HIGH LAND PARK

BICYCLE & PEDESTRIAN PLAN

2019

FINAL DRAFT

wsp

Contents


Entering
Boro of
Highland Pk
HIGH
LAND
PARK

1 Introduction

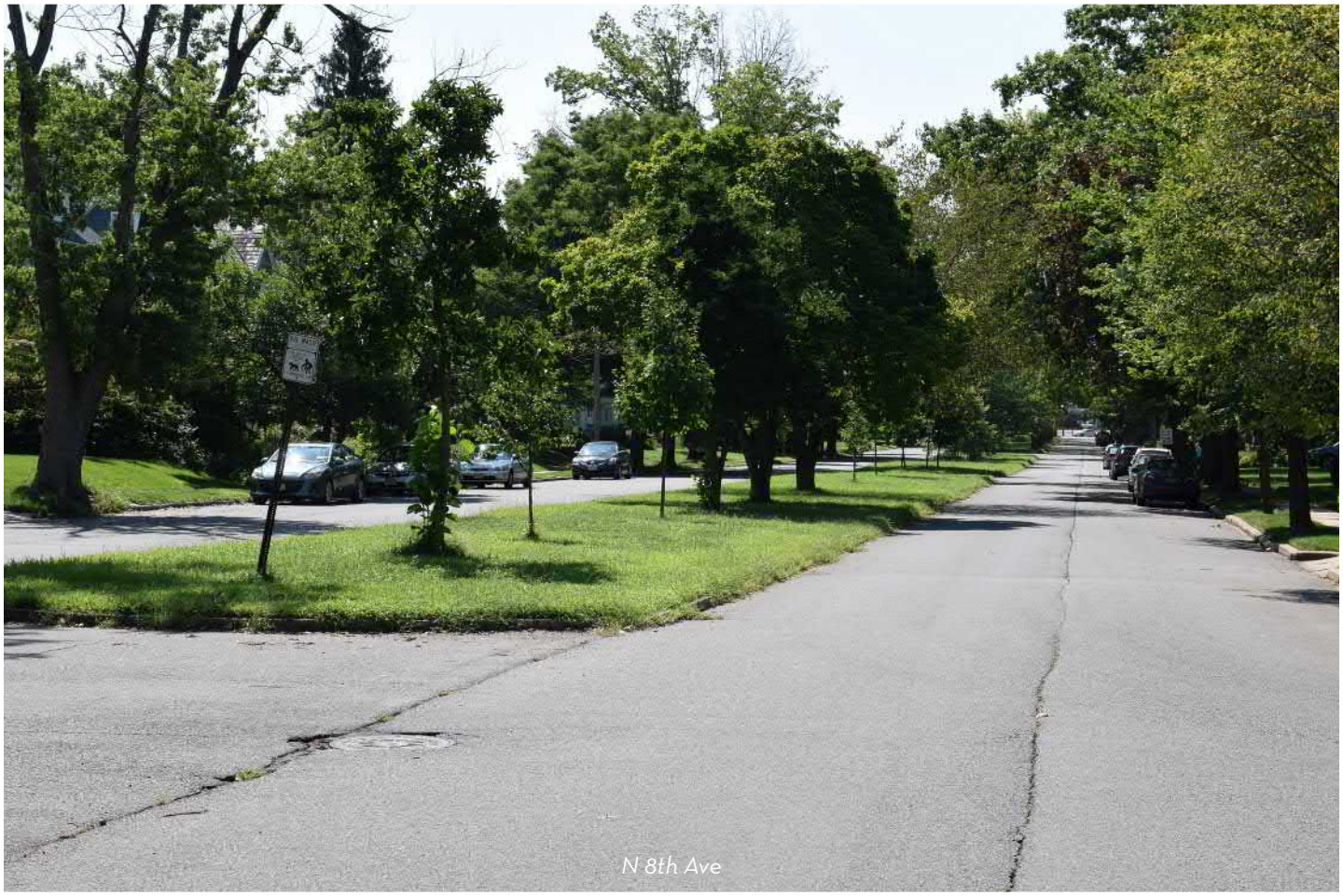
The Borough of Highland Park is committed to improving the state of biking and walking within the community through its Complete Streets Policy, Safe Routes to Schools Initiatives and establishment of a Safe Walking and Cycling Committee (SWACC). This Bicycle and Pedestrian Plan furthers Highland Park's efforts as part of the New Jersey Department of Transportation's (NJDOT) Local Bicycle/ Pedestrian Planning Assistance Program stimulating the development of non-motorized transportation modes in accordance with statewide goals and local needs.

This Bicycle and Pedestrian Plan identifies strategies and improvements to promote bicycling and walking (also known as active transportation) as safe, comfortable, and attractive modes of transportation while serving residents, supporting local businesses, and continuing to draw residents, visitors and economic investment to an active and vibrant Main Street. The plan will be incorporated into Highland Park's 2019 Master Plan Reexamination.

Compiled after an extensive process of public outreach, technical and geospatial analysis, previous study review, and field work, this report provides an overview of the local context and existing active transportation conditions. This includes an examination of crash data, identification of key pedestrian and bicycle traffic generators, assessment of existing infrastructure, review of key corridors and intersections for non-motorized traffic and analysis of the roadway's bicycle level of traffic stress. The recommendations are based on the "4 E's" – Engineering, Education, Enforcement, and Encouragement. This holistic approach is intended to improve mobility, safety, accessibility and equity for all road users.

Highland Park Farmer's Market

Raritan Ave



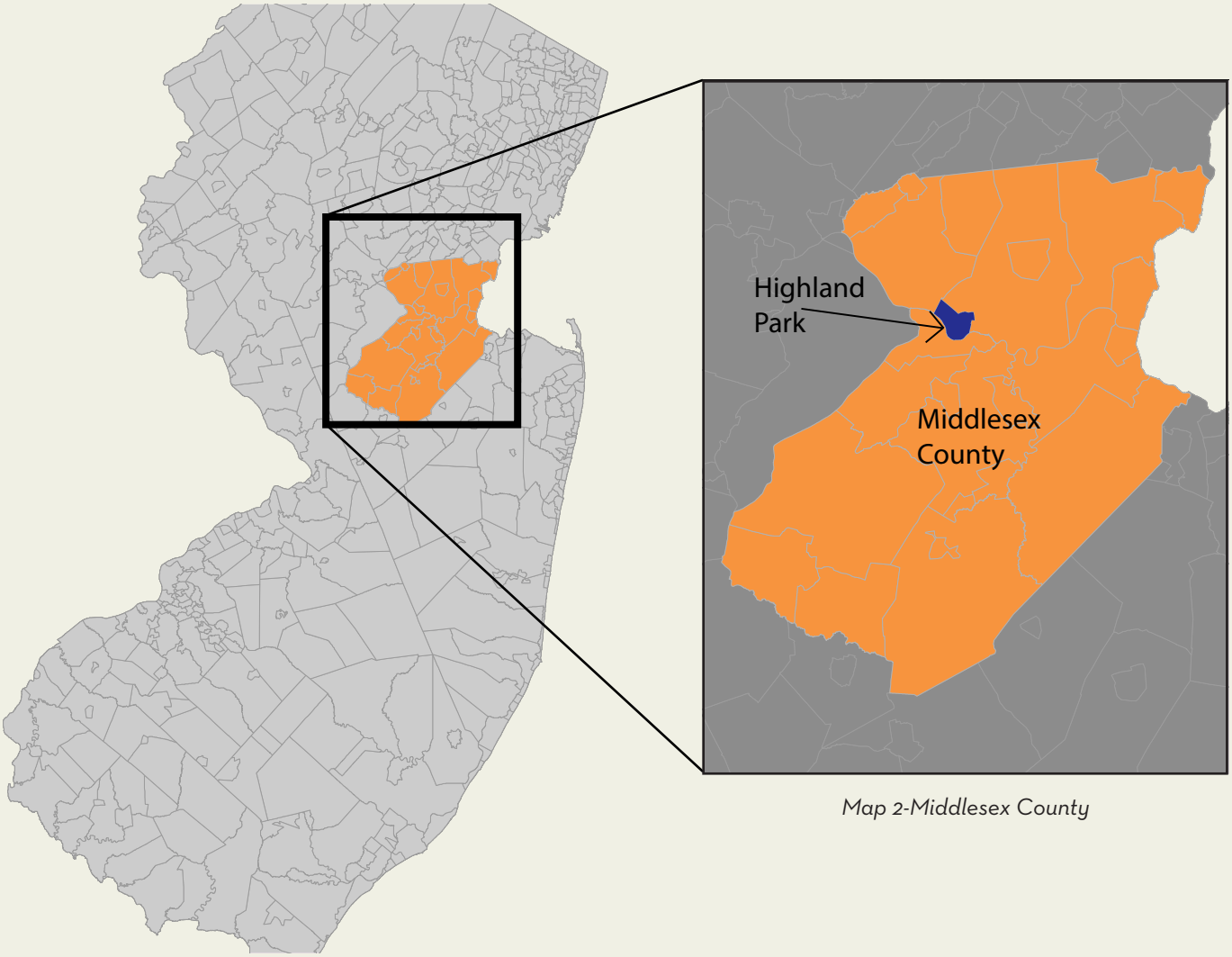
N 8th Ave

2 Context

Highland Park is a densely populated community in the heart of New Jersey. The Borough has flourished due to a concentrated development pattern and proximity to Rutgers University, major employment centers and U.S. 1, the New Jersey Turnpike and New Jersey Transit train stations in New Brunswick and Edison.

OVERVIEW

Highland Park is snuggled along a curve of the Raritan River, bordered by the larger communities of New Brunswick, Piscataway and Edison to the southwest, north and east, respectively. Covering 1.82 square miles in Middlesex County (see Maps 1 and 2), 14,000 residents call Highland Park home. With 7,700 residents per square mile, Highland Park is the County's third (of 25) most densely populated municipality and is six times denser than the state. The Borough's population has remained consistent since 1970, reaching virtually full build-out.



Map 1-New Jersey

Map 2-Middlesex County

EXISTING TRANSPORTATION NETWORK

Roadway Network

The portion of Highland Park located south of the-Northeast Corridor (NEC) tracks, home to most residents, is laid out in a fairly standard grid, catering to greater walkability. Additionally, as detailed in Map 12, 73% of Highland Park's roads have sidewalks on both sides of the street, promoting walkability. Map 4 illustrates the road network and associated land uses,.

The Borough is divided north/south by NJ Route 27 (Raritan Avenue), an important regional roadway between the more densely populated areas to the east and employment center of New Brunswick to the west, serving as the Borough's main commercial, shopping and employment district. Raritan Avenue provides Highland Park's only road connection over the Raritan River (also called the Albany Street Bridge) to New Brunswick, as well as one of only two non-limited access river crossings along the 17-mile span between Bound Brook and Perth Amboy (the other being the Landing Lane Bridge in New Brunswick). Due to this, the bridge and its approaches are often highly congested. NJ 27 has two travel lanes in each direction in the east and west ends of the town and one in each direction through the central core. Most intersections along the route are signalized. 18,000 vehicles travel daily on NJ 27 between 1st and 2nd Aves.

The following County Routes also cater to motor vehicle traffic between Middlesex County communities. For each County Route, mileage within the Borough, lane configuration, posted speed limit, connectivity, and daily traffic (where available) are noted below.

- County Route 514 (Woodbridge Avenue)
  - 0.65 miles
  - One lane in each direction with stop controls on intersecting streets; 25 mph speed limit
  - Spans northeast to Elizabeth and west to East Amwell
  - Overlaps with NJ 27 for most of route in Highland Park
  - Provides access to U.S. 1 and New Jersey Turnpike
  - 12,000 daily vehicles
- County Route 676 (Duclos Lane)
  - 0.39 miles
  - One lane in each direction with stop controls on intersecting streets; 25 mph speed limit
  - Straddles eastern border of Borough with Edison
  - Travels north to Edison industrial area and Rutgers-Livingston campus
- County Route 622 (River Rd)
  - 0.89 miles
  - Higher speed road with one lane in each direction and stop controls on intersecting streets; 35 mph speed limit
  - Begins at western end of Borough at NJ 27 and travels north to Middlesex Borough
  - Travels north to NJ 18 and I-287
  - 14,500 daily vehicles
- County Route 692 (Cedar Lane)
  - 0.52 miles
  - Two lanes in each direction with stop controls on intersecting streets; 25 mph
  - Begins in northern portion of town at River Rd and travels northeast to Edison industrial area and Rutgers-Livington campus
- County Road 807 (Johnson Park Rd)
  - 0.48 miles
  - One lane in each direction operating through Johnson Park traveling along the Raritan River north before looping back to River Rd; 25 mph speed limit
  - Only serves traffic into Park; 378 daily vehicles

The six lane U.S. Highway 1 is 0.2 miles east of the Highland Park border and travels northeast to New York City and southwest to Trenton. Interstate 95 (New Jersey Turnpike) is a three minute drive southeast of Highland Park and parallel to U.S. Highway 1.

River Rd underpass of NEC Tracks

Public Transit

NJ Transit Northeast Corridor service operates frequent trains between New York-Penn Station and Trenton with stops in New Brunswick and Edison. The New Brunswick station, with access to Amtrak, is a 10 minute walk from the Highland Park border and Edison is a 25 minute walk or five minute drive from the Highland Park border.

NJ Transit operates two bus routes within Highland Park:

- Route 810 travels west to New Brunswick and east to Woodbridge and the Woodbridge Center Mall along NJ 27
- Route 814 travels west to North Brunswick and east to Edison and Middlesex Community College along Woodbridge Ave and NJ 27

Both routes stop at the New Brunswick NJT station. In Highland Park, there's typically 600 feet (1/10th of a mile) between stops.

Located across the Raritan River, New Brunswick is a regional employment, educational and cultural hub. The city houses the main campus of Rutgers University; New Jersey's largest higher education institution with over 40,000 students in the New Brunswick-Piscataway campuses. Johnson & Johnson's world headquarters, numerous hospitals, medical research centers, museums and theater venues also call New Brunswick home.

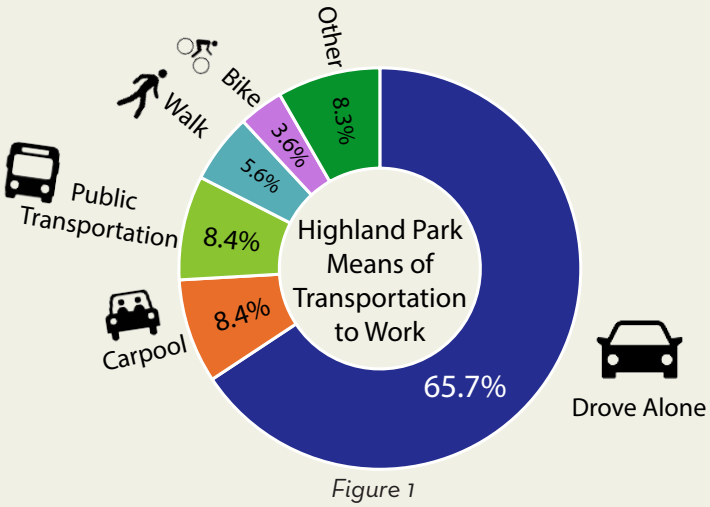


Figure 1

COMMUTING

The below charts and data illustrate Highland Park residents' commuting patterns:

- A larger share of Highland Park residents work in the County than Middlesex County commuters overall, but only 15% of Borough residents work within the Borough.
- Only 4% of employed Borough residents' do not have access to a car. Middlesex County residents overall have more cars per household than Highland Park commuters do.
- Highland Park commuters have shorter commutes than the County average; nearly half of Borough commuters travel less than than 20 minutes. Although a higher portion than the County average (13% vs. 10%) have commutes longer than an hour.

The employment locations of residents provides insights into the most heavily traveled routes and the importance of public transit for Highland Park residents. This information assists with the siting of bike and pedestrian improvements to enhance desire lines.

Map 3 and Figure 3 on pages 6 and 7, respectively present the employment locations of Highland Park residents.

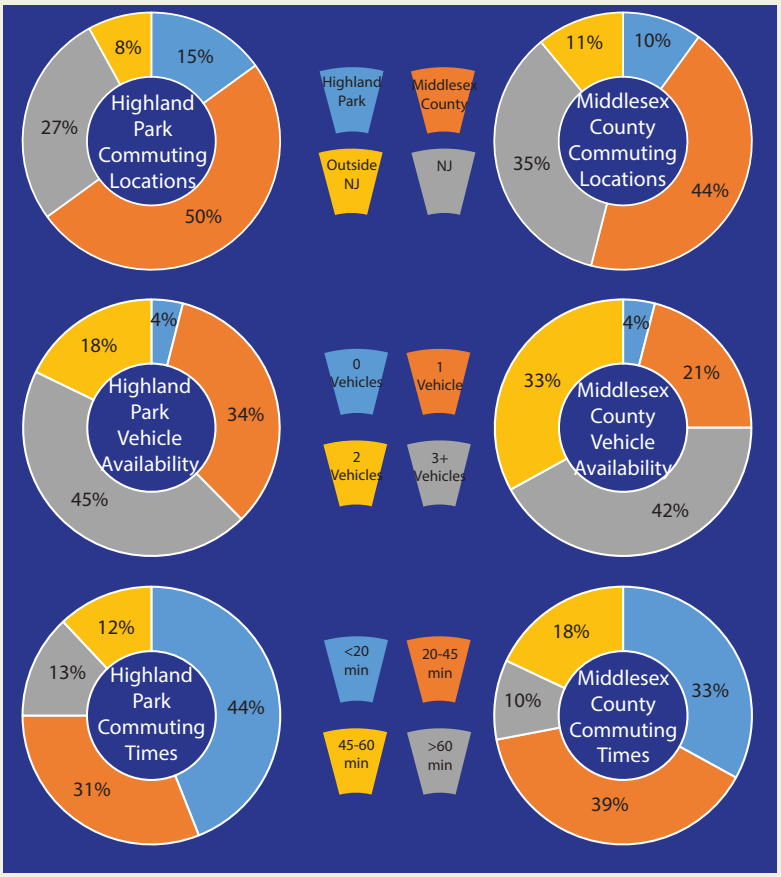
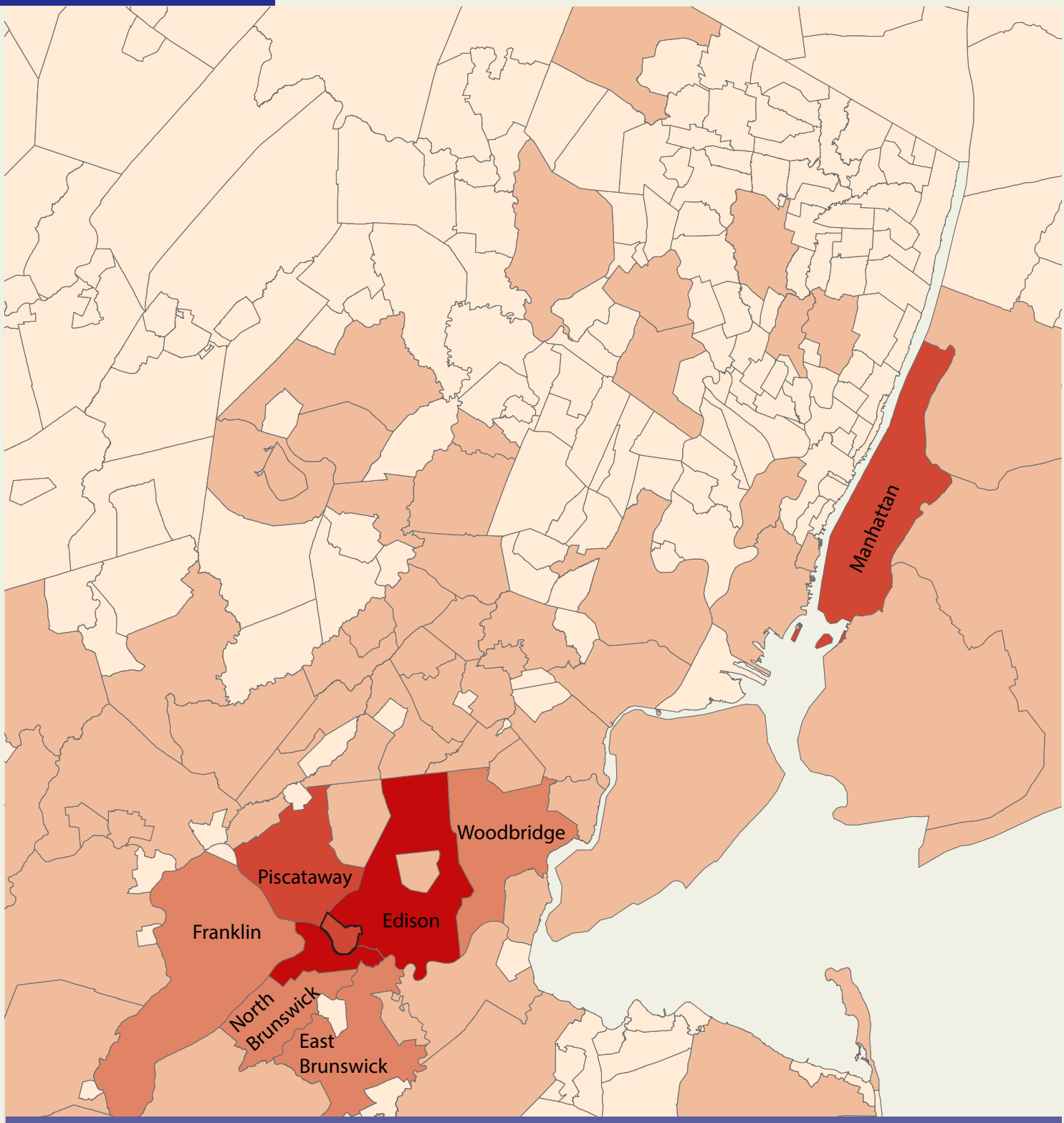


Figure 2



Map 3-Employment Locations of Highland Park Residents*

The following table expresses the municipalities most commuted to by Highland Park residents.

Location	Commuters
New Brunswick	665
Edison	448
Piscataway	297
Highland Park	284
Manhattan, NY	221
Franklin	195
Woodbridge	143
North Brunswick	135
East Brunswick	135

Figure 3-Source: 2015 Census, Longitudinal Employer-Household Dynamics Data

DEMOGRAPHICS

Of Highland Park's 14,245 residents, 18% are under 18 and 11% are over 65. The largest age cohort is 25-29 year olds, accounting for 12% of residents. Highland Park's proximity to Rutgers University makes it an appealing off-campus locale for students and recent graduates. Due to the number of young adults, Highland Park has a significantly lower portion of children and elderly than the County at 22% and 14%, respectively.

LAND USE

A community's distribution of land use leads to various traffic patterns and levels of congestion. Trips are typically made between different land uses (residential to commercial, institutional to parks, etc.) An analysis of the existing land use helps determine where and why problems exist and where improvements should be concentrated. Map 4 illustrates Highland Park's land use patterns.

Residential

Most residence's in the town are single-family detached units. Homes north of the railroad tracks consist of medium-density apartments off of Cedar Ln. The remainder of Highland Park has multi-family units interspersed throughout.

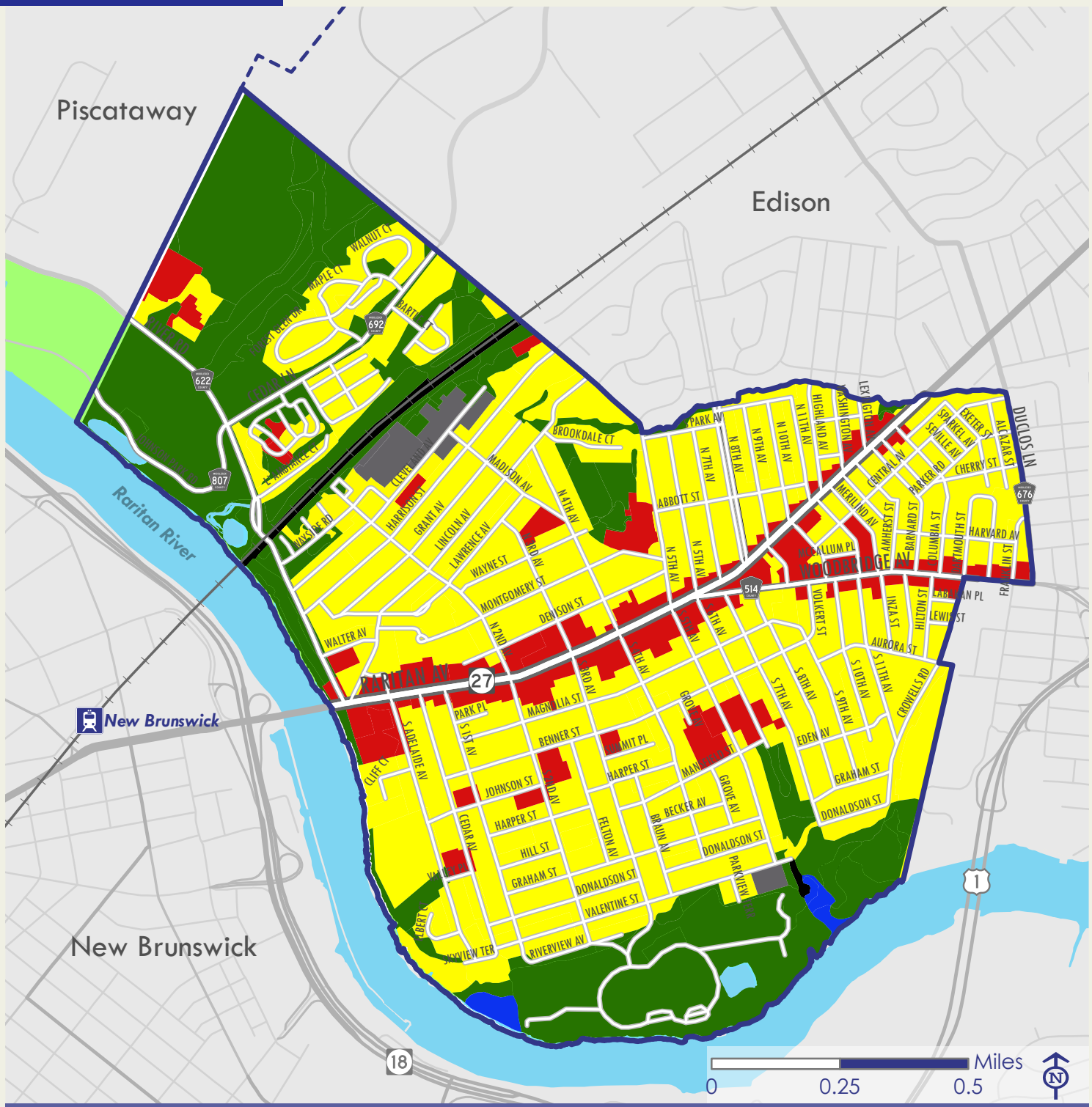
Commercial

Nearly all of the Borough's commercial establishments are located on NJ 27 and Woodbridge Ave. NJ 27, particularly the portion west of Woodbridge Ave, is mainly small, local retail and restaurant establishments. This is Highland Park's downtown. East of the intersection of these streets, larger commercial lots cater to automobile service uses.

Parks

Highland Park has two large parks. Johnson Park, covering 473 acres in the northwest corner of the Borough between River Rd and the Raritan River has tennis courts, softball fields, soccer fields, playgrounds, cricket pitches, picnic groves and a 2.5 mile shared use path. In the south of Highland Park between Riverview Ave/Valentine St and the Raritan River is the 90 acre Donaldson Park. Donaldson Park has tennis courts, basketball courts, softball fields, soccer fields, playgrounds, a boat ramp and picnic grove.

Highland Park Public Library



Map 4-Land Use

HIGH LAND PARK BIKE WALK

Residential
Commercial
Industrial
Transportation
Wetlands
Park/Forest/Recreation
Water

PREVIOUS POLICIES AND STUDIES

To build upon existing knowledge, the project team consulted several planning studies undertaken throughout Highland Park in recent years. These resources provided valuable information and fuel for analysis. This synergy will produce a more comprehensive and expansive bicycle and pedestrian system. The breadth and detail of previous studies speak to residents' desire to promote a more walkable, bike-friendly and livable community.

Complete Streets Policies

Borough of Highland Park

The Borough of Highland Park enacted their "Resolution Setting Forth Highland Park's Commitment to Complete Streets" on August 13, 2013. The policy states the Borough Council "wishes to reinforce its commitment to creating a comprehensive, integrated, connected street network that safely accommodates all road users of all abilities and disabilities for all trips." The policy continues:

"that Borough departments and professionals, such as Department of Public Works, municipal planner, engineer and Zoning Officer should incorporate Complete Streets infrastructure into all planning, design, approval, and implementation processes for any construction, reconstruction, or retrofit of streets, bridges, or other portions of the transportation network, including pavement resurfacing, restriping, and signalization operations if the safety and convenience of users can be improved within the scope of the work..."

Specific exceptions to this rule are also listed.

Middlesex County

Middlesex County passed their Resolution to Support the Middlesex County "Complete Streets" Program on July 19, 2012. This policy is intended to ensure "that no user is omitted from the design process of a road improvement project."

Borough of Highland Park 2003 Master Plan

Highland Park has a longer history of supporting Complete Streets than most New Jersey communities. The 2003 Master Plan lays the groundwork for enhancing bicycling and walking in the community to "ensure that the plan is developed in concert with the public's concerns and perceptions of the community." The plan includes a Circulation Element aiming to produce a more functional transportation network for the Borough.

The Plan notes that Highland Park's density lends itself to greater opportunities for cyclists and pedestrians. The Borough would like to capitalize on this advantage by further enhancing the active transportation network. The Master Plan proposes a greenway parallel to the Raritan River and bike routes on lower volume streets.

Recommendations to improve pedestrian mobility and calm traffic include constructing curb extensions, installing "Turning Vehicles Yield to Pedestrians" signs on Raritan Ave, and installing pedestrian signals, ADA ramps and high visibility crosswalks where feasible throughout the Borough.

Specific focus was given to improving bike and pedestrian accessibility to the Albany Street Bridge, and connecting Highland Park to New Brunswick and Rutgers University.

The Borough's master plan is being reevaluated in 2019. This bicycle and pedestrian plan will help facilitate the reassessment.

Highland Park Green Community Plan

Highland Park's 2007 Green Community Plan's goals are to have a healthy environment, healthy people, strong community, convenient transportation and fairness and equity throughout. The plan grew from the Mayor's Highland Park 2020 Vision in 2003. Across each of the five stated goals, indicators and objectives/actions are specified to best assure progress is made.

The plan does not provide specific locations for improvements, but recommends advancements for the entire Borough. Within the report's transportation category, the first objective is to "prioritize pedestrian and bike safety" by employing traffic calming devices such as curb extensions, center islands, diagonal parking and raised crosswalks, offering pedestrian and bike safety education programs, installing bike lanes through downtown and major thoroughfares, and designating pedestrian and bike planning a routine and required part of all transportation planning and development within Highland Park.

Highland Park School Travel Plan

The Borough of Highland Park and Highland Park School District partnered with Keep Middlesex Moving and Rutgers' Bloustein School of Planning and Public Policy in 2016 to produce Highland Park's School Travel Plan. As a geographically small and dense community, Highland Park has the potential to cater to high volumes of active transportation. The plan "outlines [the] community's intentions for enabling children to engage in active transportation to and from school" concluding with recommendations.

The plan was advised by a working group of school officials, public servants, residents and non-profit representatives. Despite the Borough's high population density, most of the district's students are driven to school. The working group conducted a walk assessment surrounding the district's four schools to determine barriers and opportunities of active transportation. The assessment's revealed several issues impeding pedestrian mobility including worn crosswalks and pavement, and a lack of curb ramps, bike infrastructure and bike racks. The report concludes with a list of Borough-wide recommended actions based on the "4 E's" and a strategy to evaluate progress. Engineering suggestions include:

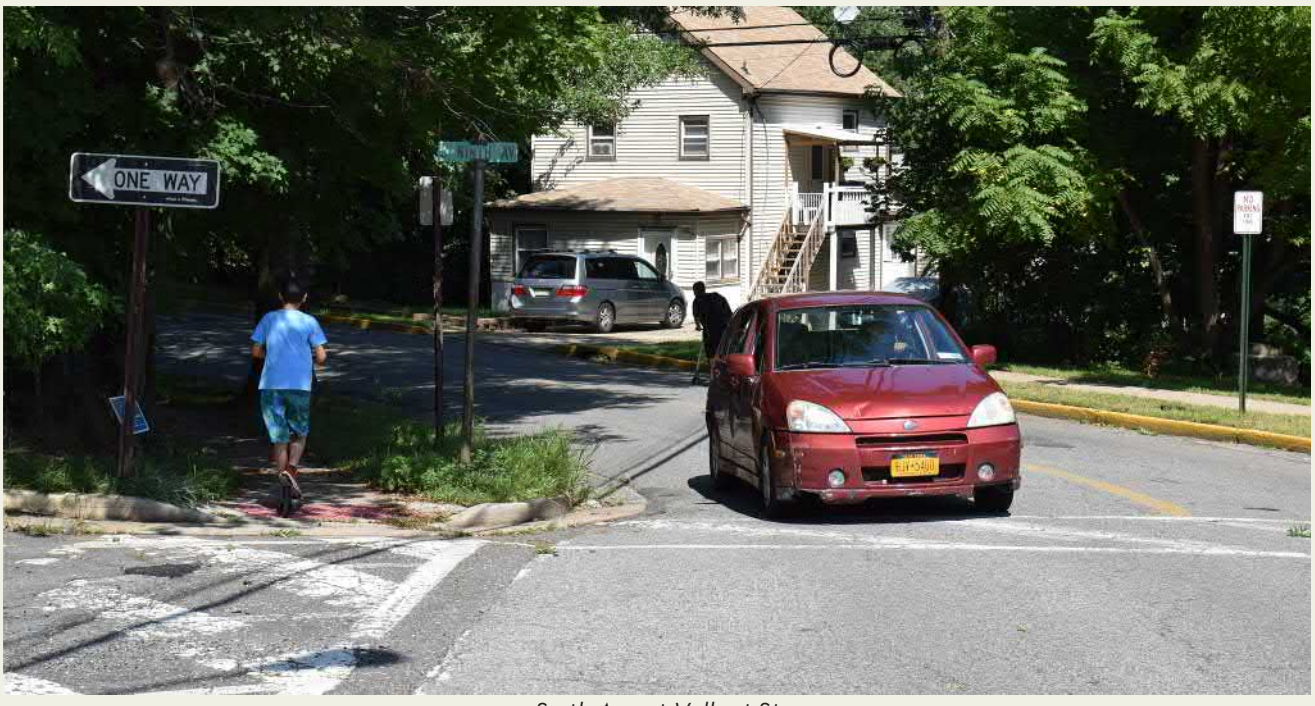
- Constructing curb ramps near schools
- Installing bike racks at Irving and Battle Schools
- Repaving/fixing pedestrian paths between Grant Ave and Cleveland Ave
- Improving signage and striping, and trimming trees at Volkert St and 9th Ave to improve visibility

Highland Park School Bike Assessment

Highland Park's School Safety Plan was complemented by the 2017 School Bike Assessment. A pilot program, the assessment was conducted by representatives from NJDOT, Rutgers University, Keep Middlesex Moving, school and elected officials and Highland Park residents. The assessment aimed to "evaluate the street, sidewalk, and neighborhood conditions around the schools, and identify safety improvements that can make cycling a safer and easier way to get to and from school."

The group of representatives was split into four teams; each riding bikes along distinct pre-defined routes. Barriers to biking noted by the teams included:

- missing sidewalks
- vegetation blocking sidewalks
- missing curb ramps
- faded crosswalks across potholed pavement
- sunken sewer grades
- motor vehicle speeding
- an overall lack of bicycle infrastructure



S 9th Ave at Volkert St

3 Study Methodology

The project team utilized various methodological tools to obtain the greatest understanding of Highland Park's existing conditions and desired vision. The process included gathering information concerning bicycle and pedestrian attractors and generators, crash history, key elements of the roadway network, and measuring the system's bicycle level of traffic stress. These components were mapped to illustrate the existing active transportation network, identify crash "hot spots" or clusters, and determine areas of confluence among the study components, indicating problem areas and/or inadequate bicycle and pedestrian facilities.

COMMUNITY INVOLVEMENT

A key element of the study was the involvement of Highland Park residents and stakeholders, who provided invaluable local qualitative information. Outreach events and local Study Advisory Committee (SAC) meetings resulted in valuable local input and feedback. The SAC includes representatives from Highland Park Recreation, Public Health, Public Works, Police, Schools, Environmental Commission, Council on Aging, Safe Walking and Cycling Committee, Planning Board and Borough Council as well as Middlesex County, the Mayor, Main Street Highland Park and local houses of worship.

Study Advisory Committee

The SAC provided overall guidance throughout the project including defining the vision and goals of the master plan, reviewing and commenting on interim work products, assisting in prioritizing recommendations and serving as a resource for local information during the data collection and inventory phases. Committee members represent a variety of demographic groups, constituencies and interests within Highland Park. The project team met with the Study Advisory Committee three times:

SAC Meeting 1

- June 18, 2018

The kickoff meeting began with a brief description of the project and team, followed by an overview of design considerations, the community outeach process and role of the SAC. The project team conducted a visioning exercise with the committee to determine what a successful bicycle and pedestrian plan would look like, and the plan's and goals and obstacles.

The committee concluded the plan should be inclusive of all residents, feasible, and supported by the planning board, police, department of public works and Borough stakeholders.

Goals included traffic calming, increasing biking and walking rates and educating residents about bike and pedestrian safety.

Challenges included the culture of driving which leads to disobeying laws, and difficulty with infrastructure in overlapping jurisdictions (local, county, state).

Highland Park Farmer's Market

SAC Meeting 2

- November 26, 2018

  The project team presented initial findings including an anaylsis of the existing pedestrian and bicycle infrastructure, general transportation issues in the Borough and a summary of public outreach results. The project team and SAC collaborated on finalizing five priority intersections for further analysis and recommendations.

SAC Meeting 3

- To be determined

Outreach Events

A multifaceted public outreach process was conducted to gather input from the Highland Park community.

Highland Park Farmers Market

The project team operated an all-day booth at the Highland Park Farmer's Market on Friday, June 22nd. Two facilitators asked attendees about their biking and walking habits within Highland Park and geographies of the Borough they found problematic. 33 members of the public provided feedback which was subsequently added to the Wikimap. Several comments were given regarding difficulties in walking/biking across the Albany Street Bridge to New Brunswick, stress while driving or riding on Raritan Ave and motorists and cyclists exhibiting unsafe behavior.

Arts in the Park & Spring Fling Street Fair

The project team attended the 13th annual Arts in the Park street festival, maintaining a booth at the event. Additionally, the project team attended the Highland Park Spring Fling Street Fair to solicit public input for the plan. Input gathered at both events yielded invaluable local knowledge about bicycle and pedestrian issues in Highland Park.

Focus Groups

Two focus groups were conducted on July 16, 2018 at the Highland Park Public Library and Borough Hall. The purpose of the group's was to better understand how bicycle and pedestrian planning affects people on a daily basis. The first group consisted of local business people. The second group was composed of representatives from local organizations and institutions.

Both groups agreed improving active transportation facilities would improve economic activity and safety along NJ 27. Stakeholders cited the following issues:

- Automobile parking is difficult along NJ 27
- Desire for more usable bicycle parking in commercial areas, including downtown
- Crosswalks are in poor conditions
- Preference for automatic pedestrian signals
- Street lighting is lacking

More site specific comments included:

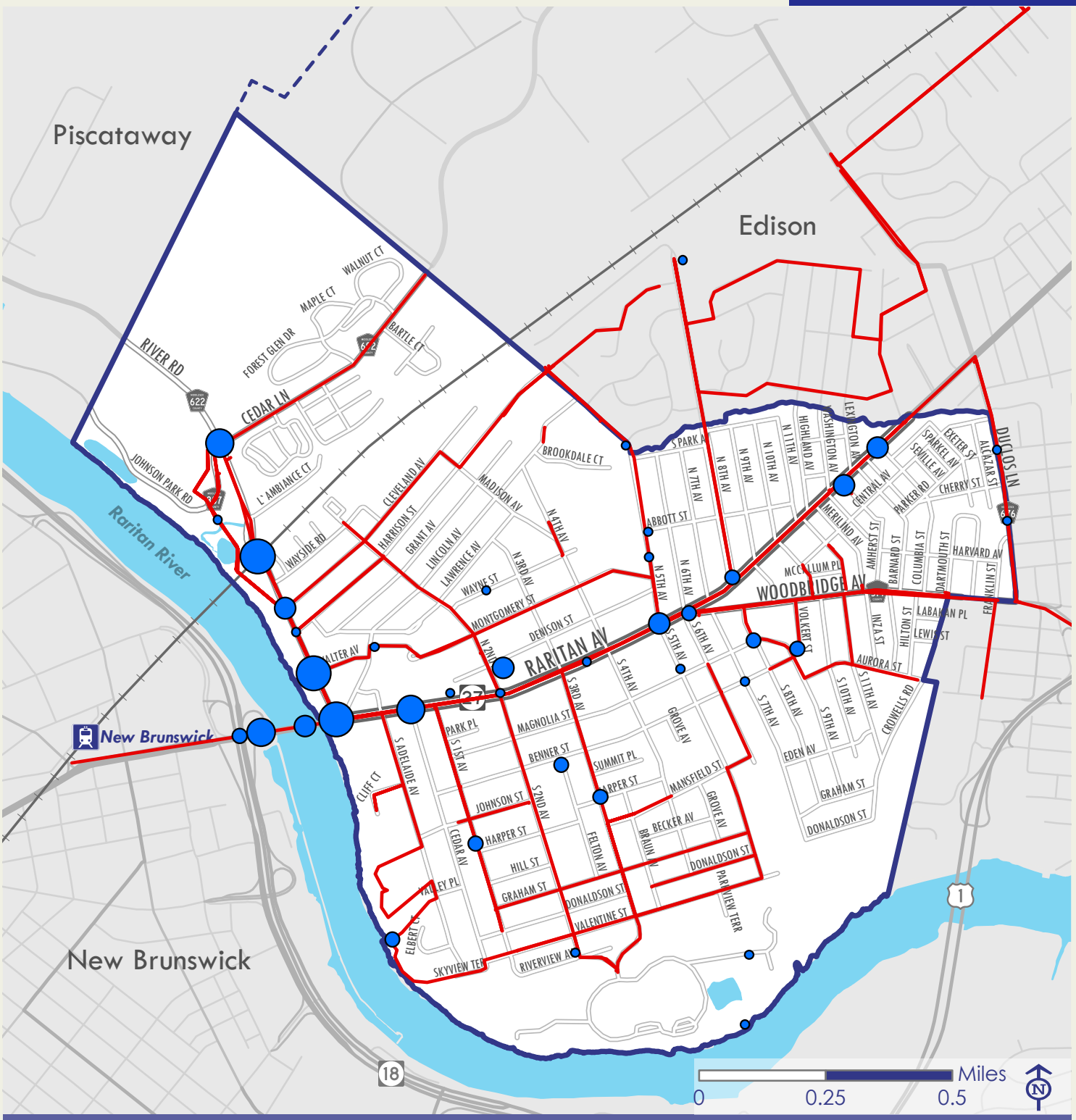
- Streets parallel to Raritan Ave should have dedicated bicycle facilities
- Residents north of the train tracks have difficulty reaching the rest of the Borough by walking
- The bridge to New Brunswick has poor drainage and limited snow removal
- Speeding often occurs on Woodbridge Ave
- The merge from Woodbridge Ave to NJ 27 is a major vehicular conflict point

Wikimap

An online "Wikimap" website was launched to collect place-based comments about walking and biking in Highland Park. Similar to hard copy maps used at public events, the web interface allowed users to mark-up a virtual map of the Borough. Accessible to the general public, users were asked to identify corridors and spot locations difficult for walking and biking, and desired locations for bicycle parking and walking and biking routes.

Locations with the most comments include River Rd, Raritan Ave and N 5th Ave. Raritan Ave was marked as a problem pedestrian and bike corridor. River Rd, Woodbridge Ave and N 8th Ave were marked as problem bike corridors.

Map 5 illustrates the location and prevlanece of Wikimap responses.



MAP 5: Wikimap Responses

HIGH LAND PARK BIKE WALK

- Train Station
- Northeast Corridor
- Highland Park Boundary
- Other Municipal Boundary

Comment Frequency

- 1-2
- 3-4
- 5-6
- 7-12
- 13-27

1-2

SURVEY RESULTS

The project team created and maintained the Highland Park Bike Walk Survey, an online tool eliciting feedback concerning stakeholder's behaviors and attitudes toward walking and biking in Highland Park. The survey received 354 responses between May and July 2018.

Demographics

89% of respondents live in Highland Park, most in the western part of the Borough. 45% live in Area 6 and 25% in Area 2 depicted in the below map.

Map 6

Survey results indicate the popularity of driving in Highland Park and the desire and willingness of residents to make shorter trips by biking and walking.

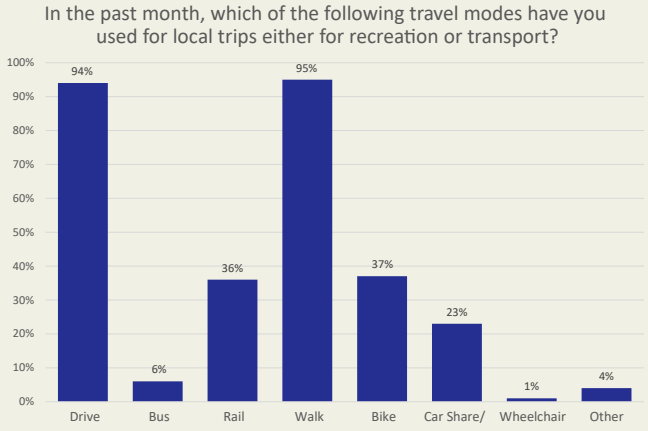


Figure 4

Only 22% of respondents both live and work in Highland Park, prompting the majority to drive to work.

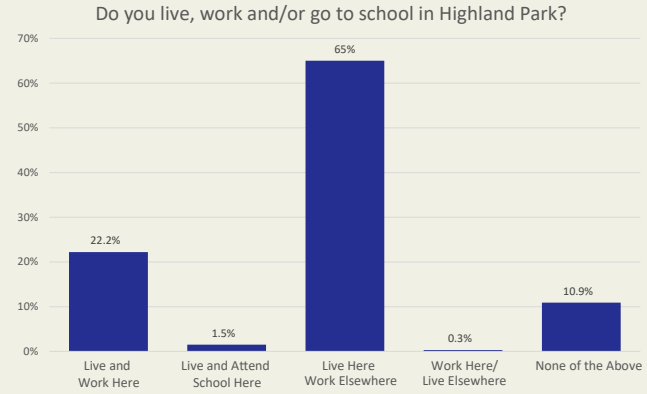


Figure 5

Walk

Despite majority car usage, a high portion of discretionary trips are made via active transportation. 95% of respondents walked within the last month, including 88% who walk at least a few times per week and 47% who walk daily. 94% of respondents drove during the last month.

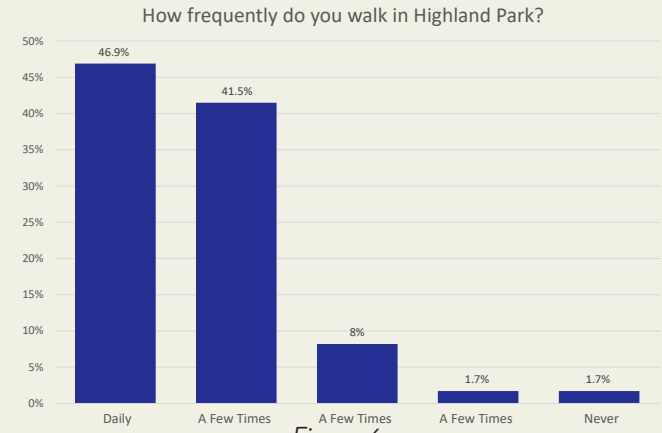


Figure 6

40% of respondents with children drive their children to school while 37% walk.

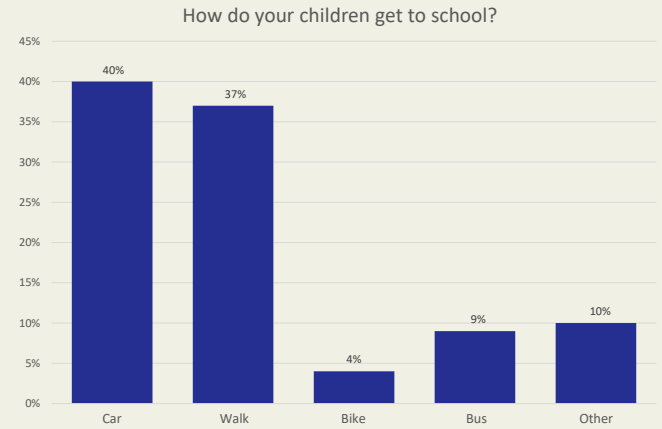


Figure 7

Of those who drive their children to school, 59% noted distance being the biggest factor precluding active transportation though road safety was also a concern.

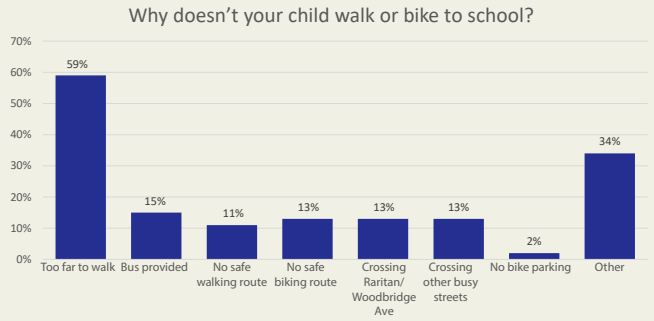


Figure 8

Travel mode varies according to the purpose of the trip. Walking and biking are more popular with discretionary trips such as dining out or social visits while biking is more common for work/school commutes. This data is shown below.

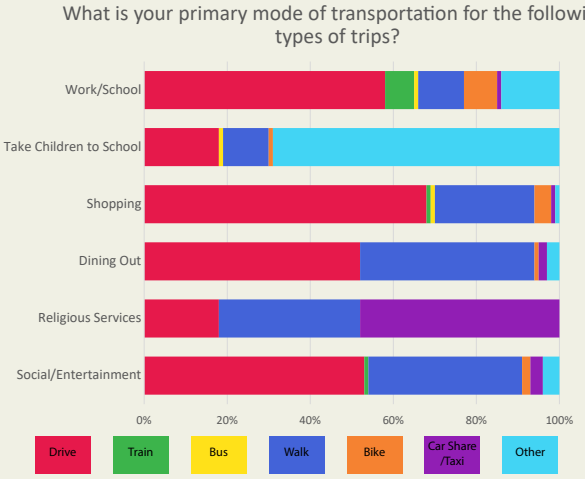


Figure 9

29% of respondents identified themselves as avid walkers, while 44% walk most places in Highland Park, 23% walk to certain locations and only 3% are uninterested in walking. Health was cited as the top reason for walking.

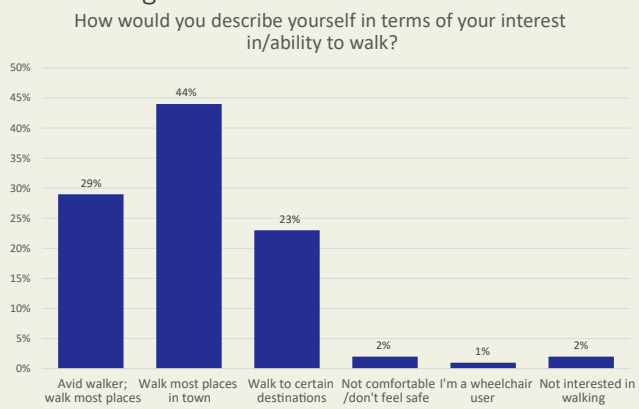


Figure 10

Though Highland Park is already a community of frequent walkers, walking for discretionary purposes and recreation can be increased by by enhancing the pedestrian network between residential areas and Raritan Ave.

Bike

A significant portion of Highland Park residents cycle regularly, although nearly half (43%) do not bicycle at all. 8% ride daily, with 16% bicycling a few times per week and an additional 15% riding several times per month.

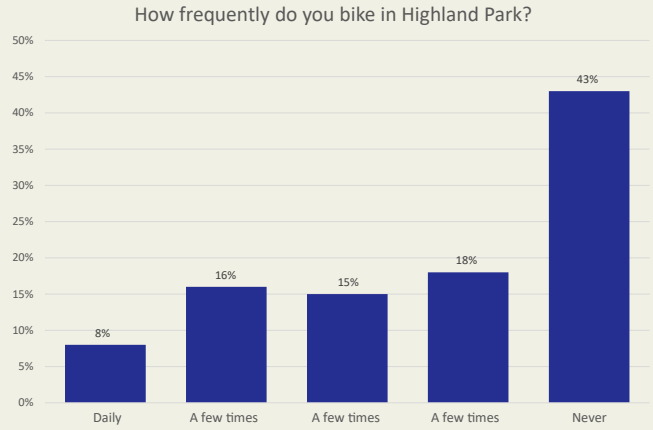


Figure 11

12% of respondents identified themselves as avid bicyclists (will ride anywhere), 18% ride to most destinations in Highland Park and 25% bike to certain places. Health was cited as a top reason for biking.

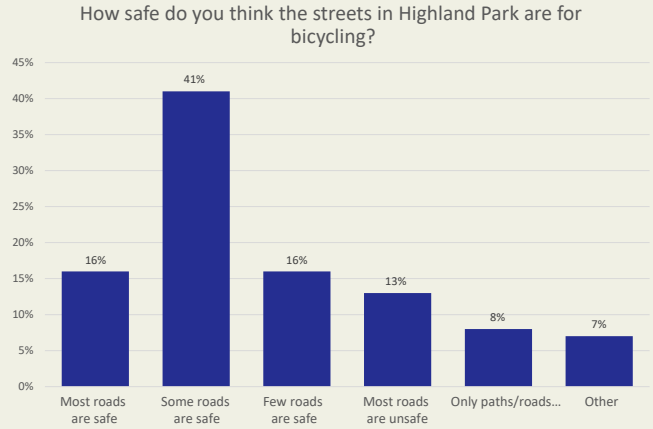


Figure 12

Though 55% expressed interest in biking, only 16% believe most roads in Highland Park are safe for cycling.

62% cited vehicle traffic or fear of collision as impediments to biking more frequently and 53% cited lack of developed bike routes as a barrier.

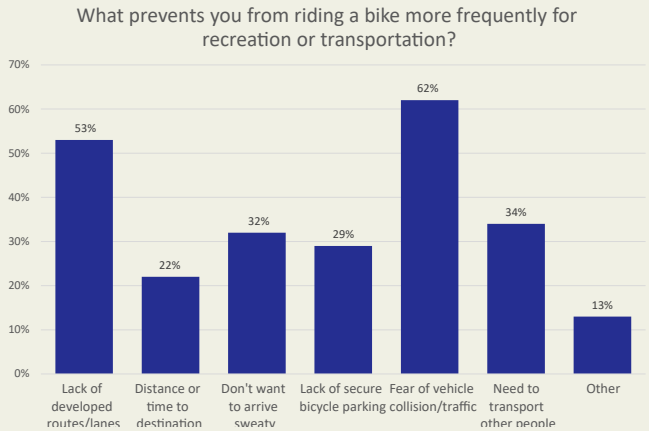


Figure 13

Respondents identified feeling safest on multi-use paths and separated bike lanes.

Despite a lack of cycling infrastructure, the relatively high bicycle usage and interest figures speak to the latent demand for improved biking conditions.

The most frequently biked streets are (respondents were able to choose multiple routes):

- Raritan Ave (46%)
- 2nd Ave (37%)
- River Rd (20%)
- 1st Ave (14%)
- Benner St (10%)

Some of these streets were also cited as the least safe:

- Raritan Ave (87%)
- River Rd (36%)
- Woodbridge Ave (29%)

Among the 14 respondents who own or operate a business on or near Raritan Ave or Woodbridge Ave, equal portions of respondents believed bike infrastructure would have a positive or negative effect on business, while 47% believed it would have no impact. Numerous studies have determined improving active transportation infrastructure spurs economic growth. More outreach should be conducted to inform business owners and the public of the benefits of bike infrastructure.

VISION AND GOALS

Developed collaboratively with the SAC, the Highland Park Bicycle and Pedestrian Plan defines an aspirational vision for the future of active transportation in the Borough, and its role in community life.

Vision

Walking and bicycling are preferred modes of travel in Highland Park. There are comfortable, safe, convenient, and accessible options for all residents and intuitive, attractive choices for visitors. The Borough's multimodal network of Complete Streets enhances access to neighborhoods throughout the Borough and nearby regional destinations, reduces reliance on the automobile, and supports continued economic growth.

To support this vision, the plan seeks to achieve the following goals:

Safety

Improve bicycle and pedestrian safety through targeted infrastructure improvements, traffic calming, Complete Streets design treatments, and education strategies for all roadway users.

Connectivity

Design a Borough-wide plan uniting the community, linking neighborhoods across the Borough, establishing connections to neighboring municipalities, and improving safety and mobility for all residents.

Promote Benefits of Walking and Bicycling

Create a robust bicycle network and identify pedestrian improvements providing access to destinations and neighborhoods throughout the Borough and making it easy, comfortable, and convenient for all residents to walk or bicycle as part of their daily routine. The graphic on the following page details the benefits of biking and walking

Implementation

Develop a feasible plan that can be implemented over time, guiding long-term planning, and be integrated into capital improvement projects.

BENEFITS OF WALKING AND BIKING

Active transportation provides many community-oriented and regional benefits:

Transportation Equity

Bicycling and walking are more than recreation. They are a means of getting to work, running errands and seeing friends, particularly for those who are too young, unable, cannot afford or choose not to drive a car. In most communities, 20%-40% of the population does not drive. Short trips of less than one mile can be easily made by bicycle or on foot, yet 60% of these trips are made by car.[1]

Environmental Sustainability

Active transportation provides a greener, more sustainable alternative to driving. It has a reduced impact on roadways, both in terms of space consumed and infrastructure maintenance required. Shifts from driving to walking or bicycling reduce vehicle miles traveled and congestion, fuel consumption, and emissions of CO_2, CO, NO_x, and VOCs.

Public Health

Active transportation integrates physical activity into everyday life. This can lead to decreased rates of obesity, diabetes, heart disease, high blood pressure, and other ailments. Children who walk or bike to school are more attentive, better able to concentrate, and have mental alertness one-half school year more advanced than their less active peers.[2]

Economic Vitality

An increase in bicycling and walking has a variety of positive economic impacts. Customers arriving by bicycle or foot are more likely to shop locally, which is beneficial to the economic strength and stability of the community. Though spending less per trip than motorists, they tend to spend more over the course of a month.[3] Pedestrian infrastructure can also support a more vibrant community, boost property values and sales revenues, and spur private investment.

Safety

Safety improvements are an essential component to encouraging more people to walk or bike. Investments in bicycle and pedestrian infrastructure also improve safety for all roadway users. High vehicle speeds can inhibit a driver's ability to react to activities happening along the roadway and narrow a driver's peripheral vision. Traffic calming enhancements reduce crash severity for all modes and create a more attractive environment for active transportation.

1 National Highway Travel Survey, 2009

2 Egelund, N. et al., Mass Experiment, 2012

3 Popovich and Handy, Bicyclists as Consumers, 2014

4 Existing Conditions

The project team conducted an analysis of the Borough's existing assets, including key trip generators such as schools, parks, employment centers and houses of worship. Existing road, bike, and pedestrian infrastructure conditions were determined and a crash analysis was conducted. A bicycle level of traffic stress (LTS) provides an analysis of the level of comfort for cyclists on each of the Borough's streets. This inventory and study of existing conditions provides insight into the priority intersections and corridors requiring more detailed analyis.

KEY LOCATIONS

Locations likely to attract a high number of pedestrian or bicycle trips were inventoried and mapped as shown in Map 7. Key destinations were split into the following categories.

Schools

- Bartle Elementary School - 435 Mansfield St
- Irving Primary School - 121 S 11th Ave
- Highland Park Middle School - 330 Wayne St
- Highland Park High School - 105 N 5th Ave

Parks

- Johnson Park
- Donaldson Park

Municipal

- Highland Park Borough Hall - 221 S 5th Ave
- Highland Park Public Library - 31 N 5th Ave
- Highland Park Senior Center - 220 6th Ave
- Highland Park Teen Center - 600 Benner St

Transit

- New Brunswick NJT Station
- NJT bus stops along NJ 27 and Woodbridge Ave

Commercial Area

- NJ 27, Adelaide Ave to Woodbridge Ave

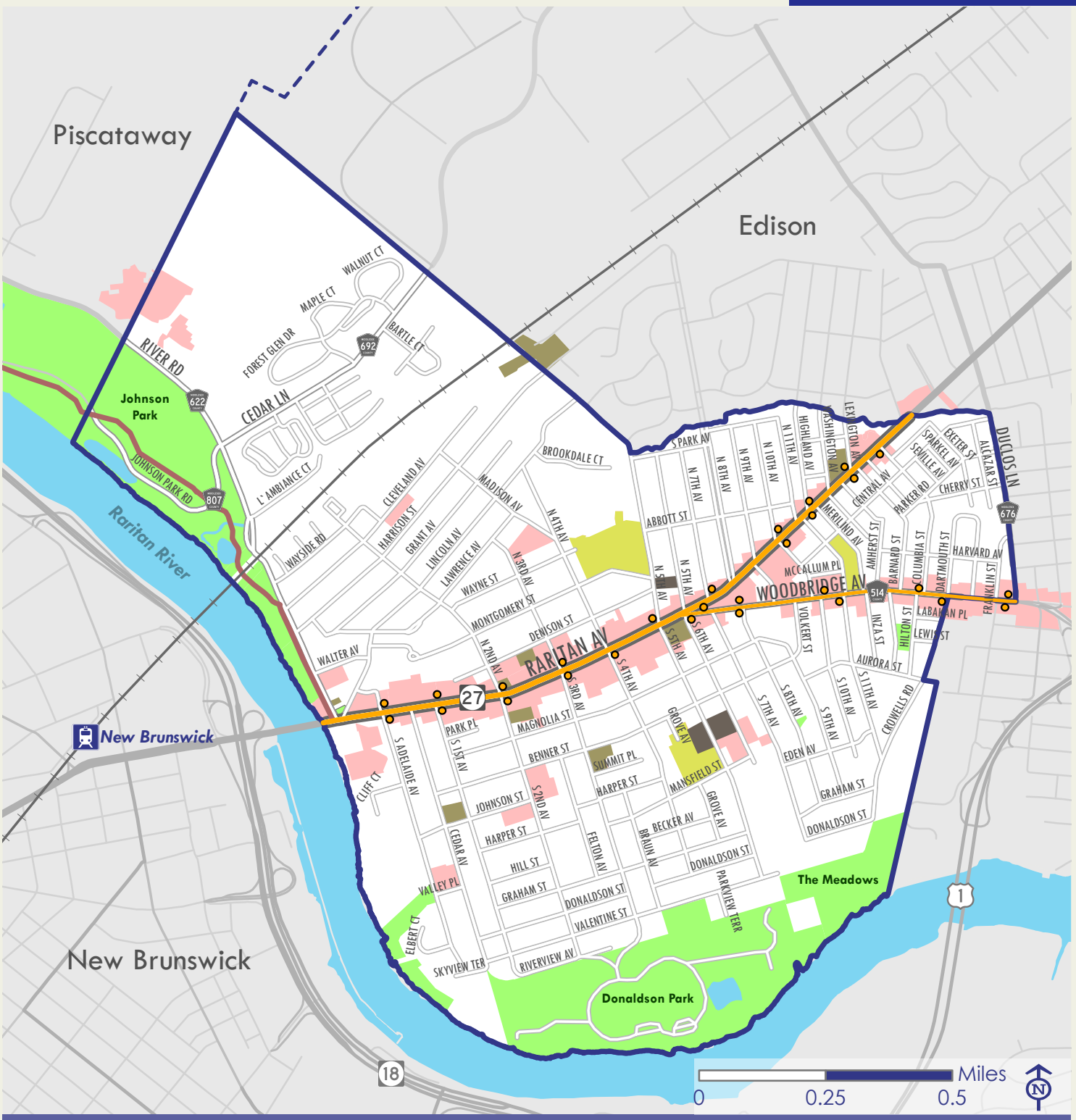
Houses of Worship

- First Baptist Church - 5 N 2nd Ave
- Reformed Church of Highland Park - 19 S 2nd Ave
- Trinity United Methodist Church - 417 Montgomery St
- St. Paul Apostle Church - 502 Raritan Ave
- Highland Park Conservative Temple - 201 S 3rd Ave
- Saint Mary of Zyrovicy Belarusian Autocephalous Orthodox Church - 9 River Rd
- Highland Park Multiethnic Church - 301 N 4th Ave
- Transfiguration of the Lord Parish - 23 S 5th Ave
- Congregation Ahavas Achim - 216 S 1st Ave
- Congregation Ohav Emeth - 415 Raritan Ave
- Congregation Etz Ahaim - 230 Denison St

Employment Centers

- Municipal buildings, schools, and businesses on NJ 27 and Woodbridge Ave

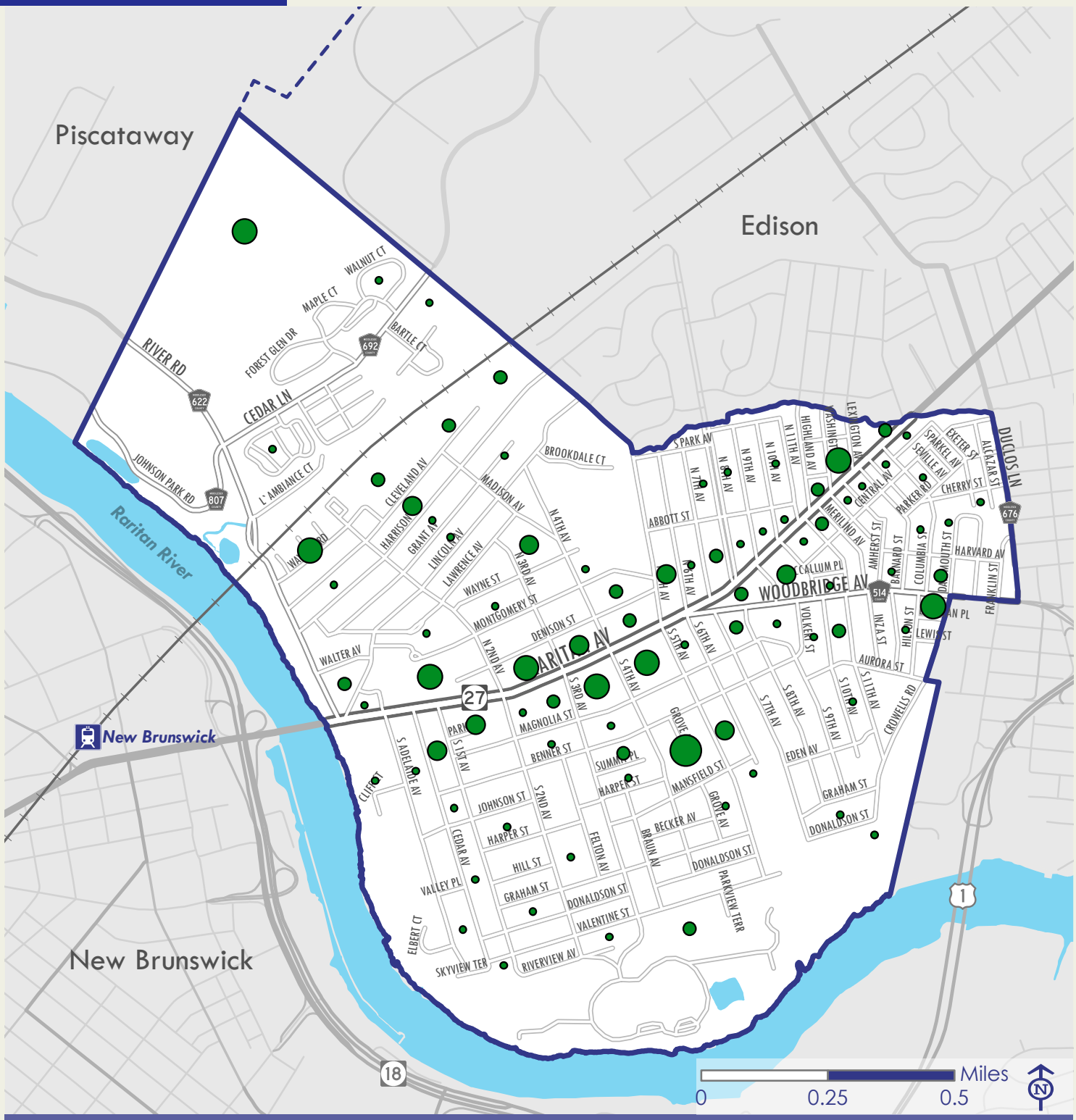
Though the commercial, retail and transportation hub of Highland Park is on Raritan Ave, pedestrian and bike generators are located throughout the Borough. Therefore, improvements have been recommended Borough-wide to enhance trips from all corners of Highland Park. This inventorying of key destinations, in addition to public outreach, is essential for judging demand for improved pedestrian and bicycle infrastructure. Employment locations are presented in Map 8.



Map 7-Major Destinations

HIGH LAND PARK BIKE WALK

- Train Station
- Northeast Corridor
- Highland Park Boundary
- Other Municipal Boundary
- NJ Transit Bus Stop
- East Coast Greenway
- NJ Transit Bus Route
- Place of Worship
- Commercial
- School
- Municipal Building



Map 8-Employment Concentration

HIGH LAND PARK BIKE WALK

- Train Station
- Northeast Corridor
- Highland Park Boundary
- Other Municipal Boundary

- <15
- 16-40
- 41-75
- 76-125
- >125

CRASH ANALYSIS

Crash Locations

The project team reviewed Borough-wide NJDOT crash data to identify the location of recent bicycle and pedestrian crashes and areas where repeated incidents or crash clusters have occurred (Maps 9 and 10). The analysis included data between 2013-2017 covering 519 crashes, including 32 involving pedestrians and 17 involving cyclists.

The location of pedestrian and bike crashes are very similar to the Borough-wide distribution of all crash types. Crashes are concentrated along Raritan Ave, Woodbridge Ave, and River Rd. Along Raritan Ave, high crash intersections include River Rd, 4th Ave, and 10th Ave. The intersection with River Rd has high volumes and turning movements which can lead to crashes. Many vehicular crashes at this intersection were rear-end crashes, likely due to congestion and the need to brake quickly.

The project team also analyzed Borough-wide bicycle and pedestrian NJDOT crash data to identify any common roadway, environmental, behavioral or demographic trends. Prevalent trends indicate areas where targeted engineering or educational strategies can improve safety. Most pedestrian crashes occured along Raritan Ave in downtown Highland Park. This is likely due to the corridor's high pedestrian demand, high turning movements and lack of visibility. It is also possible that motorists speed to catch the green light, consequently conflicting with crossing pedestrians. Bicycle crashes occured in similar areas along Raritan Ave where bike demand is high.

NJDOT provides crash summary reports for crashes statewide. The data is divided by road system: municipal, county, state and interstate. These crash summary reports were compared to crashes in Highland Park to determine if any type of crash was overrepresented. While only bike and pedestrian crashes were analyzed here in Highland Park, the statewide crash summary reports include data concerning all types of crashes. While the statewide summary reports include ten's of thousands of crashes, the Highland Park data includes only 49 total bike or pedestrian crashes. Thus, though it is helpful to compare these trends, the trends presented in Highland Park may not be generalizable over a longer period of time.

Installing dedicated bicycle facilities helps reduce the likelihood and severity of crashes with bikes by creating space and separating cyclists and motorists. Pedestrian crashes can be reduced by installing curb extensions to promote visibility, implementing traffic calming techniques to discourage speeding, and promoting enforcement measures to discourage illegal and dangerous behaviors.

The graphic on page 24 illustrates the relationship between speed and crashes.

State Roads

Crashes on State roads at night in Highland Park are overrepresented. Eight of the nine crashes at night on State roads were at a location where the street light was on. Though lighting was present, the light's bulb may not have been sufficiently bright. Speeding is more likely to occur at night when volumes are low and there is less police presence. This can increase the prevalence of crashes.

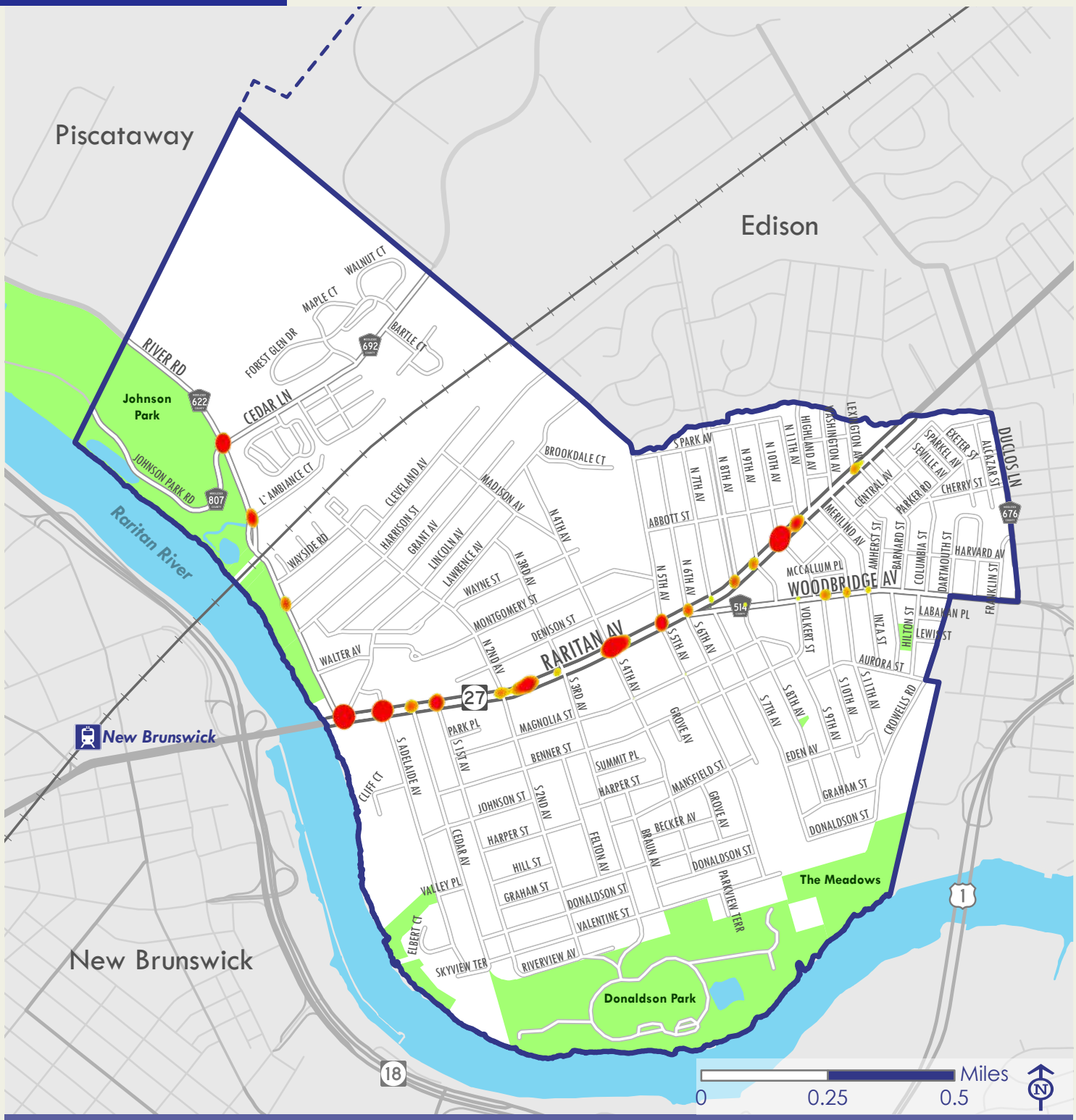
Highland Park also had a much higher portion of severe or fatal crashes on State roads. While 74% of statewide crashes on State roads result only in property damage, with 21% involving a minor complaint of pain, in Highland Park 43% involved a minor complaint of pain, 33% resulted in moderate injury and 14% (3 crashes) resulted in a fatality. The portion of crashes located away from an intersection on State roads were also overrepresented in Highland Park. These mid-block crashes are more likely to result in serious injury as motorists drive faster between intersections. The prevalence of mid-block bike and pedestrian crashes makes it likely that crashes occured with pedestrians crossing mid-block. More safe mid-block crossings would help reduce this.

County Roads

Highland Park's County roads were similarly overrepresented with more severe crashes. 63% of Highland Park crashes involved a minor complaint of pain, compared to 21% statewide. In the Borough, 38% of crashes on County roads involved moderate injury, versus 4% statewide. Highland Park's sample size for County road crashes is very low (8 crashes) so these results may not be statistically significant.

Municipal Roads

Highland Park's Municipal roads were also overrepresented with more severe crashes. 72% of Highland Park municipal crashes involved a minor complaint of pain, versus 15% statewide. While 81% of statewide municipal crashes involved property damage only, this figure is 17% in Highland Park.

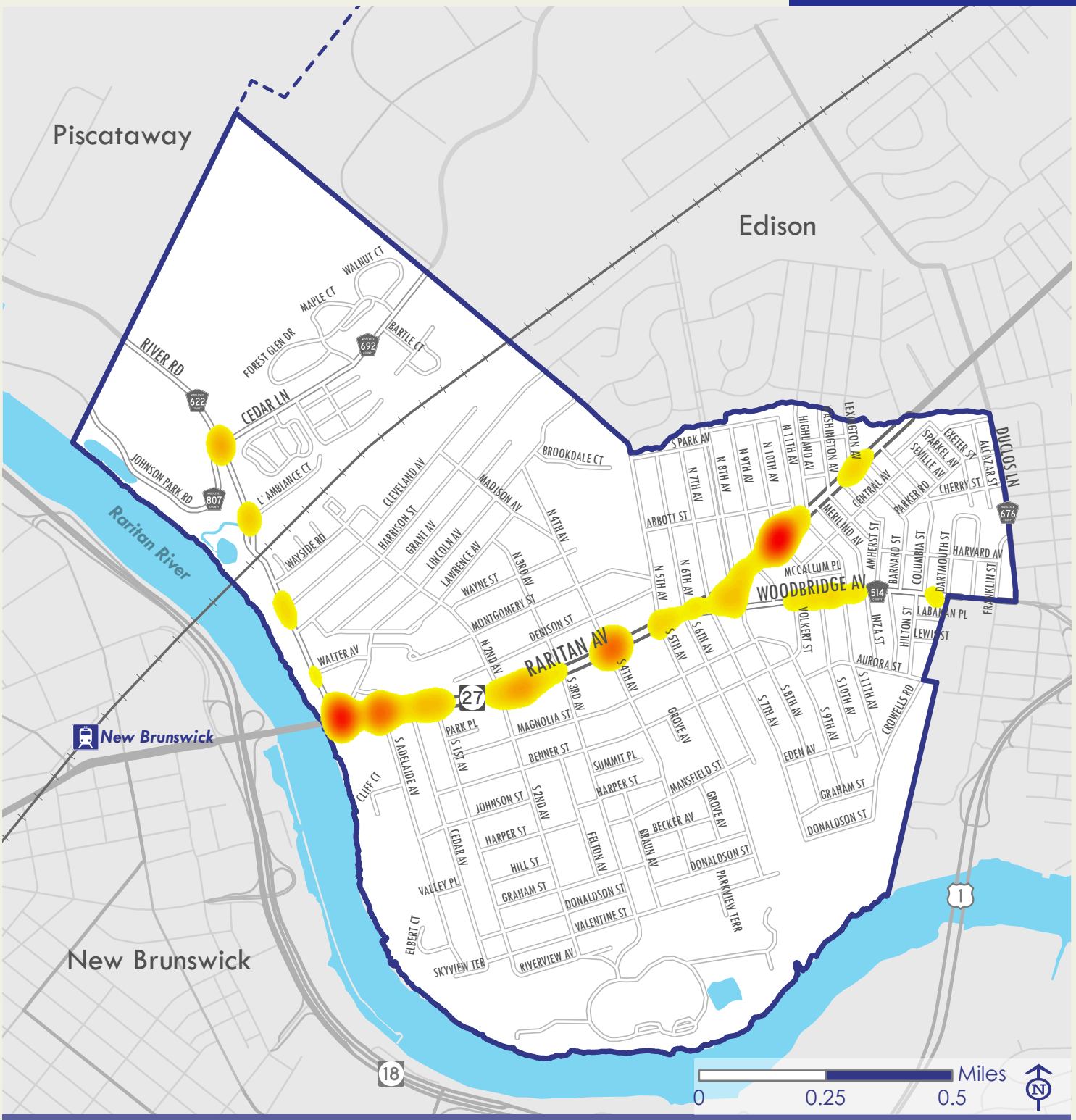


Map 9-Crash Hotspots (Bicycle/Pedestrian, 2013-2017)*

HIGHLAND PARK BIKE WALK

- Train Station
- Northeast Corridor
- Highland Park Boundary
- Other Municipal Boundary
- High Concentration of Crashes
- Low Concentration of Crashes

*includes 49 crashes



MAP 10: Crash Hotspots (All Crashes, 2013-2017)*

HIGH LAND PARK BIKE WALK

- Train Station
- Northeast Corridor
- Highland Park Boundary
- Other Municipal Boundary
- High Concentration of Crashes
- Low Concentration of Crashes

*includes 519 crashes

Effect of Vehicle Speed on Safety

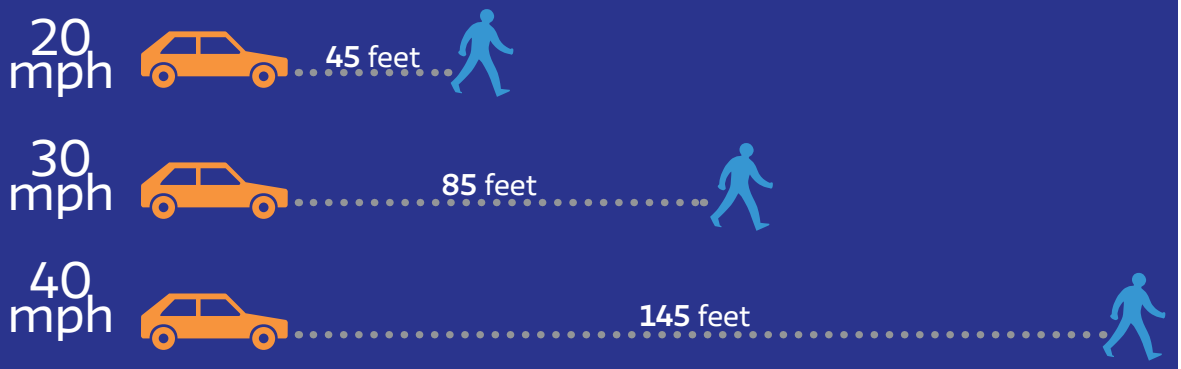
The traveling speed of a motor vehicle is one of the primary determining factors on the likelihood and severity of a crash. Faster travel increases stopping distance and the severity of a crash, and decreases the driver's field of vision.

Effect of driver speed on **crash survival rates:**

Hit by a vehicle traveling at...

Effect of driver speed on **minimum stopping distance:**

Stopping distance for a vehicle traveling at...



Effect of speed on **driver peripheral vision:**

10-15 mph | **20-30 mph** | **30-40 mph** | **45+ mph**

ROADWAY NETWORK

Roadway Jurisdiction

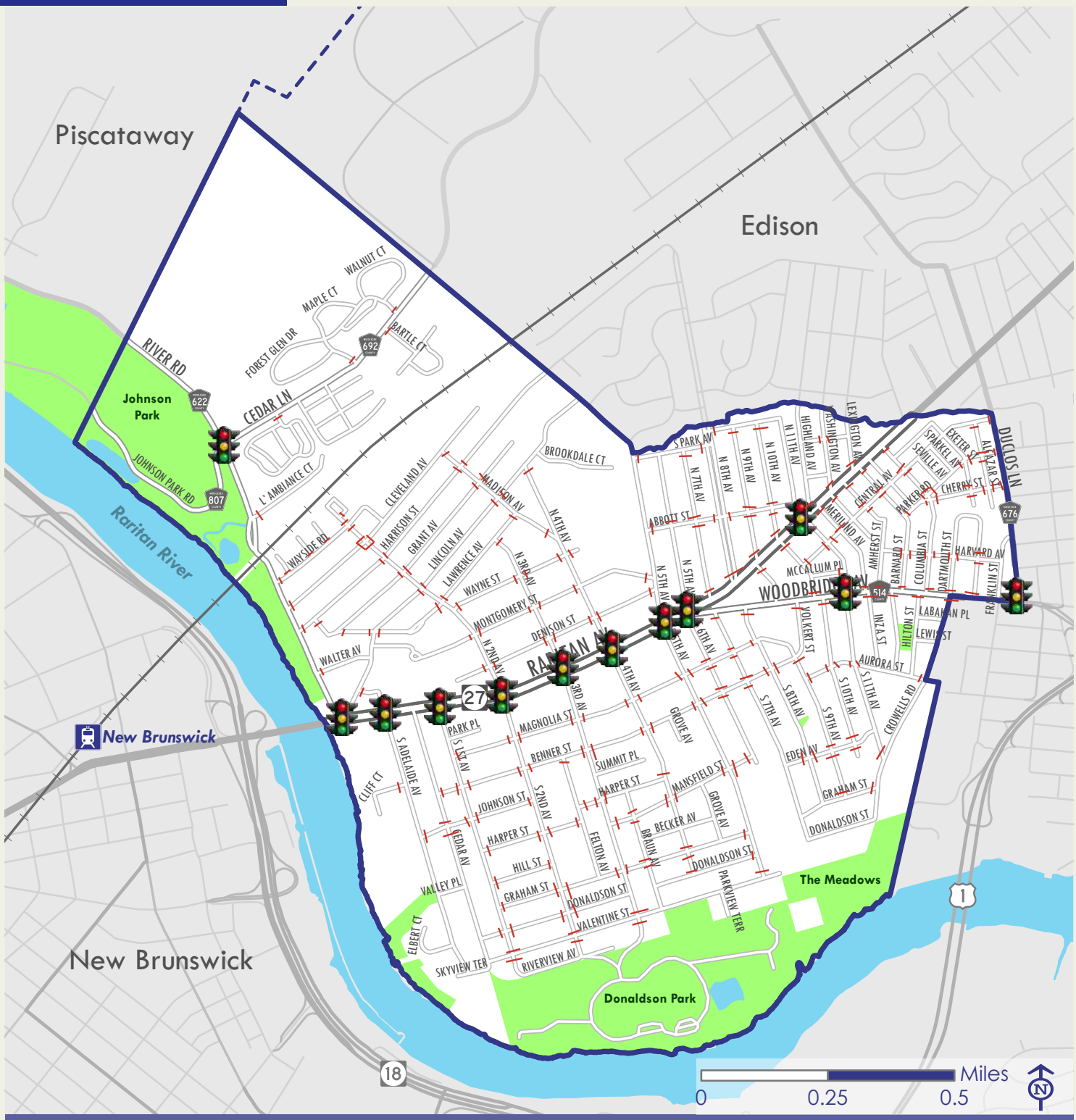
Jurisdiction of Highland Park's roads varies between local, county and state authority. All changes to the road network require local approval and input, but improving non-local roads requires more oversight and different funding sources. Local roads account for 86% of the Borough's street miles, the County 10% and State 4%. The most heavily traveled corridors for motorists, bikes and pedestrians fall under County and State jurisdiction.

NJ 27 is the only state road within Highland Park. Woodbridge Ave (CR 514), Duclos Ln (CR 676), River Rd (CR 622), Cedar Ln (CR 692) and Johnson Park Rd (CR 807) all fall under the jurisdiction of Middlesex County. More details about these routes are provided on page 4. All other roads are local and maintained by the Borough.

Traffic Controls

An inventory of Highland Park's traffic signals and stop signs was conducted to understand the Borough's traffic network and consider changes to these traffic control devices (see Map 11). Nine of the Borough's 12 traffic signals are located on NJ 27, two on Woodbridge Ave and one on River Rd. Stop signs are located throughout the Borough though primarily on east-west roads except for intersections with Woodbridge Ave and Raritan Ave.

Raritan Ave at Duclos Ln



Map 11-Traffic Controls

HIGH LAND PARK BIKE WALK

- Train Station
- Northeast Corridor
- Highland Park Boundary
- Other Municipal Boundary
- Traffic Signal
- Stop Sign

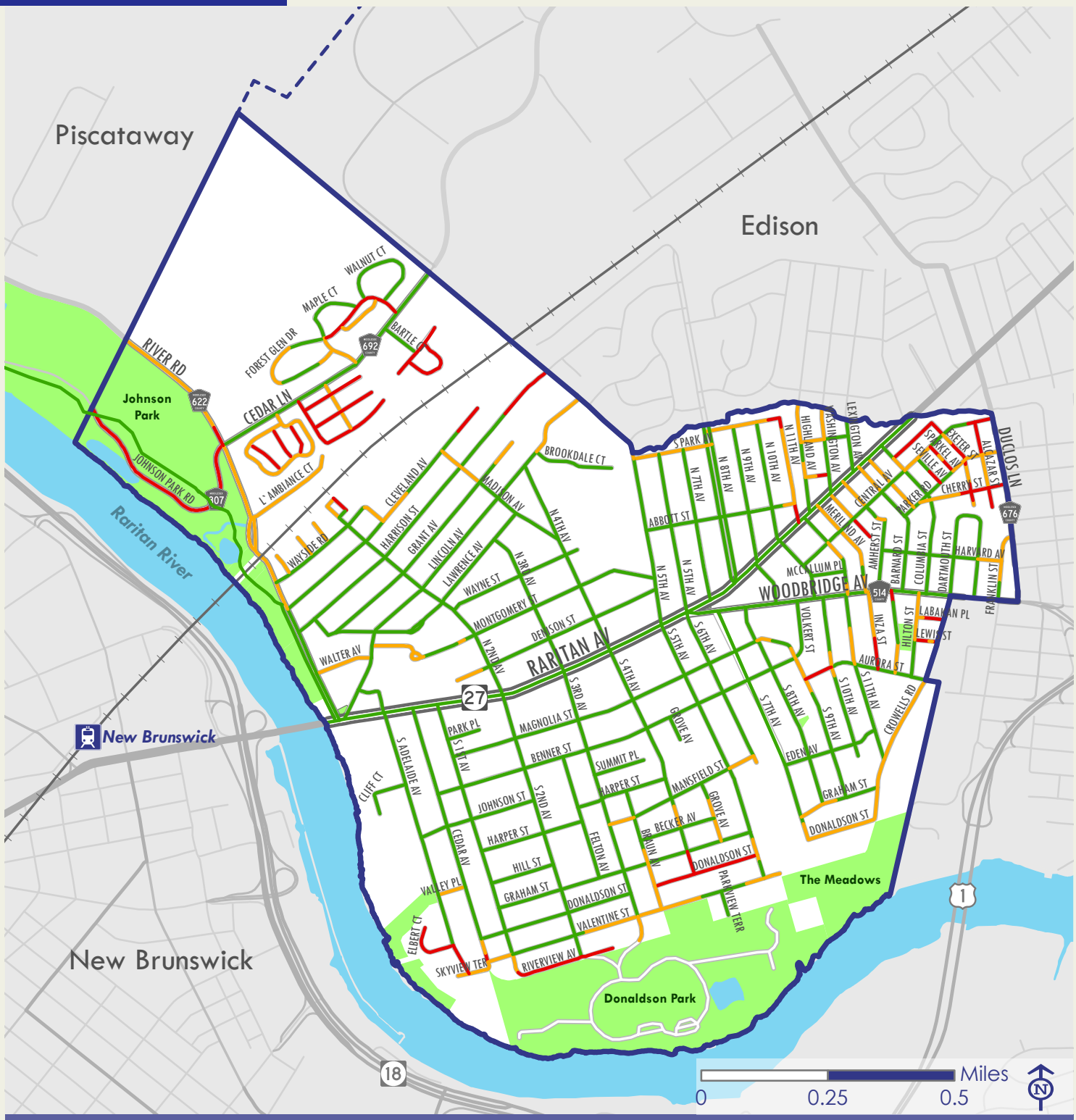
PEDESTRIAN FACILITIES

Sidewalk Network

An inventory of Highland Park's existing sidewalk network was conducted using Google Maps and field observations (see Map 12). Of Highland Park's 32+ miles of streets, 2.76 miles (9%) are without a sidewalk, 5.9 miles (18%) have a sidewalk on one side of the street and 23.6 miles (73%) have sidewalks on both sides.

The entirety of Raritan Ave, Woodbridge Ave, and Cedar Ln have sidewalks on both sides. Portions of River Rd have sidewalks on both sides and portions on only one. Duclos Ln and Johnson Park Dr have no sidewalks. Most streets near the central hub of NJ 27 have sidewalks on both sides while streets with one or no sidewalks lie on the periphery of the Borough.

Cedar Ln at Leia Ln



Map 12-Sidewalk Inventory

- Train Station
- Northeast Corridor
- Highland Park Boundary
- Other Municipal Boundary
- Sidewalk Present on Both Sides
- Sidewalk Present on One Side
- No Sidewalk Present

BICYCLE NETWORK

Existing Facilities

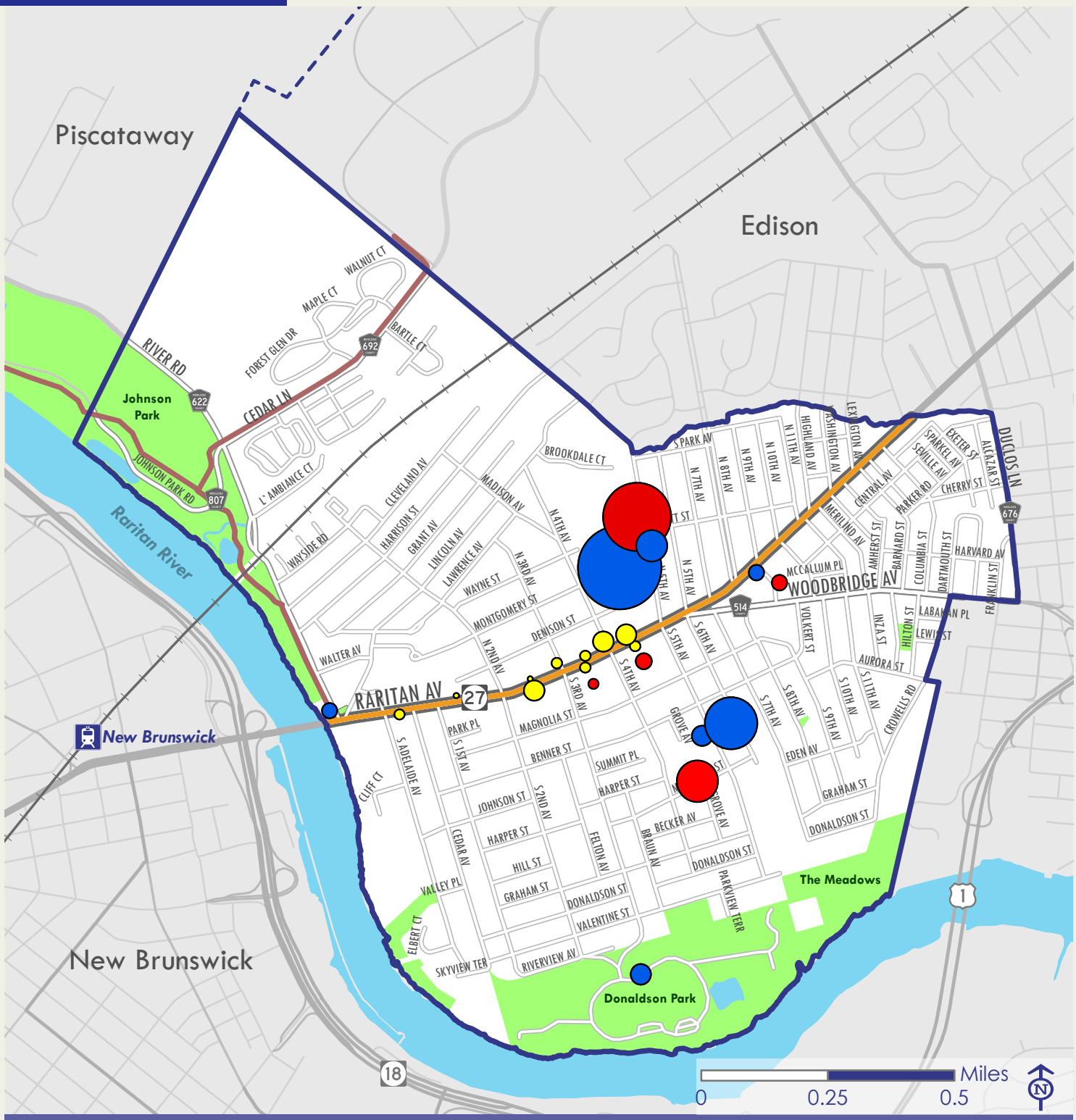
Off-road bicycle facilities exist in Donaldson and Johnson Parks. The path through Johnson Park continues northwest to Rutgers University's Piscataway campus. An off-road trail begins at the intersection of River Rd and Cedar Ln and travels northeast along Cedar Ln into Piscataway. The East Coast Greenway operates on-road along Woodbridge Ave and Raritan Ave and along off-road trails through Johnson Park. The entirety of NJ 27 in the Borough has shared lane markings.

Bike Parking

Bicycle parking facilities are necessary to extend bicycle use from a recreational opportunity to a feasible mode of transportation. An inventory of existing bicycle parking facilities was conducted through field analysis (see Map 13). Total bike parking within the Borough amounts to 199 bike spots. This includes 46 "wave" racks, accommodating 92 bikes, 24 "inverted U" racks accommodating 48 bikes and 59 "schoolyard" racks accommodating 59 bikes. "Wave" racks are located at municipal buildings, Donaldson Park, Highland Park High School and The Studio Health/Fitness/Martial Arts. "Inverted U" racks are all located on NJ 27 in the central business district. "Schoolyard" racks are located at Highland Park High School/Middle School, Irving School, Bartle Elementary School, Rite Aid and Stop and Shop. There are no bike racks in Johnson Park. Care must be taken when siting and installing bicycle parking to ensure its usability. Multiple existing bike parking facilities in Highland Park are too close to curbs, parked cars and/or bushes, reducing the parking capacity of the facility.

Bike parking at Donaldson Park

Bike parking at Highland Park Senior Center



MAP 13: Existing Bicycle Facilities

HIGH LAND PARK BIKE WALK

Train Station
Northeast Corridor
Highland Park Boundary
Other Municipal Boundary

Bike Facilities
Shared-use Path
Shared Lane Markings

Bike Parking
Inverted U
Schoolyard (comb)
Wave

Bicycle Level of Traffic Stress

Bicycle facilities and infrastructure were inventoried in the study area.

Bicycle level of traffic stress (LTS) measures a cyclist's expected comfort given the current conditions of the roadway. Each bicyclist has different tolerances for stress created by the volume, speed, and proximity of automobile traffic. The LTS metric is based on the Dutch concept of low-stress bicycle facilities. In general, lower stress facilities have increased separation between cyclists and vehicular traffic and/or lower speeds and traffic volumes. Higher stress environments generally involve cyclists riding in close proximity to traffic, multi-lane roadways, and higher speeds or traffic volumes, a condition undesirable for most cyclists. Based on an analysis of the criteria, the LTS for a given roadway segment is classified into one of four categories:

Level of Traffic Stress 1: tolerated by most users (including children and seniors)

Level of Traffic Stress 2: tolerated by most adults

Level of Traffic Stress 3: tolerated by "enthusiastic" riders who might still prefer dedicated space

Level of Traffic Stress 4: tolerated by only the most experienced riders

The LTS metric measures the bicycle network from the user's perspective. As such, the metric accounts for the ability of a user to move between points unimpeded by higher stress environments. Therefore, the stress analysis accounts for the change in stress level a user might encounter at an intersection. For example, if a user is riding on a road with a stress level of 1, but desires to cross a road with a stress level of 4, the trip would no longer be considered low stress. High stress roads, often arterials and primary connectors, can reduce bicycle connectivity, impeding a user's ability to travel to a desired destination, and discouraging wider cycling use. One goal of this plan is to provide low-stress bike connections by addressing key deficiencies on high stress roadways.

The LTS was evaluated for all roads in the Borough (see Map 14). The project team assessed major roadways and key minor roadways in the study area using a variety of data sources, including base mapping, GIS data files and NJDOT Straight Line Diagrams and traffic data. The team also conducted field evaluations to take measurements and verify the various roadway features, character, parameters, and user behavior. For many of the local roads in the study area, basic assumptions were made for their typical characteristics, such as traffic volumes and roadway width. Additionally, LTS includes factoring in the posted speed limit of a corridor, but not the actual (or prevailing) speed limit.

Most streets in Highland Park are residential streets with low traffic speeds and volume, making them LTS 1 roadways accessible to all cyclists. Though having a higher speed limit and limited roadway space, part of River Rd received an LTS of 1 due to a parallel dedicated bicycle path; negating the need to ride in mixed traffic.

LTS 2 streets consist of road segments intersecting with an LTS 3 or 4 road lacking a traffic signal. Due to the presence of the higher LTS roadway, these intersections are difficult to cross.

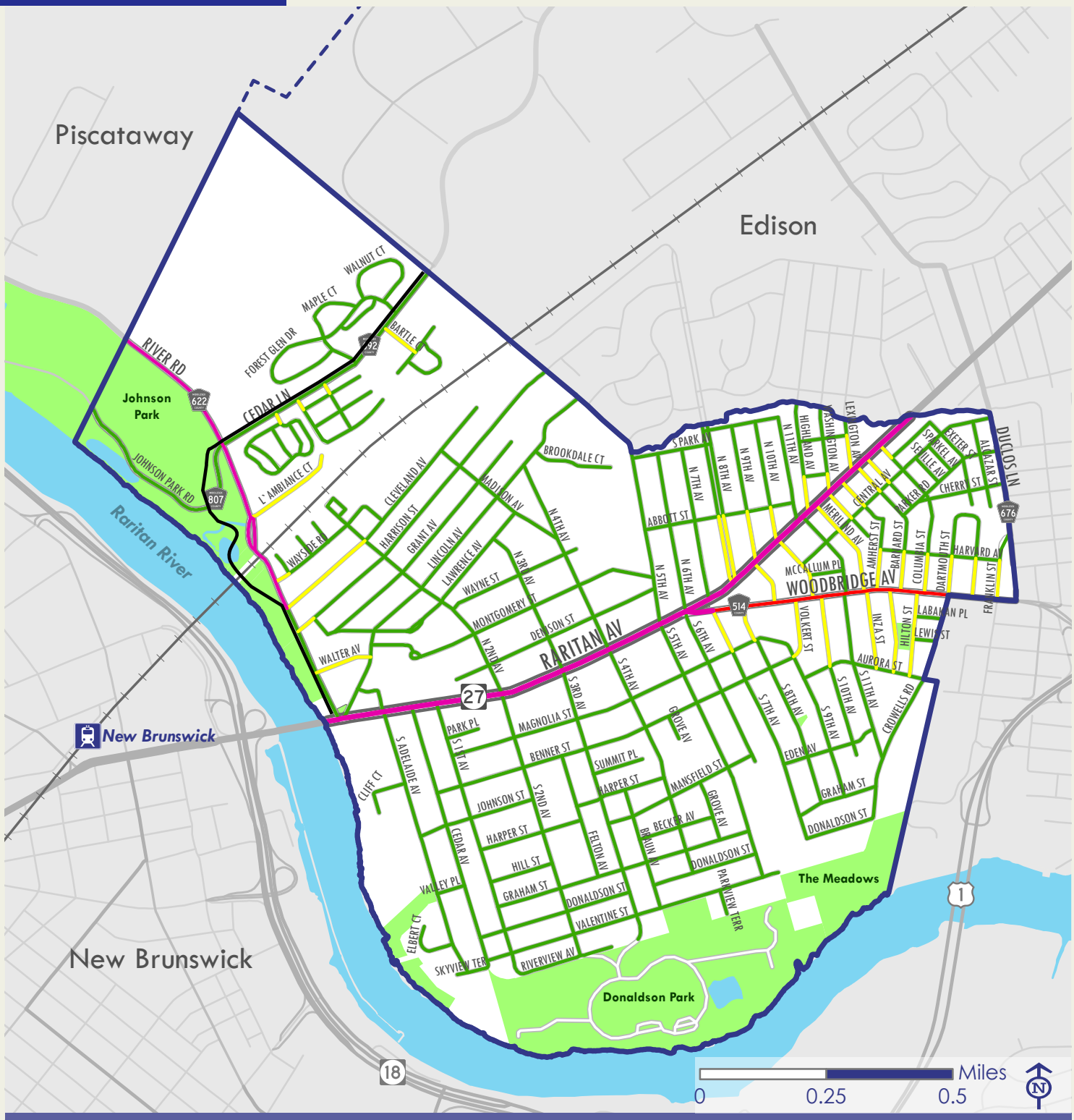
The only LTS 3 streets are Woodbridge Ave and River Rd, both County roads with higher traffic volumes and more thru-traffic than local roads.

The entirety of NJ 27 received an LTS of 4 due to traffic volumes, high speeds and in some parts, the presence of multiple travel lanes.

All Highland Park public schools are on LTS 1 roadways.

Assuming each LTS level cyclist only rides on roads matching their comfort level, existing conditions create a fragmented system of islands, separating riders from other neighborhoods. The north and south portions of the Borough are separated by NJ 27.

Map 15 shows LTS Islands, emphasizing the difficulty for many cyclists to comfortably ride between points within Highland Park and beyond. Though it may appear relatively easy to travel between north and south portions of Highland Park, this measure does not account for driver behaviors and conditions specific to each road. From public feedback, crossing Raritan Ave is a major concern, and, as a result will be a focal point for recommendations.



Map 14-Existing Bicycle Level of Traffic Stress (LTS)

HIGH LAND PARK BIKE WALK

- Train Station
- Northeast Corridor
- Highland Park Boundary
- Other Municipal Boundary
- Existing East Coast Greenway
- Level of Stress 1
- Level of Stress 2
- Level of Stress 3
- Level of Stress 4

Map 15-LTS Islands

While the majority of Highland Park's roadway network is LTS 1, as shown above, Raritan Avenue and Woodbridge Avenue present major barriers between the north and south sides of the Borough. A final barrier, Cedar Ln, exists in the north of the borough where it separates the numerous apartment communitiies in the north to the retail and social hub along Raritan Ave.

ACCESS

Park Access

Each entrance into Donaldson Park has sidewalks on one side of the street. The east side of River Rd in front of Johnson Park has sidewalks while the west side has a dirt/mud path.

School Access

Most of the Borough's schools have adequate sidewalk access. Irving Primary School on S 11th Ave has sidewalks on both sides of the street immediately in front of the school though sidewalks on the opposite side disappear a block away.

Access to Neighboring Communities

The only street connecting Highland Park to Piscataway is River Rd. Entering Piscataway, the eastern sidewalk disappears while the western path is dirt/mud. Low LTS streets connect Highland Park to Edison to the east. Duclos Ln traverses the Highland Park-Edison border. Duclos Ln's narrow right-of-way creates difficult conditions for biking. NJ 27 west of the Edison border has sharrows, but Edison does not.

A frequent concern from Highland Park residents is the desire and difficulty of crossing the Raritan River into New Brunswick along the Albany Street Bridge. Sidewalks are present on both sides of the bridge, but are too narrow to safely accommodate the high volume of cyclists and pedestrians using the bridge. Upon entering New Brunswick or Highland Park, high-traffic intersections make pedestrians and cyclists feel unsafe with crosswalks missing along some legs.

Donaldson Park

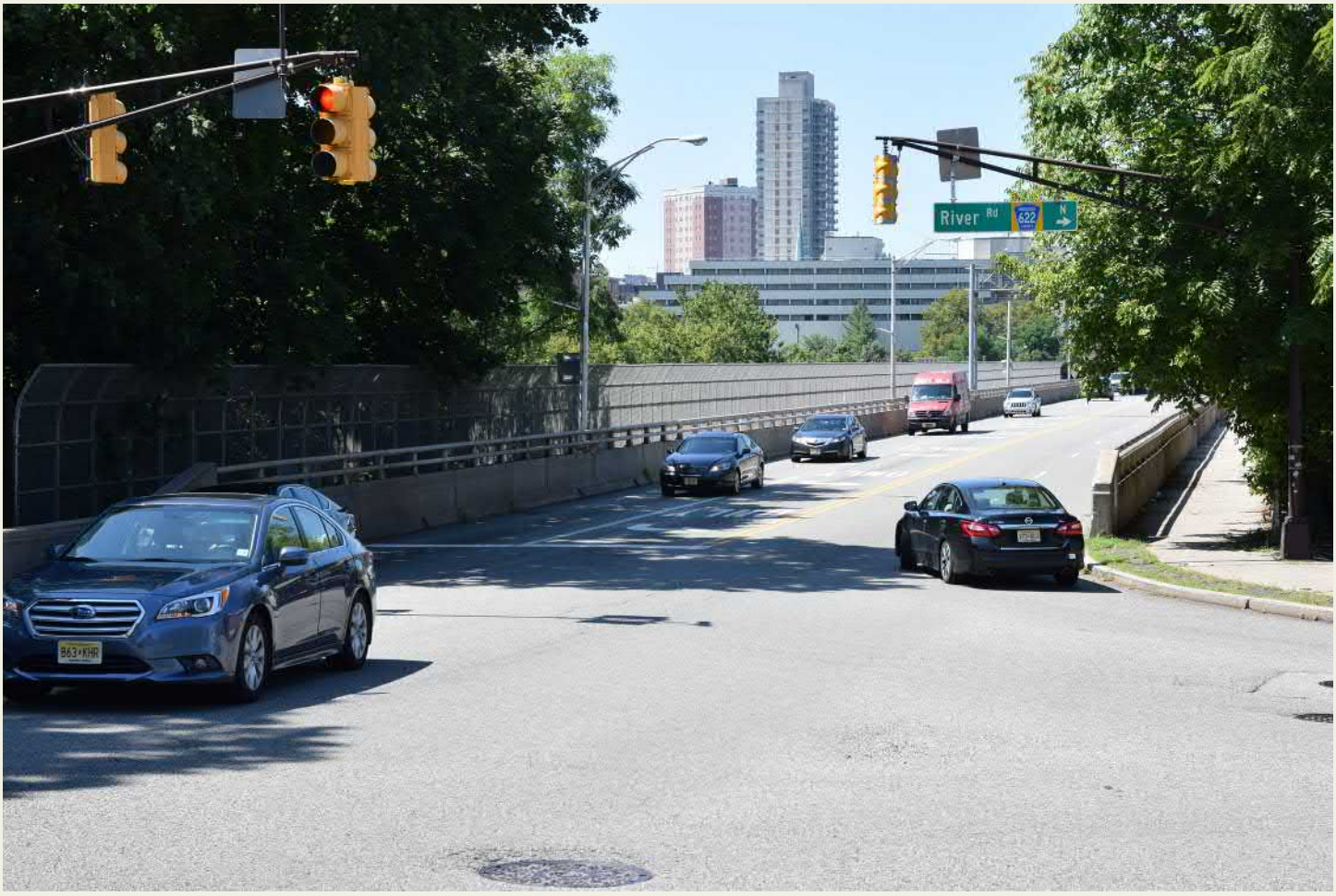
PRIORITY INTERSECTIONS

As a result of the existing conditions analysis, public input, and review of previous studies, several key intersections, issues, and themes were identified for emphasis in the development of improvement recommendations. These include:

- Highland Park's compact size, relatively high density, and proximity of schools, parks, and the downtown to residential neighborhoods are conducive to convenient walking and biking trips
- Substantial public desire to improve biking between north and south Highland Park across NJ 27 and between Highland Park and and New Brunswick

Priority Intersections

- NJ 27 & Woodbridge Ave
- NJ 27 & River Rd
- River Rd & Wayside Rd
- Benner and S 4th St
- NJ 27 & Washington Ave



Raritan Ave at River Rd

5 Programs and Policies

While proper design and physical infrastructure improvements are essential to creating a safe, comfortable, and convenient environment for bicycling and walking in Highland Park, they are only part of the process. Underlying policies and programs sponsored by the Borough, as well as partnerships with non-governmental organizations and local businesses, can help create a successful and sustainable bicycle and pedestrian friendly community, supporting and promoting higher rates of bicycling and walking, and fostering mutual respect among all roadway users. Efforts should include educational programs, encouragement initiatives, and enforcement activities.

EDUCATION

Educational programs provide all roadway users – cyclists, pedestrians, and motorists – with information about their rights and responsibilities and applicable laws. These efforts increase general awareness and promote courteous and safe interactions. Educational programs can include a simple distribution of information in a wide range of formats to improve motorist, cyclist and pedestrian awareness, and understanding of traffic laws and safe practices. Larger efforts can include a more structured, hands-on training program to improve individual skills and abilities. Educational programs should be tailored to specific audiences, such as school-age children, parents, adults, seniors, and motorists.

Specific recommendations for the study area include:

- Work with North Jersey Transportation Planning Authority (NJTPA) and Keep Middlesex Moving Transportation Management Association (TMA) Distribute public service announcements (PSAs) and brochures concerning topics such as speeding, safe bicycling, how to bicycle with traffic, proper helmet usage, bicycle routes, and safe pedestrian behavior.
- Utilize materials from NJTPA Street Smart program. This includes webinars, fact sheets, and posters encouraging safe road sharing practices for all users.

  Materials can be posted or distributed at the Highland Park Public Library, Borough municipal office, schools, and/or community events.

  PSAs can also be printed in the local newspaper or posted on the Highland Park Borough website or social media site. Resources with safety information and brochures include: the Keep Middlesex Moving TMA; NJDOT's Bicycling in New Jersey and Pedestrian Safety websites; the Pedestrian and Bicycle Information Center, a national clearinghouse of information related to walking and bicycling sponsored by the FHWA and operated by the University of North Carolina Highway Safety Research Center; and the National Highway Traffic Safety Administration (NHTSA).
- Emphasize distribution of information to parents of Highland Park school children who walk and bike to school. Coordinating with school officials is the most effective way to distribute safety information.
- Work with nearby municipalities including New Brunswick, Edison and Piscataway, along with the TMA to develop a brochure tailored to the regional needs of bicyclists and pedestrians and how they can travel seamlessly between the municipalities to their destinations.
- Integrate bicycle and pedestrian educational programs into school curriculums. Highland Park's schools are located in walkable neighborhoods though many children do not walk to school due to feeling unsafe in such traffic conditions. Educational programs tailored for children should be an important element of the overall community campaign to support and foster lifelong safe bicycling and walking habits. Several types of resources are available:

  - Traffic Safety Learning Progression Component: Funded by the Division of Highway Traffic Safety and developed by Kean and Rowan Universities, the curriculum includes lessons on pedestrian, bicycle, and traffic safety. It is an ongoing educational program with lesson plans on several pedestrian safety issues tailored to each age group with interactive activities. These materials are available to all New Jersey schools free of charge. Kindergarten through Grade 8 lesson plans can be found at http://bianj.org/prevention/childhood-safety/pedestrian-safety/ and Grade 9-12 lesson plans at http://teensafedriving.bianj.org/submit-a-lesson-plan/.
  - Other programs, such as the NJ Safe Routes to School Resource Center's curriculum based on Bikeology is available on the New Jersey Safe Routes to School website, WalkSafe®, BikeSafeTM, and Safe Kids also offer educational materials and other activities focused on school-aged children.
  - The New Jersey Safe Routes to School Initiative website also provides numerous resources concerning policies and cost estimates for pedestrian improvements;
- Partner with local community groups, schools, the police department, businesses, local advocacy groups, or other interested parties to organize bicycle training through the League of American Bicyclists (LAB). The LAB offers a range of courses by certified instructors for different ages and abilities. These interactive training courses are a good way to educate cyclists on traffic rules and safety equipment, as well as to practice cycling skills enabling novices and experts to ride confidently and safely with traffic.
- Provide training for local officials, planners, engineers, and public works staff to support Complete Streets implementation. Highland Park's adoption of a Complete Streets policy in 2013 ensures transportation projects should provide for all expected users, including pedestrians and cyclists. Providing training on effective implementation and maintenance would reinforce the Borough's policy and help make it part of all future transportation investments in the study area. NJDOT has resources available online and periodically provides training workshops.
- Keep Middlesex Moving TMA also provides technical expertise and educational resources to support local Complete Street initiatives, including:
  - Supporting the annual Bike to Work Week.
  - Offering comprehensive Safe Routes to School outreach and educational programs.
  - Presenting about pedestrian safety in schools, including topics such as yielding to cars, pedestrian signal indicators, distracted driving, and more.
  - Organizing a "walking school bus" and providing a step by step guide to faculty and parents.
  - Presenting about bicycle safety in schools, including topics such as helmet fitting, where to ride on the road, rules of the road, hand signals, visibility and predictability, and more.
  - Creating school travel plans laying out suggested steps toward increasing walking and bicycling for a school. A typical travel plan includes the following elements
    - School description
    - Working group and partnership
    - Walk/bike barriers and opportunities
    - Map of school neighborhood
    - Goals and proposed actions
    - Program evaluation and monitoring
- Utilize the Ambassadors in Motion program (AIM) at the Alan M. Voorhees Transportation Center at Rutgers University as a resource for bicycle and pedestrian education. AIM provides training on helmet fittings, bicycle skills, bike safety checks, and other topics related to bicycling and Complete Streets.
- Organize and participate in an NJDOT sponsored senior mobility workshop to discuss barriers to bicycling and walking in the Highland Park senior citizen community and context sensitive solutions to removing these barriers.

ENCOURAGEMENT

Encouraging active modes of transportation has a host of benefits for residents and the community, including better health, reduced road congestion, support for local businesses, reduced environmental impact, and lower per-trip costs. By supporting and promoting walking and bicycling activities, the Borough can spur a change in travel habits among residents and visitors, and entice residents to walk and bike more regularly. Recommendations include:

- Encourage the use of "Walking School Buses" and "Bike Trains" to promote physical activity for children and parents traveling to and from schools. Walking school buses and bike trains provide an organized and supervised way for children to walk and bike to school, particularly for younger children, and can make walking and bicycling a fun, social activity. Work with school staff, parent volunteers, and the police department to organize the events. Assistance is available through the Keep Middlesex Moving TMA.
- Continue utilizing resources through SRTS and the TMA to provide activities encouraging bicycling and walking at local schools, such as bike rodeos and other events. All Highland Park public schools and the municipality are Gold-level SRTS Recognition Program winners.
- Create and publish an online bike map on the Highland Park municipal website and social media account, highlighting the location of bicycle lanes, off-road facilities, preferred on-road cycling routes, bike parking, and major destinations (schools, businesses, etc). Providing information on Highland Park's bicycle facilities and best routes can encourage more people to bike.
- Highlight pedestrian and bicycle improvements accompanying transportation projects through press releases, websites, and social media. By focusing on these elements and improved conditions, more people would be encouraged to walk and bike.
- Apply to become a Bicycle or Walk Friendly Community. These programs, sponsored by the League of American Bicyclists and the Federal Highway Administration, respectively, not only encourages bicycle use or increased walking by residents, but serve as a potential marketing tool to encourage visitors to travel to the study area.
- Publicize and participate in Bike Month, including events such as Bike to School Day, Bike to Work Day, and Bike to Work Week.
- Ensure Rutgers' future bike share program includes ample stations in Highland Park.
- Collaborate with New Brunswick's Ciclovia, which closes three miles of streets to car traffic for one day, encouraging biking, walking and community activities. Though closing the Albany Street Bridge may be infeasible, Highland Park can attract visitors and promote walking and biking with a partnered Ciclovia event.
- Participate in Park(ing) Day or other temporary implementation events as a way to pilot an idea and demonstrate different ways to utilize public space. Typically held annually in September, cities and towns around the world use Park(ing) Day to temporarily convert a parking space into a parklet (photo below). A parklet is a small public space that can include planters, greenery, or street furniture, among other things. Like any "tactical urbanism" event, Park(ing) Day is an opportunity to collaborate with and engage residents, businesses, and other interested stakeholders to think creatively about the community's streets and public spaces and test ideas using temporary materials. This allows residents to visualize other uses of the street and see first-hand how the street would function. Temporary installations can spur new ideas or refine initial concepts, and lead to more permanent installations. In New Jersey, communities such as New Brunswick and Morristown have participated in Park(ing) Day, while Princeton and Rahway have implemented longer-term parklets.

ENFORCEMENT

When combined with education, enforcement is a key element to ensuring safe travel for all roadway users. While the police department cannot dedicate a significant amount of resources to enforce traffic regulations, targeted enforcement campaigns, through warnings and tickets, are effective at correcting unsafe behaviors. Safety is a shared responsibility among all roadways users, and enforcement should apply to both motorists (speeding, failure to stop for pedestrians) and cyclists (riding on the wrong side of the street, failure to adhere to traffic control devices). Potential strategies for Highland Park include:

- Implement a pedestrian safety enforcement (PSE) program. A key resource for local police departments is the PSE program sponsored by the NJ Division of Highway Traffic Safety (NJDHTS) with support from NJDOT. The PSE program provides a structured approach to crosswalk compliance enforcement, with training and support for local police officers. It addresses two important contributing factors to pedestrian crashes: driver knowledge of the law and driver yielding behavior. A variety of resources for enforcement are available through the NJDHTS, including grant funding. PSE training workshops are also available through the NJ Bicycle and Pedestrian Resource Center. One common PSE program supported by the NJDHTS is the "Cops in Crosswalks" decoy program. Used in municipalities throughout New Jersey, the program is a targeted enforcement campaign. A plainclothes police officer attempts to cross a marked crosswalk, and drivers who fail to stop for the pedestrian are given a warning or citation. NJDOT provides additional information about PSE programs and resources in its Pedestrian Safety Action Plan Toolbox.
- Institute a community-oriented traffic calming campaign to help raise awareness about speeding and safety.
- Distribute safe behavior tickets to children to positively reinforce their good bicycle and pedestrian behaviors.
- Implement variable message signage and mobile radar units on main roadways throughout Highland Park (e.g., Raritan Ave, Woodbridge Ave, River Rd, Cedar Ln), and near schools to make motorists more aware of their travel speeds.

POLICIES

Supportive local policies can help create avenues to advance infrastructure improvements and facilitate implementation of the plan. This section summarizes several potential policy initiatives.

- Land Use and Development Review: Continue to use the land use and development review process to ensure new development includes appropriate bicycle and pedestrian accommodations. Leveraging private development activity provides an opportunity for the Borough to advance planned improvements and preferred design standards by requiring their integration in development site plans. Potential elements addressed through site plan review include streetscape improvements, filling sidewalk gaps, repairing existing sidewalks, driveway access modifications, and installing bicycle parking. Large scale projects can also include intersection or roadway improvements.
- Bicycle Parking Ordinance: Adopt an ordinance requiring bicycle parking with new development. The ordinance should define minimum short-term and long-term bicycle parking facilities based on land use and size, and define appropriate design standards. Bike parking should also be mandated in vehicular parking facilities. This is further detailed on 82.
- Sidewalk Program: To implement sidewalk maintenance and construction projects, the Borough should continue to require sidewalk repair or installation as a part of new development or major renovation. For properties where sidewalks are not necessary, the developer should contribute to a Borough sidewalk fund used to support sidewalk repair and construction projects in other areas of the Borough. This dedicated sidewalk fund can be supplemented with grant funding and other funding sources. Where applicable, sidewalk improvements should be bundled into other roadway projects to reduce costs.
- Highland Park's Safe Walking and Cycling Committee advises, reviews and monitors implementation of policies and programs affecting active transportation in the Borough. This engaged group of stakeholders should continue working toward promoting safe and convenient biking and walking in Highland Park.
- As illustrated on 94, driveways designed and modified in the future should allow safe pedestrian movement and extend the sidewalk material and grade across driveways.

Another common funding mechanism for sidewalk projects used in New Jersey municipalities is to require abutting property owners to contribute to the costs of sidewalk repairs. Rather than require individual property owners to make repairs themselves, the Borough can consider administering a program where they bundle improvements together to reduce costs. Abutting property owners can be asked to contribute a percentage of the cost, with the Borough covering the remainder through other funding sources.

Along Raritan Ave, the Main Street HP business improvement district can continue collaborating with local businesses to support downtown streetscape projects.

- Public Private Partnerships: The Borough should partner with local business owners to sponsor and maintain bicycle parking, bicycle corrals, and/or parklets near their businesses. These partnerships benefit the business owner through increased patronage and the visitors and residents through improved infrastructure.
- Branding and Promotion as Bike-Friendly Community: Highland Park is known as a walkable and bikeable destination with a thriving arts scene. The Borough should harness the talent of local artists to help design a unified wayfinding network, a unique bicycle parking design, and vibrant gateways into the Borough from neighboring municipalities. Partner with local schools and youth organizations to involve as much of the community as possible.

6 Bicycle Network Concepts

With its compact layout, and network of low-speed, low-volume residential streets, Highland Park is an attractive community for active transportation, as evidenced by the large number of bicyclists throughout the Borough. To advance the goals of this Plan, the bicycle network improvements present opportunities to build upon the community's strengths and existing assets to continue improving cyclist safety and comfort, enhance access and connections to key destinations, and provide linkages to the regional bicycle network. The following sections discuss different types of bicycle facilities and proposed bicycle network and bicycle parking improvements for Highland Park.

BICYCLE FACILITY DESIGN

Bicycle treatments should be implemented in a standardized manner in order to create uniform, effective, and recognizable treatments throughout the Borough. Adhering to best practices helps ensure universal understanding of bicyclist and motorist behavior and expectations for a given facility type among all roadway users. The graphic below illustrates the "Five C's" for effective bike planning.

As the Borough implements elements of the Plan, facility design should refer to current best practice guidance for more detailed information, including:

- New Jersey Complete Streets Design Guide
- NACTO Urban Bikeway Design Guide
- FHWA Small Town and Rural Multimodal Networks
- AASHTO Guide for the Development of Bicycle Facilities

The following section provides a brief overview of common bicycle facility types, summarizing the main characteristics, applications, and benefits of each, including:

- Separated bicycle lanes
- Buffered bicycle lanes
- Standard bicycle lanes
- Advisory bicycle lanes
- Shared-lane markings
- Bicycle boulevards

The Five C's

Bicycle routes should be:

- ✓ *Continuous*
- ✓ *Connected*
- ✓ *Convenient*
- ✓ *Complete*
- ✓ *Comfortable*

Following the "Five C's" approach helps ensure that bicycle routes accommodate cyclists of all ages and abilities.

Cambridge, MA

Separated Bicycle Lane

A separated bicycle lane provides vertical separation to improve safety, prevent encroachment, and deter double-parking. Physical separation from passing traffic is provided by bollards, planters, on-street parking, curbing, or medians. This extra separation from motor vehicle traffic makes a separated bicycle lane more attractive for bicyclists of all ages and abilities. Typically used to enhance bicyclist comfort on streets with higher traffic speeds and/or volumes, they also require additional street width and consideration of street maintenance needs.

Newark, NJ

Buffered Bicycle Lane

Buffered bicycle lanes can enhance conventional bicycle lanes by providing a marked buffer space and creating additional horizontal separation between bicyclists and motorists. Buffers can be used where there is extra roadway width in order to visually narrow the travel lanes and calm traffic. While buffers are typically used between bicycle lanes and travel lanes to increase bicyclist comfort, they can also be used between bicycle lanes and parking lanes to discourage cyclists from riding too close to parked vehicles, decreasing the risk of conflicts with drivers opening their car door. The difference between separated and buffered bike lanes is that separated lanes have vertical separation while buffered lanes have only horizontal separation.

Asbury Park, NJ

Standard Bicycle Lane

Standard or conventional bicycle lanes provide an exclusive space for bicyclists through the use of pavement markings and signage. They enable bicyclists to ride at their preferred speed, free from interference from motorists, and help facilitate predictable behavior and interaction between bicyclists and motorists. Bicyclists may leave the bicycle lane to pass other bicyclists, make turns, or avoid obstacles and conflicts. Motorists may pass through the bicycle lane to access parking or make other turning movements, but they cannot stand or park in the lane. Standard bike lanes provide dedicated space for cyclists, but no vertical or horizontal separation from moving traffic.

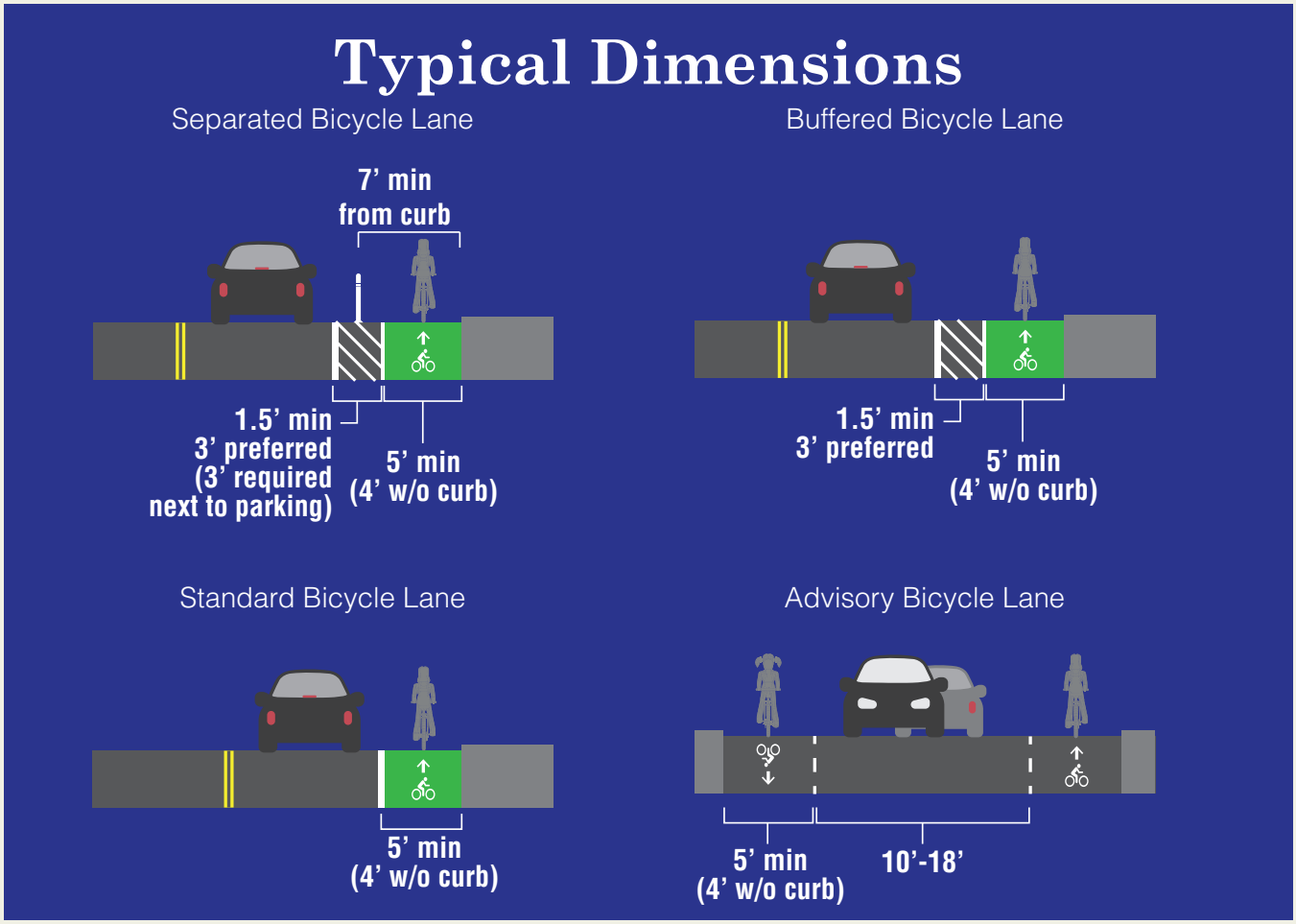
Advisory Bicycle Lane

Advisory bicycle lanes prioritize bicycle movement by creating a usable space for bicycle lanes otherwise too narrow for dedicated lanes. Unlike other mixed-traffic facilities, such as shared-lane markings or bicycle boulevards, advisory lanes function similarly to standard bicycle lanes. The lanes are delineated with dashed striping, which can be supplemented with signage or colored pavement. Motorists share a two-way center travel lane, and only encroach into the bicycle lane when necessary to pass other vehicles. Advisory bicycle lanes are typically applied on local streets with relatively low speeds and low to moderate traffic volumes.

Although common internationally, advisory bicycle lanes (also referred to as advisory shoulders or dashed bicycle lanes) are relatively new in the United States. As such, they currently require a Request to Experiment from the Federal Highway Administration (FHWA), as they track projects and gather data on implementation. A number of American precedents provide helpful information.

Typical dimensions for separated, buffered, standard and advisory lanes are illustrated below.

Edina, MN (source: FHWA's Guide to Small Town and Rural Multimodal Networks)



Shared-Lane Markings

On roadways infeasible or inappropriate for dedicated bicycle facilities, shared-lane markings may be used to indicate a shared environment for bicycles and automobiles. Shared-lane markings alone do not reduce bicycle level of traffic stress or create an "all ages and abilities" facility; however, they can provide several benefits, including:

- Assert the legitimacy of bicyclists on the roadway
- Provide directional and wayfinding guidance
- Direct bicyclists to ride in the most appropriate location on the roadway
- Provide motorists with visual cues to anticipate the presence of bicyclists

Shared-lane markings can be used to complete gaps in a bicycle network and provide connections to major destinations where there is limited cartway width or other constraints limiting implementation of other bicycle facilities.

Shared-lane markings are typically applied on streets with a speed limit of 25 mph or less. The markings typically consist of a bicycle and chevron symbol, with or without a green (photos below). Shared-lane markings should also be paired with traffic calming treatments to reinforce the low speed limit and support a more comfortable environment conducive to sharing the roadway with multiple types of road users.

To increase the visibility and effectiveness of the marking, the marking can be applied on a green background, such as the example from Newark shown on the bottom left. This "enhanced" or "green back" shared-lane marking is particularly useful on streets with higher traffic volumes and more activity, which benefit from the improved visibility.

Newark, NJ

Princeton, NJ

Ocean City, NJ

Bicycle Boulevard

Bicycle boulevards, also referred to as neighborhood greenways or quiet streets, are traffic calmed streets prioritizing bicycle travel and creating a more comfortable bicycling environment. While bicyclists share the street with motor vehicles, the low-speed and low-volume character of a bicycle boulevard creates a low-stress facility for bicyclists of all ages and abilities.

Many neighborhood residential streets provide the basic components of a bicycle boulevard. These streets can be enhanced to create a bicycle boulevard by a variety of design treatments detering high vehicle speeds and discourage through-trips by motor vehicles. Many of these treatments benefit not only bicyclists, but by creating a safe and quiet environment, benefit pedestrians and motorists.

Where constraints prevent bicycle improvements on arterial roadways, utilizing parallel neighborhood streets as bicycle boulevards provide convenient, attractive alternative routes for bicyclists.

According to NACTO's Urban Bikeway Design Guide:

Bicycle boulevards should have 85th percentile speeds at 25 mph or less (20 mph preferred)

Key elements of a bicycle boulevard include:

- **Reduced Speed Limits:** The preferred speed limit of a bicycle boulevard is 20 mph, five miles-per-hour slower than most Highland Park residential streets
- **Signage and Markings:** Pavement markings and wayfinding signage highlight the corridor as a priority route for bicyclists and the intention for the roadway as a shared, slow street
- **Speed Management:** Traffic calming elements appropriate for the context, such as curb extensions, speed cushions, chicanes, or mini-roundabouts, should be used to reinforce the low speed limit and discourage cut-through traffic
- **Access Management:** Depending on the context, elements such as diverters or medians can be used to deter or prevent vehicular through-traffic, while still accommodating local access and prioritizing bicycle through-trips
- **Intersection Crossings:** Appropriate intersection treatments, especially at crossings with major streets, are crucial to minimize bicyclist delay and ensure a safe, comfortable street for bicyclists of all ages and all abilities

Shared-use Path

Shared-use paths are bikeways distinctly separate from the roadway. Located outside of the cartway, they are separated physically from motorists traffic by either open space or a barrier. Shared-use paths are sometimes referred to as "trails." However, the term "trail" often refers to an unimproved recreational facility. Shared-use paths are designed to facilitate both utilitarian and recreational trips.

Shared-use paths are typically designed for two-way travel. They help provide low-stress bicycle accommodations in a variety of circumstances: a shortcut through residential neighborhoods, a commuting route from residential to commercial centers, a recreation route in a park or greenway, or as a side path along a roadway in lieu of (or in addition to) an on-road bicycle facility. The East Coast Greenway along River Rd is an example of a sidepath. Shared-use paths should be built as a system of off-road transportation routes complementing and enhancing the on-road bicycle network.

Shared-use Path, Somers Point

Sidepath, Princeton

INTERSECTION DESIGN

Good intersection design is a critical component of shared-use path and overall bicycle network connectivity. Poorly designed intersections can amplify conflicts between bicyclists and other modes, reduce network connectivity, and discourage many bicyclists from taking certain trips.

A properly designed intersection should reduce conflicts between bicyclists (and other vulnerable road users) and vehicles by heightening the level of visibility, denoting a clear right-of-way, and facilitating eye contact and awareness between different modes. The level of treatment required for bicyclists at an intersection depends on the bicycle facility type used, as well as the adjacent street function and land use.

On-Road Cycling and Intersection Design

Bicycle Detection

Bicycle detectors can be installed at signalized intersections to detect the presence of bicyclists. Bicycle detectors are strongly recommended at intersections with existing motor vehicle detection, as standard loop detectors may not detect bicyclists.

Pavement Markings

Intersections can be a confusing and stressful environment for bicyclists. There is an inherent mixing of traffic that often occurs at intersections, creating conflicts between vehicular traffic and bicycle traffic. The stress can be exacerbated when bicycle lanes appear to temporarily end at intersections and intersection approaches, or the roadway widens to provide turning lanes for vehicles.

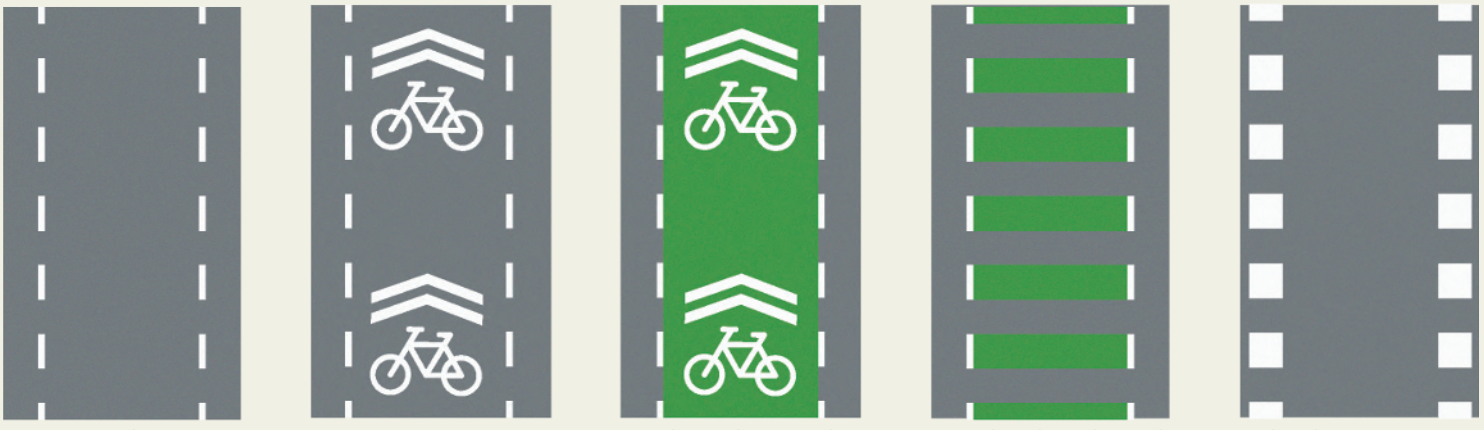
Extending Bike Paths Through the Intersection

Bicycle markings can be extended through intersections and across major driveways to guide cyclists through the intersection and mitigate bicyclist stress.

This treatment has several benefits:

- Increases the visibility of bicyclists
- Reduces bicyclist stress by clearly delineating roadway space for bicyclists and guiding them through the intersection in a direct path
- Reinforces that through-bicyclists have priority over turning vehicles or vehicles entering the roadway
- Helps bicyclists position themselves within the intersection
- Improves driver awareness of bicycle activity and movement through a high conflict area
- Makes bicyclist movement at intersections more predictable

There are several common treatment types for intersection markings (illustrated below). The standard treatment is a white dotted line extension of the bicycle lane, which maintains the continuity of the bicycle lane through the intersection. The MUTCD contains guidance on this treatment in Section 3B.08. This treatment may be enhanced to improve the visibility of the bicycle facility through various combinations of pavement markings, colored pavement, or higher visibility striping.



Dotted Line | Pavement | Colored Bicycle | Dashed Colored | Elephant's Feet

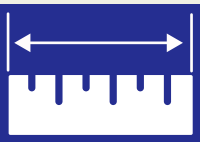
Bike Boxes

A bike box is a designated area at the head of a traffic lane at a signalized intersection, providing bicyclists with a safe and visible way to position themselves ahead of queuing traffic during the red signal phase. There is no volume threshold of vehicular volume where bike boxes would or would not be appropriate. Bike boxes should be prioritized in locations with high volumes or difficult left turns for bicyclists. More detailed bike box guidelines are presented in the box to the right.

A bike box has several key benefits:

- Increases the visibility of bicyclists
- Reduces signal delay for bicyclists
- Facilitates left-turn positioning at intersections for bicyclists
- Provides priority for bicyclists at crossings
- Mitigates conflicts between through-bicycle movements and vehicle right-turns ("right-hook" crashes)
- Groups bicyclists together, allowing bicycle traffic to clear the intersection more quickly and minimizing impediments to transit and other traffic, particularly for vehicular right-turn movements
- Reduces vehicle encroachment into the crosswalk, creating a more comfortable crossing for pedestrians

Bike Box Design



The NACTO Urban Bikeway Design Guide provides detailed guidance on the design and placement of Bike Boxes:

- Bike boxes, formed by transverse lines, should be 10 to 16 feet deep
- Stop lines should be used to indicate the point behind which motor vehicles are required to stop
- Pavement markings should be used and centered between the crosswalk line and stop line
- Pavement markings may be a Bike Symbol (MUTCD 9C-3A) or Helmeted Bicyclist Symbol (MUTCD 9C-3B)
- Where bike boxes are installed, a "No Turn on Red" sign should be used

Bike Box on Dr. MLK Jr. Boulevard in Newark, NJ

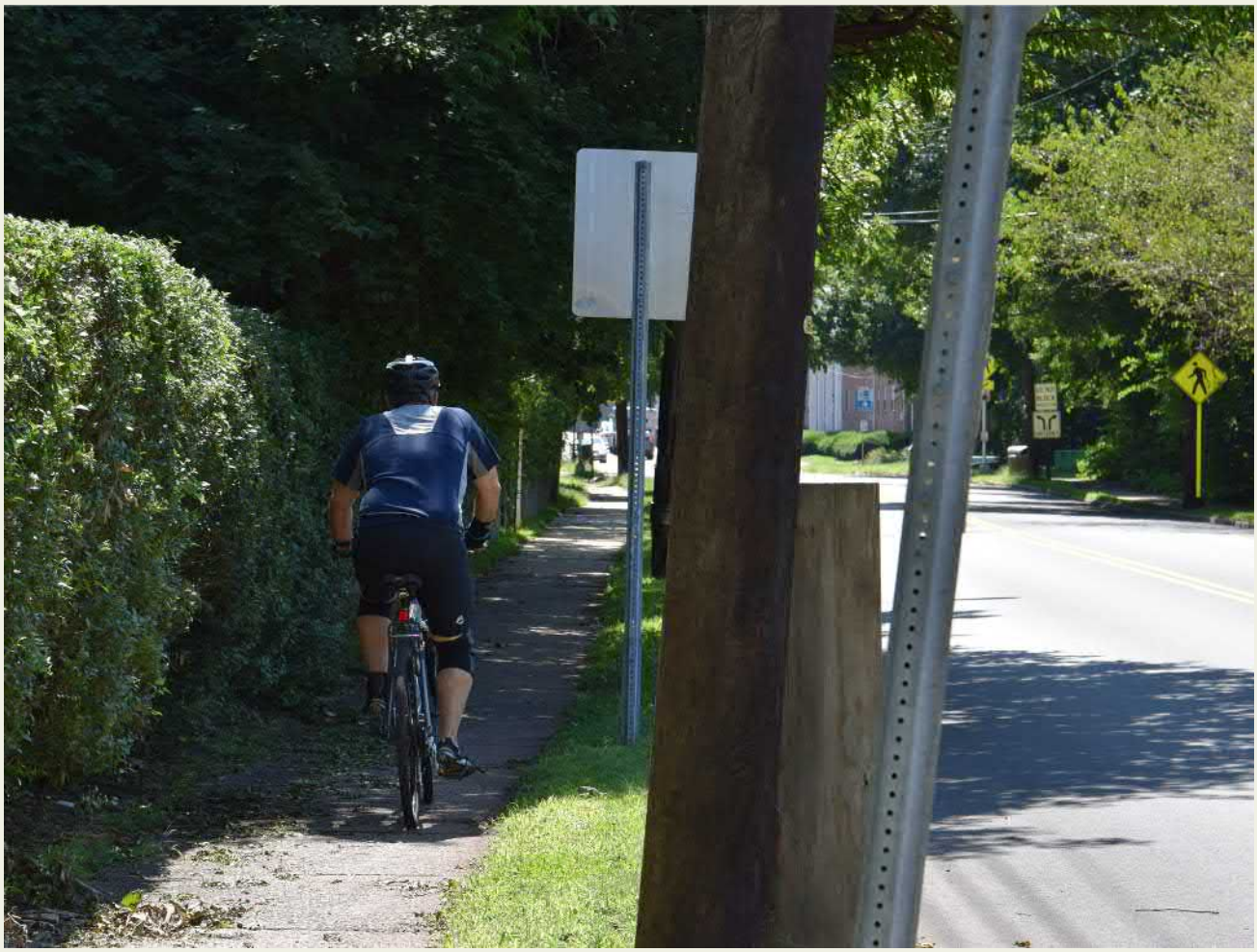
PROPOSED BICYCLE NETWORK

The proposed Highland Park bicycle network provides a framework supporting the goals of this Plan. The network utilizes several of the bicycle facilities summarized in the previous section, where feasible, and identifies a series of improvements guided by:

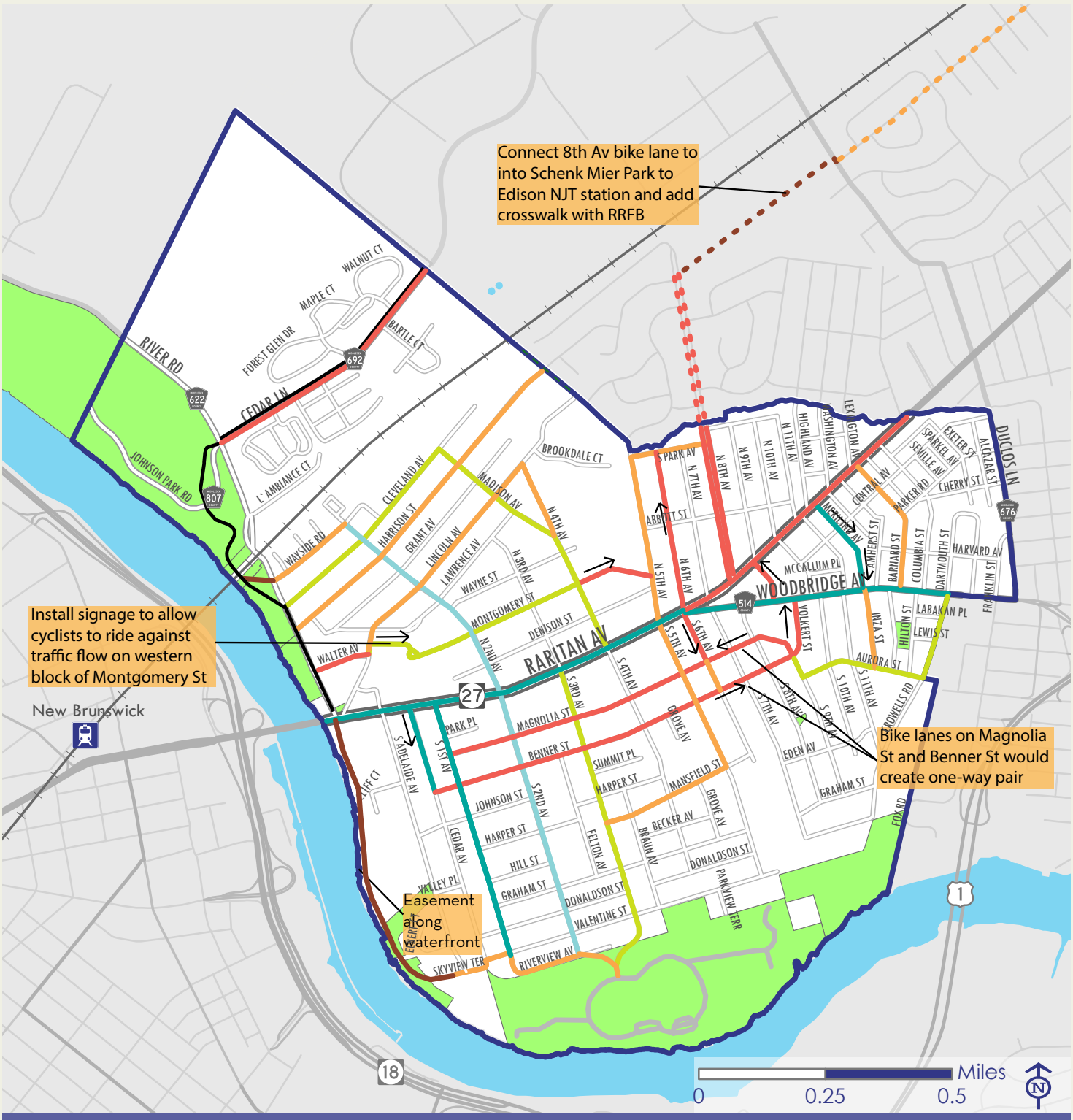
- Public input: Incorporates input from the Study Advisory Committee, Wikimap, and public meetings on existing issues and desired routes
- Bicycle level of traffic stress (LTS): Utilizes the existing conditions LTS analysis as a guide to identify high traffic stress roadways and develop targeted recommendations to improve user comfort and connectivity of the low stress network
- Existing bicycle infrastructure: Builds upon existing facilities to enhance network connectivity and leverage existing infrastructure
- Major destinations: Seeks opportunities to provide convenient access to key destinations
- Regional linkages: Identifies opportunities to create more comfortable bicycle connections with neighboring communities.
- Roadway constraints: Prioritizes easily implementable improvements that can be constructed within existing roadway widths with minimal disruption to current roadway configurations and existing on-street parking. Although Highland Park is a built out municipality, many of the Borough's streets are wide enough to accommodate bicycle facilities without requiring the alteration of pavement.
- Best available option: Recommended improvements are based on installing the most dedicated and protected facility based on the existing conditions

The proposed bicycle network is illustrated in Map 16. The subsequent sections detail the recommendations.

Cost estimates for each recommendation are provided in Section A2 of the Appendix.



River Rd



MAP 16: Proposed Bicycle Network

HIGH LAND PARK BIKE WALK

Within Highland Park
- Buffered or Separated Bicycle Lane
- Bicycle Lane
- Advisory Bicycle Lane
- Shared-use Path
- Shared Lane Markings
- Bike Boulevard

Outside Highland Park
- Buffered or Separated Bicycle Lane
- Shared-use Path
- Bicycle Lane

Existing
- Shared-use Path

Raritan Avenue

Raritan Ave (NJ 27) is Highland Park's main thoroughfare, and the only street to travel from one end of the Borough to the other. NJ 27 is a high-volume regional connection traveling 39 miles between Princeton (Mercer County) and Newark (Essex County). The corridor's position parallel to the New Jersey Turnpike and U.S. 1 places a high traffic demand upon the street. Despite the road's regional nature, it travels through the center of Highland Park's downtown, where there is also the greatest demand to walk and bike. From Highland Park, Raritan Ave travels west over the Albany Street Bridge to New Brunswick, where many Highland Park residents commute to Rutgers University, the New Brunswick train station and the many other employment opportunities within New Brunswick.

The entirety of Raritan Ave has an LTS of 4, impeding comfortable biking for most residents. As evidenced by results of the public outreach process, stakeholders' most common complaint concerns the desire for improved biking condtitions along Raritan Ave which is otherwise a physical and geographic impediment to biking within Highland Park and between neighboring communities.

Along its 1.33 miles within Highland Park, Raritan Ave has two sections with significantly different cross sections. The first is east of the street's intersection with Woodbridge Ave where two lanes of traffic operate in each direction with a mix of low-density residential, commercial and religious land uses. West of this intersection, Raritan Ave narrows to one travel lane in each direction with parallel parking on either side. This segment caters to pedestrian-friendly, retail land uses and a high demand for on-street parking. A sub-section of this segment exists west of S 1st Ave where there are two westbound travel lanes, and one eastbound travel lane. Congestion from the Albany Street Bridge often backs up to this point.

Intersection improvements at Raritan Ave and River Rd and Raritan Ave, Raritan Ave and Woodbridge Ave and Raritan Ave and Washington St can be found on pages 96, 97 and 99, respectively.

Raritan Ave

Raritan Avenue (east of Woodbridge Ave)

Recommendations

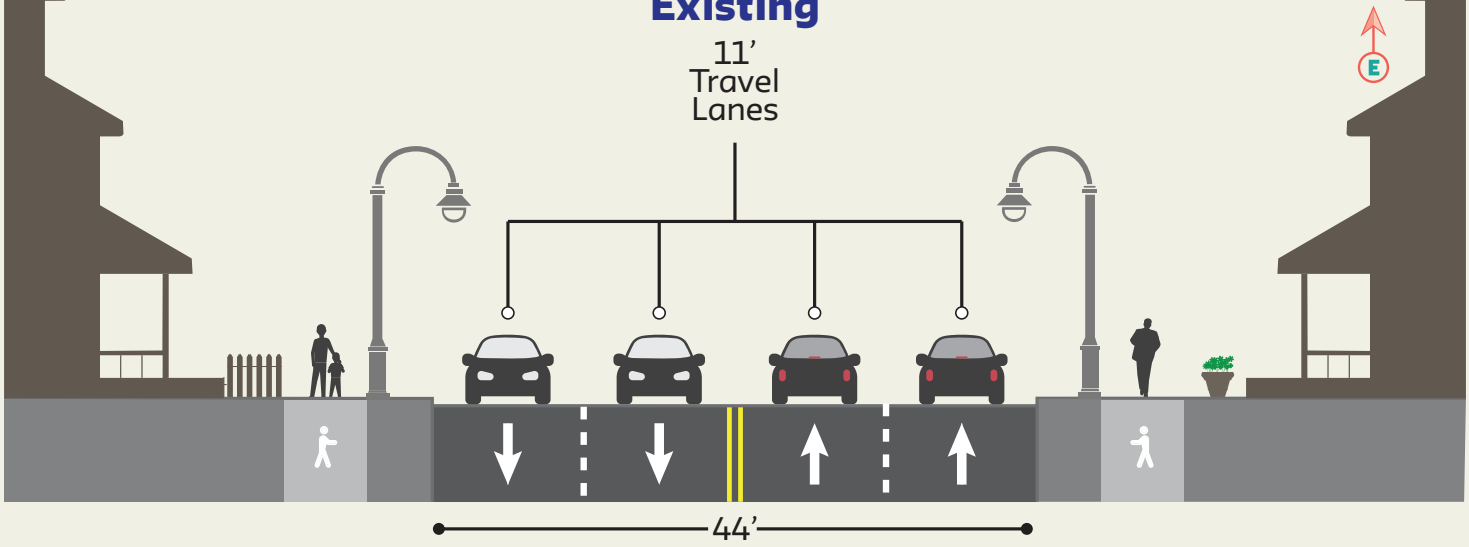
- Implement road diet, removing one lane of traffic in each direction
- Install separated bike lanes on both side of Raritan Ave
- Reduce speed limit from 35 to 30 mph

This treatment provides dedicated, low-stress bicycle facilities for more than 0.5 miles of Raritan Ave, improving from an LTS 4 to LTS 1. This reduces a large portion of the divide between north and south portions of Highland Park and improves bike access to Edison. The travel lanes would remain the same 11' width.

Highland Park should work with Edison Township and the State to investigate continuing this road diet along NJ 27 into Edison. The bike corridor would also connect to other bike routes proposed further in this report.

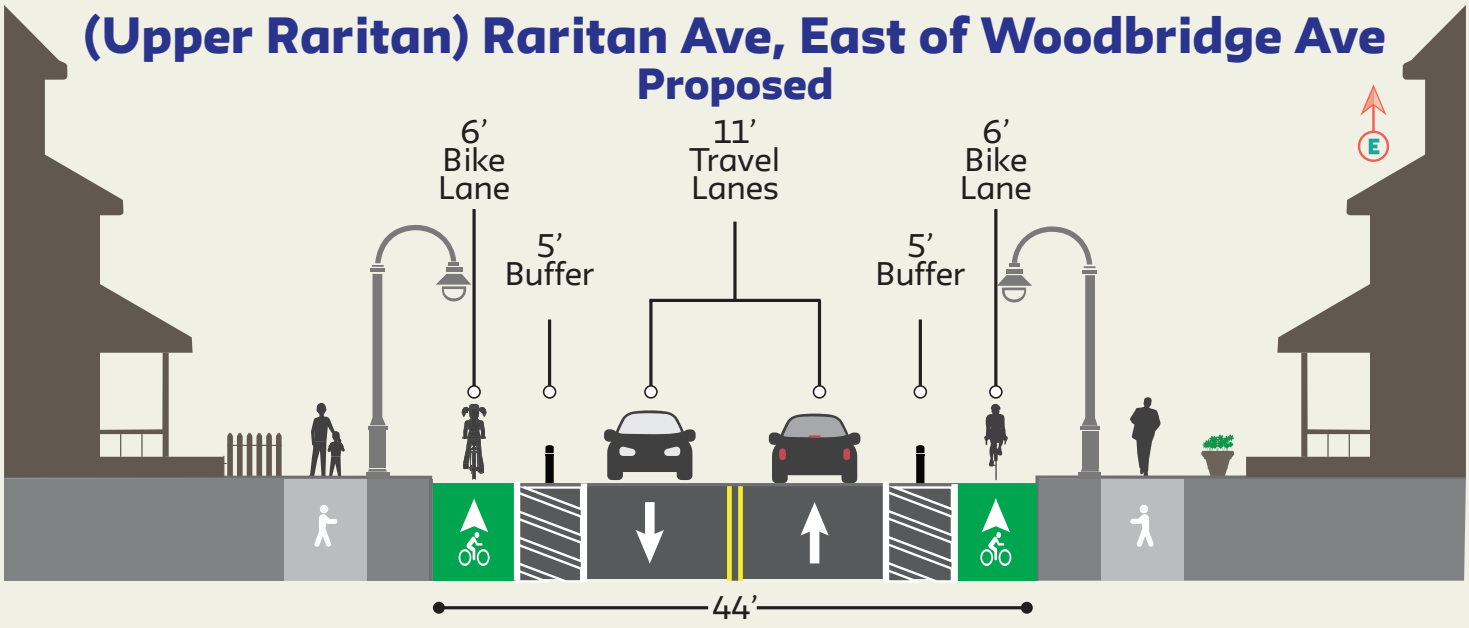
(Upper Raritan) Raritan Ave, East of Woodbridge Ave

Existing



(Upper Raritan) Raritan Ave, East of Woodbridge Ave

Proposed



Raritan Ave (River Rd to S 6th Ave)

Recommendations

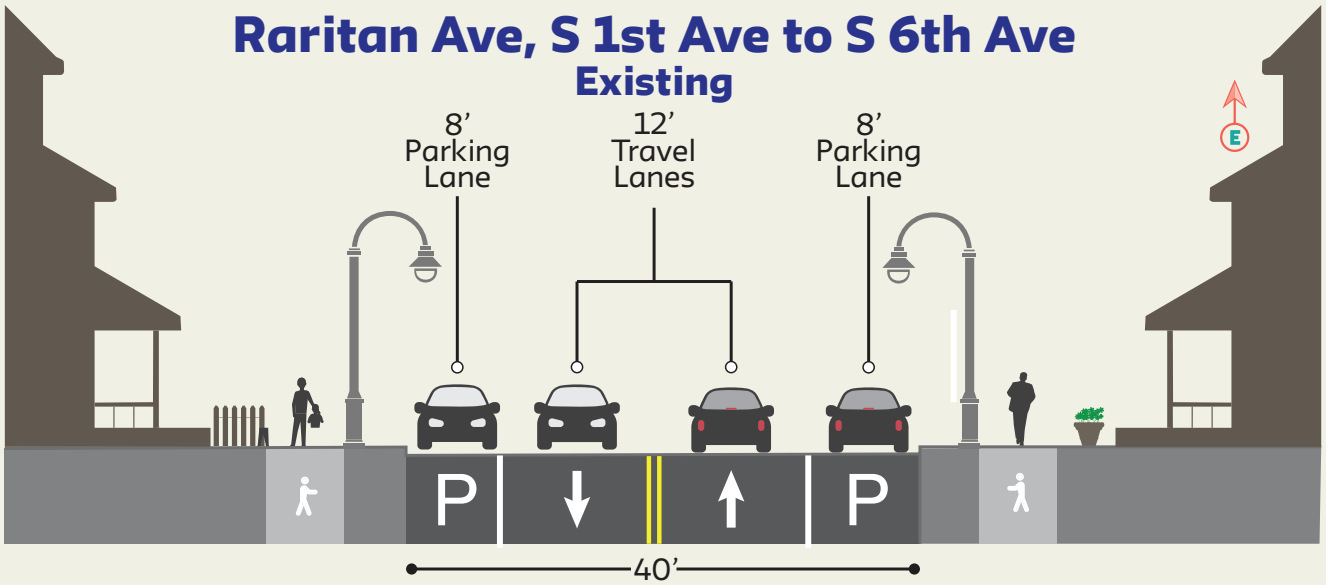
- Install curbside standard bike lane along south curb and standard bike lane on north side of Raritan Ave

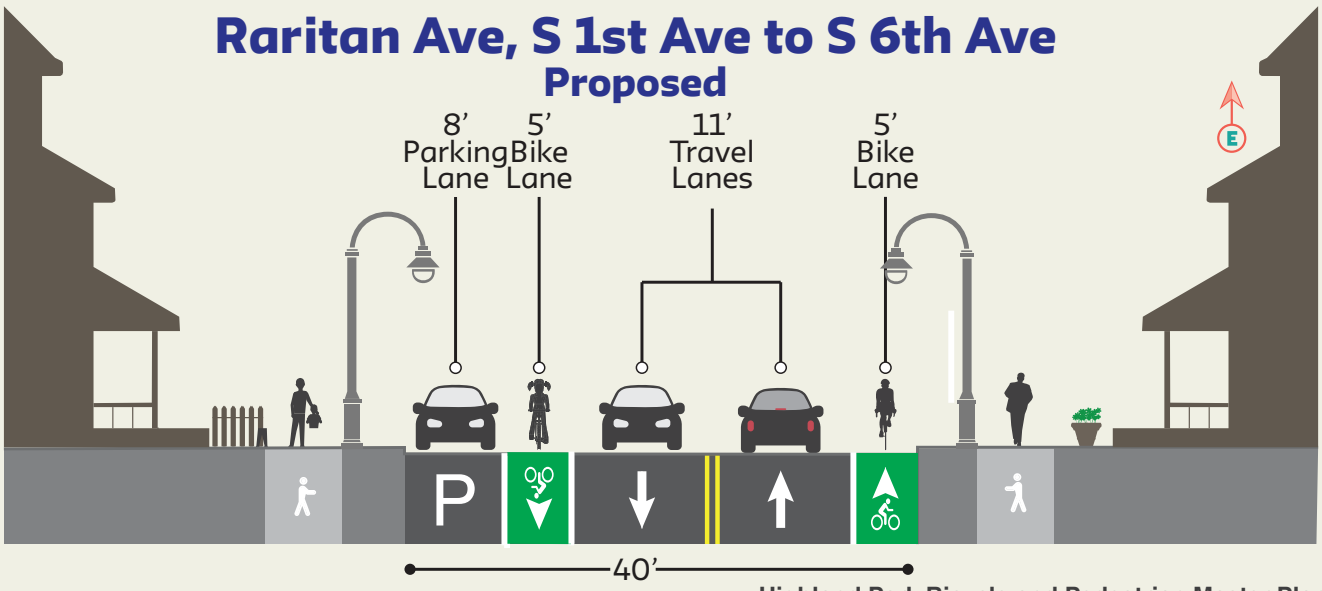
The best option for bike facilities along this portion of Raritan Ave is to remove parking along the south curb of Raritan Ave, resulting in the loss of 62 parking spaces with no parking loss along the north curb.

Two westbound travel lanes would be maintained west of S 1st Ave. The remainder of the corridor would have one travel lane in each direction. Presently, the block between S 5th Ave and S 6th Ave has two eastbound lanes. To accommodate the bike lane, this would be reduced to one lane with a short right turn bay. The maintenance of one travel lane here aligns it with blocks westward which also has one eastbound lane.

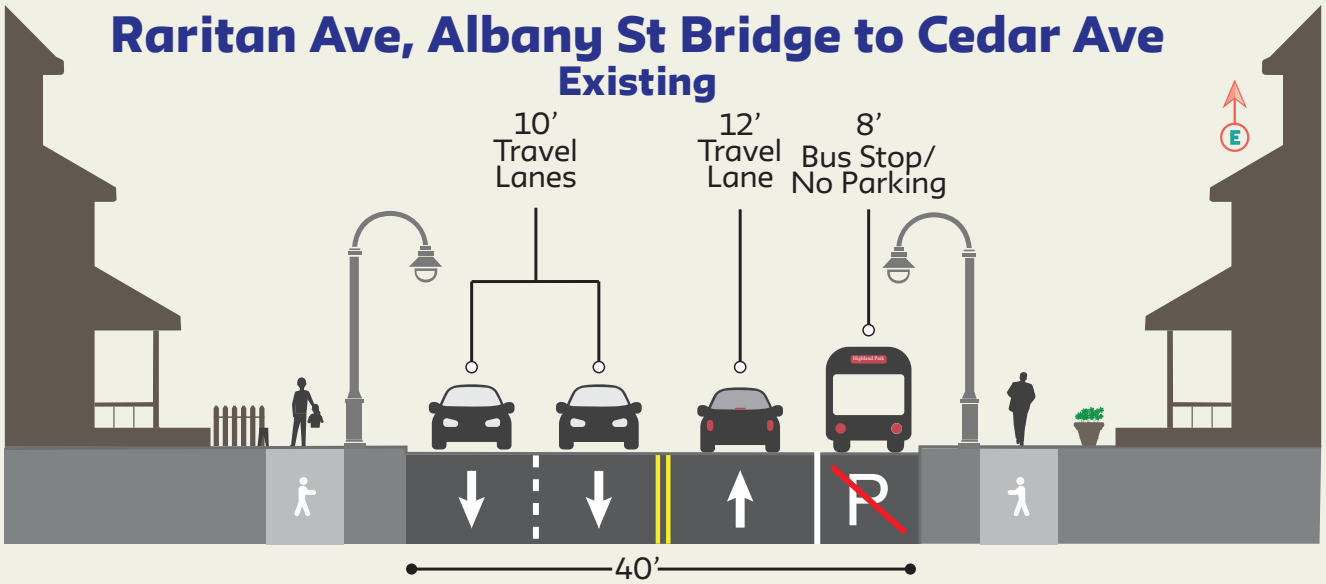
This treatment would minimize the parking loss while providing dedicated bicycle facilities for the plethora of riders wishing to traverse Raritan Ave. The Albany Street Bridge presents an additional challenge as the existing two lanes in each direction are necessary for the high volumes. Presently, cyclists can ride along the bridge's sidewalk.

Streets perpindicular and parallel to Raritan Ave have sufficient available on-street parking to offset the loss of 62 spots. Before implementing such a change, the Borough should work with stakeholders along these side streets to elicit feedback. Additionally, several large parking lots along Raritan Ave can be better utilized for visitor parking. These lots include those at the Reformed Church of Highland Park, the Rite Aid and Stop & Shop Lots and the lot on N 3rd Ave.

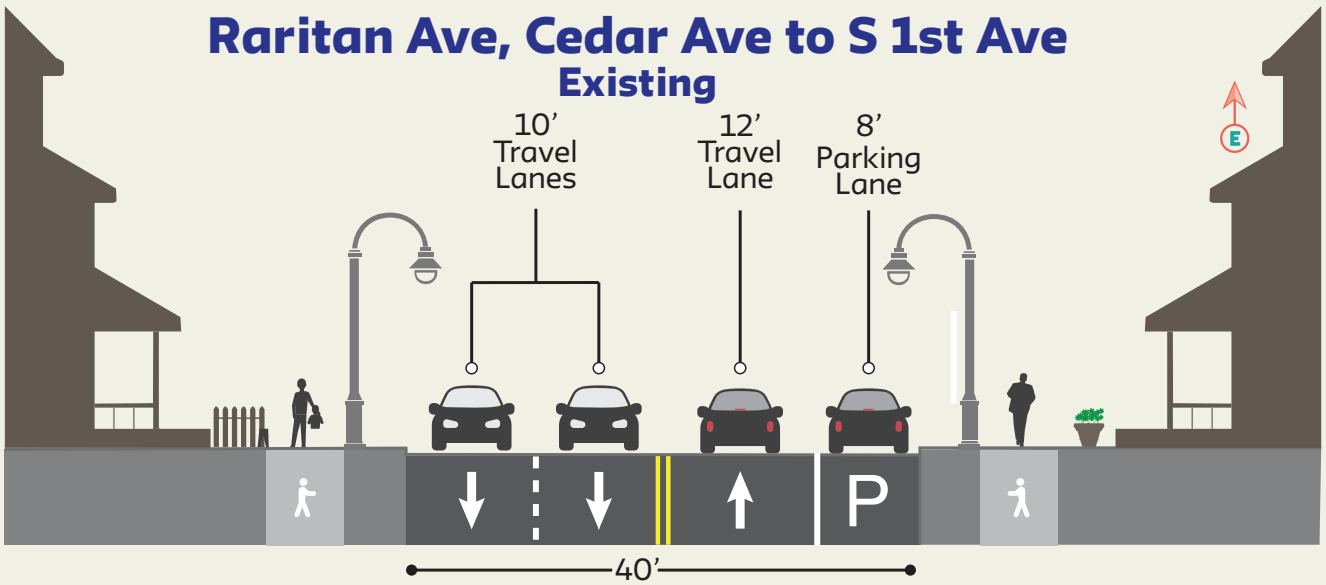




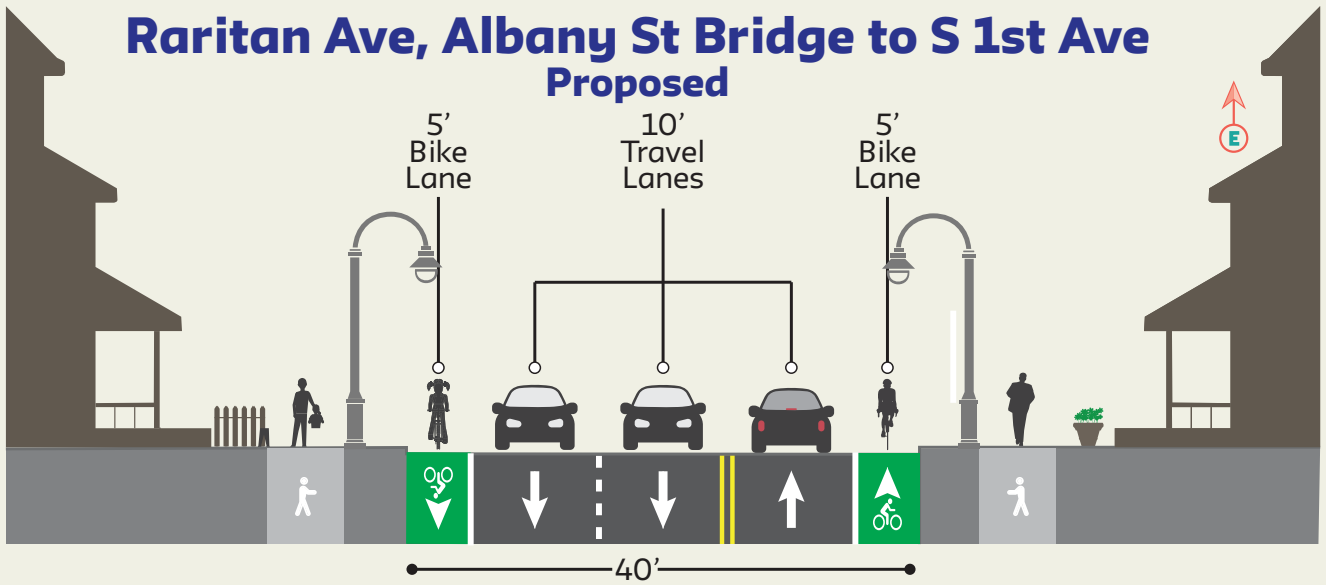
Raritan Ave, Albany St Bridge to Cedar Ave
Existing



Raritan Ave, Cedar Ave to S 1st Ave
Existing



Raritan Ave, Albany St Bridge to S 1st Ave
Proposed

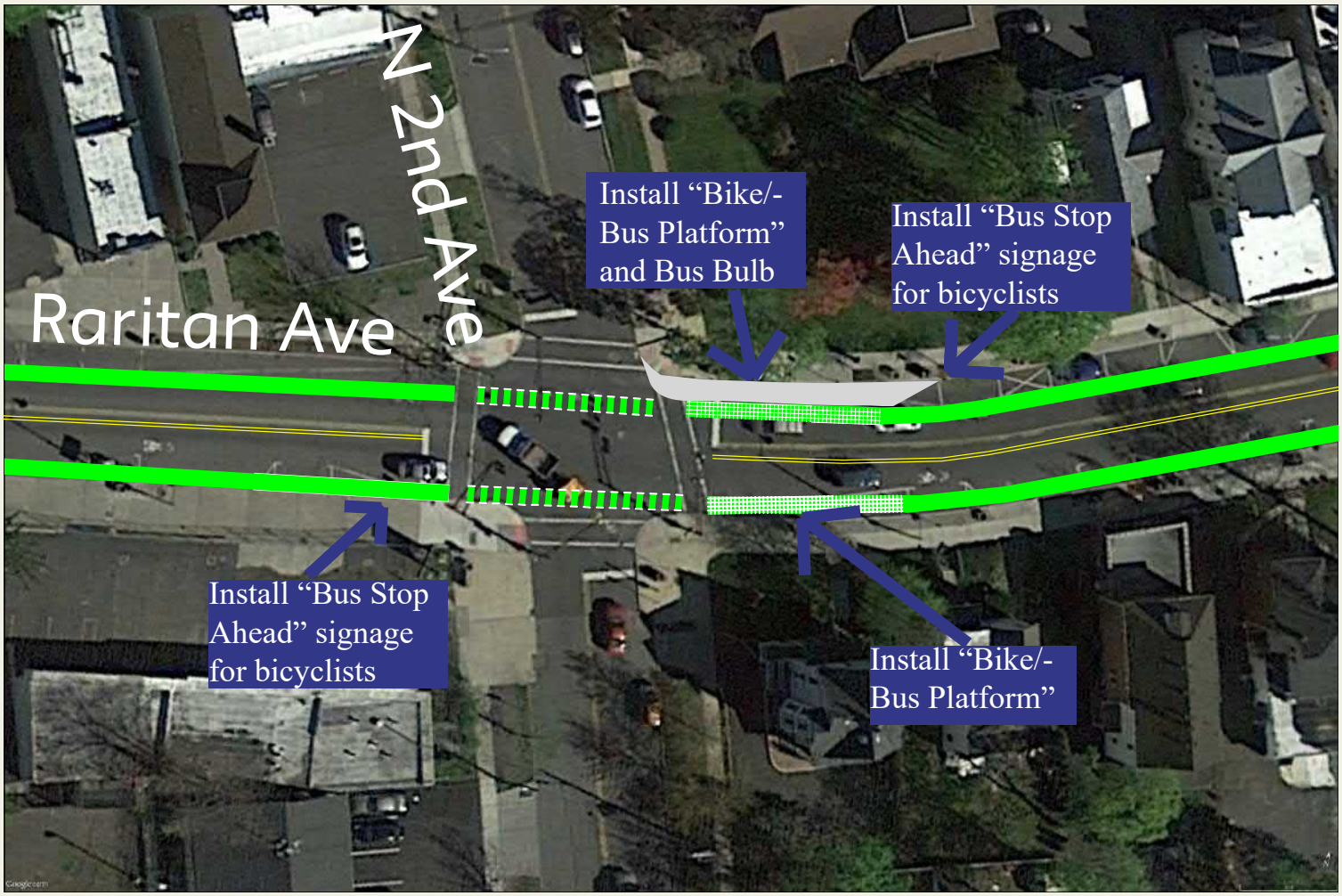


Raritan Avenue Timeframe

Due to varied vehicular demand for the two cross-sections, comprehensive improvements along Raritan Ave should be conducted at different timeframes to ensure traffic continues to flow at existing levels of service. All changes require adequate traffic and parking analyses and outreach. The potential need for handicapped spaces and loading zones should be considered in any parking study. The recommended cross-section for Raritan Ave west of Woodbridge Ave would also require a parking analysis and is thus meant to be a longer term option while the treatment along Raritan Ave east of Woodbridge Ave can be implemented in the short-to-medium term. The treatment proposed for Magnolia and Benner Streets on pages 56 and 57 would provide similar network benefits as bike facilities on Raritan Ave west of Woodbridge Ave, but is implementable in a shorter time frame.

Bus Stops

The graphic below illustrates an example of proposed bus stop markings on Raritan Ave. Similar markings should also be used on Woodbridge Ave. In the proposed condition, where there is a curbside bike lane, a temporary Bike/Bus Platform (photo on following page) will be installed with signage alerting cyclists to waiting pedestrians. This platform will allow buses to stop without swerving to the curb, saving time. Where parallel parking exists, a bus bulb (curb extension for bus passengers) willl be constructed in the parking lane with a temporary bike/bus platform adjacent to the travel lane, as shown below.

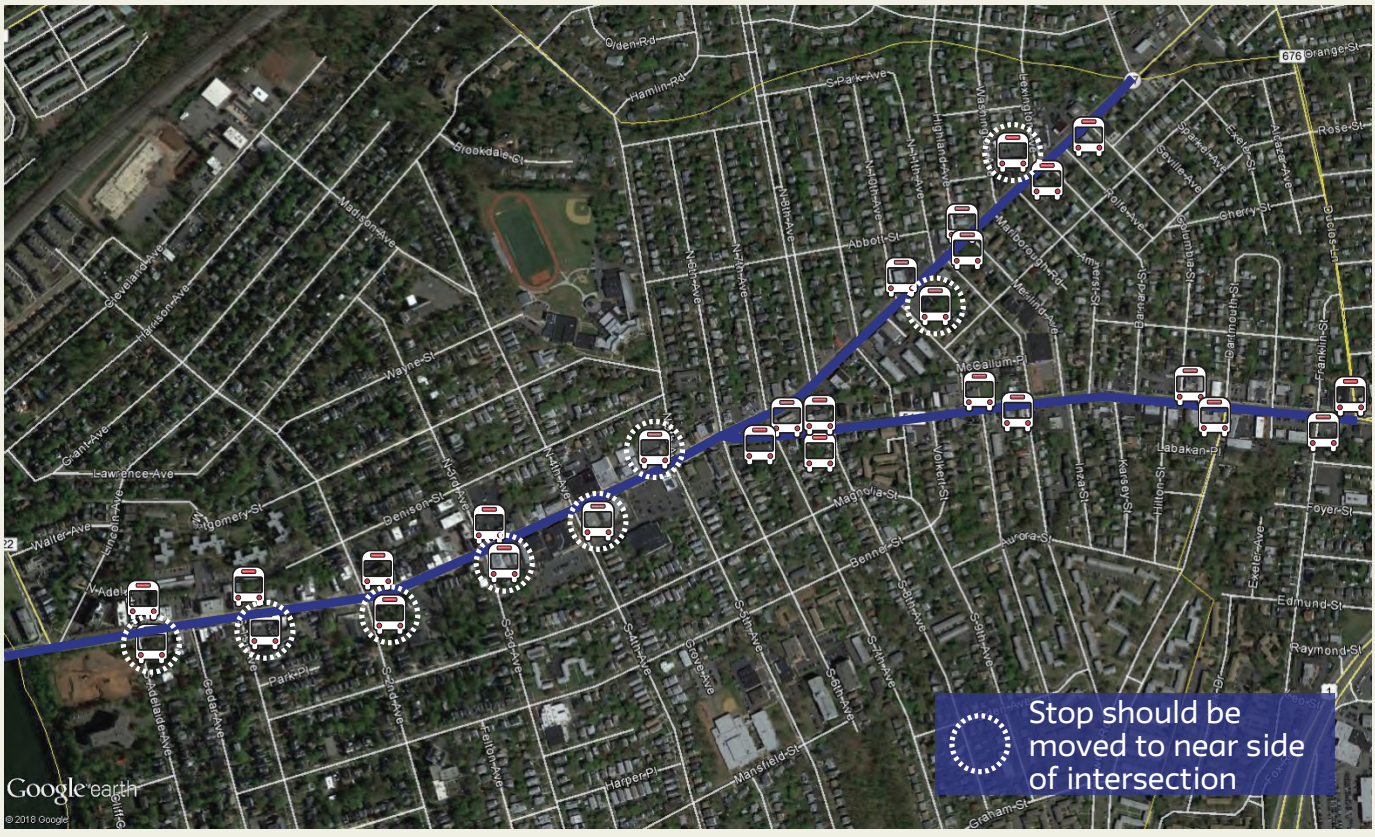


Bus Improvements

The photo to the right provides an example of a Bike/Bus Platform. This raised platform alerts cyclists to the presence of pedestrians entering and exiting a bus while also providing a platform level with the bus for pedestrians to wait and board. Where there is a parking lane, bus bulbs or curb extensions are recommended to allow the bus to not need to pull over to the curb, thus improving speeds.

Los Angeles, Source: Streetsblog

The map below depicts the location of all bus stops within Highland Park. Routes 810 and 814 travel along Raritan Ave west of Woodbridge Ave before splitting at the intersection. Each route makes frequent stops. Some routes are on the near-side of the intersection (they stop before entering the intersection) while others are on the far-side.



Benner/Volkert Streets and Magnolia Street

The most cited impediment to biking in Highland Park is Raritan Ave which bisects and separates the community with high traffic volumes. Installing dedicated bicycle facilities along Raritan Ave west of Woodbridge Ave is a long-term recommendation. Until due dilligence has been taken to implement such a treatment, one-way bike lane pairs can be installed on Benner and Magnolia Streets, requiring conversion of each of these streets to one-way traffic. As with the existing conditions, there would be parking on one side of each street, resulting in no loss of parking. Dedicated bike facilities on Benner/Volkert and Magnolia Streets would connect to facilities along Raritan Ave and Woodbridge Ave to allow comfortable and direct biking between destinations in Highland Park and adjacent communities.

An intersection improvement concept of Benner St at S 4th St can be found on page 100.

Recommendations

- Install buffered bicycle lane pair on Benner/Volkert and Magnolia Streets

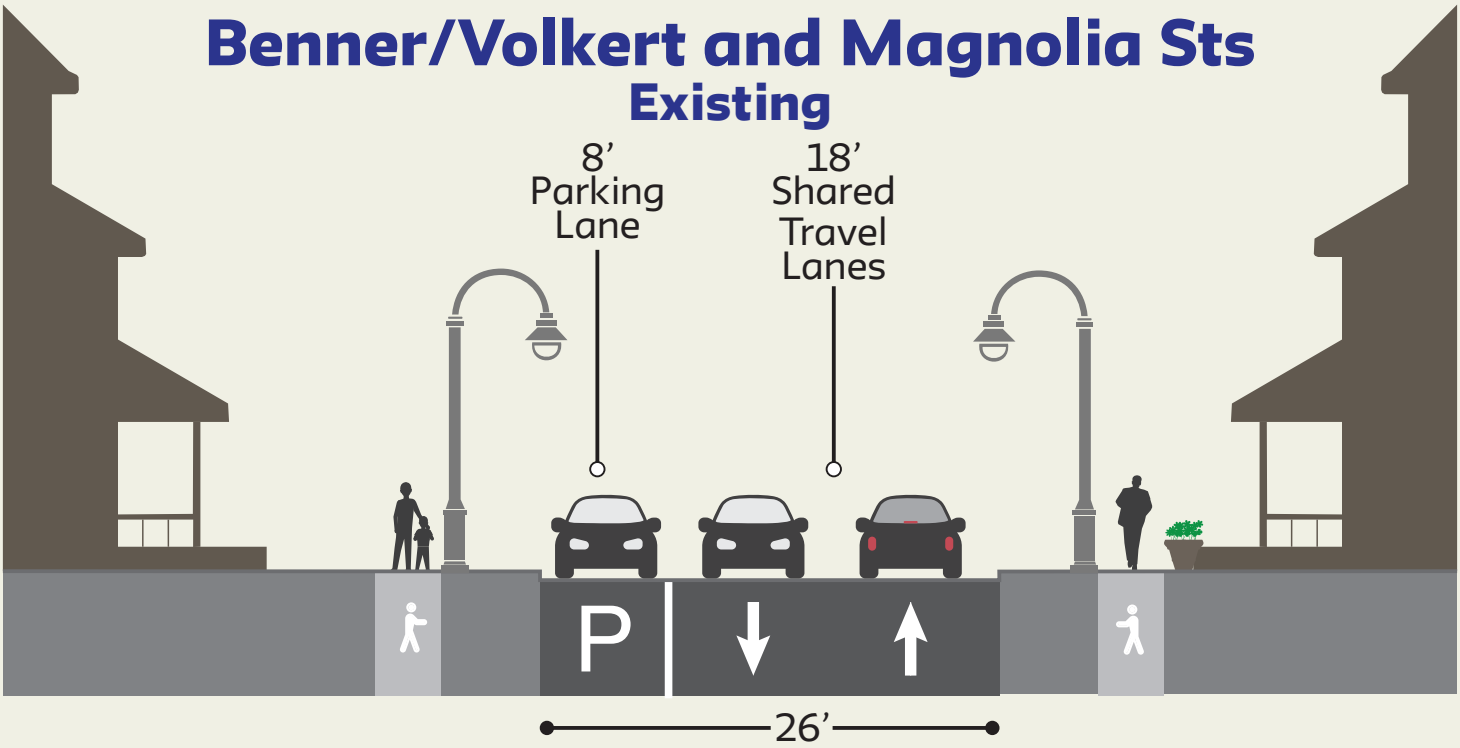
This would require converting Benner St to one-way westbound and Magnolia St to one-way eastbound. The most eastern block of Magnolia St is already one-way westbound. This configuration preserves all parking on both streets while maintaining the same travel lane width.

The Benner St bike lane would begin at Cedar Ave where a proposed standard bike lane feeds into it and end at Woodbridge Ave where shared markings would be installed.

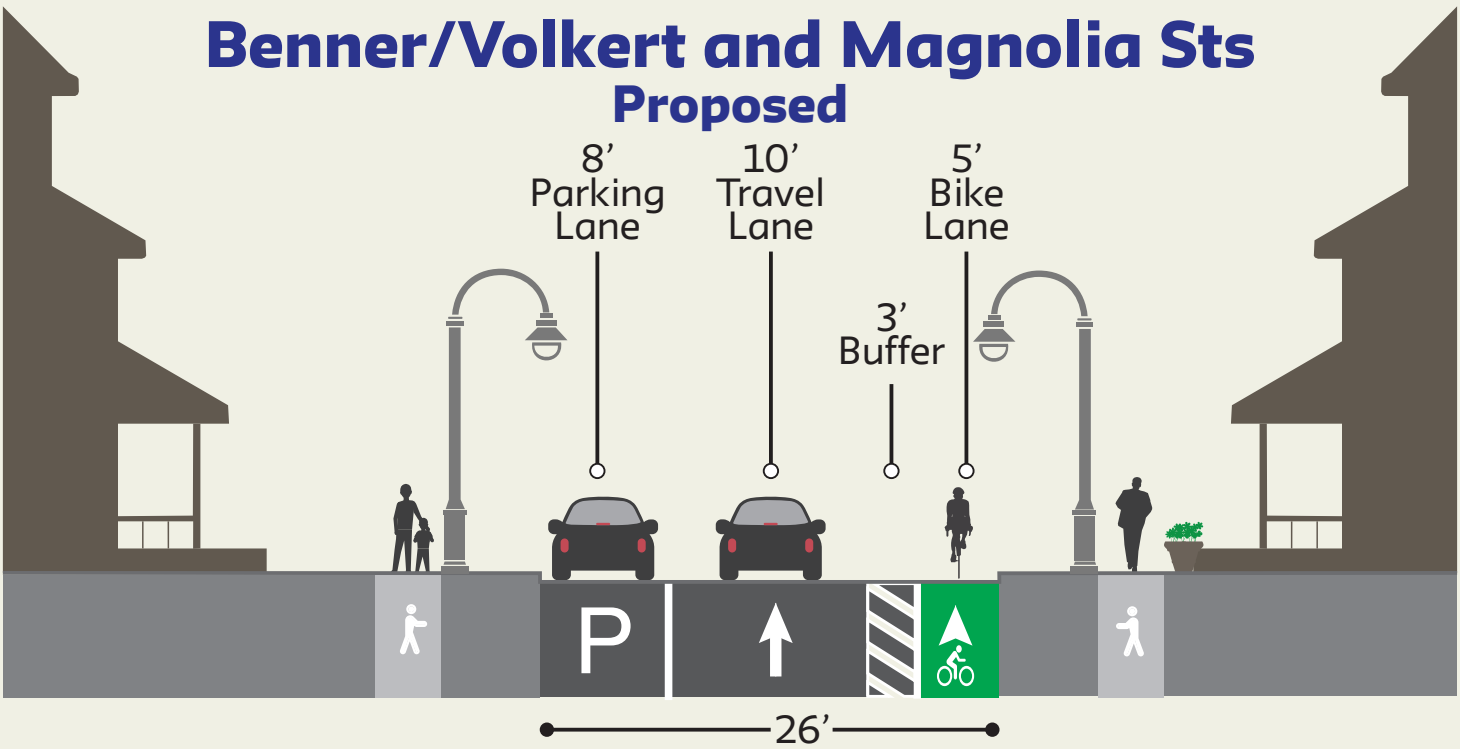
The Magnolia St bike lane would begin at Benner/Volkert St where shared markings feed into it and end at S 1st Ave where two-way standard bike lanes are proposed.

Benner St, Source: Google Maps

Benner/Volkert and Magnolia Sts
Existing



Benner/Volkert and Magnolia Sts
Proposed



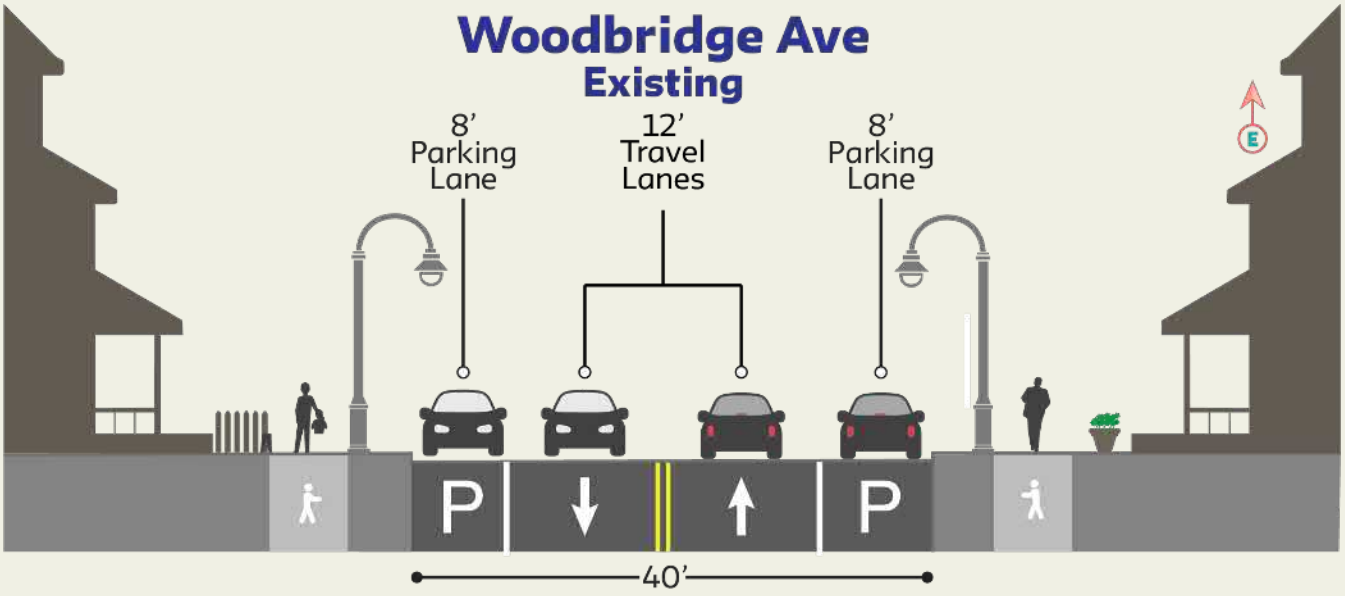
Woodbridge Avenue

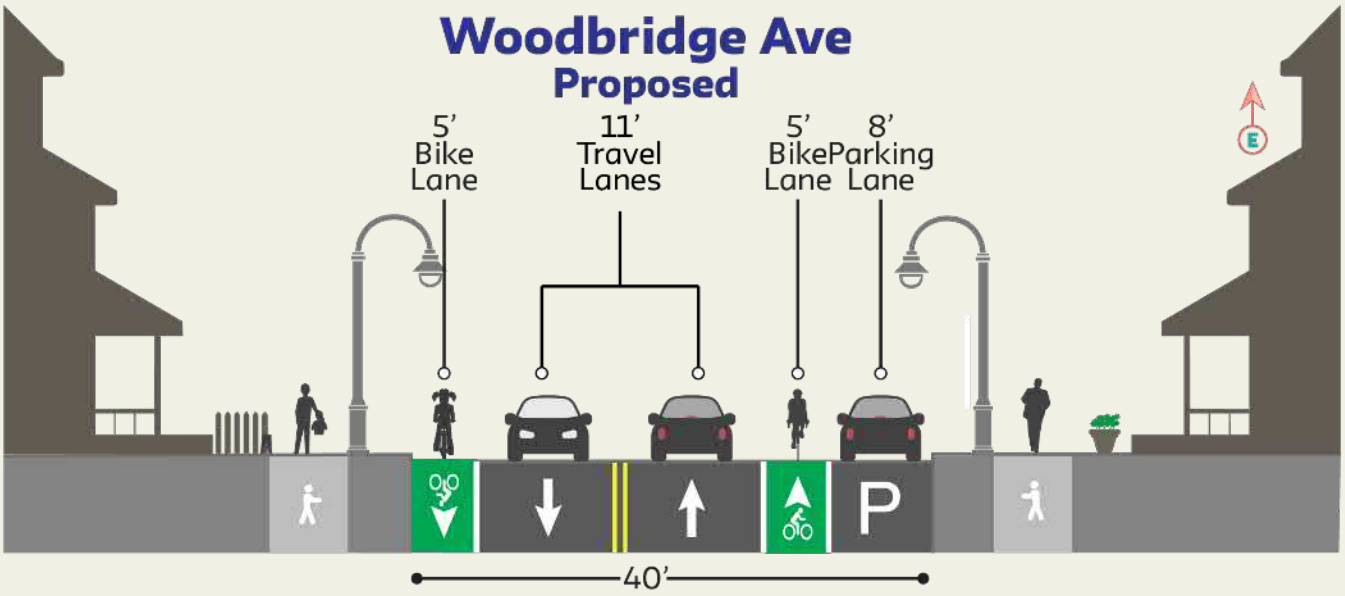
Woodbridge Ave is a primary connector between Raritan Ave and Edison. From Highland Park, Woodbridge Ave continues east passing over U.S. 1 and the New Jersey Turnpike to Middlesex Community College. One New Jersey Transit bus route travels along the corridor as well. In Highland Park, the corridor is one of the few catering to commercial uses. Addtionally, many residential streets intersect with Woodbridge Ave into local neighborhoods. Most of these intersections are uncontrolled for Woodbridge Ave traffic and stop controlled for intersecting traffic. Both the intersections with Duclos Ln and S 11th Ave are signal controlled. Though having a 25 mph speed limit, Woodbridge Ave is 40 feet wide; much wider than most streets with such a low speed limit. This encourages speeding and unsafe driving behaviors. Both sides of the street have parallel parking.

Recommendations

- Install curbside standard bike lane along north curb and standard bike lane on south side of Woodbridge Ave.

This treatment is the same as proposed for Raritan Ave west of Woodbridge Ave. Dedicated biking facilities would help shrink the roadway and discourage vehicular speeding. The bike lanes would require the removal of parking from one side of the street. The north side was chosen because parking on the south side is more highly used. In the interim, shared-lane markings can be installed along the corridor in lieu of dedicated facilities, though shared-lane markings have a minimal impact on cyclist comfort, particularly on a high-volume corridor such as Woodbridge Ave.





Cedar Lane

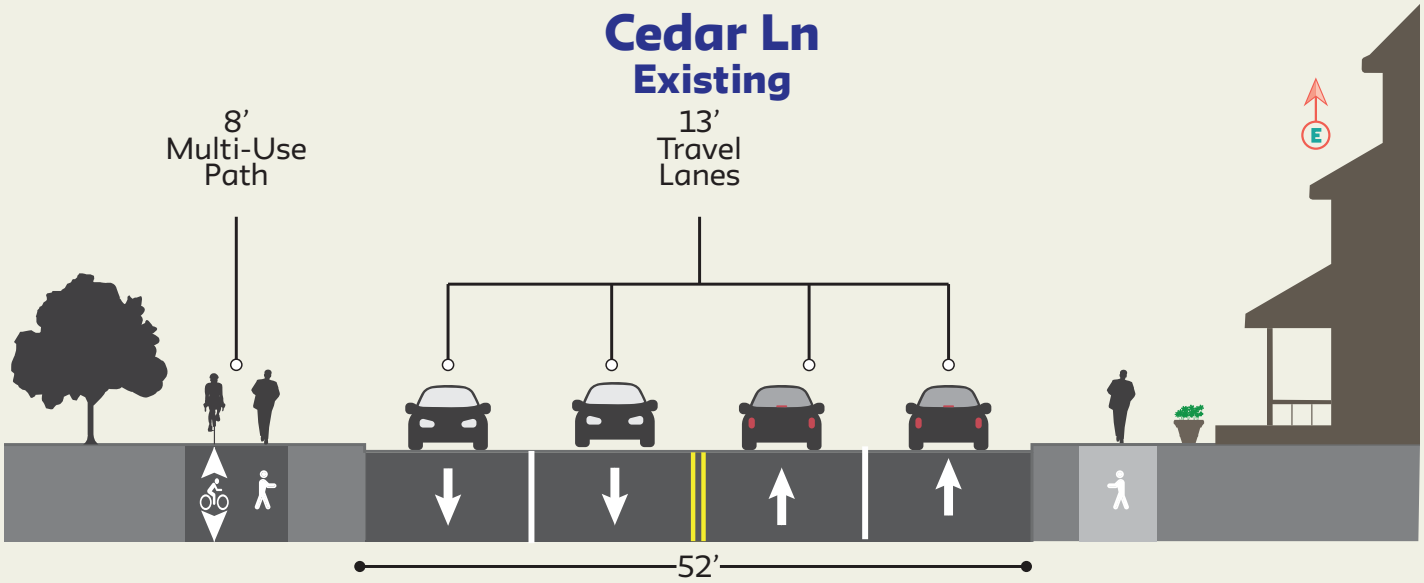
Cedar Lane (CR 692) travels in the northwest corner of Highland Park from River Rd into Edison to Rutgers' University's Livingston Campus. Within Highland Park, four large apartment complexes are located on either side of the street, each with their own entrance from Cedar Ln. The corridor has two 13' lanes in each direction before eventually dropping to one in Edison. Volumes are very low. The corridor's speed limit is 25 mph, but due to the wide roadbed, and lack of intersections, vehicles travel much faster. The East Coast Greenway multi-use path is located along the north of Cedar Ln.

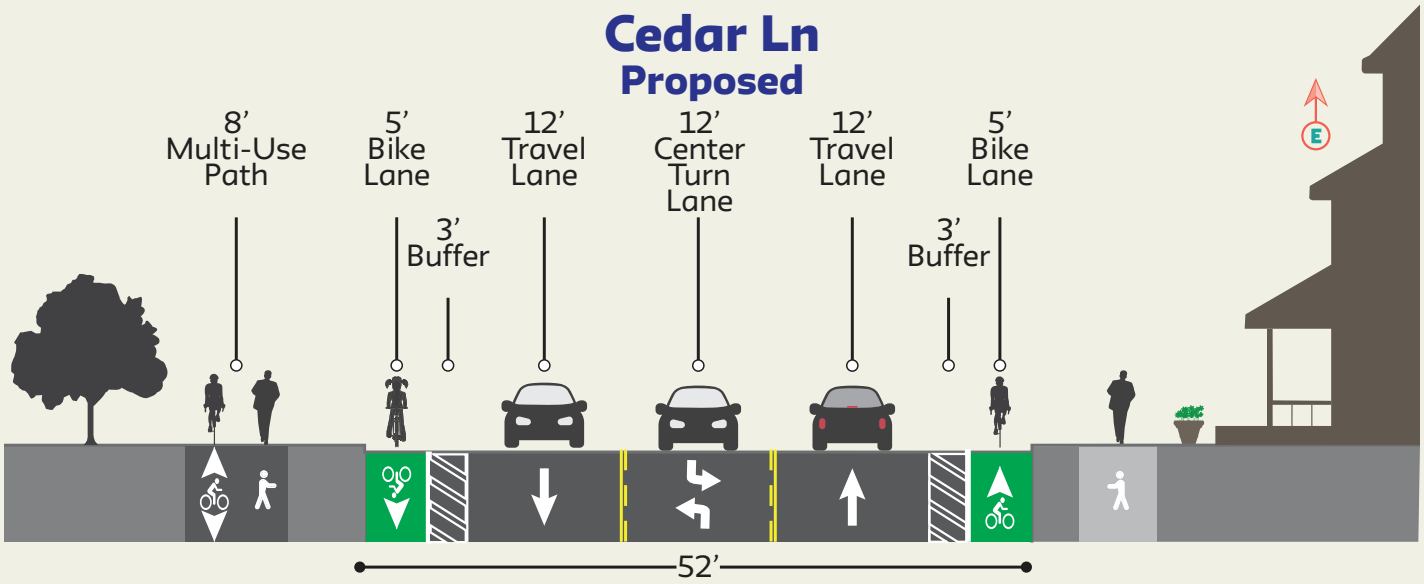
Recommendations

- Implement road diet, removing one lane of traffic in each direction and adding a shared center turn lane
- Install buffered bike lanes on either side of Cedar Ln

Though the multi-use path already caters to bike traffic along the corridor, residents' expressed a desire for dedicated on-road bike facilities to help slow traffic. These bike facilities provide an additional option for cyclists traveling between the apartment complexes and Highland Park as well as the Borough and Rutgers' Livingston campus.

Highland Park should work with Edison Township and the State to investigate continuing this road diet into Edison.





South 1st Avenue

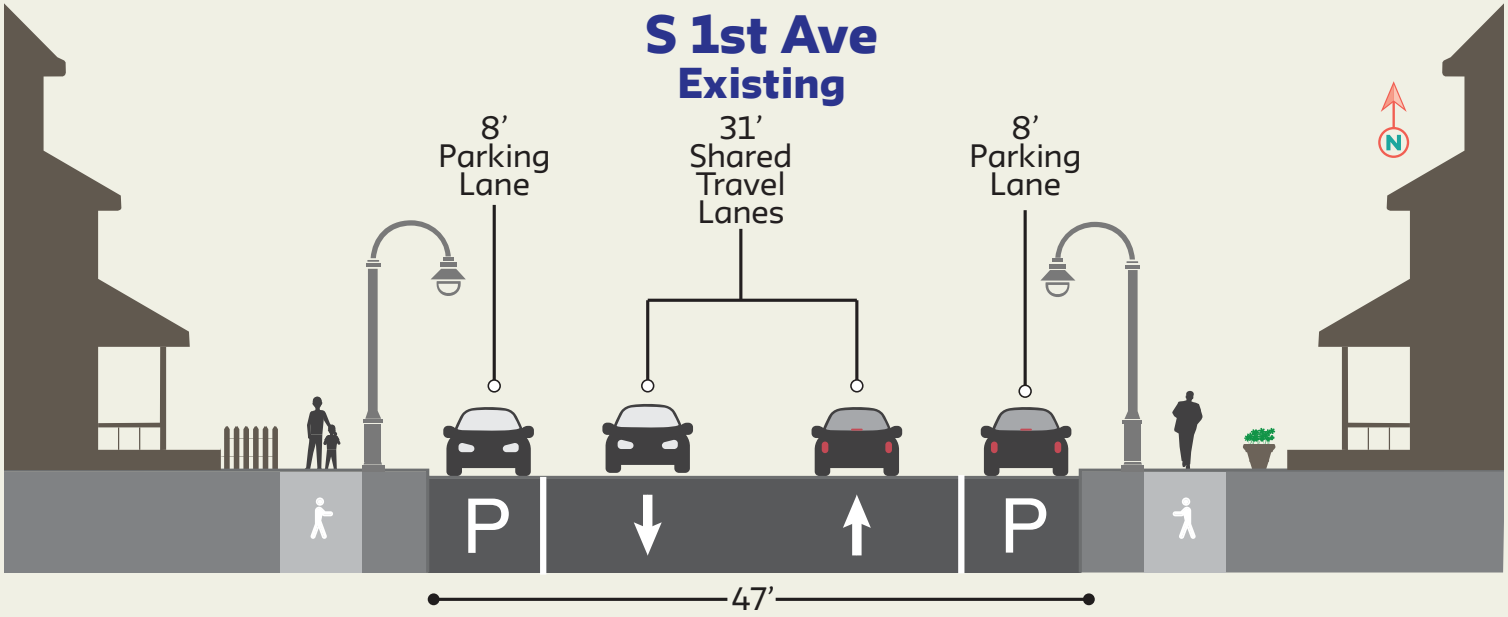
S 1st Ave travels from Raritan Ave, east of the Albany Street Bridge south toward Donaldson Park where it becomes Riverview Ave. The entirety of the corridor has low-density residential land uses, with the exception of Congregation Ahavas Achim at Johnson St. Intersecting streets have stop controls while the only stop sign along S 1st Ave is at Valentine St where the street becomes Riverview Ave.

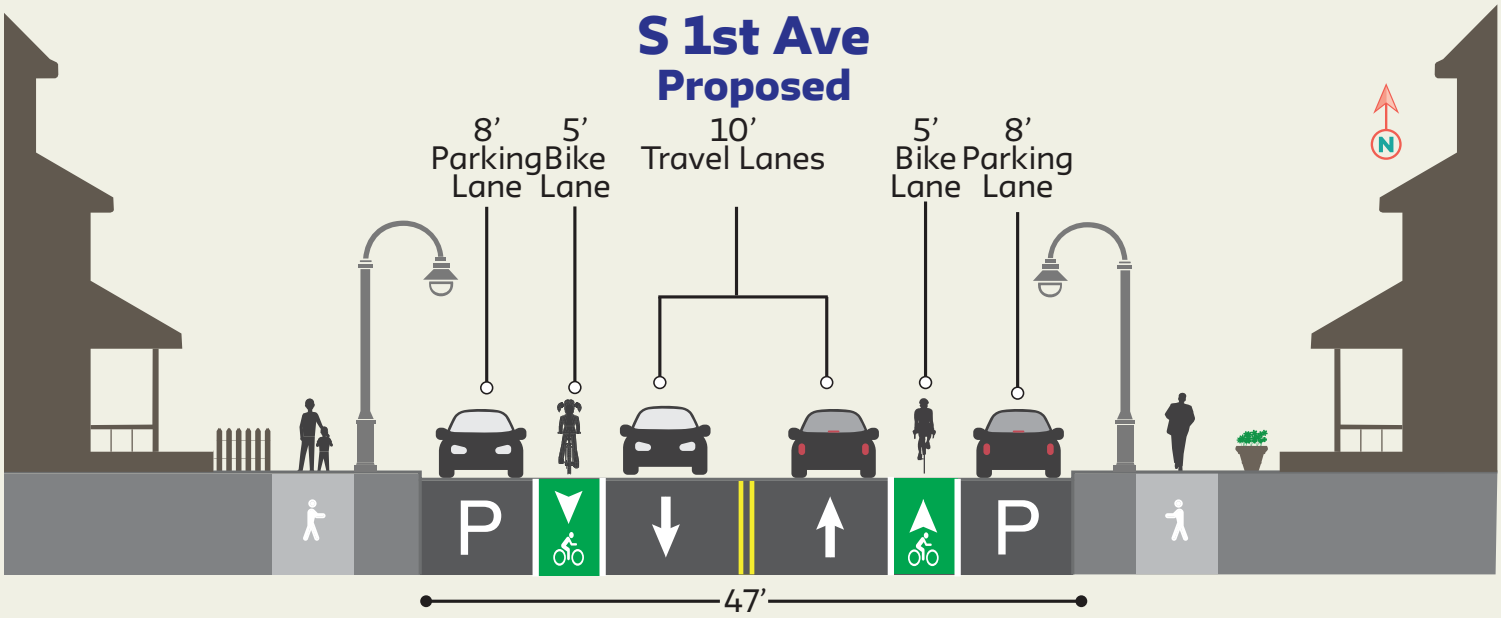
At 47 feet, S 1st Ave is one of Highland Park's widest streets. Parallel parking exists on both sides of the street with one travel lane in each direction. The corridor's low traffic volumes, low speed limit and overly wide roadbed presents a great opportunity for bicycle facilities.

Recommendations

- Install standard bicycle lane on both sides of S 1st Ave

This proposal would create a safe north-south bike route between Donaldson Park and Raritan Ave as well as connecting the residential neighborhoods within the community.





Cedar Avenue (Raritan Ave to Benner St) and Merilind Avenue

Cedar Ave parallels S 1st Ave one block to the west with a 24-foot roadbed. Likewise beginning at Raritan Ave, the street ends at Valentine St where it continues for one short block as Skyview Terr.

Cedar Ave has the same land uses as S 1st Ave, low-density residential with a synagogue at Johnson St. The northern two blocks of Cedar Ave, between Johnson St and Raritan Ave solely operates southbound traffic with parallel parking on the east curb while the remainder of the corridor has two-way traffic with parallel parking on the east curb.

With the same roadbed width as Cedar Ave, Merilind Ave runs for two blocks between Raritan Ave and Woodbridge Ave. The Irving School lies on the street's southern block on the west. The northern block operates two-way traffic while the southern block has traffic one-way southbound. The street has low-density residential uses and low traffic volumes.

Recommendations

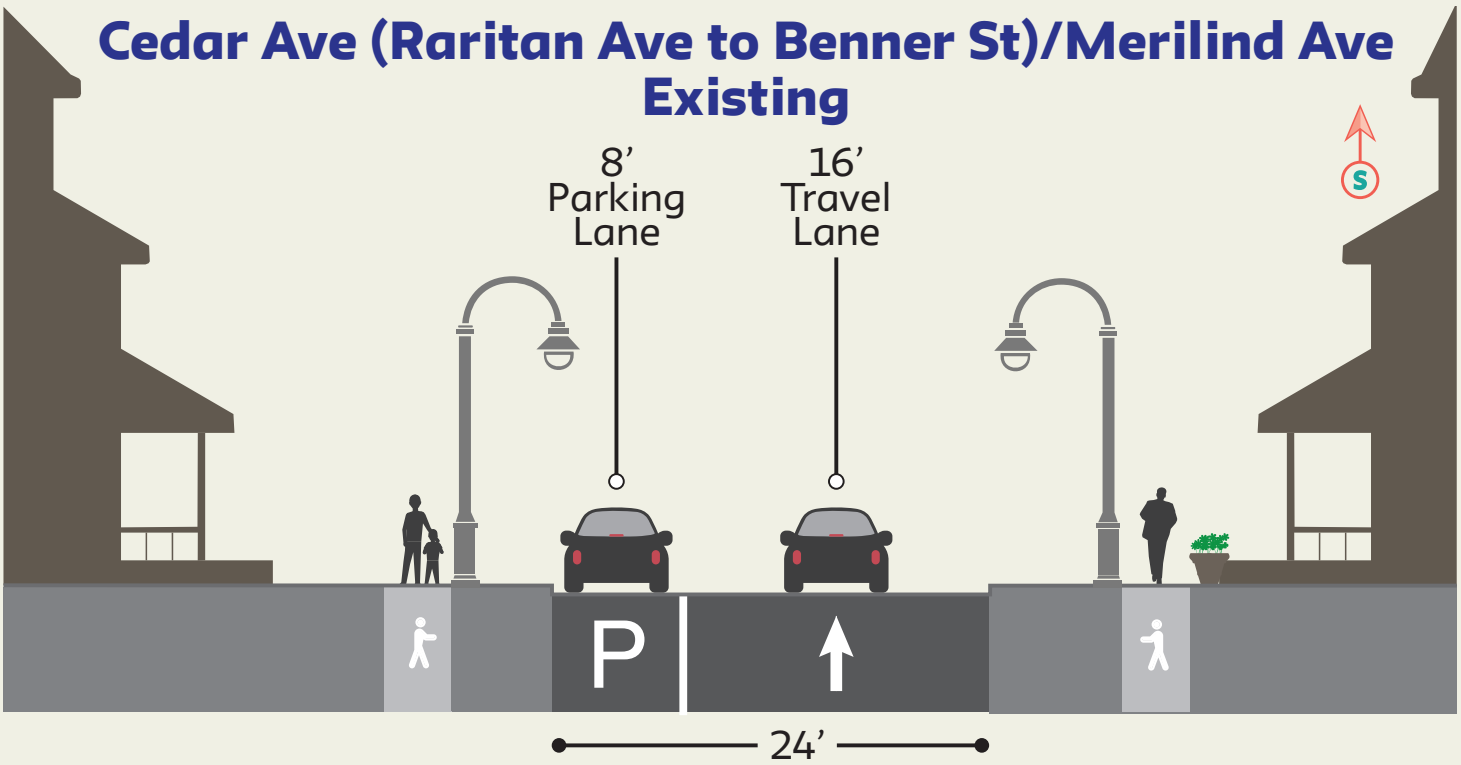
- Install standard bicycle lane on west curb of Cedar Ave between Raritan Ave and Benner St
- Install standard bicycle lane on west curb of Merilind Ave

The Cedar Ave bike lane would provide a connection from Raritan Ave and the Albany Street Bridge to the west into the southern portion of Highland Park. The lane would continue as a separated facility at Benner St. Positioning the bike lane along the west curb removes conflict with parking along the east curb.

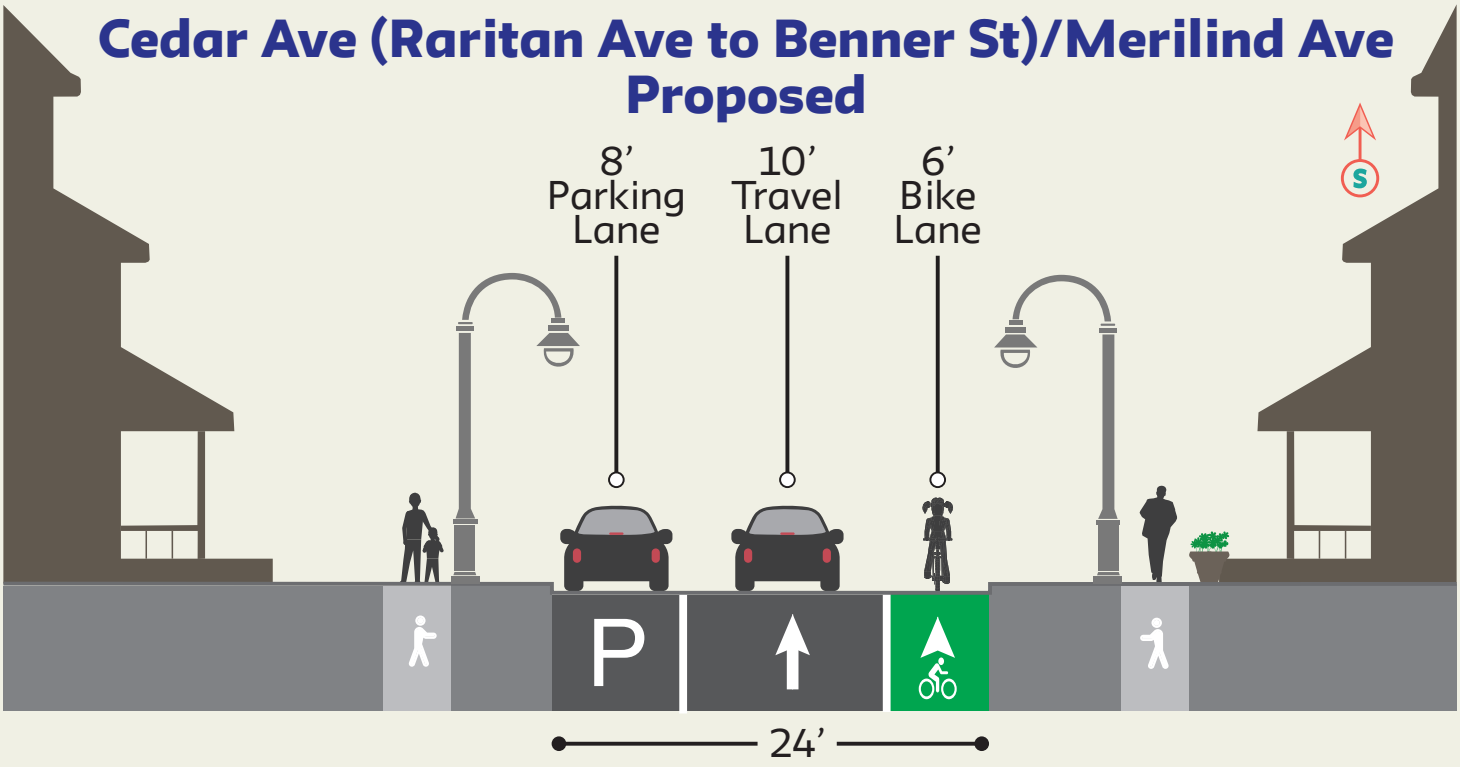
The Merilind Ave bike lane would connect Raritan Ave and Woodbridge Ave, as well as provide a bicycle connection to the Irving School. The southern end of the lane would continue onto Inza St with shared lane markings.

Cedar Ave, Source: Google Maps

Cedar Ave (Raritan Ave to Benner St)/Merilind Ave Existing



Cedar Ave (Raritan Ave to Benner St)/Merilind Ave Proposed



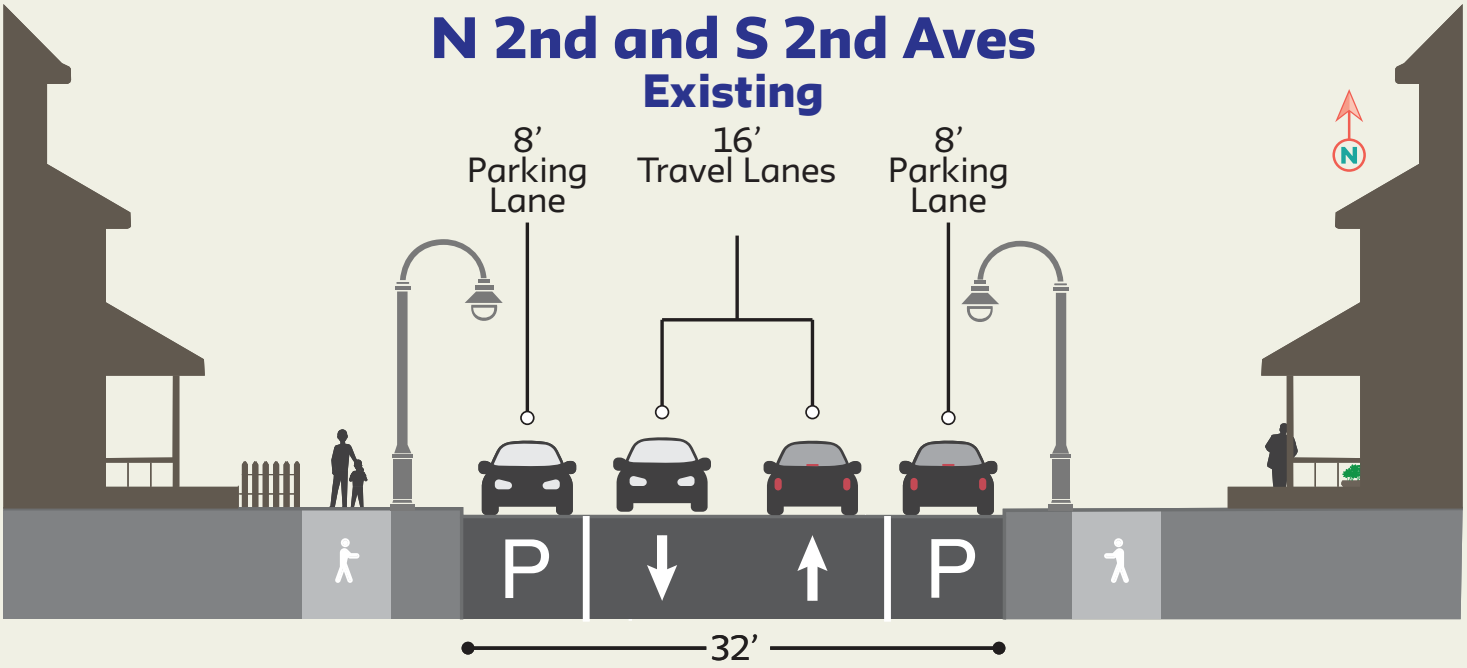
N 2nd and S 2nd Avenues

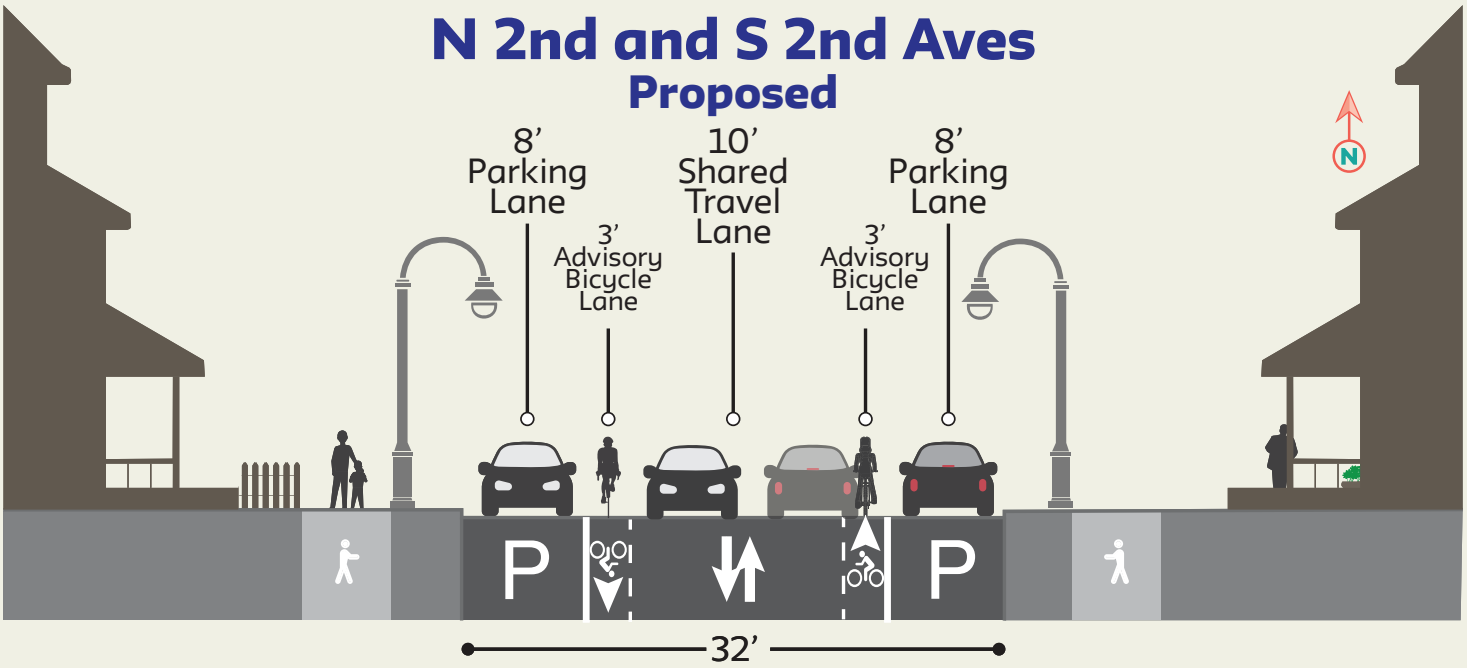
Not many streets traverse the entirety of Highland Park north to south. One exception is 2nd Ave, which travels between Riverview Ave and Donaldson Park in the south to Wayside Rd immediately short of the Northeast Corridor tracks in the north. The reach of these streets into and between residential communities presents an opportunity for bike facilities.

Recommendations

- Install advisory bike lanes on S 2nd and N 2nd Aves

As previously detailed on page 43, advisory bicycle lanes are utilized along corridors too narrow for standard or separated bicycle facilities. The low-volume, low-speed 2nd Ave would provide a direct low-stress connection between north and south Highland Park. The lanes traverse several other proposed bicycle facilities.





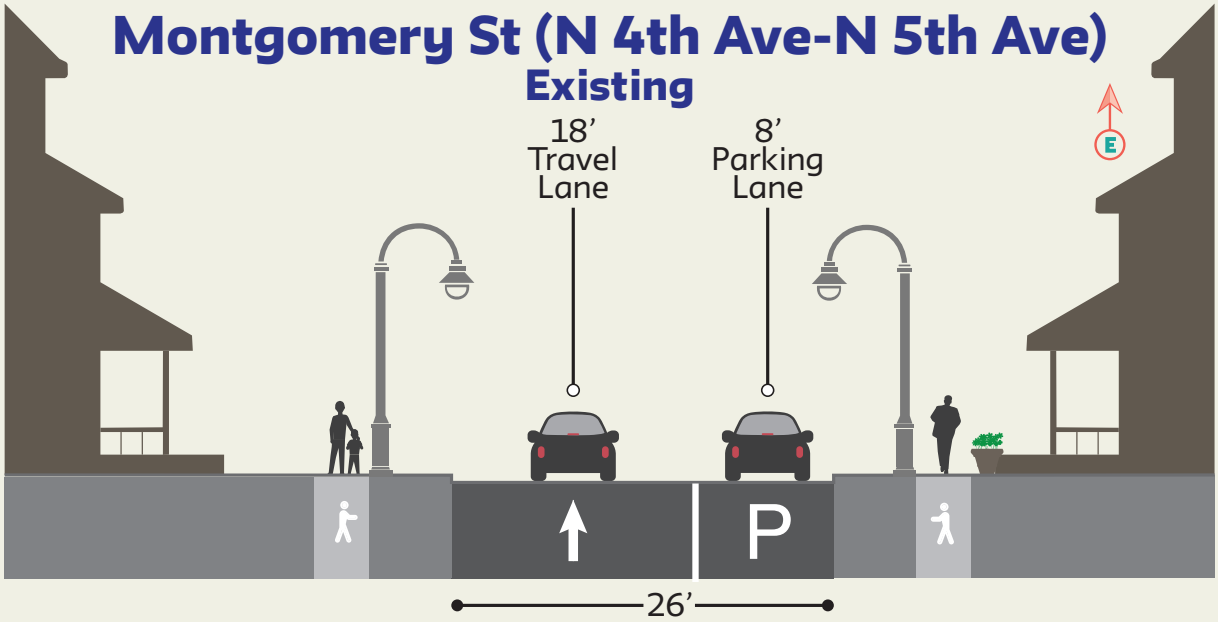
Montgomery Street (N 4th Ave to N 5th Ave)

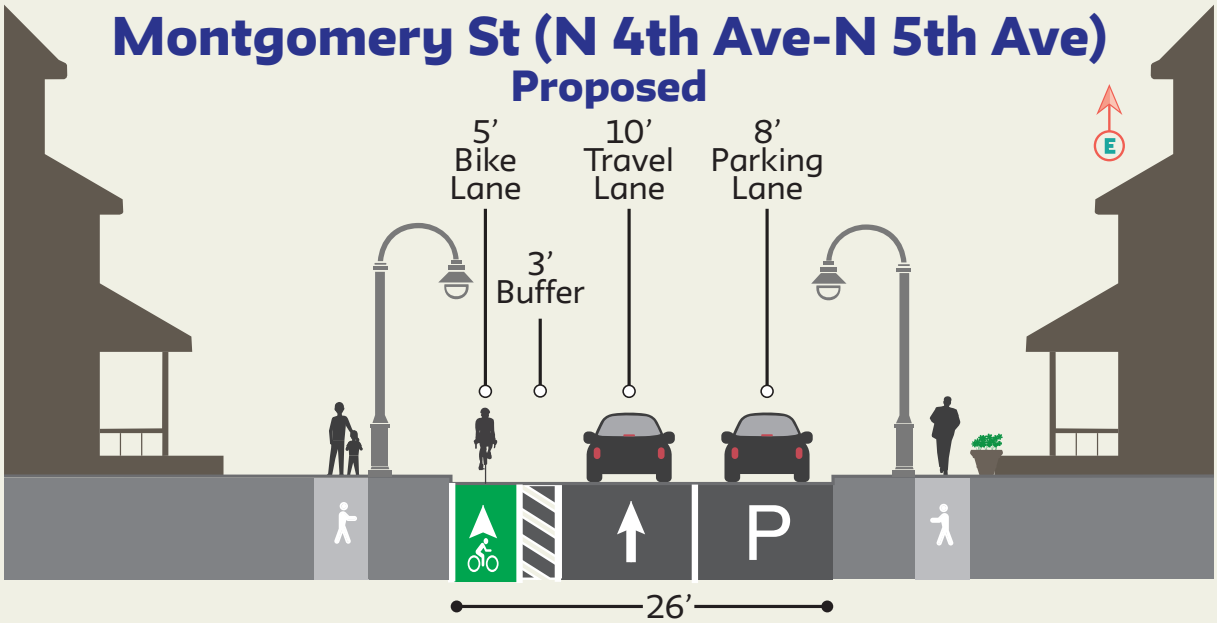
Montgomery Street travels west-east north of Raritan Ave, fronting along Highland Park Middle/High School. This block in front of the schools operates with one-way traffic eastbound.

Recommendations

- Install buffered bike lane along north curb of Montgomery St between N 4th and N 5th Aves

This dedicated bike facility provides a direct connection to the Middle/High School. The school has bicycle racks accommodating 56 bikes. The bike lane would help the many students who bike to school and encourage others to do the same, resulting in less localized traffic congestion. The north side of the street was chosen because there is only one driveway present while the south side has many more.





North 8th Avenue

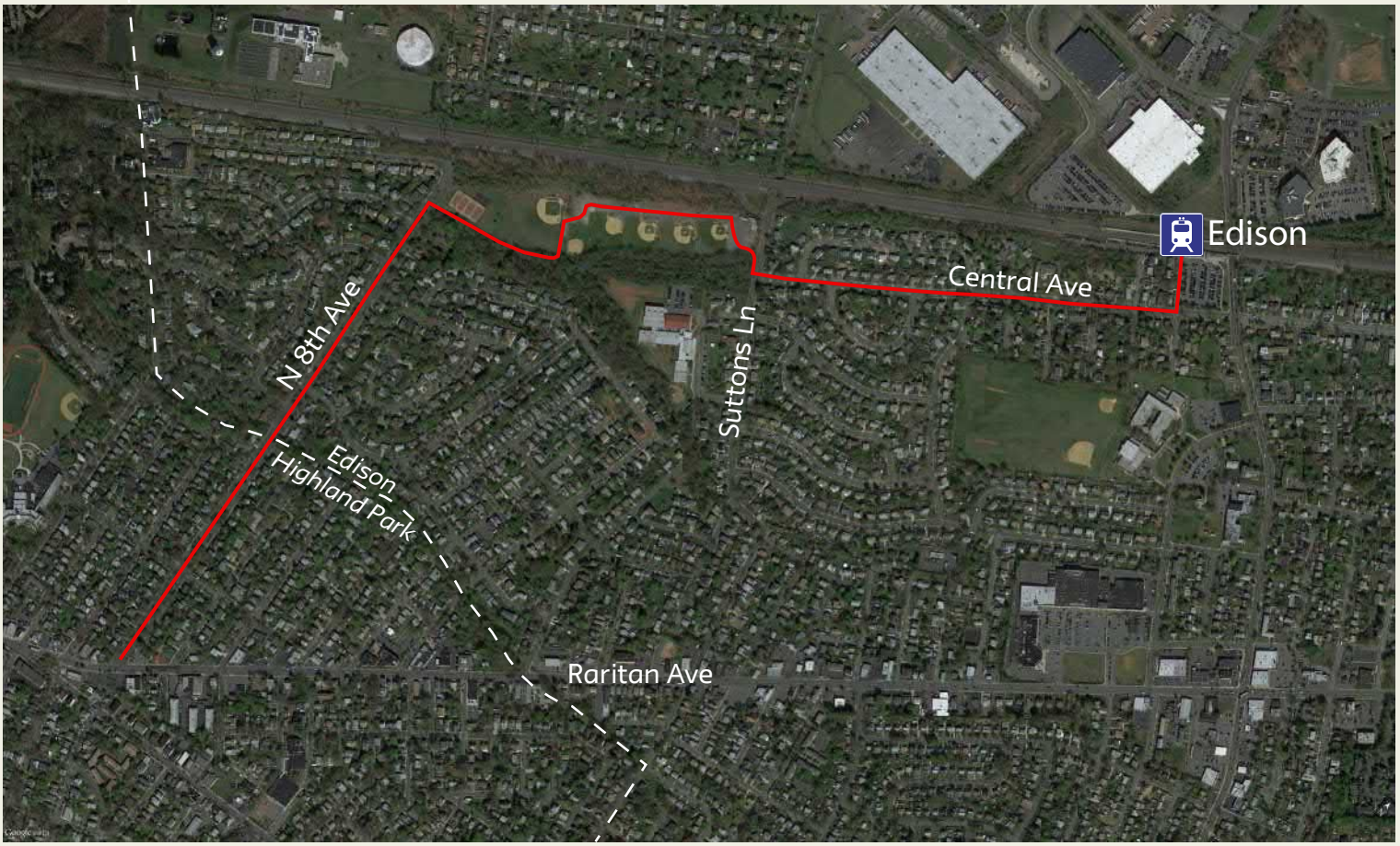
N 8th Ave travels 0.3 miles between Raritan Ave and the Edison border where it continues for 0.35 miles into Edison before turning west and becoming Edgemount Rd. Unique among streets in Highland Park, N 8th Ave is a boulevard with the northbound and southbound lanes of traffic separated by a planted greenspace median with trees. Each lane of the boulevard has parking on one side. This provides an opportunity for dedicated bicycle facilities connecting Raritan Ave and Edison.

Recommendations

- Install buffered bike lane along the median side of each side of North 8th Ave

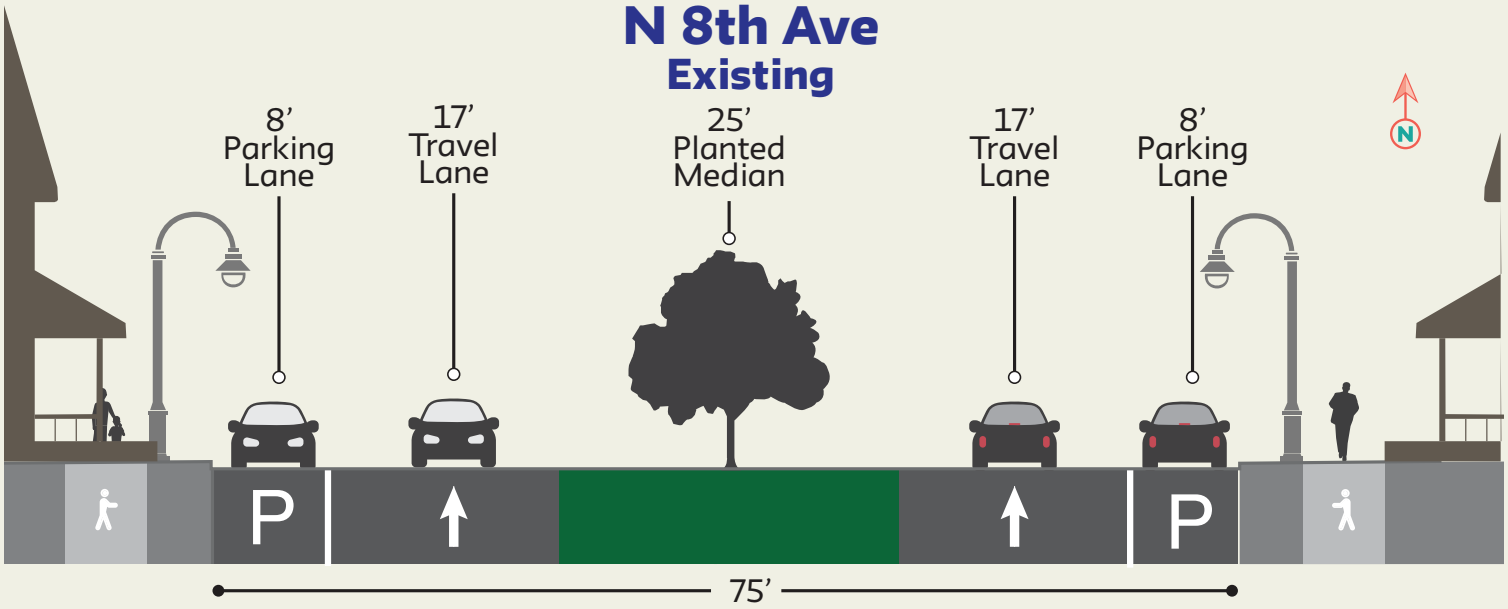
The placement of bike facilities along the greenspace removes conflicts between vehicles entering/exiting driveways and cyclists. This also allows the corridor to have no change in parking. The proposed cross-section is illustrated on the following page.

In addition to providing bicycle facilities in Highland Park, the Borough should work with Edison Township, and Middlesex County to facilitate continuing the bike facility into Edison. The bike facility should continue north along the boulevard, turn right into Schenck Mier Park continuing past the tennis courts and basefield fields onto Central Ave, and east to the Edison NJT station, as depicted below. This route would provide a direct, low-stress connection on local roads between Highland Park and the Edison train station. Though the Edison station is further from Highland Park than New Brunswick for most residents of the Borough, providing easier connections to Edison would enhance mobility and commuting opportunities for Highland Park residents.

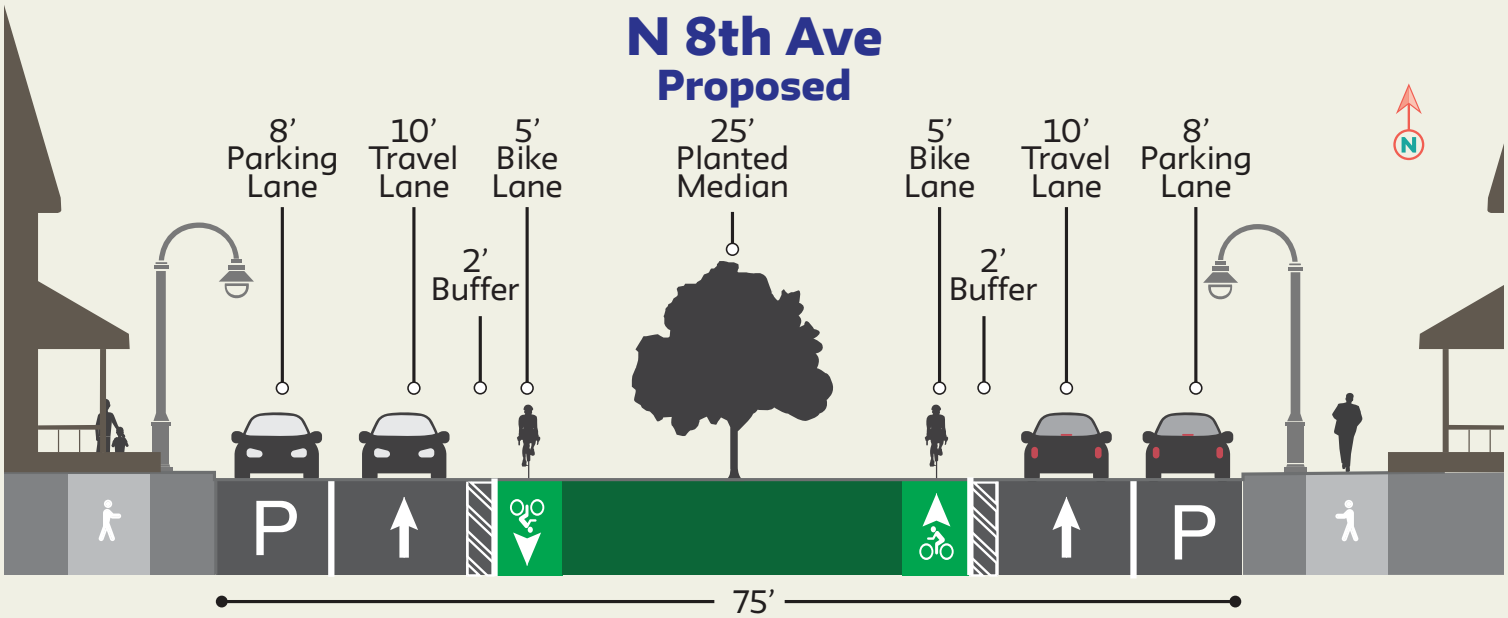


Proposed bike facilities to Edison train station

N 8th Ave
Existing



N 8th Ave
Proposed



North 6th and S 6th Avenue

6th Ave travels through most of Highland Park north-south, intersecting with Raritan Ave and Woodbridge Ave. At its intersection with Raritan Ave, each leg of 6th Ave operates with traffic one-way away from the intersection, thus S 6th Ave is one-way southbound and N 6th Ave is one-way northbound; each for one block before reverting to two-way traffic.

Recommendations

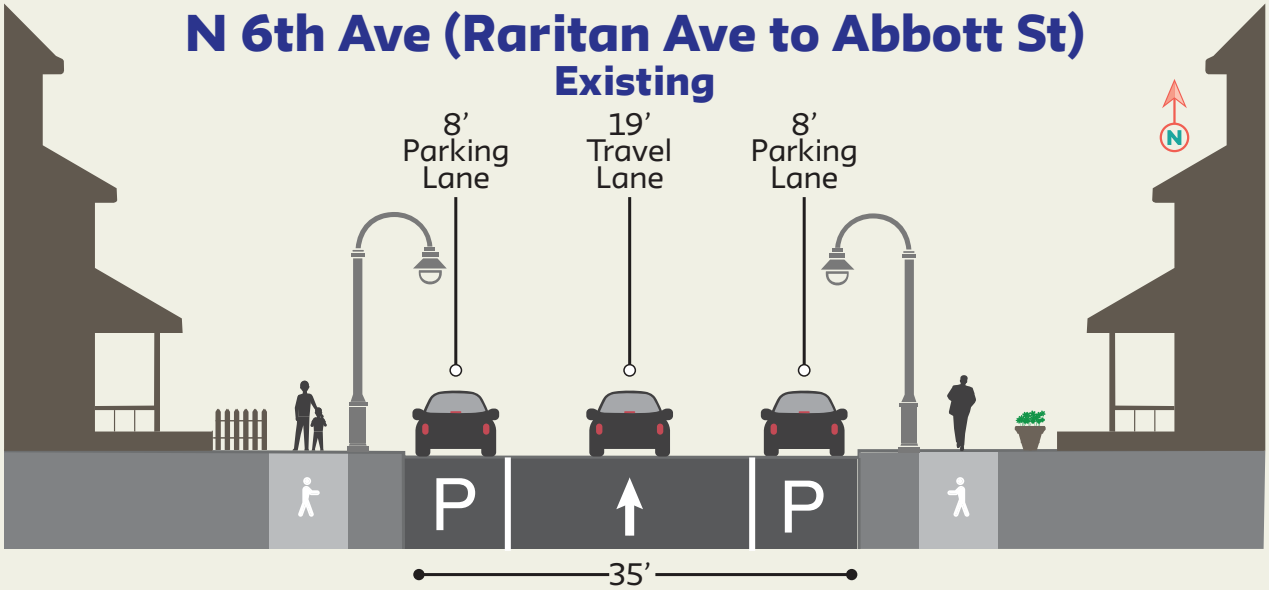
- Install buffered bike lane along N 6th and S 6th Ave; on N 6th Ave the bike lane would operate along the east curb and on S 6th Ave along the west curb

The placement of bike facilities along their respective curbs eliminates conflict between motorists' parking and cyclists. The northbound bike lane on N 6th Ave between Abbott and S Park Ave would necessitate converting the street to one-way northbound.

N 6th Ave, Source: Google Maps

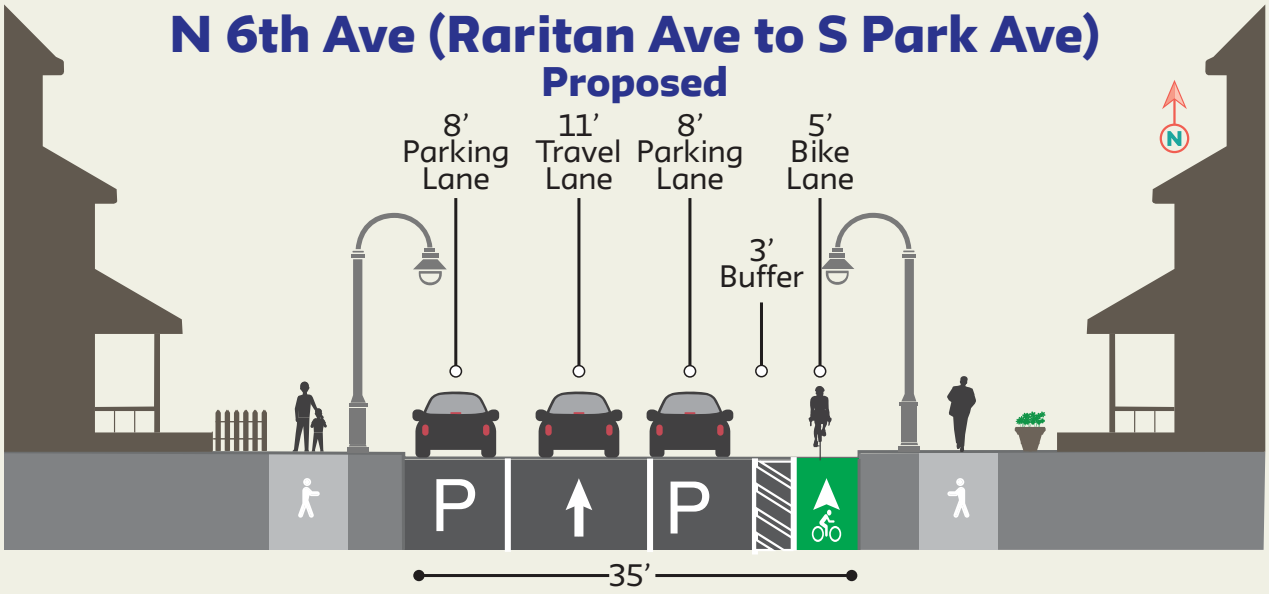
N 6th Ave (Raritan Ave to Abbott St)

Existing



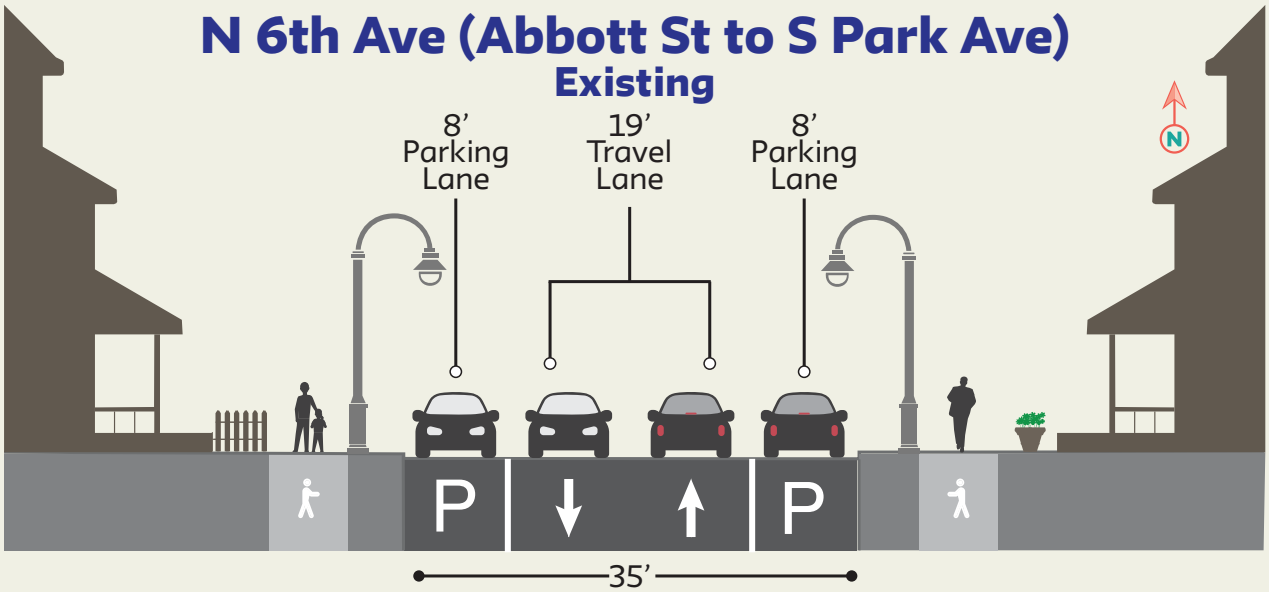
N 6th Ave (Raritan Ave to S Park Ave)

Proposed

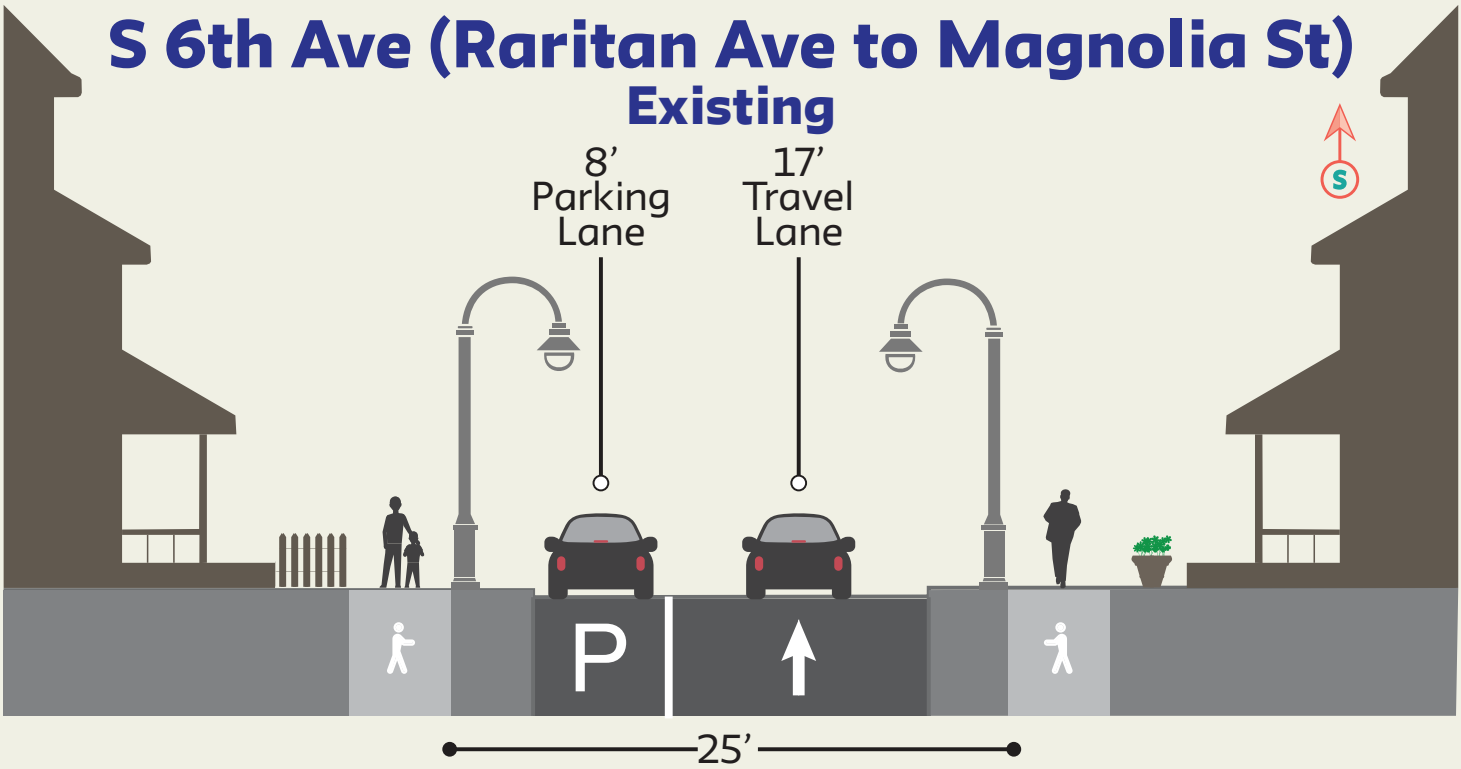


N 6th Ave (Abbott St to S Park Ave)

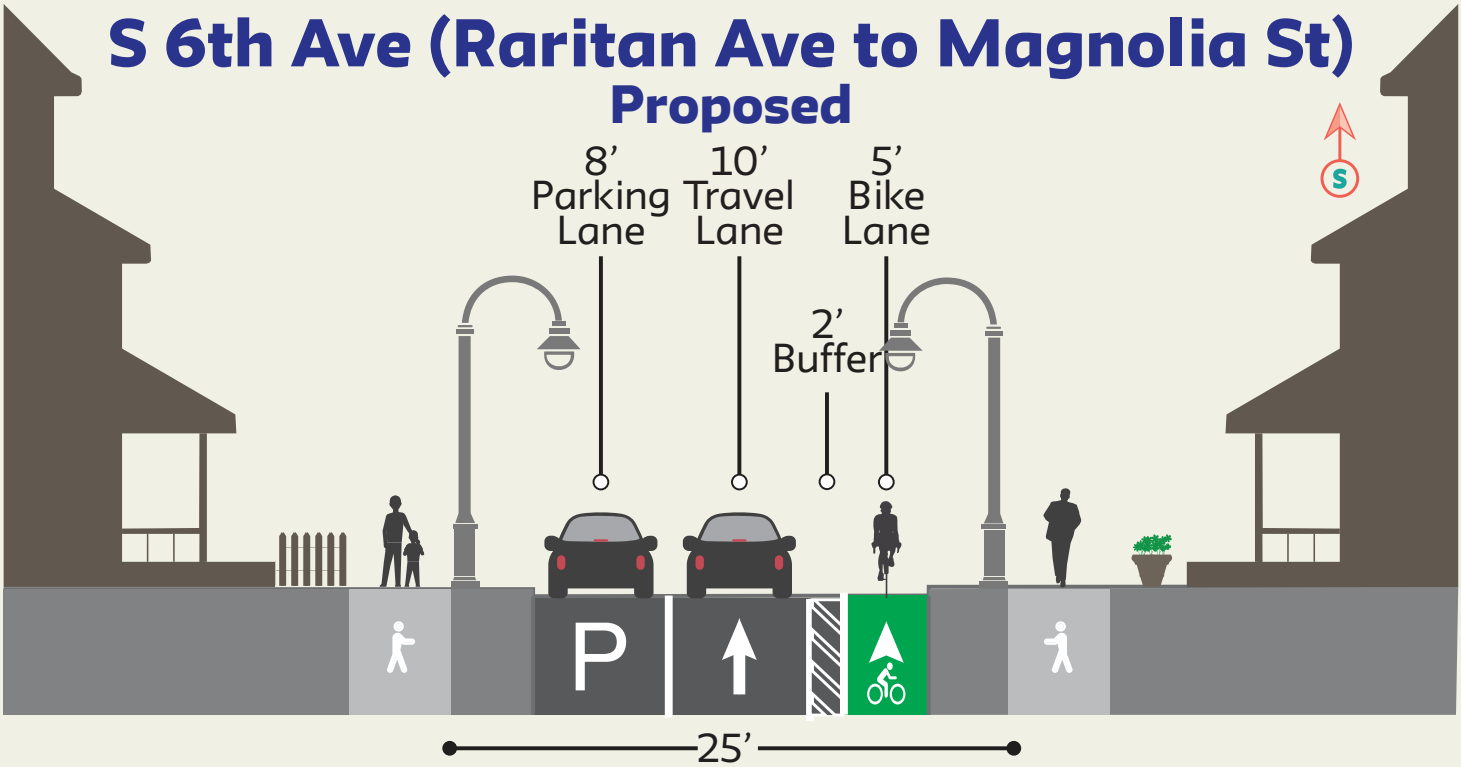
Existing



S 6th Ave (Raritan Ave to Magnolia St)
Existing



S 6th Ave (Raritan Ave to Magnolia St)
Proposed



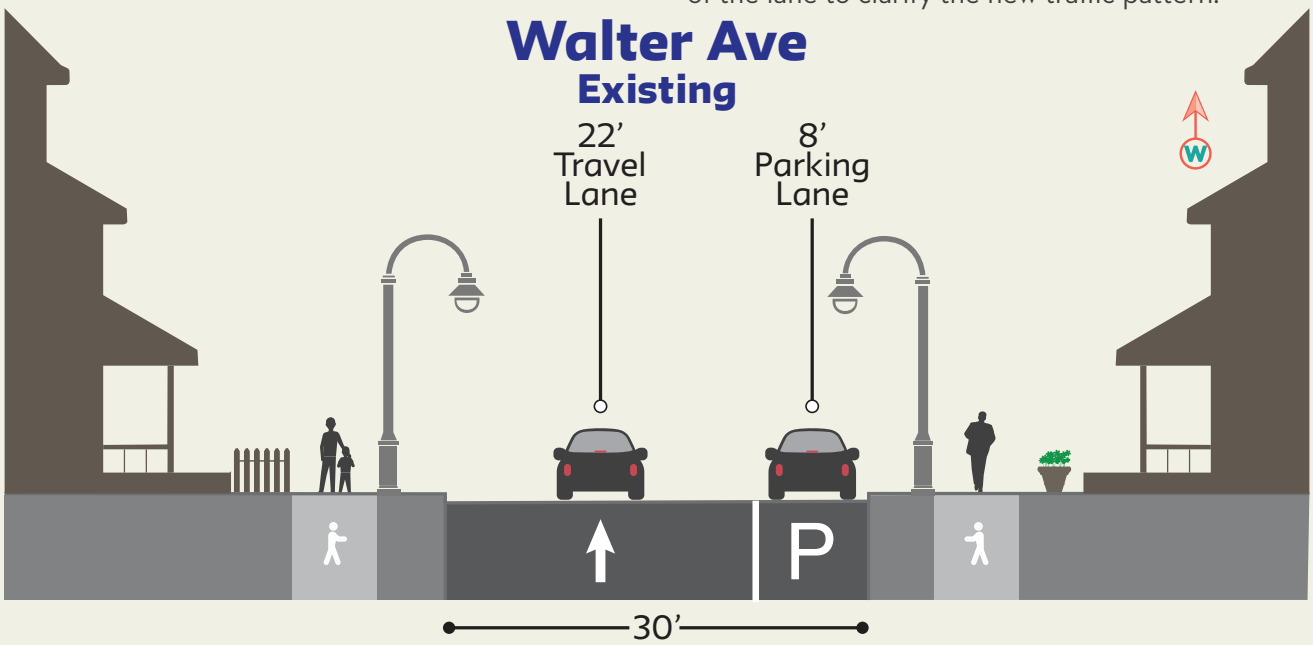
Walter Avenue

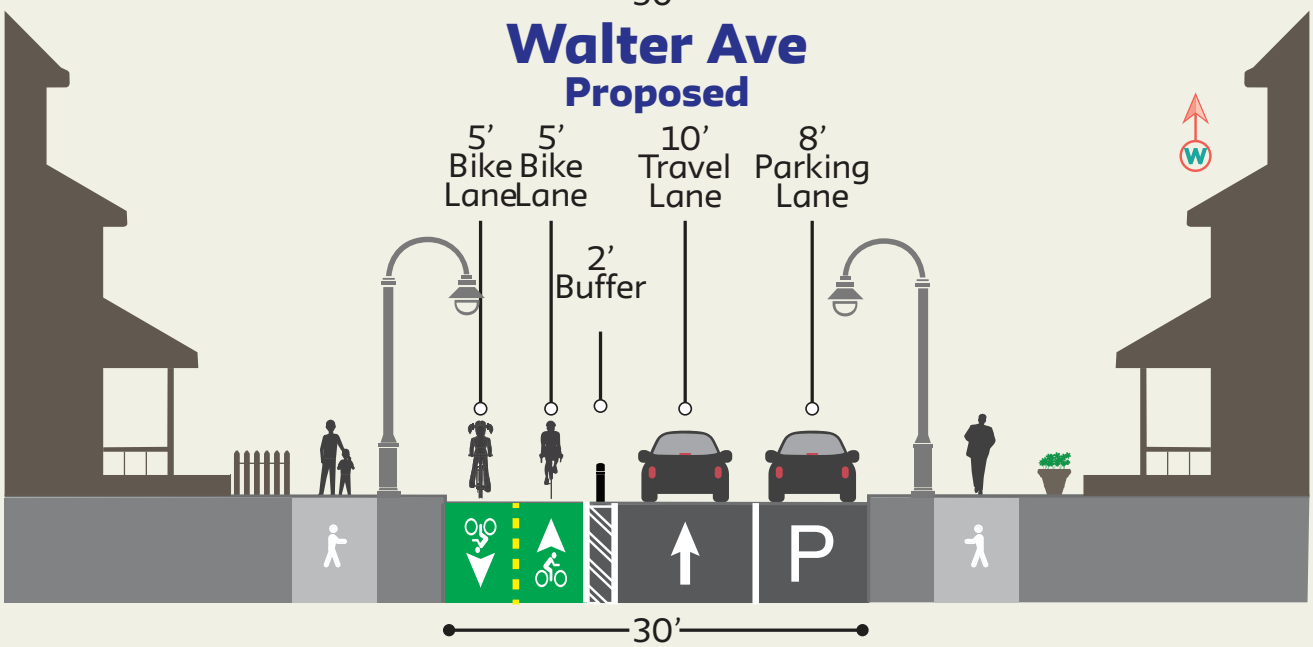
Walter Ave traverses one block west-east from River Rd to Lincoln Ave. Operating with one-way east-bound traffic, the street is 30 feet wide with parking on the north curb. Walter Ave's oversized width provides ample opportunity to connect cyclists traveling between New Brunswick, River Rd, the East Coast Greenway and residential neighborhoods north of Raritan Ave.

Recommendations

- Install two-way separated bike lanes along east curb of Walter Ave

Walter Ave's excessive width is capable of accommodating a two-way bike lane. While two-way bike lanes are uncommon on one-way streets, they are recommended in this instance to provide closer connections between the lane and the intersection of Raritan Ave and River Rd where many of the bikers would be coming from The one one-way block on Lincoln Ave is similarly positioned with a similar width, but has higher traffic volumes. Signage stating "Do Not Enter Except Bikes" should be placed on both ends of the lane to clarify the new traffic pattern.





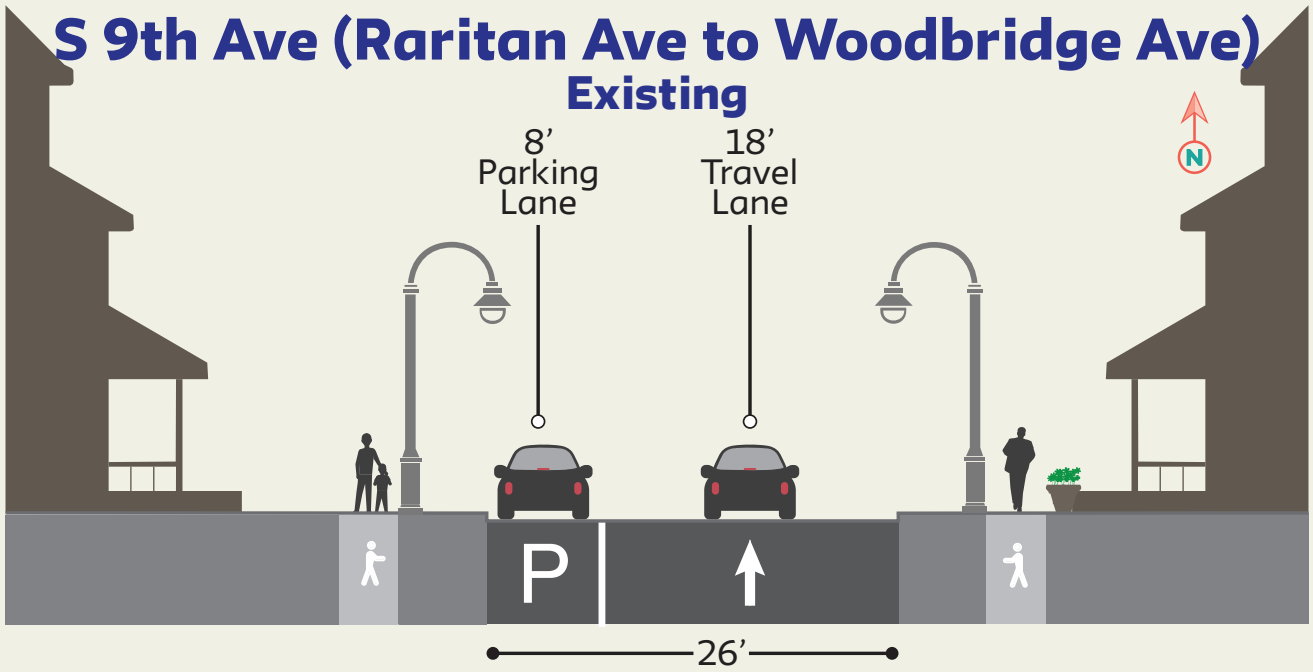
South 9th Avenue (Raritan Ave to Woodbridge Ave)

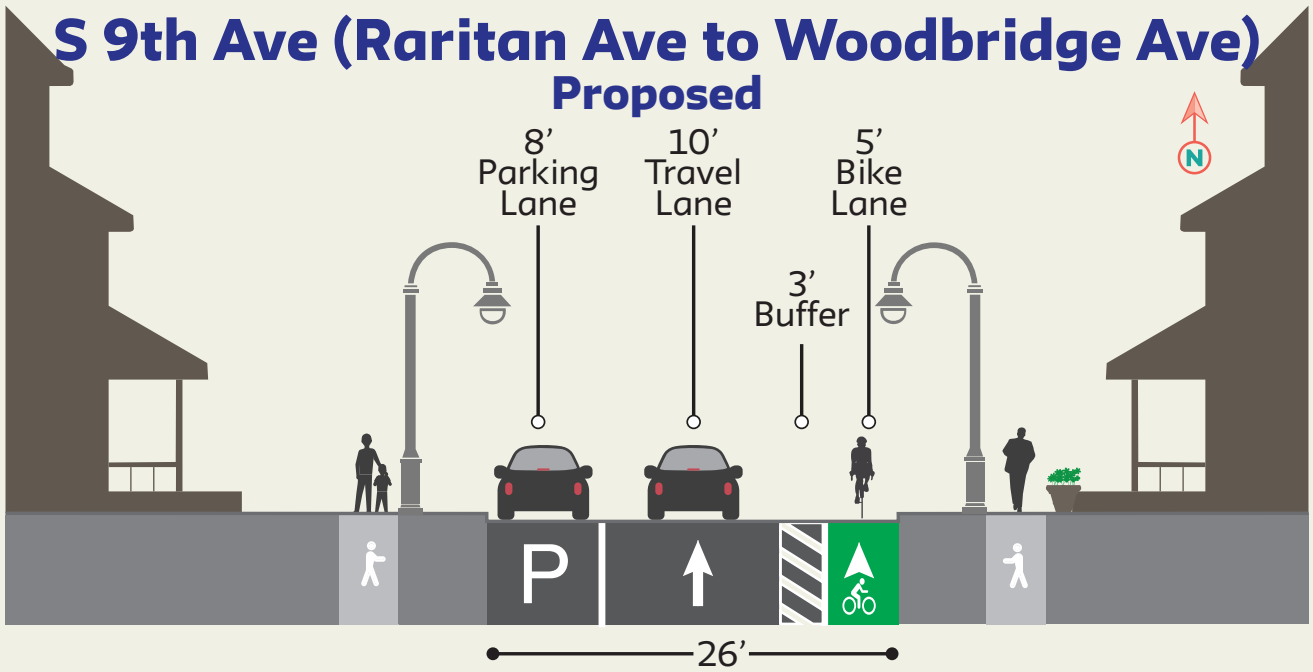
S 9th Ave travels for one block with northbound traffic between Woodbridge Ave and Raritan Ave. It is the only street connecting these two streets with no intersections in between. A disconnected section of S 9th Ave exists south of the intersection of Magnolia and Volkert Streets. Despite having the same roadbed width as two-way streets such as Benner and Magnolia Streets, S 9th Ave has one-way traffic.

Recommendations

- Install buffered bike lane along east curb of S 9th Ave

In the larger bike network, S 9th Ave would connect the northbound Volkert St bike lane with dedicated bike facilities on Raritan Ave and N 8th Ave, each continuing to Edison.





Bicycle Boulevards

Several roadways in Highland Park are ideal candidates for bicycle boulevard treatments. As described on page 45, bike boulevards are traffic calmed streets prioritizing bicycle travel and create a more comfortable bicycling environment. Ideal bike boulevard candidates are roadways with low volumes and low speeds. Many neighborhood streets already have elements of bike boulevards. These streets can be enhanced by design treatments deferring high vehicle speeds and discouraging through trips, such as signage, markings, and reduced speed limits. Bike boulevards typically form a connected route of high-demand segments.

Bike boulevard components should be implemented on the following streets in Highland Park to strengthen the bicycle network established in the previous recommendations:

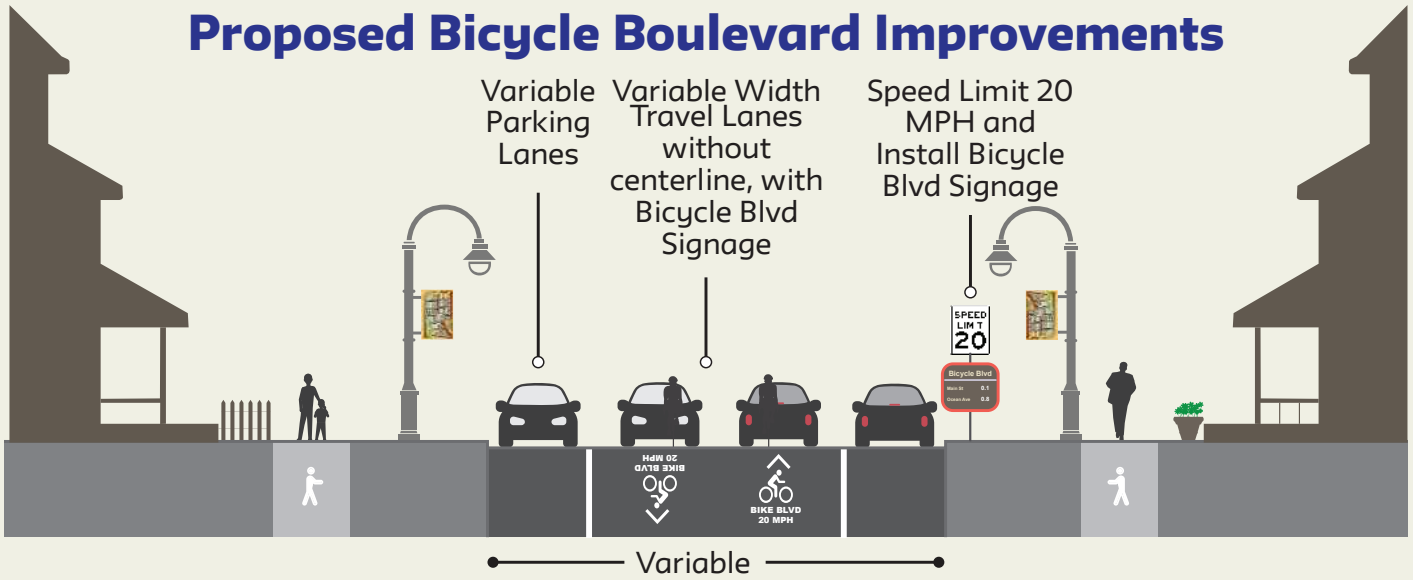
- Cleveland Ave between River Rd and Madison Ave
- Madison Ave between Cleveland Ave and N 4th Ave
- N 4th Ave between Madison Ave and Raritan Ave
- Montgomery Street between Lincoln Ave and N 4th Ave
- S 3rd Ave between Raritan Ave and Donaldson Park
- S 9th Ave between Benner St and Aurora St
- Aurora St between S 9th Ave and Crowells Rd
- Crowells Rd between Aurora St and Woodbridge Ave

Recommendations

- Stripe bicycle boulevard signage onto pavement
- Reduce speed limits to 20 mph
- Install bicycle signage, such as wayfinding and distances to destinations along the corridors
- Implement traffic calming measures where applicable, such as curb extensions, center islands, neighborhood traffic circles, raised crosswalks and speed tables

Bicycle Boulevard, Ocean City, NJ

Proposed Bicycle Boulevard Improvements



Shared-Lane Markings

Several roadways in Highland Park lack the space for dedicated bicycle facilities. The preferred application for these roadways is a shared-lane marking or "sharrow." These should be placed at least 11 feet from the curb when parallel parking is present (4 feet when no parking is present), but the preferred placement is in the middle of the travel lanes so that drivers understand cyclists have equal right-of-way on the street. Sharrows provide the least priority for cyclists of any of the bike infrastructure options. Whereas bike boulevards are designated on high-demand, contiguous street segments, shared-lane markings are installed on other low-volume, low-speed streets to make motorists aware of the presence of cyclists.

Sharrows should be installed on the following road segments in Highland Park:

- Wayside Rd between River Rd and N 2nd Ave
- Harrison St and River Rd and Edison border
- Lincoln Ave between Walter Ave and Madison Ave
- N 4th Ave between Madison Ave and Lincoln Ave
- N 5th Ave between Raritan Ave and S Park Ave
- S Park Ave between N 5th Ave and N 8th Ave
- Riverview Ave between Valentine St and Donaldson Park
- Mansfield St between S 3rd Ave and S 5th Ave
- S 5th Ave between Raritan Ave and Mansfield St
- S 6th Ave between Magnolia St and Benner St
- Inza St between Woodbridge Ave and Aurora St
- Barnard St between Raritan Ave and Woodbridge Ave
- Woodbridge Ave between Raritan Ave and Edison border
- the entirety of Skyview Terrace
- Valentine St between Cedar Ave and S 1st Ave

Woodbridge Ave

Raritan River Waterfront Easement

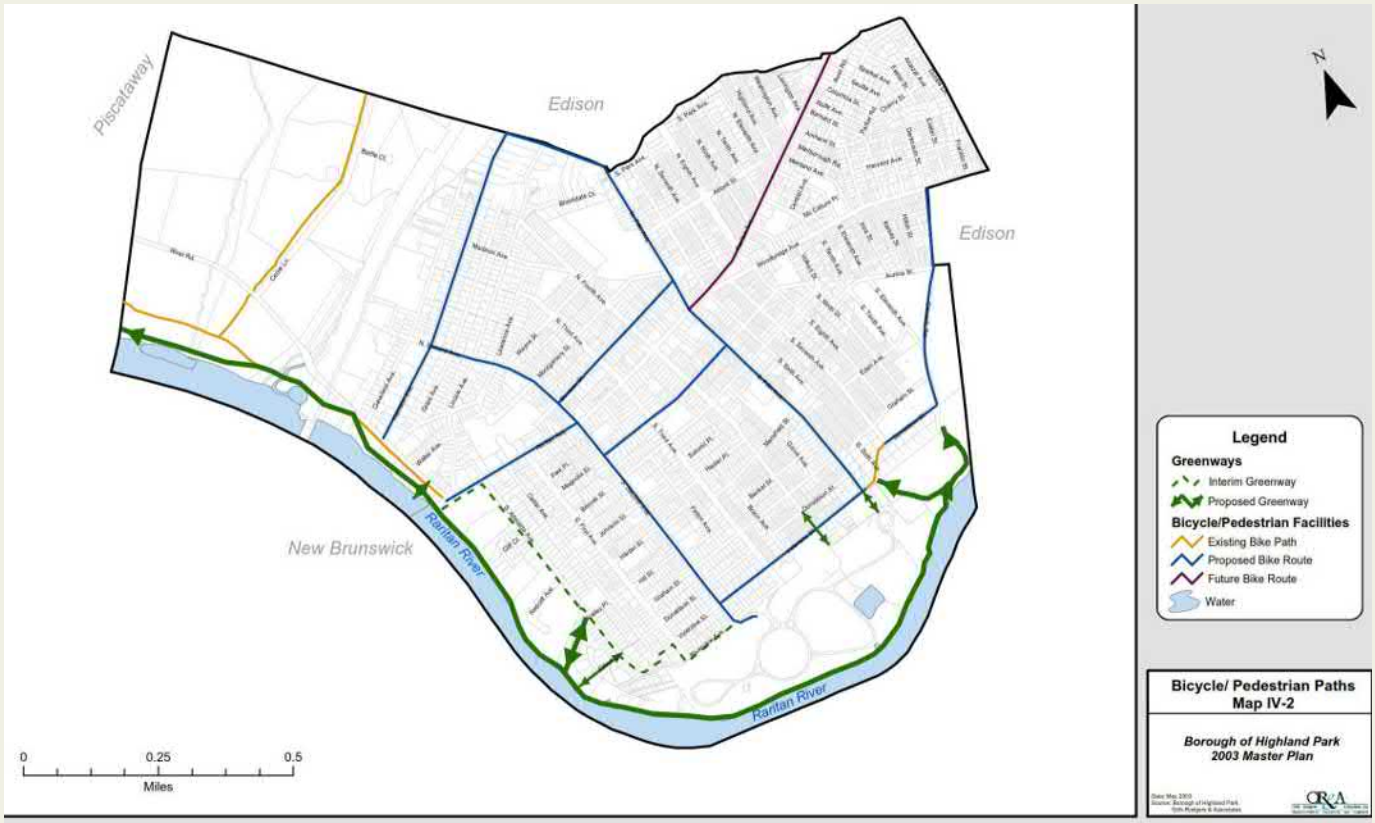
An existing bikeable path lies along the Raritan River from Skyview Terrace in the southwest to the Albany Street Bridge, though no connection is provided to Raritan Ave. Highland Park's 2003 Master Plan proposes a greenway connecting Donaldson Park and Johnson Park running along the Raritan River. This Raritan River Greenway was also identified by Middlesex County in its 1995 Open Space and Recreation Plan. As detailed in the Borough's Master Plan, the Greenway would include the following facilities:

- River Road/Native Plant Reserve and Environmental Education Center/Waterfront Park
- Donaldson and Johnson Parks
- The 16-acre Lower Meadows
- Red's Marina
- Barwood/Gutman Property
- Valley Place Ravine

The upgraded Greenway would run along the entirety of the river's portion in Highland Park into Piscataway with connections at Crowells Rd, S 6th Ave, Elbert Ct, Valley Pl and south of Walter Ave.

The Borough should work with local property owners and the County to help develop and preserve this land along the river for a greenway.

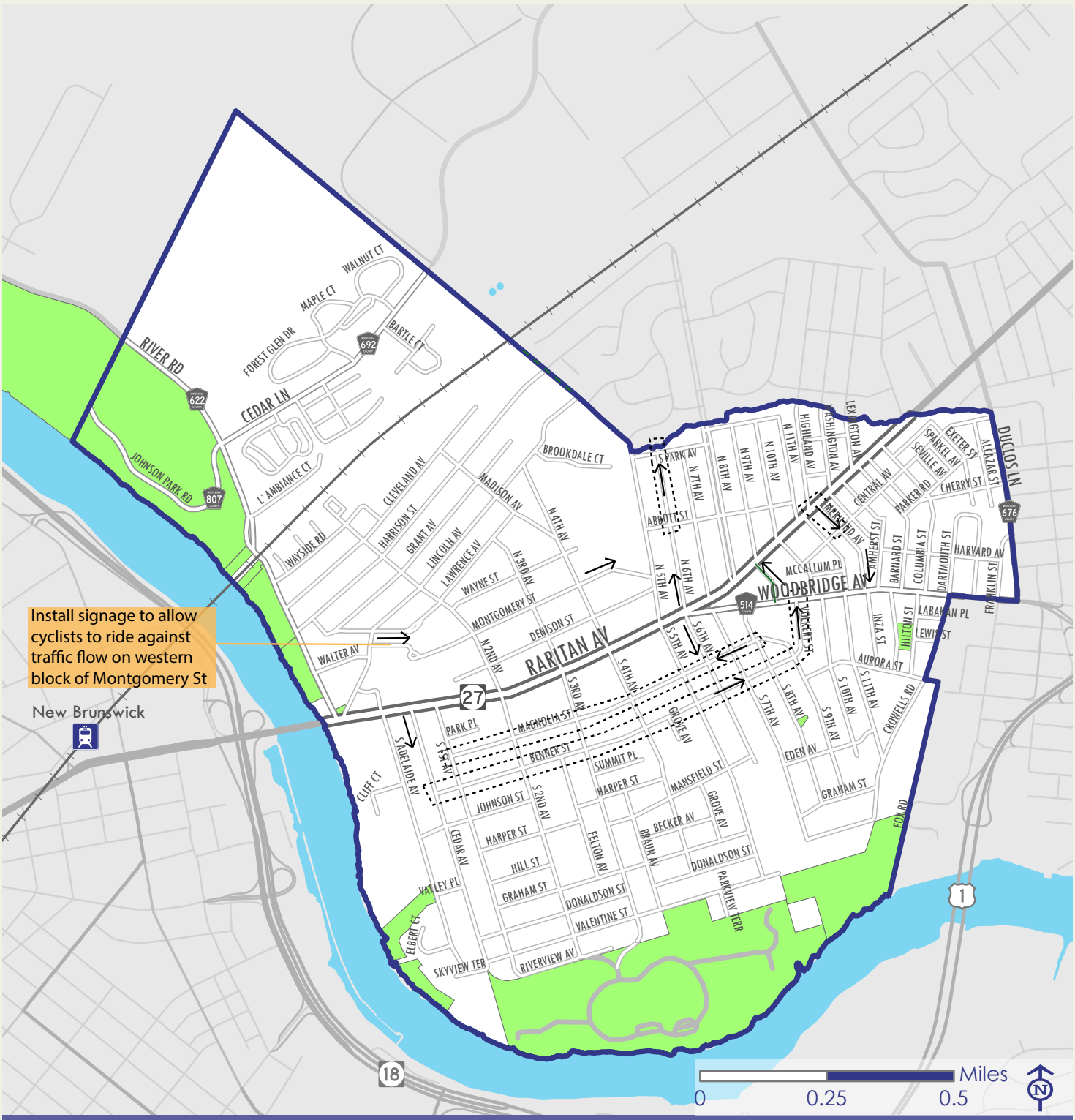
The map below illustrates the plan proposed in Highland Park's 2003 Master Plan. This includes the Greenway route (in green) along the Raritan River.



Street Direction Changes

The following page (Map 17) illustrates the three street direction changes necessary for the proposed bike improvements, including:

- Benner/Volkert St and Magnolia Street
- Merilind Ave-between Raritan Ave and Central Ave, continuing the pattern one block south
- N 6th Ave-between Abbott St and S Park Ave, continuing the pattern one block south



MAP 17: Proposed Changes in Street Directions

HIGH LAND PARK BIKE WALK

Direction Changes

Spot Bike Improvements

The following are recommended spot bike improvements, as shown on Map 18:

- Make River Rd bike facility more prominent through paint and/or signage (see existing conditions photo below)
- Install signs allowing riding bike on Albany Street Bridge sidewalk
- Add bike parking in front/next to Classic Cleaners on Raritan Ave between S 1st and S 2nd Aves
- Add bike parking in front Chamber 43 on Raritan Ave between S 3rd and S 4th Aves
- Add bike-scale signage on Raritan Ave at N 8th Ave and N 8th Ave at Edison border promoting bike route to Edison NJT station
- Install crossing of Raritan Ave at S 9th Ave with RRFB for cyclists to continue from S 9th Ave to Raritan Ave
- Install crossing of Woodbridge Ave at Volkert St with RRFB for cyclists to continue from Volkert St onto S 9th Ave

River Rd

Bicycle LTS Revisited

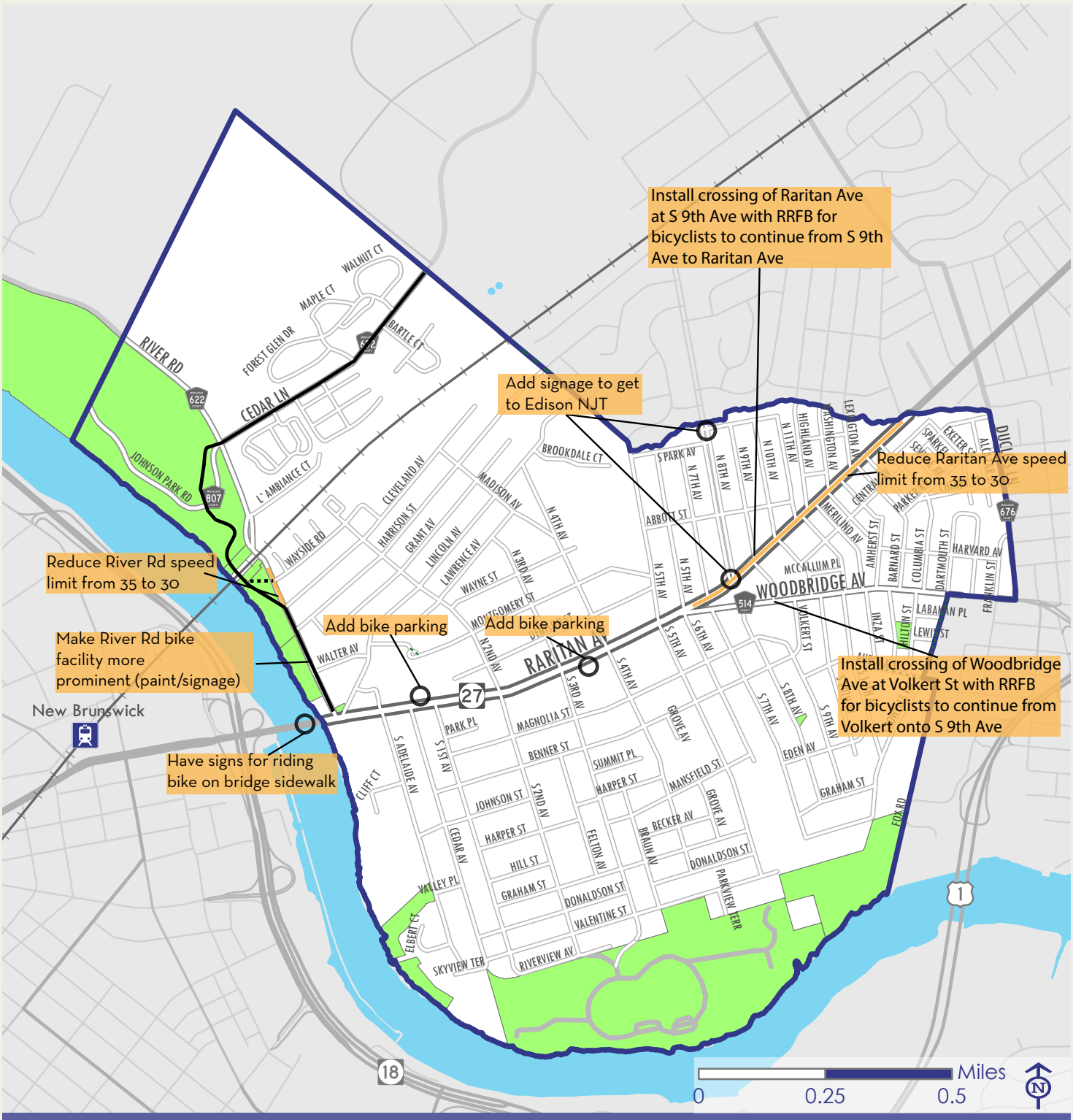
The proposed program of improvements described in the previous section is intended to create a more comfortable, convenient, and interconnected bicycle network for cyclists of all ages and abilities. Improving the bicycle facilities will create a more comprehensive bicycle network for Highland Park. The proposed bicycle network builds upon bicycle demand connecting major destinations to residents and visitors, and improves linkages between the northern and southern sections of the Borough as well as to neighboring communities.

Re-evaluating the bicycle level of traffic stress (LTS) for the proposed network is one way to measure the anticipated benefits to user comfort. Map 19 shows the revised LTS analysis with both short term and long term recommended bicycle improvements implemented. The result is a network where almost all trips can be made on LTS 1 roadways.

The most significant change in the LTS is along Raritan Ave where the segment east of Woodbridge Ave becomes an LTS 1 with separated bike lanes and a reduced speed limit, and west of Woodbridge Ave becomes LTS 2 with dedicated bike facilities. As a result of Raritan Ave's improved LTS, steets intersecting with Raritan Ave previously designated LTS 2 become LTS 1.

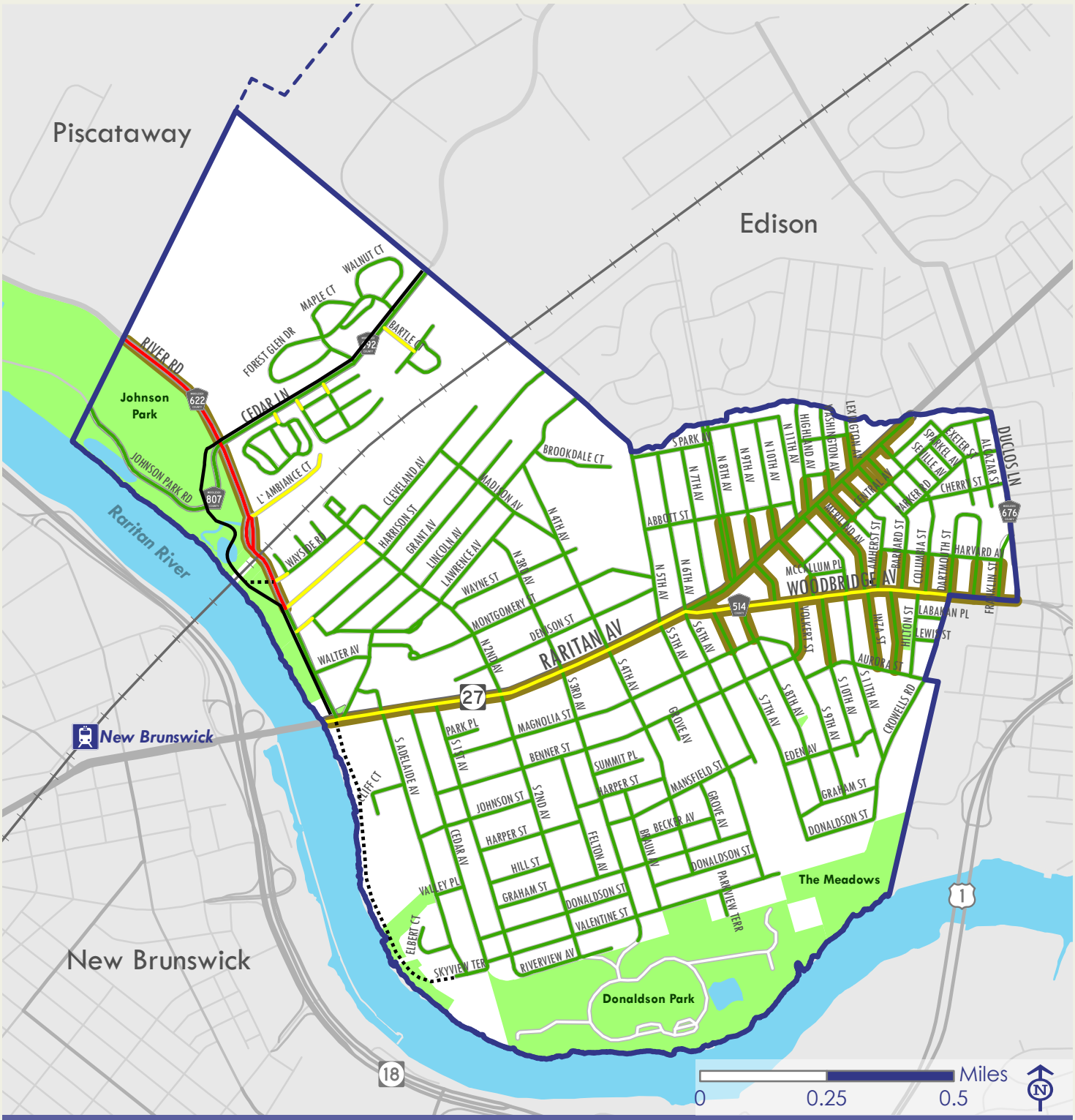
Woodbridge Ave remains LTS 3 because there is not adequate space for dedicate bike facilities along the corridor and because the span has few traffic controls. Despite still being LTS 3, the recommendations improve nearby roadways so cyclists have more options than to bike along Woodbridge Ave. Both S 9th Ave and Merilind Ave intersecting with Woodbridge Ave improve from LTS 2 to LTS 1 with dedicated bike facilities. The LTS for River Rd improves from a 4 to a 3 due to the decreased speed limit, but does not decrease to a 2 due to high traffic volumes.

The remaining recommendations were proposed for roadways classified as LTS 1 initially. While the LTS metric helps identify high stress roadways, it does not account for perceived safety or driver behavior. SAC members described several roadways throughout Highland Park as uncomfortable for cyclists, despite being an LTS 1 roadway. While the proposed improvements to these existing LTS 1 roadways do not impact the LTS based on the metric's methodology, they still improve safety and encourage new users to cycle on these enhanced bicycle facilities.



MAP 18: Spot Bike Improvements

HIGH LAND PARK BIKE WALK



Map 19-Proposed Bicycle Level of Traffic Stress (LTS)

HIGH LAND PARK BIKE WALK

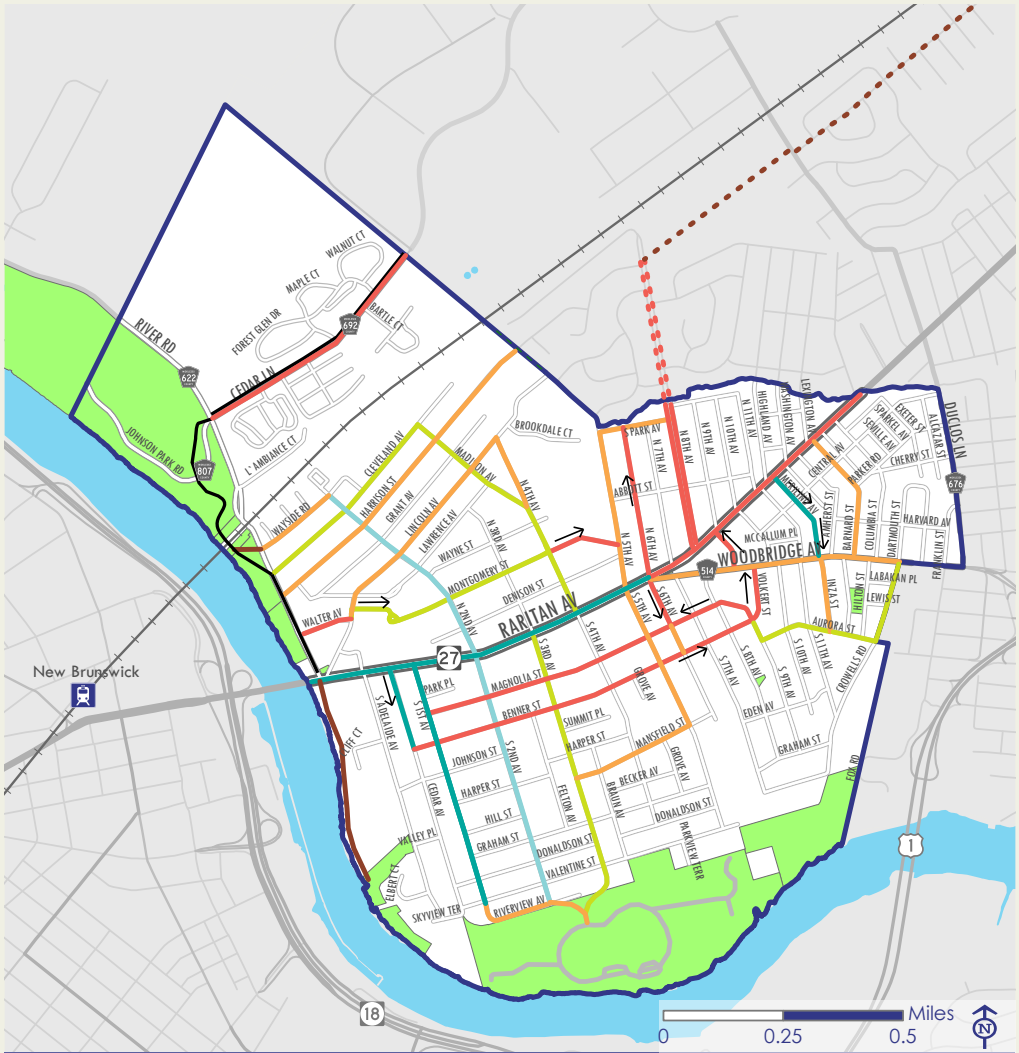
- Level of Stress 1
- Level of Stress 2
- Level of Stress 3
- Level of Stress 4
- Existing East Coast Greenway
- Proposed Multi-Use Path
- LTS Improvement from Existing Conditions

A total of 24.83 miles of bike facilities are recommended in this report. This includes a variety of bicycle facility types utilized in the variety of contexts present in Highland Park. This comprehensive network of bike facilities will encourage cycling to school, work, parks, and leisure, allowing someone to comfortably, and safely bike between any two points in Highland Park, and beyond.

Map 20 below presents the same proposed network as on page 50.

Facility Type	Length (miles)	% of Network
Separated Bike Lane	2.01	8%
Buffered Bike Lane	4.10	16%
Standard Bike Lane	4.15	16%
Advisory Bike Lane	2.00	8%
Multi-Use Path	1.36	5%
Shared Lane Markings	7.61	29%
Bicycle Boulevard	4.91	19%

Figure 14



Map 20-Proposed Bicycle Network

HIGH LAND PARK BIKE WALK

Within Highland Park
- Buffered or Separated Bicycle Lane
- Bicycle Lane
- Advisory Bicycle Lane
- Shared-use Path
- Shared Lane Markings
- Bike Boulevard

Outside Highland Park
- Buffered or Separated Bicycle Lane
- Shared-use Path

Existing
- Shared-use Path

BICYCLE PARKING

Bicycle parking facilities are needed to extend bicycle use from an opportunity for recreation to a feasible mode of daily transportation. Providing adequate, secure bicycle parking is an important measure to accommodate and encourage cycling. Proper parking facilities increase the convenience of cycling for commuting, utilitarian, or recreational purposes while also alleviating the threat of theft.

Priority Locations

As shown on page 30, the inventory of existing conditions indicated central Raritan Ave and the schools have substantial bicycle parking. In addition to evaluating the need for capacity of current racks, the following locations are prime candidates for additional bike parking based on public input and the siting of existing locations and capacities of bicycle parking facilities:

- Johnson Park
- Raritan Ave, west of 2nd Ave, and east of 6th Ave
- Woodbridge Ave

These are in addition to the spot bike parking improvements listed on page 74.

Rack Siting and Design

Parking should be conveniently located, well-lit, and easily visible for cyclists arriving at a destination. A ks are available for different capacity needs or space constraints.

The ideal racks meet the following qualities:

- Be intuitive to use
- Support the bicycle upright by its frame in two locations
- Prevent the wheel of the bicycle from tipping over
- Enable the frame and one or both wheels to be secured
- Accommodate a variety of bicycles and attachments, including bicycles without a diamond shaped frame and horizontal top tube
- Allow both front-in and back-in parking with a U-lock through the frame and front or rear wheel
- Resist the cutting or detaching of any rack element with hand tools

Racks in Highland Park fulfilling these requirements include the “inverted U’s” at Highland Park Middle/High School and the Senior Center. The “schoolyard” racks located at the Middle/High School and Bartle Elementary School do not property support the bicycle frame, generally do not facilitate locking of the frame to the rack, and frequently cause interference between the handlebars of adjacent bikes then the rack is near capacity. Additionally, Raritan Ave has many “wave” racks that often cannot hold as many bicycles as expected and is not user-friendly. Recommended bike rack designs are shown on page 81.

As racks utilizing older design guidelines are replaced and additional capacity is added, new “inverted U,” “post and ring” and “wheelwell secure” racks, or those similarly effective, should be installed.

Bike racks should also be properly spaced to allow easy, independent access to each bike. This includes providing sufficient space between racks and buildings, walls and parked cars, as well as between other bikes. Additional guidance on bike rack design and placement can be found in the Association of Bicycle and Pedestrian Professionals’ (APBP) guide: Essentials of Bicycle Parking (2015).

Bike parking at Highland Park High School

ENHANCED BICYCLE PARKING OPTIONS

Covered Parking

To further enhance bicycle parking options, the Borough should consider providing covered bicycle parking at the local schools. Covered parking helps protect bicycles from inclement weather and is particularly appealing for people parking for longer periods of time, such as students, or employees. Having covered parking available can make bicycling a more practical and attractive option if rain is forecast during the day, but not during commuting or travel times.

While covered parking requires more capital investment than racks alone, a variety of pre-fabricated shelters are available for a relatively low cost. Installation of covered parking could be a long term improvement, implemented either incrementally or integrated into larger capital projects at the schools.

Bicycle Corrals

Bicycle corrals are rows of bike racks installed in the parking lane of the street instead of on the sidewalk. Bicycle corrals help provide highly visible and ample bicycle parking without occupying sidewalk space, making them particularly useful in areas with constrained sidewalk space and/or high pedestrians activity. They can convert a parking space for a single automobile to parking for 8 to 12 bicycles, promoting convenient access for more customers of nearby businesses. Additionally, bicycle corrals help "daylight" an intersection by preventing motor vehicles from parking close to the intersection, helping improve the visibility of all road users at the intersection and creating an easier crossing for pedestrians. Corrals are also temporary, and can be easily removed during the winter.

Bicycle corrals are one tool to provide additional parking in the downtown. They can also be placed temporarily at popular events, such as the Highland Park Farmer's Market.

Bicycle corrals can be an amenity for local shops and cafes, and there may be opportunities for businesses to partner with the Borough or sponsor corrals adjacent to them.

Bicycle Parking Ordinance

Highland Park should also consider adopting a bicycle parking ordinance to further integrate bicycling into the Borough's planning process and development regulations. The ordinance would ensure appropriate bicycle parking is provided as redevelopment occurs, supporting additional parking capacity throughout the community and increasing the convenience of bicycling.

Similar to automobile parking requirements, the ordinance should reflect different demands for different types of land uses and scaled based on an appropriate metric for the land use, such as square footage, number of bedrooms, or number of employees. The ordinance should also address both short-term and long-term parking needs. While customers or visitors making quick trips may require a simple bicycle rack, employees and residents often desire more secure parking options protected from the weather.

In addition to setting capacity requirements, the ordinance should also stipulate the design standards summarized in this chapter and reference best practice design guidelines from the Association of Pedestrian and Bicycle Professionals.

As an incentive, the Borough may also consider allowing developers to provide additional bicycle parking and/or higher quality facilities (e.g., covered parking) to offset vehicular parking requirements.

Recommended Bike Rack Designs

Preferred Design

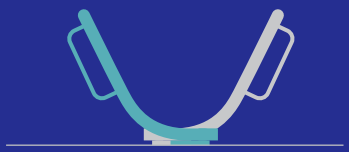
Inverted U

Common style appropriate for many uses; two points of ground contact. Can be installed in series on rails to create a free-standing parking area in variable quantities. Available in many variations.

Other Acceptable Designs

Post and Ring

Common style appropriate for many uses; one point of ground contact. Compared to inverted-U racks, these are less prone to unintended perpendicular parking. Products exist for converting unused parking meter posts.



Wheelwell Secure

Includes an element that cradles one wheel. Design and performance vary by manufacturer; typically contains bikes well, which is desirable for long-term parking and in large-scale installations (e.g. campus); accommodates fewer bicycle types than other recommended designs.

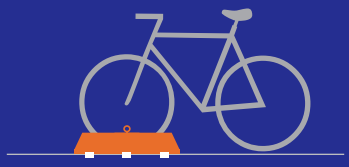
Racks to Avoid

Wave

Not intuitive or user-friendly; real-world use of this style often falls short of expectations; supports bike frame at only one location when used as intended.

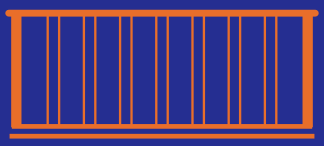
Wheelwell

Racks that cradle bicycles with only a wheelwell do not provide suitable security, pose a tripping hazard, and can lead to wheel damage.



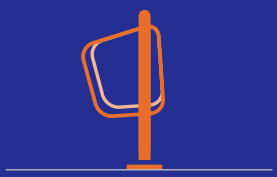
Schoolyard (comb)

Does not allow locking of frame and can lead to wheel damage. Inappropriate for most public uses, but useful for temporary attended bike storage at events and in locations with no theft concerns.



Coathanger

This style has a top bar that limits the types of bikes it can accommodate.

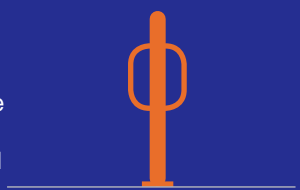


Spiral

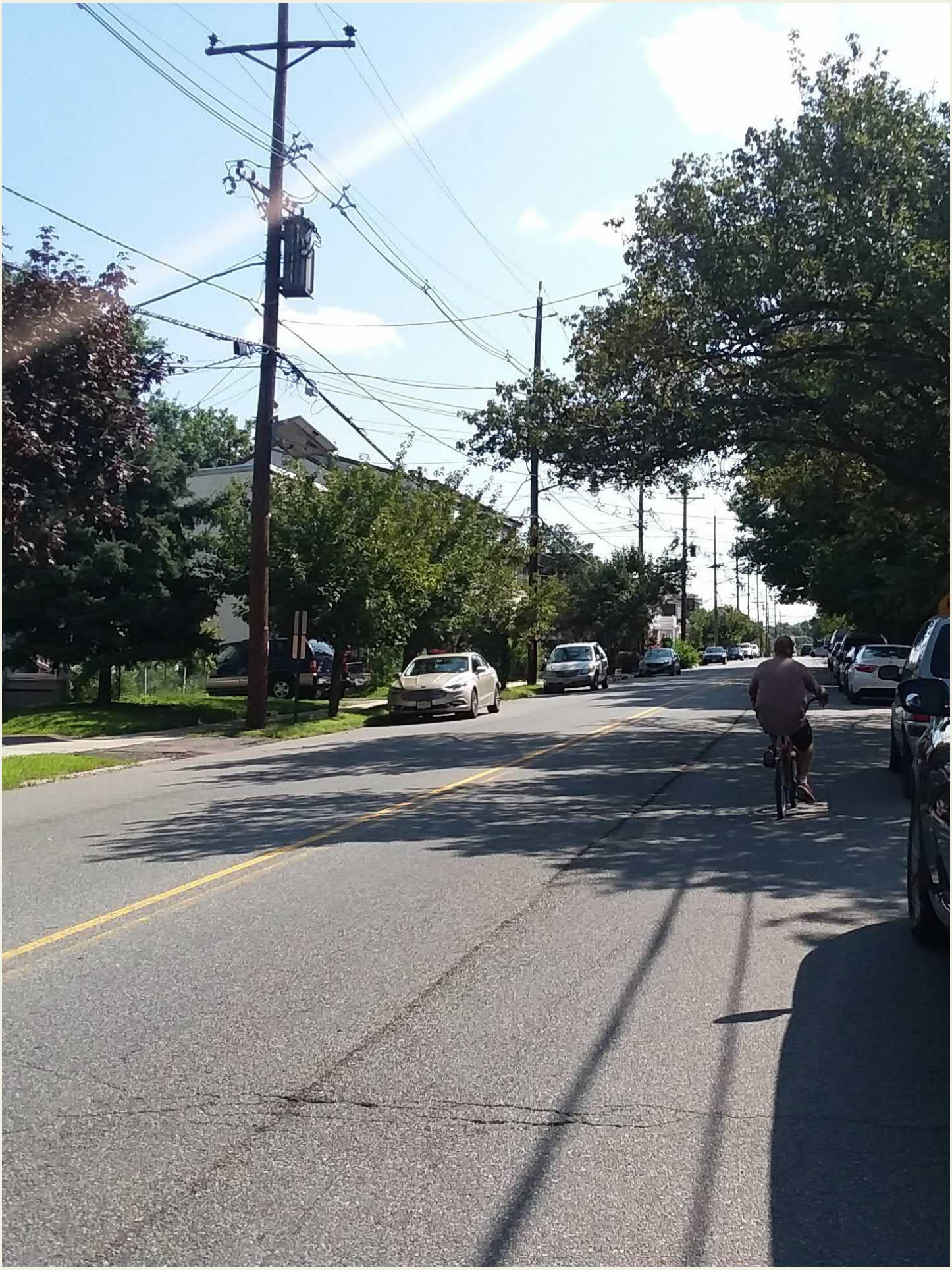
Despite possible aesthetic appeal, spiral racks have functional downsides related to access, real-world use, and the need to lift a wheel to park.

Bollard

This style typically does not appropriately support a bike's frame at two separate locations, which limits its framelock capability and bicycle stability.



Images and descriptions courtesy of APBP Essentials of Bicycle Parking



7 Pedestrian Improvement Concepts

Based upon the existing conditions analysis, feedback from the Study Advisory Committee, and public input, the proposed pedestrian improvement concepts for Highland Park identify targeted opportunities to improve pedestrian comfort, access, and safety. The recommendations outlined in this chapter include general design principles applicable to the Borough, expansion of the sidewalk network, and priority intersection enhancements.

INTRODUCTION

The proposed improvements are intended as conceptual recommendations likely requiring varying levels of design or further analysis, depending on the magnitude of the improvements. Many concepts are intended to be easily implementable and emphasize low-cost options, where applicable, such as re-striping of existing roadways or enhanced signage.

Projects may be implemented over time as funding allows. The recommendations can be used to support grant applications, integrate pedestrian projects into the capital improvement pipeline and/or incorporate pedestrian improvements into routine roadway maintenance and resurfacing projects or development activity to minimize additional costs.

The recommendations are also summarized in an implementation matrix in Section A2 of the Appendix. Where practical, order-of-magnitude cost estimates are included for each improvement based on average material rates for sidewalks, crosswalks, striping, etc. These estimates are intended to convey the level of investment proposed concepts would require for implementation. The cost estimates are based on industry standards for per-unit material costs, and do not include the cost of right-of-way acquisition, relocation of utilities or drainage, engineering design, or contingencies.

PEDESTRIAN DESIGN ELEMENTS

Pedestrian design elements include more general engineering improvements implementable throughout Highland Park as well as specific priority intersection recommendations. Many of the tenets of the intersection improvement concepts can be utilized elsewhere as well.

Pedestrian design elements applicable throughout Highland Park include:

- Enhanced pedestrian crossings
- Traffic calming

The following sections briefly summarize key elements of these pedestrian treatments. As the Borough implements various roadway projects, pedestrian facility design should refer to current best practice guidance for more detailed information, including:

- New Jersey Complete Streets Design Guide
- NACTO Urban Street Design Guide
- FHWA Small Town and Rural Multimodal Networks
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities

Enhanced Pedestrian Crossings

Based on the surrounding context, traffic volumes, and traffic speeds, enhanced pedestrian crossings utilize a variety of design elements to improve pedestrian visibility, enhance user comfort, increase driver compliance with the State's "stop for pedestrians" law, and/or decrease the crossing distance for pedestrians. Typical crosswalk designs are illustrated below.

On low-volume and low-speed roadways, crosswalk striping alone is often sufficient. However, on higher volume and/or higher speed roadways, additional pedestrian treatments are recommended to enhance the crossing and supplement crosswalk striping.

Key corridors in Highland Park that would benefit from enhanced pedestrian crossings include:

- Woodbridge Avenue
- River Road
- Cedar Lane
- Raritan Avenue

Elements of an enhanced pedestrian crossing may include:

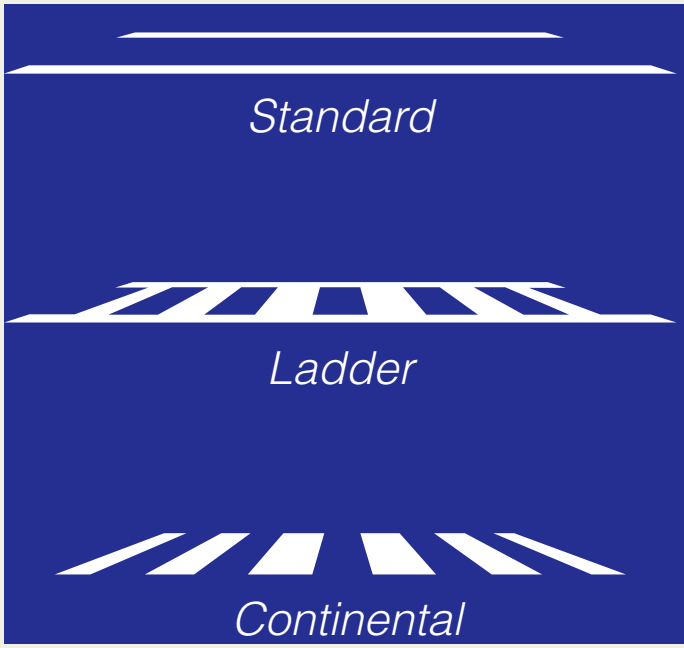
High Visibility Crosswalk Striping

Striping design can significantly enhance the visibility of a crosswalk. Transverse striping, typically a pair of parallel lines oriented perpendicular to the driver, has a very limited visual profile to motorists. Conversely, longitudinal striping (often referred to as "continental" striping) is oriented parallel to motor vehicle travel, which significantly improves the visibility of the crossing to motorists.

Pavers or stamped brick crosswalks are often incorporated into downtown streetscape designs. While these designs may provide additional aesthetic value consistent with an overall streetscape program, they generally do not have the same visibility benefits as the continental striping due to the low color contrast between the pavers and the asphalt. If the brick aesthetic is preferred, it can be combined with higher visibility striping patterns to enhance visibility.

Leading Pedestrian Intervals

Where there are pedestrian signals, signals for pedestrians and motorists typically change at the same time, so that as motorists are beginning to turn, pedestrians are beginning to cross the street. A leading pedestrian interval (LPI) provides time at the beginning of each cycle when pedestrians are able to begin crossing and increase their visibility before corresponding vehicles are allowed to move. The National Association of City Transportation Officials (NACTO) recommends 3 to 7 seconds for LPI's.



Left: Typical crosswalk striping designs

Above: Example of incorporating high-visibility striping with brick/paver material aesthetic (www.atlanticpaving.com)

Pedestrian Scramble

Also known as an exclusive pedestrian phase, or "Barnes Dance," a pedestrian scramble provides a signal phase exclusively for pedestrians to cross any leg of the intersection, including diagonally. In areas with frequent, high volumes of pedestrians, a pedestrian scramble phase can occur during each signal cycle, whereas in areas with fewer pedestrians or high volumes of pedestrians at certain times of day, a pedestrian scramble phase can be pedestrian-actuated.

Crosswalk Daylighting

Daylighting refers to improving the visibility of a crossing by removing obstacles blocking the view of either the pedestrian or approaching motorists. On-street parking too close to an intersection (i.e., closer than 20 feet, per design standards), for example, is a common obstruction to visibility.

Daylighting treatments can include seasonally removed short-term installations, pilot projects demonstrating a design concept, interim treatments until a long-term improvement can be implemented, or permanent, raised curb extensions.

Short-term or interim daylighting treatments can utilize low-cost, quickly implementable materials to reinforce the clear zone around a pedestrian crossing and deter parking or loading, as pictured below. This serves to improve safety by enhancing visibility, reducing the crossing distance, and calming traffic. Elements include a surface treatment to define the space, such as striping, paint, or epoxy gravel coating. A vertical element, such as flexible delineators, bollards, or planters, deters vehicles from entering the space and narrows the crossing.

Long-term solutions involve installing a curb extension. This extends the sidewalk and streetscape into the parking lane and/or narrows the travel lane. In addition to improved visibility and safety, curb extensions also provide an opportunity to integrate green stormwater management strategies and/or enhance the streetscape with street furniture, plantings, or other amenities.

Pedestrian Crossing Signage and Beacons

Signage can further enhance the visibility of a pedestrian crossing and reinforce driver compliance with the State's "stop for pedestrian" law. Signage options include in-road "Stop for Pedestrian" (MUTCD R1-6a) and pedestrian crossing (W11-2) signs. Both options improve motorist awareness of the crossing and their obligation to stop for pedestrians.

Crossings with higher vehicle speeds, higher vehicle volumes, or a higher volume of pedestrians may also be suitable locations for beacons. Pedestrian-actuated rectangular rapid flashing beacons (RRFBs) further improve the visibility of the crossing by combining signage with flashing amber LED lights, as pictured on the following page.

Daylighting treatments can include the use of quickly implementable, inexpensive materials in order to shorten crossings, improve visibility, and slow traffic, such as the example to the left from Hoboken, NJ. They can be used as an interim treatment until a permanent curb extension is installed, or maintained longer term in order to permit more flexible use of the street.

RRFBs at River Rd at Harrison Ave

Integrating Public Art into the Streetscape

Community crosswalk programs provide opportunities to integrate public art into the streetscape. They engage the creativity of local residents to design crosswalks or paint an entire intersection to encourage community building and transform public roadway space into neighborhood assets. Designs must abide by requirements of the MUTCD or other regulating standards related to paint color and patterns, and should follow the principle of using high-contrast to enhance visibility and improve safety. Community crosswalk programs have been implemented in municipalities across the U.S., such as Ocean City, NJ; Fort Lauderdale, FL; and Seattle, WA.

(clockwise from top right) Residents installing a painted intersection in Boulder, CO (www.bouldercolorado.gov); painted intersection in Ft. Lauderdale, FL (www.fortlauderdale.gov); colorful crosswalk in Silver Spring, MD (www.montgomeryplanning.org)

Parklet in Princeton

Traffic Calming

Traffic calming strategies aim to reduce motor vehicle speeds. Lower speeds support a more bicycle and pedestrian-friendly environment by reducing instances of vehicles overtaking bicyclists, enhancing the drivers' ability to see and react to bicyclists and pedestrians, and reducing the severity and likelihood of crashes for all street users. Reducing vehicle speeds also improves bicyclist comfort by reducing the speed differential between motor vehicles and bicyclists, and is a critical element of a bicycle boulevard.

Benefits of traffic calming techniques include:

- Decreased motor vehicle speeds
- Decreased crash likelihood and crash severity for all street users
- Improved bicyclist and pedestrian comfort
- Improved conditions for pedestrians, cyclists and all residents by reducing vehicle speeds
- Establishes and reinforces bicycle priority on bicycle boulevards
- Provides opportunity for landscaping and other community features, such as benches, communal space, and artistic painted intersections (see graphic on previous page), benefiting all roadway users and residents

In Highland Park, different traffic calming tools should be used in different circumstances though all types of streets, from busy corridors like Raritan Ave and River Rd, to low-volume residential streets would benefit from such techniques.

Speed management treatments can be divided into two types: horizontal and vertical deflection. These treatments can be implemented individually or in combination to increase their effectiveness. Examples of traffic calming strategies are described on the following pages.

As with all roadway features, traffic calming elements should be designed to consider the context and needs of the street.

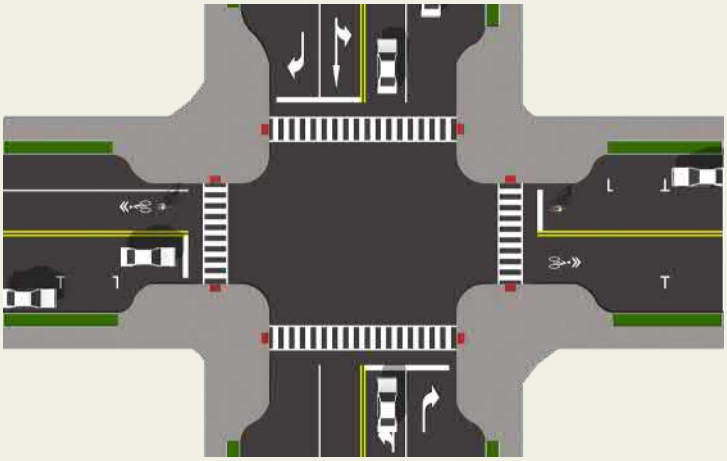
Enhanced signing strategies can also support lower traffic speeds. Radar speed signs or driver feedback signs, for example, alert drivers of their speed and the actual speed limit. These relatively low-cost, easily implementable tools have been shown to have a moderate impact on reducing 85th percentile speeds, and a significant impact on reducing high-end speeds – those exceeding the speed limit by 10 MPH or more (Spotlighting Speed Feedback Signs, Public Roads/FHWA, 2016). These devices may be used as part of gateway treatments along Raritan Ave and Woodbridge Ave approaching Highland Park from the east, Raritan Ave approaching from the west and River Rd and Cedar Ln approaching from the northwest.

Horizontal Deflection

Horizontal speed control devices are used to slow motorists by either visually narrowing the roadway or deflecting motorists through an artificial curve. Where possible, sufficient space should be provided for bicyclists to pass around the outside of the elements. The following are examples of horizontal deflection:

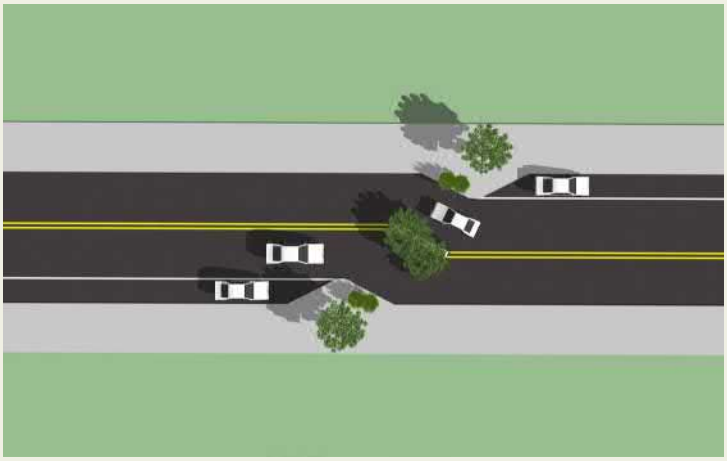
Curb Extensions

Curb extensions, or bulb-outs, extend the sidewalk or curbface into the parking lane at an intersection. Curb extensions narrow the roadway at intersections, contributing to lower motor vehicle speeds, as well as reducing the crossing distance for pedestrians and increasing the amount of space available for street furniture and green stormwater management features. They are typically applied at locations with on-street parking and should not extend into bicycle lanes. Several intersections on Raritan Ave in the Borough have curb extensions. Temporary painted curb extensions can also be installed at a reduced cost though they are not as effective.



Chicanes

Chicanes are a series of raised or delineated curb extensions, edge islands, or parking bays placed on alternating sides of a street to create an S-shaped bend in the roadway. Chicanes reduce vehicle speeds by requiring drivers to shift laterally through narrow travel lanes.



Neighborhood Roundabout

Neighborhood roundabouts, or mini roundabouts, are raised or delineated islands used at minor street crossings to reduce vehicle travel speeds by reducing turning radii, narrowing the travel lanes, and, if planted, obscuring the visual corridor along the roadway.

Different traffic calming design elements and strategies can be used in combination to improve their effectiveness as part of a comprehensive program. The examples below are from residential streets in Princeton, NJ

Raised intersections help both calm traffic and enhance pedestrian crossings.

Median islands calm traffic by narrowing the travel lane. Median islands are a versatile treatment, ranging from a cobblestone island that can be easily mounted by vehicles (as shown above) to a raised curb island with street trees or other features.

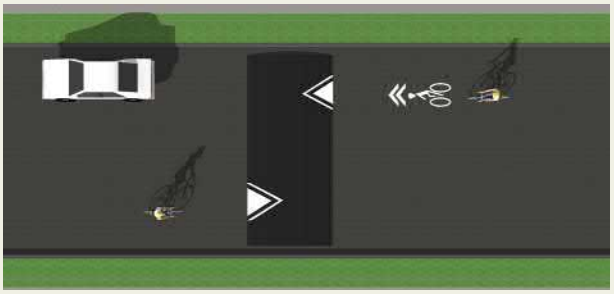
Neighborhood roundabouts, which also narrow travel lanes and tighten turning radii at intersections to reduce traffic speeds. Other treatments used with similar impacts include neckdowns (midblock curb extensions to narrow the roadway) and speed humps.

Vertical Deflection

Vertical speed control measures are composed of wide, slight changes in pavement elevation that self-enforce a slower speed for motorists. Narrow and abrupt speed bumps often used in private driveways and parking lots are not recommended for public streets and are hazardous to bicyclists.

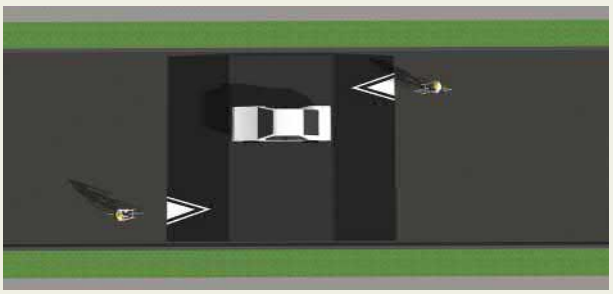
Speed Humps

Speed humps are 3 to 4 inches high and 12 to 14 feet long, with an intended vehicle speed of 15 to 20 mph. Speed hump design should adhere to the guidelines of the New Jersey "Speed Hump Law," (C.39:4-8.9, C.39:4-8.11), which adopted the ITE design standards for speed humps. Several corridors in Highland Park already have speed humps to help calm traffic.



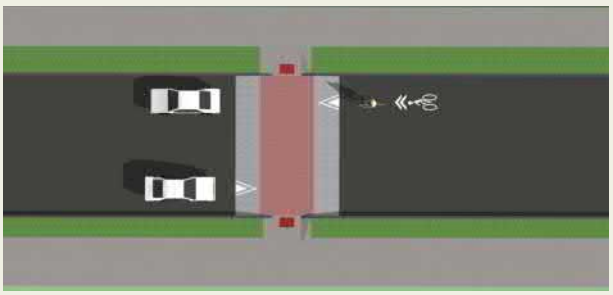
Speed Tables

Speed tables are longer than speed humps and have a flat top, with a typical height of 3 to 3.5 inches and a length of 22 feet. Intended vehicle operating speeds range from 25 to 35 mph, depending on the spacing. Speed tables may be used on collector streets, transit, and/or emergency responder routes.



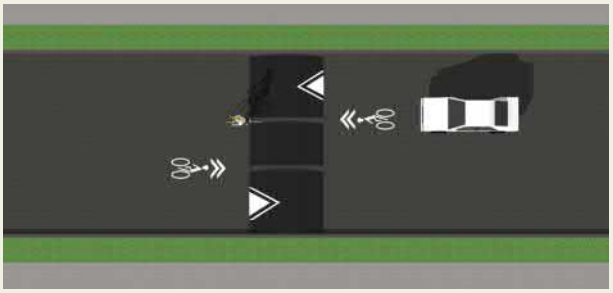
Raised Crosswalk / Raised Intersection

A raised crosswalk is a speed table signed and marked as a pedestrian crossing. It extends the full width of the street and is typically 3 inches high. At minor intersections the entire intersection can be raised to reduce motor vehicle speeds in all directions.



Speed Cushions

Speed cushions are speed humps that include wheel cutouts allowing larger vehicles to pass unaffected, but reduce passenger vehicle speeds. They are often used on key emergency response routes to allow emergency vehicles to pass unimpeded. Speed cushions should be used with caution, however, as drivers would often seek out the space in between the humps.



Pedestrian Signals

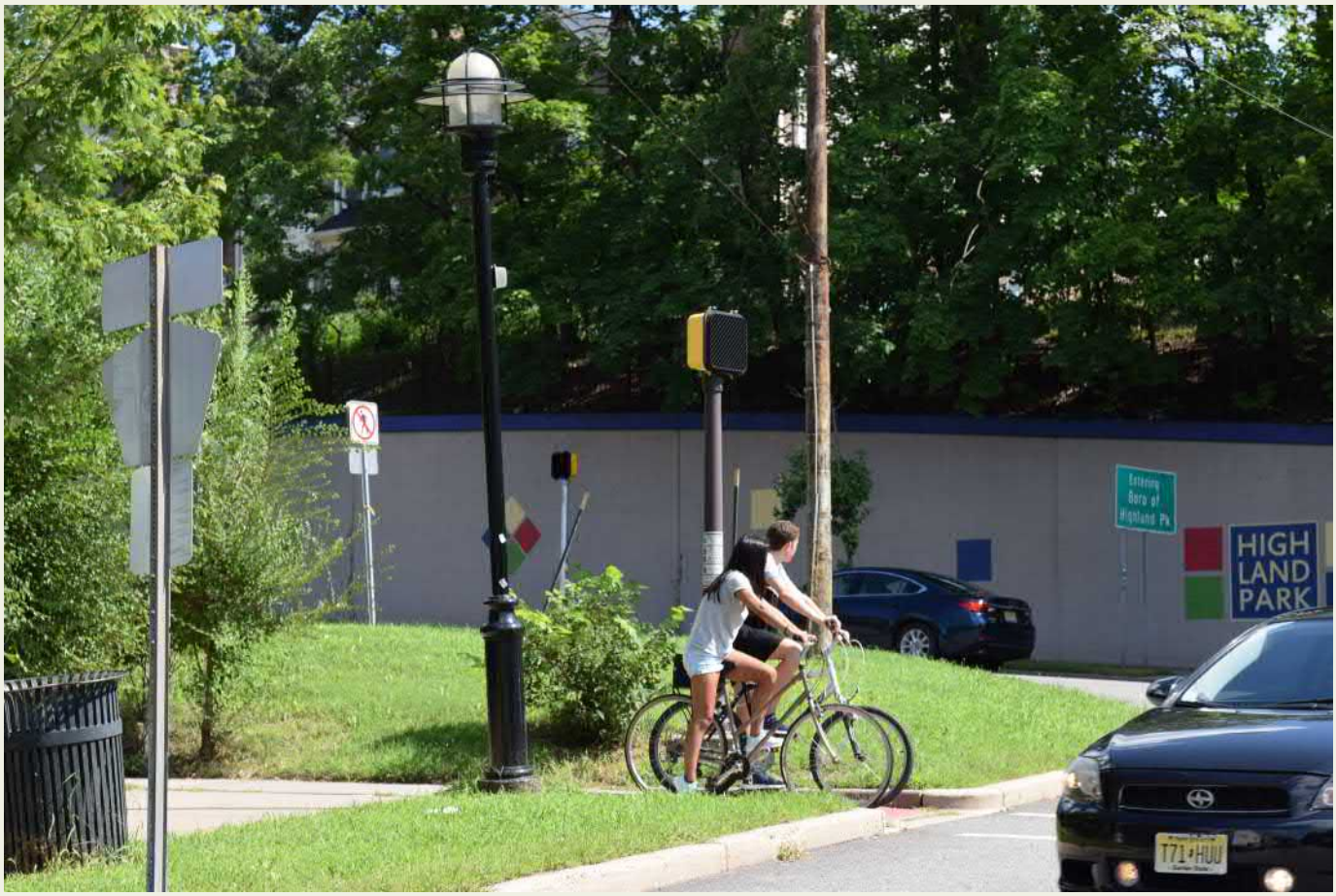
Per the MUTCD, signalized intersections should include pedestrian signal heads with countdown timers. These accommodations provide clarity to pedestrians and increase safety by clearly indicating when it is appropriate to cross the intersection and how long they have to do so.

Adequate clearance time should be provided so all pedestrians, including those who walk more slowly than average, can cross the street. For most locations, a walk speed of 3.5 feet per second is adequate, though in locations commonly used by slower pedestrians, such as locations near senior centers, 3.0 feet per second should be used.

At intersections with regular pedestrian traffic, the pedestrian phase should be provided for all crossings during each cycle. Though dedicated pedestrian phases are preferred, the use of pedestrian actuations signals such as push buttons, can be installed where there are low pedestrian volumes. In the case where pedestrian volumes are low and vehicular volumes are high, three strategies should be considered before resorting to full pedestrian actuation:

- Provide pedestrian signal phasing during hours of high pedestrian activity
- Reduce the length of a crossing by installing curb extensions
- Reduce the total cycle length at the intersection

In locations with visibility issues, a pedestrian lead time of 3-5 seconds would allow drivers to better see pedestrians in the crosswalks. In areas with high pedestrian volumes, an exclusive pedestrian phase, also known as a “pedestrian scramble” or “barnes dance” may be feasible.



River Rd at Raritan Ave

PEDESTRIAN NETWORK IMPROVEMENTS

Sidewalks

Sidewalk improvements should be targeted where they are most needed and should take into account the character of Highland Park's neighborhoods. Certain portions of Highland Park lacks sidewalks (Map 12). These gaps tend to be around the periphery of Highland Park in the following areas:

- Off of Cedar Ln north of the NEC tracks
- In the triangle surrounded by Raritan Ave, Woodbridge Ave and Duclos Ln
- Streets immiedately north of Donaldson Park

Based on the targeted sidewalk inventory conducted during the existing conditions analysis, opportunities were identified to expand the sidewalk network. Projects can be prioritized based on:

- Proximity to major destinations (e.g. walking routes to schools, parks, or downtown)
- Whether the street is a primary roadway within the Borough, carrying relatively high traffic speeds and/or volumes, thereby increasing the need for pedestrian facilities

The Borough and County should consider installing sidewalks along all segments lacking one. Such construction can be coordinated with future land development.

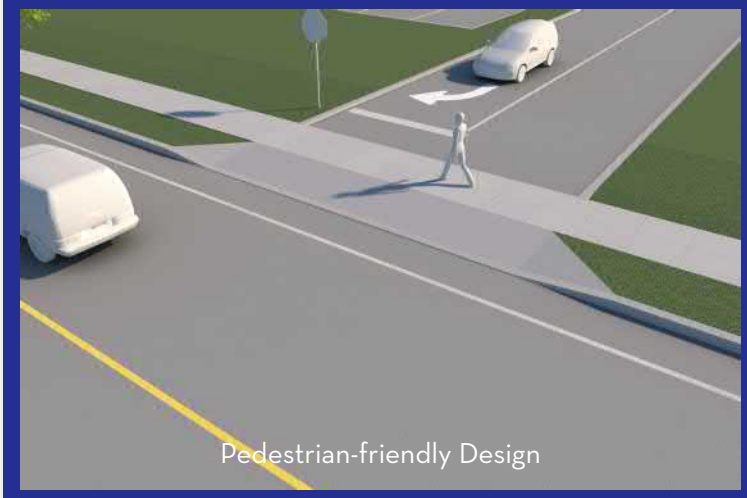
Pages 106-107 provide detailed recommendations of where sidewalks should be installed.

New sidewalks with a minimum 5' width are generally sufficient for most neighborhoods. Where space is available, a wider width may be preferred in areas with greater pedestrian activity, such as in the vicinity of schools or parks. Where right-of-way allows, a planting strip between the sidewalk and curb should also be considered to provide an additional buffer between pedestrians and the roadway, a tool considered a best practice.

During sidewalk construction, curb ramps compliant with the Americans with Disabilities Act (ADA) must also be constructed to ensure the sidewalk network is accessible for everyone, including seniors, children, people with strollers, and those in wheelchairs or with other mobility impairments.

At driveway crossings, design should make it clear and intuitive that the pedestrian has the right-of-way. As illustrated in the images below, the sidewalk material and grade should continue across the driveway. A continuous, level sidewalk requires the vehicle to cross at sidewalk grade, prioritizing pedestrian movement and encouraging turning motorists to stop for pedestrians.

Sidewalks and Driveway Design



Pedestrian-friendly Design

Auto-centric Design

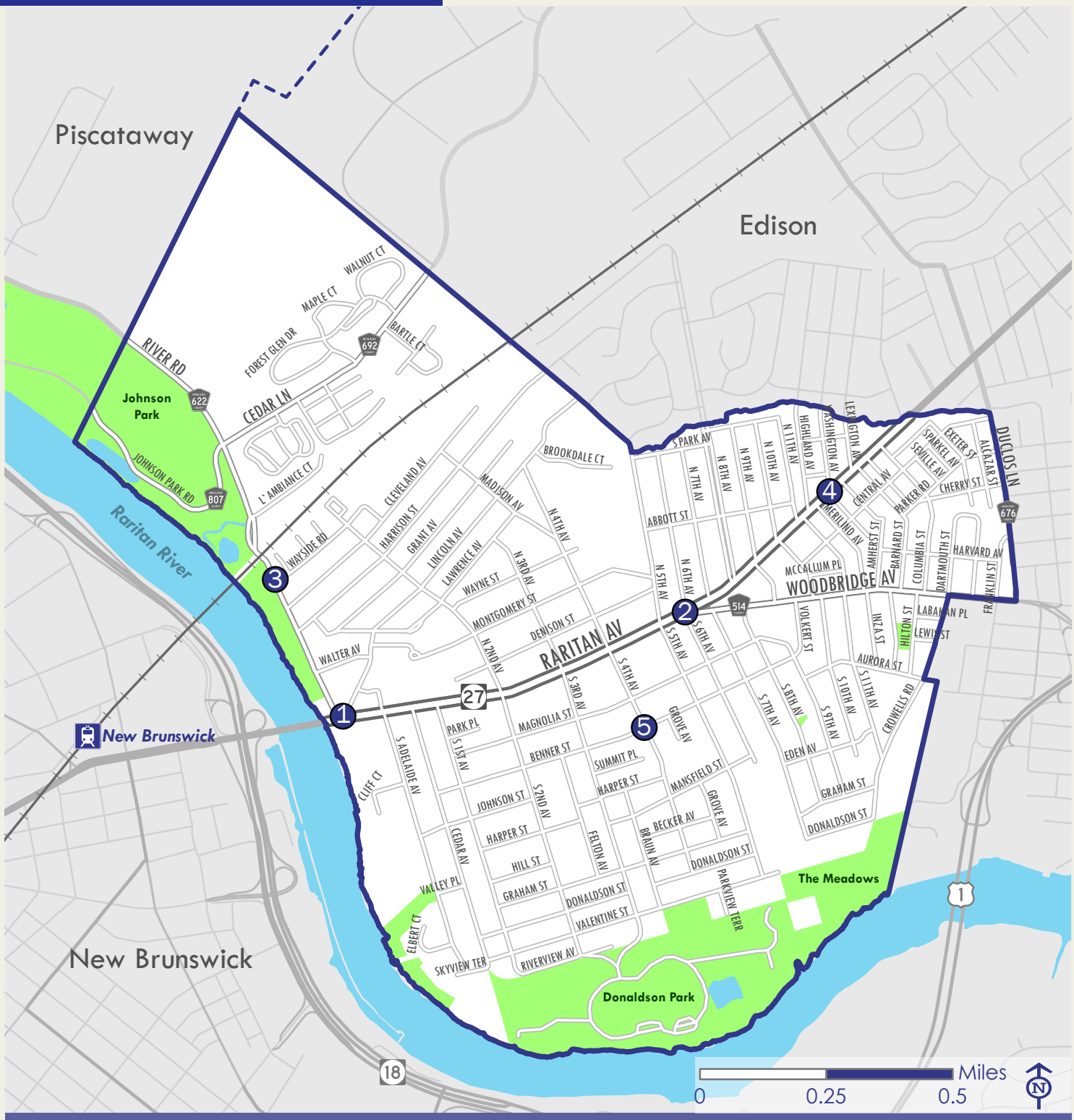
PRIORITY INTERSECTION IMPROVEMENTS

Study Advisory Committee meetings resulted in the selection of five priority intersections. Pedestrian improvement recommendations were subsequently developed based on field observations, data analysis and further stakeholder input. Generally, these locations are crossings of main roadways and are located near, or along walking and biking routes to major destinations. Recommendations for these targeted locations will serve as templates to help guide future improvements elsewhere in the community. The recommendations from the proposed bicycle network are integrated into the intersection improvement concepts.

The improvement concepts reflect state-of-the-practice guidance (i.e., NJDOT, NACTO, AASHTO, FHWA), and are consistent with both statewide and national standards for multimodal safety and mobility through implementation of Complete Streets principles. For each location, an aerial view is shown depicting recommendations. The rate at which improvements are implemented is also subject to availability of funding.

The ensuing pages detail the existing conditions, recommendations and benefits of each of the following priority intersections, as illustrated in Map 21:

- Raritan Ave & River Rd
- Raritan Ave & Woodbridge Ave
- River Rd & Wayside Rd
- Raritan Ave & Washington Ave
- Benner St & S 4th Ave



Map 21-Priority Intersections

These 5 intersections comprise a representative cross section of the various challenges that exist at Highland Park intersections. The recommended improvements should serve as templates for similar intersections throughout the Borough.

- Train Station
- Northeast Corridor
- Highland Park Boundary
- Other Municipal Boundary

Raritan Ave (NJ 27) and River Rd (CR 622)

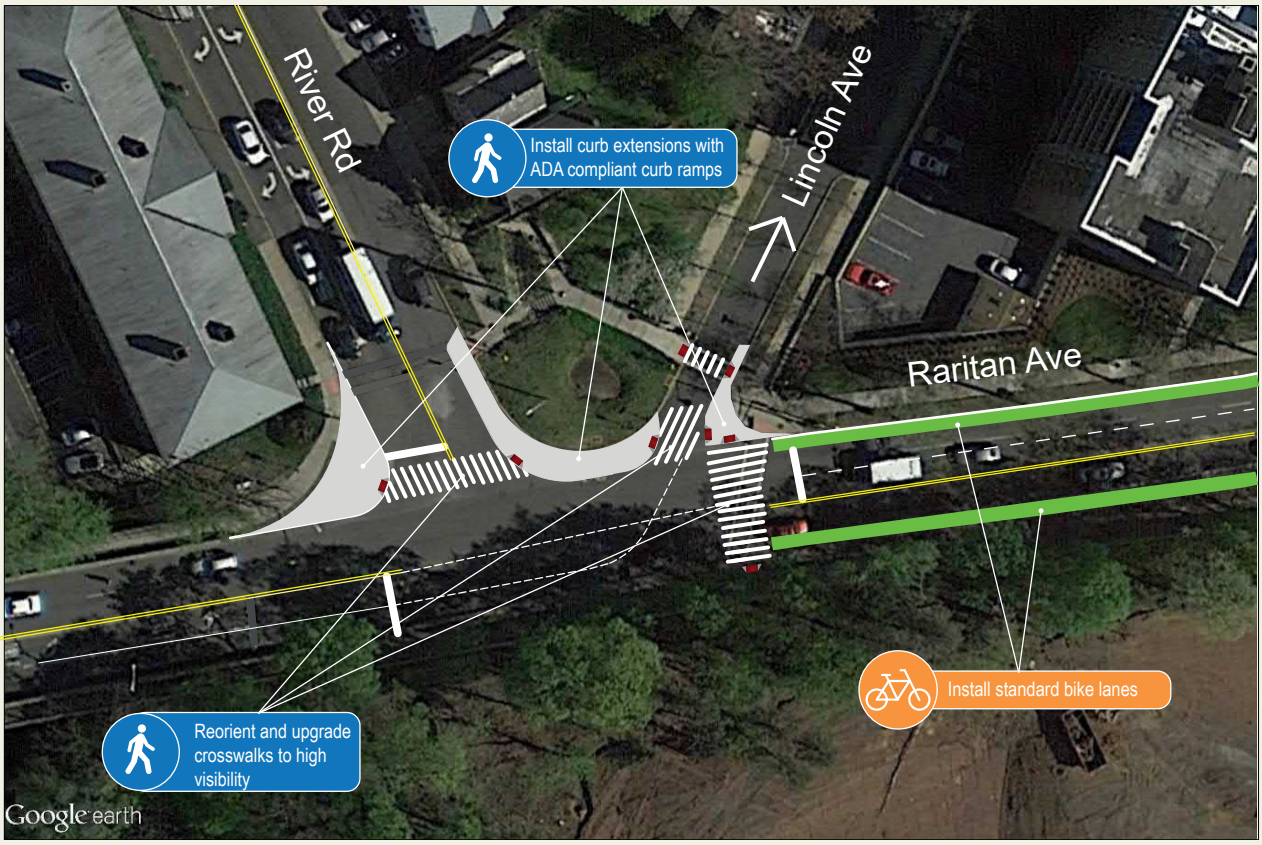
1

This intersection is the busiest in Highland Park. Whether by driving, walking, biking or bus, everyone traveling between Highland Park and New Brunswick traverses this intersection. High volumes of traffic cross the Albany Street Bridge to New Brunswick and employment centers to the west each day, causing backups on the bridge. When less congested, motorists travel to and from the limited access highway NJ 18 in New Brunswick on the bridge at high speeds. Additonally, River Rd can face high volumes from drivers avoiding the congested NJ 18. With long crossings and some legs lacking crosswalks, this unconventional intersection poses a challenge for pedestrians.

More detailed bike improvements for Raritan Ave are discussed on pages 51-55.

Recommendations

- Install curb extensions on the northwest, north-central and northeast corners of the intersection
- Upgrade all crosswalks to high visibility and reorient crosswalks to reduce radius of the intersection
- Install ADA-compliant curb ramps
- Install dedicated bicycle lanes on both sides of Raritan Ave, east of Lincoln Ave. Bike lanes on this block are feasible on their own, though extending the lanes further east as a long-term recommendation would require parking changes



Benefits

- Curb extensions reduce crossing distances for pedestrians and result in shorter turning radii, consequently slowing vehicles
- High visibility crosswalks result in greater visibility for pedestrians and slower vehicle speeds and reorienting intersections to shrink the intersection results in safer vehicular turning movements and greater pedestrian ease
- Bicycle lanes better connect the Albany Street Bridge and New Brunswick with low volume residential streets in Highland Park via a dedicated bike facility; provide base for future connections over bridge

Raritan Ave (NJ 27) and Woodbridge Ave (CR 514) 2

This intersection marks the eastern boundary of downtown Highland Park. Here Raritan Ave reconfigures from two lanes in each direction with a 35 mph speed limit in the east to one lane in each direction with a 30 mph speed limit in the west, merging with Woodbridge Ave. All legs have crosswalks, but the intersection is difficult for pedestrians due to the wide radius, forcing pedestrians to walk longer distances and in some instances, make multiple crossings to get where they are going. Just east of the intersection is the Lukoil gas station which has three two-way entrances on both Woodbridge Ave and Raritan Ave, creating more conflicts with pedestrians and oncoming traffic.

More detailed bike improvements for Raritan Ave are discussed on pages 51-55.

Due to the number and breadth of recommendations for this intersections, they are presented in three phases. As with all of the priority intersections, recommendations do not need to all be installed simultaneously. Together or separate, they would be beneficial.

Recommendations-Phase 1

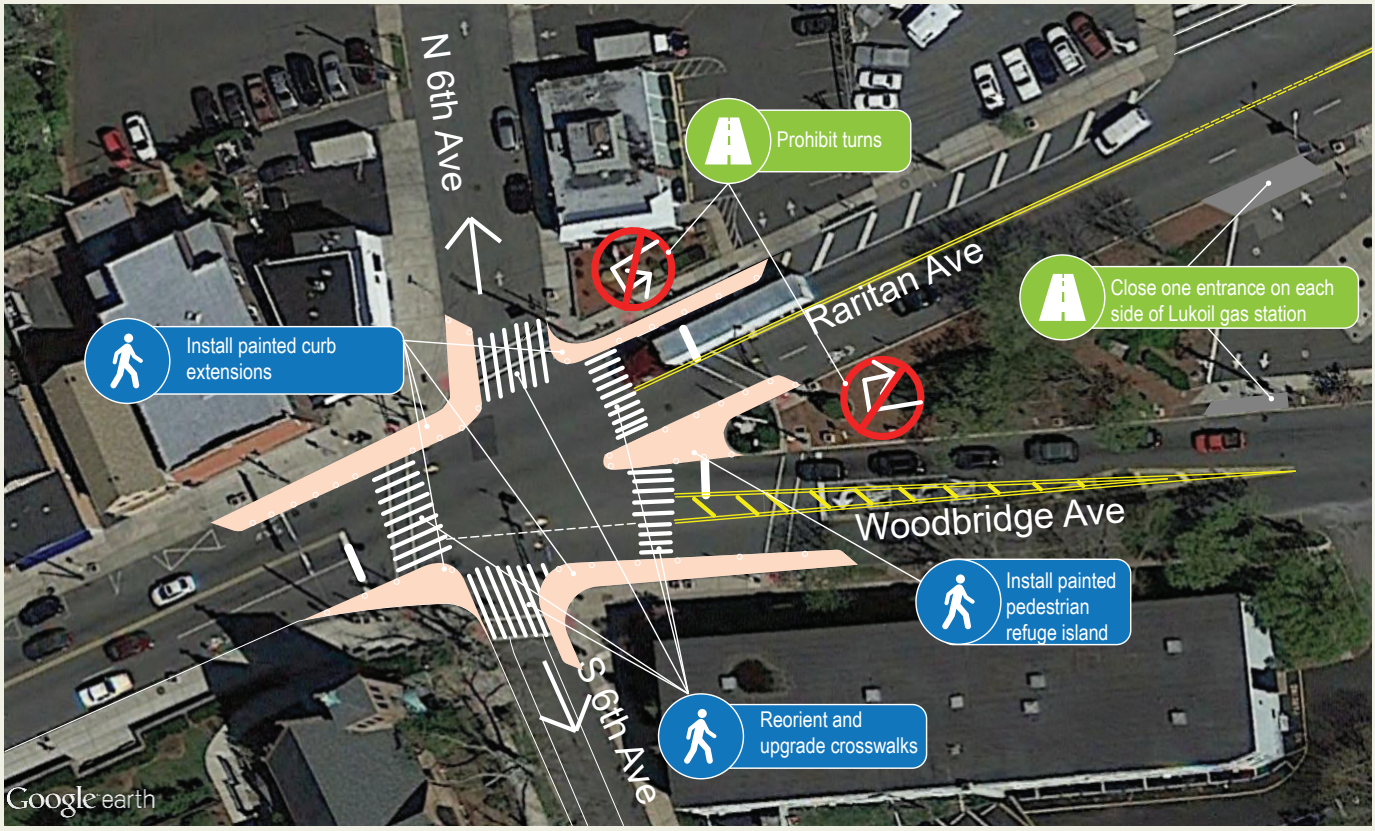
- Install painted curb extensions with flexible delineators on all corners
- Install pedestrian refuge island at corner of Raritan Ave and Woodbridge Ave
- Reorient and upgrade crosswalks to high visibility
- Work with Lukoil to consider the feasibility of closing at least two of the six roadway egresses
- Prohibit left turn from Raritan Ave to Woodbridge Ave and right turn from Woodbridge Ave to Raritan Ave
- Install green infrastructure consistent with previous improvements made along Raritan Ave

Recommendations-Phase 2

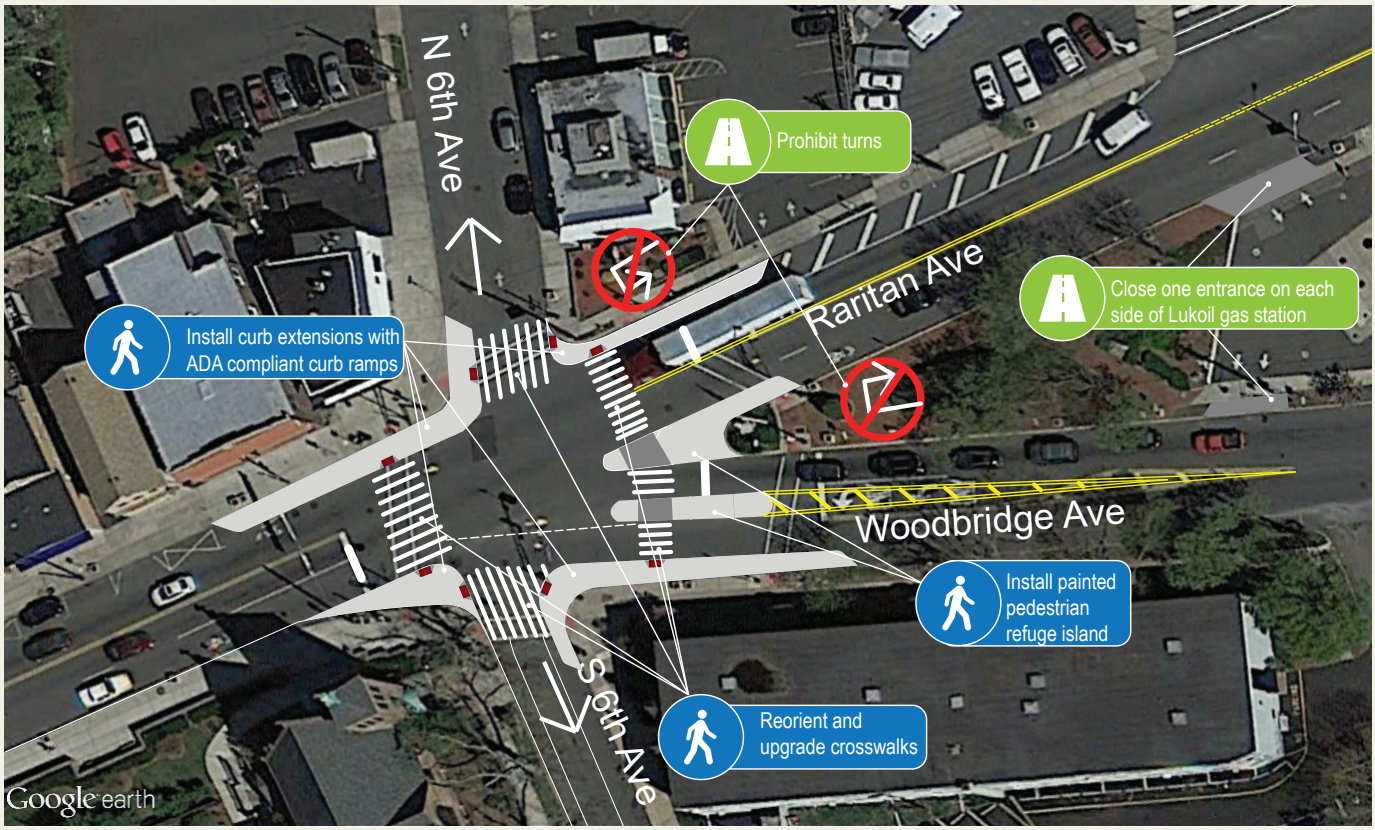
- Upgrade painted curb extensions to concrete curb extensions
- Install pedestrian refuge island on Woodbridge Ave
- Install ADA-compliant curb ramps at all corners

Raritan Ave at Woodbridge Ave, looking east, Source: Google Maps

Recommendations-Phase 1



Recommendations-Phase 2



Recommendations-Phase 3

- Install separated bike lanes on Raritan Ave east of the intersection, standard lanes west of the intersection, a buffered lane on N 6th Ave and a standard lane on S 6th Ave; if separated lanes are not fiscally feasible, buffered lanes could also be appropriate if the speed limit east of Woodbridge Ave was lowered to 30 mph
- Install green infrastructure consistent with previous improvements made along Raritan Ave
- Install bike/bus platforms (as shown on pages 55-56) where bike lanes overlap with bus stops

Benefits

- Dedicated bicycle lane on Raritan Ave provides a low-stress connection between downtown Highland Park and Edison while slowing motorists; bicycle lanes on N 6th and S 6th provide connections to residential neighborhoods and provide access to bicycle travel on low-stress routes parallel to NJ 27
- Curb extensions and median refuge islands shorten pedestrian crossings and slow motor vehicles
- High visibility crosswalks result in greater visibility for pedestrians and slower vehicle speeds
- Fewer egresses to Lukoil simplify motorist movements and reduce bike and pedestrian conflicts
- Turn prohibition between Raritan and Woodbridge eases vehicle movements; an alternate route for the prohibited movements can be made on S 9th or S 10th Avenues connecting Woodbridge and Raritan Avenues
- Green infrastructure provides trees or plantings to improve water management and streetscape

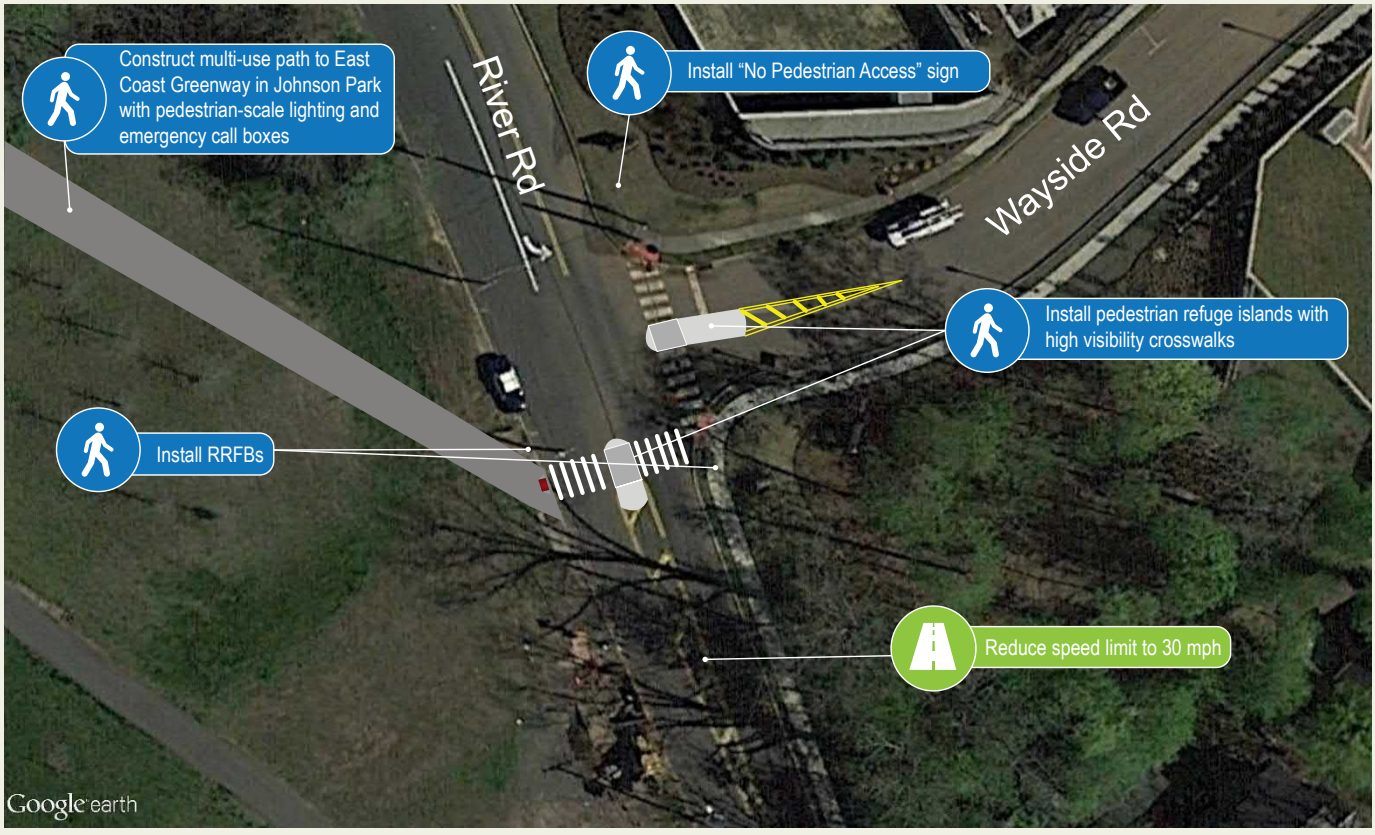
River Rd (CR 622) and Wayside Rd

3

River Rd travels northwest into Piscataway, connecting to the Rutgers-Busch and Livingston Campuses and HighPoint.com Stadium. River Rd has few controlled intersections and a 35 mph speed limit, facilitating higher speeds. Multiple mid-block pedestrian crossings with RRFB's are on River Rd south of the intersection. Immediately north of the intersection is River Rd's underpass of the NEC rail tracks where the sidewalk ends and signage limits speeds to 15 mph. A "No Pedestrian" sign exists here though no alternate route is indicated. New residential development exists on Wayside Rd. South of the intersection, the west side of the street caters to the East Coast Greenway, a major bike route from Maine to Florida. The paved path travels diagonally northwest into Johnson Park, as shown in the bottom left of the photo below.

Recommendations

- Improve signage to better notify pedestrians of narrow tunnel lacking sidewalks and direct pedestrians to the East Coast Greenway
- Pave multi-use path from intersection to East Coast Greenway with ADA-compliant curb ramp
- Install pedestrian refuge island on River Rd and Wayside Rd with high visibility crosswalks and "Stop for Pedestrians" sign; these signs placed in the middle of the road should be located at every uncontrolled crossing on River Rd
- Install automatically actuated RRFBs
- Consider reducing the speed limit on River Rd from 35 to 30 mph, requiring a speed study



Benefits

- Improved signage allows pedestrians to make safer crossings
- Multi-use path provides an accessible and safe connection from River Rd to the East Coast Greenway
- Median refuge island and RRFBs provide shorter, safer crossing for pedestrians and slows motorists
- Automatically acutated RRFB uses an FLIR infrared heat detection camera to activate the RRFB shortly after someone stands on the ramp, eliminating the need to press the button; also known as a Shabbat Pedestrian Crossing
- Reduced speed limit improves pedestrian and cyclist comfort and reduce the likelihood of crashes

Raritan Ave (NJ 27) and Washington Ave

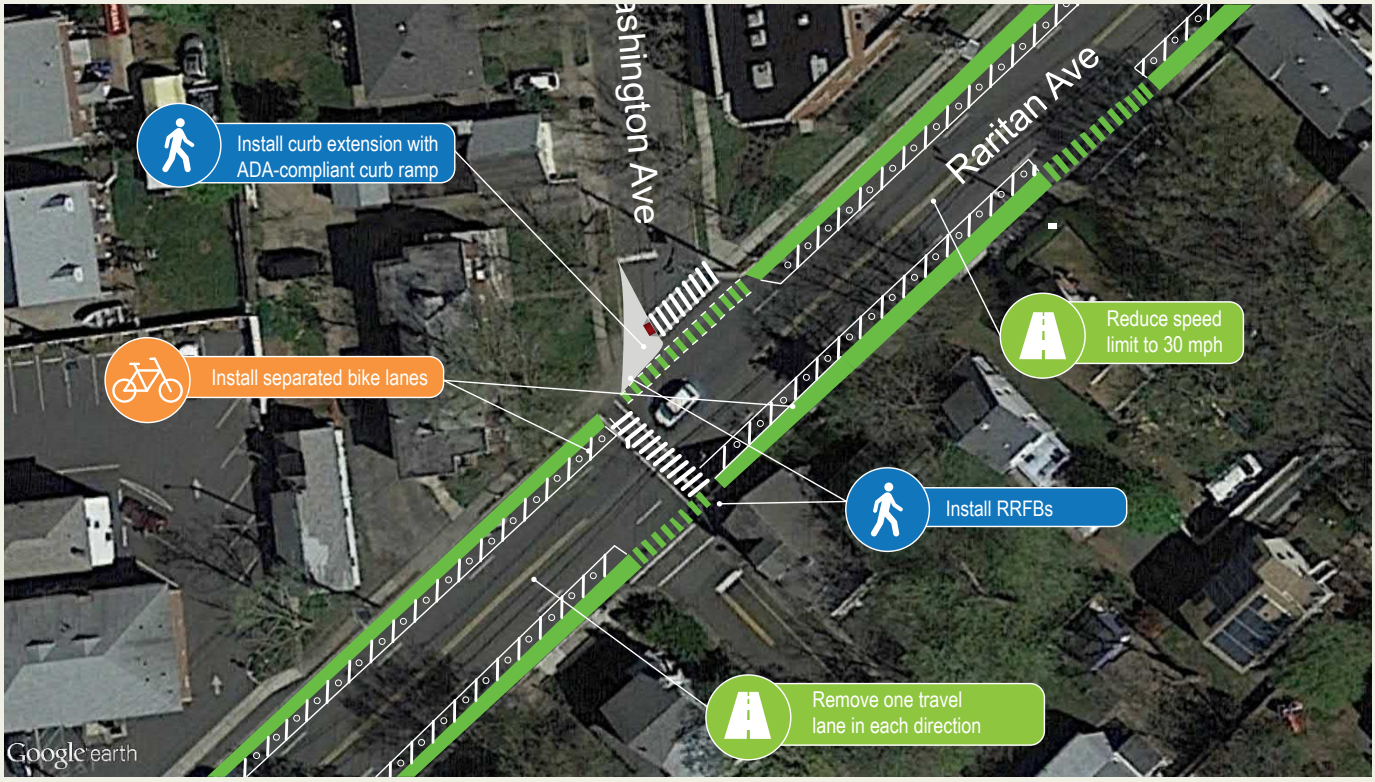
4

This portion of Raritan Ave heading into Edison has two travel lanes in each direction and a 35 mph speed limit. Few intersections along this span are signalized. Perpendicular streets frequently intersect with Raritan Ave at an obtuse angle, facilitating higher turning speeds and limiting visibility of pedestrians and oncoming vehicles. A synagogue is on the north-east corner of the intersection, causing high volumes of pedestrians to cross at this intersection at certain times. Improvements for this intersection can also be utilized at other intersecting streets with Raritan Ave east of its merge with Woodbridge Ave.

More detailed bike improvements for Raritan Ave are discussed on pages 51-55.

Recommendations

- Install curb extension on northwest corner with ADA-compliant curb ramp
- Upgrade existing crosswalk at Washington Ave to high visibility
- Install automatically actuated RRFBs
- Install separated bike lanes on both sides of Raritan Ave; removing one moving lane in each direction
- Reduce speed limit on Raritan Ave from 35 mph to 30 mph, requiring a speed study



Benefits

- Curb extension normalizes intersection, slowing approaching vehicles and reducing crossing distance
- High visibility crosswalks and RRFBs provide safer crossings for pedestrian and slow vehicles;
- Automatically actuated RRFB uses an FLIR infrared heat detection camera to activate the RRFB shortly after someone stands on the ramp, eliminating the need to press the button; also known as Shabbat Pedestrian Crossing
- Separated bike lanes provide safe place for cyclists along NJ 27; removal of travel lane and speed limit reduction results in safer motorist behavior and pedestrian crossings
- Reduced speed limit improves pedestrian and cyclist comfort and reduces the chances of a crash

Benner St and S 4th Ave

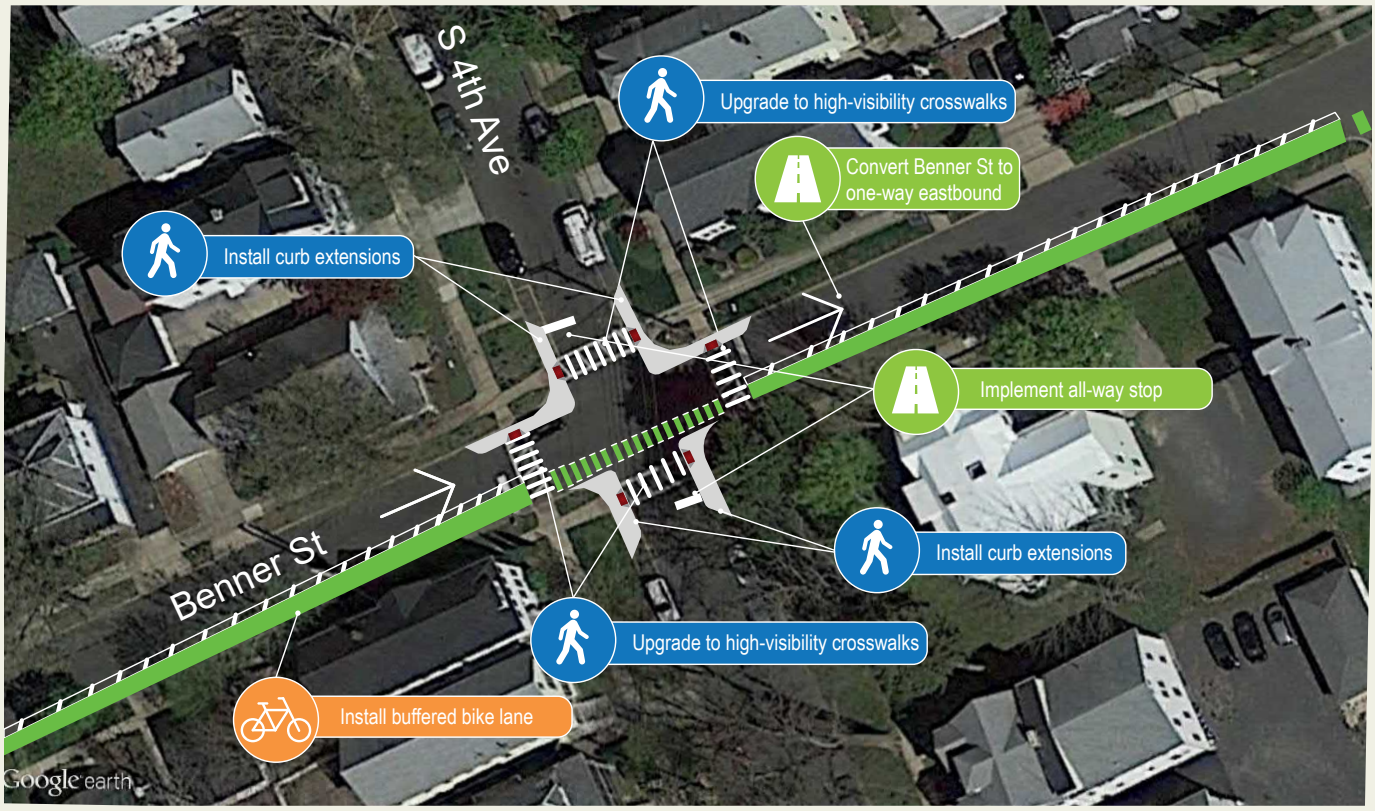
5

This intersection lies in the heart of Highland Park's residential neighborhood south of NJ 27. One block to the southeast is Highland Park's Police Department, Fire Department, Municipal Court, Senior Center and Housing Authority. One block west is the Highland Park Conservative Temple. The intersection is similar to many in the Borough with stop controls for two legs of traffic (in this case, on Benner St). Recommended improvements can be used at similar intersections throughout the Borough.

More detailed bike improvements for Benner St are discussed on pages 56-57.

Recommendations

- Upgrade crosswalks to high visibility
- Implement four-way stop
- Install buffered bike lane on Benner St
- Install curb extensions on all four corners
- Convert Benner St to one-way eastbound



Benefits

- Crosswalks alert motorists to crossing pedestrians, slowing vehicles
- Four-way stop slows motorists, and provides greater consistency for motorists
- Separated bike lane provides dedicated space for cyclists traveling east-west through Highland Park
- Curb extensions shorten crossings for pedestrians and ease motorist turns
- One-way designation allows for dedicated biking space with no decrease in parking

Spot Pedestrian Improvements

The following provides details of the recommended spot pedestrian improvements illustrated in Map 22:

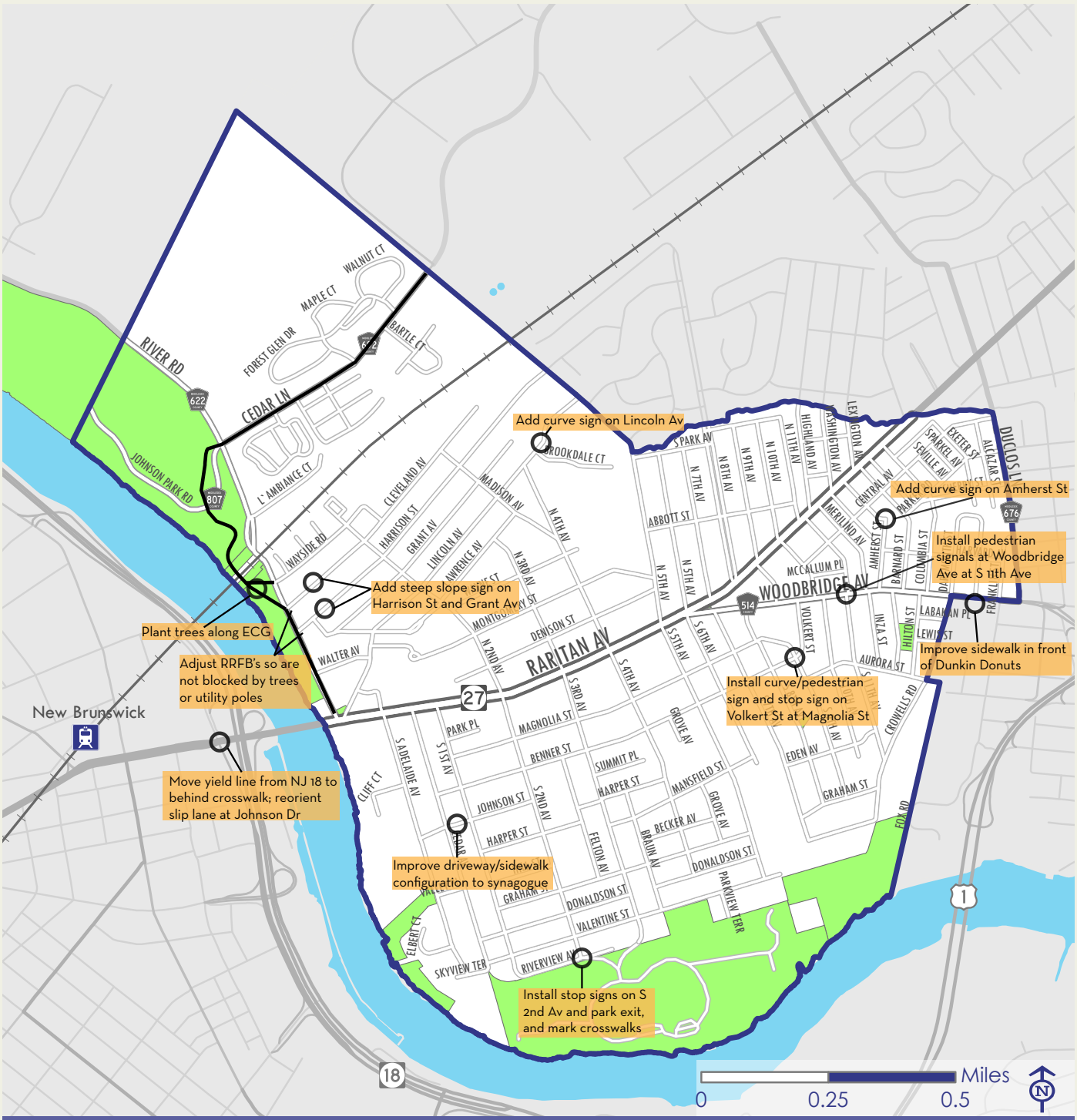
- Add curve sign on Lincoln Ave, east of Brookdale Ct
- Add steep slope sign on Harrison Ave and Grant Ave, east of River Rd
- Add curve sign on Amherst St, south of Central Ave
- Install curve/pedestrian sign and stop sign on Volkert St at Magnolia St
- Install pedestrian signals on Woodbridge Ave at S 11th Ave
- Reorient driveway/sidewalk configuration in front of Dunkin Donuts on Woodbridge Ave to prioritize pedestrians over motorists, as shown on page 92
- Reorient driveway/sidewalk configuration in front of Congregation Ahavas Achim at Johnson St and Cedar Ave, as shown on page 89 (see existing photo on middle right)
- Install stop signs at S 2nd Ave and Donaldson Park exit, and mark crosswalks
- Plant trees along East Coast Greenway between Johnson Park Rd and River Rd to improve pedestrian comfort in the sun
- Adjust RRFBs on River Rd so they are not blocked by trees or utility poles
- In New Brunswick, move yield line from NJ 18 on/off ramp to Johnson Dr behind the crosswalk, requiring working with the City of New Brunswick and Middlesex County

Congregation Ahavas Achim, Source: Google Maps

River Rd along Johnson Park

SPOT PEDESTRIAN IMPROVEMENTS

In addition to the priority intersection improvements, a number of spot improvements are recommended based on public input on the Wikimap. These locations are shown on Map 22 below and listed on the previous page.



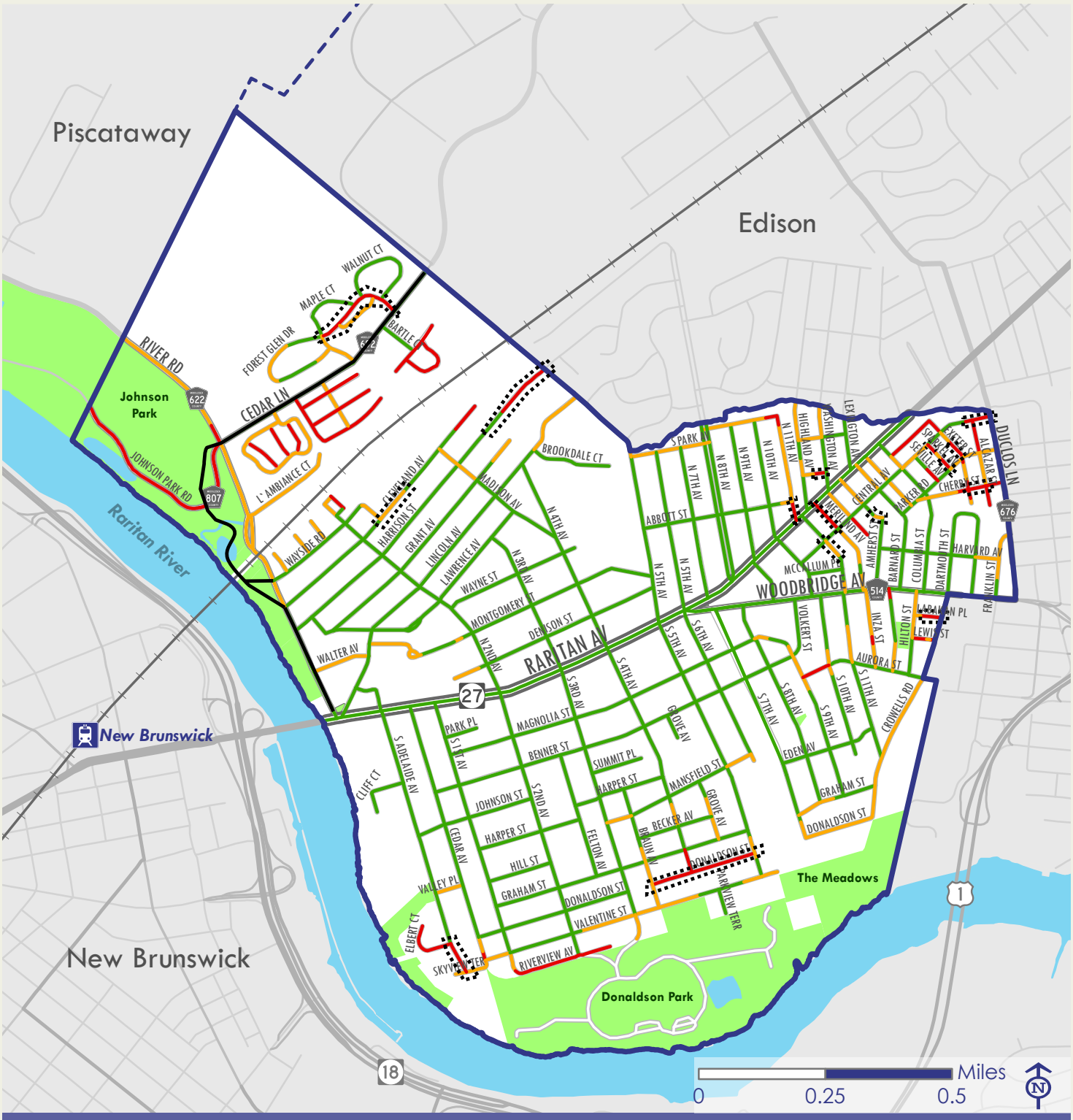
MAP 22: Spot Pedestrian Improvements

Sidewalks

As illustrated in Map 12, numerous portions of Highland Park streets lack sidewalks on one or both sides. The following list and Map 23 illustrate locations where the installation of sidewalks should be considered on at least one side of the street. In some instances, easements from adjacent property owners would be necessary.

- Treetops Dr, east of Forest Glen Dr
- Cleveland Ave, just east of Janeway Ave
- Eastern end of Harrison Ave
- S Adelaide Ave, south of Elbert Ct
- Donaldson St, between Braun Ave and S 5th Ave
- Eastern end of Labakan Pl
- S 11th Ave in front of Irving School
- Curve in the road of Amherst St
- North and south ends of Sparkel Ave (see existing conditions photo below)
- Exeter St, north of Parker Rd
- Cherry St, between Exeter St and Alcazar St
- Central Ave, west of Alcazar St to Duclos Ln
- N 11th Ave, between Raritan Ave and Abbott St
- Eastern end of Archer Pl
- Merilind Ave, north of Central Ave

Sparkel Ave, Source: Google Maps



Map 23-Proposed Sidewalk Improvements

HIGH LAND PARK BIKE WALK

- Train Station
- Northeast Corridor
- Highland Park Boundary
- Other Municipal Boundary
- Sidewalk Present on Both Sides
- Sidewalk Present on One Side
- No Sidewalk Present
- Existing Walking Path
- Proposed New Sidewalk


THE BLUE HORSE
GOOD TIMES & GREAT TASTE

8 Implementation and Next Steps

The recommendations in this Plan provide a roadmap for improving walking and bicycling in Highland Park. Prioritized and implemented over time, they outline a blend of infrastructure improvements and supportive policies and programs to help the Borough realize its vision for making "walking and bicycling convenient, comfortable, and safe transportation options for people of all ages and abilities," and the "natural, default choice" for children, residents, and visitors alike.

The pedestrian and bicycle infrastructure improvements presented in Chapters 6 and 7 are intended to be conceptual in nature, and may require varying levels of design, survey, or further analysis, and/or coordination with residents, businesses, or other stakeholders, depending on the magnitude of the improvement. As the concepts advance through engineering design, they should reflect the current best practices and guidelines referenced in the previous chapters. The recommendations are summarized in an implementation matrix in Appendix A2, which also identifies a time-frame for the improvement (short/medium/long), potential implementation partners, and order-of-magnitude cost (where practical).

The Borough should use this Plan to integrate additional improvement recommendations into planned projects and identify and prioritize future projects. The Plan can also help bolster applications for grant funding to support implementation efforts.

Highland Park should also work with NJDOT, NJTPA, and Middlesex County to help advance proposed improvements, leverage other projects, and identify resources and funding opportunities. Other entities, such as Keep Middlesex Moving TMA, may also be able to support non-infrastructure strategies, such as Safe Routes to School activities. Development activity provides another avenue for implementation, leveraging private investment to construct elements of the Plan and enhance bicycle and pedestrian mobility.

Finally, the Plan should be shared with neighboring municipalities to help inform and advance efforts to create a regional, interconnected bicycle network.

River Rd

APPENDICES

Bicycle LTS Criteria

Criteria for Level of Stress in Mixed Traffic

Posted Speed Limit	Street Width 2-3 Lanes	4-5 Lanes	6+
Up to 25 mph	LOS 1 or 2	LOS 3	LOS 4
30 mph	LOS 2 or 3	LOS 4	LOS 4
35 + mph	LOS 4	LOS 4	LOS 4

Level of Stress for Mixed Traffic in the Presence of a Right Turn Lane

Configuration	Level of Stress
Up to 25 mph Single right-turn lane with length · 75 ft. and intersection angle and curb radius limit turning speed to 15 mph	(no effect on LOS)
Single right-turn lane with length between 75 and 150 ft., and intersection angle and curb radius limit turning speed to 15 mph	LOS · 3
Otherwise	LOS = 4

Level of Stress for Unsignalized Crossings Without a Median Refuge

Speed Limit of Street Being Crossed	Width of Street Being Crossed 2-3 Lanes	4-5 Lanes	6+
Up to 25 mph	LOS 1	LOS 2	LOS 4
30 mph	LOS 1	LOS 2	LOS 4
35 + mph	LOS 2	LOS 3	LOS 4
40 + mph	LOS 3	LOS 4	LOS 4

Source: Low-Stress Bicycling and Network Connectivity, Mineta Transportation Institute, 2012

Criteria for Bike Lanes Alongside a Parking Lane

	LTS · 1	LTS · 2	LTS · 3	LTS · 4
Street width (through lanes per direction)	2	(no effect)	4 or more	(no effect)
Sum of bike lane and parking lane width (includes marked buffer and paved gutter)	15 ft. or more	14 ft.	13.5 ft or less	(no effect)
Speed limit or prevailing speed	25 mph or less	30 mph	35 mph	40 mph or more
Bike lane blockage (typically applies in commercial areas)	rare	(no effect)	frequent	(no effect)

Note: (no effect) = factor does not trigger an increase to this level of traffic stress

Criteria for Bike Lanes Not Alongside a Parking Lane

	LTS · 1	LTS · 2	LTS · 3	LTS · 4
Street width (through lanes per direction)	2	4, if directions are separated by a raised median	5, or 4 without a separating median	(no effect)
Bike lane width (includes marked buffer and paved gutter)	6 ft. or more	5.5 ft. or less	(no effect)	(no effect)
Speed limit or prevailing speed	30 mph or less	(no effect)	35 mph	40 mph or more
Bike lane blockage may apply in commercial areas)	rare	(no effect)	frequent	(no effect)

Note: (no effect) = factor does not trigger an increase to this level of traffic stress

Source: Low-Stress Bicycling and Network Connectivity, Mineta Transportation Institute, 2012

Volume Adjustment

Volume Threshold	Min. LTS
-	1
5,000	2
10,000	3
15,000	4

Implementation Matrix

The implementation matrix summarizes the improvements included in the Highland Park Bike Walk Plan, including a proposed time-frame for the improvement (short/medium/long), potential implementation partners, and order-of-magnitude cost (where practical). Only physical infrastructure improvements are listed here. Detailed policy recommendations are provided in Chapter 5. These estimates are intended to convey the level of investment that proposed concepts would require for implementation. The cost estimates are based on industry standards for per-unit material costs, and do not include the cost of right-of-way acquisition, relocation of utilities or drainage that could be involved, engineering design, or contingencies. Actual costs could vary greatly based on context. The lead agency for each project is bolded.

Priority Intersection Improvements

Location	Treatment	Cost	Time Frame	Agencies
Raritan Ave (NJ 27) and River Rd (CR 622)	Stripe STOP bars (3)	$300	Short-term	**NJDOT**, County, Borough
	Stripe high-visibility crosswalks (4)	$300	Short-term	
	Install ADA-compliant curb ramps (6)	$4400	Medium-term	
	Construct curb extensions (3)	$36,000	Medium-term	
Raritan Ave (NJ 27) and Woodbridge Ave (CR 514)	Stripe STOP bars (3)	$300	Short-term	**NJDOT**, County, Borough
	Stripe high-visibility crosswalks (6)	$3900	Short-term	
	Install ADA-compliant curb ramps (7)	$5900	Medium-term	
	Construct curb extensions (4)	$48,000	Medium-term	
	Install pedestrian refuge islands (2)	$24,000	Medium-term	
	Close driveway exits (2)	$1500	Long-term	
River Rd (CR 622) and Wayside Rd	Stripe high-visibility crosswalk	$700	Short-term	**County**, Borough
	Install signage for pedestrians	$100	Short-term	
	Install ADA-compliant curb ramp	$700	Medium-term	
	Install pedestrian refuge island (2)	$2300	Medium-term	
	Install RRFB (2)	$13,600	Medium-term	
	Pave multi-use path	$7400	Long-term	
Raritan Ave (NJ 27) and Washington Ave	Stripe high-visibility crosswalks (2)	$1600	Short-term	**NJDOT**, County, Borough
	Install ADA-compliant curb ramp	$700	Medium-term	
	Construct curb extension	$12,000	Medium-term	
	Install RRFB (2)	$13,600	Medium-term	
Benner St and S 4th Ave	Strip STOP bars (2)	$100	Short-term	**Borough**
	Stripe high-visibility crosswalks (4)	$2300	Short-term	
	Install ADA-compliant curb ramps (6)	$4400	Medium-term	
	Construct curb extensions (4)	$48,000	Medium-term	

Spot Pedestrian Improvements

Location	Treatment	Cost	Time Frame	Agencies
Lincoln Ave, east of Brookdale Ct	Install curve sign	$100	Short-term	**Borough**
Harrison Ave, east of River Rd	Install "Steep Slope" sign	$100	Short-term	**Borough**
Grant Ave, east of River Rd	Install "Steep Slope" sign	$100	Short-term	**Borough**
Amherst St, south of Central Ave	Install "Curve" sign	$100	Short-term	**Borough**
Volkert St at Magnolia St	Install "Curve" sign	$100	Short-term	**Borough**
	Install "Pedestrian" sign	$100	Short-term	**Borough**
	Install "Stop" sign	$100	Short-term	**Borough**
Woodbridge Ave at S 11th Ave	Install pedestrian signals	$4000	Medium-term	**County**, Borough
Dunkin Donuts on Woodbridge Ave	Reorient/reconfigure drive-way/sidewalk configuration	$1300	Medium-term	**County**, Borough
Congregation Ahavas Achim at Johnson St and Cedar Ave	Reorient/reconfigure drive-way/sidewalk configuration	$700	Medium-term	**Borough**
S 2nd Ave and Donald-son Park exit	Install stop sign	$100	Short-term	**Borough**
	Mark crosswalk	$1900	Short-term	**Borough**
East Coast Greenway between Johnson Park Rd and River Rd	Plant trees	varies	Medium-term	**Borough**
Johnson Park	Install blue police box	$6000	Short-term	**County**, Borough
	Install pedestrian scale lighting	varies	Medium-term	**Borough**
River Rd	Adjust RRFB locations	varies	Medium-term	**Borough**
NJ 18 on/off ramp to Johnson Dr (New Brunswick)	Request to move yield line to beyond crosswalk	NA	Short-term	**NJDOT,** County, New Brunswick

Sidewalk Construction

All sidewalk construction recommendations fall under Borough jurisdiction and are short or medium term depending on the need to provide an easement for the sidewalk.

Location	Side	Cost
Treetops Dr, east of Forest Glen Dr	North	$29,200
Cleveland Ave, just east of Janeway Ave	North	$10,600
Eastern end of Harrison Ave	Either	$29,800
S Adelaide Ave, south of Elbert Ct	Either	$8200
Donaldson St, between Braun Ave and S 5th Ave	North	$28,700
Eastern end of Labakan Pl	South	$4800
S 11th Ave in front of Irving School	West	$5000
Curve in the road of Amherst St	North	$2200
North and south ends of Sparkel Ave	Both	$10,555
Exeter St, north of Parker Rd	East	$5100
Cherry St, between Exeter St and Alcazar St	North	$4400
Central Ave, west of Alcazar St to Duclos Ln	South	$6100
N 11th Ave, between Raritan Ave and Abbott St	West	$1800
Eastern end of Archer Pl	South	$2900
Merilind Ave, north of Central Ave	East	$8333

Bicycle Facilities

Location	Extents	Treatment	Directions	Cost	Agencies
Central Ave	Suttons Ln to Edison NJT station entrance	Shared Lane	Two	$5200	**Edison**
Wayside Rd	River Rd to N 2nd Ave	Shared Lane	Two	$2200	**Borough**
Lincoln Ave	Walter Ave to Madison Ave	Shared Lane	Two	$4700	**Borough**
Harrison Ave	River Rd to Edison border	Shared Lane	Two	$8400	**Borough**
N 4th Ave	Lincoln Ave to Madison Ave	Shared Lane	Two	$2200	**Borough**
N 5th/S 5th Ave	S Park Ave to Mansfield St	Shared Lane	Two	$7400	**Borough**
S Park Ave	N 5th Ave to N 8th Ave	Shared Lane	Two	$2200	**Borough**
Riverview Ave	Valentine St into Donaldson Park	Shared Lane	Two	$3200	**Borough**
Mansfield St	S 3rd Ave to S 5th Ave	Shared Lane	Two	$3200	**Borough**
S 6th Ave	Magnolia St to Benner St	Shared Lane	Two	$1200	**Borough**
Inza St	Woodbridge Ave to Aurora St	Shared Lane	Two	$2200	**Borough**
Barnard St	Raritan Ave to Woodbridge Ave	Shared Lane	Two	$3200	**Borough**
Skyview Terr	Entirety	Shared Lane	Two	$1200	**Borough**
Valentine St	Cedar Ave to S 1st Ave	Shared Lane	Two	$1200	**Borough**
Cleveland Ave	River Rd to Madison Ave	Bike Boulevard	Two	$5200	**Borough**
Montgomery St	Lincoln Ave to N 4th Ave	Bike Boulevard	Two	$5200	**Borough**
N 4th Ave	Madison Ave to Raritan Ave	Bike Boulevard	Two	$2700	**Borough**
Madison Ave	Cleveland Ave to N 4th Ave	Bike Boulevard	Two	$3200	**Borough**
S 3rd Ave	Raritan Ave into Donaldson Park	Bike Boulevard	Two	$6900	**Borough**
S 9th Ave	Benner St to Aurora St	Bike Boulevard	Two	$700	**Borough**
Aurora St	S 9th Ave to Crowells Rd	Bike Boulevard	Two	$3200	**Borough**
Crowells Rd	Woodbridge Ave to Aurora St	Bike Boulevard	Two	$2200	**Borough**
Raritan Ave	River Rd to S 6th Ave	Standard	Two	$11,300	**NJDOT,** Borough
Woodbridge Ave	S 6th Ave to Edison border	Standard	Two	$10,000	**Borough**
S 1st Ave	Raritan Ave to Valentine St	Standard	Two	$7900	**Borough**
Cedar Ave	Raritan Ave to Benner St	Standard	One	$1500	**Borough**
Merilind Ave	Raritan Ave to Woobridge Ave	Standard	One	$2100	**Borough**
Magnolia St	S 1st Ave to Volkert St	Buffered	One	$7900	**Borough**
Benner/Volkert St	Cedar Ave to Woodbridge Ave	Buffered	One	$9600	**Borough**
S 6th Ave	Raritan Ave to Magnolia St	Buffered	One	$1700	**Borough**
N 6th Ave	Raritan Ave to S Park Ave	Buffered	One	$3800	**Borough**
Montgomery St	N 4th Ave to N 5th Ave	Buffered	One	$3700	**Borough**
N 8th Ave	Raritan Ave to Edison border	Buffered	Two	$6600	**Borough**
S 9th Ave	Raritan Ave to Woodbridge Ave	Buffered	One	$1200	**Borough**
Cedar Ln	River Rd to Edison border	Buffered	Two	$11,800	**County,** Borough

Bicycle Facilities (continued)

Location	Extents	Treatment	Directions	Cost	Agencies
Walter Ave	River Rd to Lincoln Ave	Separated	Two	$8500	**Borough**
Raritan Ave	S 6th Ave to Edison border	Separated	Two	$43,800	**NJDOT,** Borough
Raritan Ave	east of Highland Park-Edison border	Separated	Two	NA	**NJDOT,** Borough
N 8th Ave	north of Highland Park-Edison border to Schenck Mier Park	Separated	Two	$23,400	**Edison**
N 2nd/S 2nd Ave	Wayside Rd to Riverview Ave	Advisory	Two	$12,300	**Borough**
Within Schenck Mier Park	N 8th Ave to Suttons Ln	Shared Use	Two	NA	**Edison**
Suttons Ln	Schenck Mier Park to Central Ave	Shared Use	Two	NA	**Edison**
Easement along Raritan River	Donaldson Park to Raritan Ave	Shared Use	Two	$367,600	**County,** Borough
Johnson Park	Wayside Rd/River Rd to East Coast Greenway	Shared Use	Two	$24,700	**County,** Borough

Bicycle Parking

Location
Johnson Park
Raritan Ave, west of 2nd Ave
Raritan Ave, east of Woodbridge Ave
Woodbridge Ave
In front of Chamber 43 on Raritan Ave between S 3rd and S 4th Aves
In front/next to Classics Cleaners on Raritan Ave between S 1st and S 2nd Aves

Basic bicycle parking racks typically cost approximately $100.

Spot Bike Improvements

Location	Cost
Make River Rd bike facility more prominent through paint and/or signage	$36,000
Install signs allowing riding bike on Albany Street Bridge sidewalk	$200
Add bike-scale signage on Raritan Ave at N 8th Ave and N 8th Ave at Edison border promoting bike route to Edison NJT station	$200
Install crossing of Raritan Ave at S 9th Ave with RRFB for cyclists to continue from S 9th Ave to Raritan Ave	$14,500
Install crossing of Woodbridge Ave at Volkert St with RRFB for cyclists to continue from Volkert onto S 9th Ave	$14,500