Shaker Heights On-Road Bicycle Route Network

June 2008

Prepared By
Northeast Ohio Areawide Coordinating Agency
1299 Superior Avenue
Cleveland Ohio 44114

NOACA
Planning For Greater Cleveland

Inside Front Cover

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- Serve as the Metropolitan Planning Organization (MPO), with responsibility for comprehensive, cooperative and continuous planning for highways, public transit, and bikeways, as defined in the current transportation law.
- Perform continuous water quality, transportation-related air quality and other environmental planning functions.
- Administer the area clearinghouse function, which includes providing local government with the opportunity to review a wide variety of local or state applications for federal funds.
- Conduct transportation and environmental planning and related demographic, economic and land use research.
- Serve as an information center for transportation and environmental and related planning.
- At NOACA Governing Board direction, provide transportation and environmental planning assistance to the 172 units of local, general purpose government.

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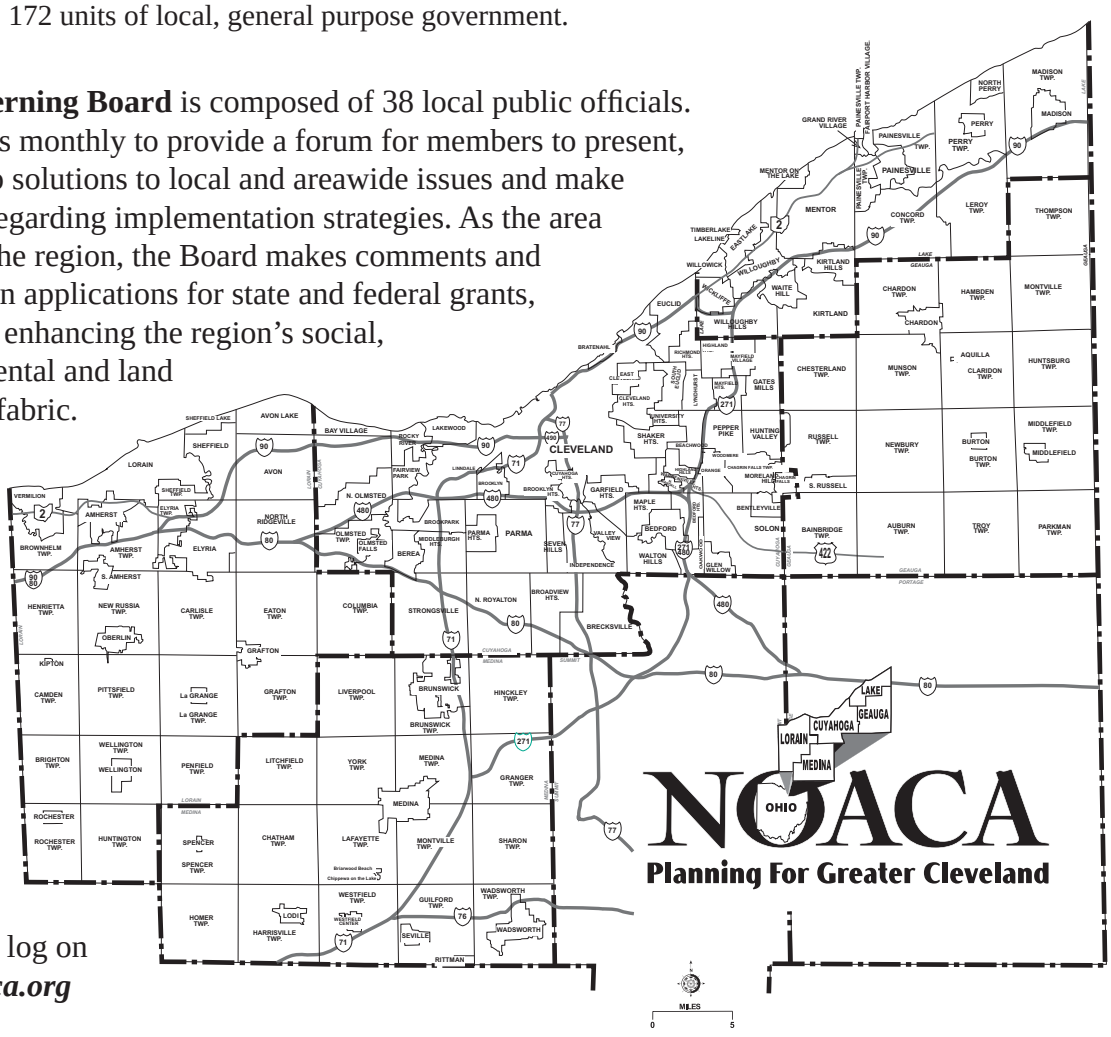

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3) Author(s): **Maher Holozadah, Senior Transportation Engineer**	**4) Report Date:** **June 2008**
5) Performing Organization Name & Address: **Northeast Ohio Areawide Coordinating Agency** **1299 Superior Avenue, Cleveland, OH 44114-3204** **Phone: (216) 241-2414 FAX: (216) 621-3024 Web site: www.noaca.org**	**6) Project & Task No. :** **6253-1** **7) Contract/Grant No. :** **ODOT/FHWA**
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Reviewers

NOACA:

Ron Eckner, Director of Planning, Planning and Programs Division

William Davis, Associate Director of Planning, Planning and Programs Division

Mahmoud Al-Lozi, Principal Planning Engineer

Sahar Tawfiq, Transportation Planning Engineer

Jim Armaline, Senior Planning Engineer

Michelle Johnson, Planner

Gayle Godek, Communications Specialist

City of Shaker Heights:

Dan Feinstein, Planner

Ann Klavora, Planner

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On-Road Bicycle Route Network

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Prepared By
Northeast Ohio Areawide Coordinating Agency
1299 Superior Avenue
Cleveland Ohio 44114

Principal Author

Maher Holozadah,
Senior Transportation Engineer

Contributors

Mahmoud Al-Lozi, Principal Planning Engineer
Sahar Tawfiq, Transportation Engineer
Gary Grano, Senior Transportation Planner
Gayle L. Godek, Communications Specialist

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Executive Summary

The City of Shaker Heights requested NOACA to help select an on-road bicycle route network for Shaker Heights. NOACA staff, in concert with staff from the City of Shaker Heights, studied the area and selected a network based on the rationale described in this study report. The network serves the entire City of Shaker Heights and provides reasonably adequate service to the east-west and north-south directions. It also provides access to many points of interest in the community.

The City of Shaker Heights has been studying and pursuing the introduction of bicycle routes in the city to enhance its community appeal and to provide a safe alternative mode of transportation. The city has introduced and built some off-road, multipurpose paths and trails but felt it also needed to complement such trails with on-road bicycle routes to facilitate access to the off-road trails and to provide safer routes for bicycle travel as a means to reach local destinations and points of interest.

The city applied for and received an assistance grant from NOACA through NOACA's Transportation for Livable Communities Initiative (TLCI) program. The request for funding was approved in Fiscal Year (FY) 2005. The study was undertaken by NOACA through its Neighborhood Planning Assistance element of the FY 2008 Overall Work Program.

Introduction

Bicycle facilities in various forms, such as dedicated bike lanes on existing roadways, designated bike routes sharing the road with the general vehicular traffic, exclusive single-purpose off-road bikeways, and bikeways within paved multipurpose paths, have become an important part in any integrated transportation system. While the primary use of bicycle facilities is for recreational purposes, there is a growing interest in using them for general and commuter travel needs.

The City of Shaker Heights is home to many community activity centers and other points of interest. The city, therefore, requested this study be undertaken to integrate bicycle travel with the existing roadway network and enable residents to reach destinations by bicycle on safe, well defined, and clearly marked bicycle routes.

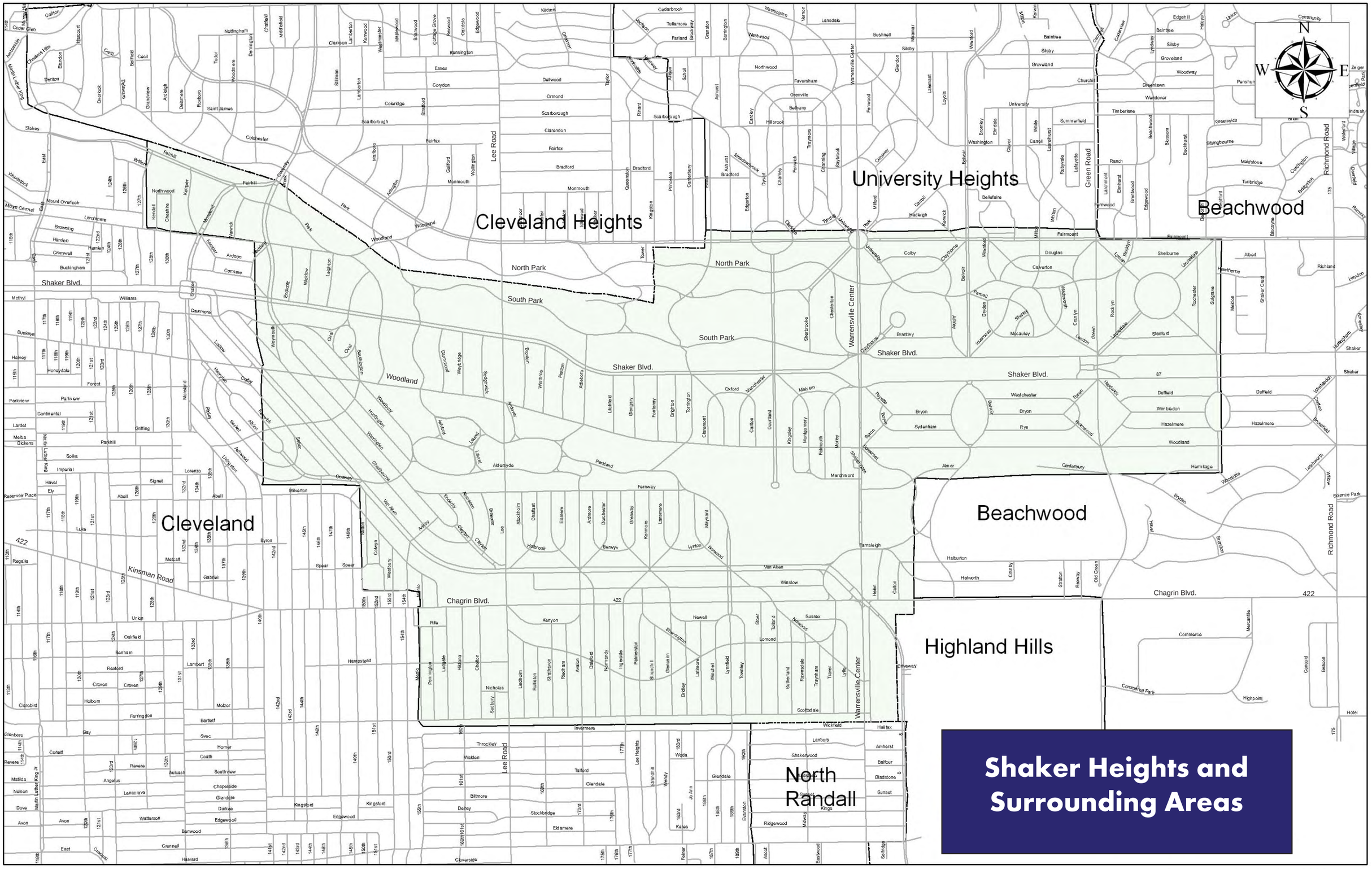
About forty percent (40%) of vehicular trips nationally are general-purpose trips to destinations within two miles from place of residence. It is believed that promoting or encouraging bicycling can be achieved by providing safe and convenient bicycle facilities. Using bicycles as a mode of transportation would reduce the use of motor vehicles for short distance trips and also reduce reliance on motor vehicles as the only means of transportation. This reduction directly benefits the public through the associated reduction in pollutants emitted.

According to NOACA's transportation model, approximately 15 percent of all two-way, single-occupancy passenger vehicle trips are three miles or less, nine percent are two miles or less and four percent are one mile or less. Not included in these percentages are trips to high schools, colleges, and universities; trips in and out of NOACA's five counties; and trips made from somewhere other than home, such as driving to a restaurant from work for lunch.

Study Area

The study area encompasses all of the City of Shaker Heights. The on-road bicycle route network is intended to serve the entire city as practically as possible. The network was chosen in a manner to ensure that it passes through or near population areas to encourage residents to use bicycles not only for pleasure and recreational purposes, but also as an alternative means of transportation, at least for short trips.

See map of the City of Shaker Heights and surrounding areas.


Cleveland Heights
University Heights
Beachwood
Cleveland
Beachwood
Highland Hills
North Randall
Shaker Heights and Surrounding Areas
Shaker Blvd.
North Park
South Park
Woodland
Lee Road
Green Road
Richmond Road
Warrensville Center
Chagrin Blvd.
Kinsman Road
422
N
S
E
W

Rationale for the Selection of the On-Road Bicycle Route Network

Staff from NOACA and the City of Shaker Heights toured the suburb together by car and on bicycles to gain a more intimate understanding of the prevailing environment. In addition, NOACA staff made several field visits and stops at many locations along the preliminary candidate roadways to gain direct physical experience with the prevailing conditions. NOACA staff selected the suggested bicycle routes that form the bicycle route network based on the following rationale as well as judgments generated from scouting the field:

1. Bicycle routes were selected to be on roads that are primarily parallel and in close proximity to major roadways;
2. Roads that carry less traffic volumes than others;
3. Roads that provide more scenic or pleasant surroundings for a more enjoyable ride;
4. Roads that connect or lead to major activity centers and other points of interest such as schools, recreation centers, public parks, public libraries, City Hall, and public transit stations;
5. Roadways that have fewer or safer intersections to minimize the number of crossing locations and any risks associated with crossing;
6. Roadways with minimum crossings at major intersections that are heavily travelled by vehicular traffic;
7. Ensure that the bicycle network is fully connected and continuous;
8. Roadways that provide adequate directional access to serve the north-south as well as the east-west directions;
9. Roadways that are conducive to being connected to further additions of more bicycle routes and spurs;
10. Roadways that connect with or are close to existing off-road bicycle routes and trails;
11. Roadways that pass through residential areas to encourage more use of bicycles by the resident population; and
12. Roads that are consistent with, close, or connect to NOACA's regional bicycle priority routes.

Suggested On-Road Bicycle Route Network

The suggested on-road bicycle route network is shown on the following two maps. The first map shows the suggested on-road bicycle route network and how it closely passes by various attractions and destinations in the city. It also shows the bicycle routes relative to the mass transit system, including light rail stations and bus routes and stops. The second map shows the location of the on-road bicycle route network relative to various landmarks in Shaker Heights, such as lakes, parks, and schools.

In some instances, bicycle routes are designated on roads that pass through multiple jurisdictional boundaries or corporation lines. Neighboring communities are urged to cooperate and coordinate their planning efforts and activities to integrate their bicycle route networks. They are encouraged to work together to help make bicycle route connections outside their municipal boundaries possible.

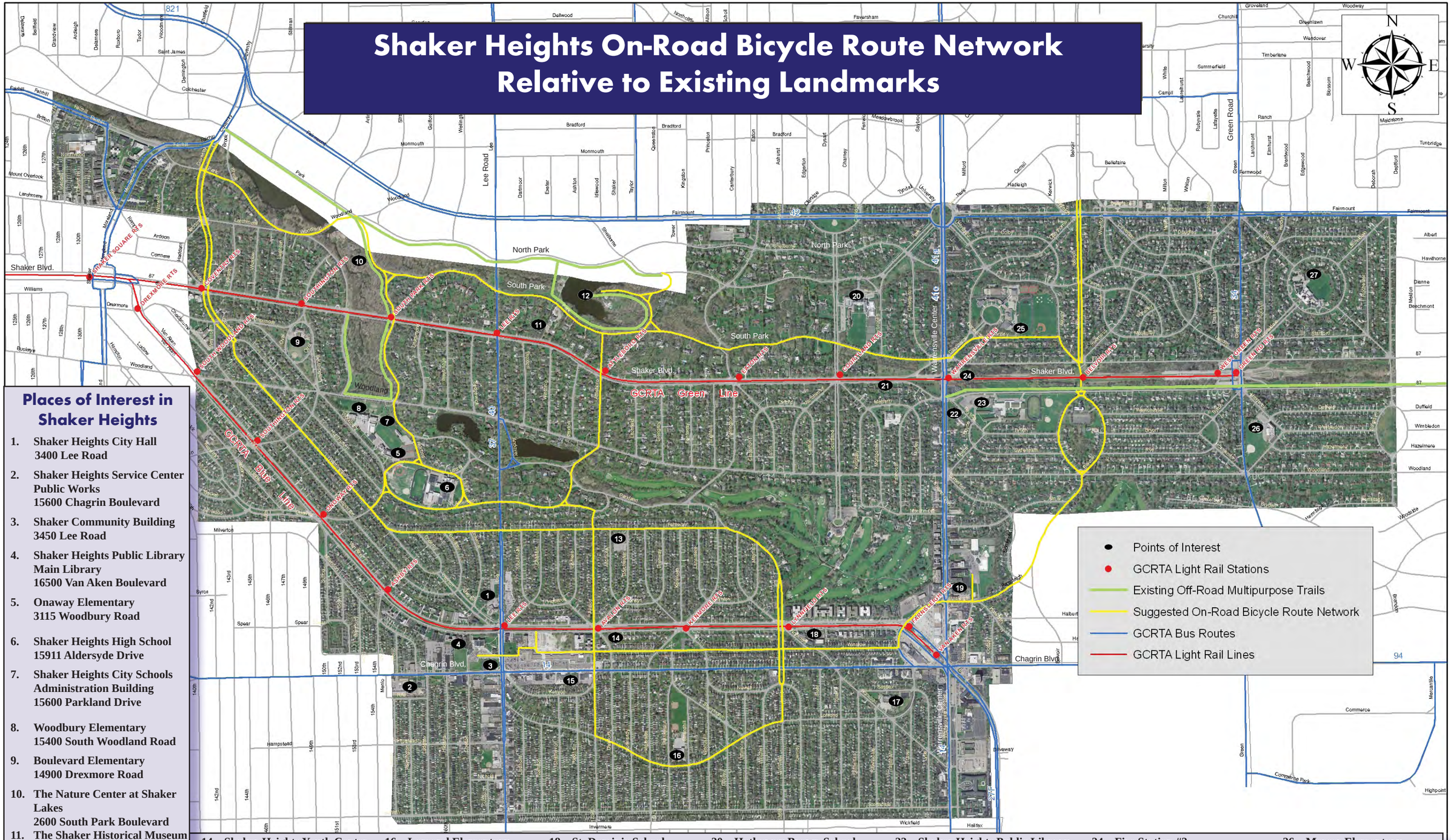
Shaker Heights
On-Road Bicycle Route Network
with GCRTA Light Rail and Bus Lines

Places of Interest in Shaker Heights

1. **Shaker Heights City Hall**
   3400 Lee Road
2. **Shaker Heights Service Center**
   Public Works
   15600 Chagrin Boulevard
3. **Shaker Community Building**
   3450 Lee Road
4. **Shaker Heights Public Library**
   Main Library
   16500 Van Aken Boulevard
5. **Onaway Elementary**
   3115 Woodbury Road
6. **Shaker Heights High School**
   15911 Aldersyde Drive
7. **Shaker Heights City Schools**
   Administration Building
   15600 Parkland Drive
8. **Woodbury Elementary**
   15400 South Woodland Road
9. **Boulevard Elementary**
   14900 Drexmore Road
10. **The Nature Center at Shaker Lakes**
    2600 South Park Boulevard
11. **The Shaker Historical Museum**
    16740 South Park Boulevard
12. **Horseshoe Lake Park**
13. **Fernway Elementary**
    16740 Fernway Road
14. **Shaker Heights Youth Center**
    17300 Van Aken Boulevard
15. **Fire Station #1**
    17000 Chagrin Boulevard
16. **Lomond Elementary**
    17917 Lomond Boulevard
17. **Shaker Family Center**
    19824 Sussex Road
18. **St. Dominic School**
    3455 Norwood Road
19. **Thornton Park**
    20710 Farnsleigh Road
20. **Hathaway Brown School**
    19600 North Park Boulevard
21. **Hanna Perkins Center**
    19910 Malvern Road
22. **Shaker Heights Public Library**
    Bertram Woods Branch
    20600 Fayette Road
23. **Shaker Heights Middle School**
    20600 Shaker Boulevard
24. **Fire Station #2**
    2801 Warrensville Center Road
25. **University School**
    29791 Brantley Road
26. **Mercer Elementary**
    23325 Wimbledon Road
27. **Laurel School**
    1 Lyman Circle

Points of Interest
GCRTA Light Rail Stations
Existing Off-Road Multipurpose Trails
Suggested On-Road Bicycle Route Network
GCRTA Light Rail Lines
GCRTA Bus Routes

Shaker Heights On-Road Bicycle Route Network
Relative to Existing Landmarks



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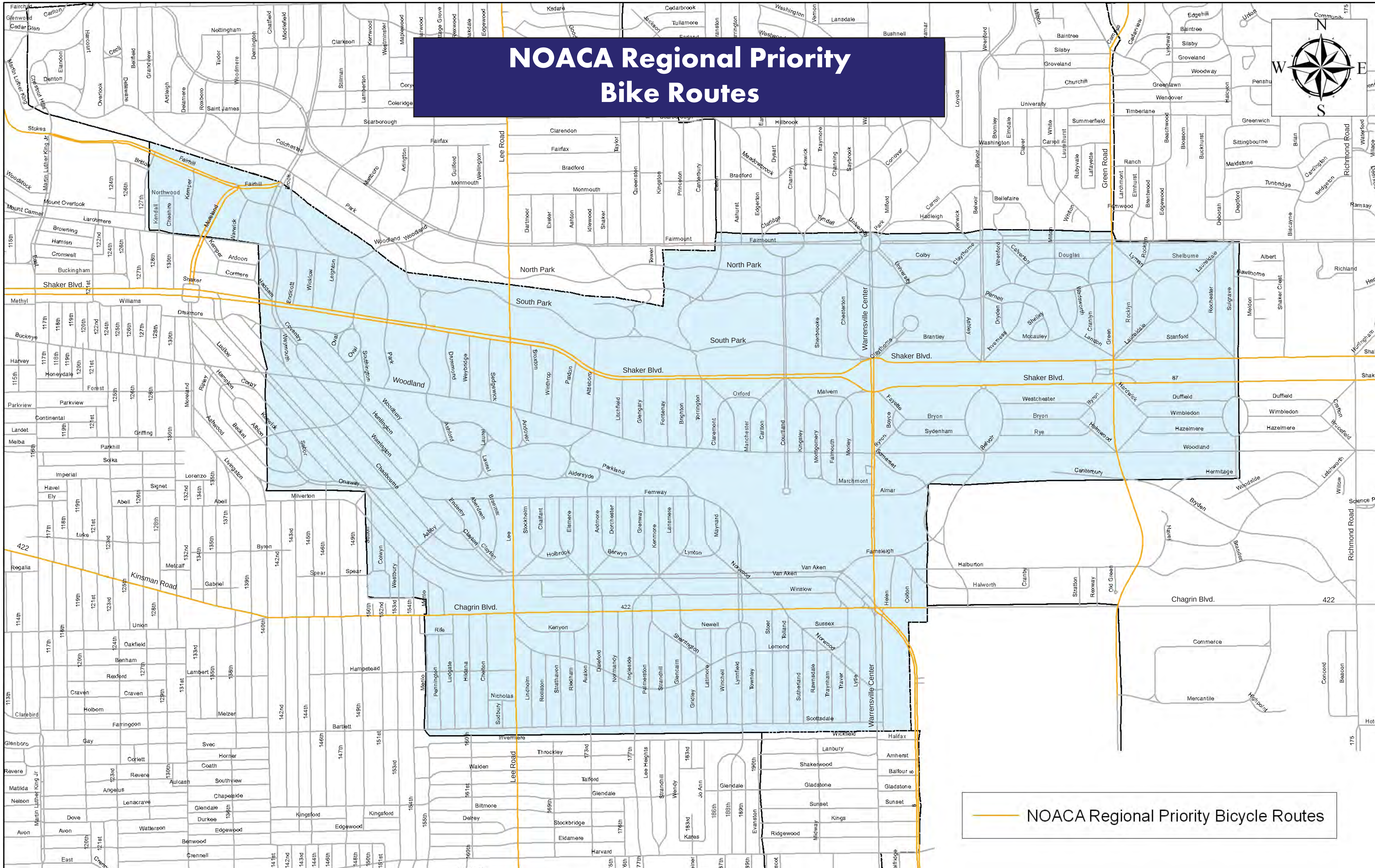
Regional Priority Bicycle Routes

NOACA's Regional Bicycle Transportation Plan, published in March 2008, addresses the subject of project reconstruction priorities for roads considered as candidates for regional bicycle facilities. It "reflects NOACA's priorities for roads that should accommodate bicyclists." The plan states, "Road reconstruction, major rehabilitation, and widening projects on these routes using NOACA-attributable dollars shall include bicycle facilities unless it is demonstrated pursuant to NOACA's Bicycle and Pedestrian Policy that bicycle facilities are not feasible. In this case, that route shall be removed from the Bicycle Priority Plan and an alternative will be designated if possible." The following map shows the regional bicycle routes within the City of Shaker Heights.

The plan further states that "For these projects, the bicycle accommodation can be part of the project, which is a more cost-effective way of achieving bicycle accommodation." When non-NOACA funds are used, the plan states that "For projects on the Priority Plan using non-NOACA funds, inclusion of bikeways is strongly encouraged in order to have an effective, interconnecting bikeway system. The appropriate type of bikeway (i.e., bike lane, route, path, paved shoulders, wide curb lanes, etc.) will be determined based on the specific road or bridge conditions."

Joint reconnaissance by and discussions among Shaker Heights and NOACA staff led to the establishment of this suggested on-road local bicycle network. The Shaker Heights On-Road Bicycle Route Network supports and complements NOACA's Regional Bicycle Transportation Plan by providing local residential access to the regional priority routes. The local network is within close proximity of the NOACA Regional Priority network and provides a continuous loop. When the regional priority routes are due for reconstruction, Shaker Heights may evaluate the feasibility of incorporating bicycle routes into the reconstruction plan and whether to add the roadway to its local bicycle route network or substitute it with one of the local bicycle routes. The two networks and their relative relationship are shown on the following map.

NOACA Regional Priority Bike Routes



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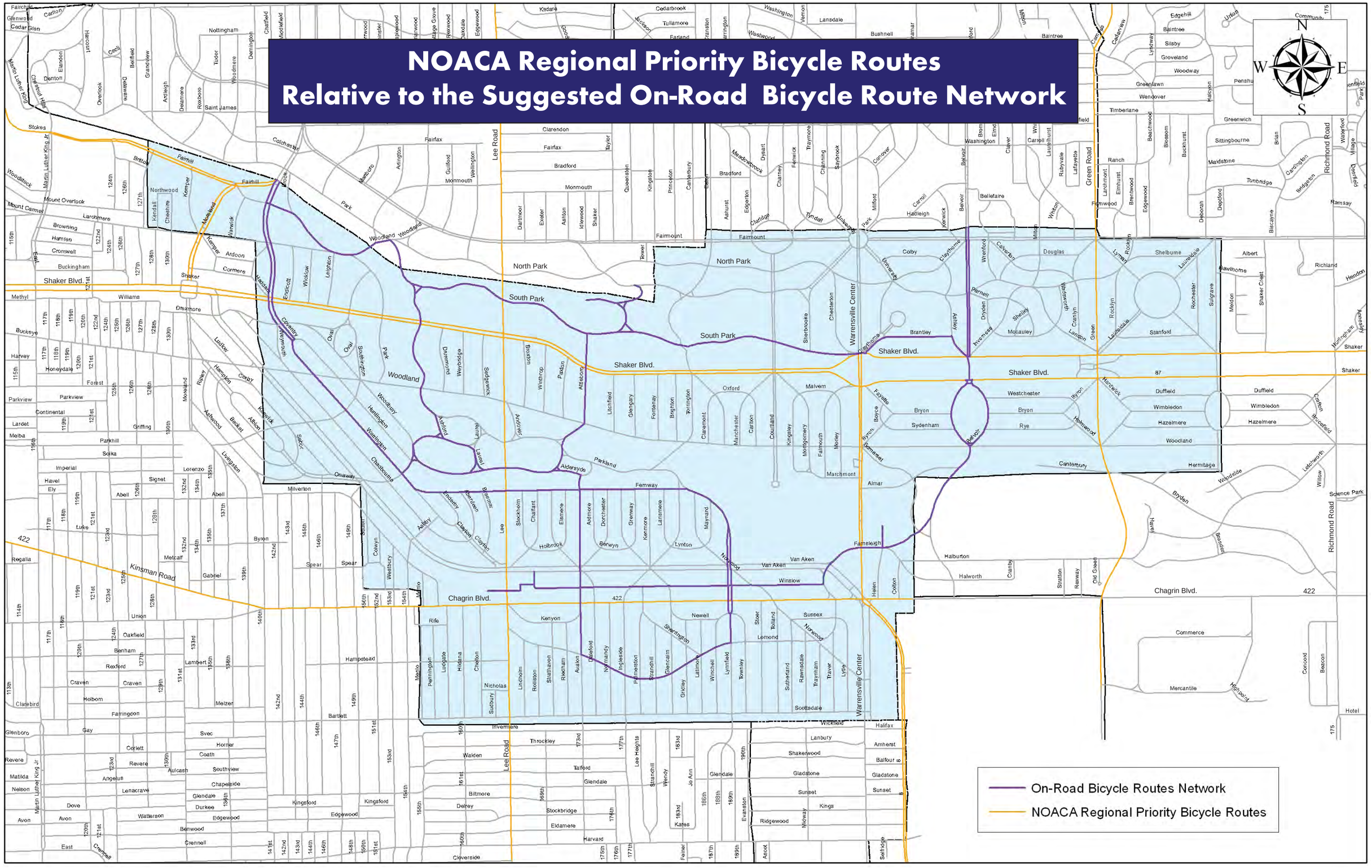
NOACA Regional Priority Bicycle Routes
Relative to the Suggested On-Road Bicycle Route Network



Suggested Typical Signage and Pavement Marking

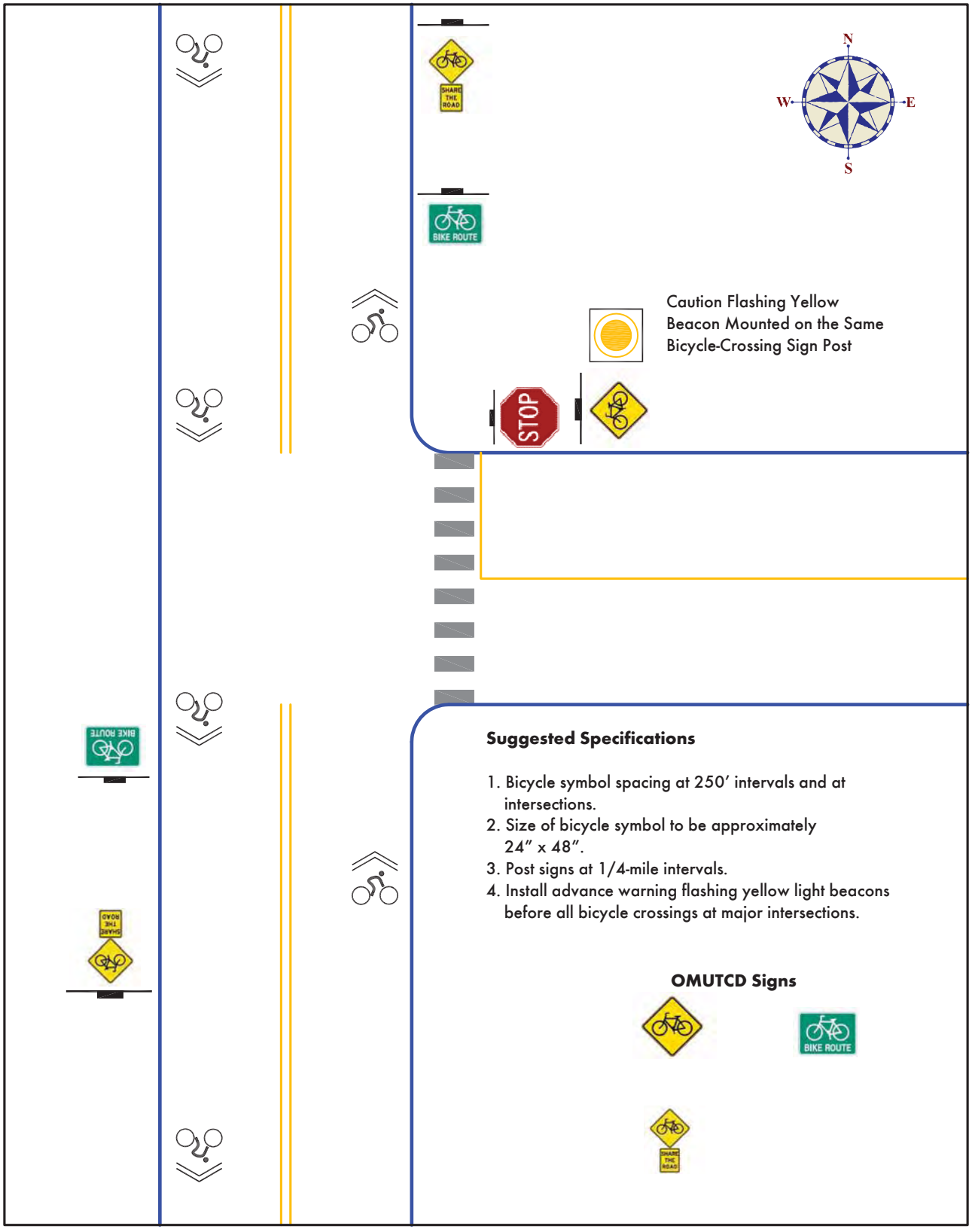
Bicyclists should be able to identify easily the designated bicycle routes. Clearly marked bicycle routes are important for the safety of cyclists as road users are more likely to pay closer attention to the presence of bicyclists when they recognize that the particular road they are using is also shared by bicyclist. Furthermore, bicycle routes should have signs with destination information to enable bicyclists unfamiliar with the community to find their way to their destinations. When bicyclists know that the bicycle routes in their communities are fully connected and integrated with other modes of transportation, they will likely feel more confident that these routes will not lead them astray. They will know that these routes can bring them back to the same point from which they started because the routes are continuous and form a complete circuit.

The following suggested measures will help identify and mark the designated bicycle routes:

- Space posted signs at approximately ¼-mile intervals.
- Stencil or imprint, at 250-ft intervals on the pavement, the "Shared-Lane" marking symbol, also commonly known as "sharrow," to mark or identify the designated bicycle routes.
- Install destination signs (i.e., the public library, schools by name, community centers, public parks, City Hall, golf course, etc.).
- Use high reflectivity, durable, white paint on the pavement, as shown on the schematic diagrams.
- Use warning yellow flashing lights in both directions at bicycle crossings where traffic does not stop to increase the visibility of crossing locations and to alert drivers to the likelihood of the presence of bicyclists.

The following two templates show suggested typical signage and pavement markings on and at intersections along the bicycle route network.

Suggested Typical Signage and Pavement Marking



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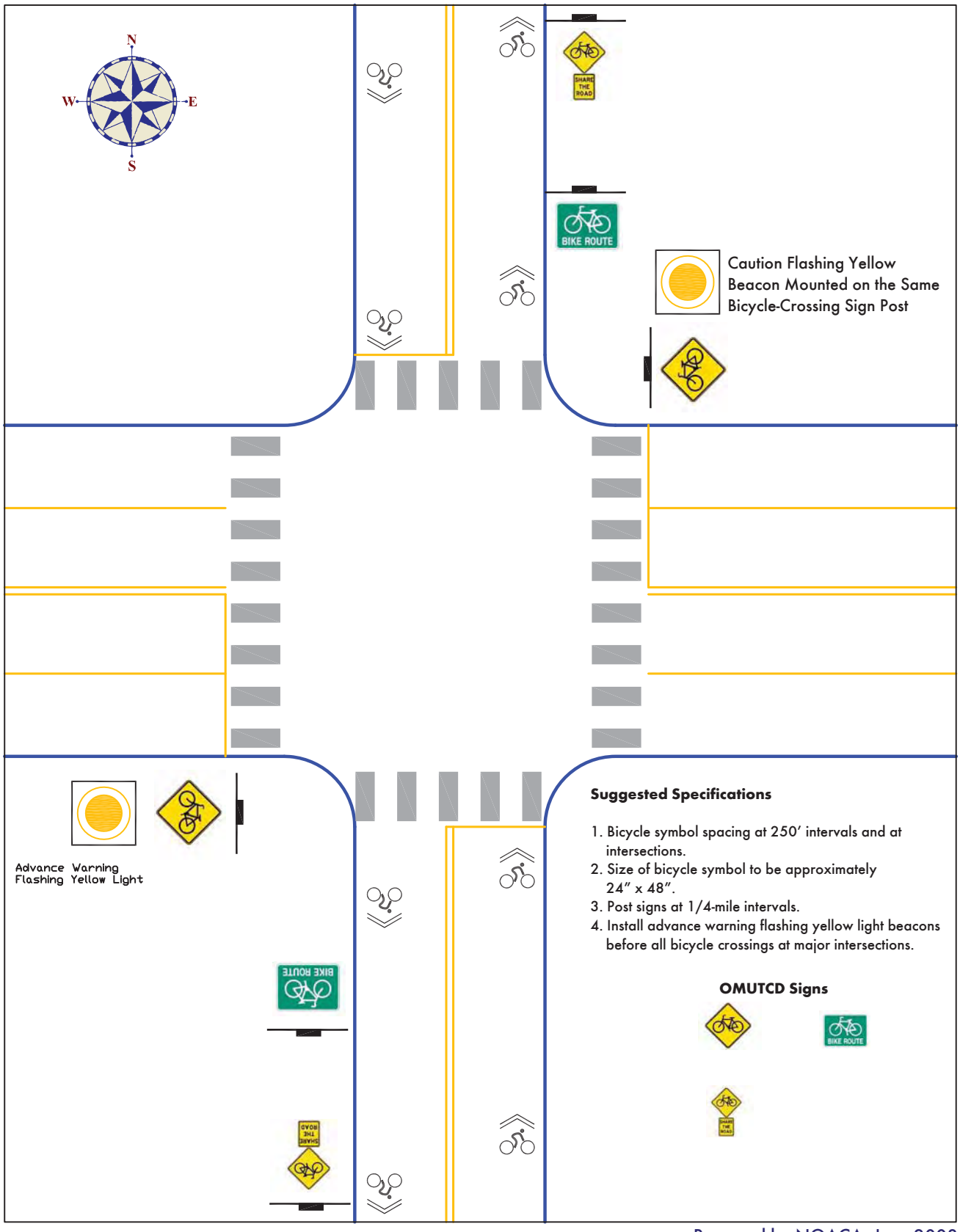

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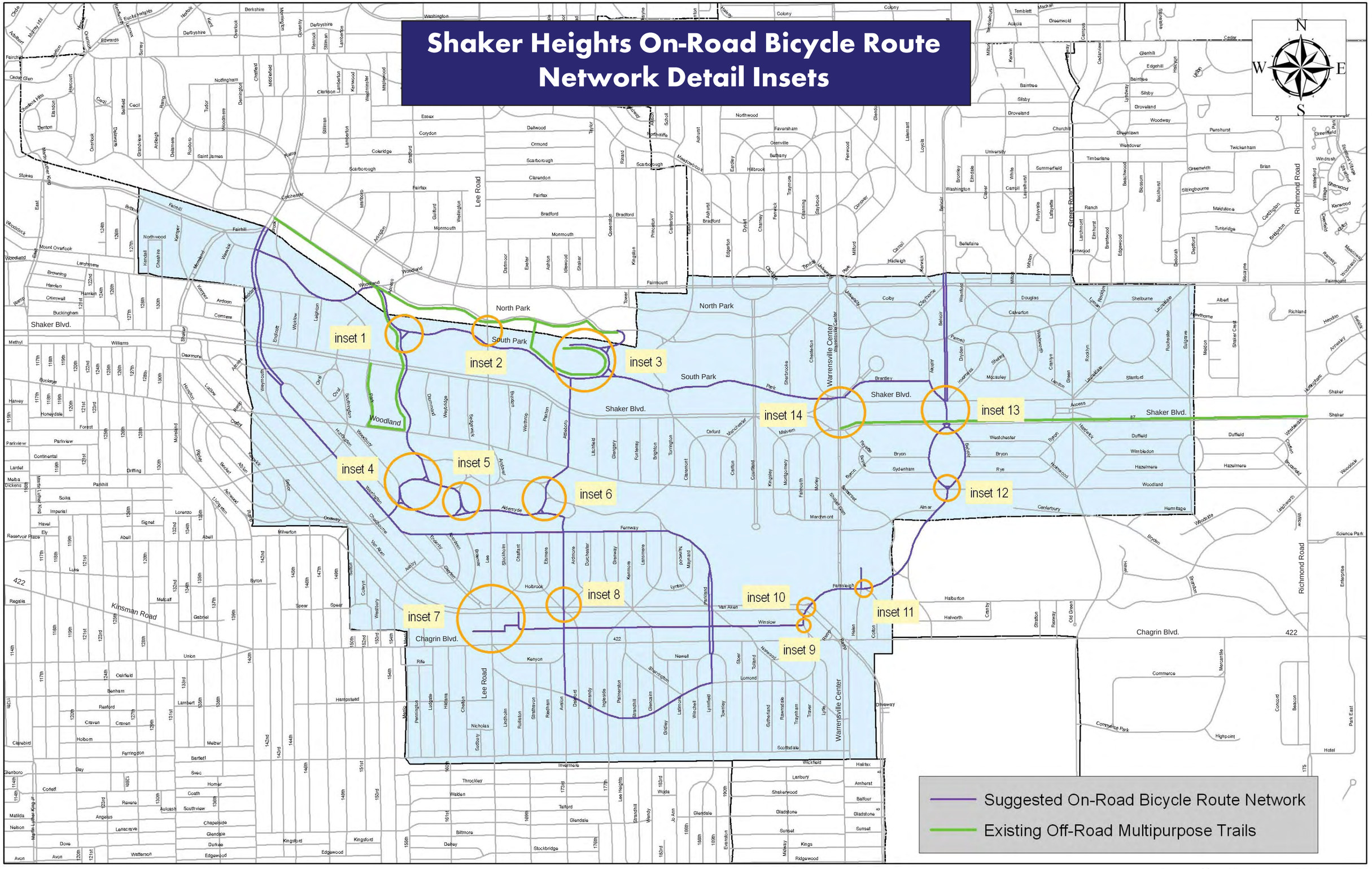
Suggested Treatment at Key Locations

Pavement markings and bicycle route signage at many key locations are shown on the following schematic diagrams to illustrate how to define and highlight these locations for better visibility. The signs identify the bicycle routes and help bicyclists recognize and follow the bicycle routes as they travel. The pavement-marking scheme increases safety by increasing awareness among cyclists and drivers sharing the road. The pavement marking and signage schemes help to point out the preferred locations for crossing and to guide cyclists to the direction of the flow of bicycle traffic. The signs and caution/warning devices highlight the existence of bicycle routes and urge motorists to be cognizant that bicycles and vehicles coexist and share the same roadway facilities.

The “Detail Insets” map shows key locations for which suggested detail treatment at each location is illustrated in a separate drawing inset. All other locations for which insets were not provided are deemed ordinary or typical and should be treated according to the template showing suggested typical pavement marking and signage. All traffic control devices shown on the maps or sketches are those that presently exist.

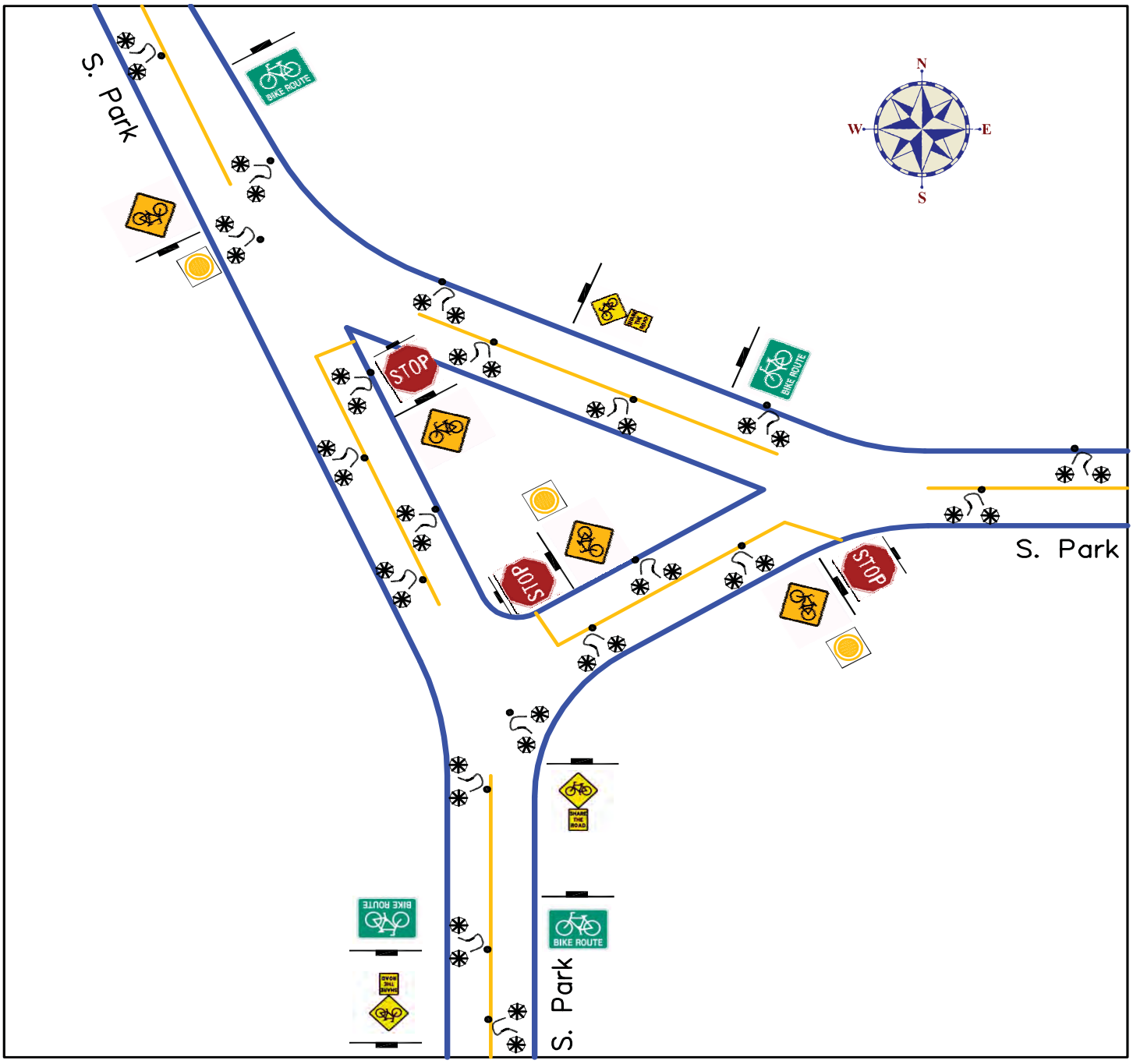
Shaker Heights On-Road Bicycle Route Network Detail Insets



Inset 1a

South Park Boulevard - South Park Boulevard

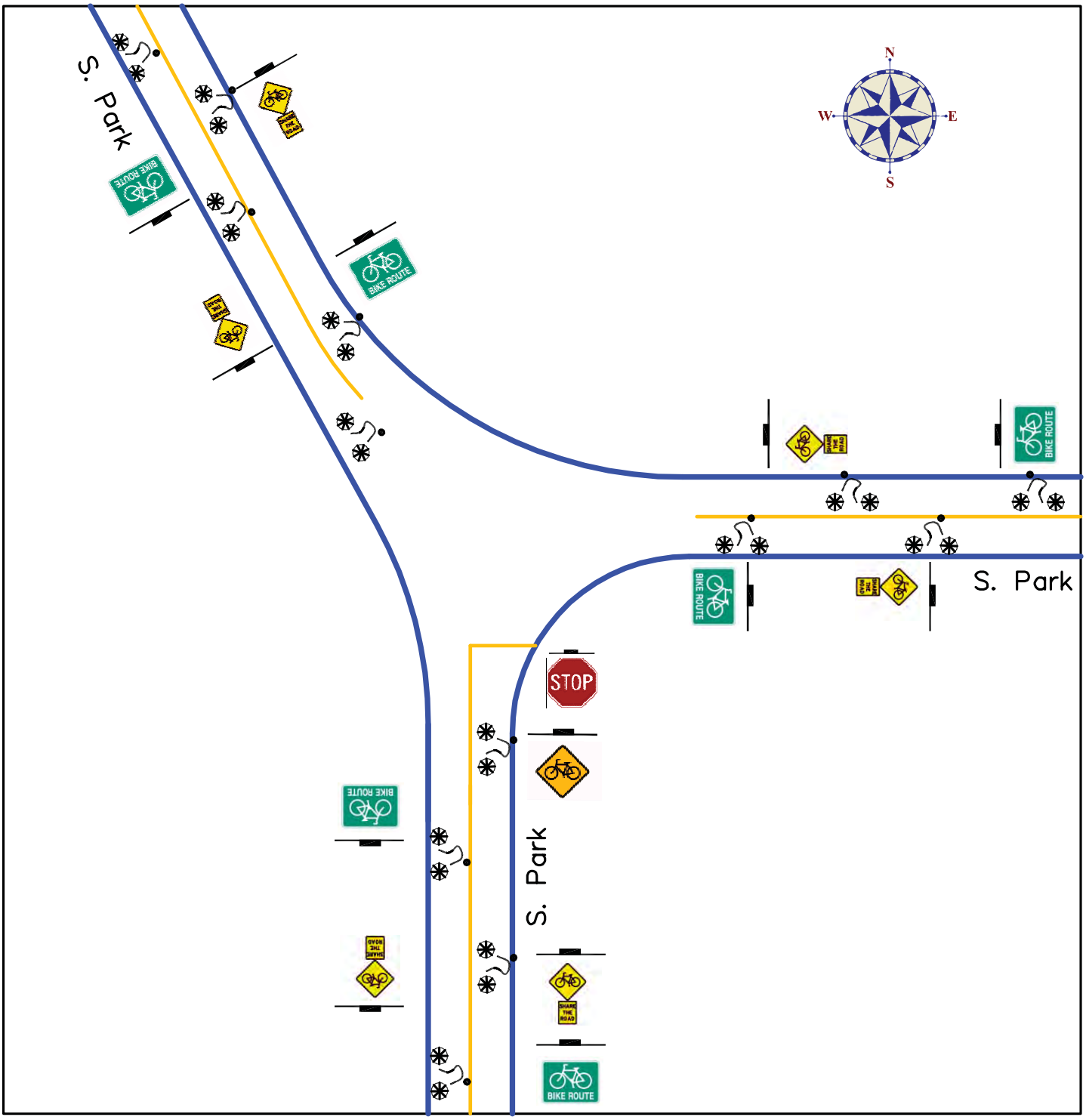
Alternative 1 (Existing Intersection Geometry)



Prepared by NOACA, June 2008

Inset 1b

South Park Boulevard - South Park Boulevard Alternative 2 (Modified Intersection Geometry)



Prepared by NOACA, June 2008

Inset 1c

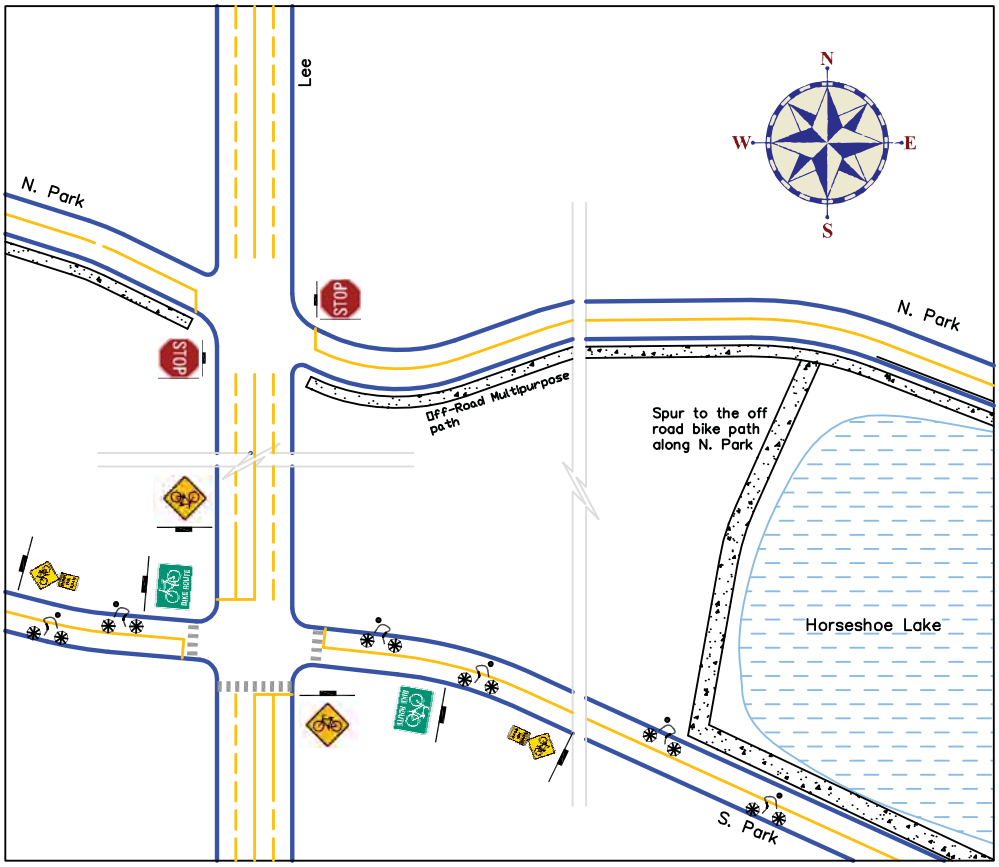
South Park Boulevard - South Park Boulevard

Illustration of Alternative 2 on Aerial Photo

Suggested Modified Intersection Layout: Convert the intersection into a simple T-intersection to change the existing traffic movement pattern in order to reduce the number of crossings and the vehicular traffice movement conflicts with bicycle traffic.

Inset 2

Lee Road - South Park Boulevard - North Park Boulevard - Horseshoe Lake Spur



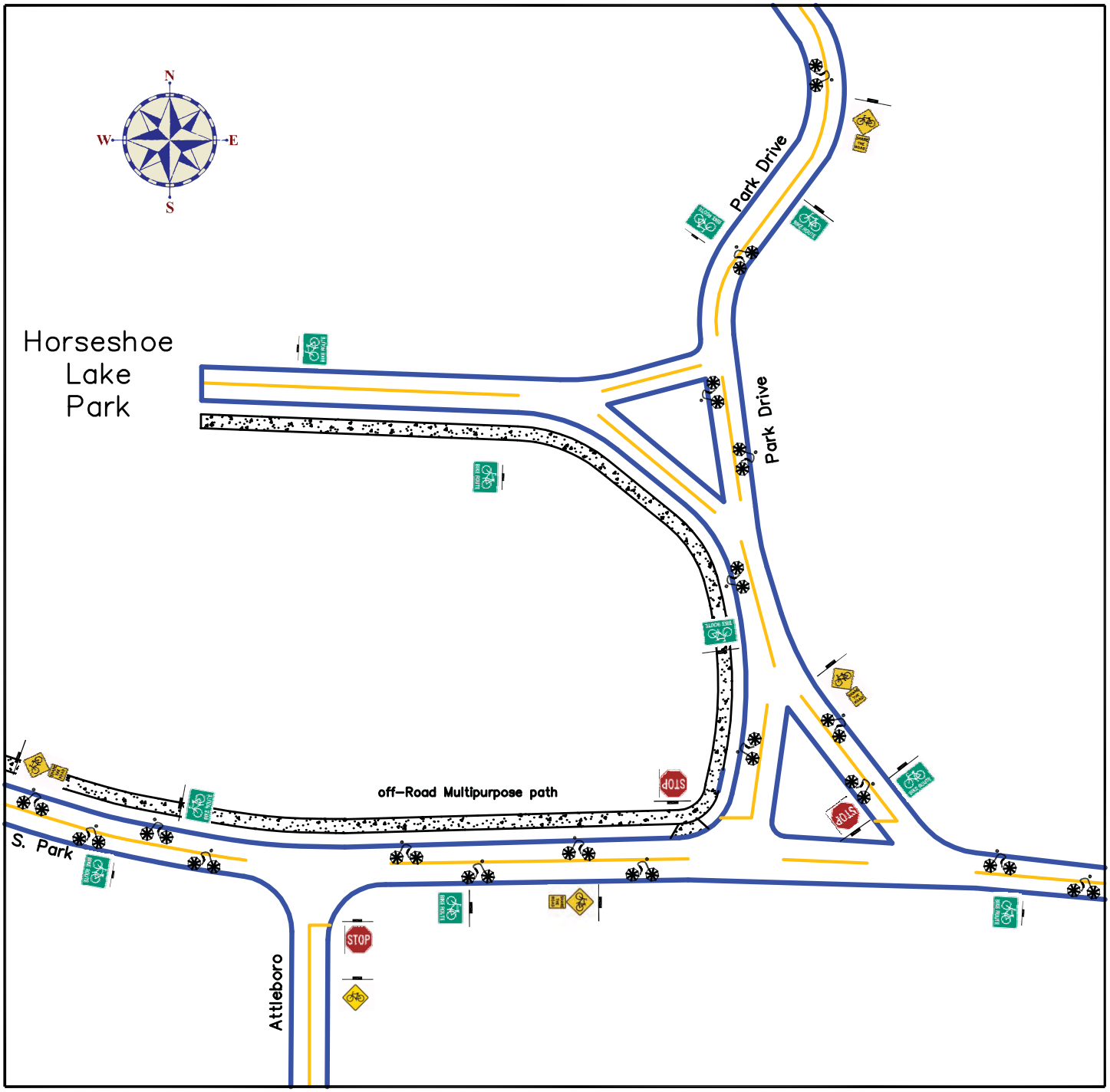
Prepared by NOACA, June 2008

The diagram above illustrates the off-road spur connecting the off-road multipurpose paths along both North Park Boulevard in Cleveland Heights and South Park Boulevard in Shaker Heights and their relative interconnection with the on-road bicycle route on South Park Boulevard.

Aerial photo of the area represented in the diagram above.

Inset 3

South Park Boulevard - Attleboro Road - Park Drive

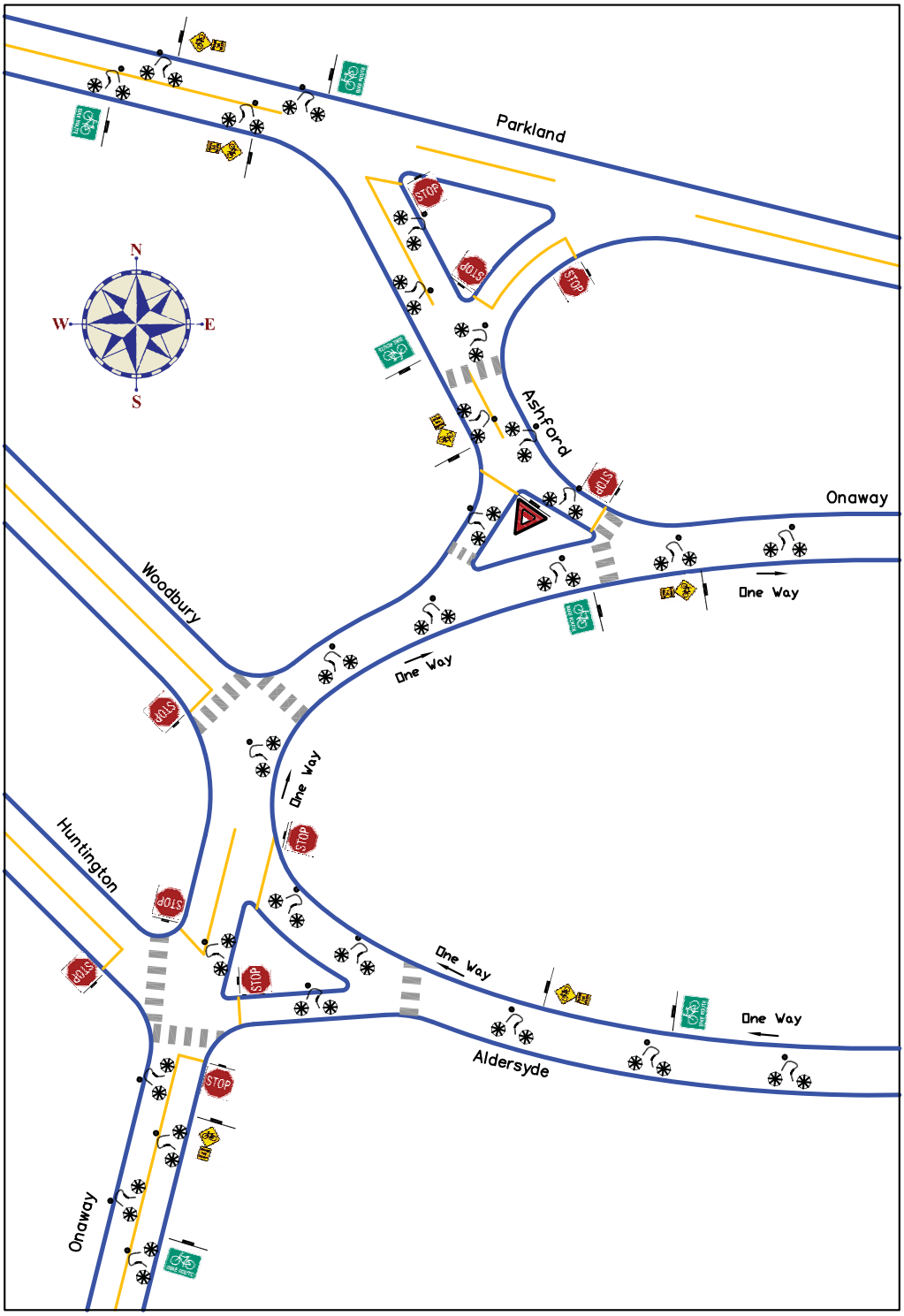


Prepared by NOACA, June 2008

This diagram illustrates the on-road bicycle route connection to Horseshoe Lake Park and the off-road multipurpose path.

Inset 4

Onaway Circle: The Western Section

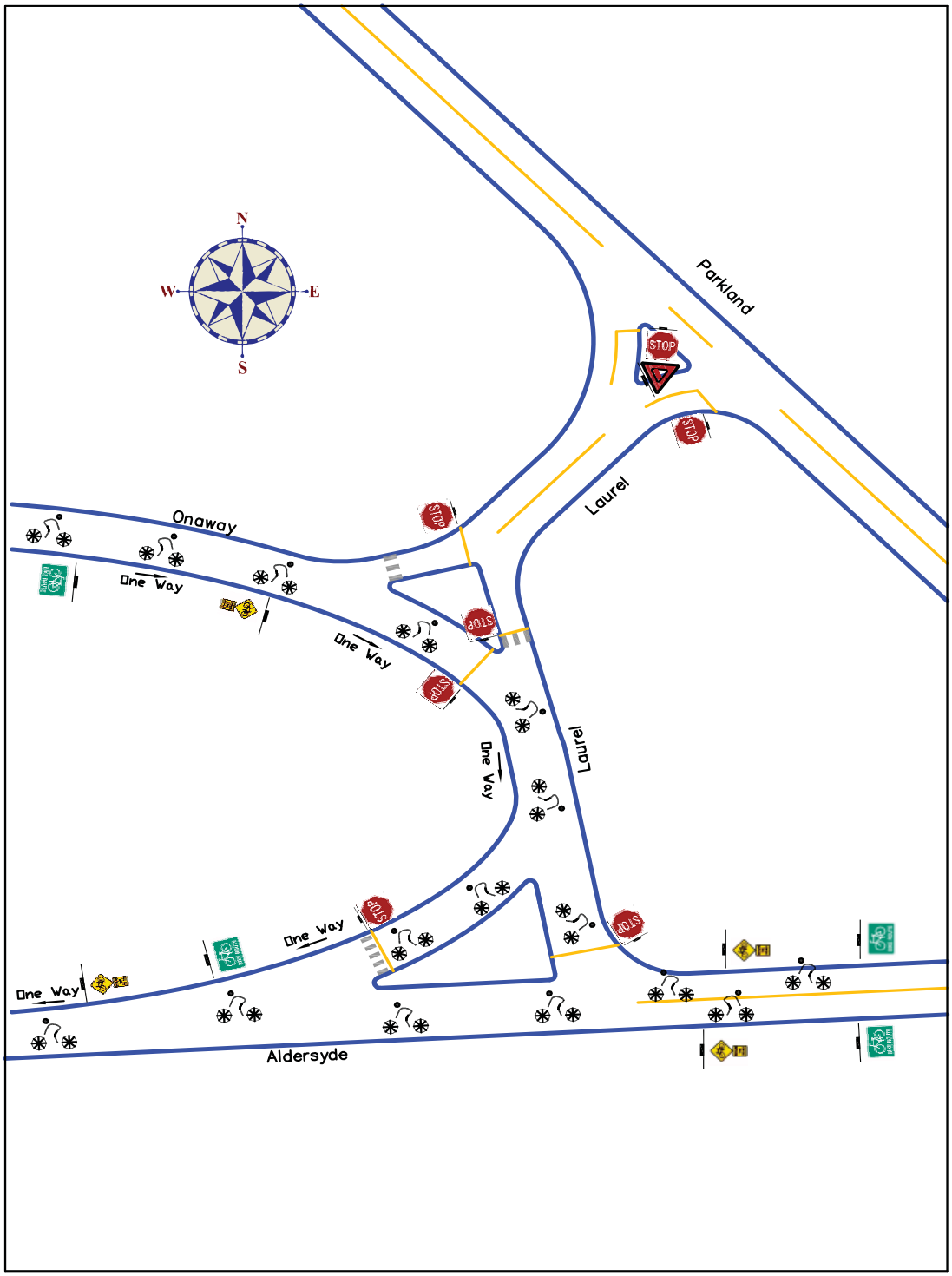


Prepared by NOACA, June 2008

Note: All traffic control devices shown in this diagram are as they currently exist. No new ones were suggested.

Inset 5

Onaway Circle: The Eastern Section

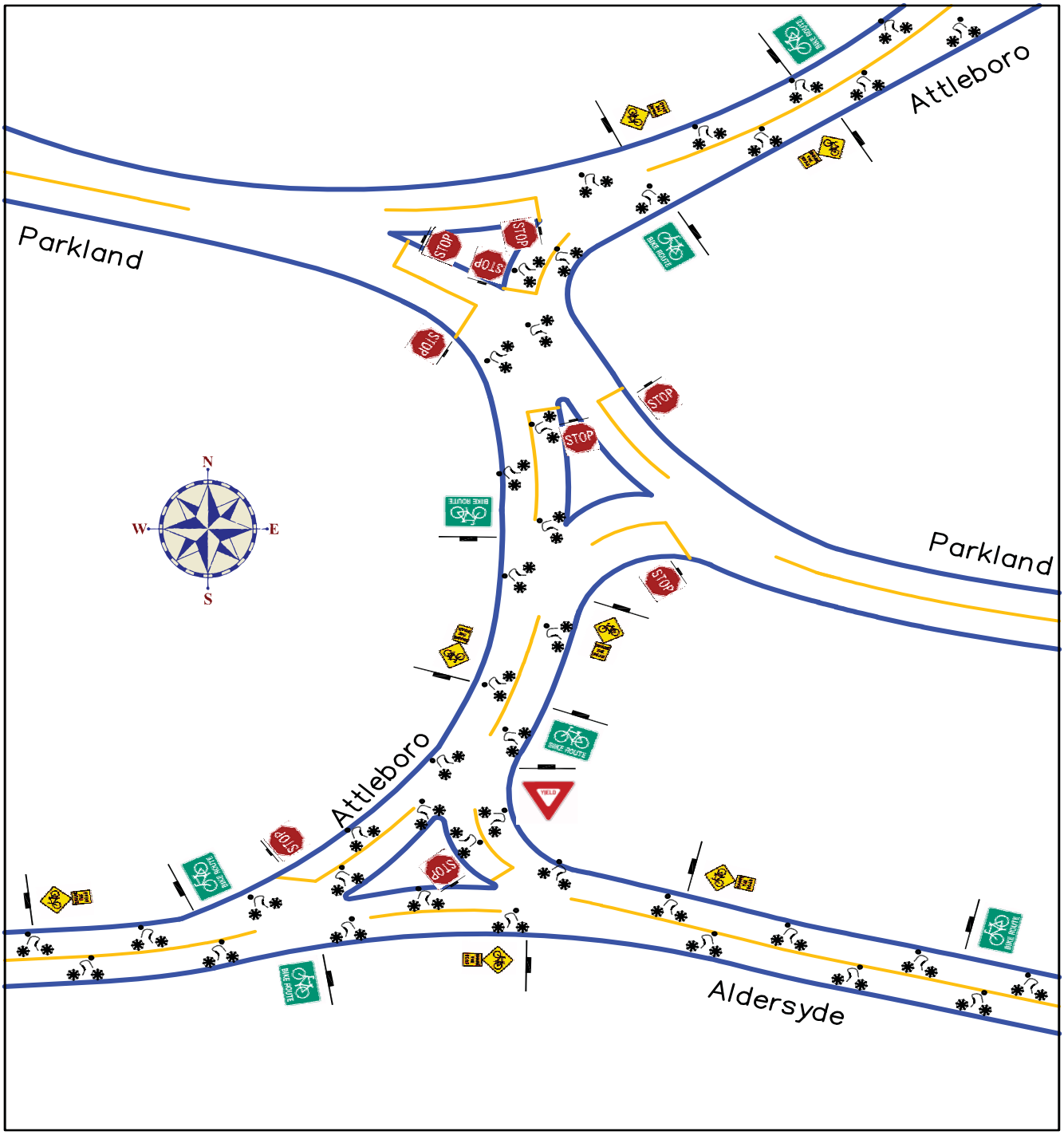


Prepared by NOACA, June 2008

Note: All traffic control devices shown in this diagram are as they currently exist. No new ones were suggested.

Inset 6

Attleboro Road - Aldersyde Drive - Parkland Drive

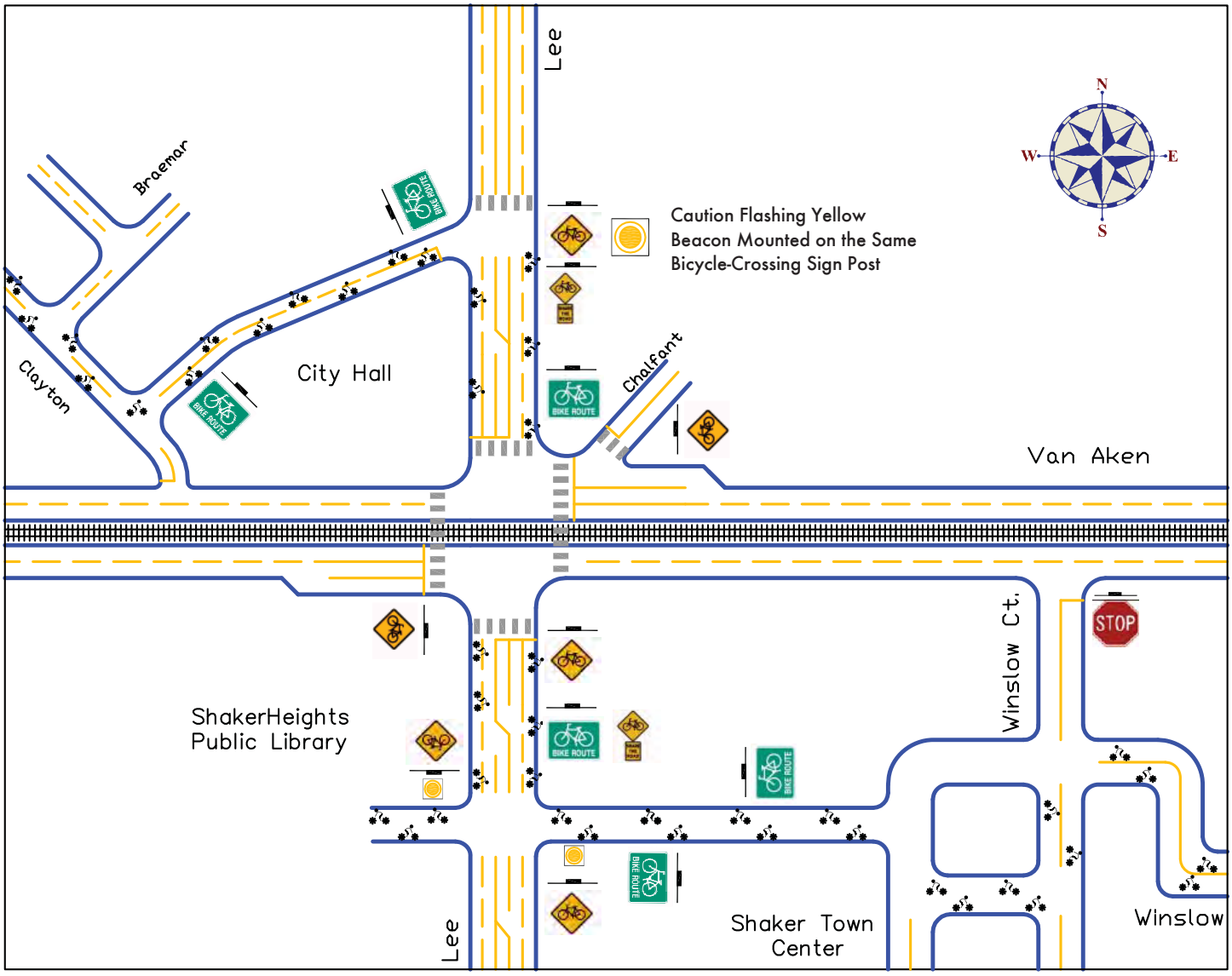


Prepared by NOACA, June 2008

Note: All traffic control devices shown in this diagram are as they currently exist. No new ones were suggested.

Inset 7

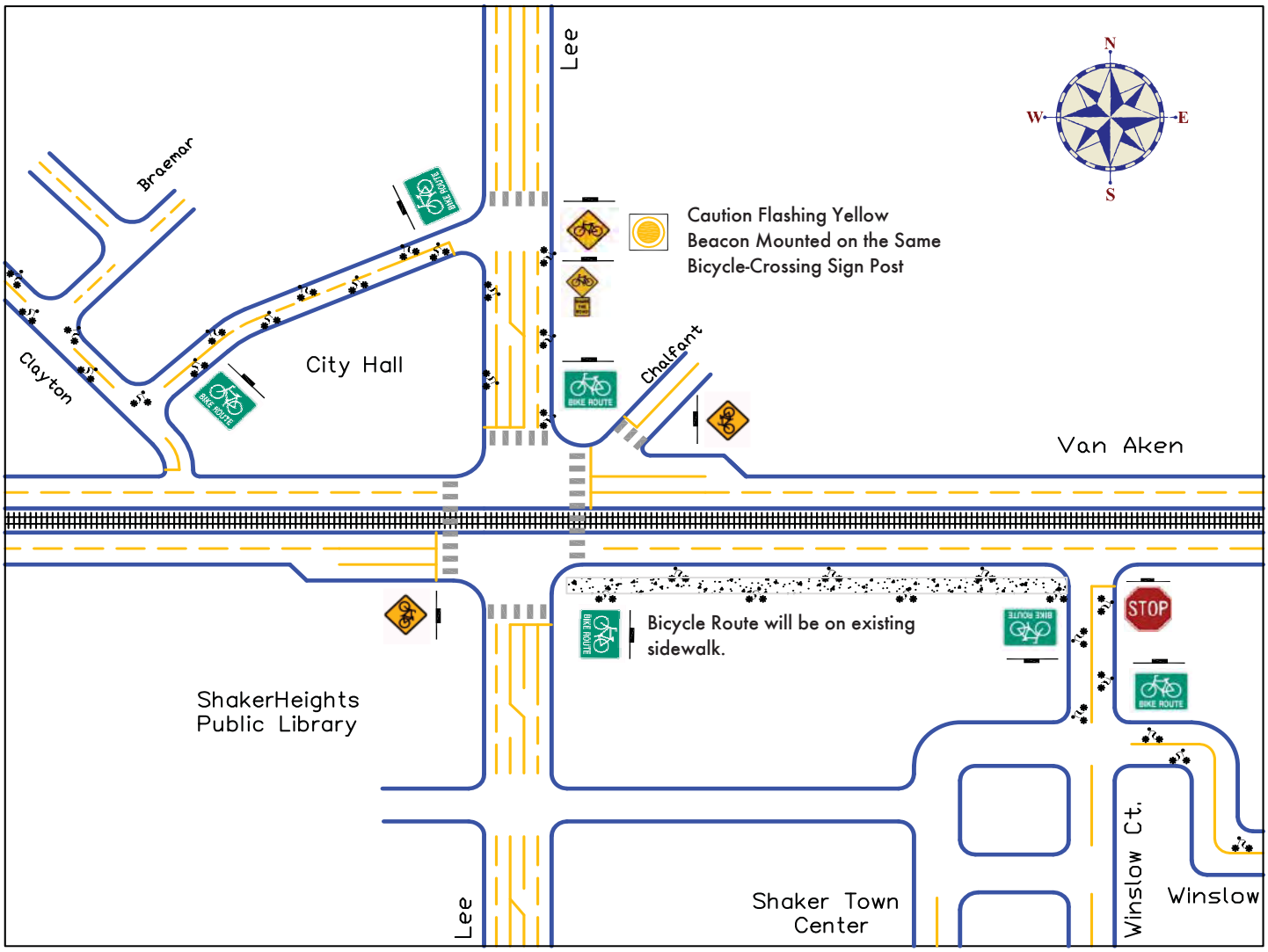
Van Aken Boulevard - Lee Road
Alternative 1



Prepared by NOACA, June 2008

Inset 7a

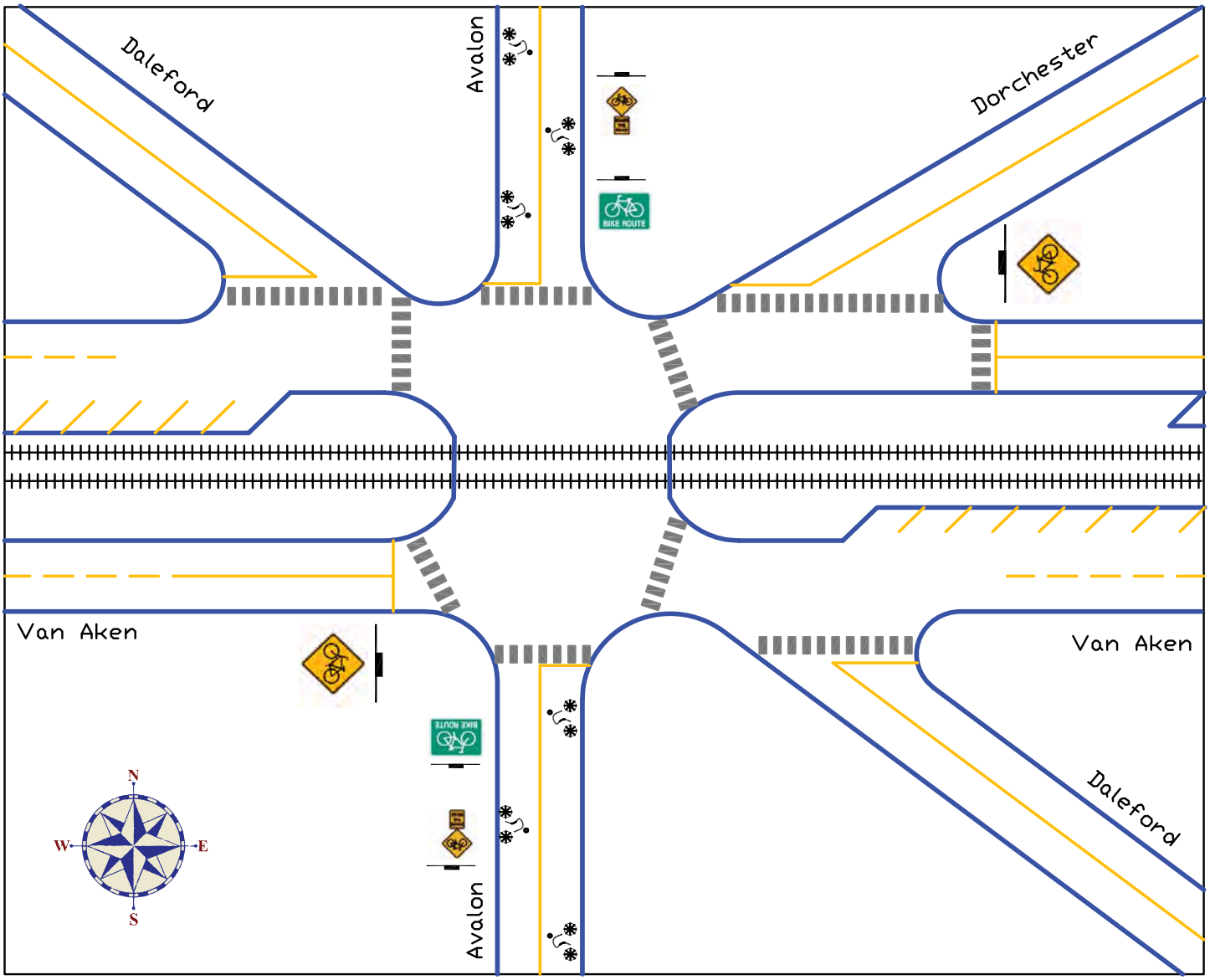
Van Aken Boulevard - Lee Road Alternative 2



Prepared by NOACA, June 2008

Inset 8

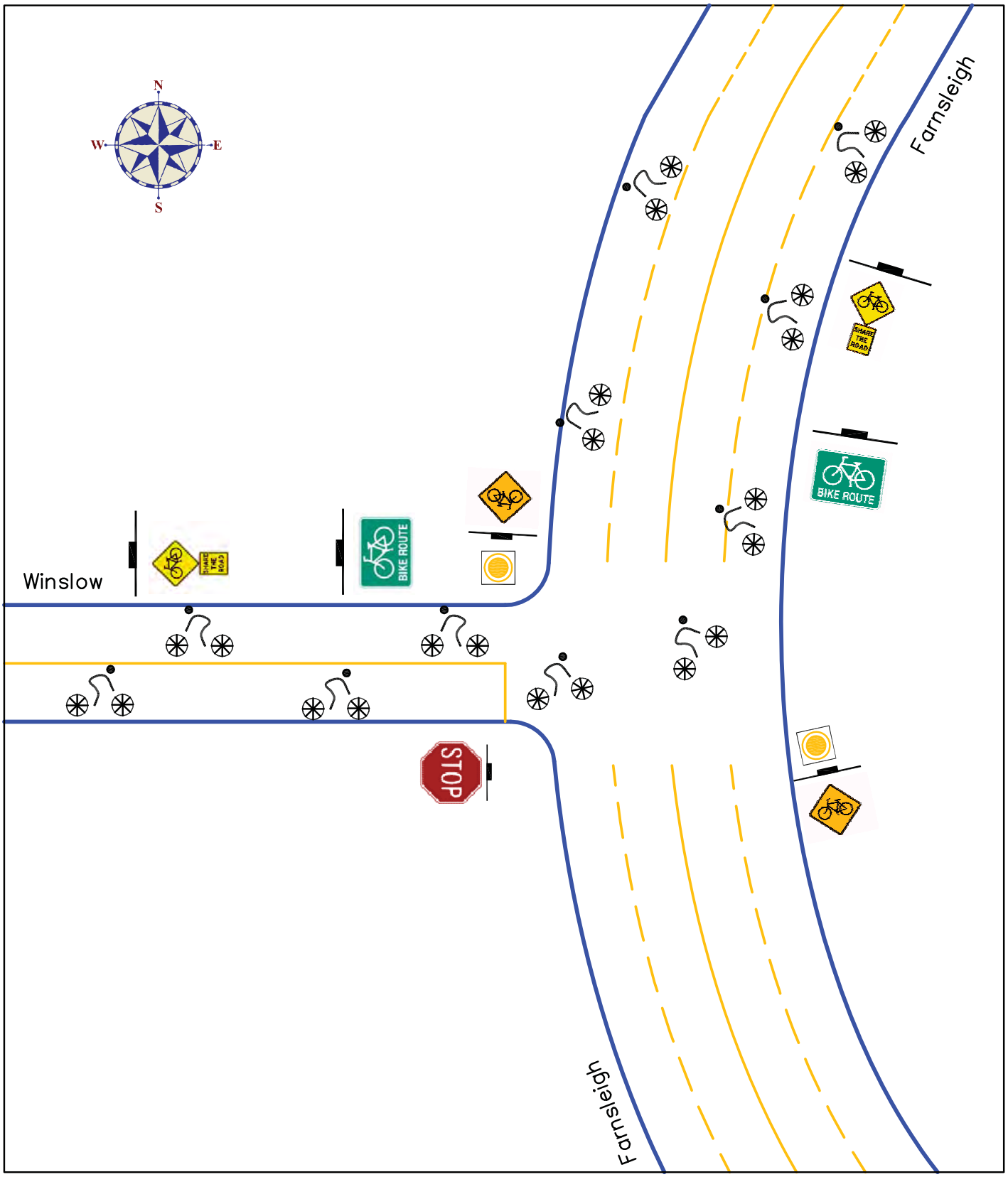
Van Aken Boulevard - Avalon Road



Prepared by NOACA, June 2008

Inset 9

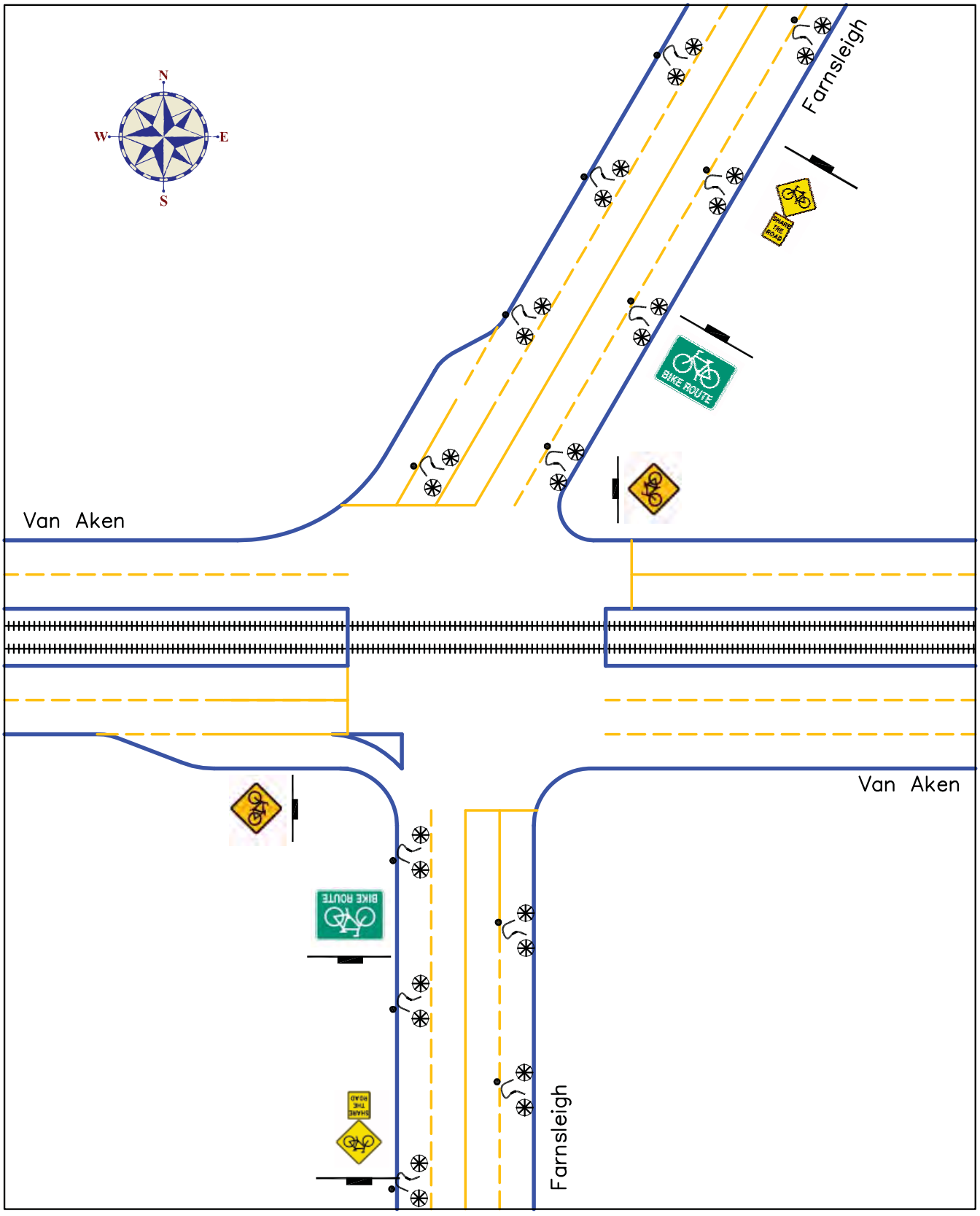
Farnsleigh Road - Winslow Road



Prepared by NOACA, June 2008

Inset 10

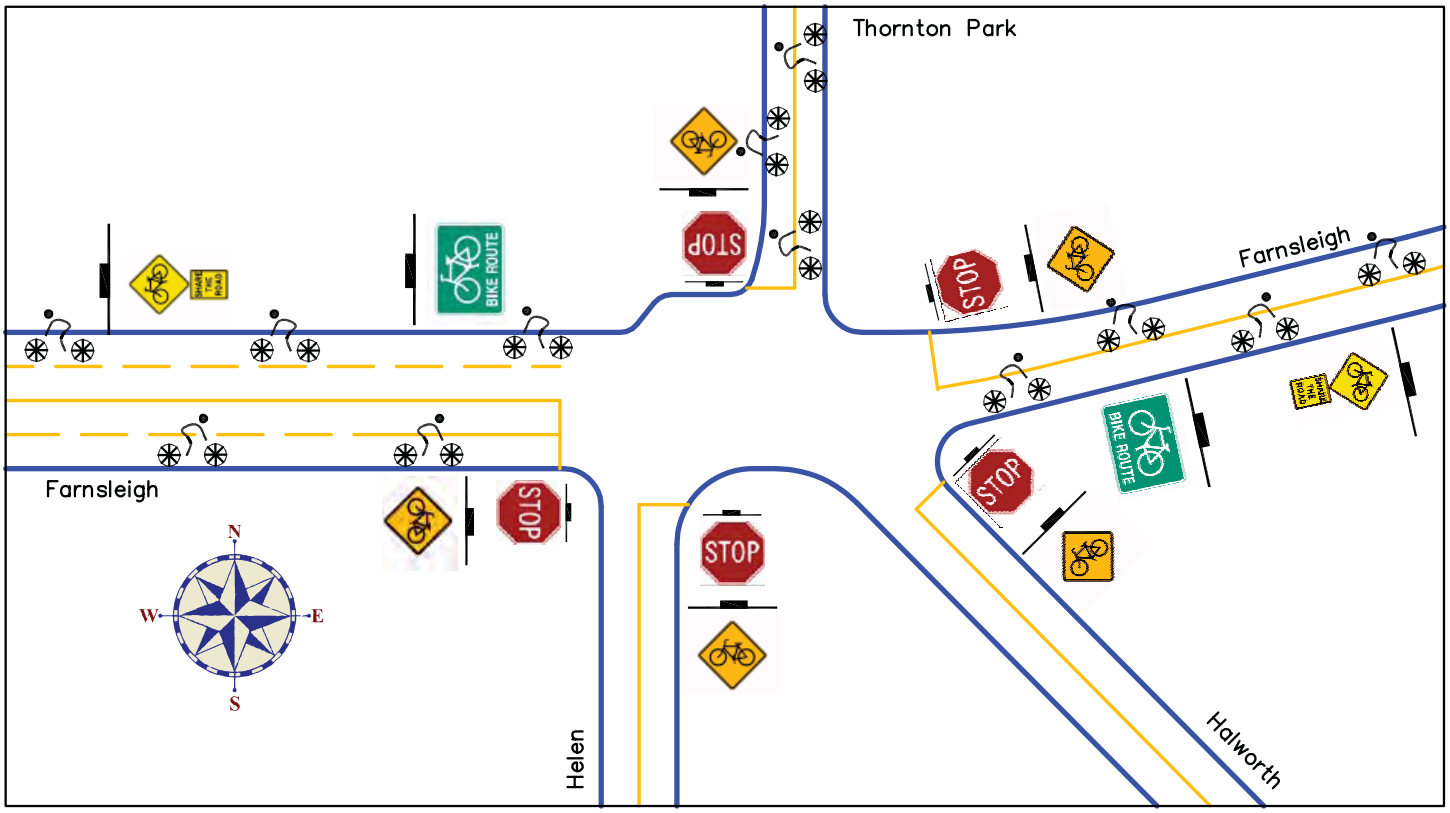
Van Aken Boulevard - Farnsleigh Road



Prepared by NOACA, June 2008

Inset 11

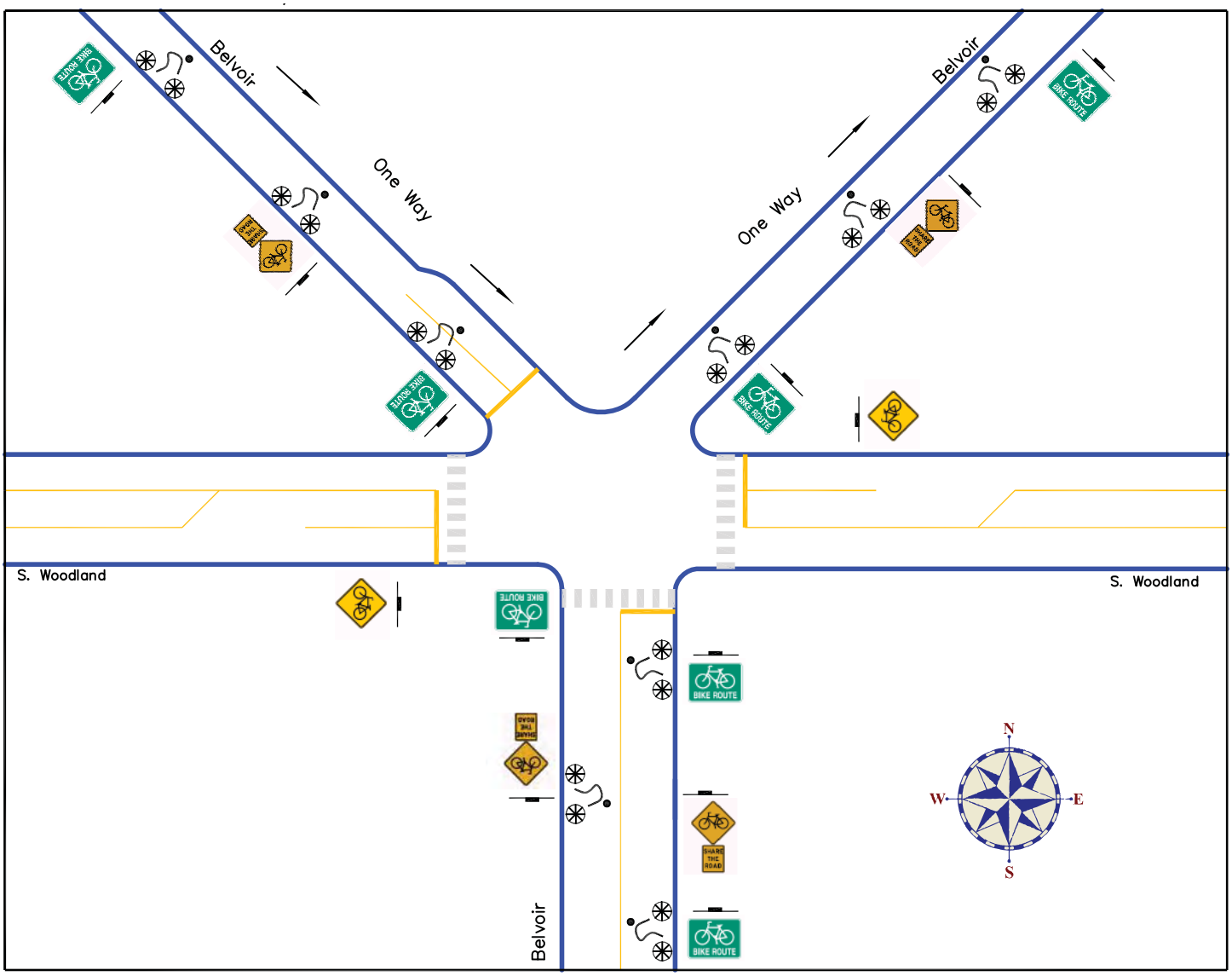
Farnsleigh Road - Helen Road - Halworth Road



Prepared by NOACA, June 2008

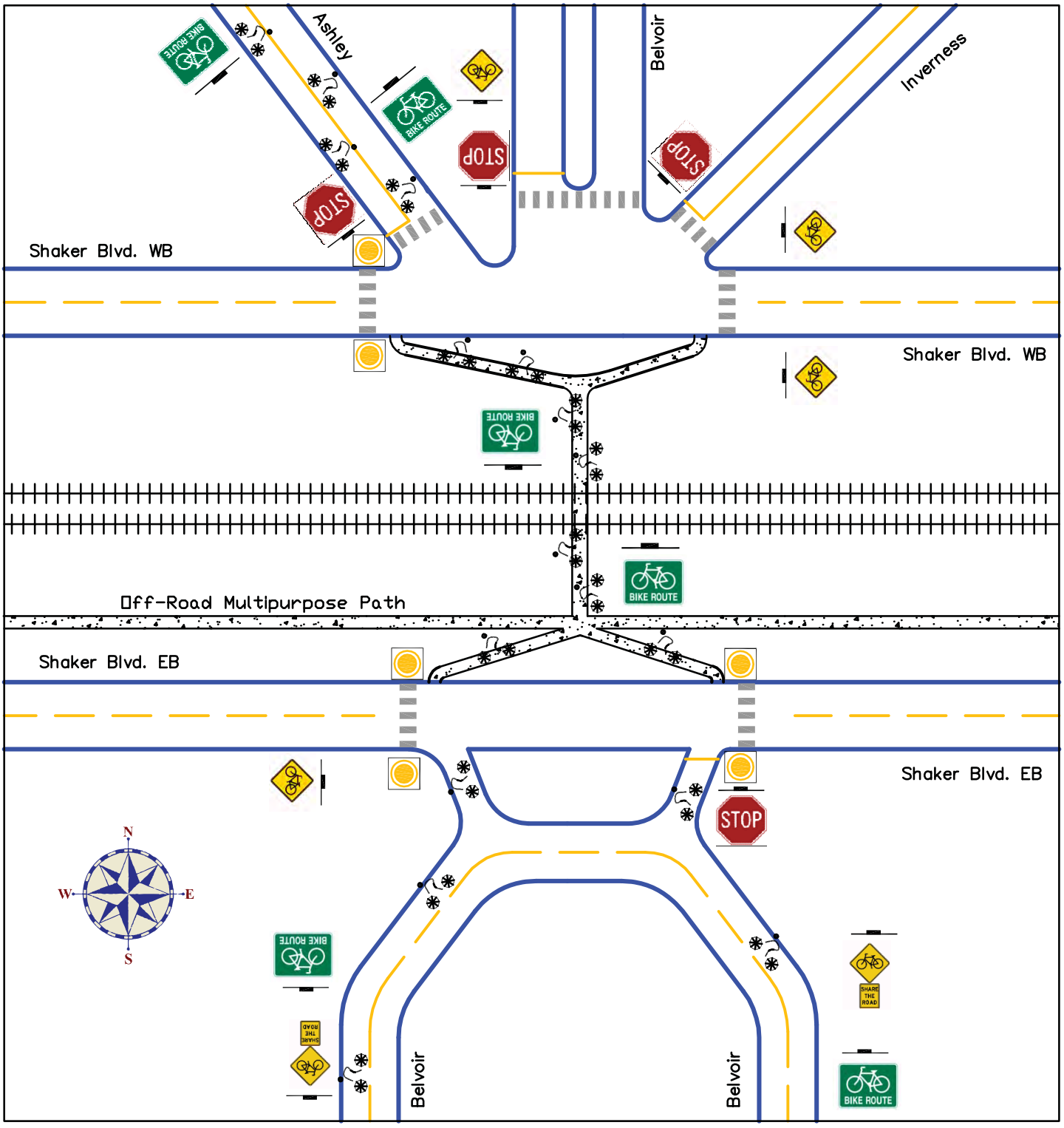
This diagram illustrates the suggested on-road bicycle route connection to Thornton Park.

Inset 12
South Woodland Road - Belvoir Oval



Prepared by NOACA, June 2008

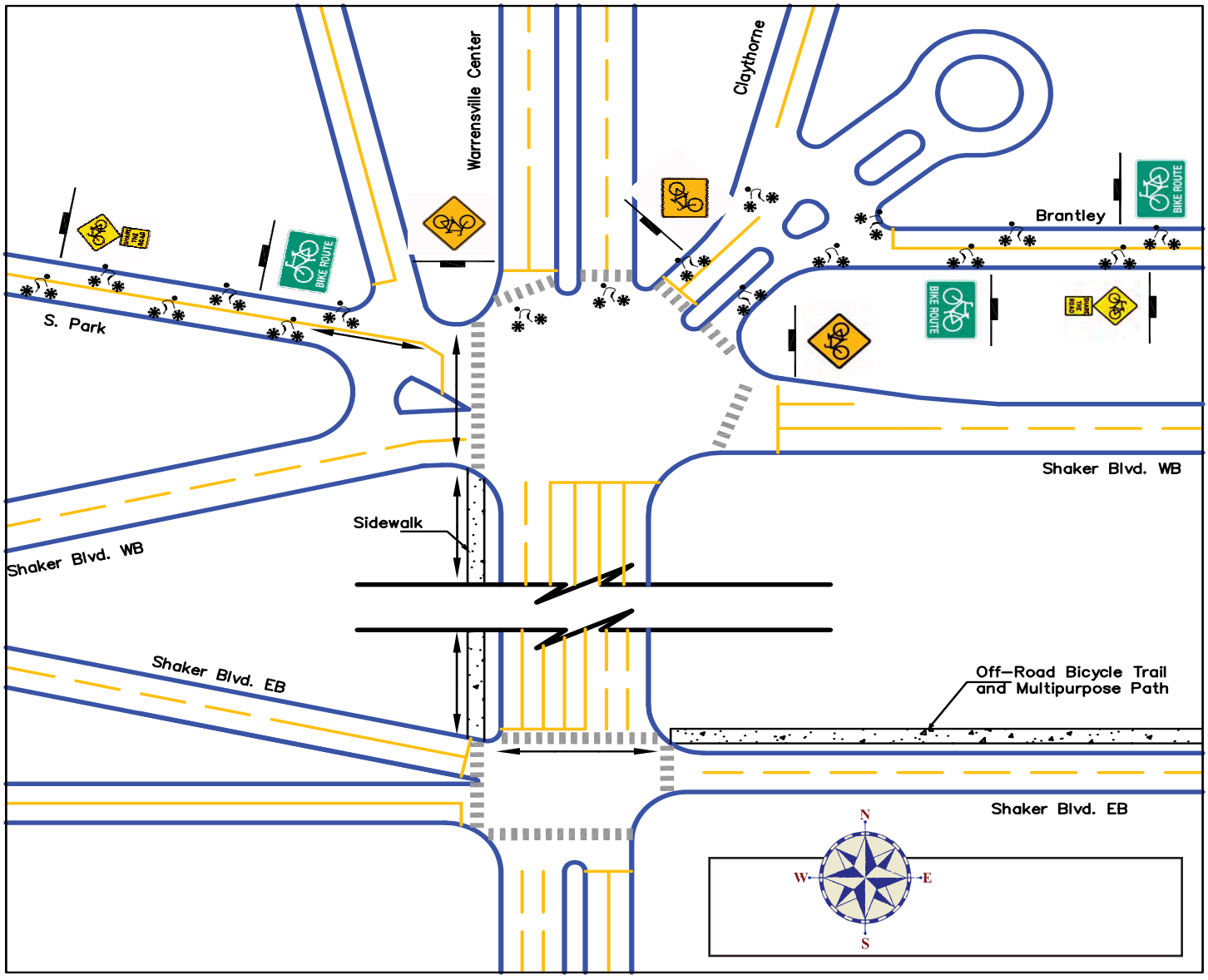
Inset 13
Shaker Boulevard - Belvoir Boulevard



Prepared by NOACA, June 2008

Inset 14

Shaker Boulevard - Warrensville Center Road - South Park Boulevard - Claythorne Road



Prepared by NOACA, June 2008

Note: Arrows illustrate the connection between the Shaker Boulevard Median Multipurpose Trail and the South Park suggested on-road bicycle route. Riders will cross Warrensville Center Road at the Shaker Boulevard eastbound side and ride on the sidewalk to South Park Boulevard.

Appendices

A. Material Concerning Shared Lane Marking and Identification

B. Information, Destinations, and Guide Signs

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Appendix A

Material Concerning Shared Lane Marking and Identification

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National Committee on
Uniform Traffic Control Devices

17200 West Bell Road No.1135 * Surprise, Ariz. 85374
Telephone (623) 214-2403 * e-mail: ncutcd@aol.com

TECHNICAL COMMITTEE RECOMMENDATION

TECHNICAL COMMITTEE: Bicycle Technical Committee

DATE OF ACTION: 07 January 2005 *(revised 23 June 2005, 18 January 2007)*

TOPIC: Proposed Shared Lane Marking
Part 9 of the MUTCD

ORIGIN OF REQUEST: NCUTCD Bicycle Technical Committee

DISCUSSION:

Traffic lanes are often too narrow to be shared side-by-side by bicyclists and passing motorists. Where parking is present, bicyclists wishing to stay out of the way of motorists often ride too close to parked cars and risk being struck by a suddenly opened car door (being "doored"). Where no parking is present, bicyclists wishing to stay out of the way of motorists often ride too close to the roadway edge, where they run the risks of being run off the road, being clipped by overtaking motorists who misjudge passing clearance, or of encountering drainage structures, poor pavement, debris, and other hazards.

Riding further to the left avoids these problems, and is legally permitted where needed for safety. However, this practice can run counter to motorist expectations. A pavement marking that indicates the legal and appropriate bicyclist line of travel, and cues motorists to pass with sufficient clearance, is needed. In recognition of this need, several symbols and variations are being used by numerous local agencies around the country.

To address this growing problem, the City of San Francisco selected two (2) candidate Shared Lane Markings based on a human factors study, and conducted an on-street test of those markings that was completed in February of 2004.

The results showed significant improvements to bicyclists' and motorists' positioning in the roadway, and identified the bike-with-chevron marking as most effective. These results have since provided guidance to the California Department of Transportation (Caltrans) to adopt the Shared Lane Marking in the California Supplement to the MUTCD.

The draft proposal that the Bicycle Technical Committee is transmitting to sponsors is based on the findings of the San Francisco study and the language and figure adopted in the MUTCD California Supplement.

Results from the San Francisco study indicate that the shared lane marking:

- Improves positioning of the bicyclist and motorist
  - Increases the distance between bicyclists and parked cars (by 8 inches in the SF study)
  - Increases the distance between overtaking motorists and bicyclists (by 2 feet in the SF study)
- Improves bicyclist behavior
  - Reduces wrong-way bicycling, a major cause of collisions (by 80% in the SF study)
- Reminds motorists of likely bicyclist presence
  - When surveyed, motorists claimed they did not notice the marking; however, the data indicates that their position on the roadway was adjusted to better accommodate bicyclists.

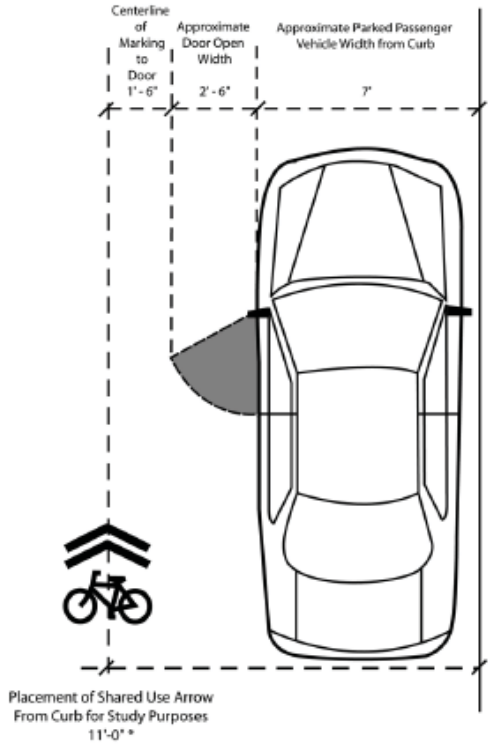


Diagram from San Francisco Shared Lane Marking study

These proposed changes were also reviewed by the NCUTCD Markings Technical Committee at their meeting in January 2005.

COMMITTEE ACTION:

The Bicycle Technical Committee recommends that the National Committee forward this proposal to Federal Highway Administration for consideration.

Approved 35-0-3 by NCUTCD Council 19 January 2007.

Section 9C.XX Shared Lane Marking

Support:

The Shared Lane Marking is intended to:

1. Help bicyclists position themselves in lanes too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane;
2. Encourage safe passing of bicyclists by motorists;
3. Reduce the chance of a bicyclist's impacting the open door of a parked vehicle in a shared lane with on-street parallel parking;
4. Alert road users of the lateral location bicyclists may occupy; and
5. Reduce the incidence of wrong-way bicycling.

Option:

The Shared Lane Marking shown in Figure 9C-X may be used to assist bicyclists with positioning in a shared lane with on-street parallel parking and to alert road users to the location a bicyclist may occupy within the traveled way.

Standard:

If used in a shared lane with on-street parallel parking, Shared Lane Markings shall be placed so that the centers of the markings are a minimum of 3.3 m (11 ft) from the curb face, or from the edge of pavement where there is no curb.

Shared Lane Markings shall not be used on shoulders or in designated bicycle lanes.

Guidance:

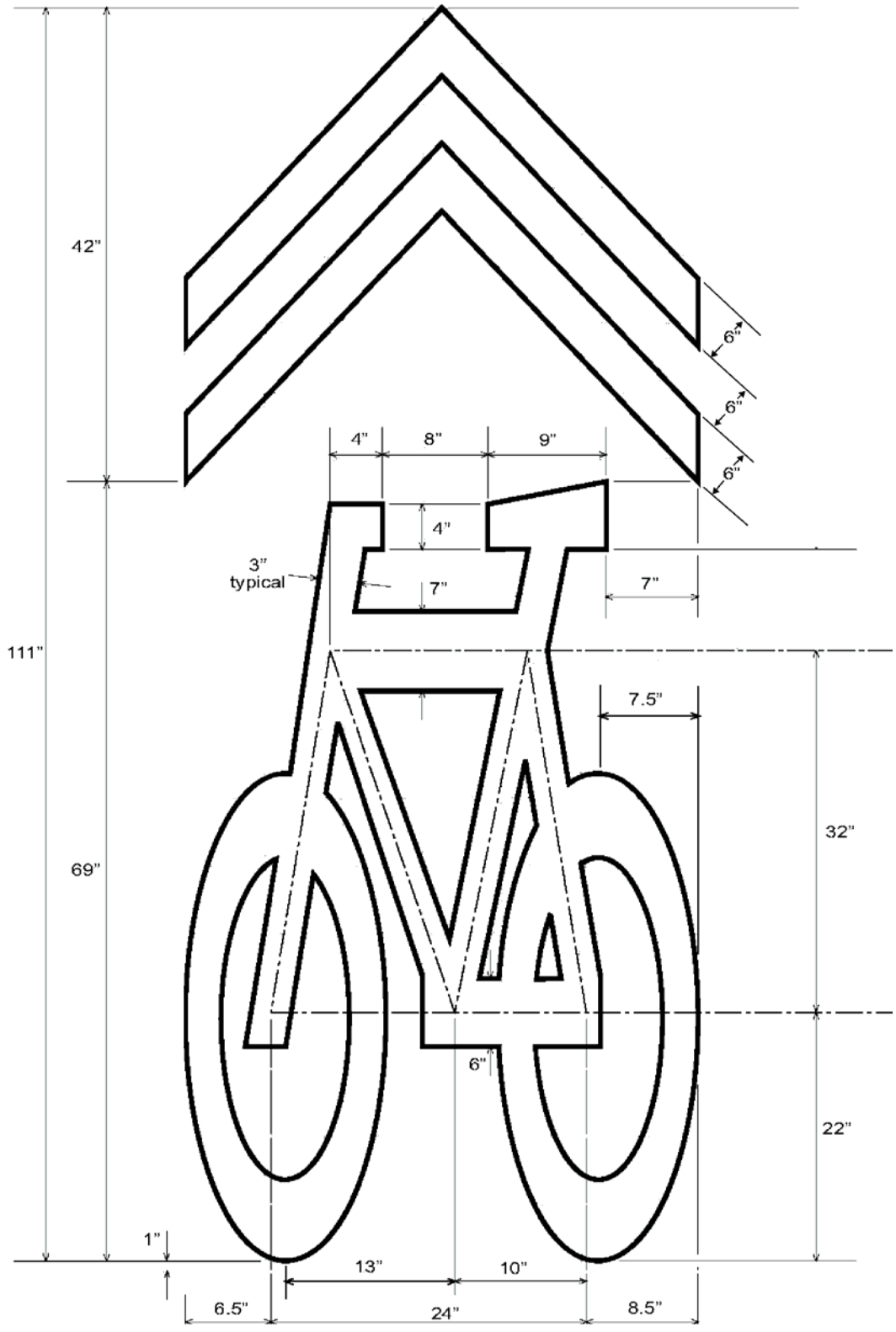
The Shared Lane Marking should not be placed on roadways with a speed limit above 55 km/h (35 mph).

When used, the Shared Lane Marking should be placed immediately after an intersection and spaced at intervals not greater than 75 m (250 ft) thereafter.

Option:

When the shared lane marking is used, the distance from the curb or from the edge of pavement or paved shoulder may be increased beyond 3.3 m (11 ft).

Figure 9C-XX. Shared Lane Marking



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Appendix B

Information, Destinations, and Guide Signs

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Information, Destinations, and Guide Signs

Ohio Manual of Uniform Traffic Control Devices (OMUTCD), 2005

Warning Signs

W16-1

W8-10

W7-5

Information, Destinations, and Guide Signs

Ohio Manual of Uniform Traffic Control Devices (OMUTCD), 2005

Guide Signs

D11-1

D1-1b

D1-1c

D1-H4

D1-H4a

M7-2

M7-3

M7-4

M7-5

M7-6

M7-7