrian and bicycle connections between East Boulevard, Martin Luther King, Jr. Drive, and East 105th Street will improve links within Wade Park, between the CWRU campuses, and between the Hough, Upper Chester, and University Circle neighborhoods.

- **Add speed tables and curb extensions**
  Add speed tables and/or curb extensions along East Boulevard near Bellflower Road and where the proposed CWRU Connector will intersect with East 105th Street and Martin Luther King Jr. Drive. These will alert drivers to the presence of pedestrians and create safer crossings at each location.

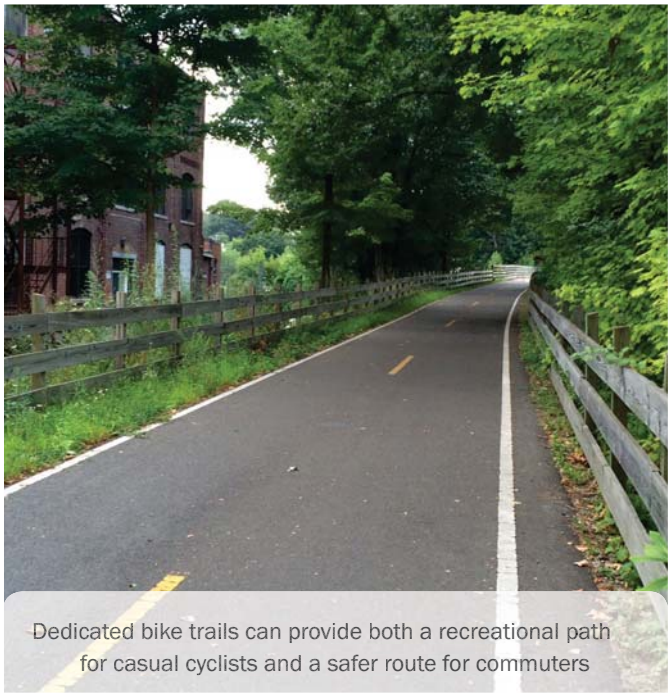
Capital Cost Estimate
$

Existing



Proposed

The proposed CWRU and Park Lane connectors are currently in planning and will be further developed in coordination with project partners.



Dedicated bike trails can provide both a recreational path for casual cyclists and a safer route for commuters

Traffic calming, such as speed humps, tables and other devices, can slow down traffic and improve safety conditions for pedestrians

Community Feedback on Proposals

- There was strong support for the proposed stop signs at Bellflower Road and East Boulevard especially from those concerned about bicyclist and pedestrian visibility around the area.
- Many commenters mentioned the confusion and potential danger in crossing East Boulevard and supported the proposals for focused changes to the intersection.
- Enhanced crossings of MLK were broadly supported, especially by stakeholders from Judson Manor and Cleveland Sight Center.

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Chester and Euclid Avenues, Stokes Blvd., and Martin Luther King, Jr. Drive

Issues & Community Views

Walking First

"Crossing Chester at E 107th is hazardous to pedestrians."

"Shouldn't be so difficult to walk from UH/CWRU to Cleveland Clinic."

Bicycle Friendly

"Cars don't know how to treat bikes and yell at you to get on the sidewalk or drive too close and honk."

Safe and Reliable Auto Access

"Confusing as to which lane goes where. Lanes turn into turn-only lanes which make drivers merge over suddenly."

Opportunities

- **Excess Street Space**
  This is a large, complicated set of intersections with several confusing or underused street segments. Recapturing them can create more space for pedestrians, bicyclists, and open space while simplifying vehicle movement, while providing a safer place for all travelers.
- **Coordination with Upcoming Projects**
  3rd Precinct Redevelopment, CWRU Master Plan, One University Circle

Recommendations

Walking First & Real Estate Development

- Expand pedestrian refuges
- Add marked crosswalks, ramps at all corners
- More space at Chester and Stokes offers development opportunities

Bicycle Friendly & Safe, Reliable Auto Access

- Reduce conflicts between drivers, pedestrians, and bicyclists especially at intersections with high crash volumes like this focus area.

Chester Avenue at East 107th Street

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Proposed Intersection Improvements

- **Close the slip lane at Chester and Stokes**
  Remove the double right turn slip lanes from eastbound Chester Avenue to southbound Stokes Boulevard to reduce the pedestrian crossing distance and discourage speeding.

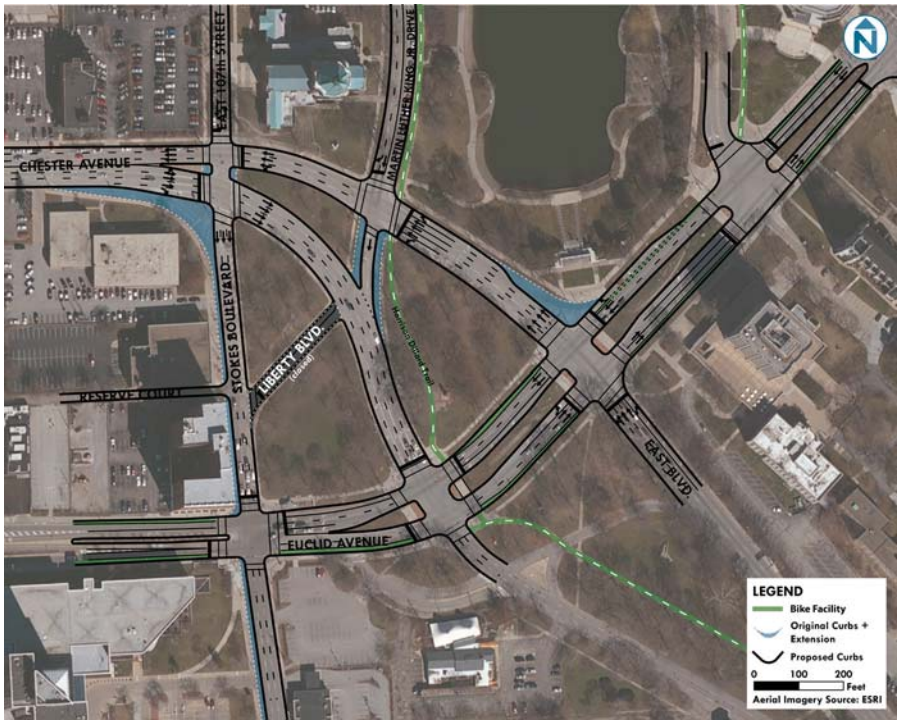
- **Create pedestrian refuges**
  Extend the median on both sides of Chester and 107th to create pedestrian refuges.

- **Liberty Boulevard North road diet**
  Reduce Liberty Boulevard between the eastbound and westbound sections of Chester Avenue to one lane which will increase safety and reduce dangerous merging without disrupting traffic flow.

- **Remove Liberty Boulevard South**
  Remove Liberty Boulevard between Chester Avenue eastbound and Stokes Boulevard, which is redundant and cuts across open space. This would also add space for temporary programming or long term redevelopment.

- **Close the slip lane at Euclid and Chester**
  Remove Liberty Boulevard between Chester Avenue eastbound and Stokes Boulevard to add park or redevelopment space and allow for removal of one southbound lane of Stokes.

Existing



Proposed

Capital Cost Estimate

$$$

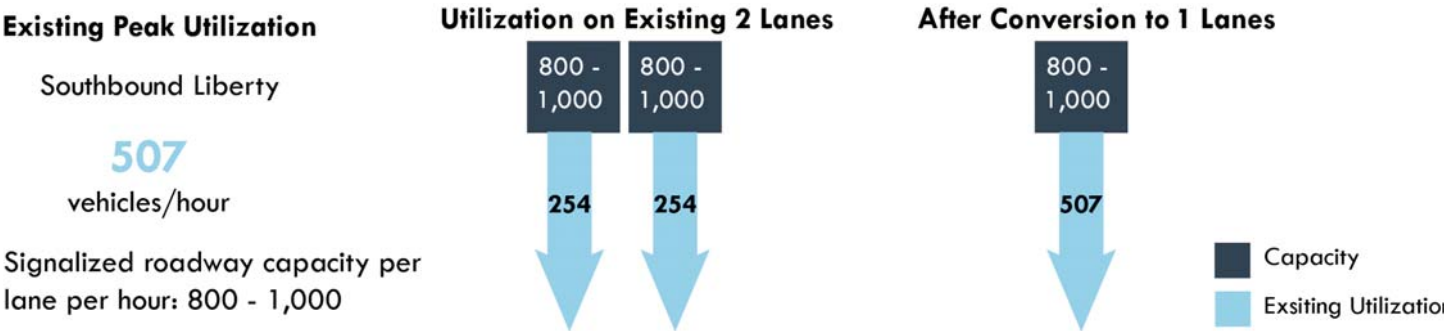
City Architecture rendering of Chester Avenue and Stokes Boulevard

Intersection Vehicular Operations

Intersection	Existing LOS		Projected LOS	
	AM	**PM**	**AM**	**PM**
Chester at 107th/ Stokes	A	B	A	B
Stokes at Euclid	D	D	E	E

Community Feedback on Proposals

- Strong support for removing Liberty Boulevard with many people seeing it as an unnecessary complication to the intersection. Also, strong opposition, due to concerns that lane closures would lead to increased congestion on Euclid Avenue.
- Significant feedback on the curb extensions with many stakeholders weighing in both for and against the proposal.
- Better bike infrastructure throughout the area was requested by commenters including stronger messaging to drivers than "Share the Road."



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Carnegie Avenue and Stokes Blvd.

Issues & Community Views

Walking First
"Eliminating the cut-thru triangle [could] make this area safer for pedestrians and cyclists."

Safe & Reliable Auto Access

Bicycle Friendly

Connectivity

Opportunities

- **The Triangle**
  The irregular left turn configuration is confusing, encourages uncontrolled left turns and queuing into traffic lanes. Closing it can improve safety for drivers, while creating new opportunities for development or open space.
- **More sidewalk space**
  This is a large intersection with wide curves that encourages speeding. Curb extensions can calm traffic and improve safety for everyone who travels here without reducing traffic flow.
- **Coordination with upcoming projects**
  CWRU Master Plan, Cleveland Clinic parking garage, and Stokes Corridor development.

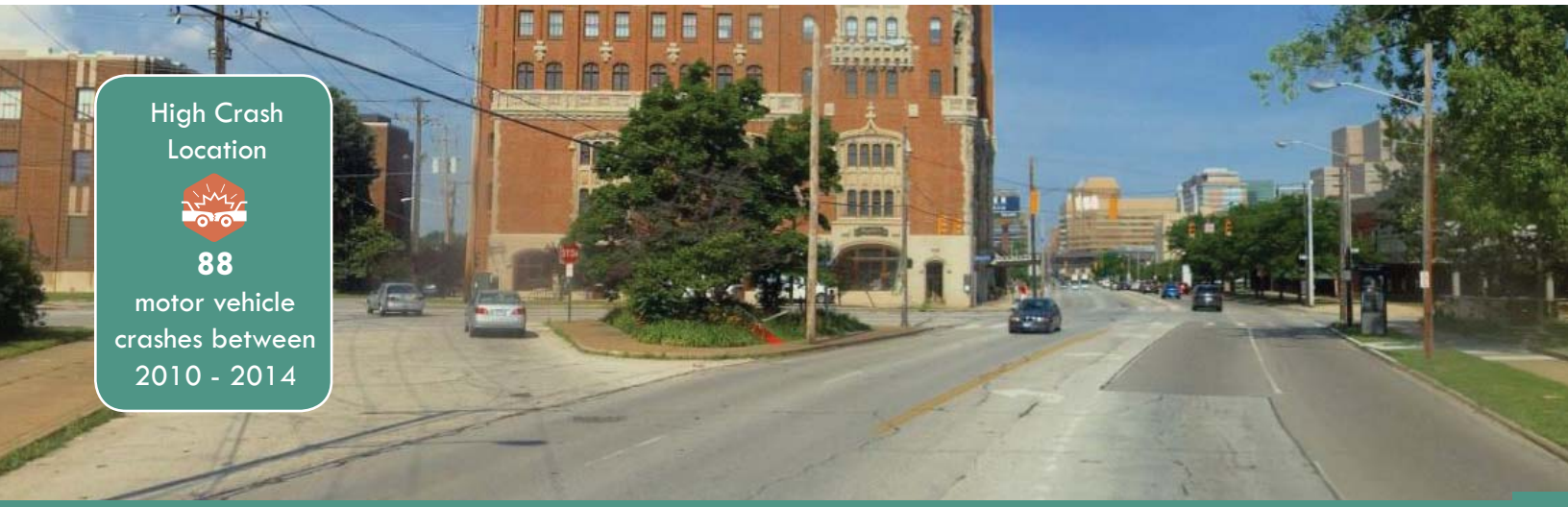
Recommendations

Walking First

- New crosswalks on the south side of Carnegie Avenue and Stokes Boulevard
- Curb extensions on Stokes Boulevard at 107th Street
- New median on Carnegie Avenue, west of Stokes Blvd.

Dynamic Streets

- Close the triangle and remove the southbound slip lane on Stokes Boulevard.
- Create opportunities for public space and placemaking
- Use bioswales if possible
- Remove one lane of vehicle traffic on southbound Stokes Blvd.



Carnegie Avenue at Stokes Boulevard, looking west

NELSON NYGAARD

- **Close the slip lane**
  Close the left turn slip lane from westbound Carnegie Avenue to Stokes Boulevard. Left turns can be accommodated at the full intersection. Closing this lane can improve safety and create an opportunity for development.

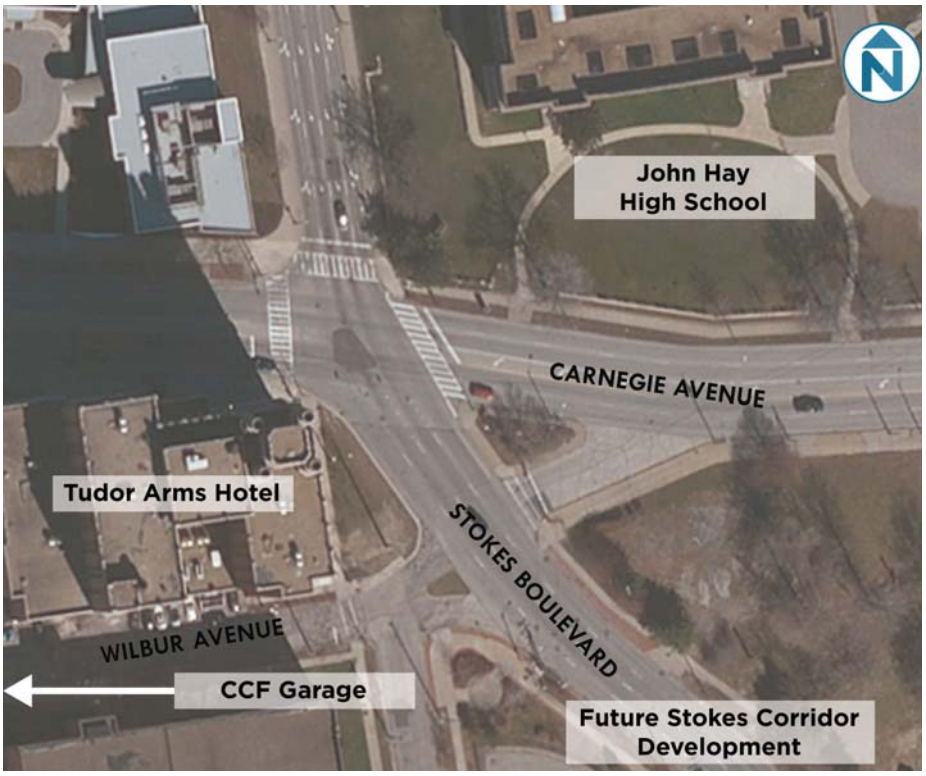
- **Add curb extensions**
  Expanding the sidewalk space at the corner and providing a median and pedestrian refuge on Carnegie Avenue will reduce the crossing distance for pedestrians, calm traffic, and increase opportunities for landscaping and bioswales.

- **Make Wilbur Avenue right-in, right-out**
  A right-in, right-out intersection will reduce conflicts between turning vehicles and improve the safety of pedestrians crossing the street.

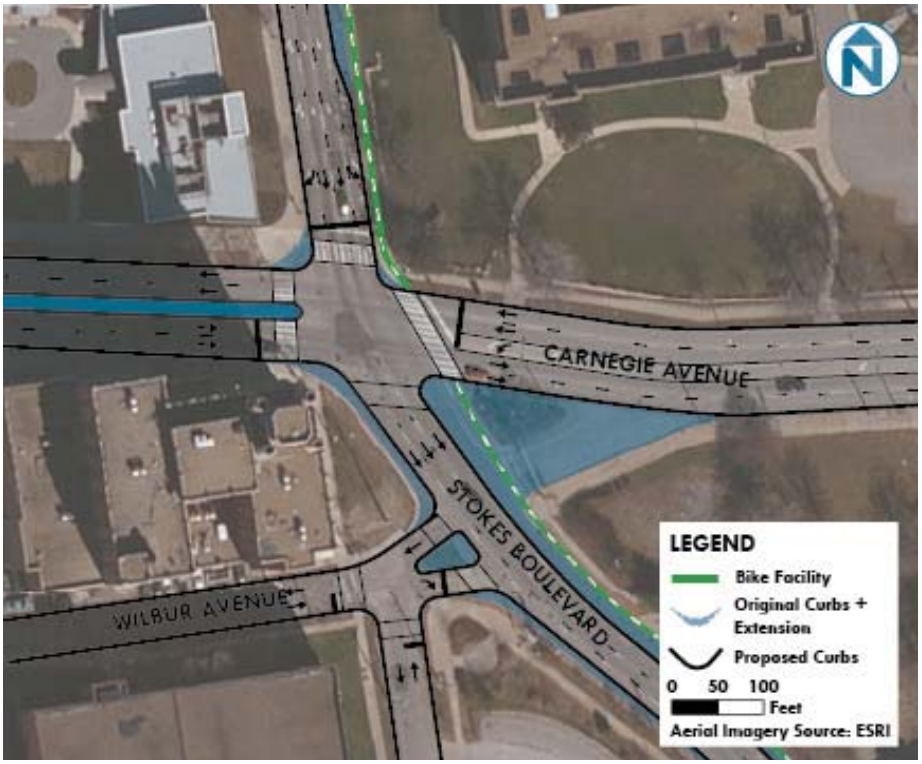
- **Reduce the number of lanes on Stokes Boulevard**
  Traffic volumes here only justify two lanes. Even providing three lanes makes it possible to repurpose the excess space for other uses.

- **Create a multimodal Stokes Corridor** with wider sidewalks and a bikeway connection, enabling Stokes to become a major link for all modes.

Capital Cost estimate
$$



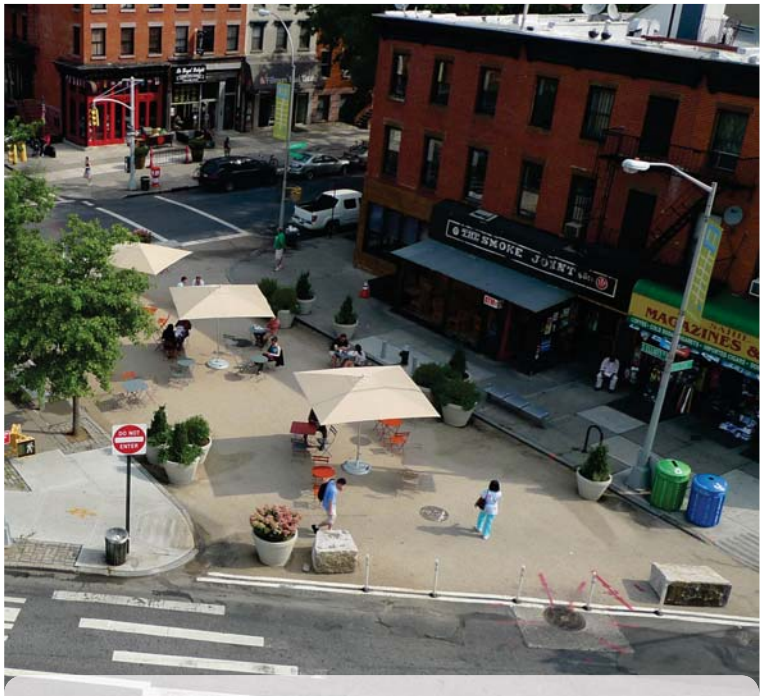
Existing



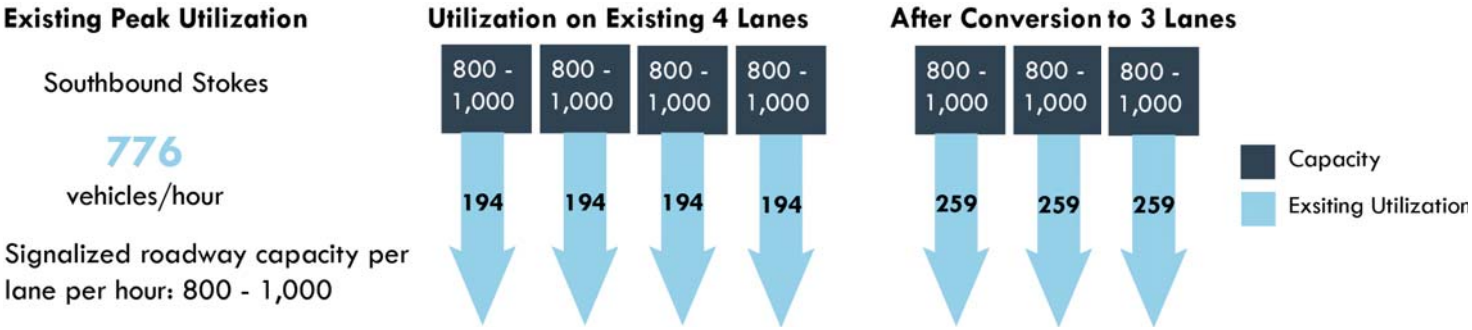
Proposed

Intersection Vehicular Operations

Existing LOS		Projected LOS	
AM	**PM**	**AM**	**PM**
C	B	C	C



Closing unnecessary roads to cars can open up space for other uses. (Brooklyn, NY)



Community Feedback on Proposals

- Strong support for closing the slip lane and the curb extension from Carnegie Avenue to Stokes Boulevard from a majority of stakeholders, with some strong opposition voiced over concerns about access to the new Cleveland Clinic garage.
- Strong support from cyclists for extended off-road connection.
- Mixed support for the proposed Stokes Boulevard at Wilbur Avenue intersection, especially the concern that the right-turn lane on Wilbur Avenue onto Stokes Boulevard would cause congestion and potentially block southbound traffic.

UNIVERSITY CIRCLE

Stokes Boulevard and Cedar Road

Issues & Community Views

Walking First
"Many bike riders use the sidewalk between the rail overpass and Cedar Ave."

Real Estate Development

Bicycle Friendly
"Horrible biking connection."

Safe & Reliable Auto Access
"Confusing as to which lane goes where. Lanes turn into turn-only lanes which make drivers merge over suddenly."

Opportunities

- **Excess street space**
  This is a large intersection with wide curves that encourage speeding, while there are more lanes than traffic volumes require. Repurposing street space for pedestrians and bicyclists can calm traffic and improve safety for everyone who travels here without reducing traffic flow.
- **Coordination with upcoming projects**
  Development potential on Stokes Corridor surface lots

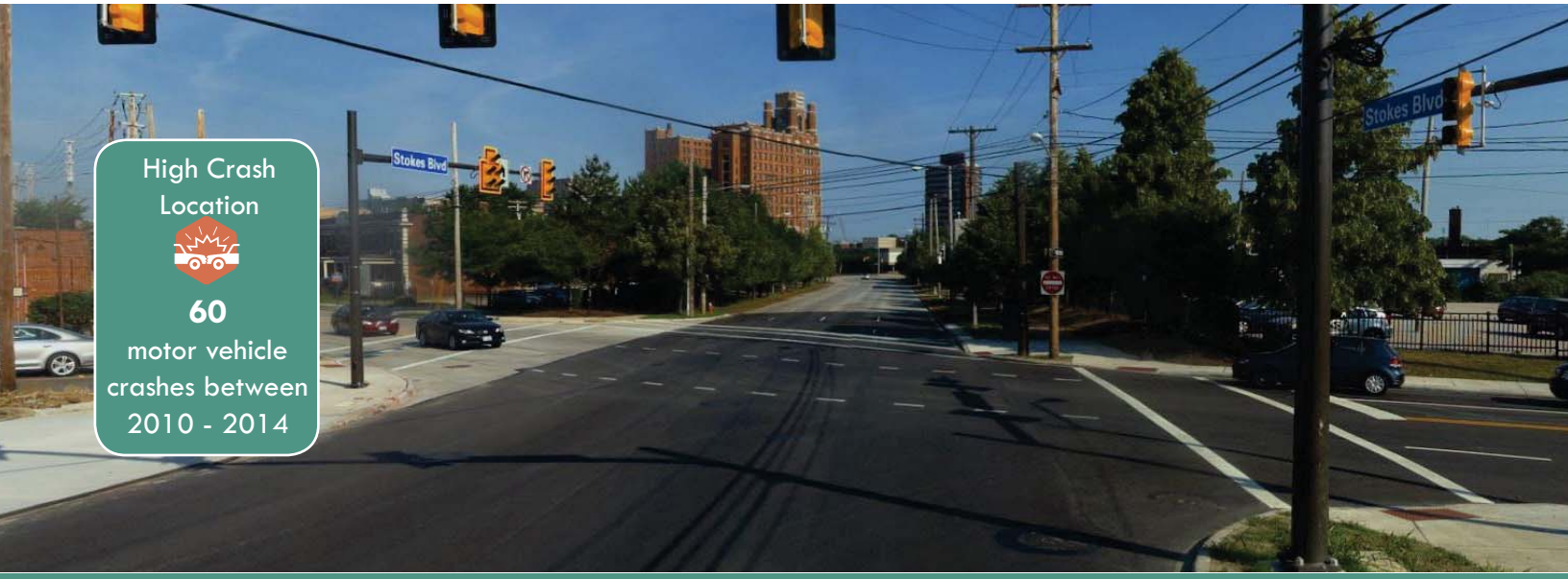
Recommendations

Walking First & Bicycle Friendly

- Crosswalks on all four legs of the intersection
- Bicycle path along the east side of Stokes
- Remove one lane of Stokes to allow for extension of off-street bicycle path on the east side of the street

Dynamic Streets

- Repurpose extra street space for landscaping and bioswales



Stokes Boulevard at Cedar Road, looking northwest

NELSON NYGAARD

- **Curb extensions**
  Extend the sidewalk at the southwest side of Stokes Boulevard and Cedar Road to reduce crossing distances and discourage speeding.

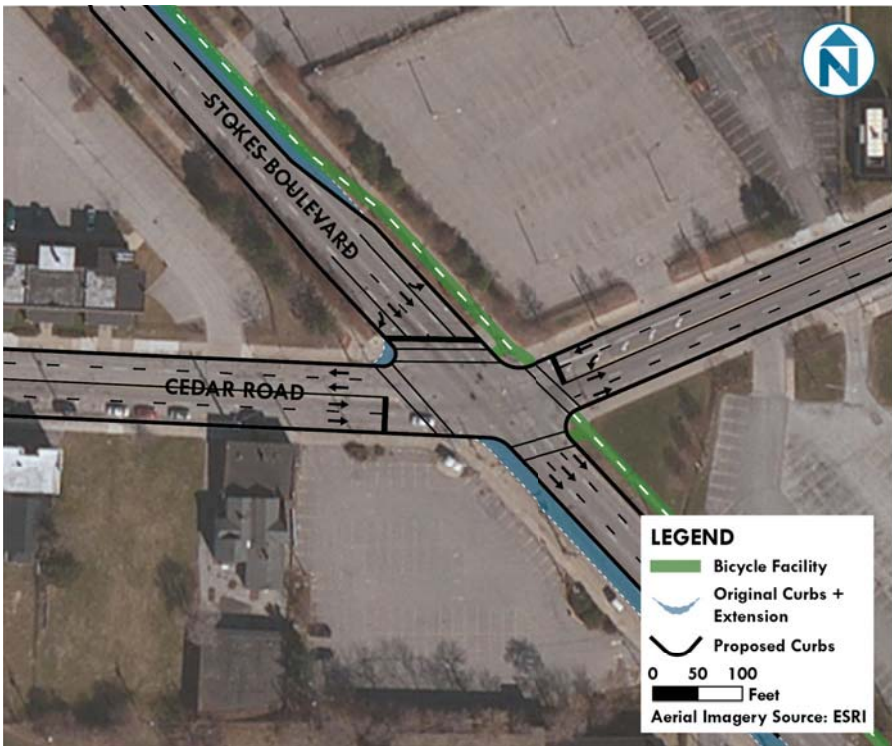
- **Road diet for Stokes Boulevard**
  Reduce Stokes Boulevard from four lanes to three lanes. Use the reclaimed space for wider pedestrian sidewalks, and soften the edges of the road using bioswale tree pits integrated with the curb extensions.

- **Multi-Use Path**
  Extend Lake-to-Lakes Trail along Stokes Boulevard, creating a new off-road connection on the "desire line" from the Stokes/ Fairhill/MLK intersection to destinations like the Cleveland Clinic, John Hay High School and connections along Euclid Avenue.

- **Future Development**
  Encourage pedestrian-oriented mixed-use development on surface lots in this area by enhancing bicycle and pedestrian connectivity.

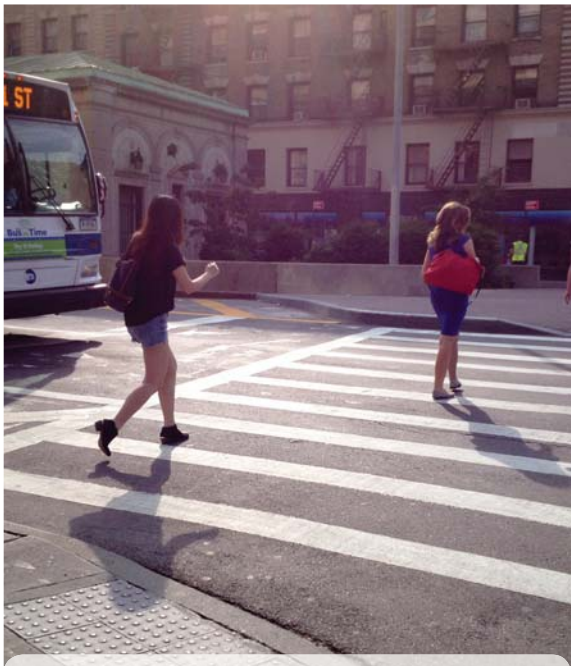
Capital Cost Estimate
$$

Existing



Proposed

Bioswale tree pits add greenery, drainage and soften the edges of this street (Seattle, WA)



Adding crosswalks to all legs of an intersection increases pedestrian safety and utility

Road diets can simplify traffic flow through complicated intersections

Community Feedback on Proposals

- Some commenters thought that the proposed curb alignment seemed unnecessary.
- Commenters strongly supported the bikeway through the area.
- Support for maintained lane capacity at the intersection and for lane reductions south of the intersection on the uphill section of Stokes.

UNIVERSITY CIRCLE

Cedar-University Station, Martin Luther King Jr. Drive, and Carnegie Avenue

Issues & Community Views

Walking First

"It is nearly impossible to cross this mess safely."

"This is a horrible road for walking and biking. The sidewalk is not ADA compliant and the road's design speed is excessive. It is a candidate for a road diet."

Transit Accessible

Heavy transfer activity between local and regional bus and rail service.

Safe & Reliable Auto Access

Opportunities

- **Excess street space**
  This is a large intersection with wide curves that encourages speeding. Repurposing street space for pedestrians and bicyclists can calm traffic and improve safety for everyone who travels here without reducing traffic flow.
- **Major pedestrian generators**
  A large number of pedestrians are drawn to the rail/bus station and the nearby schools. This intersection is a great opportunity to create a safer and more pleasant walking experience.
- **Coordination with upcoming projects**
  CWRU Master Plan, Cleveland School of the Arts

Recommendations

Walking First & Dynamic Streets

- Wide, high-visibility crosswalks
- Shortened pedestrian crossing distances
- Set back stop bars on Cedar Glen and for buses leaving the RTA station

Bicycle Friendly & Transit Accessible

- Improve trail connections by closing De Forest Road
- Enhance bike/ped access to a major transit hub

Cedar Avenue at Martin Luther King, Jr. Boulevard

NELSON NYGAARD

Proposed Intersection Improvements

- **Help People Cross the Street**
  Provide a safe east-west crossing of MLK for pedestrians on the north side of the intersection by extending curbs, installing a crosswalk and signals, and reassigning Cedar westbound lane movements (see "Appendix: Cedar-University Memorandum").

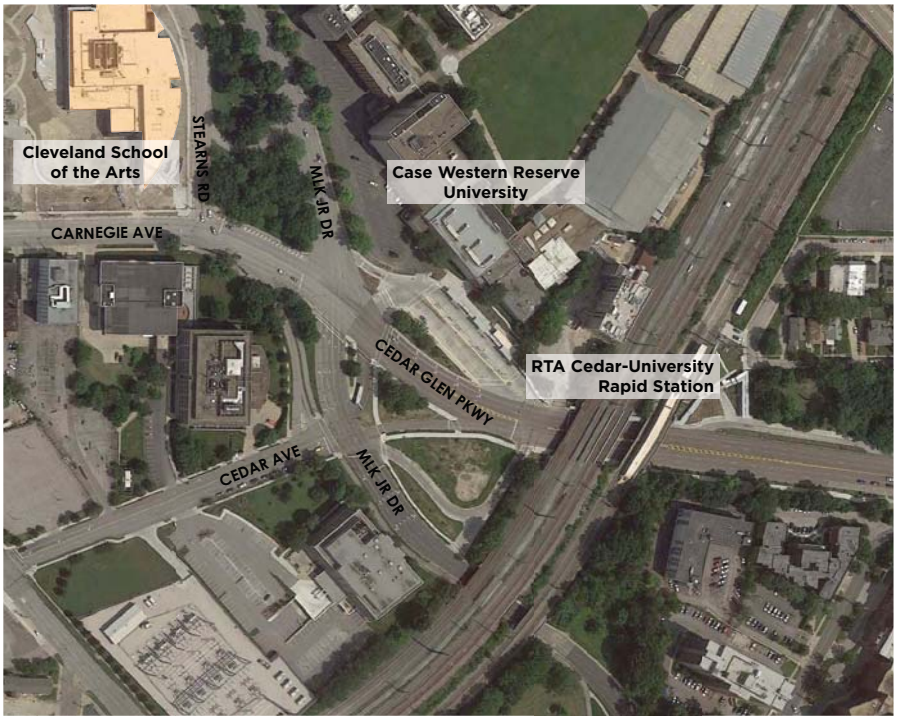
- **Separate through traffic from turning traffic**
  Use medians to channelize traffic making turns, reducing the crossing distance for pedestrians, discouraging speeding, and reducing dangerous weaving motions.

- **Close De Forest Road**
  Removing this redundant street segment eliminates conflicts between turning drivers, cyclists, and pedestrians at the street's intersections with Carnegie and Cedar avenues.

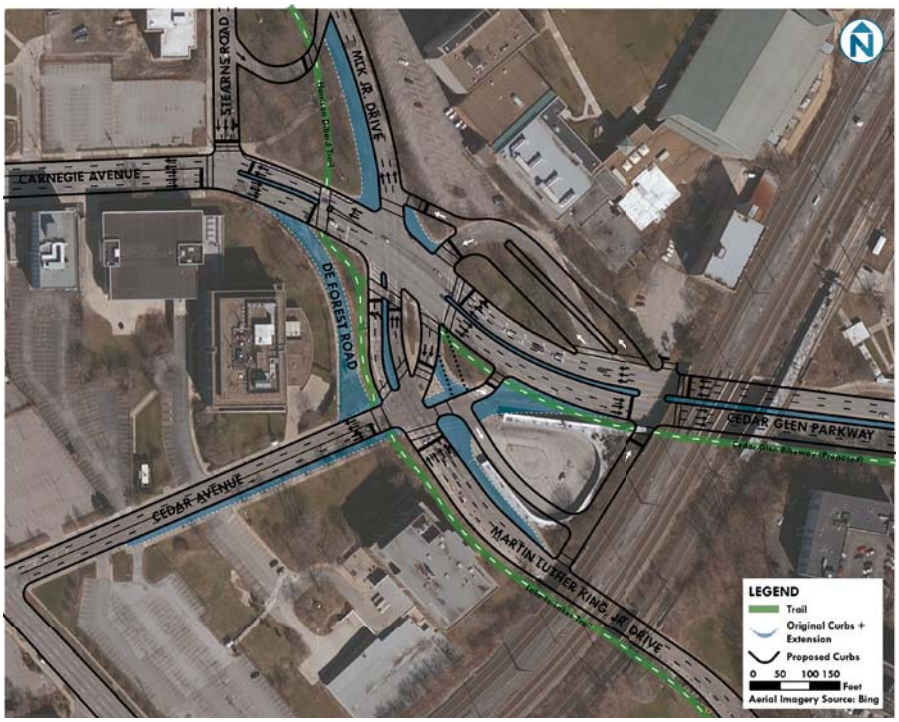
- **Enhance bike access**
  Align the Harrison Dillard and Lake-to-Lakes Trails with a north-south crossing of Carnegie aligned with MLK.

- **Create a bus lane between Carnegie Avenue and the bus loop**
  Providing direct bus access here maintains all bus access with the closing of De Forest Road.

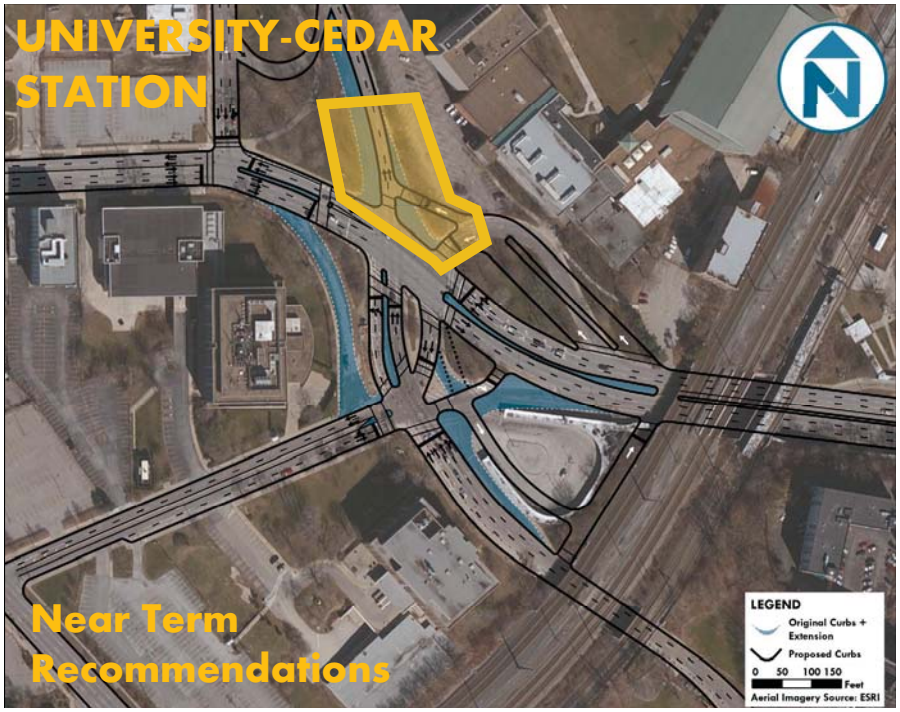
Capital Cost Estimate
$$$$



Existing



Proposed

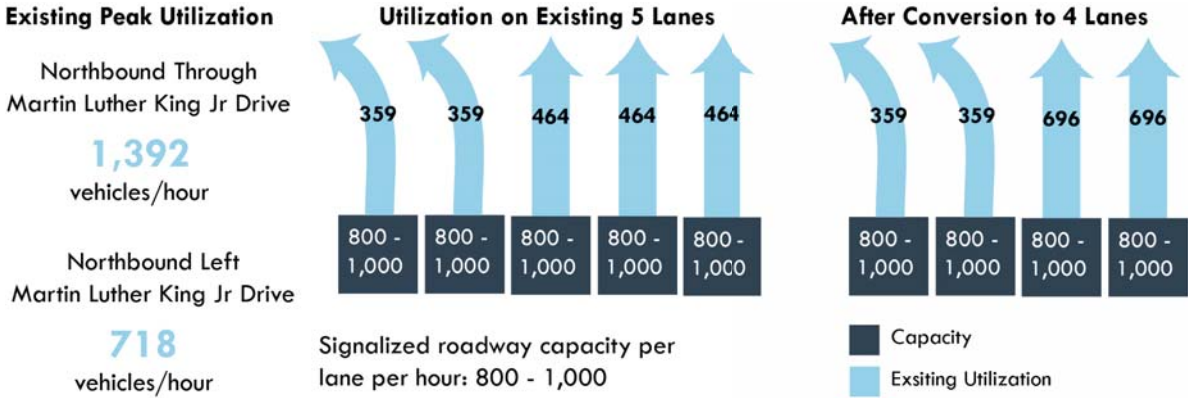


Intersection Vehicular Operations

Existing LOS		Projected LOS	
AM	**PM**	**AM**	**PM**
E	D	F	E

Community Feedback on Proposals

- Commenters agreed that this intersection was exceedingly complicated and confusing.
- The improvements to the pedestrian environment, including the curb extensions on Martin Luther King Jr. Drive had support and were ranked as the highest priority recommendation for immediate implementation. Many of these recommendations can be accomplished without any negative impacts to vehicular LOS.
- Some commenters felt that the adding the median on Martin Luther King Jr. Drive would exacerbate existing traffic trouble through the intersection rather than creating any benefit.



UNIVERSITY CIRCLE

Euclid Heights Blvd., Cedar Glen Parkway, and Cedar Road

Issues & Community Views

Walking First
"Narrow sidewalk, not comfortable."

Bicycle Friendly
"I feel like I'm going to get hit here. It sucks."

Safe & Reliable Auto Access
"Confusing intersection that leads to drivers cutting others off because they don't know what lane they should be in."

Opportunities

- **Multimodal access**
  This is a large intersection with wide curves that encourage speeding. Repurposing street space for pedestrians and bicyclists can calm traffic and improve safety for everyone who travels here without reducing traffic flow.
- **Coordination with Upcoming Projects**
  CWRU Master Plan

Recommendations

Walking First
- New crosswalks on Harcourt Drive and Cedar Road
- Enhanced ADA ramps at all crossings
- Extend median and curbs to slow vehicles and shorten crossing distances for pedestrians.

Dynamic Streets
- Recapture extra street space as medians for green space and landscaping
- Install an off-road bicycle facility to provide for a safe bicycle connection along Cedar Glen.

Euclid Heights Boulevard, Cedar Glen Parkway, and Cedar Road

NELSON NYGAARD

- **Extend the Euclid Heights Boulevard curb**
  A wider curb will help drivers identify the receiving lane past the intersection and create a shorter and safer crossing for pedestrians.

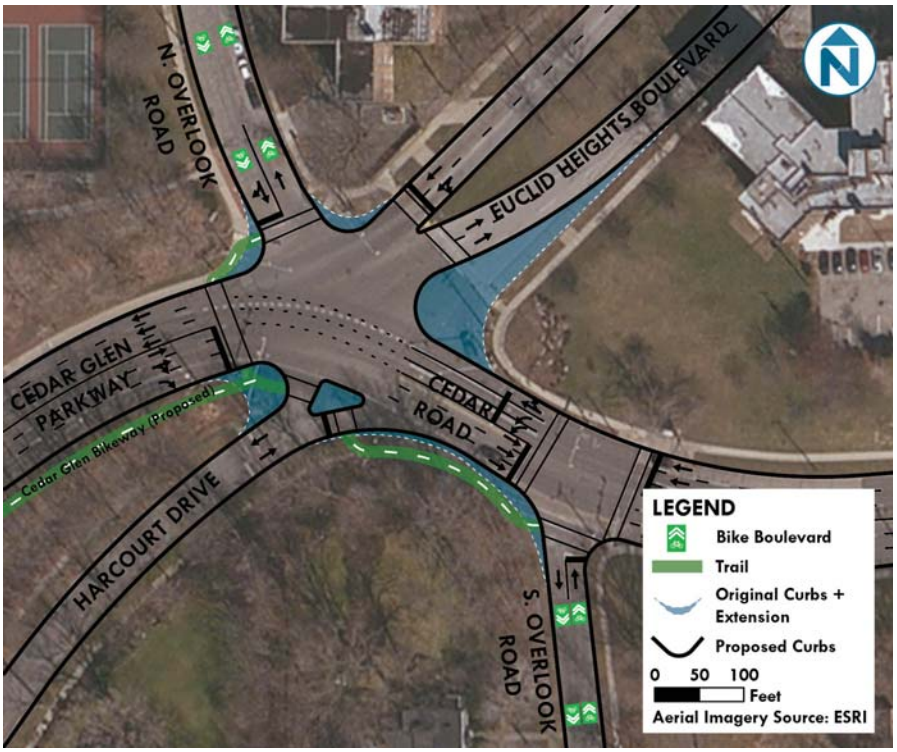
- **Restripe Euclid Heights Boulevard**
  Reducing the width of lanes here will calm traffic, delineate lanes, and discourage dangerous, high-speed turns from Cedar Glen Parkway.

- **Install curb extensions**
  Extend the curb at Cedar Road and Overlook Road, Cedar Road and Harcourt Drive, and Overlook Road. This will reduce the crossing distance for pedestrians and discourage drivers from speeding while making right turns.

- **Create an off-road bicycle facility on Cedar Road and Cedar Glen Parkway.**
  Adding this link will support the proposed Cedar Road Bicycle Boulevard while shifting bicycles from a confusing intersection and improve operations for all modes. This will also support the bicycle access proposed in the Circle Heights TLCI study.

<u>Capital Cost Estimate</u>
$$$

Existing



Proposed

Off-street paths provide dedicated space for cyclists and pedestrians (Lake-to-Lakes Trail).

Refuge islands give crossing pedestrians a safe space to wait without having to make it across the entire intersection at once.

Community Feedback on Proposals

- Many commenters mentioned the confusion of driving through the intersection and being uncertain about which lane to connect with once through. Guidance markers through the intersection were suggested to help with this confusion.
- The curb extensions for pedestrians were seen as big positives for the intersection.
- There were many responses regarding bicycle routing through the intersection. Some thought that encouraging bikes in the intersection would add further congestion, while others saw the new facility as a solution to a significant gap in the network.
- Further pedestrian improvements such as pedestrian leading intervals and more signage for drivers were suggested as additions that could be helpful.

UNIVERSITY CIRCLE

Martin Luther King Jr. Drive, Stokes Blvd. and Fairhill Road

Issues & Community Views

Walking First
"Vehicular speed and movement (often "yielding" instead of stopping) make crossing at all four corners scary."

Connectivity
"The pedestrian island is poorly aligned and fails to take into account that bikes will be passing through it."

Safe & Reliable Auto Access
"I've been involved in too many close calls here."

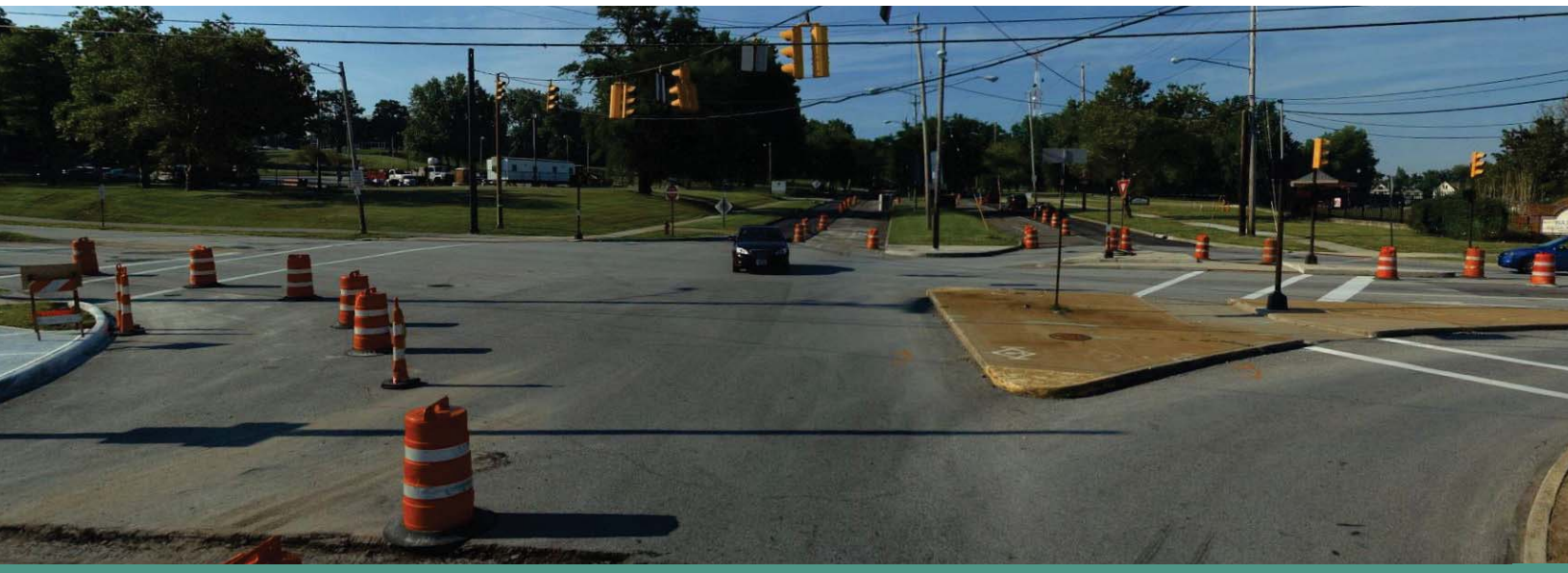
Opportunities

- **Excess street space**
  This is a large intersection with wide curves that encourage speeding, while there are more lanes than traffic volumes require. Repurposing street space for pedestrians and bicyclists can calm traffic and improve safety for everyone who travels here without reducing traffic flow.
- **Coordination with upcoming projects**
  Future CMSD Development, NEORSD stormwater demonstration project

Recommendations

Walking First & Dynamic Streets
- New crosswalk on north side of intersection
- New pedestrian refuges
- Reduce slip lane capacity to slow vehicular movement and increase crossing safety for pedestrians.

Bicycle Friendly
- Improve the Lake-to-Lakes Trail crossing at Martin Luther King, Jr. Drive.



Stokes Boulevard/Fairhill Road looking east towards Martin Luther King, Jr. Boulevard

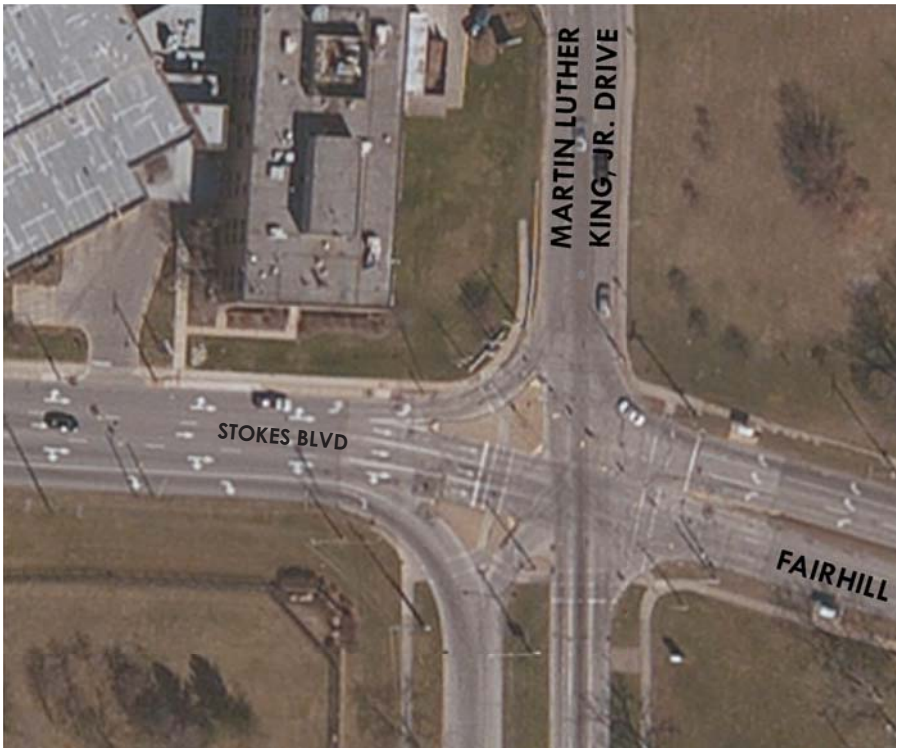
NELSON NYGAARD

- **Narrow the Stokes eastbound right turn slip lane**
  Narrow the slip lane from 2 to 1 lane to slow turning movements and reduce conflicts with crossing cyclists and pedestrians. This accommodates vehicle turns while improving safety for all crossers.

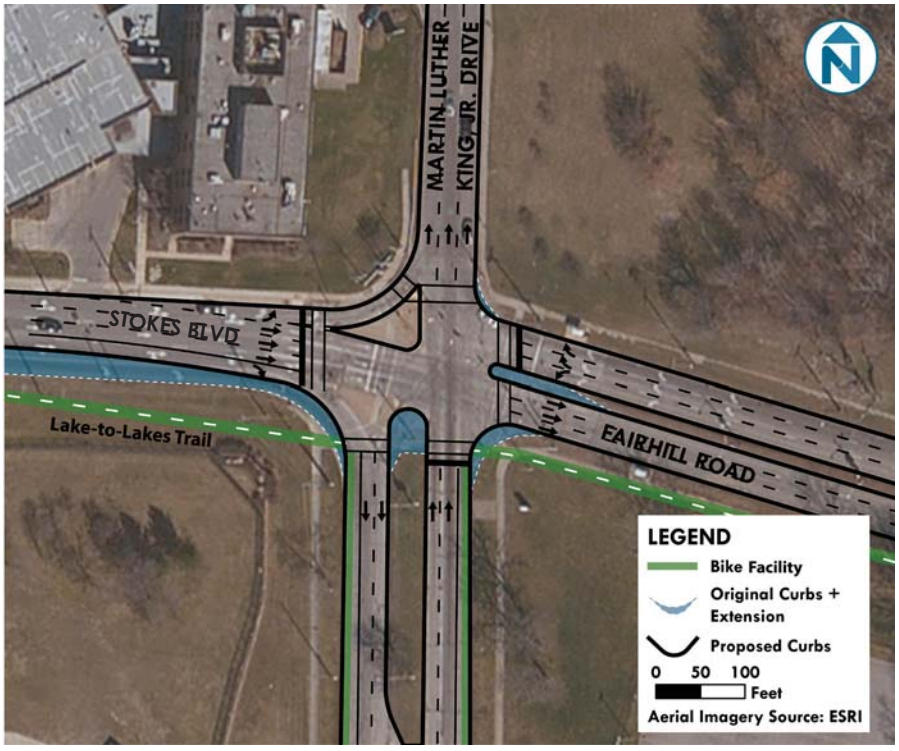
- **Provide pedestrian refuges**
  This gives pedestrians a place to wait while crossing the street and discourages drivers from speeding while making left turns.

- **Curb extensions and bioswales**
  This reduces the crossing distance for pedestrians and encourages drivers to slow down while making right turns. Build upon the momentum of the nearby NEORSD green infrastructure projects by softening the edges of the road using bioswale tree pits integrated with the curb extensions.

Capital Cost Estimate
$$



Existing



Proposed

Bicycle trails like the Lake-to-Lakes Trail (above) can be built with permeable materials and bioswales

Pedestrian refuge with permeable paving and landscaping

Intersection Vehicular Operations

Existing LOS		Projected LOS	
AM	**PM**	**AM**	**PM**
B	E	C	E

Community Feedback on Proposals

- The curb extensions were supported by commenters and seen as aiding pedestrians and cars by straightening out the intersection while providing guidance as travelers went through.
- Some commenters felt that the two right turn lanes from Stokes Boulevard eastbound to Martin Luther King Jr. Drive was better suited for a yield sign rather than the existing stop arrow.

UNIVERSITY CIRCLE

Euclid Avenue, Mayfield Road, and Ford Drive

Issues & Community Views

Walking First
"Drivers don't pay attention or try to turn ahead of pedestrians crossing street in crosswalks."

"The pedestrian signal button on the north side of the crosswalk is in an awkward location for people in wheelchairs."

Bicycle Friendly
"There are no bike markings or signage, indicating that all vehicles must share the road."

Dynamic Streets
"The pavers have settled and this creates a bumpy and uneven surface."

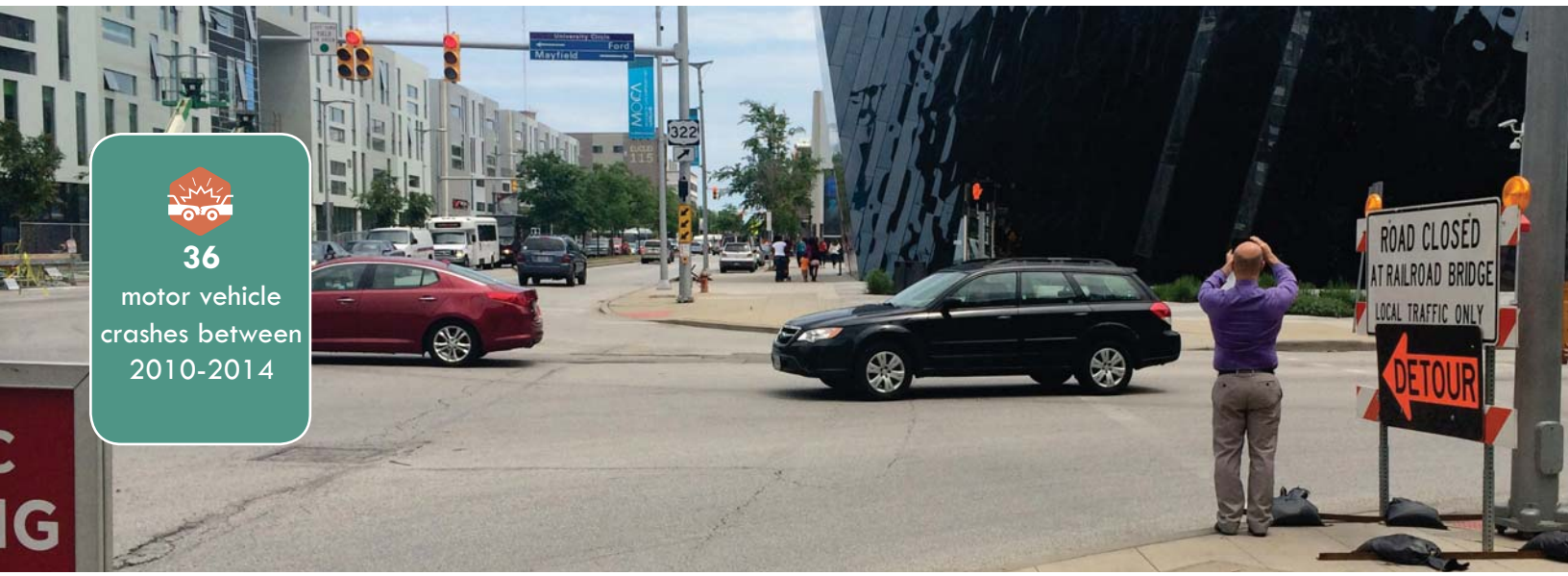
Opportunities

- **Uptown developments**
  The Uptown development has brought new housing and retail options to the area, generating significant street activity. Emphasizing that this is a location for all, regardless of travel mode, will reinforce the location as a place and not just an intersection.
- **Coordination with Upcoming Projects**
  CWRU Master Plan, Intesa, Little Italy-University Circle Red Line Station

Recommendations

Walking First & Dynamic Streets
- Level sidewalks
- Improve sidewalk drainage with bioswales
- Add Lead Pedestrian Intervals
- Implement No Right Turn on Red
- Enhance crosswalks throughout the intersection

Bicycle Friendly
- Provide sharrows and signage on Euclid Avenue and Ford Drive to remind all road users to share the road with bicyclists.



36
motor vehicle crashes between 2010-2014

Euclid Avenue Facing North at Mayfield

NELSON NYGAARD

- **Add curb extensions**
  Curb extensions will reduce the crossing distance for pedestrians, encourage drivers to slow down, and provide additional space for landscaping or street furniture.

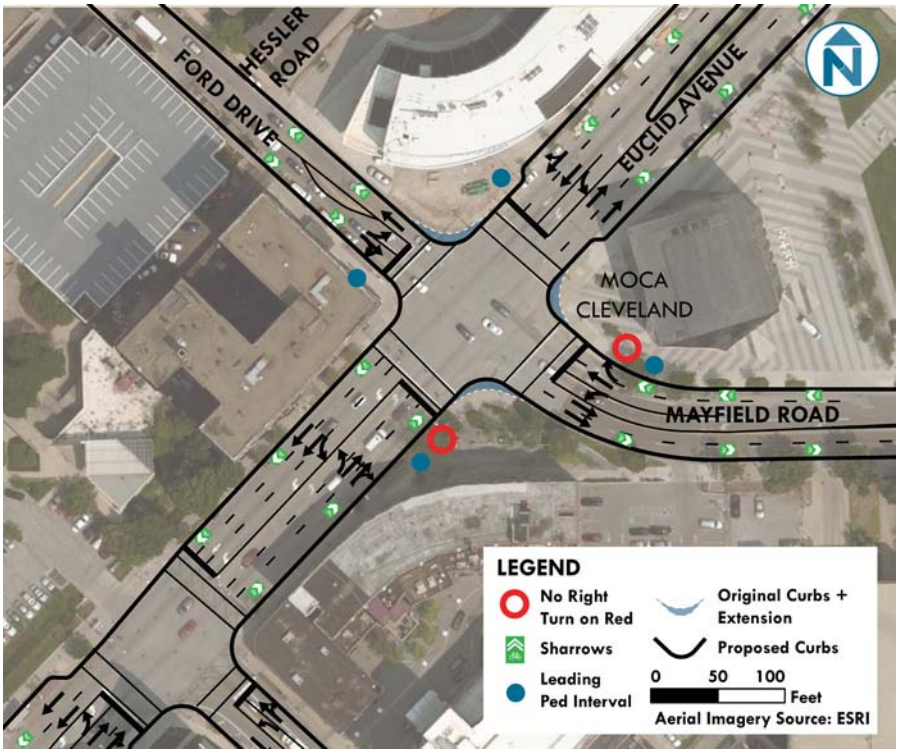
- **Add Lead Pedestrian Intervals**
  Without sufficient time to cross, community members stated they had many near misses at this intersection. Lead Pedestrian Intervals (LPIs) give pedestrians crossing the street a head start over drivers going the same direction, increasing their visibility in the crosswalk before drivers enter the intersection.

- **Implement No Turn on Red**
  This reduces conflicts between drivers turning right and pedestrians in the crosswalk, increasing safety.

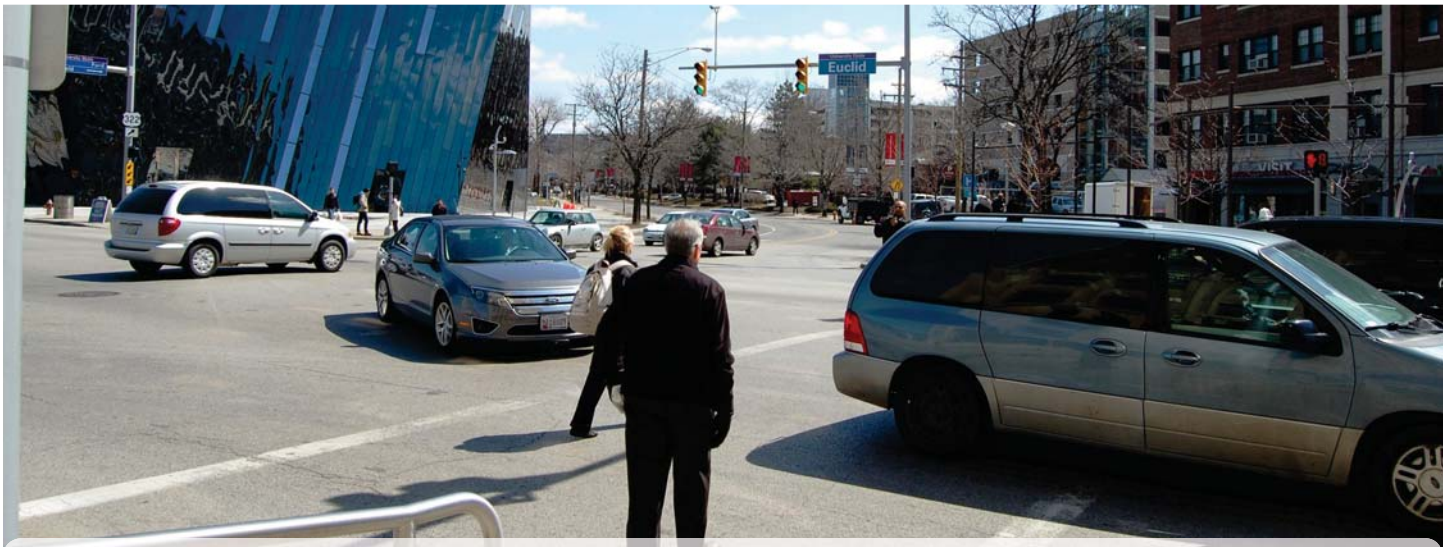
- **Install sharrows on Euclid Avenue and Ford Drive**
  Bicycle sharrow lane markings placed in the middle of the lane encourage safe bicycling away from parked car doors and increase the visibility and awareness of cyclists sharing the road with other vehicles. Use green paint to box sharrows for greater visibility. Add signage to these routes to further alert drivers to the presence and rights of cyclists.

Capital Cost Estimate
$$

Existing



Proposed



Pedestrians and turning vehicles in conflict at an intersection without a Leading Pedestrian Interval (LPI) (Euclid Avenue at Mayfield Road)

Intersection Vehicular Operations

Existing LOS		Projected LOS	
AM	**PM**	**AM**	**PM**
D	C	E	C

Community Feedback on Proposals

- There were many strong opinions about implementing No Right on Red at Mayfield Road and Euclid Avenue. Many see it as a potential cause of significant traffic delays while others see it as much-needed protection for the high number of pedestrians moving through the area.
- Support for pedestrian improvements in general were strong, with many commenters explicitly supporting the proposed Leading Pedestrian Intervals and curb extensions as part of the answer to long standing conflicts at this intersection.

UNIVERSITY CIRCLE

CWRU North Campus

Issues & Community Views

Walking First

"No crosswalks or signage to indicate crossing at East Blvd. Also, a blind spot for pedestrians and cars. A real gamble to cross here"

"A few re-worked corners and sidewalks would greatly enhance the experience for the many who are challenged by a mere 4 inch curb"

Dynamic Streets

"The pothole patches have potholes."

Opportunities

- **Placemaking**
  The CWRU campus and student presence here create an opportunity to use the street network as a branding or identifying tool for the area.
- **Uptown development**
  New housing and retail options along Euclid Avenue reinforce the pedestrian- and bicycle-oriented character of North Campus by giving residents, students, faculty, and staff more amenities within walking and bicycling distance.
- **Coordination with upcoming projects**
  CWRU Master Plan, Bellflower Walk

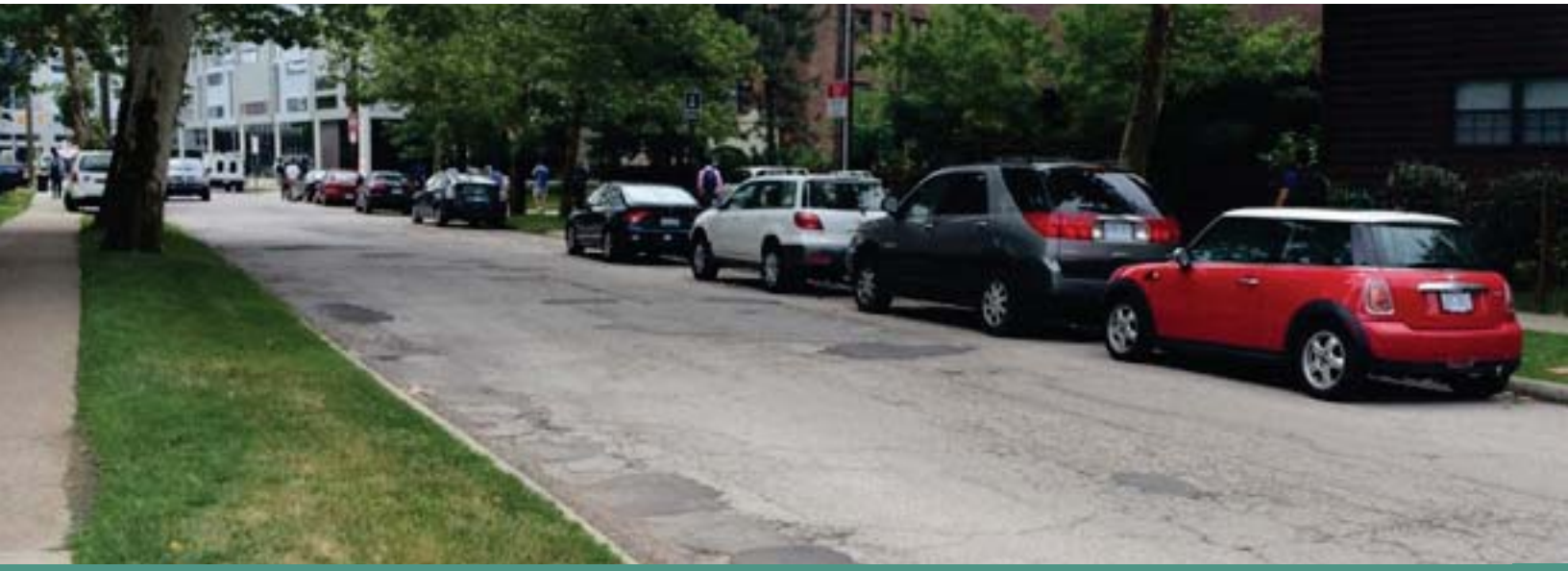
Recommendations

Walking First

- Build on success of Hessler Road and Juniper Road as high-quality walking environments
- Create a "slow zone" on North Campus
- Add crosswalk ramps and markings at all intersections

Dynamic Streets, Safe & Reliable Auto Access

- Repave the street surface and restripe for clarity of lane use/ direction.



East 115th Street at Bellflower Road facing south

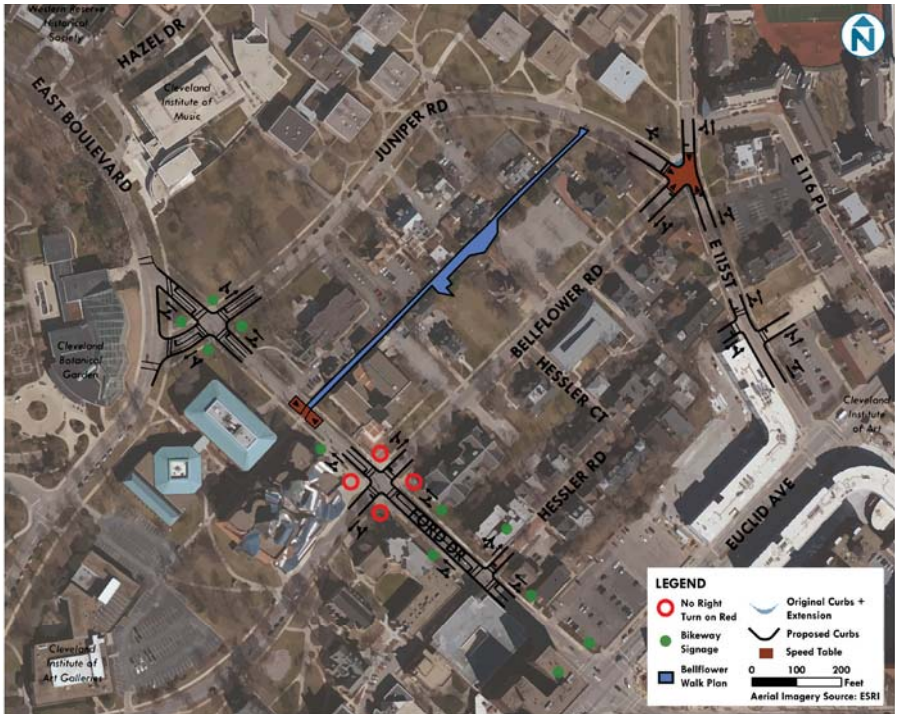
NELSON NYGAARD

- **Add crosswalks**
  Re-stripe all crosswalks in North Campus to increase visibility and pedestrian safety, and add crosswalk ramps at all intersections. Add crosswalk markings and signage at Ford Drive and Hessler Road and at East 115th Street and Cotman Vistas. Consider higher visibility "ladder" or "continental" style markings or other bolder alternatives.

- **Create a "slow zone"**
  Turn the streets on and around North Campus into a "slow zone" to calm traffic and increase pedestrian and bicyclist safety.
  - Add 25 mph signage to reinforce the speed limit
  - Provide No Right Turn on Red signs at Bellflower Road and Ford Drive
  - Remove pedestrian-actuated signals at Bellflower and Ford and provide a walk signal in every cycle.
  - Add speed tables at the intersection of East 115th Street, Juniper Road, and Bellflower Road and the intersection of Bellflower Court and Ford Drive to calm traffic.
  - Add sharrows on Ford Drive to connect the bikeway network from Euclid Avenue to East Blvd.

- **Eliminate conflicts**
  Change Juniper Road from Bellflower Court to East 115th Street to one-way eastbound.

Existing



Proposed

Capital Cost Estimate
$$$

Existing conditions at Ford Drive and Bellflower Court

Speed humps and tables can slow down traffic and improve safety conditions for pedestrians

Community Feedback on Proposals

- Many people lamented the complicated nature of CWRU North Campus intersections in general putting pedestrians and motorists at risk.
- Commenters supported the speed table at 115th Street, Bellflower Road, and Juniper Road citing the confusing nature of the intersection and safety concerns.
- There was skepticism as to whether converting Juniper Road to a one-way will help or hurt the street activity in the already confusing area. CWRU will further evaluate alternatives as part of their Master Plan.
- There was support and disagreement about implementing “No Right on Red” between those who saw it as an aid to pedestrians and those who saw it as a would-be cause of increased congestion in the already backed-up area.
- Significant comments about the sheer number of pedestrians traveling through the area.

UNIVERSITY CIRCLE

Euclid Avenue Uptown

Issues & Community Views

Walking First
"Bikes use the already narrow sidewalk."

"The sidewalks on this stretch of Euclid...slope sharply into the buildings, making wheelchair movement difficult."

Bicycle Friendly
"No bike racks!!! This one's an easy fix."

Dynamic Streets
"[The ramps at Euclid and 115th] have gaping ruts, jagged crevices that flood during the rains."

Opportunities

- **Transit access**
  This corridor is home to two HealthLine bus rapid transit stops and is a short walk from the new Little Italy - University Circle Red Line station. Improving pedestrian and bicyclist safety can increase transit access and support its use.
- **Uptown development**
  New housing and retail along the Euclid corridor encourages street life and puts more amenities within easy walking or bicycling distance.
- **Coordination with Upcoming Projects**
  CWRU Master Plan, Intesa, CIA Campus Consolidation

Recommendations

Walking First & Dynamic Streets
- Repair sidewalks and crosswalk ramps to prevent puddling.
- Prohibit right turns on red at East 115th Street.

Bicycle Friendly
- Provide sharrows and signage on Euclid Avenue to remind all road users to share the road with bicyclists.

17
motor vehicle crashes between 2010-2014

Euclid Avenue facing north at East 115th Street

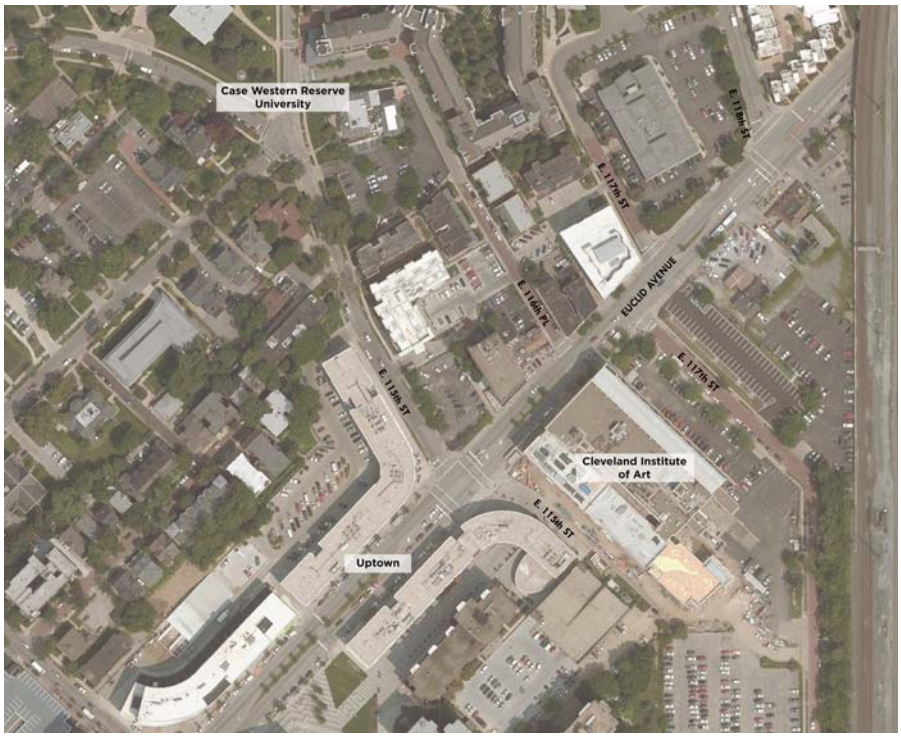
NELSON NYGAARD

- **Implement No Turn on Red**
  This reduces conflicts between drivers turning right and pedestrians in the crosswalk, increasing safety.

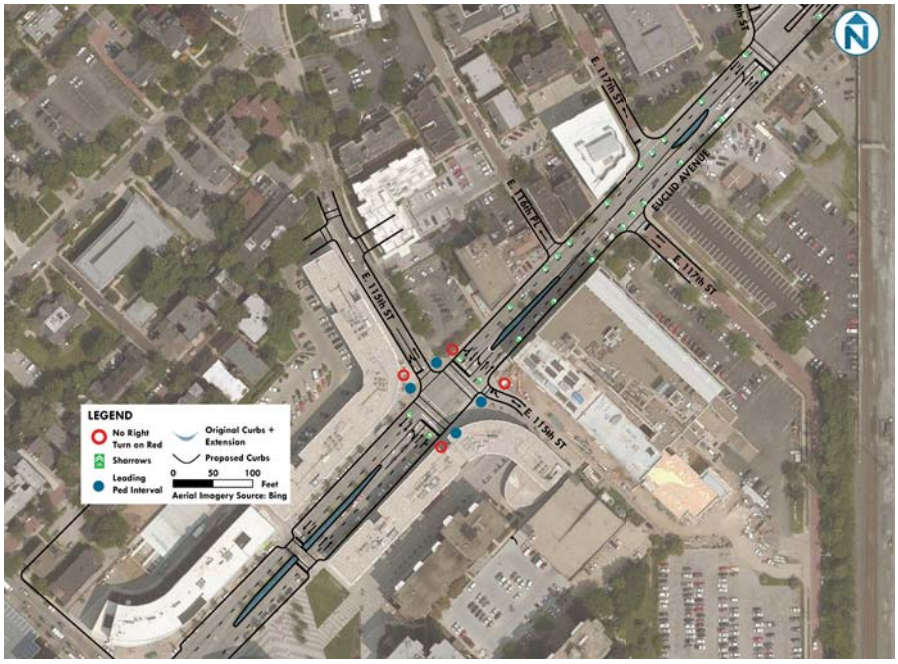
- **Improve signal timing for pedestrians**
  Remove the pedestrian-actuated signals at Euclid and East 115th and add a leading pedestrian interval (LPI). This gives pedestrians crossing the street a head start over drivers going the same direction, allowing them to clear the crosswalk before drivers start turning.

- **Install sharrows on Euclid Avenue**
  Bicycle sharrow lane markings placed in the middle of the lane encourage safe bicycling away from parked car doors. Use green paint to box sharrows for greater visibility. Add signage to these routes to further alert drivers to the presence and rights of cyclists.

Capital Cost Estimate
$



Existing



Proposed

Current conditions at a Euclid Avenue pedestrian crossing

Bike sharrows guide bicyclists through the area and alert drivers to their presence

Intersection Vehicular Operations

Existing LOS		Projected LOS	
AM	**PM**	**AM**	**PM**
B	C	C	C

Community Feedback on Proposals

- While some commenters felt implementing No Right on Red would cause traffic delays, the majority of comments related to its implementation was strongly supportive.
- Encouraging biking along Euclid Avenue by placing sharrows was a cause for concern among some commenters who thought that the large HealthLine buses and wide streets were better oriented for cars. One alternative suggestion was to take the space intended for the proposed median and use it to fit protected bike lanes along the corridor.
- Many commenters saw pedestrians, especially students, as a strong presence throughout the area and supported measures to heighten their visibility including adding "Yield to Pedestrians" signage throughout the area.

Appendix: Community Involvement

Community involvement is a key component in making transportation plans work both in process and in implementation. The Moving Greater University Circle Transportation & Mobility Study included a multi-pronged community involvement effort to enable stakeholders to fully understand the project issues, opportunities, and expectations. Through this process, the community actively influenced the study's direction and recommendations, yielding more applicable and readily implementable results. The project's Steering Committee and public agency partners received tailored briefings four times during this phase.

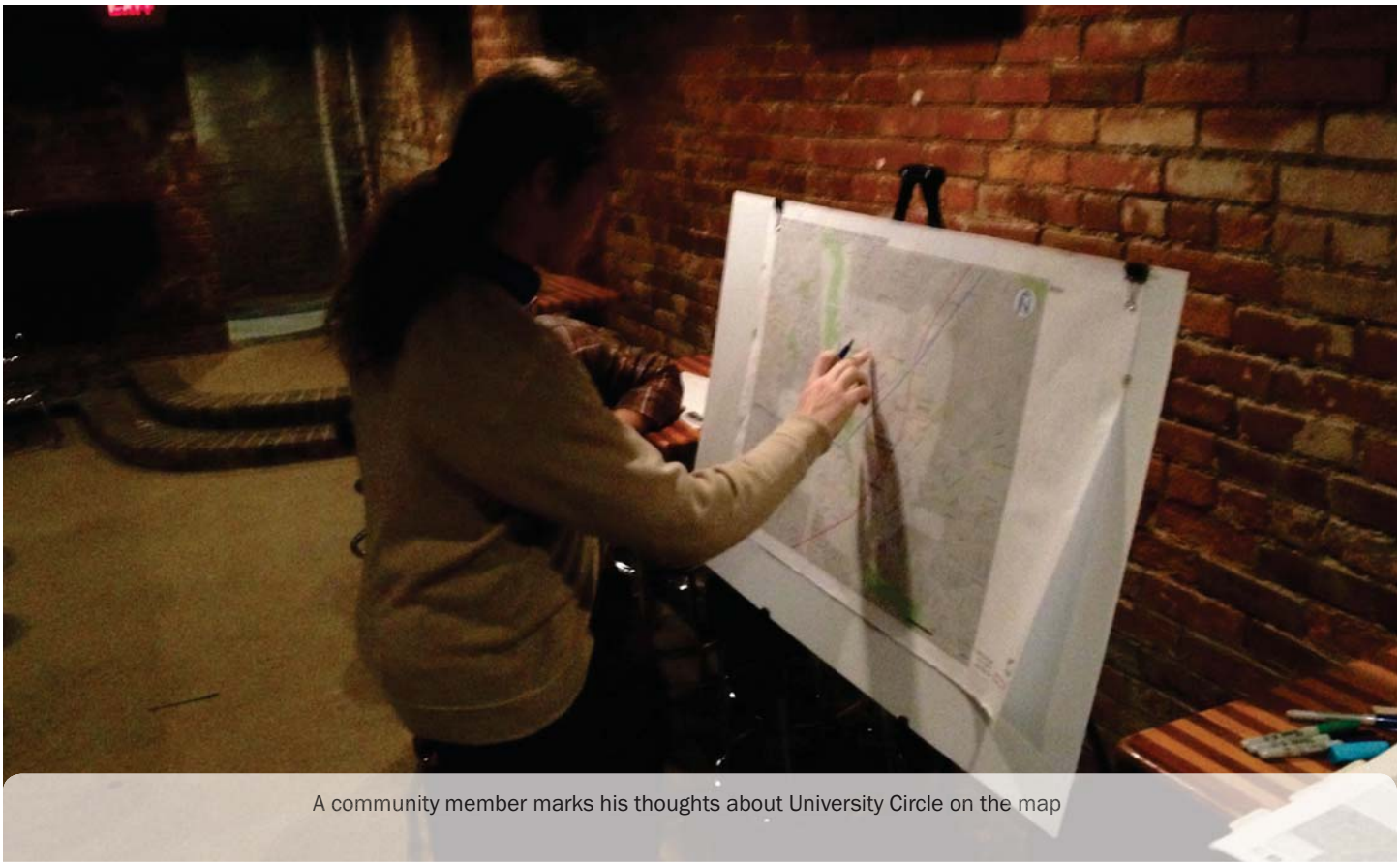
During October and November 2014, the Project Team hosted multiple events to help the community identify mobility issues throughout Greater University Circle. These events provided different, flexible settings so that the community could highlight why they use different modes to travel, where they do and do not travel (and why), and what improvements could be made to improve the complete transportation system. Events included open houses for the general public at highly trafficked locations (midday at Case Western Reserve University, University Hospitals, Cleveland Clinic, and early evening at Constantino's Market) and were coupled with focus group sessions and walking tours for stakeholders from Uptown, Upper Chester, the Cleveland Institute of Art, and the district's bicycling community. During this time, a Wikimap and survey were posted online so the community could participate on their own schedule. In total, over 650 participated in these opportunities, helping influence selection of the 11 focus areas that were identified for in-depth analysis.

Community members discuss proposed changes to University Circle areas

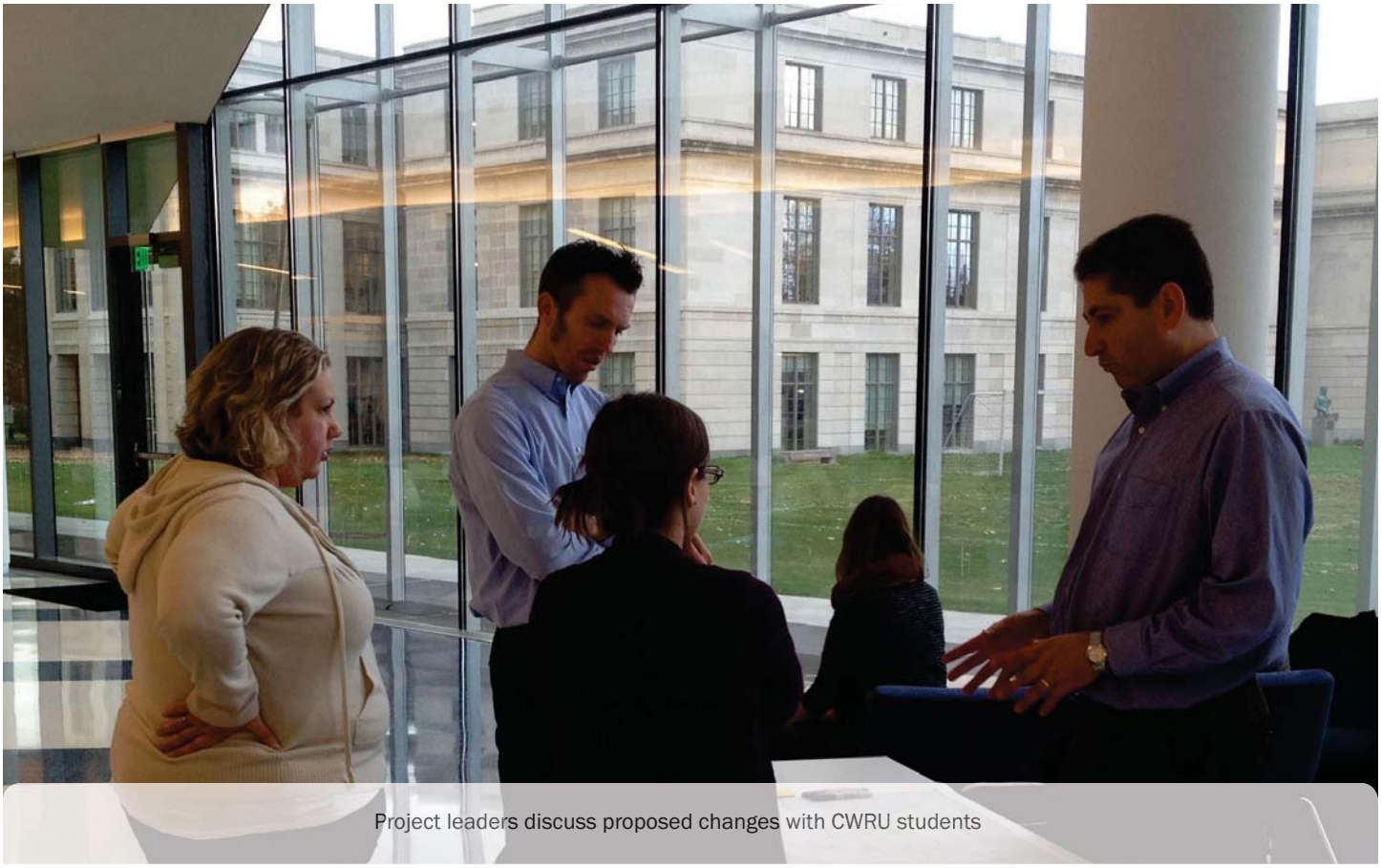
In April 2015, the Project Team presented concepts at open houses at Case Western Reserve University and Maximum Accessible Housing of Ohio, that addressed the issues highlighted by the community. Participants were guided through the recommended changes at the 11 focus areas and were asked about both the recommendations as well as whether these recommendations supported the project's overall goals.

A Wikimap and survey were again posted online with the same information presented at the Open Houses. In total, approximately 500 participants provided feedback, which was incorporated into the concepts presented earlier in this report.

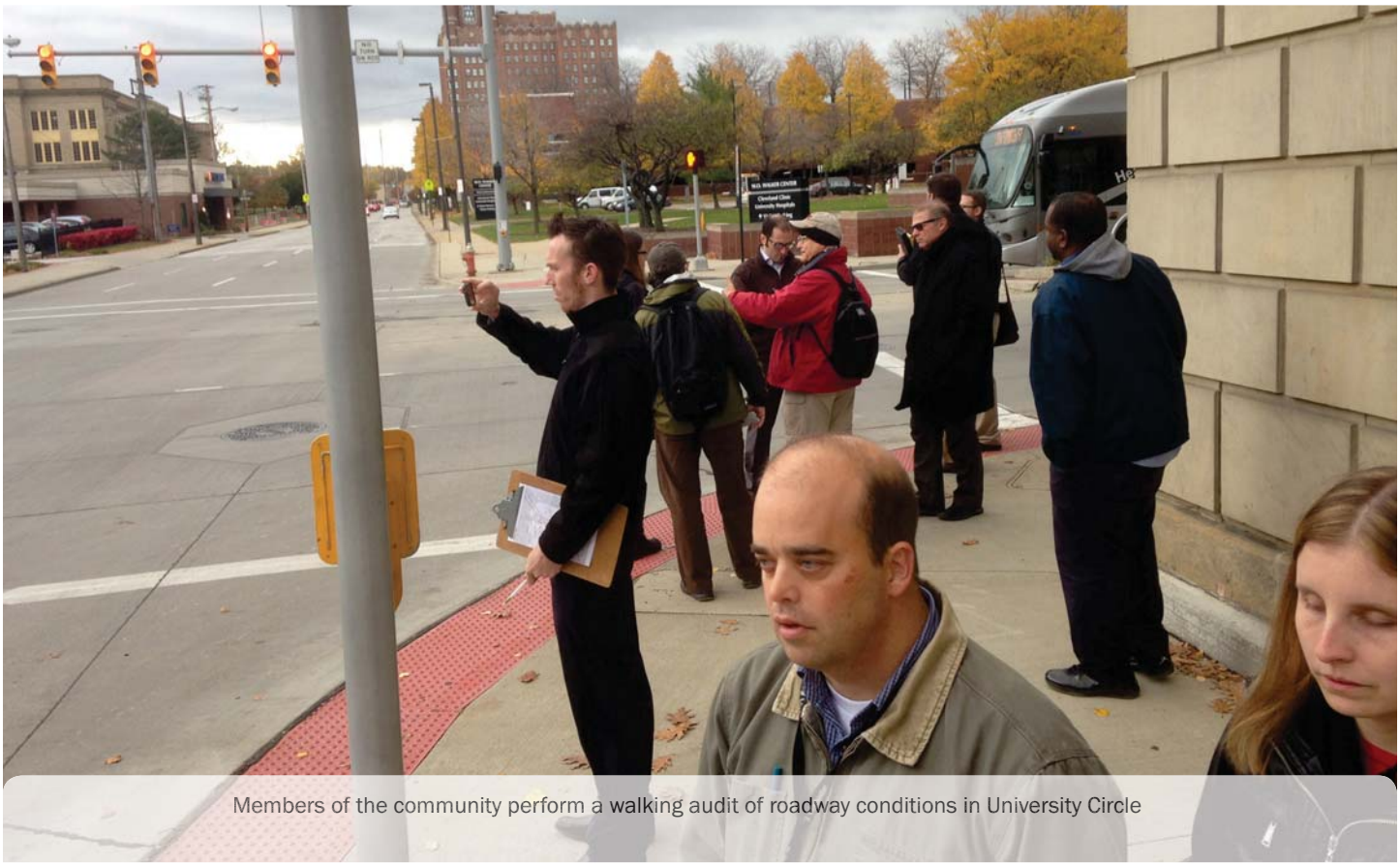
University Circle neighbors discuss proposed changes at a community meeting



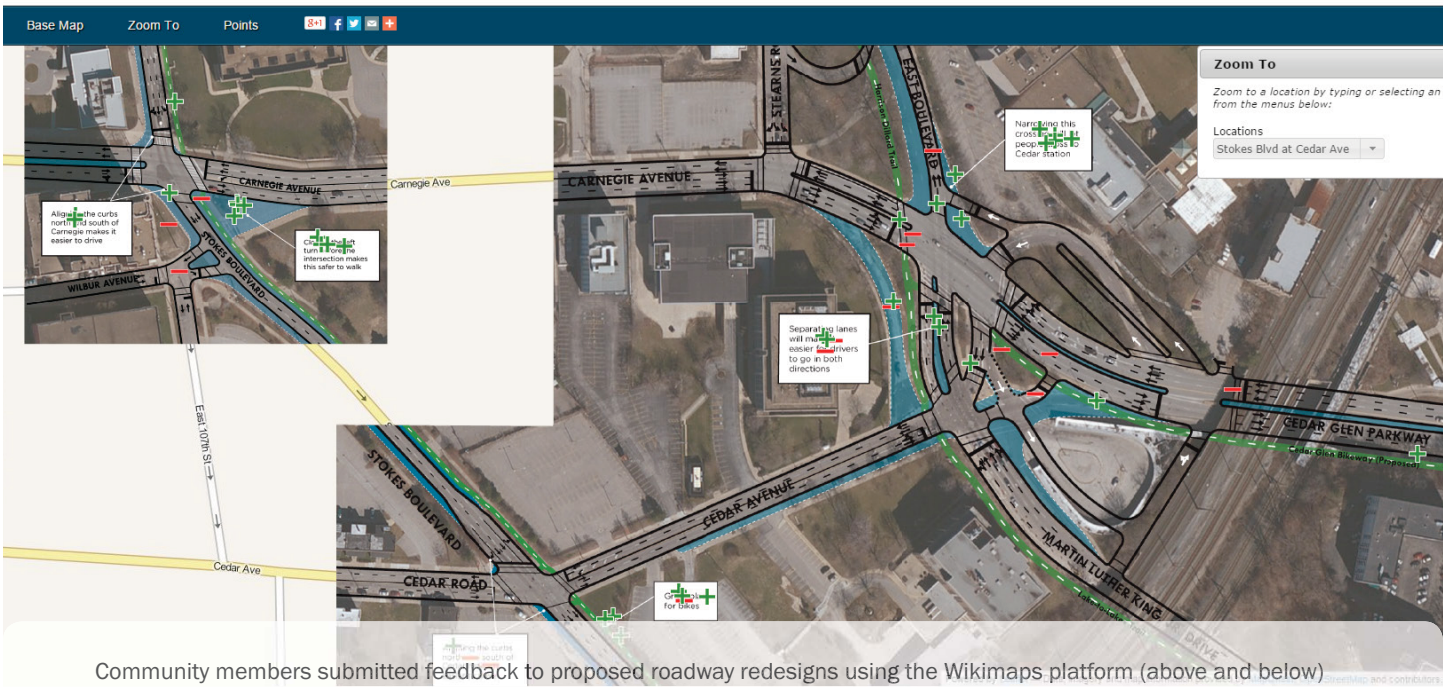
A community member marks his thoughts about University Circle on the map



Project leaders discuss proposed changes with CWRU students



Members of the community perform a walking audit of roadway conditions in University Circle



Community members submitted feedback to proposed roadway redesigns using the Wikimaps platform (above and below)

Moving Greater University Circle

Transportation & Mobility Study

We want to hear from you!

Please visit www.universitycircle.org/transportationstudy

for a stakeholder survey, interactive map

and public meeting information.

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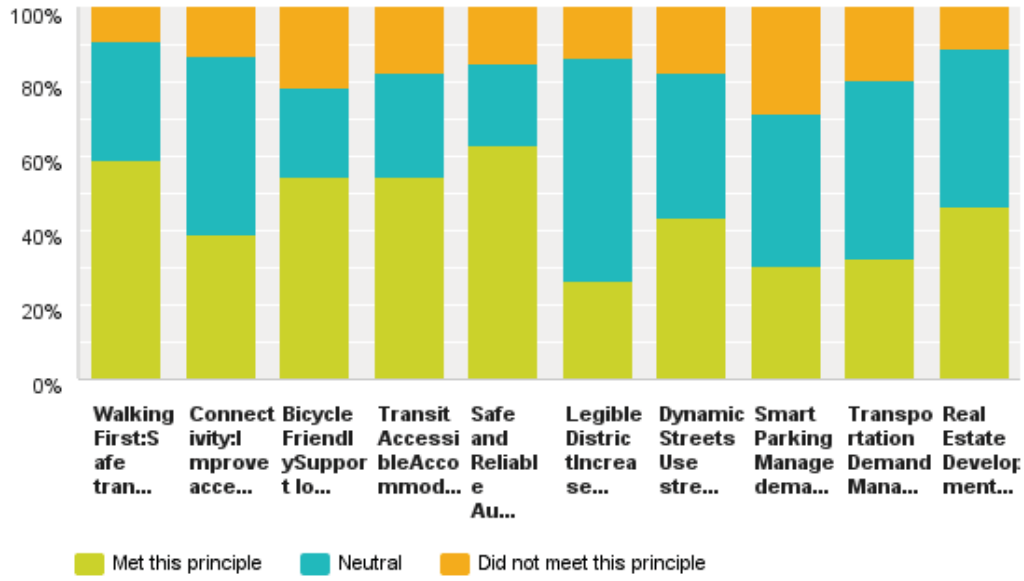
Flier distributed to community members announcing the MGUC online survey.

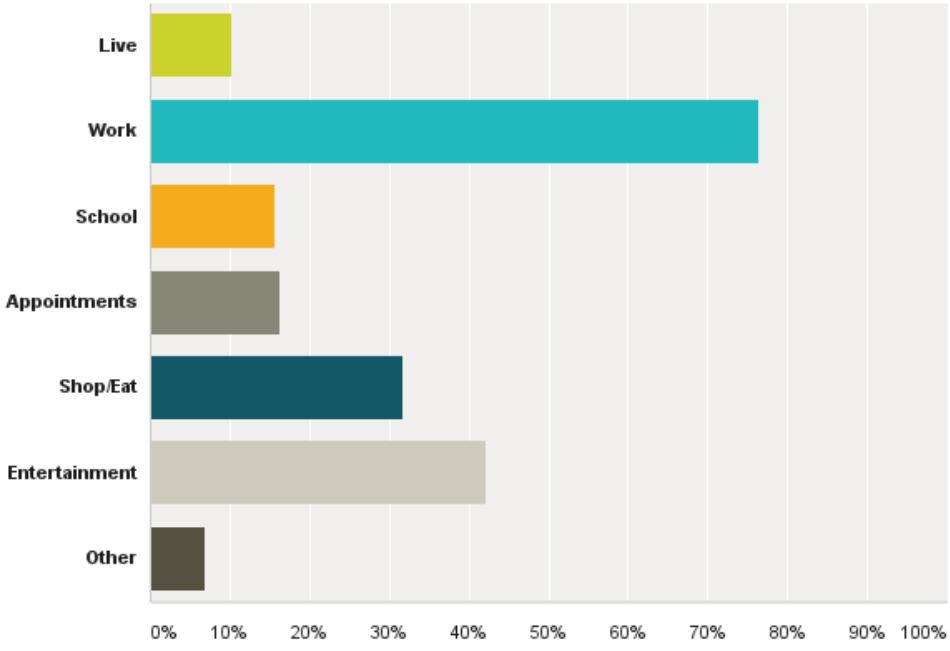
Q1 The plan is based on 10 principles to continue to make University Circle a great neighborhood for all who live, work, play, shop, and go to school here. How well did the recommendations meet the principles?

Answered: 46 Skipped: 2



Q2 Which of the following best describes your connection to the University Circle area?

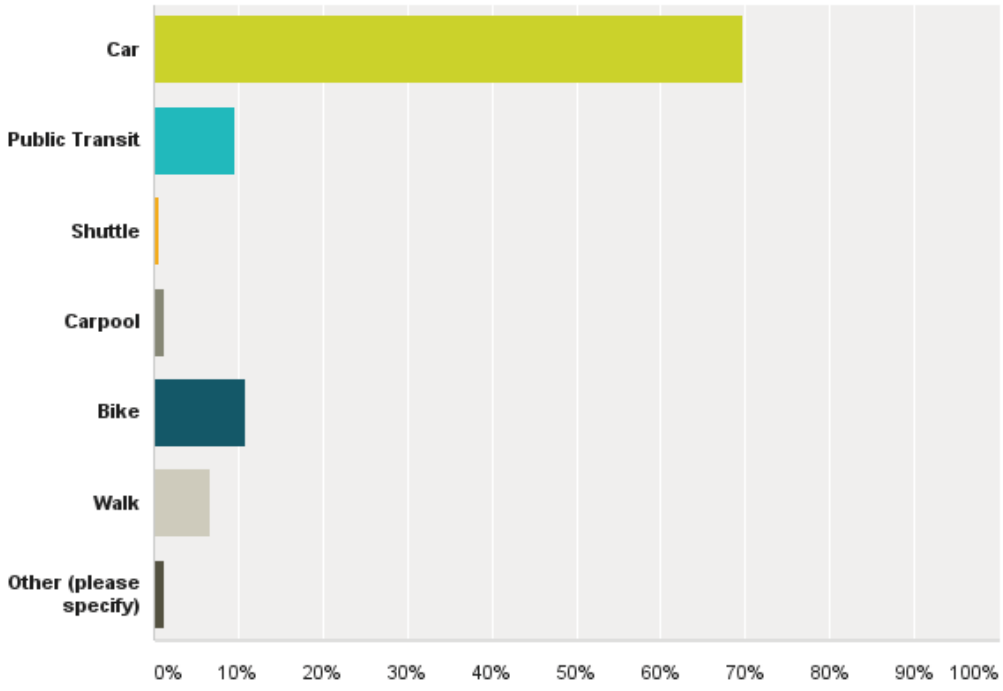
Answered: 562 Skipped: 0



Results from an online mobility survey distributed to University Circle community members

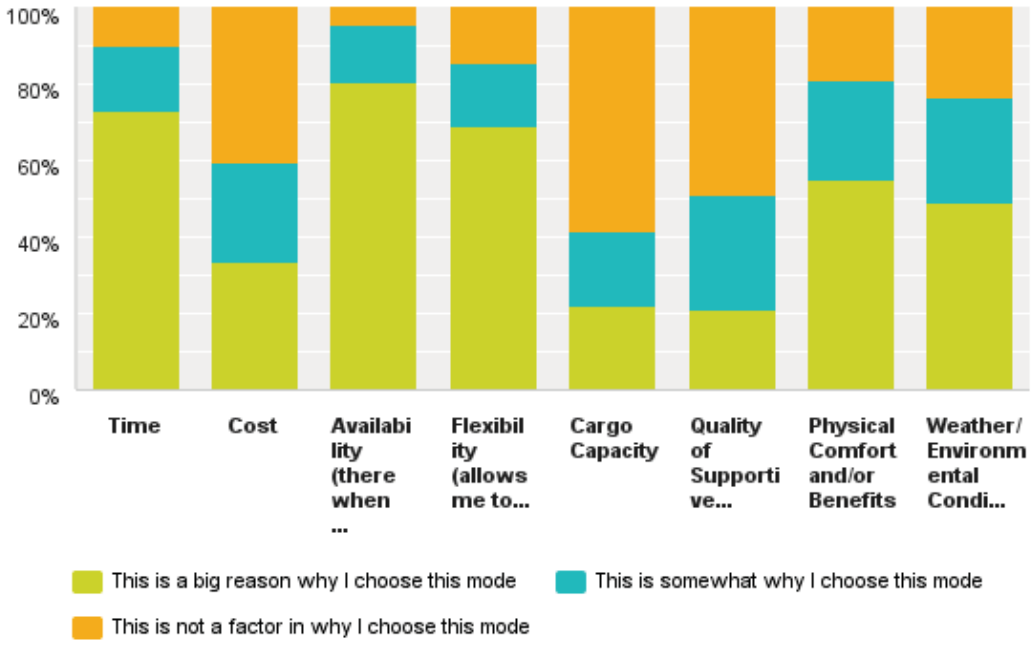
Q4 What mode of travel do you use for the longest portion of your trip to University Circle?

Answered: 562 Skipped: 0



Q5 Why do you choose to commute by that mode?

Answered: 562 Skipped: 0



Results from an online mobility survey distributed to University Circle community members

NELSON NYGAARD

MEMORANDUM

To: Chris Bongorno, University Circle Incorporated

From: Nelson\Nygaard Project Team

Date: March 16, 2015

Subject: Moving Greater University Circle Traffic Analysis

OVERVIEW

The Moving Greater University Circle (MGUC) Transportation Study has focused on understanding and evaluating the comprehensive transportation systems and mobility issues that confront the Greater University Circle District study area. The current Mobility Phase has identified past studies and coordinated a large data collection element including but not limited to traffic counts, pedestrian counts, and bicycle usage. This enabled analysis to be based on multimodal evaluations of capacity during peak periods and comprehensive safety conditions

From the capacity evaluations, field observations, and public feedback, detailed evaluation of eleven (11) focus areas was performed leading to conceptual recommendations and evaluation of the potential change in traffic conditions with the proposed designs being implemented. These focus areas included:

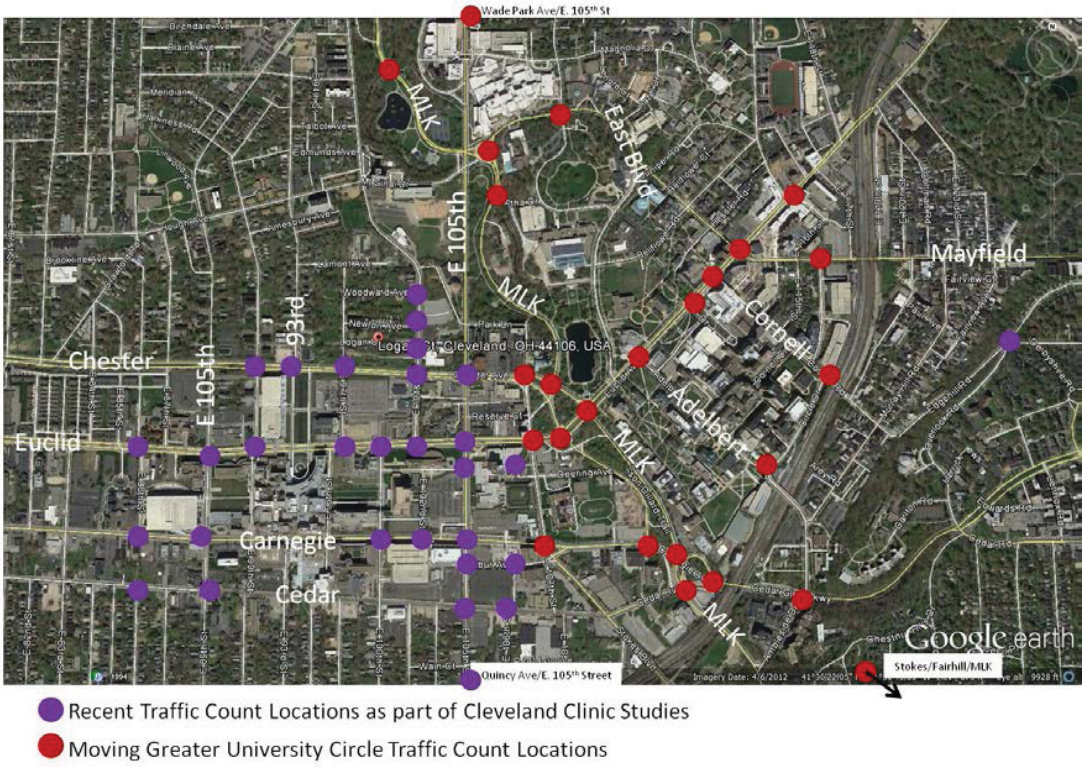
1. Chester Avenue at E 93rd
2. South Wade Park
3. Euclid Ave/Chester Ave/Stokes Blvd
4. E 107th at Carnegie Avenue
5. Stokes Blvd at Cedar Avenue
6. University-Cedar Train and Bus Station area
7. MLK Drive at Fairhill Road
8. CWRU North Campus
9. Euclid Avenue Uptown
10. Euclid Ave, Ford Road and Mayfield Road
11. Euclid Heights Blvd at Cedar Blvd

This memorandum outlines the data collection effort and the traffic analysis methodology and results for the proposed scenarios including a focus on vehicle operations along the Euclid Avenue corridor within the study area.

DATA COLLECTION

The MGUC study area consists of a complex transportation network covering approximately one-square mile. Traffic count data was collected by TMS Engineers during the Fall of 2014 and this was combined with data collected as part of on-going Cleveland Clinic studies in October 2013 and June 2014. In total 55 intersections were included in the data collection effort and these are shown in Figure 1. It is noted that roadway construction activity along the MLK Dr corridor was on-going during the Fall of 2014 which affected data collection at East Blvd., E 105th St., and Jeptha Dr. Follow-up counts at these locations are recommended to obtain traffic counts under fully operational conditions.

Figure 1 Map of Traffic Count Locations



A full listing of intersections and the date of data collection is included as Appendix A. NOACA provided crash statistics for 2008-2012 which is also included in Appendix A; this data is used to contextualize traffic conditions at focus areas for transportation design recommendations.

TRAFFIC ANALYSIS METHODOLOGY

Synchro (version 9) traffic analysis software was used to analyze the intersections within the MGUC study area as highlighted in Figure 1. The following settings and assumptions were used for traffic evaluation using Synchro:

- Traffic counts at 25 intersections, as agreed upon by the stakeholders, were undertaken in the Fall of 2014 (see Appendix A).
- Traffic counts over 9 hours (7-10am, 11am – 2pm, 3pm-6pm).
- Traffic counts included Cars, Trucks, Buses, Pedestrian, and Bicyclists. These counts were included within the Synchro model at all intersections including heavy vehicle percentages.
- The Peak Hour Factor for each approach was calculated and included in the Synchro model.
- Transit-only lanes were not entered into the model as they contain 100% bus volumes and are only applicable to Euclid Avenue in this study area.
- Signal timing sheets were obtained from the City of Cleveland (on Dec 3rd 2014) for each intersection and entered accordingly for both the AM and PM model.
- Bus volumes and the number of buses stopping on each roadway were included as bus blockages where appropriate.
- Lane configuration and turn restrictions were field checked during the traffic count process.
- The future development scenarios include proposed growth within the Greater University Circle District utilizing ITE Trip Generation rates, NOACA TAZ mode splits and trip distribution, and real estate development anticipated by University Circle, Inc. (see Appendix B).
- An initial 10% reduction in vehicular trip generation was assumed for the study area for the Transportation Demand Management scenario.

Two key indicators are used to analyze the road network, Level of Service (LOS) and average delay. Vehicular LOS is the National Cooperative Highway Research Program's (NCHRP) Highway Capacity Manual measure of vehicular quality of service of a roadway. Figure 2 describes the typical vehicular travel delay associated with the grade ratings of LOS.

Figure 2 Vehicular LOS Ratings[1]

LOS	Signalized Intersection	Unsignalized Intersection
A	≤10 sec	≤10 sec
B	10-20 sec	10-15 sec
C	20-35 sec	15-25 sec
D	35-55 sec	25-35 sec
E	55-80 sec	35-50 sec
F	≥80 sec	≥50 sec

Traffic conditions were evaluated under five scenarios to account for proposed development activity (incorporating population and employment growth) for the study area, conceptual design changes to the roadways, and introduction of transportation demand management (TDM) measures.

The five scenarios evaluated were:

1. Existing conditions, to serve as a system baseline.
2. Future conditions with planned developments (resulting in resident, visitor, and employment growth).
3. Future conditions with proposed transportation recommendations and no planned development.
4. Future conditions with development induced growth **and** proposed transportation design recommendations.
5. Future conditions with development induced growth, transportation design recommendations, and moderate TDM measures implemented.

Existing Conditions

The existing conditions scenario serves as a baseline of the Greater University Circle District transportation system. The scenario includes current roadway design, lane configuration, traffic signal timings and traffic counts.

Future with Development Growth

This scenario evaluated population, visitor, and employment growth resulting from planned developments within the study area. Utilizing ITE Trip Generation rates and NOACA TAZ mode splits and trip distribution, the proposed growth was added to the existing conditions Synchro model to analyze future traffic conditions.

[1] NCHRP. Highway Capacity Manual 2010

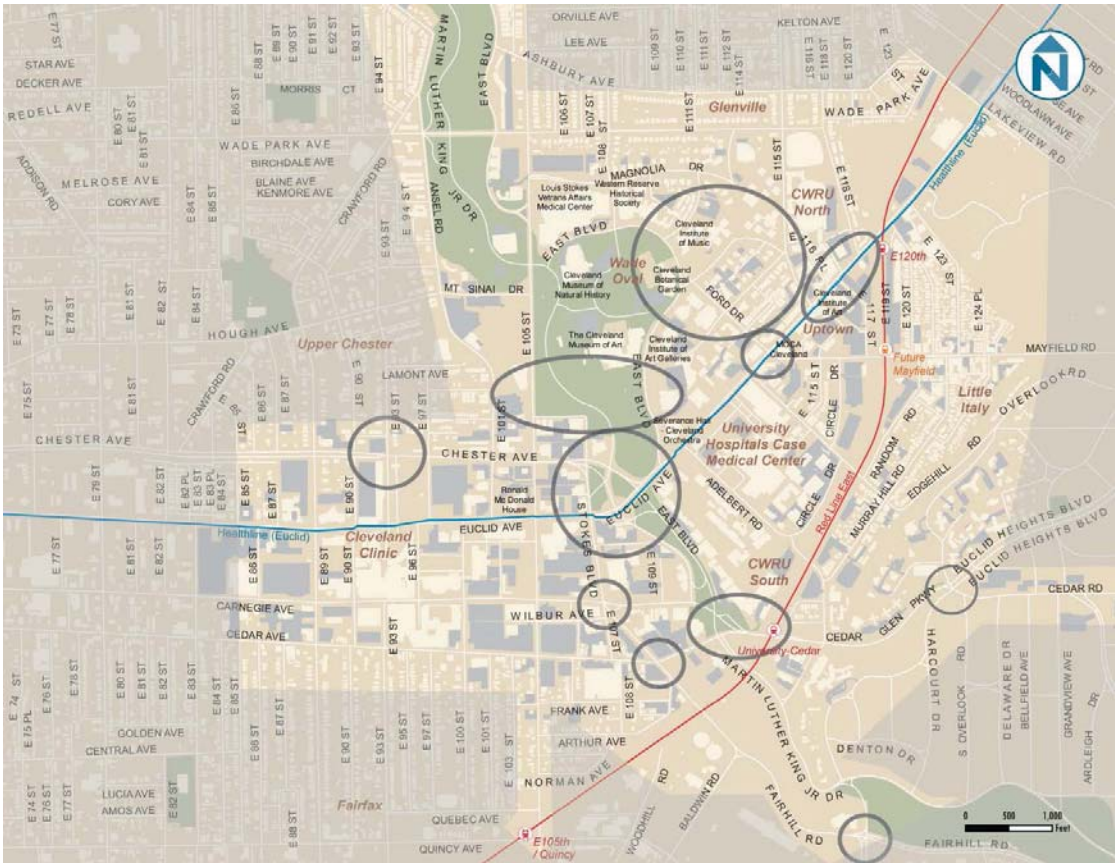
Future with Transportation Recommendations

Through the Mobility Phase of the Moving Greater University Circle study, eleven (11) focus areas were selected for site specific conceptual recommendations. These recommendations were based on field observations, traffic analysis, crash history, and public input. The focus areas are show in Figure 3. The conceptual design recommendations focus on helping University Circle to continue to grow while accommodating and encouraging travel by all modes through mobility strategies such as:

- Walking First
- Connectivity
- Bicycle Friendly
- Transit Accessible
- Safe and Reliable Auto Access
- Legible District
- Dynamic Streets
- Smart Parking
- Transportation Demand Management
- Real Estate Development

The focus areas and the associated recommendations are outlined in detail in Appendix C.

Figure 3 Map of Focus Areas



Future with Development Growth and Transportation Recommendations

This scenario evaluated the combination of changes resulting from development induced growth and the implementation of design recommendations at the eleven (11) focus areas.

Future with Development Growth, Transportation Recommendations, and TDM

The first phase of the Moving Greater University Circle Study proposed several strategies to reduce vehicle traffic through transportation demand management strategies. The final future scenario evaluated included changes in traffic based on development induced growth, transportation design recommendations, and the successful introduction of moderate programming of TDM strategies for area employers and institutions for a 10% reduction in localized vehicle traffic.

TRAFFIC ANALYSIS RESULTS

The LOS results for existing conditions include all intersections in the study area. Future condition LOS comparisons are specific to the eleven (11) focus areas of the Moving Greater University Circle study area.

Level of Service Analysis

Existing Conditions

More than half of the intersections evaluated in the study area (both signalized and unsignalized) are performing at a LOS C or better with less than 30 seconds of vehicular delay (Figure 4).

Three signalized intersections however, including Martin Luther King Jr. Drive at Carnegie Avenue, University-Cedar Station (Carnegie Ave, MLK Dr, Cedar Glen Parkway), and Carnegie Avenue at Stearns Road, have delays of more than 60 seconds during the morning peak (LOS E or above).

During the evening peak period, Cedar Glen Parkway at Ambleside Drive, and Martin Luther King Jr. Drive at Stokes Blvd/Fairhill Road also have delays of more than 60 seconds (LOS E).

In addition, certain approaches currently operate with more than 60 seconds of delay, as identified in Figure 4.

Figure 4 Existing Level Of Service Results

Street	Cross Street	AM Peak Period	PM Peak Period	Approaches at LOS E	Approaches at LOS F
Focus Areas					
Chester Avenue	93rd Street	B	B		
Euclid Avenue	Mayfield Road	C	C	Southbound Through (PM)	Southbound Through (AM)
MLK Drive	Stokes Blvd /Fairhill Drive	B	E		Eastbound Through (PM)
University Cedar Station	(MLK Dr/Cedar Glen/Chester/Carnegie)	F	D	Eastbound Through (PM)	Westbound Through, Eastbound Left (AM)
Carnegie Avenue	107th Street /Stokes Blvd	C	B		
Chester Avenue	107th Street /Stokes Blvd	A	B		
Stokes Blvd	Euclid Avenue	D	D	Westbound Left (AM)	Westbound Left (PM)
Euclid Avenue	115th Street	B	C		
Additional Locations Evaluated in the Study Area					
Euclid Avenue	Chester Ave/MLK Dr	C	C	Eastbound Left	

Street	Cross Street	AM Peak Period	PM Peak Period	Approaches at LOS E	Approaches at LOS F
				(AM)	
MLK Dr	Jeptha Dr	A	A		
MLK Dr	Chester Avenue	B	C		
Euclid Avenue	Adelbert Road	B	D	Eastbound Through (PM)	
Euclid Avenue	Cornell Rd	C	D	Westbound Left (AM)	Westbound Left (PM)
Euclid Avenue	MLK Dr	C	C	Eastbound Left (AM)	Eastbound Left (PM)
Euclid Avenue	University Hospital Dr	A	B	Northbound Left/ Westbound Left (AM and PM)	
Mayfield Road	Circle Drive	D	C		
Circle Drive	Cornell Road	C	D	Northbound Left (AM)	Southbound Through (PM)
Circle Drive	Adelbert Road	B	B		
Cedar Glen Parkway	Ambleside Drive	D	E	Westbound Through (AM)	Southbound Through (PM)
Cedar Avenue	MLK Dr	C	D		
Carnegie Avenue	Cedar Ave/ MLK Dr	F	D	Eastbound Through (PM)	Westbound Through (AM)
Carnegie Avenue	Stearns Road	E	B	Westbound Through (AM)	
Wade Park Avenue	E.105th Street	B	B		
East Boulevard	Wade Oval Drive/E.108th Street	B	B		
Chester Ave	93rd St	C	B		
Chester Ave	97th St	A	B		
Chester Ave	101st St	C	C		
Chester Ave	105th St	B	B		
Euclid Ave	89th St	C	C		
Euclid Ave	100th St	B	B		
Euclid Ave	105th St	C	D		
Carnegie Ave	86th St	C	B		
Carnegie Ave	89th St	B	C		
Carnegie Ave	100th St	B	B		
Carnegie Ave	102nd St	A	A		

Future Conditions

In order to analyze the study area network incorporating potential development growth, the existing Synchro network was built with the additional peak period trip generation and associated trip distribution. Figure 5 provides a comparison of existing conditions to the future condition scenarios evaluated which consisted of the following:

- Future with Development Growth
- Future with Transportation Recommendations (in the 11 focus areas)
- Future with Development Growth and Transportation Recommendations
- Future with Development Growth, Transportation Recommendations and TDM Strategies.

Although some locations show a decrease in Level of Service under the future scenarios compared to the existing conditions, it is important to view the context of improvements for people walking, bicycling, and riding transit as well as the improvement of safety at high crash intersections. Future TDM strategies can also help to mitigate any vehicle delay as a result of future growth and transportation design recommendations.

In the long term with the implementation of the recommended transportation design changes and the proposed development growth, improved LOS and reduced overall delay would occur at the intersections of:

- MLK Jr Blvd at Stokes Blvd and Fairhill Road (PM Peak)

An overall decrease in LOS but still at LOS D or better may result at:

- Chester Avenue at E 93rd St (PM Peak)
- Carnegie Avenue at 107th St/Stokes Blvd (PM Peak)

The two focus areas that would experience future conditions at vehicular LOS E are Stokes Blvd at Euclid Avenue and Euclid Avenue at Mayfield Road/Ford Road. Figure 5 highlights the LOS changes as well as the average seconds of delay per vehicle at the focus area intersections under the modeled scenarios.

Figure 5 Comparison of LOS Changes for Focus Areas

Intersection	High Crash Site	Existing		Future with Transportation Recommendations		Future with Development Growth (with ave. delay in secs)		Future with Development Growth and Transportation Recommendations (with ave. delay in secs)		Future with Development Growth, Transportation Recommendations, and TDM	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Chester Avenue at 93rd Street	Yes (76 in 4 yr period)	B	B	B	C	C 30.4s	B 18.5s	C 33.4s	C 31.8s	B	C
Euclid Avenue at Mayfield Road/Ford Road	Yes (27 in 4 yr period)	C	C	D	C	E 74.3s	C 25.3s	E 74.3s	C 25.3s	D	C
MLK Jr Blvd at Stokes Blvd/Fairhill Road	Not evaluated at time of study	B	E	C	D	B 19.5s	E 70.5s	C 21.3s	E 59.0s	C	D
University Cedar Station	Yes (145 in 4 yr period)	F	D	F	D	F 207.4s	E 78.1s	F 208.3s	E 78.7s	F	D
Carnegie Avenue at 107th Street/Stokes Blvd	Yes (84 in 4 yr period)	C	B	B	C	B 19.6s	C 23.1s	C 26.7s	C 26.1s	C	C
Chester Avenue at 107th/Stokes Blvd	Yes (26 in 4 yr period)	A	B	A	B	A 6.4s	B 12.9s	A 6.3s	B 12.7s	A	B
Stokes Blvd at Euclid Avenue	Yes (75 in 4 yr period)	D	D	D	D	E 58.9s	E 64.9s	E 61.6s	E 62.7s	D	E
Euclid Avenue at 115th Street	Yes (36 in 4 yr period)	B	C	B	C	B 16.7s	C 30.8s	C 20.2s	C 30.8s	B	C

Euclid Avenue Queuing Analysis

As a key transportation corridor in the University Circle study area, Euclid Avenue provides an important east-west link from University Circle to Downtown Cleveland. The building and implementation of the BRT Healthline in 2007 also included major roadway improvements and as such any proposed changes to Euclid Avenue are of particular concern to the City. In order to assess potential impacts to the Euclid Avenue corridor within the University Circle study area, Synchro was utilized to analyze the intersection queuing impacts under existing conditions, future development growth conditions and future conditions with development growth and the proposed transportation recommendations.

With the anticipated development growth along the Euclid Avenue corridor, queue lengths do extend under the future condition (with development growth) compared to the existing conditions as shown in Figure 6. Under the future condition with development growth and the proposed transportation recommendations (in the 11 focus areas), the queue lengths are very similar when compared to the future conditions with development growth only. The primary changes occur at the following intersections:

- Euclid Avenue/E 105th St – PM Eastbound Thru improved with proposed recommendations
- Euclid Avenue/Stearns Rd – PM Eastbound Thru and Westbound Thru improved with proposed recommendations
- Euclid Avenue/Stokes Blvd– PM Eastbound Thru marginally longer queues under the proposed recommendations

It is noted however, that the queuing impacts between the two future scenarios are negligible due to the main transportation recommendations not directly affecting the predominant east-west movements along the Euclid Avenue corridor. Any significant queuing impacts under the future conditions stems from the continued development growth within the University Circle area and in particular the Euclid Avenue corridor. Figure 6 does note when queuing is metered by an upstream signal and also when the queue length exceeds the available capacity of the link. Under the future conditions the area surrounding Euclid Avenue at Stearns Road, Stokes Blvd and E 105th St becomes an area for additional future analysis as it relates to signal timing due to the proximity of the intersections and the reduced capacity with the separated BRT line.

Figure 6 Comparison of Vehicular Queuing for Euclid Avenue

Intersection	Existing				Future with Development Growth				Future with Transportation Recommendations			
	AM		PM		AM		PM		AM		PM	
	EBT	WBT	EBT	WBT	EBT	WBT	EBT	WBT	EBT	WBT	EBT	WBT
Euclid Ave at 100th St	238	20	215	125	303	289	289	211	303	289	279	211
Euclid Ave at 105th St	195	172	285	237	#530	#380	#555	#493	#530	#380	#529	#468
Euclid Ave at Stokes Blvd	435	186	#498	#311	#767	314	#610	375	#767	#316	#633	375
Euclid Ave at Stearns Rd	m4	144	m45	111	m72	257	m158	73	m70	257	m123	60
Euclid Ave at MLK Dr	323	244	250	334	299	273	297	398	297	273	290	398
Euclid Ave at Adelbert Rd	358	171	457	169	473	361	#603	87	473	361	#603	87
Euclid Ave at University Hospital Dr	215	264	234	250	250	397	288	m295	250	397	288	m295
Euclid Ave at Cornell Rd	77	210	223	134	153	m247	281	193	153	m247	281	193
Euclid Ave at Mayfield Rd	104	199	247	176	157	230	305	252	157	230	305	252
Euclid Ave at E 115th St	83	178	145	136	104	225	166	178	105	230	166	178

Notes: m = Queue metered by upstream signal
= Queue length may exceed capacity

APPENDIXES

- Appendix A:
  - Data Collection Sheets
  - Crash Data
- Appendix B:
  - Projected Development Program
- Appendix C:
  - Proposed Transportation Recommendations

Appendix A Traffic Count List and Crash Data

Intersection		Date Traffic Data Collected	Crash Statistics Available
Carnegie Ave	Stokes Blvd	Sept 16 2014	Yes
Carnegie Ave	Cedar Ave/Cedar Glen Parkway	Oct 07 2014	Yes
Euclid Ave	Stokes Blvd	Sept 16 2014	Yes
Euclid Ave	Chester Ave/MLK Dr	Sept 16 2014	Yes
Martin Luther King Jr Dr	Jeptha Dr	Oct 07 2014	Yes
Martin Luther King Jr Dr	Chester Ave	Sept 23 2014	Yes
Euclid Ave	Adelbert Rd	Sept 18 2014	Yes
Euclid Ave	Cornell Rd	Sept 23 2014	Yes
Euclid Ave	Mayfield Rd	Sept 23 2014	Yes
Euclid Ave	E. 115th St	Sept 18 2014	Yes
Euclid Ave	Martin Luther King Jr Dr	Sept 16 2014	Yes
Euclid Ave	University Hospital Dr	Sept 18 2014	Yes
Mayfield Rd	Circle Dr	Sept 17 2014	Yes
Circle Dr	Cornell Rd	Sept 30 2014	Yes
Circle Dr	Adelbert Rd	Sept 30 2014	Yes
Cedar Glen Parkway	Ambleside Dr	Sept 30 2014	Yes
Stokes Blvd/Fairhill Rd	Martin Luther King Jr Dr	Oct 07 2014	Yes
Cedar Avenue	Martin Luther King Jr Dr	Oct 02 2014	Yes
Carnegie Avenue	Cedar Ave/ MLK Dr	Oct 02 2014	Yes
Carnegie Avenue	Stearns Rd	Oct 02 2014	Yes
Chester Avenue	E 107th St	Sept 24 2014	Yes
Martin Luther King Jr Dr	East Blvd (Entire Circle)	Jan 27th 2015	Yes
Wade Park Ave	E.105th Street	Oct 01 2014	Yes
East Blvd	Wade Oval Drive/E.108th St	Oct 07 2014	Yes
MLK south of the ramps to/from Wade Park Ave		Oct 07 2014	Yes
Carnegie Avenue	E 86th St	Yes	Yes
Carnegie Avenue	E 89th St	Yes	Yes
Cedar Avenue	E 86th St	Yes	Yes
Cedar Avenue	E 89th St	Yes	Yes
Cedar Avenue	E 105th St	Jun 17 2014	Yes
Cedar Avenue	E 106th St	Jun 19 2014	Yes
Chester Avenue	E 90th St	Jun 10 2014	Yes
Chester Avenue	E 93rd St	Jun 10 2014	Yes

Chester Avenue	E 97th St	Jun 05 2014	Yes
Chester Avenue	E 101st St	Jun 05 2014	Yes
Chester Avenue	E 105th St	Jun 10 2014	Yes
E 100th Street	Carnegie Ave	Oct 31 2013	Yes
E 100th Street	Cleveland Clinic	Oct 08 2013	Yes
E 100th Street	Euclid Ave	Oct 31 2013	Yes
E 100th Street	Parking Lot & Garage	Oct 10 2013	Yes
E 102nd Street	Carnegie Ave	Oct 31 2013	Yes
E 105th Street	Carnegie Ave	Oct 24 2013	Yes
E 105th Street	Cleveland Clinic Dr	Oct 24 2013	Yes
E 105th Street	Euclid Ave	Oct 24 2013	Yes
E 105th Street	Wilbur Ave	Oct 31 2013	Yes
Euclid Avenue	E 86th St	Jun 25 2014	Yes
Euclid Avenue	E 89th St	Jun 26 2014	Yes
Euclid Avenue	E 90th St	Jun 12 2014	Yes
Euclid Avenue	E 97th St	Jun 12 2014	Yes
Euclid Avenue	E 101st St	Jun 12 2014	Yes
Frank Avenue	E 105th St	Jun 18 2014	Yes
Frank Avenue	E 106th St	Jun 19 2014	Yes
Wilbur Avenue	E 105th St	Jun 18 2014	Yes
Wilbur Avenue	E 106th St	Jun 19 2014	Yes
Newton Avenue	E 101st St	Jun 05 2014	Yes

Location	*CHESTER AVE & STOKES BLVD*	*EUCLID AVE & CHESTER AVE*	*EUCLID AVE & STEARNS RD*	*STOKES BLVD & EUCLID AVE*	*EUCLID AVE & EAST BLVD*
Total Number of Collisions	45	4	70	26	45
Number of Fatal Crashes					
Number of Injury Crashes	10		14	10	8
Number of Property Damage Only Crashes	35	4	56	53	37
Collision Characteristics					
Motorists Only	44	4	69	60	44
Motorist and Bicyclist			1	1	1
Motorist and Pedestrian	1			2	
Most Common Direction of Travel	East-West	North-South	East-West	East-West	North-South
Most Common Light Conditions (proxy for Time of Day)	Daylight	Dark-Lighted (after dark street with lights	Daylight	Daylight	Daylight
Most Common Crash Type and Factors Cited	Rear-ending for following too closely	Sideswipe-Passing with Left Turning Vehicles	Sideswipe-Passing Traveling Straight	Sideswipe-Passing with improper lane change or improper turning	Rear-ending for following too closely
Pedestrian and/or Bicycle Crash Details	Driver Didn't See Pedestrian "view obstructed" - Daytime Crash		Driver Failure to Yield - Daytime Crash	Car-Bike: No Driver Errors - Daylight Car-Ped: Driver failure to yield in both instances. One at night, one daylight	Driver improper turning - after dark

Location	*Carnegie Ave & E 105th St*	*Carnegie Ave & 107th & Stokes Blvd*	*Cedar Ave & Stokes Blvd*
Total Number of Collisions	84	84	96
Number of Fatal Crashes			
Number of Injury Crashes	23	12	30
Number of Property Damage Only Crashes	61	72	66
Collision Characteristics			
Motorists Only	84	83	94
Motorist and Bicyclist			1
Motorist and Pedestrian		1	1
Most Common Direction of Travel	North-South	North-South	North-South
Most Common Light Conditions (proxy for Time of Day)	Daylight	Daylight	Daylight
Most Common Crash Type and Factors Cited	Rear-ending due to following too closely	Sideswipe with Improper Turning	Sideswipe with Improper Turning; 2nd most common (22 crashes) angled crash, 7 are red light running (7% overall)
Pedestrian and/or Bicycle Crash Details			Car-Bike: Daylight - no driver errors noted while traveling through intersection Car-Ped: Night (along lighted street) driver inattention while traveling through intersection

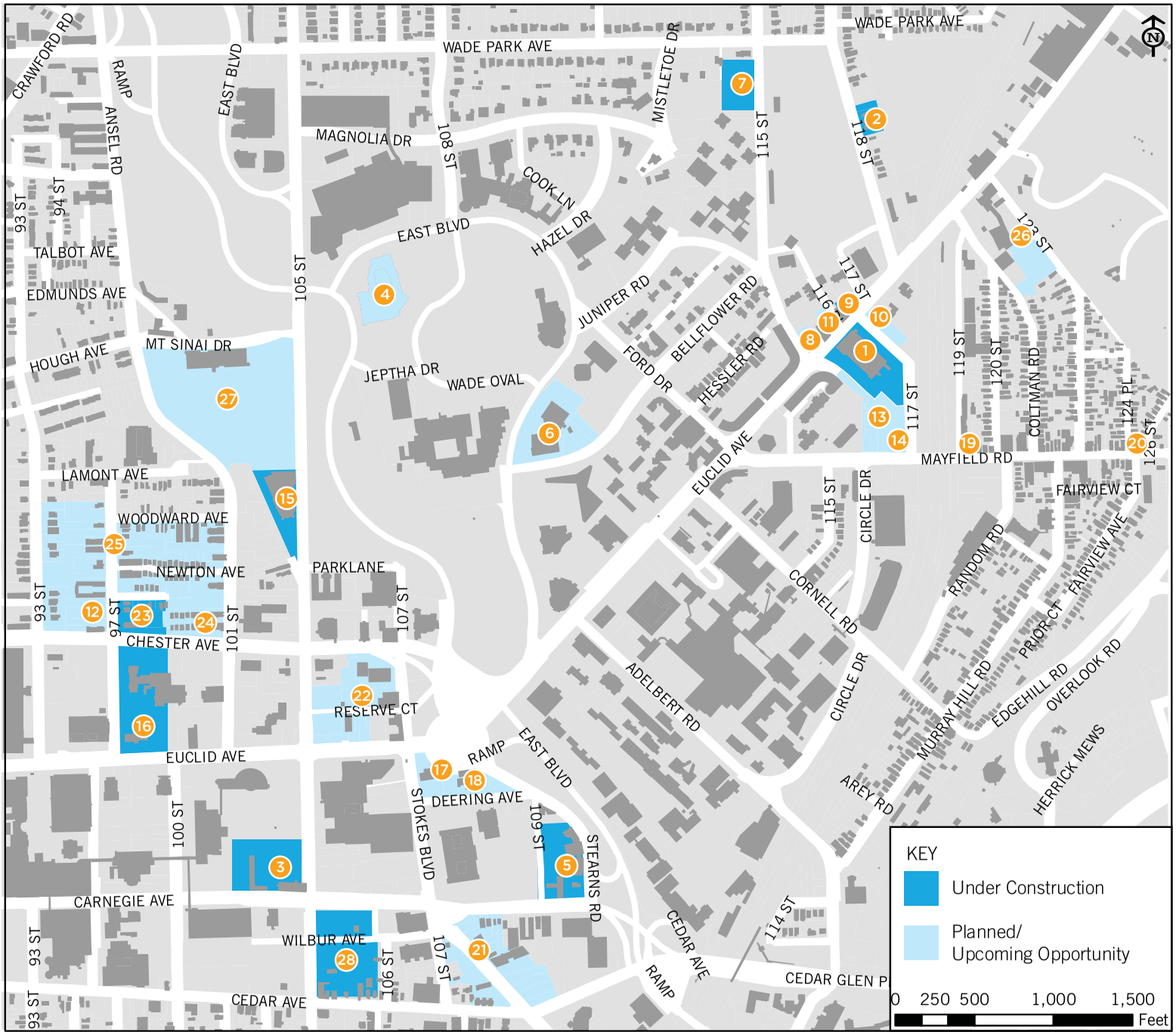
Location	*East Blvd/MLK & Carnegie*	*Cedar Ave/Cedar Glen Pkwy & MLK & Carnegie*	*Cedar Glen Pkwy btwn MLK/EastBlvd & Ambleside Dr*	*Murry Hill Rd btwn Cedar Glen & Adelbert Rd*
Overlapping Intersection Area				
Total Number of Collisions	27	47	59	12
Number of Fatal Crashes				
Number of Injury Crashes	1	14	17	4
Number of Property Damage Only Crashes	26	33	42	8
Collision Characteristics				
Motorists Only	27	47	57	12
Motorist and Bicyclist			1	
Motorist and Pedestrian			1	
Most Common Direction of Travel	East-West	East-West	East-West	North-South
Most Common Light Conditions (proxy for Time of Day)	Daylight	Daylight	Daylight	Daylight
Most Common Crash Type and Factors Cited	Rear-ending for following too closely	Rear-ending for following too closely	Rear-ending for following too closely	Rear-ending or Sideswipe passing with improper lane change
Pedestrian and/or Bicycle Crash Details			Car-Bike: Driver Inattention while turning at intersection, daylight Car-Ped: Driver failure to yield at intersection signal, at night (lighted streets).	

Location	*E 118st St & Wade Park Ave*	*Bellflower Rd & Ford Dr*
Total Number of Collisions	4	18
Number of Fatal Crashes	1	
Number of Injury Crashes	1	1
Number of Property Damage Only Crashes	2	17
Collision Characteristics		
Motorists Only	3	17
Motorist and Bicyclist	1	1
Motorist and Pedestrian		
Most Common Direction of Travel	East-West	East-West
Most Common Light Conditions (proxy for Time of Day)	Daylight	Daylight
Most Common Crash Type and Factors Cited	Hitting Fixed Objects at dusk or night	Rear ending due to following too closely - Tied with - Hitting parked cars due to other driver error
Pedestrian and/or Bicycle Crash Details	Car-Bike: noted as Property Damage Crash - Driver failure to control vehicle, daylight	Car-Bike: noted as Property Damage Crash - Driver failure to yield traveling straight through intersection, daylight
Fatality Crash Detail	Due to driver hitting fixed object in snow/nighttime conditions	

Location	*Euclid btwn Mayfield/Ford & E 115th/E 116th Sts*	*Euclid btwn E 115th & E 118th Sts*	*Euclid btwn E 118th and 120th Station/Coltman Rd*
Total Number of Collisions	27	36	47
Number of Fatal Crashes			
Number of Injury Crashes	3	15	14
Number of Property Damage Only Crashes	24	21	33
Collision Characteristics			
Motorists Only	26	34	46
Motorist and Bicyclist	1	1	1
Motorist and Pedestrian		1	
Most Common Direction of Travel	East-West	East-West	East-West
Most Common Light Conditions (proxy for Time of Day)	Daylight	Daylight	Daylight
Most Common Crash Type and Factors Cited	Rear ending due to following too closely - Tied with - Sideswipe Passing due to other driver error	Rear-ending following too closely	Rear-ending following too closely
Pedestrian and/or Bicycle Crash Details	Car-Ped: noted as Property Damage Crash - "No Driver Error" at intersection at night (streets lighted)	Car-Bike: Driver Failure to yield at intersection, daylight Car-Ped: Driver inattention (non-interesection crash), night (streets lighted)	Car-Bike: noted as Property Damage Crash - Driver failure to control vehicle along roadway, daylight

Appendix B Development Program

UNIVERSITY CIRCLE FUTURE DEVELOPMENTS



1. CIA Campus Consolidation
2. Circle118 Flats - Oval
3. CCF Cancer Center
4. CMNH Expansion
5. CMSD School of the Arts
6. 1956 CIA Gund Site
7. CWRU N Residence Hall
8. Euclid and 115 - NE
9. Euclid and 116 - NW
10. Euclid and 117 - SE
11. Euclid Tavern
12. Hough Heritage Housing (Upper Chester)
13. Intesa - Phase 1
14. Intesa - Phase 2
15. CWRU Maltz Performing Arts Center
16. New CWRU Medical Center
17. One University Circle - Phase 1
18. One University Circle - Phase 2
19. Perotti Development (Little Italy)
20. Primo Vino Development (Little Italy)
21. Stokes Corridor
22. Third District Police Station and Environs
23. Upper Chester- Innova Phase 1
24. Upper Chester- Innova Phase 2
25. Upper Chester - Future Phases
26. Visconsi Development (Little Italy)
27. CWRU West Campus
28. CCF 3,000-Space Garage

Institution	Location	Type	Change to Parking	Status	Sources
VA Medical Center	West side of E.105th St between Wade Park Ave & East Blvd	Phase 1: 800 car parking garage, two-story atrium, warehouse and laboratory, 20,000 sq ft mental health addition Phase 2: 370,000 sq ft patient care tower, a rehabilitation center for the blind Phase 3: office complex, 2,080 car parking garage, 122 bed center for homeless veterans	Phase 1: 800 car parking garage; Phase 2: 2,080 car parking garage	Completion expected in 2014	http://planning.city.cleveland.oh.us/projects/detail.php?ID=9
Cleveland Museum of Natural History	Along Wade Oval Drive	Reconfigure and add exhibit space, new 300 car parking garage to replace existing surface lot along Wade Oval Drive	New 300 car parking garage to replace existing surface lot along Wade Oval Drive	2016 – break ground 2019 – finish construction	http://www.cleveland.com/architecture/index.ssf/2014/03/the_cleveland_museum_of_natura_1.html
Case Western Reserve University	Juniper Rd between Ford Dr and Bellflower Rd	Alumni center expansion	Small net loss of existing surface parking		http://www.cleveland.com/metro/index.ssf/2013/09/case_western_reserve_universit_14.html
Case Western Reserve University	E.115th St near Wade Park Ave	16 double-occupancy townhouses on East 115th Street and 274 beds in a five-story apartment-style building		Construction to start in 2014, open in 2015	http://www.cleveland.com/metro/index.ssf/2014/03/case_western_reserve_universit_23.html
Case Western Reserve University and Cleveland Museum of Art	East Blvd at Bellflower Rd	Current CIA Buildings Will be Demolished and Site Re-Purposed In Future	TBD	Purchase agreement in place. Transfer in 2015.	http://blog.cleveland.com/architecture/2013/01/the_cleveland_institute_of_art_1.html
Case Western Reserve University	West of E.105th St to Ansel Rd south of Mt. Sinai Dr	Future Development Potential in West Quad	TBD		http://www.ideastream.org/news/feature/case_western_reserve_scales_back_west_quad_project http://case.edu/administration/cpfm/pdc/mp/proj_over_west.html
Intesa/University Circle Inc.	Corner of Mayfield and E.117th St	New mixed-use development including 200 apartments, a 700 space parking garage, office space.	700 car parking garage		http://www.cleveland.com/business/index.ssf/2014/05/intesa_project_in_university_c.html
Case Western Reserve University	Bellflower Rd btwn East Blvd & Ford Dr	Tinkham Veale University Center (89,000 gsf with large event facilities now occupied)		Opens August 24, 2014	
Case Western Reserve University	Between E.105th St & Ansel Rd south of Mt. Sinai Dr	Tilfereth Israel Renovation/Addition			http://www.cleveland.com/architecture/index.ssf/2014/03/cwru_will_soon_launch_a_59_mil.html
Cleveland Clinic	Carnegie Ave btwn E.102nd & E.105th Sts	Cancer Center Expansion (f377,000 sf)		2014 – break ground 2017 – construction completed	http://www.cleveland.com/healthfit/index.ssf/2014/08/cleveland_clinic_to_unveil_plans_today_for_new_cancer_center_all_cancer_treatment_to_be_under_one_roof.html
Cleveland Clinic	Cedar Avenue to Wilbur Avenue, between E 105th St and E 106th St	New parking structure	Building 3,000-space parking structure on land that currently holds a 500-space surface lot.	2014 – break ground 2017 – construction completed	http://www.cleveland.com/business/index.ssf/2014/08/cleveland_clinic_cancer_center.html

Institution	Location	Type	Change to Parking	Status	Sources
Cleveland Clinic	Euclid Avenue between East 93rd and East 100th Streets	New CC/CWRU Medical (500,000 sf)	714 required spaces to be provided in the proposed Wilbur/Cedar Parking Deck with other structured parking reassigned accordingly	2014/2015 – Break ground 2019 - Completed	
The Finch Group	Chester Ave btwn E.93rd & E.101st Sts	Upper Chester Mixed-Use Developments: residential apartments above first floor retail space in 6story structures; two level s of parking provided north of the buildings; a linear park along Chester Ave.	800 parking spaces	Initial wave of construction could be finished by June 2015	http://www.upperchesterliving.com/development.html http://www.cleveland.com/business/index.ssf/2014/03/the_finch_group_buys_upper_che.html
	Crawford at Wade Park Ave	Demolition and reconstruction of MLK Plaza retail center		Identified as development opportunity by the city	http://planning.city.cleveland.oh.us/dev/cpc/basemap.jsp
	Carnegie Ave at Stokes Blvd	John Hay High School renovation linking school campus to CWRU & Cleveland Clinic		Identified as development opportunity by the city	http://planning.city.cleveland.oh.us/dev/cpc/basemap.jsp
	Cedar at E.105th St	Redevelop the area to a mixed-use district incorporating institutional and research facilities with residential development including live-work spaces		Identified as development opportunity by the city	http://planning.city.cleveland.oh.us/dev/cpc/basemap.jsp
	Area south of Carnegie, east of E.105th and west of Stokes	Redevelop area for office, institutional and research facilities incorporating residential development, including live-work spaces, in locations closer to University Circle		Identified as development opportunity by the city	http://planning.city.cleveland.oh.us/dev/cpc/basemap.jsp
University Circle Inc	Euclid Ave at Stearns Rd	High-rise apartment building (25 -28 stories tall)	Expect to build on top of a parking garage, details TBD	Agreement signed; aiming for 2017 opening	http://www.cleveland.com/business/index.ssf/2014/04/developers_plan_high-rise_apar.html
	Euclid at Mayfield	Mixed-use development with 200 apartments, shops, restaurants, bookstore, grocery store	In the future, the lot on the corner of Euclid Avenue and Ford Road will be opened for retail parking, plus 100 metered spaces in the Triangle Apartments parking lot.	Under construction	
Perrotti Development	Mayfield Road and East 119th St	Proposed 17 condo building (24,000 sf)	Unknown	Unknown; plans for seeking financing in 2008 and commencing construction in 2009	http://blog.cleveland.com/architecture/2008/04/little_italy_condo_project_sho.html
Casa d'Angolo Condominiums	Mayfield Road and E. 126th St	3-unit Condo development over street level retail to replace Primo Vino restaurant	Unknown	Construction planned to begin spring 2015	http://www.cleveland.com/business/index.ssf/2014/06/condominium_project_will_repla.html
Golden Bowl Site	Mayfield Road and E.123rd Street	Vacant Site Could be mixed use site	Unknown	Looking for Developer	LIRC
	Woodhill Supply Site, E 123rd St between Mayfield Rd and Euclid Ave	192 Market Rate Apartments	Unknown	Going through the approval process. Hoping to break ground first part of 2015	LIRC

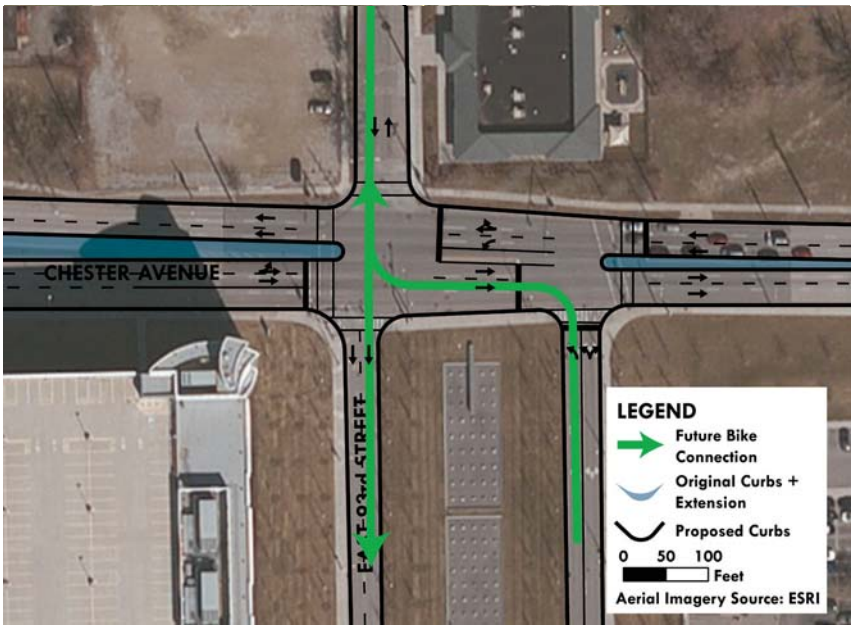
Institution	Location	Type	Change to Parking	Status	Sources
Case Western Reserve University	Lincoln Storage Building, 11201 Cedar Avenue	Think[box] - 55,000 gsf center for innovation, invention and collaboration in renovated Lincoln Storage Building	Unknown	Cosntruction to begin in 2014.	Email
Linsalata Alumni Center		Linsalata Alumni Center - 8,000 gsf event space addition to existing center.	Unknown		Email
Case Western Reserve University	North Residence Village	Residence hall - 123,230 sf new conscturction	Unknown	Scheduled for completion at start of 2015-2016 AY.	Email
Case Western Reserve University	E 118th St, north end of CWRU football field	Wyant Athletic and Wellness Center - 23,960 GSF new construction	Unknown	Scheduled for completion in fall or winter 2014	Email
Case Western Reserve University	1855 Ansel Rd	Maltz Performing Arts Center - Expand and renovate Temple-Tifereth Israel into performing arts center	Unknown		Email

Appendix C Focus Areas

CHESTER AVENUE AT E. 93RD STREET

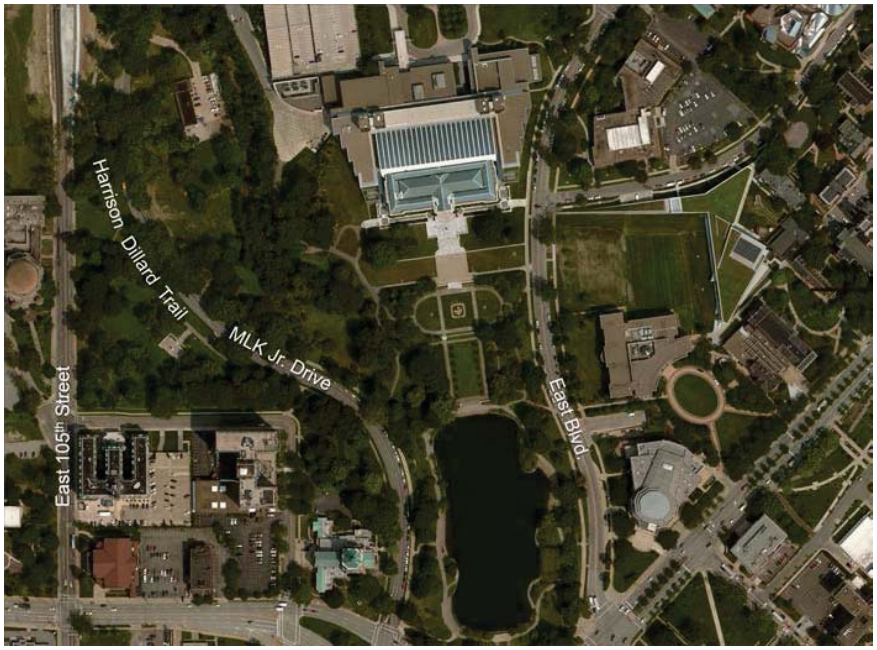
Existing

Proposed

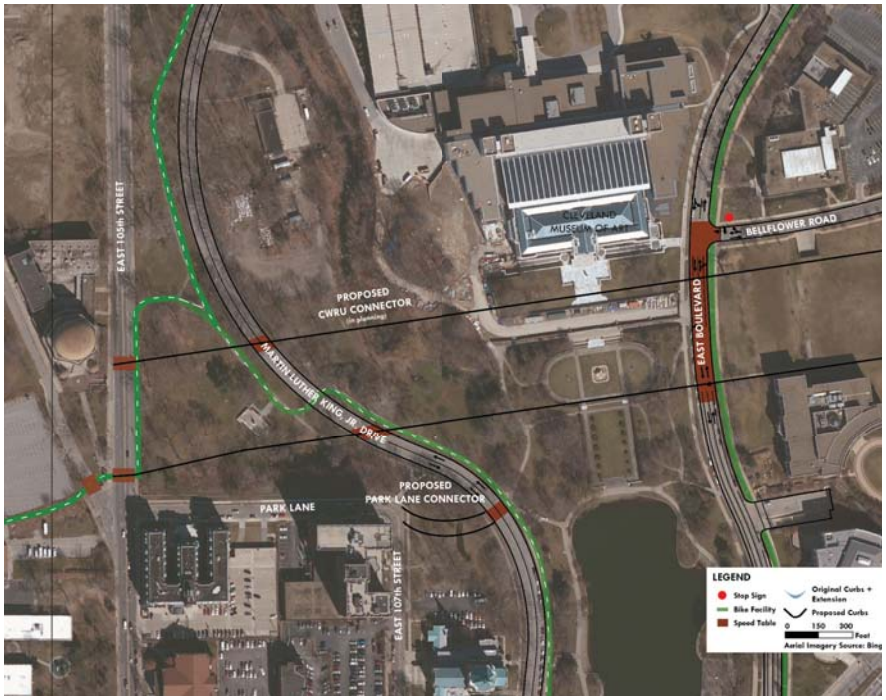


SOUTH WADE PARK

Existing



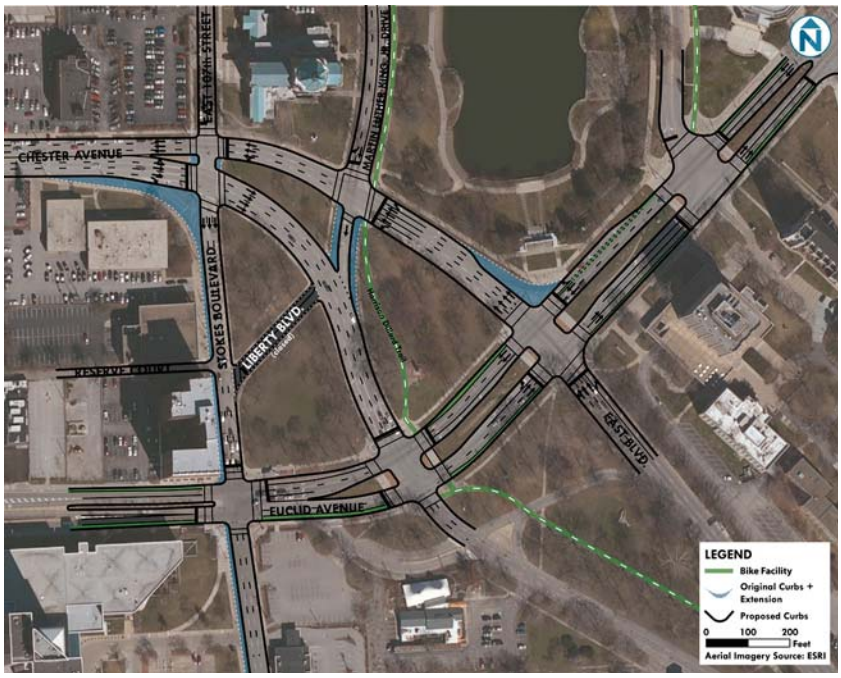
Proposed



EUCLID, CHESTER, STOKES

Existing

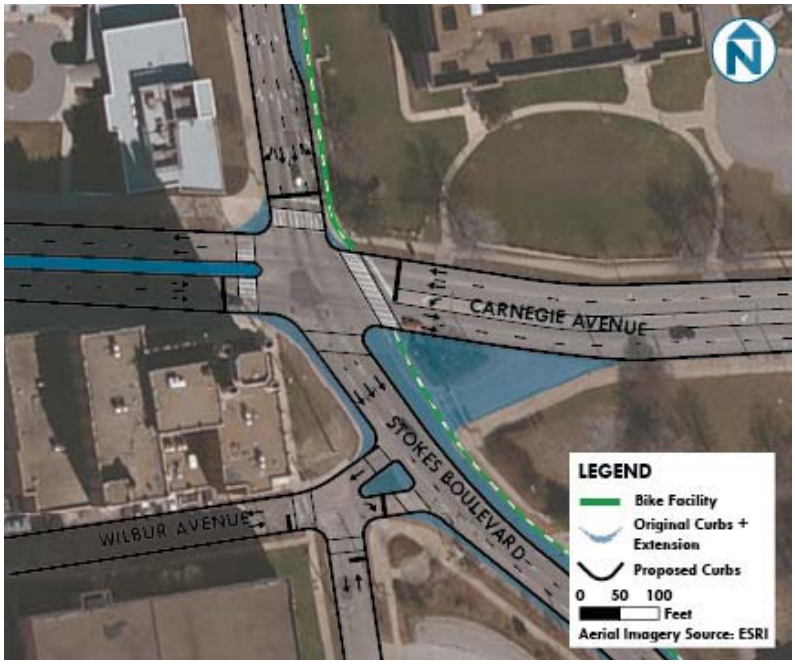
Proposed



E. 107TH STREET & CARNEGIE AVENUE

Existing

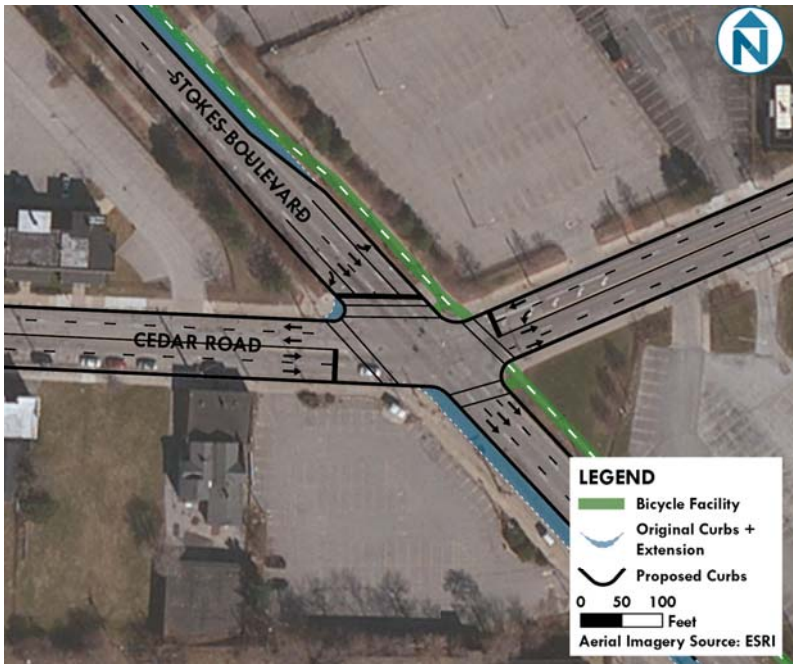
Proposed



STOKES BOULEVARD & CEDAR AVENUE

Existing

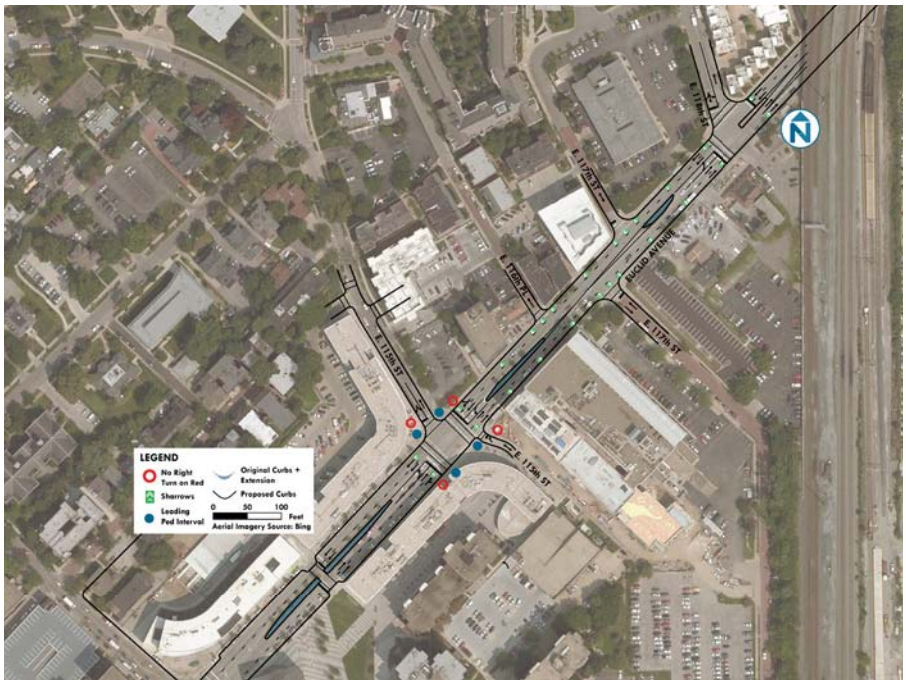
Proposed



EUCLID AVENUE UPTOWN

Existing

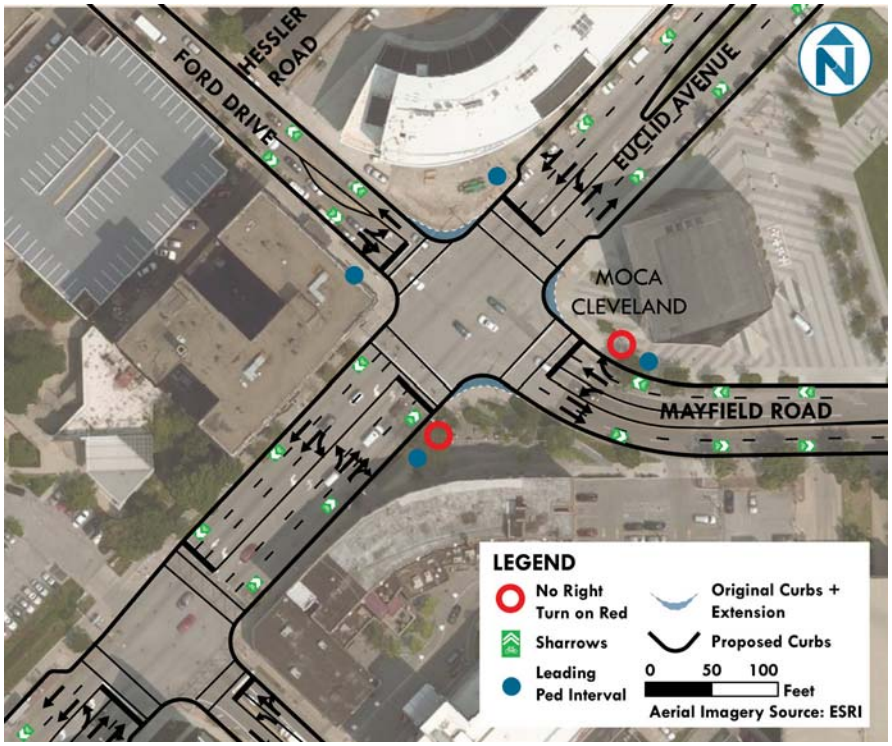
Proposed



EUCLID AVENUE & FORD/MAYFIELD ROADS

Existing

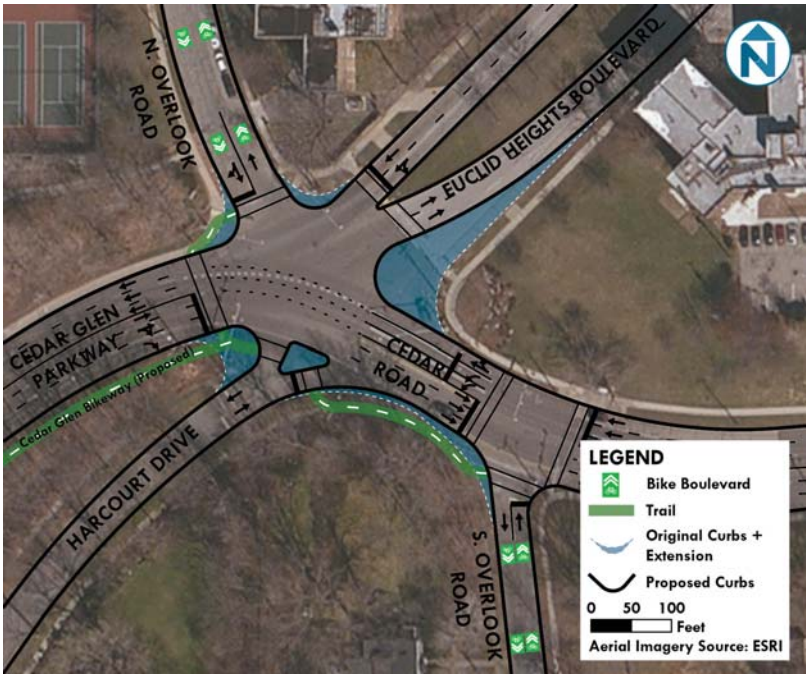
Proposed



EUCLID HEIGHTS BOULEVARD & CEDAR ROAD

Existing

Proposed



MEMORANDUM

To: Chris Bongorno, UCI

From: Nelson\Nygaard Project Team

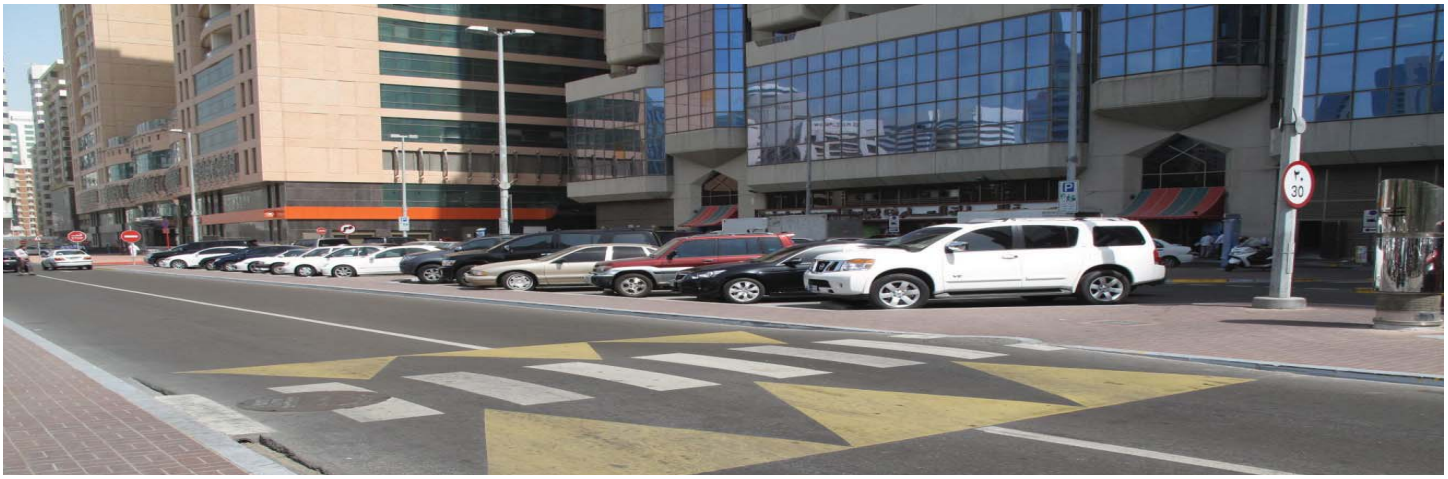
Date: April 29, 2015

Subject: Speed Tables

WHAT ARE SPEED TABLES?

Speed tables are raised (or vertical) sections of roadway that are similar to speed humps and speed bumps in height, but have a flat top that is typically long enough for the entire wheelbase of a car to rest on its top. The speed table has become increasingly popular throughout the world as a self-enforcing method of controlling traffic speeds and traffic volume while simultaneously improving pedestrian safety.

Speed tables are generally used on local, residential, or neighborhood streets with posted speed limits between 25-35 mph. At its highest point the maximum height of a standard speed table is approximately 3-3.5 inches. Its length, in total, is approximately 22 feet in the direction of traffic, with 10 feet devoted to the flat top area, and 6 feet to each the sloped approaches. The table will generally take up the entire width of the street, but can be adjusted for drainage if needed[1].



1 Parkhill, Margaret, Rudolph Sooklall, and Geni Bahar. "Updated guidelines for the design and application of speed humps." In ITE 2007 Annual Meeting and Exhibit. Pittsburgh PA. 2007.

WHAT DO THEY DO?

Speed tables are designed to encourage drivers to travel at a consistent, appropriate speed without requiring stopping or significantly reducing speed to traverse them. This also helps to eliminate, or reduce, the dangerous practice of rapid acceleration between braking periods that sometimes accompanies speed humps, speed bumps, or series' of stop signs. Depending on the spacing between tables, vehicle operating speeds generally range from 25-30 mph.

Table 1 Typical Operating-Speed Range of Streets with Speed Tables

	Typical Operating-Speed Range (mph)
Institute of Transportation Engineers	25-27
Boston Complete Streets Guidelines	25-30
Huntsville, Alabama	22-27
Los Angeles County, California	25-30
Pennsylvania Traffic Calming Handbook	25-30

WHERE DO THEY GO?

Speed tables are typically used on local and collector streets, or main streets. They are generally not recommended for use on major arterials, highways, or other main roadways. Speed tables are typically installed at various points between intersections, but can also be used at pedestrian crossings to create a raised crosswalk or, less commonly, at intersections to create raised intersections. When paired with crosswalks or intersections the flat top of speed tables is often made of high quality materials (such as bricks or pavers), patterned materials, or distinctive painting. They can be especially effective when paired with other traffic calming measures such as curb extensions, on-street parking, and street trees.

WHEN SHOULD SPEED TABLES BE USED?

Speed tables are used to address unacceptable speeds and/or excessive cut-through traffic on neighborhood streets[2]. They will provide nearly the same speed and traffic volume reduction benefits of the speed hump while providing a more comfortable driving experience (especially appropriate in residential or cultural districts), and less wear and tear on vehicles. The table is also a more appropriate option than speed humps for bus routes and emergency vehicle routes, as they cause less disruption to large vehicles such as fire trucks, ambulances, and school buses.

Streets meeting the following conditions are appropriate for speed tables[3]:

- 85th percentile speed is equal to or greater than 30 mph
- Street is not a local or through truck route
- Street is not an emergency vehicle route or snow emergency route

2 Ewing, Reid. "Traffic calming in the United States: are we following Europe's lead." Urban Design International 13, no. 2 (2008): 90-104.

3 "Traffic Calming Design Guidelines," NYC DOT, accessed April 28, 2015, http://www.nyc.gov/html/dot/html/pedestrians/streetdesignmanual.shtml

- Street does not have a fire department station or hospital emergency entrance on the block
- Street has only one lane in each direction (or one lane total for a one way street)
- Street is not wider than 50 feet, and if wider than 45 feet has clear markings establishing one moving lane in each direction
- Street does not have a grade of more than 8%

On streets containing a school, speeding need not be a priority when considering whether to install speed tables.

OTHER CONSIDERATIONS

Maintenance Costs

Speed tables, on average, cost approximately $2,500, but can vary significantly in price depending on the types of materials used. The approximate low end of the cost scale is about $1,000, while the high end of the scale is approximately $6,900. Accordingly, the costs of maintaining speed tables can also vary greatly depending on the materials.

Emergency Responders

Vertical traffic-calming measures (speed tables, humps, and bumps, etc.) can lead to an increase in the response time of emergency vehicles[4]. This, in turn, can lead to opposition of vertical traffic-calming measures from emergency responders, and traffic officials, and even residents, particularly when the measures are being proposed on primary emergency routes. However, because speed tables are less disruptive than other vertical measures they are generally perceived more favorably by emergency responders and are less likely to be met with opposition.

Snow Removal

As with any vertical traffic calming measure, speed tables may require some extra planning and labor in the event of snow. Because of their extended length and gentler slopes, however, the impact of speed tables on snow removal and associated costs is minimal. Plowing operators should always be made aware of the existence of speed tables, but the gentle slope of a typical speed table will allow most plows to traverse over them without incident. Communities in areas with frequent winter weather events could also consider installing rubber speed tables which can be removed and reinstalled without being destroyed.

4 Batson, S. M. "Offset Speed Tables for Reduced Emergency Response Delay." In Intersection Safety: Achieving Solutions Through Partnerships. 2004.

CASE STUDY

Boca Raton, Florida

In the late 1990's the city of Boca Raton, Florida, developed a neighborhood traffic calming program in response to the needs and demands of local residents who had become increasingly concerned about the volume and speed of traffic on neighborhood streets. To save on costs associated with more expensive traffic calming measures, and eliminate the need for expensive and time consuming design work, the city decided to exclusively use "enhanced" speed tables[5].

The Boca Raton "enhanced" speed table design includes a standard four inch high, ten foot long table with six foot approaches for a total length of twenty-two feet. It is also paired with a choker, which narrows the street to 18 feet, and high quality pavers for the table top. The cost of the speed tables alone (without the chokers) was approximately $1,500 per table. Combined with the chokers the cost was approximately $10,000 per table.[6]

By 2002, a study[7] of the effects of the Boca Raton speed tables showed them to be very successful at reducing average vehicle speed to appropriate levels. This included locations where the average speed at the speed tables was reduced from 31-33 mph to about 21 mph, and remained below 30 mph between 200-350 feet away from the tables. Citywide, the traffic volumes of Boca Raton have decreased 27% on average, while 85th percentile speeds have decreased 18% on average.[8]

5 Daniel, Janice, Steven Chien, and Rachel Liu. Effectiveness of Certain Design Solutions on Reducing Vehicle Speeds. No. FHWA-NJ-2005-007. New Jersey Department of Transportation, 2005.

6 "City Neighborhood Traffic Calming," City of Boca Raton, accessed April 28, 2015, http://www.myboca.us/muni/pdf/traffic/TrafficCalmingInventory2.pdf

7 Daniel, Chien, & Liu, 2005

8 "Traffic Calming – Before/After Studies," City of Boca Raton, accessed April 28, 2015, http://www.myboca.us/muni/traffic/trafficcalm.shtm

MEMORANDUM

To: University Circle, Inc

From: Nelson\Nygaard Consulting Associates, Inc.

Date: July 27, 2015

Subject: University Circle - MLK Jr. Dr/Carnegie Ave

This technical memo provides data and analysis of the traffic impacts of the proposed MLK Jr. Dr/ Carnegie Ave. roadway modifications recommended within the Moving Greater University Circle Transportation & Mobility Study. This memo describes the proposed recommendation, articulates existing transportation conditions, and presents the projected future transportation impacts given the implementation of the roadway modifications.

EXISTING CONDITIONS

The MLK Jr. Drive/Carnegie Avenue intersection recently underwent configuration changes as a result of the reconstruction of the RTA Cedar-University Station. Figure 1 shows the most recent aerial of the intersection, which has undergone some changes through the construction, but the roadway lane configurations are the same. To document existing transportation patterns, vehicle, pedestrian, and bicycle turning movement counts (TMC's) were utilized from the *Moving Greater University Circle Transportation & Mobility Study*. These counts were undertaken in the fall of 2014 and included heavy vehicles, buses, cars, pedestrians and bicyclists. Updated traffic turning movement counts were undertaken on April 28th at MLK Jr. Drive/Cedar Avenue/Carnegie Avenue to account for construction projects that were recently completed.

To assess existing traffic operations at intersections, turning movement counts and volumes were compiled and evaluated utilizing the procedures outlined by the 2010 Highway Capacity Manual (HCM) through the Synchro modeling software. The MLK Jr. Dr/Carnegie Ave. intersection was analyzed for level-of-service (LOS), reporting the vehicular delay with a letter grade A to F, volume to capacity ratio (V/C), the average vehicle stop time delay in seconds and the 95th percentile queue lengths.

A summary chart of the results of the existing traffic capacity analysis for weekday peak hours is

presented in Table 1 and shows that the overall intersection level of service is LOS E in the morning peak hour and LOS D in the afternoon peak hour. The intersection capacity analysis worksheets are provided in the Appendix of this memo.

Figure 1 Existing Roadway Configuration

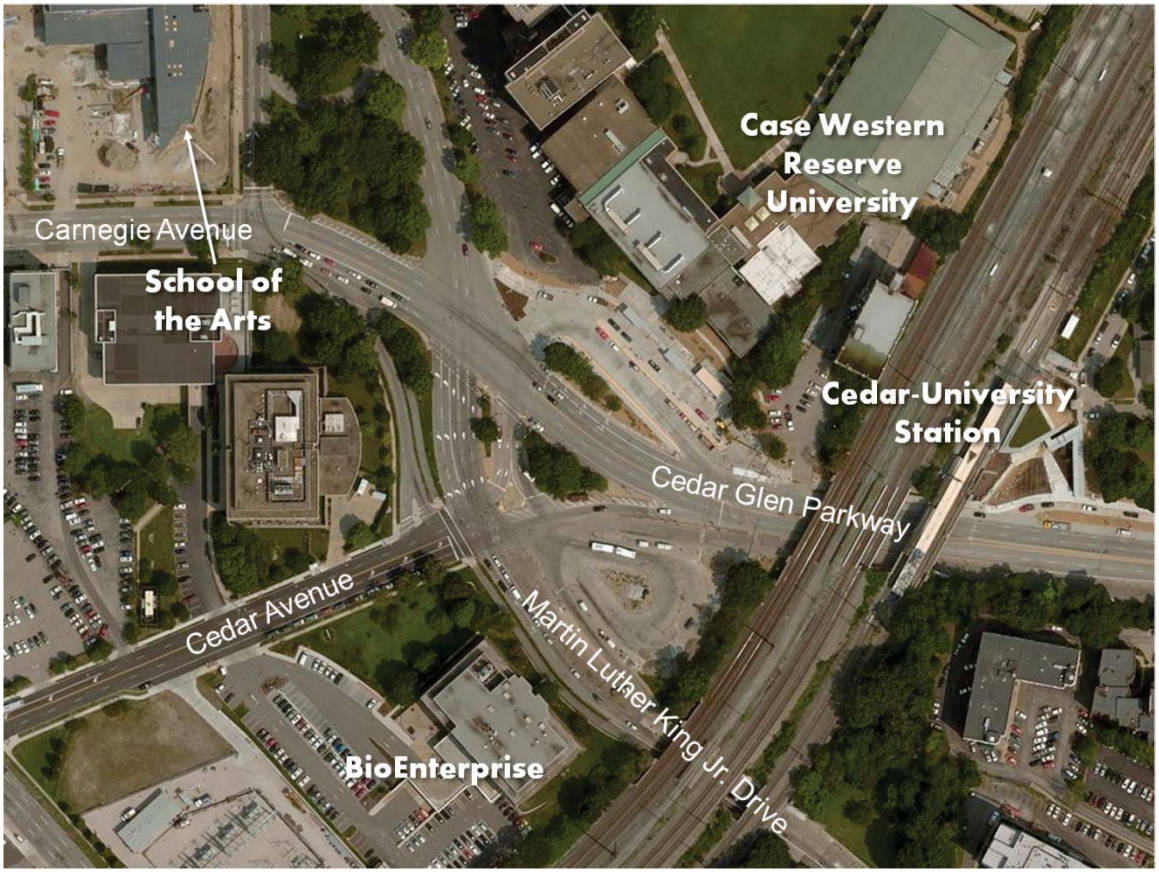


Table 1 Existing Intersection Level of Service

Intersection	Movement	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Queue(ft) 95th %	LOS	Delay	V/C	Queue(ft) 95th %
MLK Jr. Dr./ Carnegie Ave.									
	EB	C	30.6	1.02	135	E	78.9	1.05	813
	WB	D	50.4	1.09	936	A	5.9	0.59	25
	NB	F	104.2	1.10	530	C	29.9	0.45	224
	Intersection	E	72.2	1.10	-	D	45.1	1.05	-

FUTURE CONDITIONS AND RECOMMENDATIONS

The Moving Greater University Circle Transportation & Mobility Study, which included public feedback and field observations, found that pedestrians (particularly students from the John Hay High School) were crossing the northern leg of the MLK Jr. Dr/Carnegie Ave intersection, despite the lack of a crosswalk. This crossing movement is the desire line from the northern sidewalk of Carnegie Ave. to the RTA station and is heavy during the morning peak and at the beginning of the afternoon peak. The alternative crossing movement involves crossing five roadways which is significantly longer in both distance (625-ft vs. 475-ft) and time (5 pedestrian crossings vs. 2 pedestrian crossings). With the fall 2015 opening of the School of Arts at the corner of Stearns Rd and Carnegie Ave, the demand for a northern crossing across MLK Jr. Dr will continue to increase. See figures 2-5 for images of this movement.

Figure 2 Pedestrian Desire Line vs. Existing Route

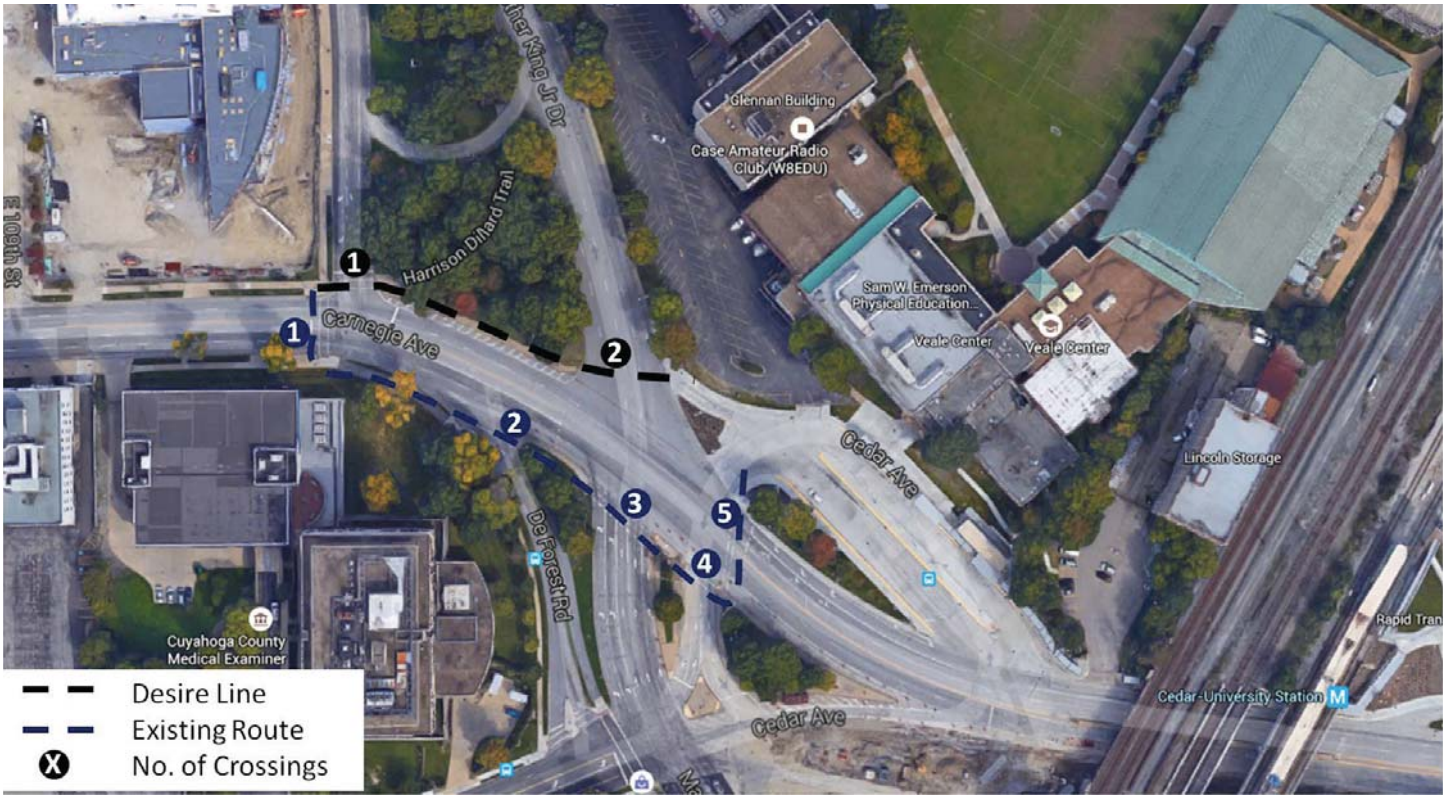


Figure 3 Pedestrians Crossing MLK Jr. Dr

Figure 4 Pedestrians Crossing MLK Jr. Dr

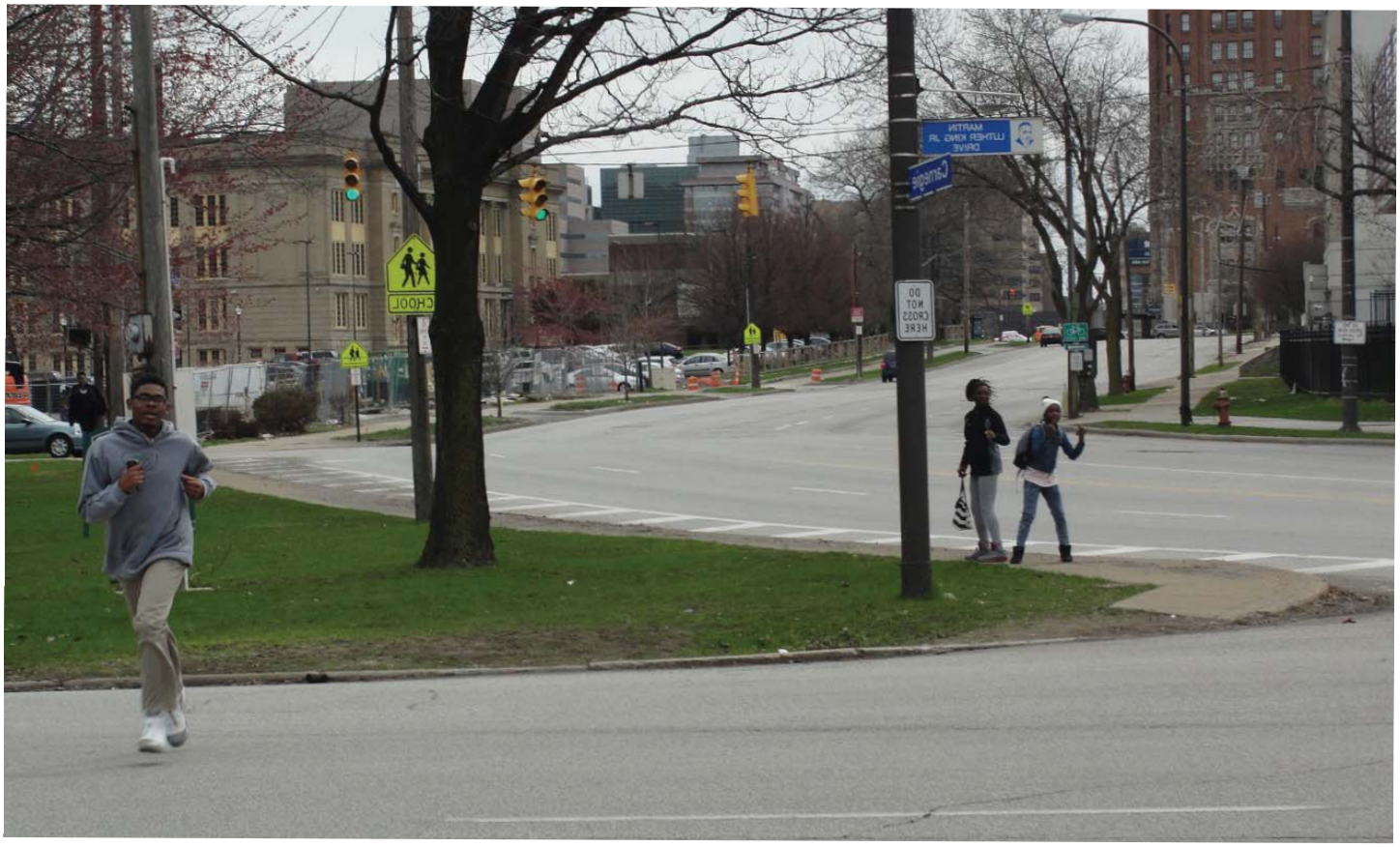


Figure 5 Pedestrians Crossing MLK Jr. Dr

In order to facilitate a safe and convenient crossing across MLK Jr. Dr, a number of recommendations are proposed within the intersection as outlined below.

- Install northern crosswalk across MLK Jr. Dr. with signal phase
- Narrow MLK Jr. Dr. northern leg from four (4) to three (3) receiving lanes. The existing fourth lane is superfluous as none of the approaches supply four lanes.
- MLK Jr. Dr southern approach remains three thru lanes
- Change Carnegie Ave. westbound lane configuration to two thru lanes and one right-turn lane (from a thru lane, a thru/right lane and a right lane)
- Optimization of signal phasing.

To assess the potential impacts of the proposed recommendations the intersection was analyzed for level-of-service (LOS), reporting the vehicular delay with a letter grade A to F, volume to capacity ratio (V/C), the average vehicle stop time delay in seconds and the 95th percentile queue lengths.

The results of the existing traffic capacity analysis for weekday peak hours with the proposed recommendations are presented in Table 2. The intersection capacity analysis worksheets and projected traffic volumes are provided in the Appendix of this memo. As shown in Table 3, the levels of service remain the same for all approaches and for the intersection overall. The queue lengths either improve or remain constant in all but one case, which worsens only slightly. V/C either decreases or remains the same in all cases.

Table 2 Proposed Recommendations under Existing Traffic Volumes

Intersection	Movement	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Queue(ft) 95th %	LOS	Delay	V/C	Queue(ft) 95th %
MLK Jr. Dr./ Carnegie Ave.									
	EB	C	33.3	0.95	120	E	78.9	1.05	813
	WB	D	49.2	1.02	788	A	4.3	0.54	14
	NB	F	111.0	0.87	560	C	29.9	0.45	224
	Intersection	E	74.9	1.02	-	D	44.6	1.05	-

Table 3 Level of Service Summary

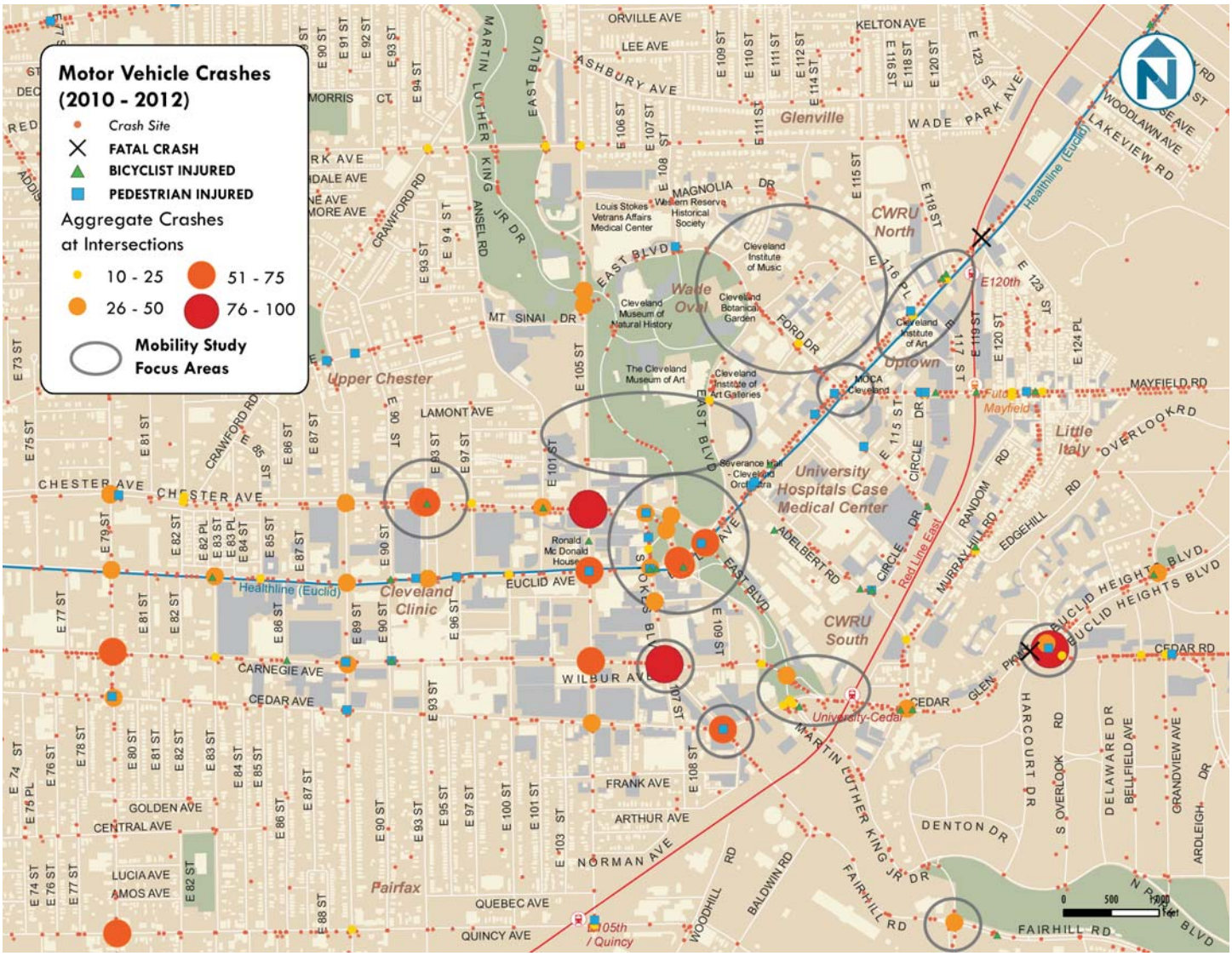
Intersection	AM Peak Hour LOS		PM Peak Hour LOS	
	Existing	Existing with Recommendations	Existing	Existing with Recommendations
MLK Jr. Dr./ Carnegie Ave.				
- EB	C	C	E	E
- WB	D	D	A	A
- NB	F	F	C	C
- Overall	E	E	D	D

NEXT STEPS

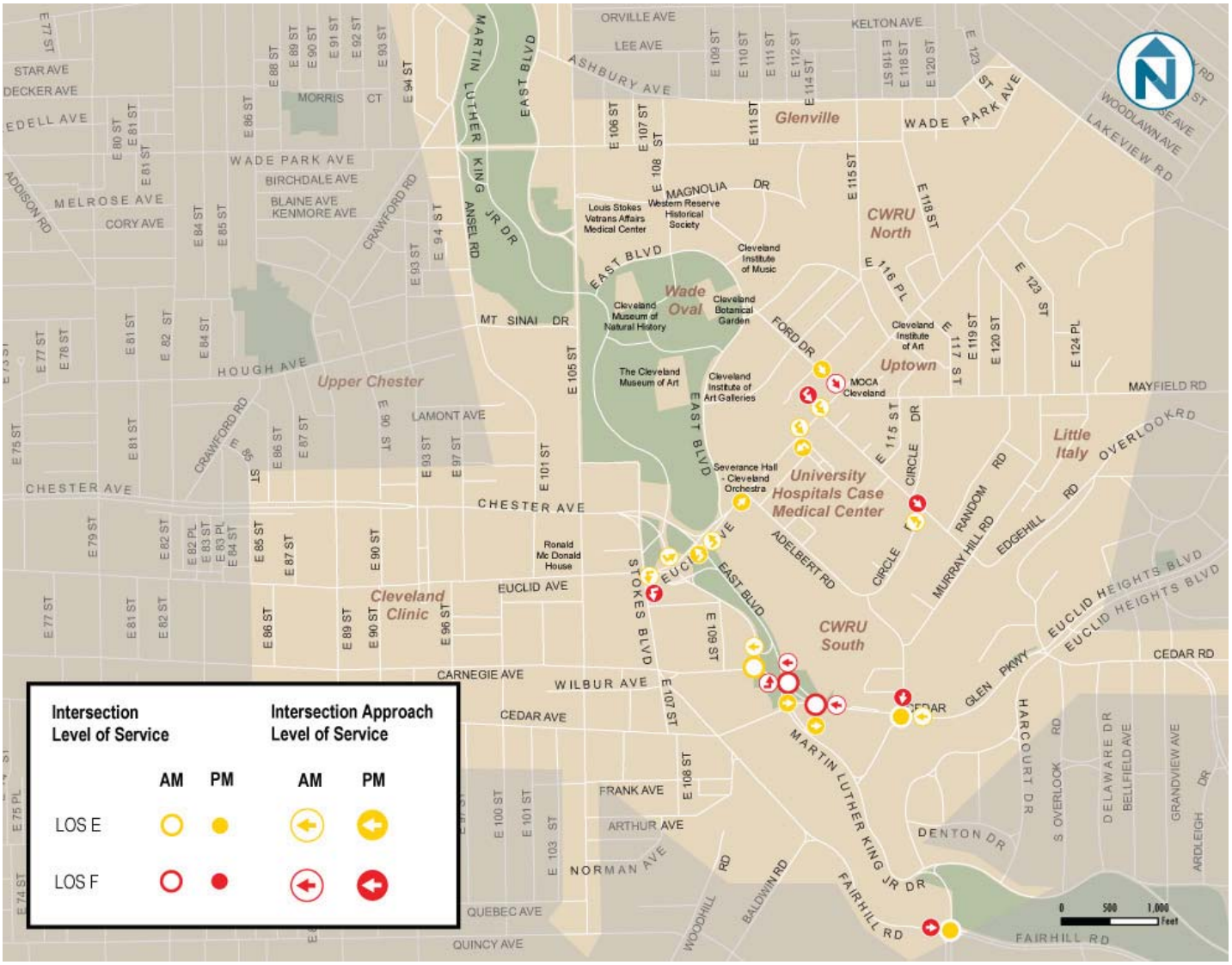
With the proposed recommendation of providing a northern crosswalk and reducing the MLK Jr. Drive receiving lanes to 3 lanes (from 4 lanes), the next steps would be to undertake a demonstration pilot. While the analysis shows that the recommendations would have minimal impacts on the existing conditions a pilot demonstration could be achieved with low cost and without permanent installation in order for the City to monitor the impacts on the intersection and network as a whole. Monitoring of the changes would include before and after observations incorporating pedestrian usage and compliance, vehicle queue lengths and vehicle compliance.

The pilot installation would require temporary pedestrian signals, crosswalk markings, lane reduction markings with temporary barrier, advance warning signage and intersection signal timing modifications. An initial cost estimate would be approximately $15,000-$20,000 but would be detailed further based upon the City's requirements.

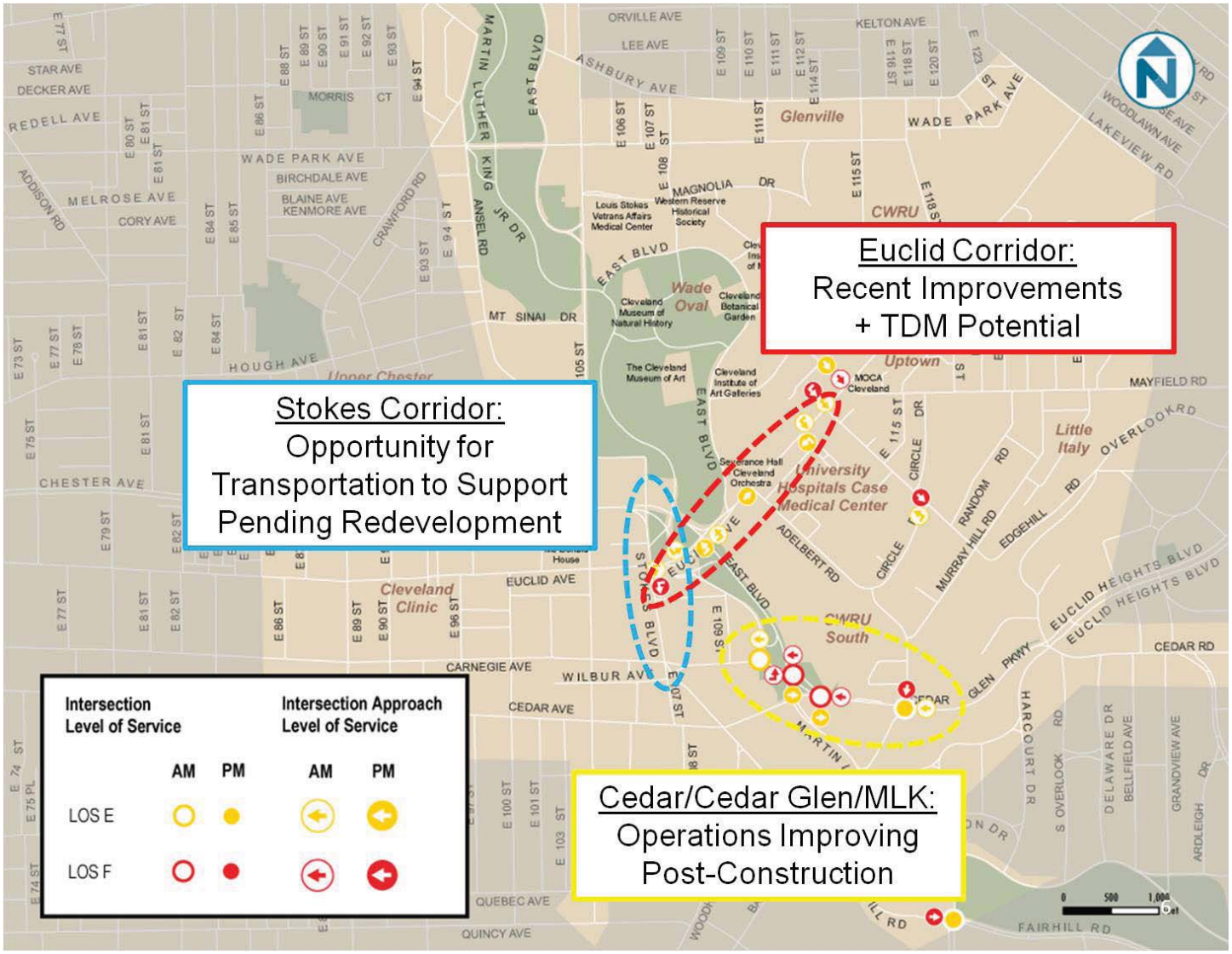
Appendix: Crash Map



Appendix: LOS Map



Appendix: Corridor Map



Appendix: Capital Cost Estimates

Intersection		Planning Level Cost Estimate
MLK Cedar University Station	$	477,926.41
Chester Ave at E.93rd St	$	97,704.53
South Wade Park	$	13,579.83
Chester Ave, Euclid Ave, Stokes Blvd/E 107th	$	112,411.86
Carnegie Ave at Stokes Blvd	$	60,271.53
Stokes Blvd at Cedar Ave	$	93,271.53
Euclid Heights Blvd at Cedar Glen Parkway	$	113,957.58
MLK Blvd at Fairhill Rd	$	90,958.23
Euclid Ave at Mayfield Rd	$	60,284.81
CWRU North Campus	$	110,003.03
Euclid Ave Uptown	$	17,375.24
Total	**$**	**1,247,744.57**

Planning Ranges	
< $50,000	Euclid Ave Uptown South Wade Park
$50,000 - $100,000	Chester Ave at E.93rd St Carnegie Ave at Stokes Blvd Stokes Blvd at Cedar Ave MLK Blvd at Fairhill Rd Euclid Ave at Mayfield Rd
$100,000 - $150,000	CWRU North Campus Euclid Heights Blvd at Cedar Glen Parkway Chester Ave, Euclid Ave, Stokes Blvd/E 107th
>$150,000	MLK Cedar University Station

Intersection	Item	Unit Price	Unit	Amount	Cost		Source
MLK Jr. Dr at Carnegie Ave							
MLK Jr. Dr at Carnegie Ave	new ramps	$ 1,100.00	Ramp	2	$ 2,200.00		
	4" thermoplastic marking	$ 0.98	Linear foot	150	$ 147.00		
	6" thermoplastic marking	$ 2.00	Linear foot	150	$ 300.00		
	12" thermoplastic marking	$ 3.93	Linear foot	150	$ 589.50		
	Signage	$ 200.00	Sign	6	$ 1,200.00		
	Pedestrian Signal Unit	$ 2,250.00	Signal	2	$ 4,500.00		
	Portable Signal Bases	$ 400.00	each	2	$ 800.00		
	Monitoring	$ 100.00		6	$ 600.00		
	Traffic Turning Movement Counts	$ 800.00		2	$ 1,600.00		
	SUBTOTAL				**$ 11,936.50**		
	erosion & sediment control			5%	$ 596.83		
	drainage & utility relocation			15%	$ 1,790.48		
	maintenance of traffic during construction			10%	$ 1,193.65		
	design contingency			25%	$ 2,984.13		
	construction mobilization			10%	$ 1,193.65		
	TOTAL				**$ 19,695.23**		

Intersection	Item	Unit Price	Unit	Amount	Cost		Source
Chester Ave at E. 93rd Sheet							
Chester Ave at E. 93rd Sheet	New ADA ramps	$ 1,100.00	Ramp	2	$ 2,200.00		
	4" thermoplastic marking	$ 0.98	Linear foot	200	$ 196.00		
	6" thermoplastic marking	$ 2.00	Linear foot	100	$ 200.00		
	12" thermoplastic marking	$ 3.93	Linear foot	50	$ 196.50		
	Signage	$ 200.00	Sign	4	$ 800.00		
	Curb extension	$ 10,000.00	Extension	3	$ 30,000.00		
	granite linear curb	$ 52.30	Linear foot	170	$ 8,891.00		
	backfill	$ 50.00	Cubic yard	250	$ 12,500.00		
	PCC sidewalk 4 inch	$ 17.00	Square yard	170	$ 2,890.00		
	sod	$ 8.82	Square yard	250	$ 2,205.00		
	SUBTOTAL				**$ 57,878.50**		
	erosion & sediment control			5%	$ 2,893.93		
	drainage & utility relocation			15%	$ 8,681.78		
	maintenance of traffic during construction			10%	$ 5,787.85		
	design contingency			25%	$ 14,469.63		
	construction mobilization			10%	$ 5,787.85		
	TOTAL				**$ 97,704.53**		

The figures on this and the following pages represent order of magnitude cost estimates for capital investments related to the recommendations in the Places section of this report. These estimates are meant to serve as a guide for implementation as one or more recommendations are pursued throughout the mobility focus areas. The estimates are based on federal Department of Transportation figures and do not include design and engineering costs. In all cases, further due diligence will be required to identify actual project costs.

Intersection	Item	Unit Price	Unit	Amount	Cost		Source
MLK Jr. Dr at Carnegie Ave							
MLK Jr. Dr at Carnegie Ave	new ramps	$ 1,100.00	Ramp	2	$ 2,200.00		
	4" thermoplastic marking	$ 0.98	Linear foot	150	$ 147.00		
	6" thermoplastic marking	$ 2.00	Linear foot	150	$ 300.00		
	12" thermoplastic marking	$ 3.93	Linear foot	150	$ 589.50		
	Signage	$ 200.00	Sign	6	$ 1,200.00		
	Pedestrian Signal Unit	$ 2,250.00	Signal	2	$ 4,500.00		
	Portable Signal Bases	$ 400.00	each	2	$ 800.00		
Stearns Road & Carnegie Avenue	new ramps	$ 1,100.00	Ramp	6	$ 6,600.00		
	4" thermoplastic marking	$ 0.98	Linear foot	170	$ 166.60		
	6" thermoplastic marking	$ 2.00	Linear foot	170	$ 340.00		
	12" thermoplastic marking	$ 3.93	Linear foot	170	$ 668.10		
	Signage	$ 200.00	Sign	6	$ 1,200.00		
	Pedestrian Signal Unit	$ 2,250.00	Signal	2	$ 4,500.00		
	Portable Signal Bases	$ 400.00	each	2	$ 800.00		
MLK Jr. Drive at Cedar Avenue	new ramps	$ 1,100.00	Ramp	10	$ 11,000.00		
	4" thermoplastic marking	$ 0.98	Linear foot	200	$ 196.00		
	6" thermoplastic marking	$ 2.00	Linear foot	200	$ 400.00		
	12" thermoplastic marking	$ 3.93	Linear foot	200	$ 786.00		
	Signage	$ 200.00	Sign	14	$ 2,800.00		
	Pedestrian Signal Unit	$ 2,250.00	Signal	2	$ 4,500.00		
	Portable Signal Bases	$ 400.00	each	2	$ 800.00		
Cedar Glen Parkway & New Bus Entrance	new ramps	$ 1,100.00	Ramp	6	$ 6,600.00		
	4" thermoplastic marking	$ 0.98	Linear foot	250	$ 245.00		
	6" thermoplastic marking	$ 2.00	Linear foot	250	$ 500.00		
	12" thermoplastic marking	$ 3.93	Linear foot	250	$ 982.50		
	Signage	$ 200.00	Sign	6	$ 1,200.00		
	Pedestrian Signal Unit	$ 2,250.00	Signal	2	$ 4,500.00		
	Portable Signal Bases	$ 400.00	each	2	$ 800.00		
Curb Extensions/Road Closure	Small curb extension	$ 10,000.00	Extension	3	$ 30,000.00		
	granite linear curb	$ 52.30	Linear foot	2050	$ 107,215.00		
	backfill	$ 50.00	Cubic yard	1708.333	$ 85,416.67		
	Remove island	$ 77.00	Linear foot	100	$ 7,700.00		
	SUBTOTAL				**$ 289,652.37**		
	erosion & sediment control			5%	$ 14,482.62		
	drainage & utility relocation			15%	$ 43,447.86		
	maintenance of traffic during construction			10%	$ 28,965.24		
	design contingency			25%	$ 72,413.09		
	construction mobilization			10%	$ 28,965.24		
	TOTAL				**$ 477,926.41**		

Intersection	Item	Unit Price	Unit	Amount	Cost		Source
South Wade Park (not including east-west connection across park)							
South Wade Park	new ramps	$ 1,100.00	Ramp	4	$ 4,400.00		
	4" thermoplastic marking	$ 0.98	Linear foot	100	$ 98.00		
	6" thermoplastic marking	$ 2.00	Linear foot	80	$ 160.00		
	12" thermoplastic marking	$ 3.93	Linear foot	40	$ 157.20		
	Signage	$ 200.00	Sign	4	$ 800.00		
	Speed Table	$ 3,500.00	each	1	$ 3,500.00		
	bike lane	$ 14,060.00	Per mile	0.25	$ 3,515.00		
	SUBTOTAL				**$ 8,230.20**		
	erosion & sediment control			5%	$ 411.51		
	drainage & utility relocation			15%	$ 1,234.53		
	maintenance of traffic during construction			10%	$ 823.02		
	design contingency			25%	$ 2,057.55		
	construction mobilization			10%	$ 823.02		
	TOTAL				**$ 13,579.83**		

Intersection	Item	Unit Price	Unit	Amount	Cost		Source
Chester, Euclid Ave, Stokes Blvd and E. 107th Street							
Chester, Euclid Ave, Stokes Blvd and E. 107th Street	new ramps	$ 1,100.00	Ramp	2	$ 2,200.00		
	4" thermoplastic marking	$ 0.98	Linear foot	300	$ 294.00		
	6" thermoplastic marking	$ 2.00	Linear foot	200	$ 400.00		
	12" thermoplastic marking	$ 3.93	Linear foot	80	$ 314.40		
	Signage	$ 200.00	Sign	6	$ 1,200.00		
	Small curb extension	$ 10,000.00	Extension	2	$ 20,000.00		
	granite linear curb	$ 52.30	Linear foot	400	$ 20,920.00		
	backfill	$ 50.00	Cubic yard	500	$ 25,000.00		
	SUBTOTAL				**$ 68,128.40**		
	erosion & sediment control			5%	$ 3,406.42		
	drainage & utility relocation			15%	$ 10,219.26		
	maintenance of traffic during construction			10%	$ 6,812.84		
	design contingency			25%	$ 17,032.10		
	construction mobilization			10%	$ 6,812.84		
	TOTAL				**$ 112,411.86**		

Intersection	Item	Unit Price	Unit	Amount	Cost		Source
Carnegie Ave at Stokes Blvd							
Carnegie Ave at Stokes Blvd	new ramps	$ 1,100.00	Ramp	2	$ 2,200.00		
	4" thermoplastic marking	$ 0.98	Linear foot	200	$ 196.00		
	6" thermoplastic marking	$ 2.00	Linear foot	100	$ 200.00		
	12" thermoplastic marking	$ 3.93	Linear foot	40	$ 157.20		
	Signage	$ 200.00	Sign	2	$ 400.00		
	Small curb extension	$ 10,000.00	Extension	1	$ 10,000.00		
	granite linear curb	$ 52.30	Linear foot	250	$ 13,075.00		
	backfill	$ 50.00	Cubic yard	250	$ 12,500.00		
	SUBTOTAL				**$ 36,528.20**		
	erosion & sediment control			5%	$ 1,826.41		
	drainage & utility relocation			15%	$ 5,479.23		
	maintenance of traffic during construction			10%	$ 3,652.82		
	design contingency			25%	$ 9,132.05		
	construction mobilization			10%	$ 3,652.82		
	TOTAL				**$ 60,271.53**		

Intersection	Item	Unit Price	Unit	Amount	Cost		Source
Cedar Ave at Stokes Blvd							
Cedar Ave at Stokes Blvd	new ramps	$ 1,100.00	Ramp	3	$ 3,300.00		
	4" thermoplastic marking	$ 0.98	Linear foot	200	$ 196.00		
	6" thermoplastic marking	$ 2.00	Linear foot	100	$ 200.00		
	12" thermoplastic marking	$ 3.93	Linear foot	40	$ 157.20		
	Signage	$ 200.00	Sign	2	$ 400.00		
	Small curb extension	$ 10,000.00	Extension	3	$ 30,000.00		
	granite linear curb	$ 52.30	Linear foot	250	$ 13,075.00		
	backfill	$ 50.00	Cubic yard	250	$ 12,500.00		
	SUBTOTAL				**$ 56,528.20**		
	erosion & sediment control			5%	$ 2,826.41		
	drainage & utility relocation			15%	$ 8,479.23		
	maintenance of traffic during construction			10%	$ 5,652.82		
	design contingency			25%	$ 14,132.05		
	construction mobilization			10%	$ 5,652.82		
	TOTAL				**$ 93,271.53**		

Intersection	Item	Unit Price	Unit	Amount	Cost		Source
Euclid Heights Blvd at Cedar Glen Pkwy and Cedar Rd							
Euclid Heights Blvd at Cedar Glen Pkwy and Cedar Rd	new ramps	$ 1,100.00	Ramp	3	$ 3,300.00		
	4" thermoplastic marking	$ 0.98	Linear foot	200	$ 196.00		
	6" thermoplastic marking	$ 2.00	Linear foot	100	$ 200.00		
	12" thermoplastic marking	$ 3.93	Linear foot	40	$ 157.20		
	Signage	$ 200.00	Sign	2	$ 400.00		
	Small curb extension	$ 10,000.00	Extension	3	$ 30,000.00		
	granite linear curb	$ 52.30	Linear foot	380	$ 19,874.00		
	backfill	$ 50.00	Cubic yard	300	$ 15,000.00		
	bike path	$ 14,060.00	Per mile	0.1	$ 1,406.00		
	sharrow markings	$ 229.00	Marking	8	$ 1,832.00		
	SUBTOTAL				**$ 69,065.20**		
	erosion & sediment control			5%	$ 3,453.26		
	drainage & utility relocation			15%	$ 10,359.78		
	maintenance of traffic during construction			10%	$ 6,906.52		
	design contingency			25%	$ 17,266.30		
	construction mobilization			10%	$ 6,906.52		
	TOTAL				**$ 113,957.58**		

Intersection	Item	Unit Price	Unit	Amount	Cost		Source
MLK Jr. and Stokes Blvd at Fairhill Road							
MLK Jr. and Stokes Blvd at Fairhill Road	new ramps	$ 1,100.00	Ramp	6	$ 6,600.00		
	4" thermoplastic marking	$ 0.98	Linear foot	300	$ 294.00		
	6" thermoplastic marking	$ 2.00	Linear foot	100	$ 200.00		
	12" thermoplastic marking	$ 3.93	Linear foot	40	$ 157.20		
	Signage	$ 200.00	Sign	6	$ 1,200.00		
	Small curb extension	$ 10,000.00	Extension	2	$ 20,000.00		
	granite linear curb	$ 52.30	Linear foot	250	$ 13,075.00		
	backfill	$ 50.00	Cubic yard	250	$ 12,500.00		
	Remove island	$ 77.00	Linear foot	100	$ 7,700.00		
	SUBTOTAL				**$ 55,126.20**		
	erosion & sediment control			5%	$ 2,756.31		
	drainage & utility relocation			15%	$ 8,268.93		
	maintenance of traffic during construction			10%	$ 5,512.62		
	design contingency			25%	$ 13,781.55		
	construction mobilization			10%	$ 5,512.62		
	TOTAL				**$ 90,958.23**		

Intersection	Item	Unit Price	Unit	Amount	Cost		Source
Euclid Ave at Mayfield Road							
Euclid Ave at Mayfield Road	No Turn on Red signage	$ 200.00	Sign	2	$ 400.00		
	Small curb extension	$ 10,000.00	Extension	3	$ 30,000.00		
	sharrow markings	$ 229.00	Marking	24	$ 5,496.00		
	Lead Pedestrian Intervals Timing	$ 200.00	Hour	2	$ 400.00		
	4" thermoplastic marking	$ 0.98	Linear foot	260	$ 254.80		
	6" thermoplastic marking	$ 2.00	Linear foot	65	$ 130.00		
	12" thermoplastic marking	$ 3.93	Linear foot	65	$ 255.45		
	SUBTOTAL				**$ 36,536.25**		
	erosion & sediment control			5%	$ 1,826.81		
	drainage & utility relocation			15%	$ 5,480.44		
	maintenance of traffic during construction			10%	$ 3,653.63		
	design contingency			25%	$ 9,134.06		
	construction mobilization			10%	$ 3,653.63		
	TOTAL				**$ 60,284.81**		

Intersection	Item	Unit Price	Unit	Amount	Cost		Source
CWRU North Campus							
CWRU North Campus	No Turn on Red, Bikeway, speed limit signage	$ 200.00	Sign	25	$ 5,000.00		
	Small curb extension	$ 10,000.00	Extension	1	$ 10,000.00		
	granite linear curb	$ 52.30	Linear foot	50	$ 2,615.00		
	remove pedestrian-actuated signals						
	Speed Table	$ 3,500.00	each	2	$ 7,000.00		
	new ramps	$ 1,100.00	Ramp	40	$ 44,000.00		
	4" thermoplastic marking	$ 0.98	Linear foot	1240	$ 1,215.20		
	6" thermoplastic marking	$ 2.00	Linear foot	310	$ 620.00		
	12" thermoplastic marking	$ 3.93	Linear foot	310	$ 1,218.30		
	SUBTOTAL				**$ 66,668.50**		
	erosion & sediment control			5%	$ 3,333.43		
	drainage & utility relocation			15%	$ 10,000.28		
	maintenance of traffic during construction			10%	$ 6,666.85		
	design contingency			25%	$ 16,667.13		
	construction mobilization			10%	$ 6,666.85		
	TOTAL				**$ 110,003.03**		

Intersection	Item	Unit Price	Unit	Amount	Cost		Source
Euclid Avenue Uptown							
Euclid Avenue Uptown	No Turn on Red, Bikeway, speed limit signage	$ 200.00	Sign	4	$ 800.00		
	add leading pedestrian interval	$ 200.00	Hour	2	$ 400.00		
	4" thermoplastic marking	$ 0.98	Linear foot	380	$ 372.40		
	6" thermoplastic marking	$ 2.00	Linear foot	95	$ 190.00		
	12" thermoplastic marking	$ 3.93	Linear foot	95	$ 373.35		
	sharrow markings	$ 229.00	Marking	25	$ 5,725.00		
	SUBTOTAL				**$ 7,060.75**		
	erosion & sediment control			5%	$ 353.04		
	drainage & utility relocation			15%	$ 1,059.11		
	maintenance of traffic during construction			10%	$ 706.08		
	design contingency			25%	$ 1,765.19		
	construction mobilization			10%	$ 706.08		
	TOTAL				**$ 17,375.24**		

Appendix: UCI Action Plan Donors

- Anonymous
- The City of Cleveland
- The George W. Codrington Charitable Trust
- The Eaton Corporation Charitable Trust
- The George Gund Foundation
- Holden Parks Trust
- Huntington National Bank
- David S. & Louise H. Ingalls Foundation
- The Fred A. Lennon Charitable Trust
- The Lubrizol Foundation
- The Jack, Joseph & Morton Mandel Philanthropic Fund Foundation
- The S. Livingston Mather Charitable Trust
- Medical Mutual of Ohio Charitable Fund
- Northeast Ohio Areawide Coordinating Agency
- PNC Bank
- Nathan & Fannye Shafran Foundation
- The Sears-Swetland Family Foundation
- Joseph and Ellen Thomas

Submitted electronically.