When to Road Diet, Roundabout or Run?

SUZANNE SCHULZ, AICP
CHRIS ZULL, PE - CHRIS IS SICK TODAY 😊
WHAT IS A COMPLETE STREET?

Streets that are “planned, designed, and constructed to provide appropriate access to all legal users in a manner that promotes safe and efficient movement of people, and goods whether by car, truck, transit, assistive device, foot or bicycle.”

~PA 135 of 2010
PA 134 OF 2010
(AMENDED PLANNING ENABLING ACT 33 OF 2008)

• Definition of “streets” expanded to include use by bicycles, pedestrians and other legal users
• Expanded elements that may be included in a master plan to include all forms of transportation
• Specified that transportation improvements be appropriate to their context
• Specified cooperation with county road commission and MDOT
WHY ALL USERS?

• 1/3rd of the population does not drive

• Aging population: 1 in 5 seniors do not drive

• Most seniors outlive their ability to drive by 7 to 10 years (AARP)

• 20% of Americans have a disability that limits their daily activities; nearly half of people 65 and older have a disability

• 1/4th of younger people do not have a driver’s license

• Annual cost of vehicle ownership is $9,282/year ($773.50/month) according to AAA
VITAL STREETS

JUST HOW BAD?
2002 60% FAIR TO GOOD
2012 60% POOR
2019 87% POOR

ONLY 8% OF OUR STREETS ARE IN GOOD CONDITION

STREETS ARE VITAL FOR

RESIDENTIAL
INCREASED PROPERTY VALUES AND BETTER MOBILITY (CARS, BIKING, WALKING AND BUSES)

SMALL BUSINESS
CUSTOMERS NEED TO SAFELY REACH RETAILERS & RESTAURANTS IN THE AREA

BIG BUSINESS
STREETS ARE VITAL FOR MOVING GOODS & PRODUCTS TO CONSUMERS

OUR GOAL 70% GOOD REPAIR

WHAT'S NEEDED?
$22 MILLION A YEAR
($294.6 MILLION OVER 15 YEARS)
**Favorite Street**

- Lake Drive
- North Monroe south of Ann
- Wealthy
- Division, Fulton/Michigan
- Lake Drive
- Lake Drive
- North Monroe
- Grandville at the RAPID
- West Fulton, Zoo to Campus
- Jefferson, Burton/Alger
- Wealthy Street

- Cherry Street
- Seward
- Plainfield, Leonard to Ann
- Commerce Street, south of Fulton
- Brick Streets – Monroe Center
- Knapp Street
- Madison, south of Hall
- Michigan, Fuller East
- Century, Hall to RAPID
- Madison/Hall
- Lake, Diamond to Robinson (Complete Street)
- Holmdene
- Scribner at Road Commission
- Fix on I-196
- Wealthy
- Lake Drive (road diet)
- 6th Street Bridge
- Plainfield
- Monroe Center
- Coit Bridge
- Monroe, north of 196
- Monroe, north of 196
- Monroe Center (Echelon Paving)
- Cherry/Diamond

**Least Favorite Street**

- Lafayette south of Fulton
- North Monroe north of Ann
- State, Madison to Jefferson
- Woodmere
- Robinson
- Michigan
- Eastern/Alger
- Carlton
- Lafayette south of Fulton
- North Monroe, Ann to North Park
- Front, Pearl south especially Fulton south
- Jefferson at Traffic Circle
- Robey Place
- Monroe/Knapp/Ann
- Plainfield, 3 Mile/Fuller
- Ottawa, north of Michigan
- Fulton and Lake Michigan/Pearl
- Fulton Street
- Pearl / 131 intersection
- Century, Hall to RAPID
- Alger/Eastern
- Bridge under U.S. 131
- Perkins
- Kalamazoo
- Woodmere NE
- Robinson Rd.
- Monroe, North Park to Knapp
- Lake/Robinson intersection
- Robinson Road, east of Lake
- Bridge at Mt. Mercy
- Wealthy, east of 131
- Wealthy bridge
- Buchanan, south of Hall
- Godfrey
- Ransom/Bostwick
Our Vision

City Streets and rights-of-way will be accessible, attractive, and safe, serving all people of our community, contributing to the livability of our neighborhoods and business districts and increasing economic opportunity to individuals, businesses, and new development.

Infrastructure assets will be maintained and well-managed, using a multi-faceted funding strategy and innovative approaches to preserve our investment.
MEASURES OF SUCCESS

City staff will collect and analyze metrics as they relate to measures of project success. In addition, the VSOC will then be charged with monitoring the results of Vital Streets investments. The VSOC shall use the following performance measures to monitor the overall health and performance of the street system and check that investments are making progress toward the Vital Streets goals. In addition, the street types established in this framework each have objectives and desired outcomes. Vital streets projects will also be evaluated on project-based metrics to ensure a continuous cycle of performance monitoring.

» TRAFFIC-RELATED SERIOUS INJURIES + FATALITIES
   It is the intent and desire of the Vital Streets program to provide safe street design and maintain the quality of infrastructure to eliminate serious injuries and fatalities on city streets (Vision Zero).
   
   - 3-year running average crashes involving pedestrians
   - 3-year running average crashes involving bicyclists
   - 3-year running average traffic-related serious injuries and fatalities
VALUES

The Vital Streets investments should advance the ambitious goals and targets established by the City of Grand Rapids. Specifically:

» **Mode Share:** Reduce single-occupant vehicle travel from a 95% drive-alone commute rate to 45% by 2035 by providing efficient transit corridors, safe walking and bicycle facilities, and smart solutions for ride-sharing to achieve a mode split of 20% transit, 12% walking, 5% biking, and 20% ridesharing.

» **Equity:** Ensure transportation options are available, affordable, and reliable for all people to meet their travel needs regardless of age, ability, race, ethnicity, or economic status.

» **Vision Zero:** Eliminate all traffic related serious injuries and fatalities on Grand Rapids city streets.

» **Health:** Promote and enable walking, bicycling and other forms of active transportation. Vital Streets should, over time, contribute to reductions in childhood and adult obesity and improve public health outcomes.

» **Age-Friendly Community:** Serve and accommodate people through their many phases of life, from an infant to student to active adult to aging senior.

» **Climate Change:** Reduce transportation related emissions by reducing Vehicle Miles Travelled (VMT) through the increased use of transit, shared vehicles, and non-motorized transportation.
PARADIGM SHIFTS
WHO ARE YOU DESIGNING FOR?
SAFETY

Facilitate safe movement along and across streets (crosswalks, access management, traffic signals, etc.) because roads have been engineered for high motor vehicle volumes and speeds; resulting in severe crashes and fatalities.
SELF-ENFORCING DESIGN

- Driving behavior is influenced by the environmental cues we get from the design of a street.
- When done correctly, it reduces the need for active police enforcement to control speed and driver behavior.

- Travel lane widths
- Turning radii
- Street edge features and activities (trees, buildings, retail storefronts)
- Intersection controls
- Number of lanes
- Line of sight
- Presence of multiple modes of transportation
- Progression speed
MOBILITY

Full array of facilities (on-street bike lanes, sidewalks, pathways, trails, transit, TDM, etc.) are desired to build redundancy into the system, find cost effective options, increase resiliency, improve public health, and reduce congestion and auto emissions.
CHARACTER

Match street design to user needs and context (includes everything in public right-of-way) because place matters and if it is well designed it will increase activity and investment.
ACCESS

Interconnected networks (destinations linked by roads, sidewalks, trails and transit) because 1/3rd of the population will lack access to jobs, education, health care, and fresh food if the transportation system is entirely auto-dependent.
MEASURES OF SUCCESS

Level of Service (LOS) doesn’t tell us:

- How vibrant an area is
- How users other than vehicles are moving
- Delay across a whole trip
- Delay to traveling *persons*
WHAT IS A ROAD DIET?

A Road Diet is not:
- A reduction in the cross section

Think of it as:
- Lane reallocation
- Lane rebalancing
- Conversion
IMPROVES SAFETY

- Road diets reduce total crashes by 18 to 44 percent
- Reduce crashes resulting in serious injury crashes reduced
- Better sight distances
- Dedicated space for left turns
- Eliminates “jockeying” cars for position and passing on the right
- Provides greater separation from traffic for pedestrians (buffers) and decreases crossing distance
- Provides space for bicycles (they are safer on the street than the sidewalk)

safety.fhwa.dot.gov/road_diets/info_guide
PROVIDES VALUE

- Cheaper than policing
- Avoids issues with 85<sup>th</sup>%tile rule
- Creates opportunities for lower cost transportation alternatives
- Lower maintenance on street edges
- Reduces damage to street trees
- Every 1 point improvement in Walkscore = $500 to $3,000 increase in housing value
- Transportation options is a key selection indicator among homebuyers
- Increases person throughput
ROUNDABOUTS
WHAT IS A ROUNDBOUT?

- A circular intersection that converts all entering movements into right turns.
- Traffic signals or stop signs are replaced by yield signs at every entrance.
- All motorists entering a roundabout must yield to the circulating traffic, who has the right-of-way.
- An approaching motorist has to wait for a safe gap to appear in the flow of traffic before entering. This yield-at-entry rule keeps traffic from locking up and allows free flow of traffic.
IMPROVES SAFETY

- Roundabouts reduce total crashes by 39%
- Reduce serious injury and fatal crashes by 90%
- Reduces vehicular travel speeds
- Provides refuge islands for pedestrians in each leg, reducing crossing distance and crossing where travel is in one direction
Reduces intersection maintenance costs (~$3-5k) due to signal removal
Reduces travel delay, which results in a decrease in fuel consumption and air pollution
Fewer travel lanes are needed than at a signalized intersection
Can contribute to place-making
LAND USE AND TRANSPORTATION

- How could this corridor be improved? Are we trying to create a place?
- How can we improve access and provide choice?
- What might the improvements look like?
- What are the tradeoffs of different alternatives?
FULLER AVENUE

Road diet: 4 to 3 lane conversion
Modal improvement: Addition of bike lanes
<table>
<thead>
<tr>
<th>Year</th>
<th>South of Leonard</th>
<th>North of Leonard</th>
<th>North of Knapp</th>
<th>North of Aberdeen</th>
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### Table 3: AM Peak Existing & Proposed Capacity Analysis by Intersection

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<th>Intersection</th>
<th>Approach</th>
<th>Existing</th>
<th>Future</th>
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<td>Fuller &amp; Leonard</td>
<td>C</td>
<td>22.8</td>
<td>C</td>
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<tr>
<td></td>
<td>C</td>
<td>24.8</td>
<td>C</td>
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<td>C</td>
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<td>Fuller &amp; Knapp</td>
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<tr>
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<td>Overall</td>
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<tr>
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<td>C</td>
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<td>5.6</td>
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<tr>
<td>Overall</td>
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<td>13.6</td>
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### Table 5: PM Peak Existing & Proposed Capacity Analysis by Intersection

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<thead>
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<th>Intersection</th>
<th>Approach</th>
<th>Existing</th>
<th>Future</th>
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<tbody>
<tr>
<td></td>
<td>LOS</td>
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</tr>
<tr>
<td>Fuller &amp; Leonard</td>
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<td>C</td>
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<tr>
<td></td>
<td>C</td>
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<tr>
<td>Overall</td>
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<td>28.7</td>
<td>E</td>
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<tr>
<td>Fuller &amp; Knapp</td>
<td>C</td>
<td>25.2</td>
<td>C</td>
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<td>C</td>
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<td>Overall</td>
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<tr>
<td>Overall</td>
<td>B</td>
<td>14.3</td>
<td>B</td>
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</tbody>
</table>
2014 RECOMMENDATION

Recommendations
The capacity analysis shows that the intersections currently operate at acceptable levels of service with existing geometry. For future analysis with the same traffic volumes and proposed geometry of a three lane cross-section, all the signalized intersections will operate at acceptable levels of service except for Fuller Avenue and Leonard Street. This intersection requires two through lanes for northbound and southbound Fuller Avenue.

recommends maintaining the geometry at the intersection of Fuller Avenue and Leonard Street as a five lane cross-section, adding shared lanes for the bicycles. Fuller Avenue could transition to the three lane cross-section with dedicated bike lanes approximately 275 feet north of Leonard Street.
ALAS….IT NEVER HAPPENED!

- Lacking support from leadership
- Public opposition
- Traffic counts rose
- Problems with Fuller and Leonard intersection
- Change too big/too much
- “Flashy” peaks due to commuter traffic
- Commuters shifted from Plainfield to Fuller
BURTON AVENUE

Road diet: 4 to 3 lane conversion
Modal improvement: Addition of bike lanes
WHY CHANGE THE STREET?

- Constant complaints about speed, requests for GRPD
- 85\textsuperscript{th}%tile rule in effect, need to repost speed limit
- Residential context
- Presence of schools, including a new middle school
- Adopted city policies recommend (Master Plan, Zoning Ordinance, Green Grand Rapids, Complete Streets Resolution, Bike Network Map, SSTF Vision)
- Reduce wear and tear on road edges
BURTON ROAD DIET: HORTON TO BRETON

Street Configuration

Four Lane - Two travel lanes in each direction
Three Lane - One travel lane in each direction, center left turn lane, and bike lanes

Construction

2012 – Horton to Plymouth
2014 - Plymouth to Concord
No Diet - Concord to Breton - Remained four lane roadway at the request of residents
2017 – Concord to Breton implemented
PUBLIC FEEDBACK

- “I am very concerned about taking away car lanes...with all the schools and churches in area, including two high schools as well as all the athletic and performance based activities happening at those high schools to take out car lanes causes more traffic jams than are already occurring.”

- “It’s very clear that your (‘your’ referring to anyone working on this project) goal is NOT safety and is NOT for the betterment of traffic flow – it’s to be able to add bike lanes. I don’t have a problem with adding bike lanes – I have a problem adding to traffic problems when there are other options for bikes.”
PUBLIC FEEDBACK

- **Safety**
  - Increase in crashes along Burton
  - Transition resulting in rear-ends at Omena
  - Concern of distracted driving from residents and GRPD
  - Vehicles driving around stopped buses
  - High travel speeds especially near schools

- **Congestion**
  - Increased delay during peak times
  - Difficult to make left turns unsignalized during peak times

- **Support**
  - Noticeably reduced speeds in three lane section
  - Suggested extending three lane section to Breton
  - Residential property owners adjacent felt safer

![Total Crashes](chart)

Total crashes increased 23.9% post road diet.
Average daily traffic on Burton Street increased 11.6% on average (2012-2016)
Crashes caused by distracted driving increased by % (from 11 to 29)
Weather-related crashes rose % (from 14 to 24)
Failure to yield rose % (from 18 to 39)

Nationally, from 2013 to 2015 total crashes increased 10.7%
  The percentage of drivers texting while driving has increased from 1.7% to 2.2% (2013-2014); 4.9% of drivers 16-24 texting while driving
  Crashes involving cell phone use while driving increased from 5% to 8% (2010-2013)
  Smart phone ownership increased from 52% to 82% (2011-2014)
  Vehicle miles traveled increased 3% (70 billion miles) (2015-2016)
RELATED CRASHES

Crashes related to four lane roadway vs. three lane roadway decreased by 8.3%

- 120 related crashes pre-road diet
- 110 related crashed post road diet

Examples of related crashes:
- Rear end
- Sideswipe between through lanes
- Vehicles passing in bike lane
- Vehicles passing in center turn lane
- Crashes occurring in center turn lane
PREVENTABLE CRASHES

- 83.5% reduction in preventable crashes overall
- 95% reduction in preventable crashes in 3-lane section
- 8 of 11 preventable after crashes occurred in 4-lane section - Concord to Breton
- Type A - Incapacitating injury crashes ↓67%
- Type B - Non-incapacitating injury crashes ↓36%
- Severe crashes ↓43% overall

Examples of preventable crashes:
- Left-turn rear end in through lane
- Sideswipe same direction between through lanes
- Left-turn struck in second through lane
SPEED

- 85\textsuperscript{th} percentile down 1 mph in 4-lane section
- 85\textsuperscript{th} percentile speed down 8-9 mph Eastern to Plymouth
  - Consistent with posted speed limit
- Speeding citations issued down 81% in 3-lane section
CONTINUED ADJUSTMENTS

- Extended Road Diet: Moved transition area to more appropriate location from Chesaning to Breton
- Added traffic signal at Chesaning to increase gaps, provide safe crossing for pedestrians
- Relocated public bus stop near a church/school
- Continued signal improvements and timing adjustments
HOW DO YOU MEASURE SUCCESS?

- Consistent with Vital Streets goals
- Total Crashes - up 23.9% (consistent with City trends)
- Related Crashes 8.3%
- Crashes prevented by 3-lane section 83.5%
- Severe crashes 43%
- 85th percentile speeds 8 mph in road diet section
- Speeding citations 81% in road diet section
DIVISION AVENUE

Road diet: 4 and 5 lane conversion to 3 lanes
Modal improvement: separated bicycle facility, buffered sidewalk, signalized crossing
NORTH DIVISION ROAD DIET

- Converted Division Avenue from a 5– and 4– lane road to a 3–lane road from Michigan Street to Wealthy Street
- Low cost pilot project. Repainted travel lanes and adjusting traffic signal timings
- Mostly commercial and institutional uses (13,000-15,000 cars/day)
- Carries local and through traffic (commuter route)
- Pedestrian traffic can be significant, particularly near colleges
- No physical changes to the street geometry (“It’s just paint!”)
- City has taken back jurisdiction from MDOT
WHY CHANGE THE STREET?

- Enhance overall quality of life along the corridor
- Limited sidewalk width/lacking buffer for pedestrians
- Reduce vehicle speeds
- Accommodate bicycles (N-S routes limited)
- Increase on-street parking
- Reduce crashes
- Support business growth and vitality
- Adopted city policies recommend
ANALYSIS PROCESS

Before
- 3 years (provides good sense of average operations)
  - Crash history
  - Traffic operations
  - Travel times

After
- 1 year
  - User experience
  - Person trips
  - Quality of life measures
  - Public feedback
### STUDY SUMMARY

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>More car parking spaces</td>
<td>Increased delay for cars</td>
</tr>
<tr>
<td>Decreased vehicle speeds (-1 mph to -4 mph)</td>
<td>Longer car queues (i.e. Northbound increased from 81 ft before to 180 feet after road diet – PM)</td>
</tr>
<tr>
<td>Improved bicycle facilities (Bike Lanes / Sharrows)</td>
<td>Longer car travel times (average increase of 19 to 52 seconds through corridor)</td>
</tr>
<tr>
<td>Reduction in certain crashes head on left “turn” (-114 %), angle (-17 %), and sideswipe crashes (-20 %)</td>
<td>Increase crash total in 1 year (83 before and 125 after)</td>
</tr>
<tr>
<td>Increased pedestrian flow (19% overall) (+13 % PM, +57 % off peak, and -14 % AM)</td>
<td>Increased exhaust emissions (+19.8 % AM, +1.1 % off peak, and -5.3 % PM)</td>
</tr>
<tr>
<td>Decreased car volumes (traffic perspective) (-18 % to -29 % north of Wealthy)</td>
<td>Decreased car volumes (business perspective) (-18 % to -29 % north of Wealthy)</td>
</tr>
</tbody>
</table>
“I want to let you know how pleased we are with the current set-up of Division Avenue. The reduction from five lanes to three with on-street parking has had a positive impact on our business and on the people we work with in the neighborhood”

Rev. Andy Debraber, Heartside Ministry

“I am writing in support of maintaining the current lane and parking options on South Division St.” Dennis Cochran, Guiding Light Mission

“I would like to voice my support....The additional parking, slower vehicular traffic, and increased awareness of the needs of pedestrians have been embraced by this organization” Janet Teunis, UICA

“Parking on the street is absolutely essential for our business to survive....I watch traffic everyday and there is a short window between 4:30 pm and 5:15 pm when traffic slows down a bit”

Mr. Roberts, Sanctuary Folk Art

“The City launched Revision Division in 2011 as a one-year pilot project. Now it won’t make a decision until 2014 or 15. What is taking so long?”

MLive

“City and MDOT staff responses to the needs of business and residents during the process have been superior. We request you consider instituting the 3 lane structure” Dwelling Place and South Division Stakeholders
### STUDY RESULTS

**Inconclusive Results**

- Overall increased crashes, increased queue length
- Positive feedback, improved Quality of Life elements

**More Data Needed**

- Crash History
- Queue / Delay

**More Public Feedback Needed**

<table>
<thead>
<tr>
<th>Greater Business Vitality?</th>
<th>Quality of Life Improvements?</th>
<th>Transportation Choices?</th>
</tr>
</thead>
</table>
LEONARD STREET NW

Road diet: 4 to 3 lane conversion
Modal improvement: sidewalk widening
WEST SIDE AREA SPECIFIC PLAN

PEDESTRIAN SCALED LIGHTING

PEDESTRIAN VISIBLE SIGNALS, CROSSWALKS THAT ARE ADA COMPLIANT

RESIDENTIAL MIXED USE

CONSISTENT BRANDING AND WAYFINDING

WestSide ASP
Grand Rapids, Michigan

adopted May 12, 2015

prepared by: Jeffrey Parker
project manager:
BEFORE – LEONARD (ALPINE TO TURNER)
AFTER – LEONARD (ALPINE TO TURNER)
PREFERRED DESIGN
POST CONSTRUCTION AND CELEBRATION
ROAD DIET: 4 to 3 lane conversion
Modal improvement: enhanced pedestrian crossings
Green infrastructure improvement: bioswale medians
CRESTON CORRIDOR INITIATIVE
PROCESS

Collect data, compare w/guidance → Implement low risk, low cost markings → Collect feedback, review operations → Review with PD, Fire, Public Works

Rotomill and repave → Opportunity → Build partnerships → Build medians

New investment → Build Partnerships → Safe Routes to School Grant → Build Rapid Flashing Beacon
Water Quality Islands

How they work
This graphic illustrates the secret to how Water Quality Islands, like those installed on Plainfield Avenue NE, function to improve water quality in the Grand River.

1. Rain from the street is directed to the island and dispersed here.
2. Plants and soils filter and absorb rain water.
3. The overflow of water in the island travels to this drain.
4. Excess water permeating the soil makes its way here via this underdrain.
5. Excess water in the basin flows to the storm sewers and into the Grand River.
6. Final soil filtration and absorption takes place at this catch basin.

[Diagram showing the flow process of water through the island.]

[Image of a street with greenery and trees.]
NORTH MONROE AVENUE

Road diet: 3 lane to 2 lane
Modal improvement: separated bicycle facility, pedestrian crossings
Intersection improvement: addition of 4 roundabouts
Green infrastructure improvements: porous asphalt and bioswales
WHY CHANGE THE STREET?

- Constant complaints about speed, requests for GRPD
- Residential context
- Presence of Riverside Park
- Road closure for large walk/run events due to lack of path
- Connection to the White Pine Trail
- Complete reconstruction
- Street was a barrier to the neighborhood due to travel speeds, no clear crossings, crossing distance
CELEBRATE THE PROJECT!

A Free, Family Friendly Neighborhood Celebration!

HEALTHY and SAFE MONROE

MAY 27th at 6:30 PM

Ribbon Cutting for Improvements of Monroe at Riverside

Mayor’s Bike Ride

Family Route = 2.25 miles
Extended Route = 6 or 16 miles

All ages and organizations invited welcome.

It's a walk, a ride, a fun event for everyone.

Sponsored by

YMCA GRPD Spoke Folks and Boston Square Community Bikes

Vegetable Ven Helmet Pledge will be doing safety inspections

~ 2403 Monroe NE - Riverside Park - Guild St. Parking Lot
KEY TAKEAWAYS
RECOMMENDATIONS

• Policy support: What’s in your master plan? Local ordinance? Resolutions? Is there a shared vision?
• Leadership, both political and staff
• Educate the public
• Bring people along in decision-making
• Be prepared with talking points
• Use data, don’t accept assumptions
RECOMMENDATIONS

• Don’t react …use data
• Be open to alternatives
• Build a culture of support with engineering, planning, traffic safety, stormwater/infrastructure, grants writing
• Start with easy sections, then go on to more difficult
• Phase over time, be patient
• Celebrate. All. The. Time.
THANK YOU

We welcome your feedback, insights and inquiries.