CMAP

Village of Arlington Heights Bicycle and Pedestrian Plan

Appendices

March 2017

Table of Contents

APPENDIX A. 4
APPENDIX B 20
APPENDIX C 22
APPENDIX D 28
APPENDIX E 30
APPENDIX F 42
APPENDIX G 58
APPENDIX H 62
APPENDIX I 66
APPENDIX J 76
APPENDIX K 80
APPENDIX L 86
APPENDIX M 88

Appendix A
Visioning Charette Notes

Village of Arlington Heights Bicycle and Pedestrian Master Plan Visioning Charrette

To: Village Staff and member of the BPAC

From: CMAP Staff

Re: Summary of the Visioning Charrette

Date: March 17, 2015

The following is a summary of the results of the public visioning charrette that was held on Thursday, March 12 from 6:00 to 8:00 p.m. at the Public Works Department (222 North Ridge Avenue). Approximately 55 residents, business leaders, government representatives, and elected and appointed officials participated in the public visioning workshop. Attendees learned about the existing conditions in the Village through a brief presentation by CMAP staff which highlighted key issues and opportunities. Next, participants were divided into smaller working groups to work with maps of the Village and its surrounding area to discuss how they would improve walking and biking throughout Arlington Heights. The following is a summary of each of the group's ideas and recommendations.

INDIVIDUAL GROUP SUMMARIES

GROUP 1

The following is a summary of the key ideas and comments that were made by group 1 for each category in the instruction booklet.

Safety

- On some streets in town, drivers tend to speed. These streets could benefit from stop signs or traffic control.
- There is no consistency in cross-walk markings.
- There is a lack of protected (and designated) bike lanes or sidepaths.
- Biking improvements should be made:
  - From Golf to Kirchoff on New Wilke Road
  - From Arlington Heights Road and Rand Road and Palatine Road ("the triangle")
- Walking improvements should be made:
  - At Arlington Heights Road and Rand Road, where no walk signals exist
  - In the Pioneer Park neighborhood, where stop and yield signs are needed

Destinations

- Important destinations include:
  - Arlington Park,
  - Downtown/train station/library,
  - Lake Arlington,
  - Recreation Park,
  - Busse Woods,
  - Twin Lakes,
  - Midtown Shopping from the north,
  - Buffalo Grove High School, and
  - John Hersey High School.

Barriers

- Major barriers along important bicycling or walking routes include:
  - No cross-walks or curb cuts on northbound Wilke,
  - No pedestrian or bicycle accommodation at the interchange of I-90 and Arlington Heights Road, and
  - District 25 crossing guard locations need improved cross walk markings and ramps.

Missing Links/Gaps

- Southwest corner of Palatine Road and Arlington Heights Road sidewalk doesn't meet road.
- Dunton between Park and Central sidewalk stops in middle of block.
- Would like to see a future bike lane and side path on Davis Street.

Bicycle Parking

- Locations where new or additional bicycle parking is needed:
  - Downtown
  - Library
  - Arlington Town Center
- Locations where existing parking should be improved:
  - Library rack on Dunton
  - Increase capacity and remove bikes that haven't been moved in some time

Education, Encouragement and Enforcement programs

The following is a list of the programs or activities that were noted:

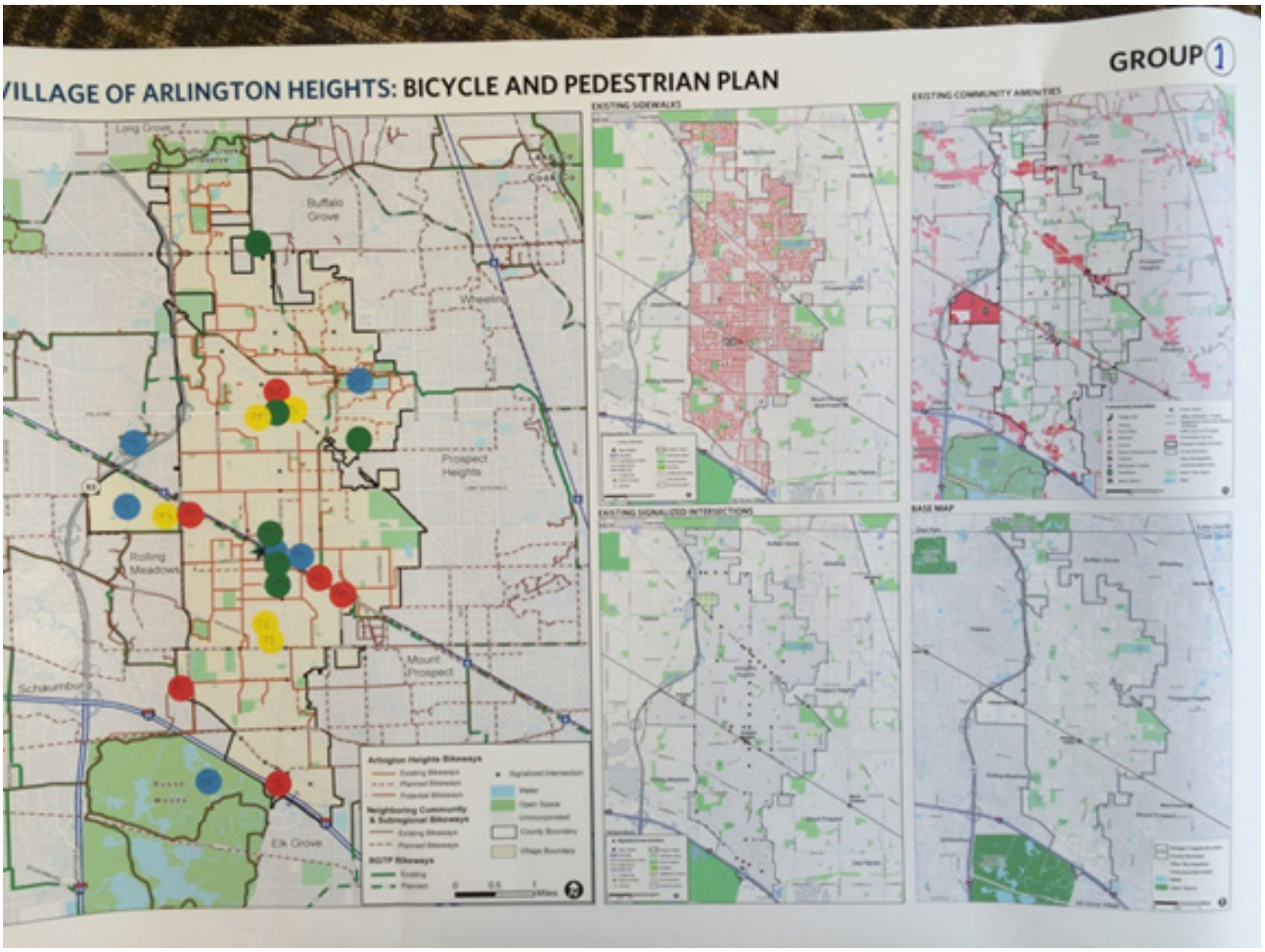
- Traffic skills 101 classes at the Park District
- www.bikewafetyquiz.com
- "Bikes, too" signs below existing stop signs
- Bike maintenance classes
- Pass out basics – lights, water bottles
- Bike Ambassadors

Review of the Draft Vision Statement

Each group was also asked to review the draft vision statement for the Village's Bicycle and Pedestrian Plan. The following is the draft statement with the group's changes marked:

The Village of Arlington Heights is a bicycle- and pedestrian-friendly community that strives in all its policies, plans, and programs and in the construction, reconstruction, maintenance, and operations of all its roadways and related infrastructure, to ensure that residents and visitors of all ages and abilities are able to travel safely and conveniently to all ~~community~~ (in the community and beyond) destinations by walking and bicycling.

GROUP 1's MAP



GROUP 2

The following is a summary of the key ideas and comments that were made by group 2 for each category in the instruction booklet.

Safety

- Pedestrian infrastructure needs improvement.
  - Some neighborhoods have sidewalks that stop and start (gaps).
  - Sidewalks without grass parkway buffers are less safe.
  - Sidewalk shoveling rules should be enforced.
- Bike infrastructure and education could be enhanced.
  - Better signage and markings are needed, such as green-painted lanes.
  - Encourage riders to wear helmets, ride with traffic.
- Specific pedestrian improvements suggested:
  - Walk buttons and pedestrian timers on all major crosswalks,
  - Increased "caution" signage of pedestrian crossings,
  - Improve pedestrian crossings around Metra station, and
  - Wider sidewalks on Wilke.
- General street improvements:
  - Fix potholes on White Oak Rd., Campbell Ave.

Destinations

- Important destinations include:
  - Busse Woods,
  - Frontier,
  - Lake Arlington,
  - Arlington Park,
  - Deer Grove, and
  - Buffalo Creek.

Barriers

- Major barriers along important bicycling or walking routes include:
  - White Oak to Algonquin: snowplows block cul-de-sacs with snow; and
  - Northwest Highway at Arlington Heights Road: not plowed.

Missing Links/Gaps

- Neighborhoods that need sidewalks: Arlington Farms, Hana, Thomas & Maud, Scarsdale, Stonegate, Sherwood
- No sidewalk on Wilke north of White Oak
- No way to get to and from the Des Plaines River Trail
- Poor connections to Busse Woods

Bicycle Parking

- Locations where new or additional bicycle parking is needed:
  - Train station and downtown
  - North side of downtown
  - Pools
  - Town & Country Mall
  - Mitsua Plaza Shopping Center
  - North Point
  - Harmony Park
  - High Schools
  - Arlington Park
- Locations where existing parking should be improved:
  - Library
  - Train stations (both Arlington Heights and Arlington Park)
  - Create a plan for businesses to obtain bike racks

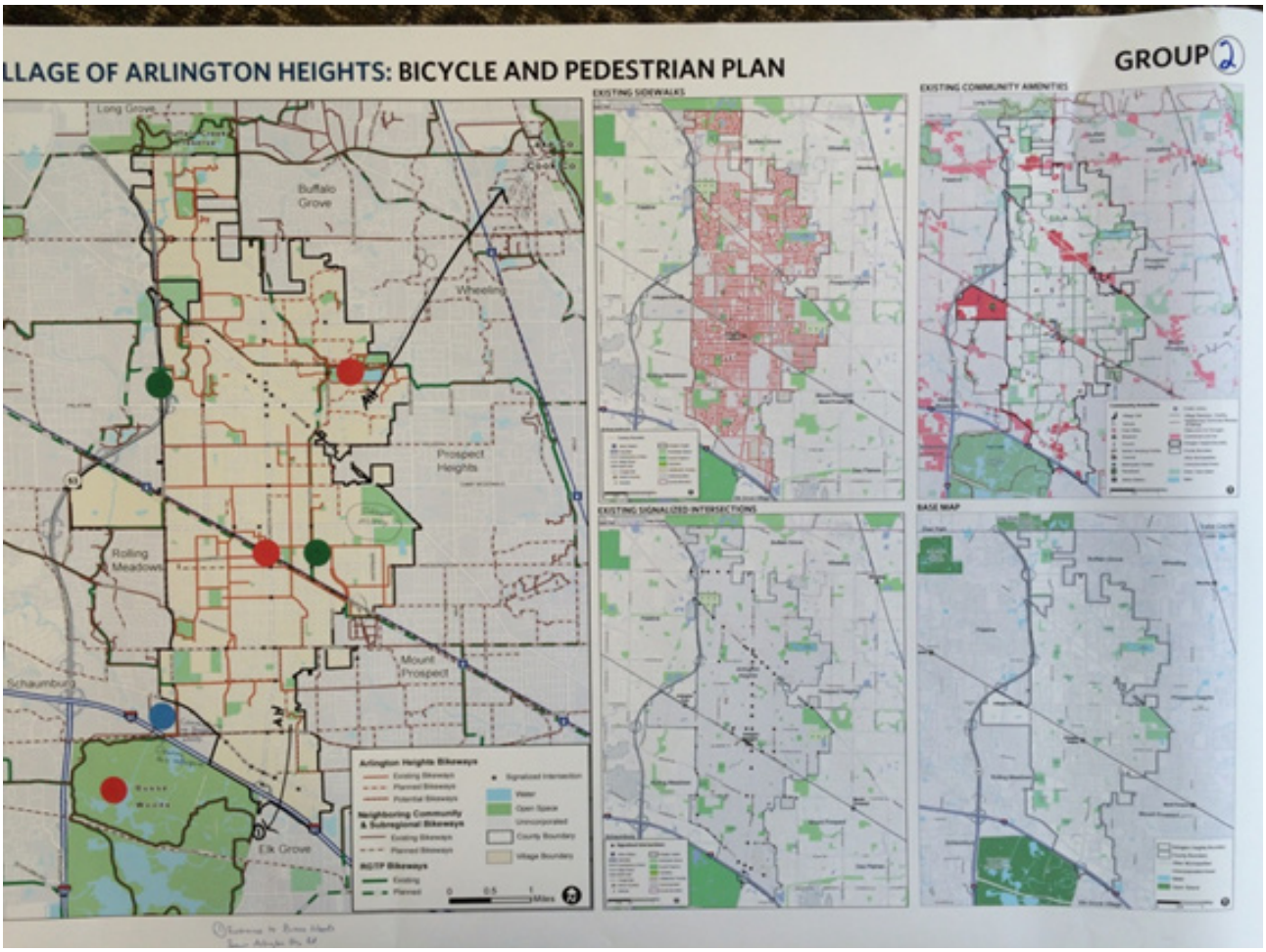
Education, Encouragement and Enforcement programs

The following is a list of the programs or activities that were noted:

- Add more right-of-way signs

- Encourage helmet use (Middle schools)
- Need more Safety Town classes at park district
- Include biking education in high school driver's ed
- Encourage bike lights, helmet and reflector use
- Have a bike safety booth at Frontier Days
  - o Free reflectors, vendor with cool helmets
- Keep walkers and runners on the sidewalk
- Monthly bike safety reminders
- Bike safety program at library
- Safety tips on Facebook, Twitter, and public access TV

GROUP 2's MAP



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Comment: "Really long. Make bullet points?"

GROUP 3

The following is a summary of the key ideas and comments that were made by group 3 for each category in the instruction booklet.

Safety

- Unsafe locations:
  - Rand & Thomas – light is quick, no pedestrian button
  - Windsor & Beverly – no pedestrian button
  - Thomas & Belmont – no stop sign
  - Arlington Heights Rd. & Dryden – no stop sign
  - Bike path on Euclid: ends with no sidewalk/shoulder to continue biking on
  - Windsor & Palatine Rd.: unsafe crossing
  - Kensington & NW Hwy: unsafe crossing
  - Kensington/Rand & 83: unsafe crossing
- Existing rules that need enforcement:
  - Three-feet-to-pass for drivers passing bicyclists
  - Shoveling
  - Speed limits (for pedestrian safety)
  - Enforce rules against parking on sidewalks/in driveways
- Suggested biking improvements:
  - Better bike route signage—need signs leading to destinations
  - Signs should show distance, direction, and destinations
  - Need better signage to Palatine Trail from Frontage Rd.
- Suggested pedestrian improvements:
  - More intersections with pedestrian countdowns

Destinations

- Important destinations include:
  - Deer Grove Preserve – needs better signage
  - North Point Shopping Center
  - Downtown, Metra
  - Trader Joe's
  - Lake Arlington
  - Recreation Park
  - Randhurst
- Difficult-to-reach destinations:
  - Busse Woods (#1 issue)
  - Not enough east-west bicycle routes (a lane on Euclid would be useful)

Barriers

- Major barriers along important bicycling or walking routes include:
  - Rand Road – huge barrier
  - Gobert & Golf – dangerous intersection – needs pedestrian buttons
- Suggested improvements:
  - Pedestrian bridge at Palatine & Windsor, Windsor & Rand
  - Bridges/underpasses/signs to Lake Arlington from south side of town

Missing Links/Gaps

- Rand Road – no sidewalks north of Euclid; not continuous
- Palatine Road west of Kennicott – no sidewalk
- Windsor from Forest View to Lake Arlington
- Bikeway along Northwest Highway would be great

Bicycle Parking

- Bicycle parking, regardless of location, needs to be lit
- Locations where new or additional bicycle parking is needed:
  - Every street parking space next to handicap spaces could hold 10 bikes per space if adequately marked

- o Shopping areas – Trader Joe's, Valley Produce
- Locations where existing parking should be improved:
  - o Fast food restaurants
  - o Downtown – no year-round bike parking exists
  - o Parking garages – should add covered bike racks

Education, Encouragement and Enforcement programs

The following is a list of the programs or activities that were noted:

- Public access TV programming about existing laws, safety
- School programs on SRTS, bike safety
- Education about cars in driveways blocking sidewalks
- Positive tickets: have police give "tickets" for good biking behavior

Review of the Draft Vision Statement

Each group was also asked to review the draft vision statement for the Village's Bicycle and Pedestrian Plan. The following is the draft statement with the group's changes marked:

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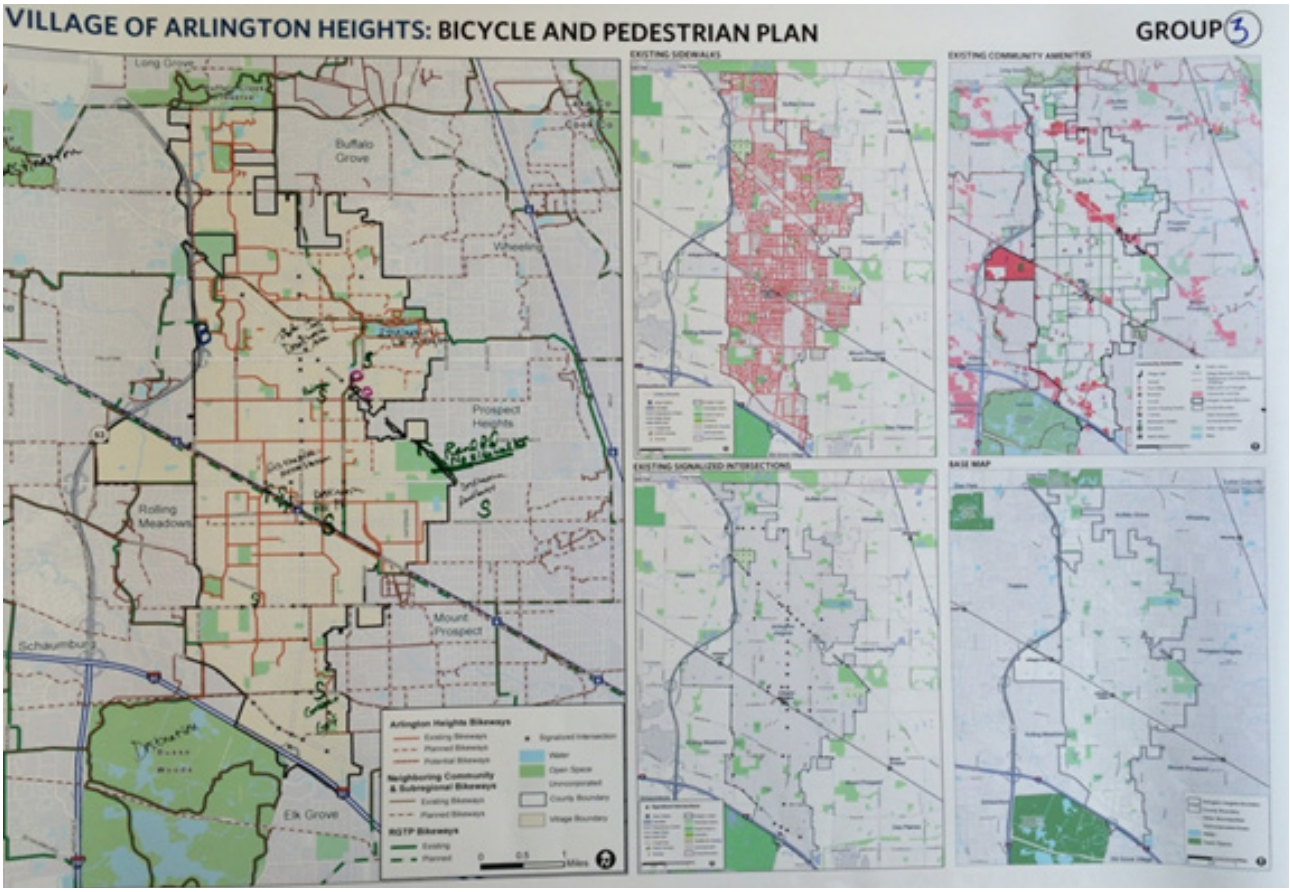
Comment: "Pedestrians should come first, cars come last. Good vision, needs to become a reality."

GROUP 3'S MAP



GROUP 4

The following is a summary of the key ideas and comments that were made by group 4 for each category in the instruction booklet.

Safety

- Concerns:
  - Lack of walk buttons at stoplights
  - No marked biked lanes or continuous paths
  - Riding in traffic/drivers sharing the road
  - "Orange lines" (bike routes) only known to bikers, not drivers – need painted lane markings, at minimum
- Specific locations where biking improvements are needed:
  - Ridge at Northwest Highway
  - Arlington Heights Road at Interstate 90
  - Schaffer at Lake Cook
  - Thomas & Rand (Hersey High School)
- Locations where pedestrian improvements are needed:
  - Thomas & Rand
  - Palatine Road and Arlington Heights Road

Destinations

- Important destinations include:
  - Both Metra stations
  - Library
  - Des Plaines River Trail
  - Buffalo Creek Preserve
  - Busse Woods
  - Lake Arlington
- All these destinations have significant barriers to bicycle/pedestrian access

Barriers

- Major barriers along important bicycling or walking routes include:
  - Traffic (Northwest Highway and all major roads)
  - Missing or broken sidewalks
  - Lack of continuous sidewalks
  - Snow-covered sidewalks
- Suggested improvements:
  - Over/underpass at Northwest Highway and Metra station

Missing Links/Gaps

- Wilke south to Busse Woods
- Northwest Highway from Wilke to IL-53
- Arlington Heights Road

Bicycle Parking

- Locations where new or additional bicycle parking is needed:
  - Both Metra stations
  - Library
  - Downtown Arlington Heights
  - Portable bike racks for events (Frontier Days)
  - Parks
- Locations where existing parking should be improved:
  - All of the above
  - Not enough racks
  - Existing racks are not secure

Education, Encouragement and Enforcement programs

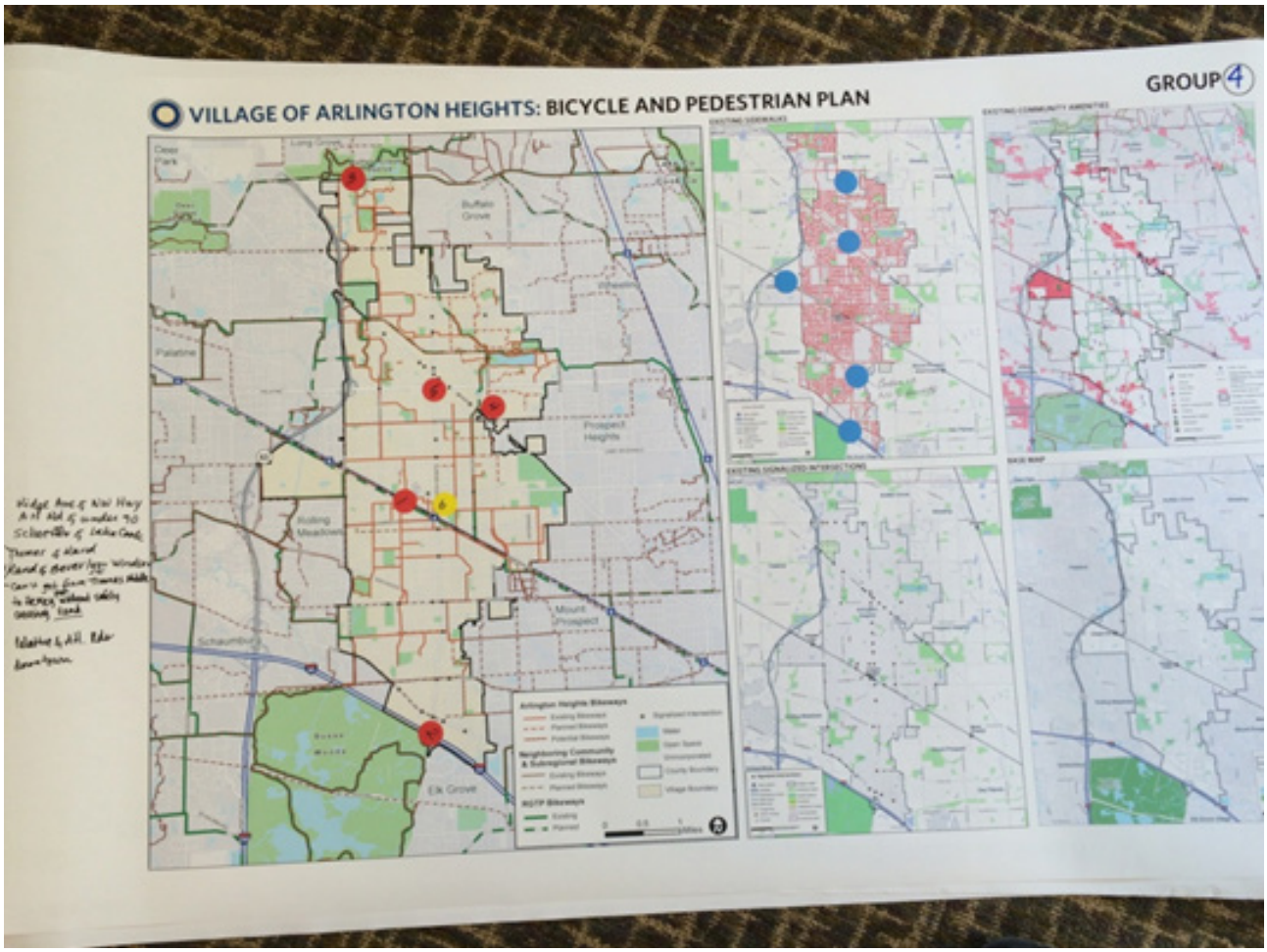
The following is a list of the programs or activities that were noted:

- "Share the Road" signs
- Driver education on bicycling
- "Foot Power" program – encourage to bike/walk instead of driving
- Biking benefits

Review of the Draft Vision Statement

Each group was also asked to review the draft vision statement for the Village's Bicycle and Pedestrian Plan. This group had no comments or changes.

GROUP 4's MAP



GROUP 5

The following is a summary of the key ideas and comments that were made by group 5 for each category in the instruction booklet.

Safety

- Separate use zones (lanes)
- Enforcement of existing pedestrian/bicycle lanes
- Specific locations:
  - No connection to Busse Woods
  - Arlington Heights Road
  - Prospect, Harper College—for walking commuters
  - Need connections to destinations, including Lake Arlington

Destinations

- Important destinations include:
  - Schools & Harper College
  - Lake Arlington & park district facilities
  - Busse Woods
  - Train station
- Destinations with barriers:
  - Palatine to Deer Grove
  - Getting to Palatine is difficult in general
  - Des Plaines River Trail

Barriers

- Major barriers along important bicycling or walking routes include:
  - Train tracks
  - Interstate 90
  - Palatine Road
  - Cars parked on sidewalks
  - Uneven pavement
  - Lack of crosswalk buttons
- Suggested improvements:
  - Improve crosswalk signals
  - Improve sidewalks
  - "Stop for Pedestrians" signs
  - Speed bumps/traffic calming
  - Enforcement—plowing & clean sidewalks
  - Pavement markers & directions

Missing Links/Gaps

- Scarsdale, Stonegate, and almost all neighborhoods
- Euclid to Rolling Meadows
- Kirchoff Road
- Connections to Busse Woods and Lake Arlington

Bicycle Parking

- Locations where new or additional bicycle parking is needed:
  - Downtown (no place to lock up)
  - Create map of bike parking locations!
- Locations where existing parking should be improved:
  - Improve lighting and security (cameras?)
  - Add more parking

Education, Encouragement and Enforcement programs

The following is a list of the programs or activities that were noted:

- Training/safety programs for high school student
- Public awareness workshops
- Enforcement of runners in the street
- Critical Mass
- Provide online bike maps, including interactive maps that allow users to report potholes/maintenance problems

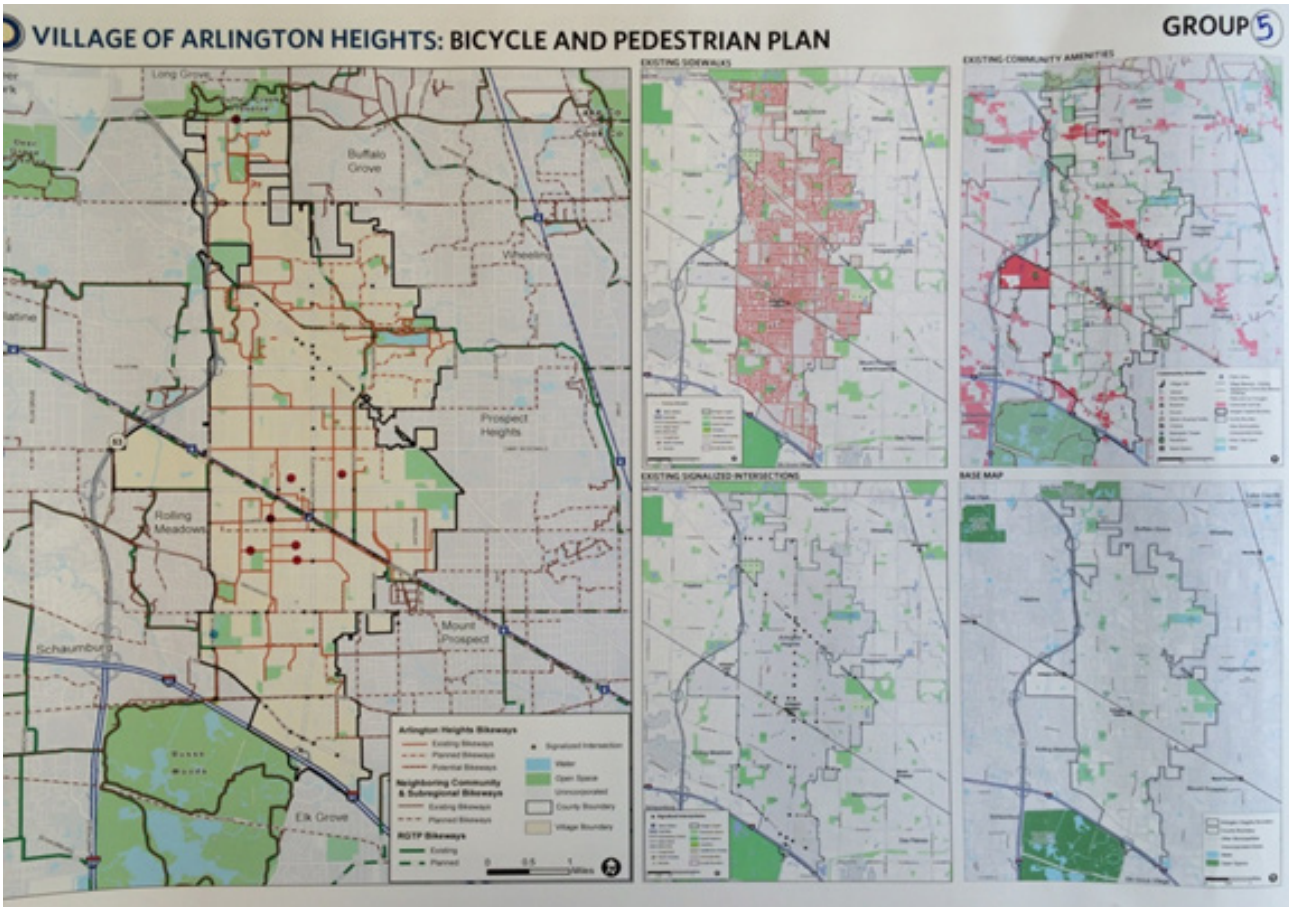
Review of the Draft Vision Statement

Each group was also asked to review the draft vision statement for the Village's Bicycle and Pedestrian Plan. The following is the draft statement with the group's changes marked:

The Village of Arlington Heights is a bicycle- and pedestrian-friendly community that strives in all its policies, plans, and programs and in the construction, reconstruction, maintenance, and operations of all its roadways and related infrastructure, to ensure that residents and visitors of all ages and abilities are able to travel safely and conveniently to ~~all community~~ destinations (in and outside the community) by walking and bicycling.

Comment: Please note linkages to other communities.

GROUP 5's MAP



GROUP 6

The following is a summary of the key ideas and comments that were made by group 6 for each category in the instruction booklet.

Safety

- Motorist interaction on major roads – drivers must give three feet when passing cyclists
- Crossways at railroad tracks
- Specific locations that need bicycling improvements:
  - Arlington Heights Road, Palatine Road, and Rand Road
  - East on Euclid/Rand near cemetery
  - Northwest Highway: no safe crossing
  - Algonquin Road, Golf Road, and Wilke
  - Schaffer at Lake Cook (signal)
  - Douglas at Euclid
  - Rand Road – no shoveling of sidewalk
- Locations that need pedestrian improvements
  - Mariano's

Destinations

- Important destinations include:
  - Mariano's
  - Buffalo Creek Preserve
  - Busse Woods
  - Downtown/train station
  - Deer Park Grove
  - Schools
  - Parks/pools
  - Walmart/Best Buy/Target
  - Rand/Hurst groceries
  - Hersey
- Hard-to-reach destinations:
  - Arlington Park train station
  - Getting to Arlington Park racetrack (Euclid)
  - Northpoint/Southpoint
  - Underpass near Arlington Park tracks no longer accessible

Barriers

- Major barriers along important bicycling or walking routes include:
  - Wing & Campbell on Ridge – no sidewalks on east side
  - Palatine Road
  - Highways
  - Train tracks
  - Route 53
  - Residential areas near downtown – no sidewalks
  - Dangerous curve on Wilke between Thomas and Palatine
  - Davis & Arthur
- Suggested improvements:
  - Crossings designed to accommodate bicyclists/pedestrians, especially at key intersections and major streets
  - Stop signs and pedestrian countdown lights
  - Bike path to Busse Woods would also help with senior center use

Missing Links/Gaps

- Euclid near the cemetery
- Kirchoff (residential area)
- N Vail
- Connect Prospect Trail (ComEd right-of-way) to Palatine Trail
- Bike lane on Northwest Highway – all the way to Chicago
- Better-marked trails in general
- Underpass at Gregory & Northwest Highway

Bicycle Parking

- Locations where new or additional bicycle parking is needed:
  - More and improved bike parking at every covered municipal lot

- o Train station – Arlington Park
- o Shopping areas

- Locations where existing parking should be improved:
  - o All of the above

Education, Encouragement and Enforcement programs

The following is a list of the programs or activities that were noted:

- "Share the Road" signs – bicyclists can take full lane
- Biking education in driver's ed classes
- Signage: Pedestrians and bicyclists have the right of way
- Public access TV programs
- Mirror what is being done in the City of Chicago
- Bicyclists: stop sign = yield sign

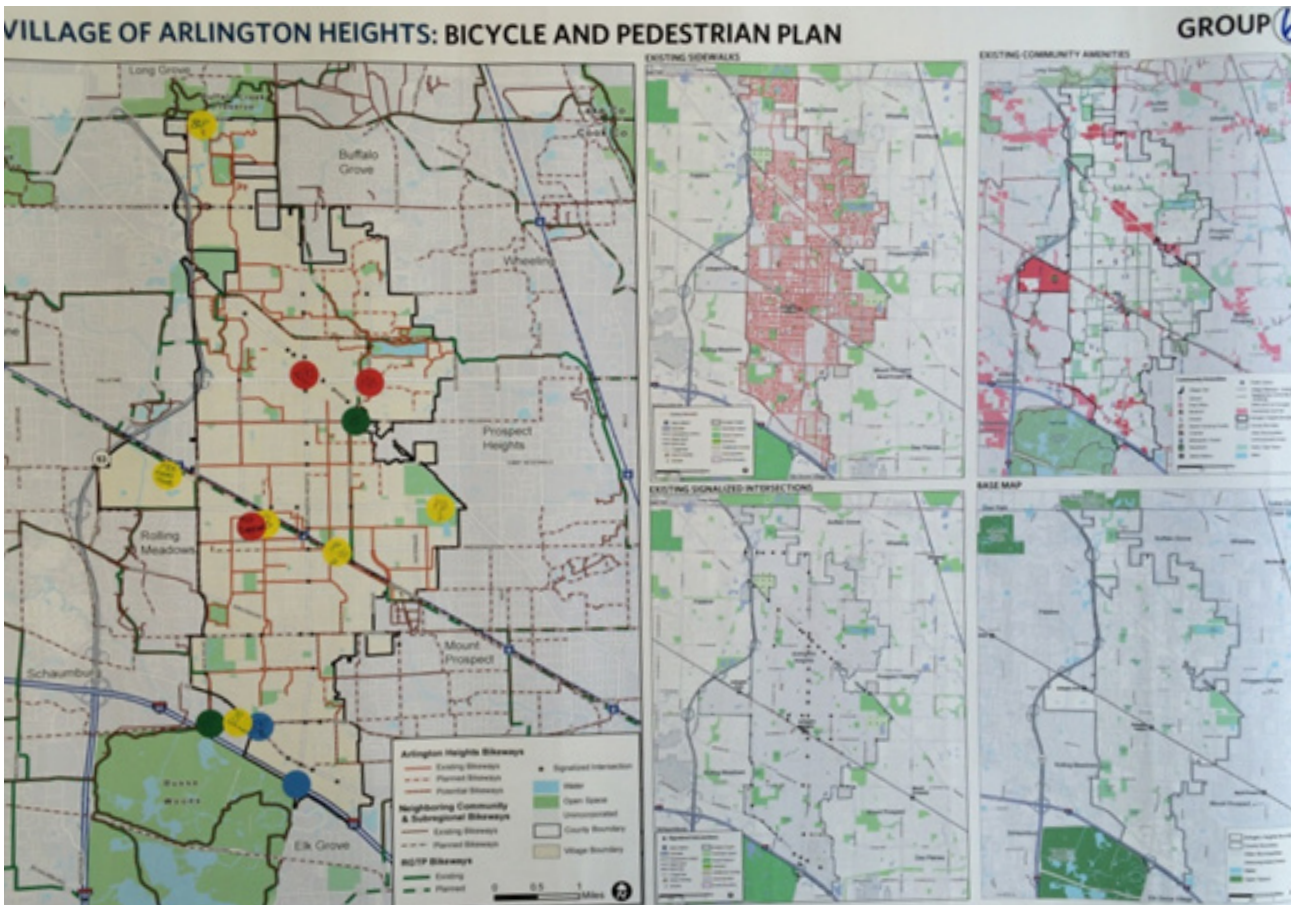
Review of the Draft Vision Statement

Each group was also asked to review the draft vision statement for the Village's Bicycle and Pedestrian Plan. The following is the draft statement with the group's changes marked:

The Village of Arlington Heights ~~is~~ (is working to be) a bicycle- and pedestrian-friendly community that strives in all its policies, plans, and programs and in the construction, reconstruction, maintenance, and operations of all its roadways and related infrastructure, to ensure that residents and visitors of all ages and abilities are able to travel safely and conveniently to all community destinations by walking and bicycling.

Comment: Vision claims that we are already bicycling friendly. Wording should be "Strives to be, is working to be, aspires to be," not "is."

GROUP 6's MAP



BIG IDEA SUMMARY

After working in smaller groups to create their unique vision for how to improve walking and biking in Arlington Heights each group presented their key ideas and recommendations to the larger group. Then the larger group was asked to vote (using key pad polling) for their top three ideas (in order of importance) from each of the smaller groups. The following table summarizes the results of the voting:

Responses		
Big Idea	**Percent**	**Weighted Count**
Linkages to open space (Parks, Forest Preserves, Des Plaines River Trail)	23.93%	168
Signage and bike striping (visible)	23.50%	165
Overpass/underpass (Northwest Highway/Triangle of Death, I-90)	15.38%	108
Education and enforcement (online, workshops)	11.97%	84
Linkages to destinations (home, work)	11.11%	78
Intersection improvements (countdown signals)	9.40%	66
Bike parking phone app (portable bicycle racks)	2.56%	18
Safety (sale of lights)	2.14%	15
Totals	**100%**	**702**

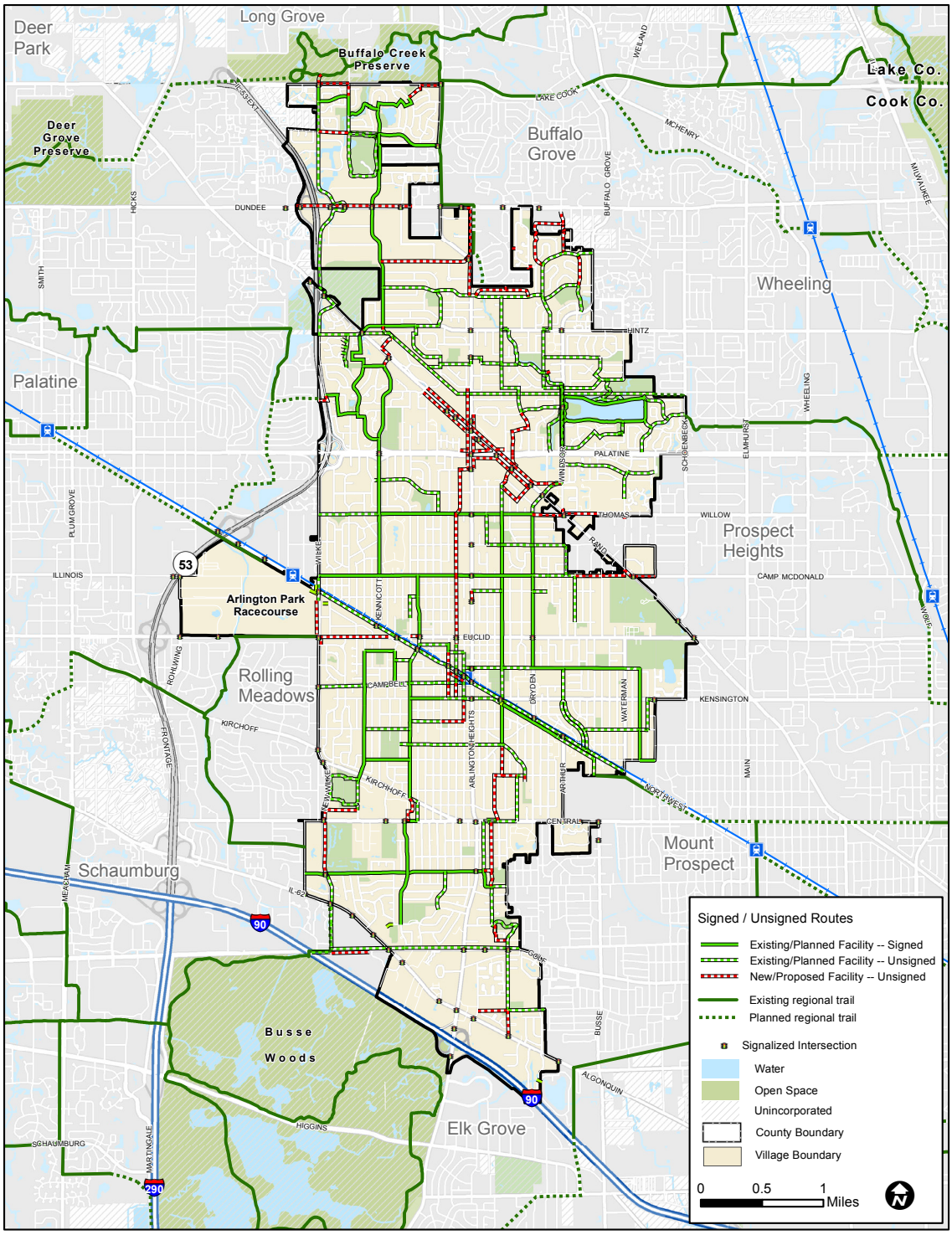
The majority of workshop attendees, or approximately 24%, that voted on their top three big ideas indicated that their most preferred idea was linkages to open space including neighborhood parks, Forest Preserves, and the Des Plaines River Trail. The next popular big idea, which came in very close to the first idea with 23 percent of the votes, was the need for increased signage and visible bicycle striping throughout the Village. Approximately 15 percent of the participants voted for the need of overpasses and underpasses along Northwest Highway, Palatine Road, Rand Road, and Arlington Heights Road commonly referred to as the "Triangle of Death," and Interstate 90, as the third top big idea.

Appendix B

Map of signed, unsigned, and new (unsigned) routes

It should be noted "existing" here signifies that these routes appear on the 2014 Village of Arlington Heights Bikeways Map. Some of the "existing" routes, therefore, are shown as planned or potential routes on that map.

Figure B1



Chicago Metropolitan Agency for Planning, 2016.

APPENDIX C

Lake-Cook Road at Buffalo Creek Forest Preserve, Alternative design strategies

The plan recommends creating a safe, convenient connection between the popular Kennicott framework bicycle route and the Buffalo Creek Preserve, its trail, and points beyond. This connection could be made by relocating the existing signal from Wilke to Schaefer. However, if engineering studies determine that this is not feasible, other potential solutions exist.

One option would be to install a pedestrian hybrid beacon (PHB) and associated safety treatments at Schaefer Road. The PHB stops traffic on Lake Cook Road when activated. Figure C1 illustrates, in a conceptual manner, this solution.

Figure C1

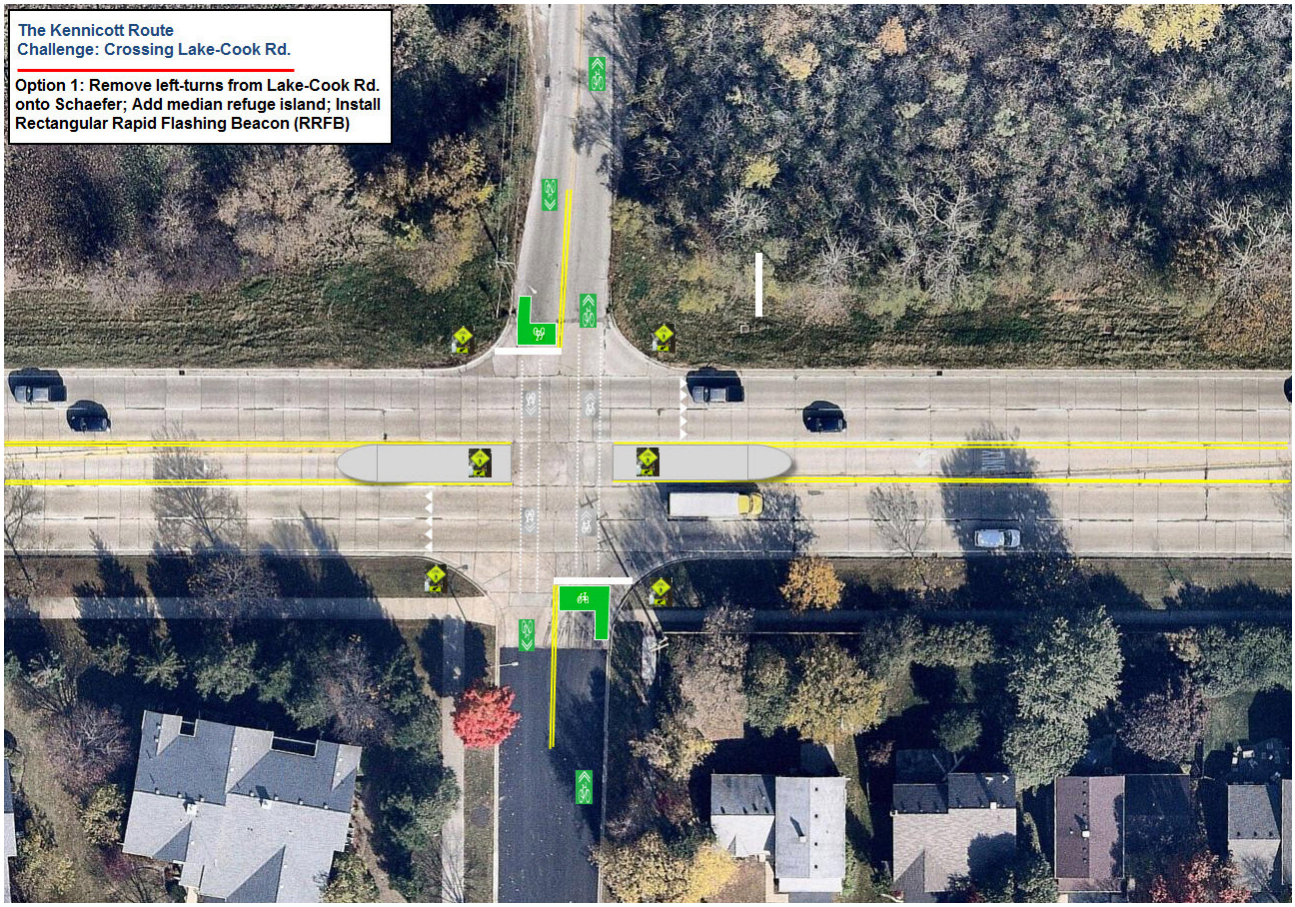


Figure C2 shows a PHB as installed in Phoenix, AZ. Note the marked crosswalk, regulatory and warning signage, and raised center median.

Figure C2

Photo credit: Mike Cynecki (www.pedbikeimages.org)

Another option would be to create a multi-use path connection from the existing signalized intersection. This connection could be achieved in one of two ways. The first would be to construct a spur trail from a proposed landing area on the north side of the T-intersection to connect to the existing Buffalo Creek Trail (roughly where the "use trail" is currently visible in aerial photographs). This option is illustrated below in **Figure C3**. In order, however, to function safely and comfortably for all types of cyclists, the spur trail and (at least part of) the Buffalo Creek Trail may need to be reconstructed as a paved trail. Currently, it surface is made of crushed limestone screenings.

A second option for a connection from this intersection (Wilke and Lake-Cook) would be to construct a sidepath on the north side of Lake-Cook Road, running from the proposed landing, east to Schaefer Road, where the bicycle route would continue north on-street (within the Village of Buffalo Grove). This option is shown below in **Figure C4**, with (proposed) buffered bike lanes on Wilke Road (recommended between Nichols and Lake-Cook Roads.)

Both options would entail the installation of an ADA accessible and bicycle-friendly landing or queuing area on the north side of Lake-Cook Road, as well as other safety treatments and enhancements to indicate the presence of cyclists, as well as proper positioning for cyclists when crossing. Narrowing lanes at the intersection may allow for a center refuge island, which would further increase the safety and comfort of the crossing for pedestrians and bicyclists.

Figure C3 - Spur-trail access from Wilke Road to Buffalo Creek Trail

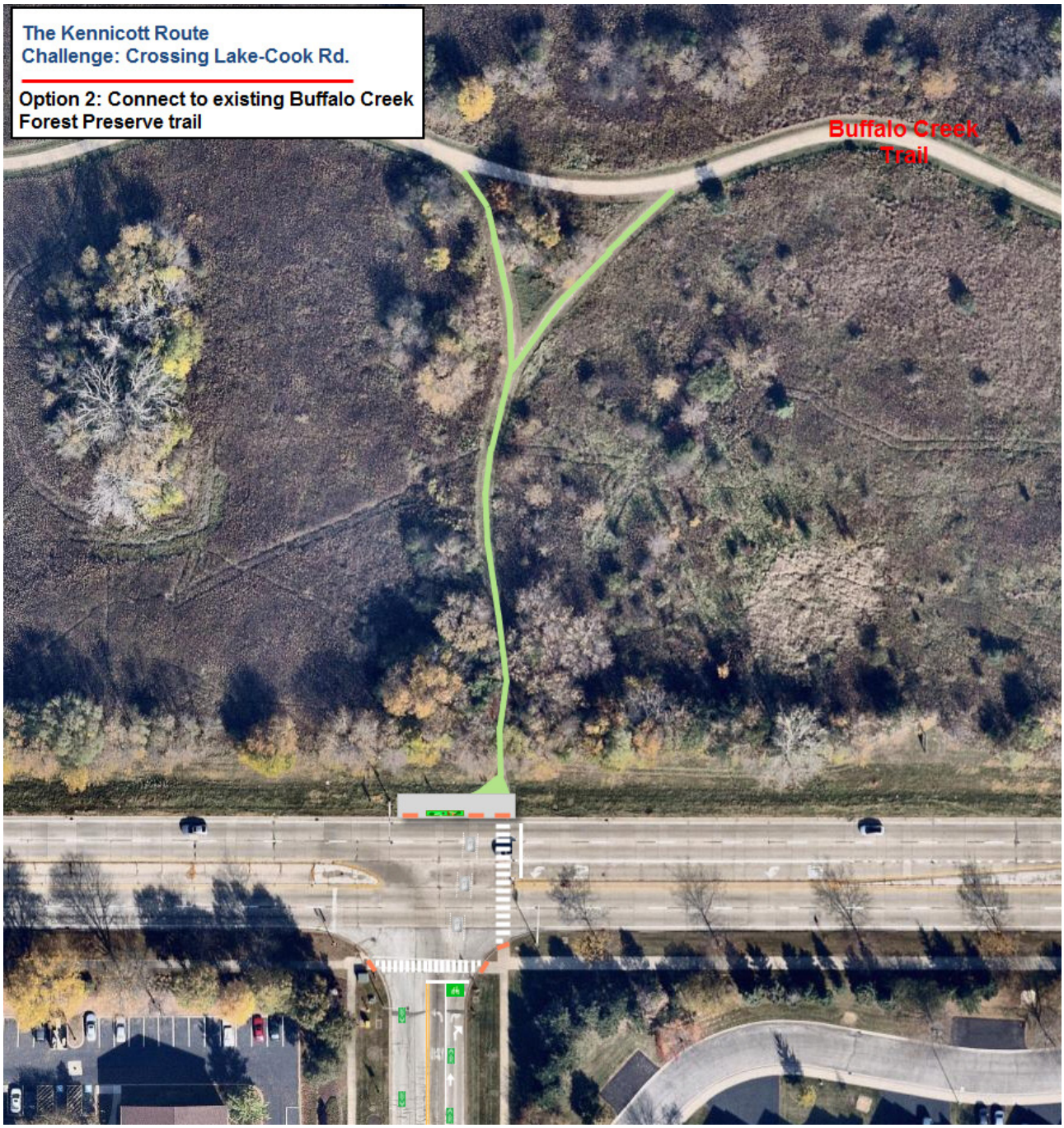
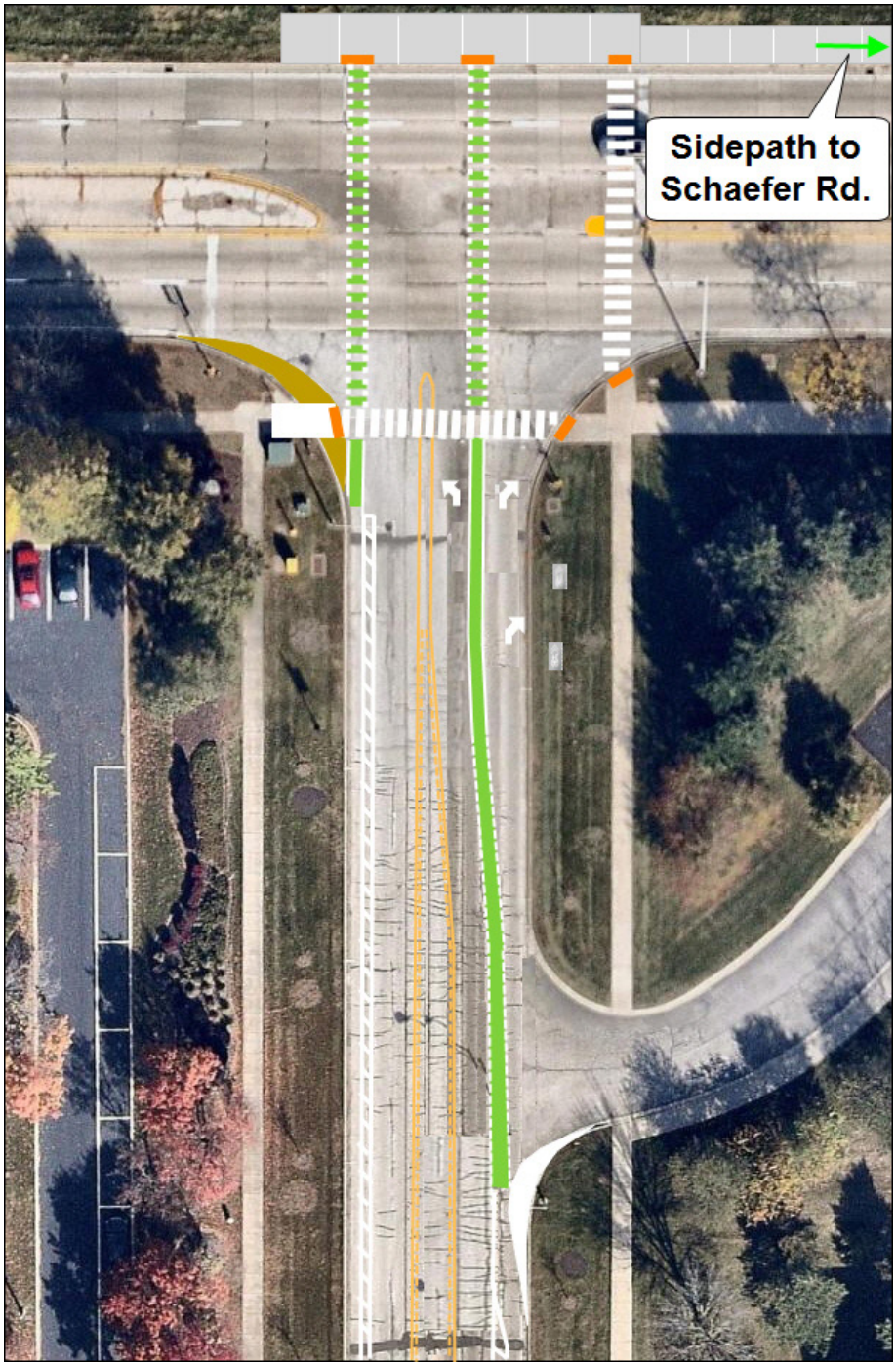


Figure C4 - On-street bikeway and sidepath from Wilke to Schaefer



APPENDIX D

Trails and Shared Use Paths at Signalized Intersections

For locations where designated multiuse paths or trails utilize signalized intersections to cross roadways, specific treatments can be used to enhance the visibility and safety of the crossing. Design guidance and treatments for these locations can be found in American Association of State Highway and Transportation Officials' (AASHTO) Guide to the Development of Bicycle Facilities, Fourth Edition (2012), Chapter 5, Section 5.3; in the FHWA publication, Designing Sidewalks and Trails for Access and Guide for the Planning (2001); in AASHTO's Design, and Operation of Pedestrian Facilities (2004, currently being updated); and in the U.S. Access Board's proposed Accessibility Guidelines for Shared Use Paths and proposed Public Rights-of-Way Accessibility Guidelines.

One example of a best practice from Skokie, IL is shown below in **Figure D1**. Note the separation of the pedestrian crosswalks and the bicycle crossings, the application of green color and on-street markings. Signage and bicycle friendly curb ramps and actuation (if installed) are also important treatments. Additional examples of best practices from our region (and beyond) for locations where multiuse paths and/or sidewalks cross large, high-volume, high-speed roads at signalized intersections, are given, in Appendix E.

Best practice for signal operations intended to improve bicyclist and pedestrian safety at locations where multiuse paths (or sidepaths) cross roads at signalized intersections include:

- Fully protected left and right turns from the parallel street across the multiuse path;
- Prohibition of right turns on red from the crossing roadway; and
- Leading pedestrian interval or exclusive pedestrian/bicyclist phase.

Figure D1 - Example of multiuse path crossing large, signalized intersection

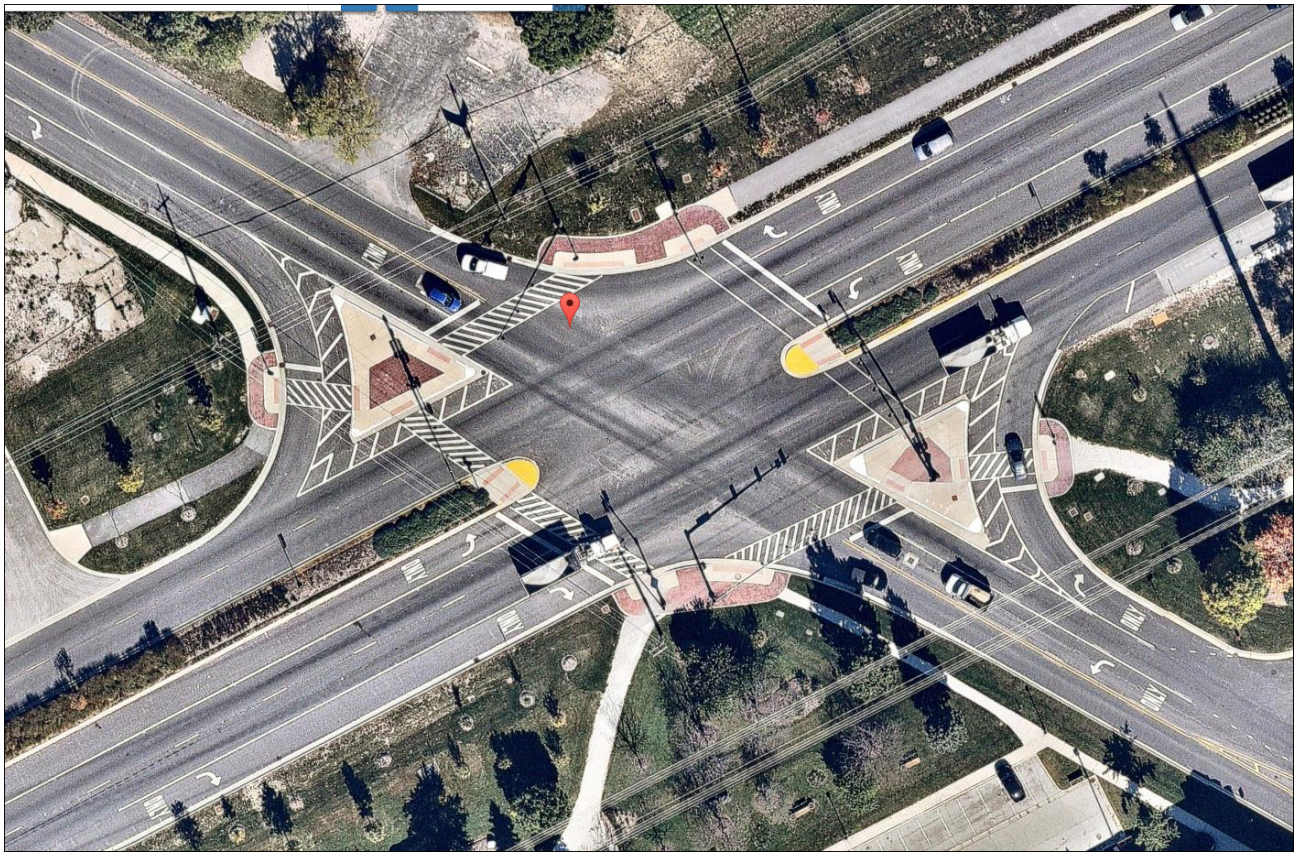
Skokie, IL

APPENDIX E

Large, arterial intersections designed to accommodate bicyclists and pedestrians

Below are examples (aerial photographs) of locations where multiuse paths, sidewalks, and dedicated bicycle facilities cross large, multi-lane, high-volume, high-speed roads at signalized intersections. The best design practices shown here can be applied to many locations in the Village, where existing and planned bicycle and pedestrian ways (of various types) cross such roads (e.g. Lake-Cook, Palatine, Rand, Dundee, Golf, Algonquin, etc.). The images provide examples of various intersection treatments intended to improve bicycle and pedestrian safety, visibility, and convenience at major arterials, which are described in more detail throughout this plan and in Appendix I. For more information on methods to improve large, high-volume intersections, see the article "Improving High-volume Intersections for Pedestrians" at http://www.humantransport.org/universalaccess/library/wide/wide.htm.

Figure E1



Source: www.nearmap.com

Warrenville, IL

Figure E2

Source: www.nearmap.com

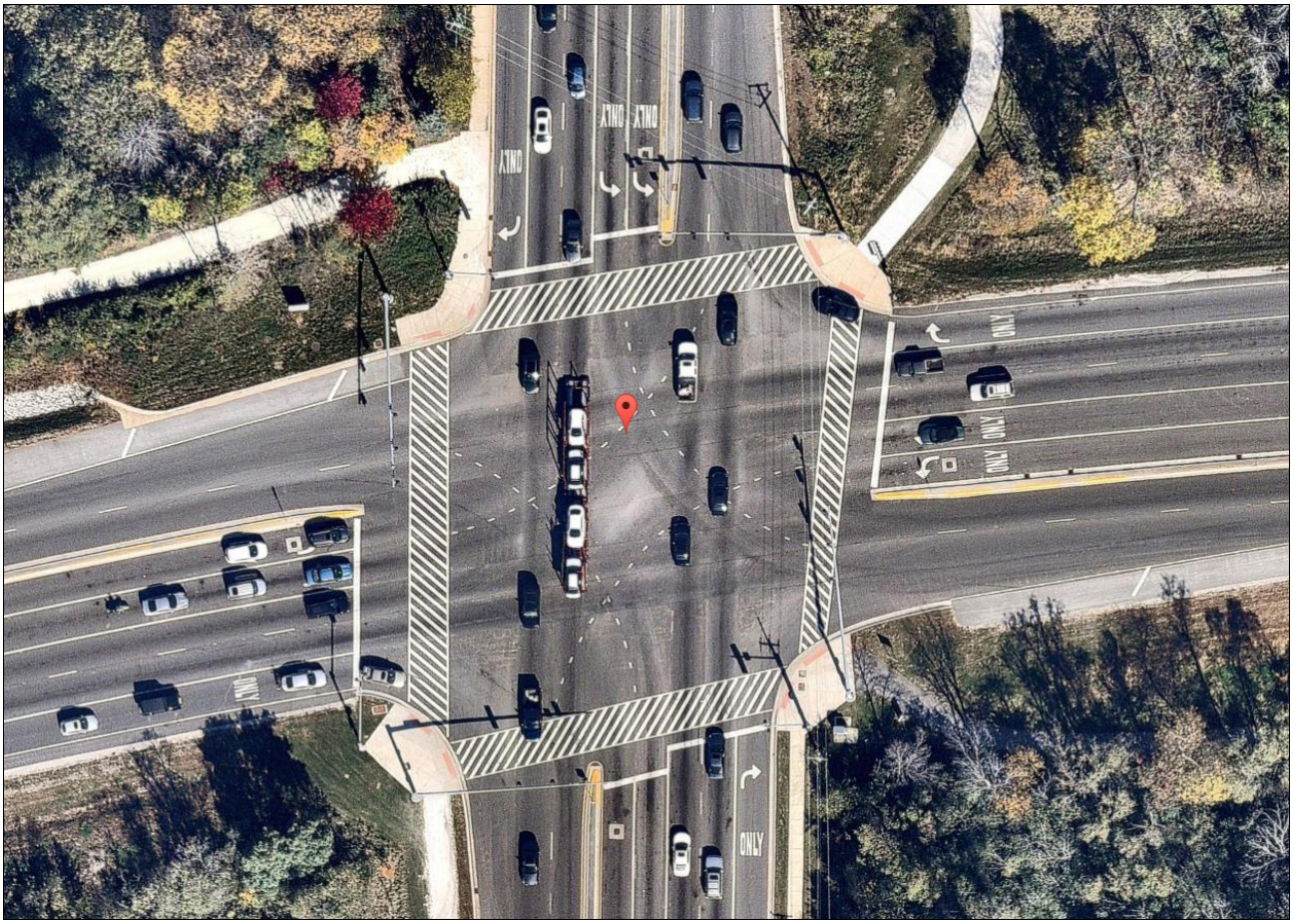
Geneva, IL

Figure E3

Source: www.nearmap.com

Orland Park, IL

Figure E4



Source: www.nearmap.com

Warrenville, IL

Figure E5

Source: www.nearmap.com
Vancouver, BC (Canada)

Figure E6

Source: www.pedbikeimages.org (Dan Burden)

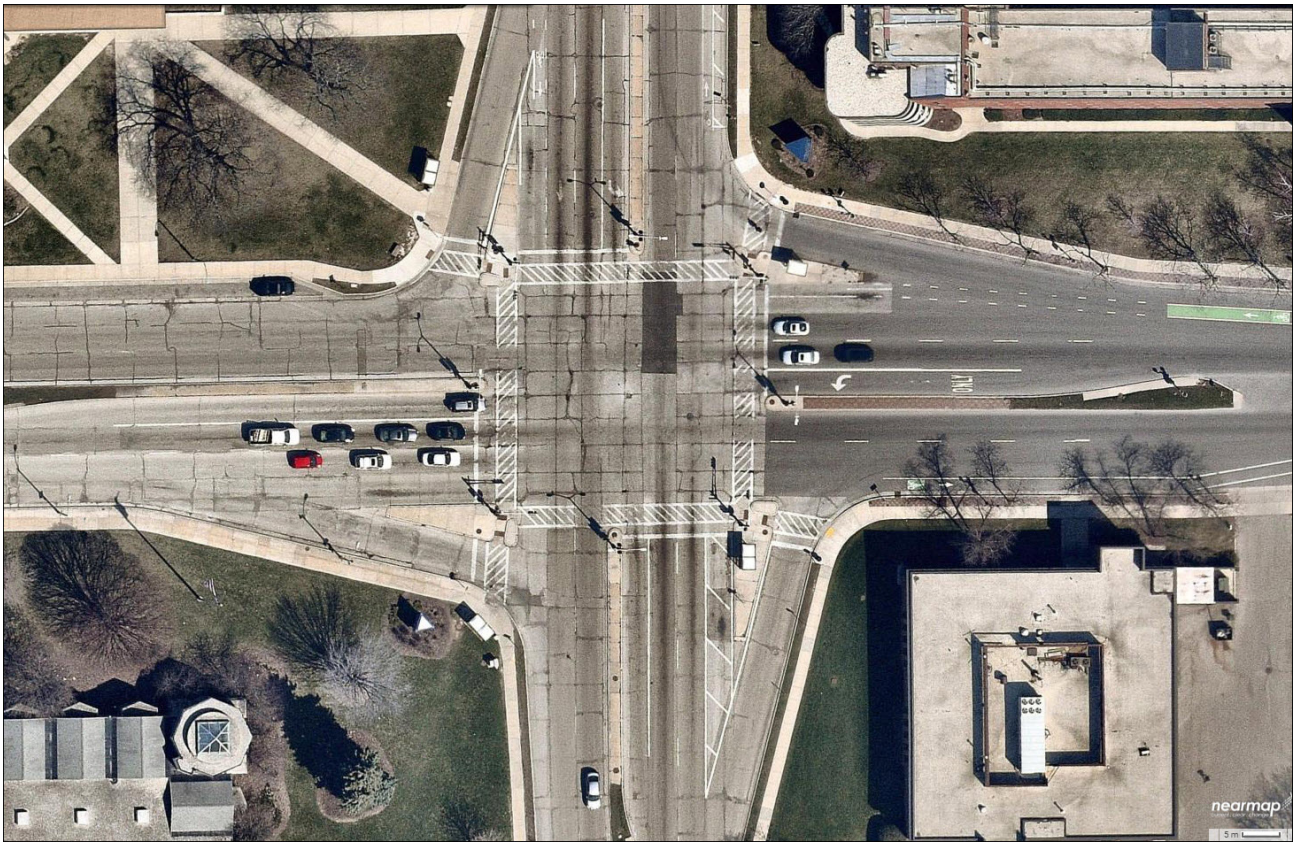
Boulder, CO

Figure E7

Source: www.nearmap.com

Milwaukee, WI

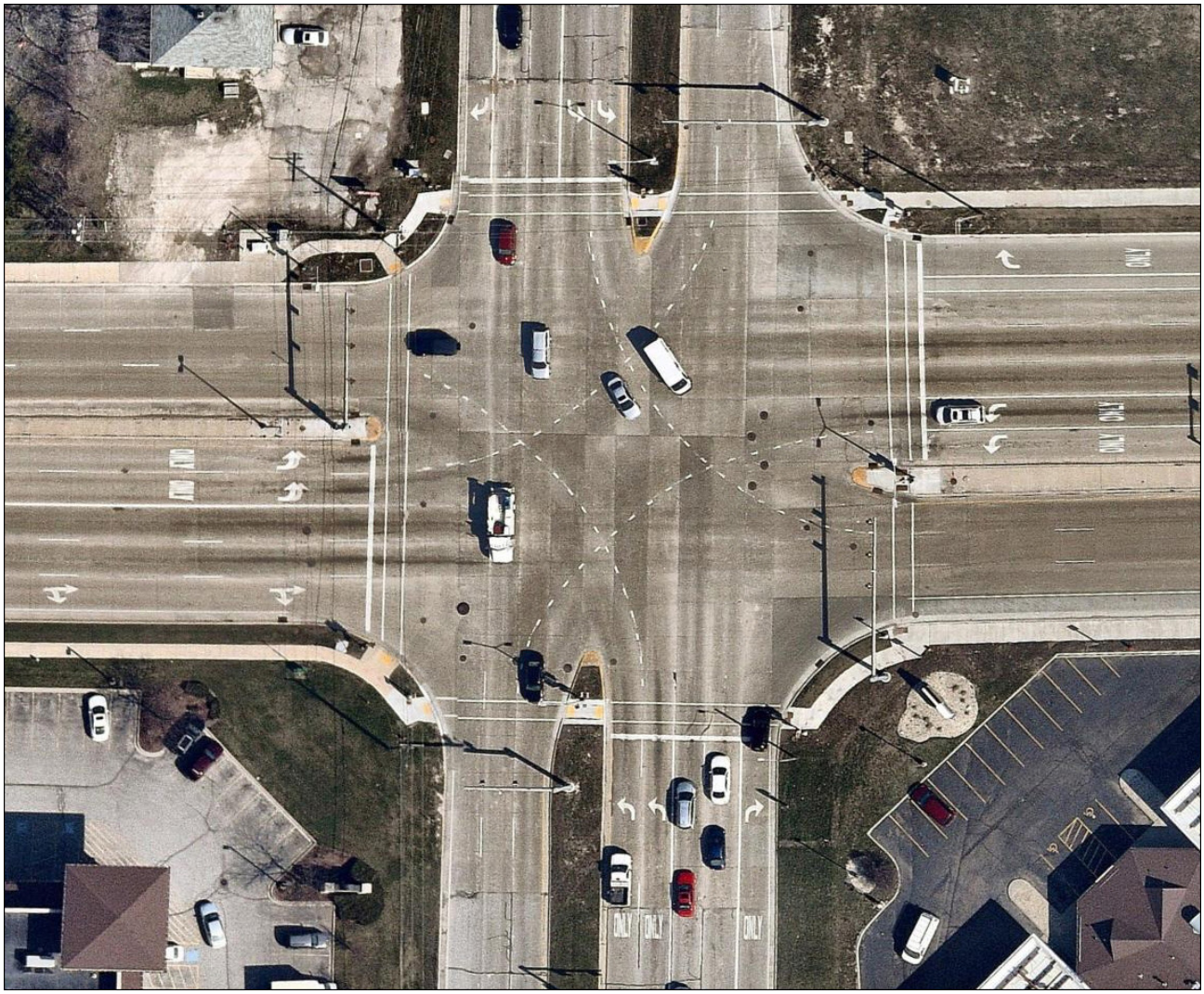
Figure E8



Source: www.nearmap.com

Wauwatosa, WI

Figure E9



Source: www.nearmap.com

Franklin, WI

Figure E10

Source: Google Streetview

Plainfield, IL

Figure E11 - Figure 4.11. View of crosswalks from mounted camera height at the intersection of South Blvd. and Sharon Rd. W. in Charlotte, NC.

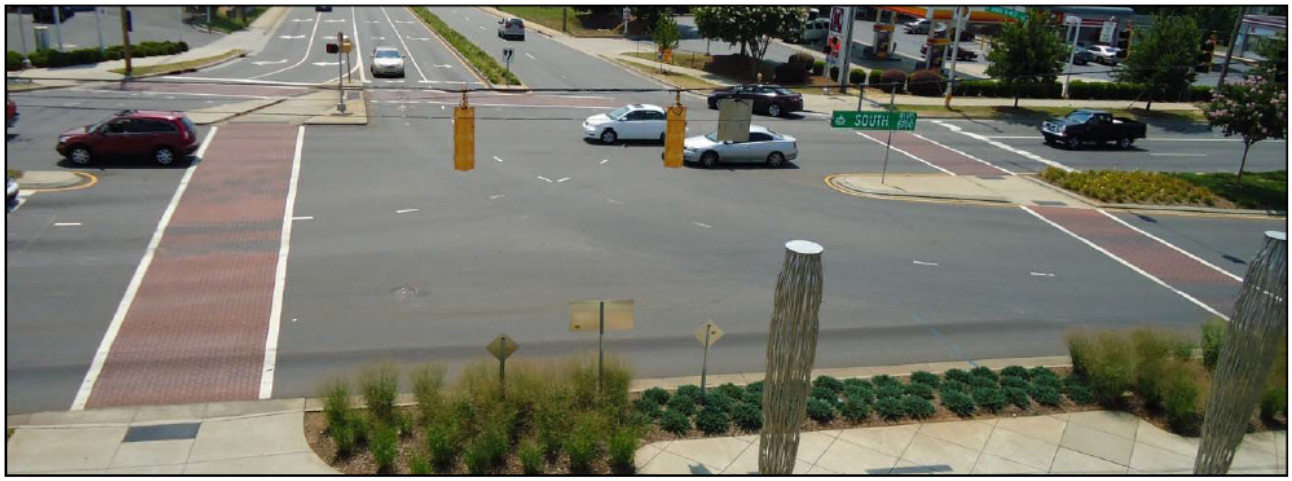


Figure 4.11. View of crosswalks from mounted camera height at the intersection of South Blvd. and Sharon Rd. W. in Charlotte, NC.

Source: "Pedestrian and Bicycle Accommodations on Superstreets" (J.E. Hummer et al., 2014)

Charlotte, NC

APPENDIX F

Busse Woods Trail, Alternative routes

» Bikeways through parking lots (access to Busse Woods and to the Arlington Park Metra station)

» Road diets (access to Busse Woods)

Alternative 1 (**Figure F1**) involves a new, signed, on-street bike route on Kasper and Kennicott south of White Oak, to Algonquin Road. From there, the existing sidewalk along the north side of Algonquin Road would be widened and improved to bikeway standards (10 foot wide sidepath) to the signalized intersection at Algonquin Road and an entrance to the Meadows Shopping Center. This intersection would need to be substantially improved to provide, at a minimum, 1) an accessible queuing area large enough to accommodate cyclists on the north side of Algonquin Road, 2) signal actuation technology for pedestrians and cyclists, and 3) marked crossings for pedestrians and bicyclists.

From this intersection, the route would utilize the (private) roads within the shopping center parking lot to reach Golf Road, approximately 500 feet east of Wilke. Here, once again, the existing sidewalk along the north side of Golf would need to be widened and improved to bikeway standards (10 foot wide sidepath) to the intersection of Golf and Wilke. As discussed above and illustrated in **Figure 35**, crossings at the Golf-Wilke Road intersection should be improved to increase visibility, safety and wayfinding for cyclists (and pedestrians). One option to help achieve this would be to narrow travel lanes at the intersection in order to allow for a widened raised center median that would fully function as a pedestrian/bicyclist refuge island.

This alternative (as well as Alternative 5, discussed below) involves the unusual, though not unprecedented, step of utilizing (and retrofitting) large, big-box parking lot roads as a bikeway. Such a step would entail working with the property owner to install wayfinding and safety elements and treatments. The Manual on Uniform Traffic Control Devices (MUTCD) standards and guidance apply to all roads "open to public travel," which includes private roads within shopping centers, parking lots, sports arenas, and other similar business and recreation facilities. They do not, however, apply to driving "aisles" within parking lots, which are the vehicular ways limited to providing access to individual parking stalls.[1]

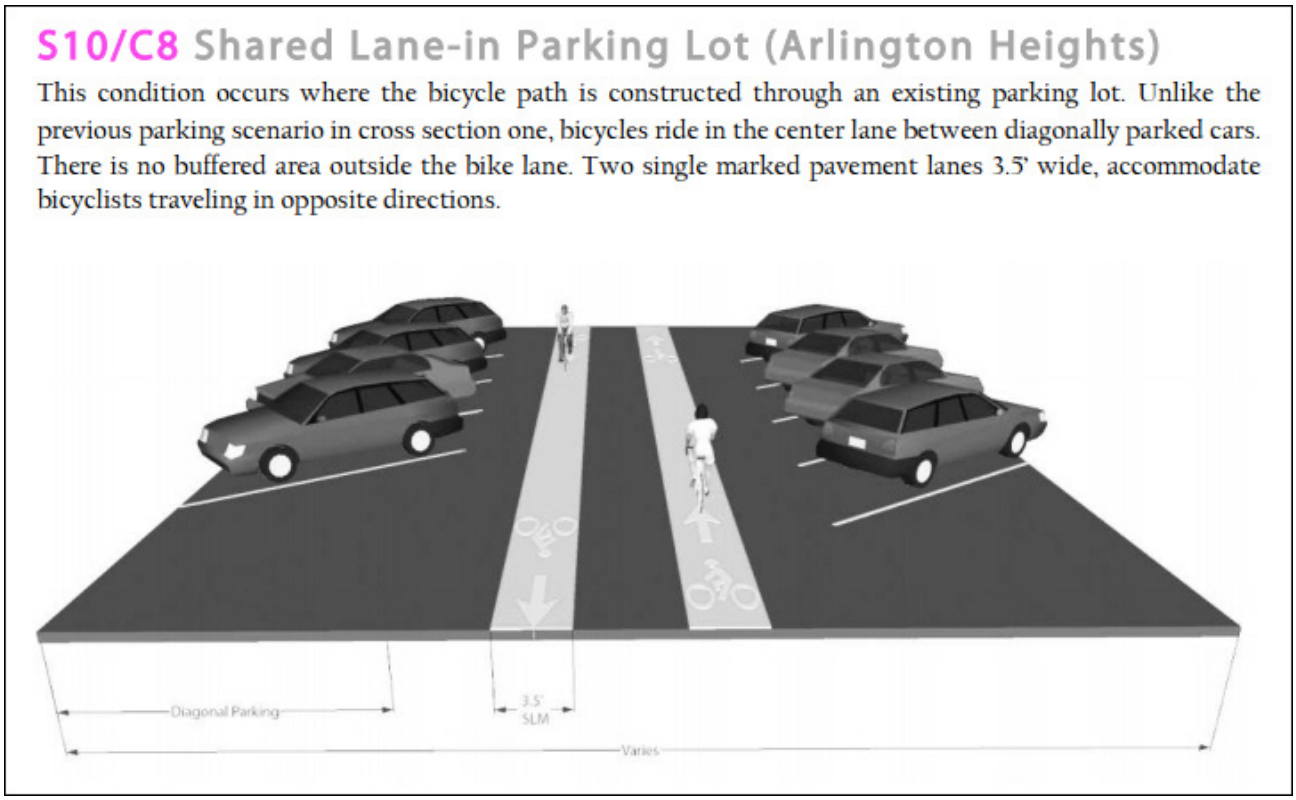
The bikeway segment through the shopping mall parking lot(s) would consist primarily of route signage and on-street pavement markings – which were recommended in the Northwest Municipal Conference's Northwest Highway Bicycle Facility Plan (2012) for the extension of the Commuter Drive sidepath through Metra's Arlington Park station, to Wilke Road (shown in **Figures F2**, below). Another example of this approach

[1] For more information, see the first paragraph of the Introduction to the 2009 MUTCD (http://mutcd.fhwa.dot.gov/htm/2009r1r2/intro/intro.htm), the definitions 159 and 161 in Chapter 1A (http://mutcd.fhwa.dot.gov/htm/2009r1r2/part1/part1a.htm), and the FAQs at http://mutcd.fhwa.dot.gov/knowledge/faqs/faq_general.htm#pra and at http://mutcd.fhwa.dot.gov/knowledge/faqs/faq_general.htm#genq4.

is the Shining Sea Bike Path in Woods Hole, MA, described and photographed in an article by, John S. Allen, at http://bikexprt.com/massfacil/capecod/woodshole.htm. In essence, such a facility would function in a manner akin to a Dutch woonerf or a "shared street."

Figure F1 - Alternative 1

Figure F2 to F8 - Examples of Bikeway Treatments through Parking Lots



Northwest Municipal Conference *Northwest Highway Bicycle Facility Plan*, p. 16 (available at http://www.nwmc-cog.org/Transportation/Documents/NWHighwayBikePlan.aspx.)

Figure F3

Sanibel Island, FL (courtesy of Jerry Foster)

If engineering studies demonstrate feasibility and agreements with private property owners can be reached, the creation of a separated bike path (or cycle track) through the parking lot may provide significantly improved visibility, clarity, and associated safety benefits. Examples of such facilities can be found in several cities across the United States:

Figure F4

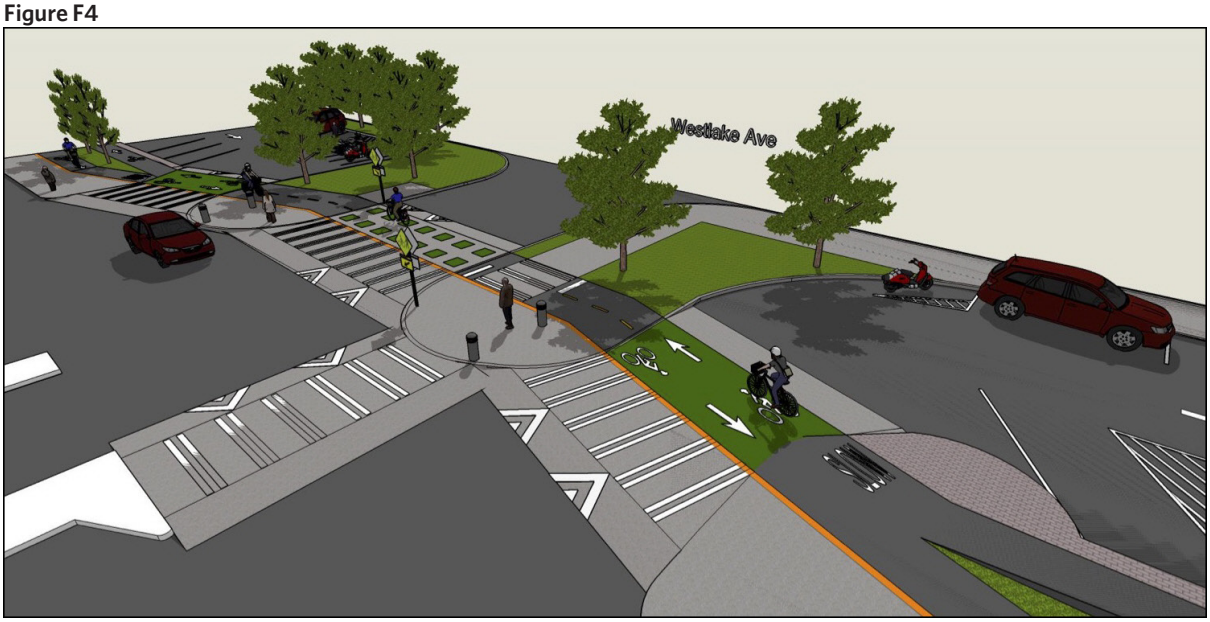
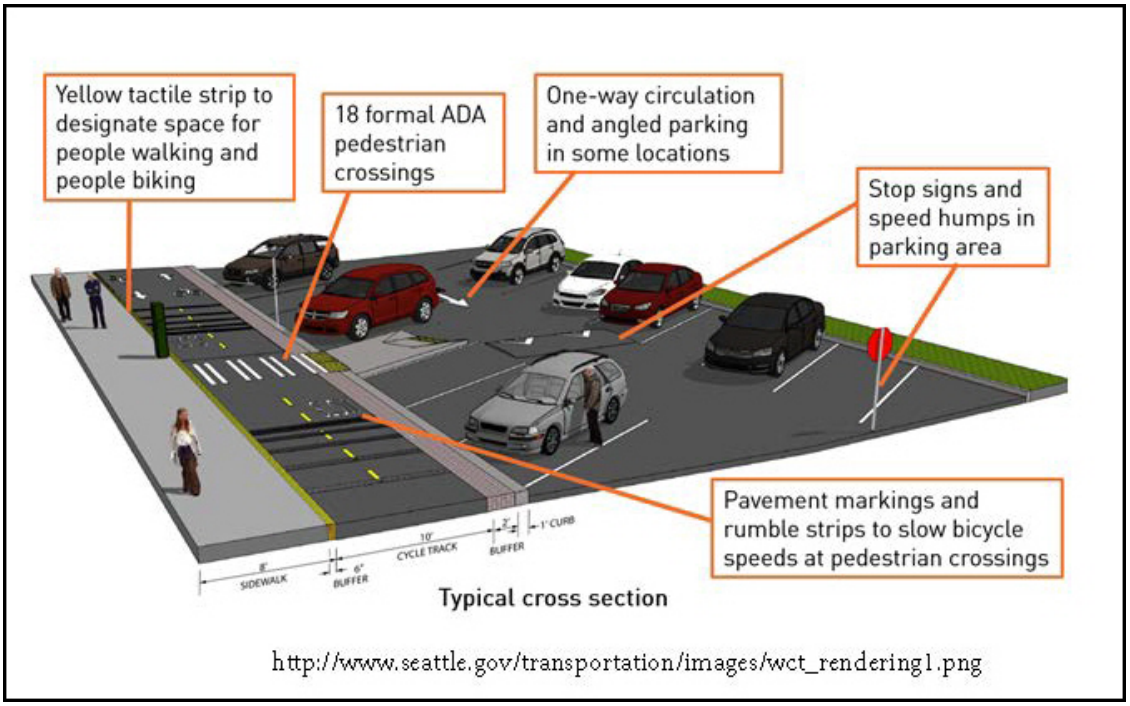


Figure F5



Both images courtesy of Seattle DOT

Figure F6

Los Angeles Zoo (courtesy of Bill King)

Figure F7

Santa Monica Beach State Park (courtesy of Ryan Johnson)

Figure F8

New Westminster Shopping Center, Vancouver, BC (courtesy of Mike Anderson)

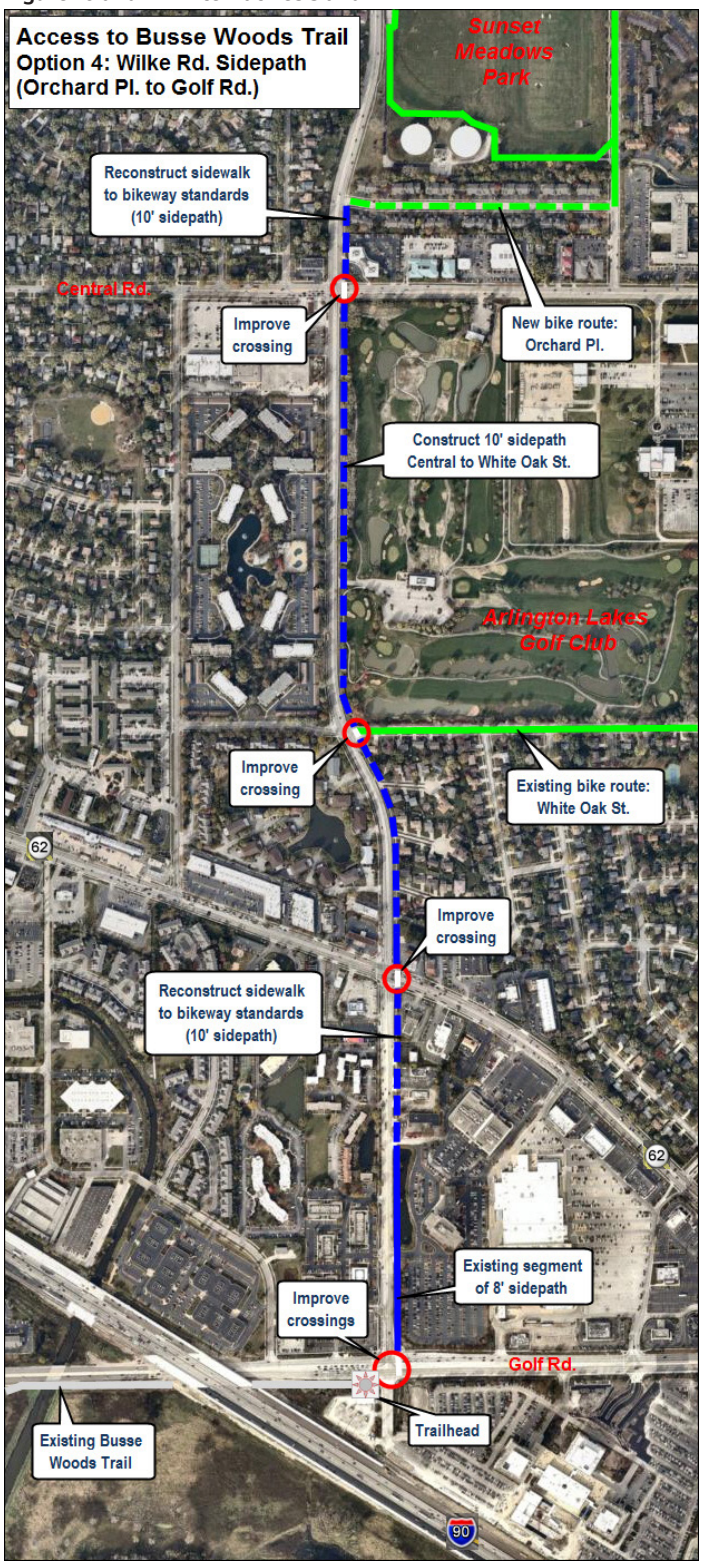
Routing a bikeway through the parking lots of big-box shopping centers and districts can be the only feasible means, in built-out suburban communities, of providing a bikeway connection between large arterial roads surrounding big-box shopping districts, and the residential or mixed-use neighborhoods located beyond those arterials. The necessity of such routing is bolstered by the fact that traffic signals along the arterials are placed at the main entrances/exits to the shopping centers, rather than at connecting neighborhood streets (collector and local roads). This placement is due to the fact that the shopping mall entrances/exits have the greater volumes of (turning) vehicles. As a result, the only locations at which bicyclists can safely cross the large arterials are at these signalized entrances/exits. Proximate signalized intersections are, typically, too far away for and do not safely accommodate bicyclists. Public and stakeholder input, as well as guided bike tours of the Village, indicated that many experienced Arlington Heights cyclists already are familiar with and use the 'unofficial routes' through parking lots that we recommend as the only feasible way to traverse the sprawling big-box districts and to reach desired destinations on the other side(s). Similar land use and development patterns produce this situation in communities throughout our region. We recommend that the Village explore the option of formalizing these routes to increase safety and provide access.

Alternative 2 (**Figure F9**) is similar to the preferred option (**Figure 35**). This routing involves the widening of the existing sidewalk along the east side of Wilke Road, between White Oak Street, which is an east-west framework bike route, and Golf Road. Currently, the last 1,100 feet of the sidewalk (which is in the Village of Rolling Meadows) has been retrofitted to eight feet in width, by means of simply adding three additional feet of concrete alongside the original five foot wide sidewalk. This same rudimentary type of sidewalk widening exists for another segment along Wilke from Algonquin Road, north for approximately 200 feet. The technique has also been used at other locations within the Village. While such retrofitted facilities provide the minimum width required for a sidepath, they do not offer the recommended width for comfortable passing by cyclists. In addition, the surface quality of these minimal-width sidepaths can be compromised by the different age of the two parts of the path and by the fact that the seam between the three-foot wide segment and the five-foot wide segment may not always be, or remain over time, flush and even. For this alternative, crossings at Algonquin Road and at the Golf-Wilke Road intersection should be improved to increase safety, signal actuation, and wayfinding for cyclists (and pedestrians). Development and implementation of this and all other options will require coordination and collaboration with the Village of Rolling Meadows, as well as with IDOT.

Figure F9 - Alternative 2

Alternative 3 (**Figure F10**) extends the proposed sidepath along the east side of Wilke Road further north to Orchard Place, just south of Sunset Meadows Park. Here it connects to the existing bike facility on Dwyer Avenue. This extension would involve the construction of a new facility (sidepath) between Central Road and White Oak Street, adjacent to the Arlington Lakes Golf Club property, which is owned and operated by the Arlington Heights Park District. The placement of a sidepath here would benefit from the fact that only one driveway (the entrance to the club) would need to be crossed. The existing sidewalk between Central Road and Orchard Place should be upgraded to a sidepath to accommodate two-way bicycle and pedestrian traffic. Crossings at Central Road, White Oak, Algonquin Road, and at the Golf-Wilke intersection should be improved to ensure the safety of cyclists and pedestrians, and to include bike route and wayfinding signage.

Figure 10 and 11 - Alternatives 3 and 4

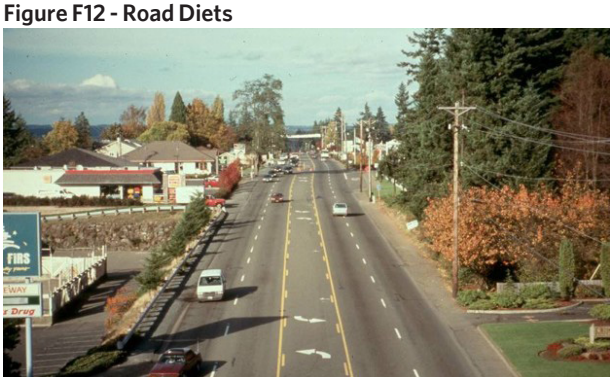


Alternative 4 (**Figure F11**) consists of a roadway reconfiguration, or road diet, on Wilke Road from Campbell Street (an east-west framework bike route), south to Golf Road. The road diet entails reducing the number of travel lanes from four to five lanes to three to four lanes. This reduction in the number travel lanes would allow for the installation of buffered or separated bike lanes. While further engineering study and analysis of traffic flows – including turning movements, traffic diversion, etc. – would need to be undertaken to determine the feasibility of a road diet here, the latest ADT information (2014) indicates that the road volume is within the acceptable limits for road diets.

Additional information on road diets can be found in FHWA's *Road Diet Informational Guide*, at http://safety.fhwa.dot.gov/road_diets/info_guide/ and other FHWA resources at http://safety.fhwa.dot.gov/road_diets/, as well as Section 4.9.2 of AASHTO's *Guide to the Development of Bicycle Facilities: Fourth Edition*, ITE's Professional Development Program supplement, *Road Diet Handbook: Setting Trends for Livable Streets*, at http://www.seattle.gov/transportation/docs/nickerson/Road%20Diet%20Rosales%20Overview%20.pdf, and AARP's *Road Diet Factsheet*, at http://www.aarp.org/content/dam/aarp/livable-communities/documents-2014/Livability%20Fact%20Sheets/Road-Diets-Fact-Sheet.pdf.

In addition to providing space for on-street bicycle lanes, the potential benefits of road diets include increased safety through reduced vehicle speeds and speed differentials, a reduction in delays through separating left-turn movments and reduced weaving, and improved access and mobility for non-drivers (Complete Streets). Currently, the posted speed limit on Wilke, in this stretch, is 35-40 mph. Should a road diet be implemented, we recommend that the Village lower the speed limit to 30 mph.

Figure F12 - Road Diets



Source: National Complete Streets Coalition (via Flickr)

Source: National Complete Streets Coalition (via Flickr)

Source: National Complete Streets Coalition (via Flickr)

Source: National Complete Streets Coalition (via Flickr)

Figure F13 - Road Diet with Protected Bike Lane

Source: National Complete Streets Coalition (via Flickr)

Alternative 5 proposes a routing similar to **Alternative 1**, utilizing a new on-street bike route along local roads from the existing Fernandez Avenue bikeway to the currently unsignalized intersection of Kennicott and Algonquin. The southwest leg of this intersection forms a left-in, right-out entrance to the Meadows Shopping Center. The route, therefore, would necessitate signalization and reconstruction of this intersection to allow through movements (for bicyclists) from Kennicott to the Meadows Shopping Center drive. The route then utilizes a private road through the shopping center parking lot to Golf Road. Here, at the signalized intersection, crossings to the existing sidepath along the south side of Golf should be improved to increase safety and visibility of bicyclists and pedestrians, including installation of bicycle detection technology and pedestrian actuation travel lanes would allow for a widened center median to function as a pedestrian refuge island. From this point, cyclists would continue west along the Golf Road sidepath to the Busse Woods trailhead. In considering this option, it should be noted that the recently completed sidepath along the south side of Golf Road between Meijer Drive and New Wilke Road, which this route would utilize, is a substandard six and one-half to seven feet in width, as well as being directly adjacent to a high-speed, high-volume travel lane.

Figure F14 - Alternative 5

Access to Arlington Park Metra Station

Bicycle access to Arlington Park Metra station is another important, high-priority project that utilizes routing of an on-street bikeway through a parking lot to access major transit and link to existing multi-use paths and existing, newly installed bike parking. The Arlington Park station is served on the east and south by the multiuse path along Wilke Road, and from the west by the new path along Commuter Drive, which connects to Rolling Meadows trail network (on Rohlwing Road). The nature and location of this proposed project requires the use of treatments and techniques for routing a bikeway through a parking lot (which are described and illustrated in relation to Alternative 1). Implementation would require detailed study and analysis by engineering professionals in close coordination with representatives from Metra and Arlington Park International Racecourse.

Figure F15 - Potential bike routes at Arlington Park Metra station

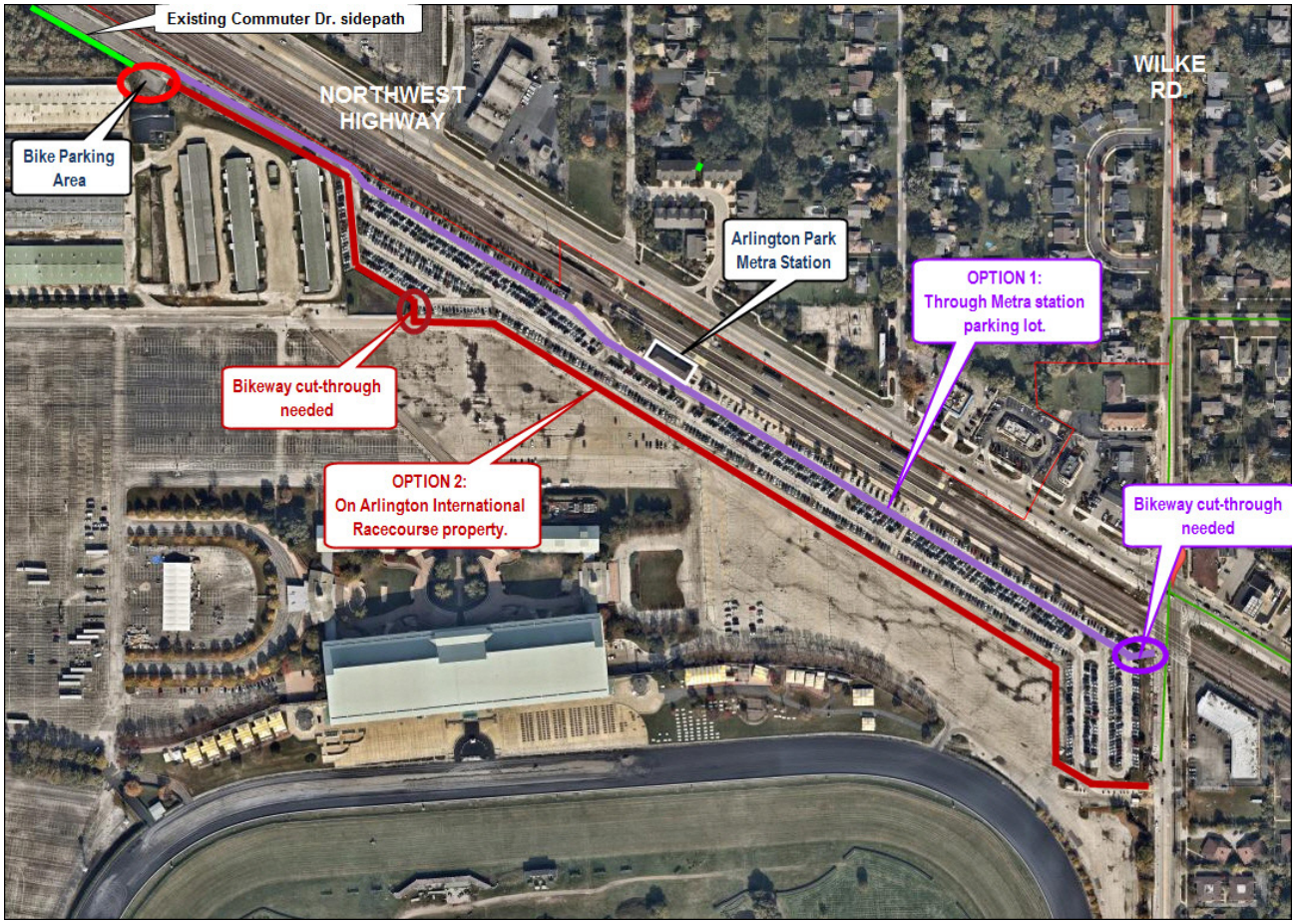


Figure F16 illustrates concepts for providing bicycle access to the Metra station. The project would also help activate and achieve synergy with two bicycle projects that the Village recently completed near the station, as well as an IDOT project currently underway to improve the intersection of Northwest Highway and Wilke Road.

The Village recently constructed a multi-use path along Commuter Drive from Rohlwing Road (where it connects to Rolling Meadows' bikeway network). This path currently ends at a newly constructed bicycle parking area, approximately a quarter mile west of the station depot. Connecting this designated bicycle parking area to the station depot and to Wilke Road – the "entrance" to the station for most Arlington Heights residents, and the point at which Arlington Heights' bikeway network can be accessed – requires routing through the parking lot. Two potential routes have been developed (see **Figure F16**). One utilizes the main drive aisle through the Arlington Park Metra station parking lot. The other would make use of the private drive in the parking lot on Arlington International Racecourse property and would thus require permission and coordination with the Racecourse. Both options would require improvements to, or creation of, at least one cut-through to provide a continuous route – the former, at the entrance to the station along Wilke Road (near the UP rail line); the latter, near the Racecourse stables, passing from Racecourse to Metra property.

An alternative to routing bicyclists through the parking lot would be to designate – and perhaps widen further – the existing 11.5 feet wide path along the tracks, leading from Wilke to the station depot, as a bikeway. Such designation would entail the installation of signage, and perhaps pavement markings, to indicate the path as a bikeway (while still serving pedestrians). Study of pedestrian volumes and usage on the path would need to be undertaken to determine any potential safety issues.

In conjunction with providing bicycle access to the station, the Village should explore options for adding additional high-quality, covered parking near the depot, similar to that found at the downtown Arlington Heights station. A location close to the depot should be favored. The grassy area west of the depot may provide the space needed. If this area does not provide sufficient space or, for some other reason, cannot be utilized, then the Village, in consultation with Metra, should consider removing three to four automobile spaces to provide space for high-quality, protected bicycle parking.

Figure F16 - Downtown Arlington Heights Metra station bicycle parking

APPENDIX G

Additional sidepath recommendations:

1. Along the north side of **Golf Road** within Village boundaries. This facility is called for in the Northwest Municipal Conference *2010 Bicycle Plan*. It is one of sixteen conceptual regional bikeway corridors identified in the plan.

2. Along the east side of **New Wilke Road**, from Orchard Place, south to Village limits. This facility represents one option for reaching the Busse Woods Trail. Coordination with the Village of Rolling Meadows would be necessary since the last 0.36 miles is within their Village limits.

3. Along the north side of **Kirchhof Road** (between Ridge and Walnut Avenues) and along the north side of **Central Road** (between Walnut and Fernandez Avenues). These sidepaths, which are upgrades of existing sidewalk and a reconstruction of a substandard sidepath, are short segments of the key north-south "Kennicott" framework bike route. The crossing of Kirchoff (at Walnut) should include treatments to enhance safety, such as a Rectangular Rapid Flash Beacon or pedestrian hybrid beacon, raised medians, enhanced lighting, warning signage, in-street pedestrian crossing signs, longitudinally striped crosswalks, etc.

4. Along **Northwest Highway** within Village boundaries. This facility is called for in the Northwest Municipal Conference (NWMC) Bicycle Plan. It is one of sixteen conceptual regional bikeway corridors identified in the plan. The entire corridor, from Barrington to Park Ridge, was studied in detail in NWMC's *Northwest Highway Bicycle Facility Feasibility Study*.

5. Along the east side of **New Wilke Road**, between Fremont and Euclid. This facility connects local, residential neighborhoods and streets to the signalized intersection, at which the Wilke Road sidepath, running north to the Arlington Park Metra station, begins.

6. Along the north side of **Euclid Avenue**, between Walnut and Ridge. This facility provides a direct route for cyclists heading north along the "Kennicott" framework bike route (from points south of Euclid) to Olympic Park and Swim Center.

7. Along the south(west) side of **Rand Road**, between Waterman and East Oakton. This new sidepath would fill a gap in the sidewalk network and would connect the east-west framework bikeway on Oakton to the signalized crossing of Rand Road. Bicyclist/pedestrian actuation or detection technology, along with improvements to enhance crossing safety, would be needed at the intersection

8. Along **Thomas Street**, between Dryden and John Hersey High School. The sidepath could be on either then north or the south side east of Rand, but should be on the north side west of Rand.

9. Along the east side of **Windsor Drive** from Palatine to Crabtree Drive, where the McDonald Creek trail begins. This priority of this sidepath would be lessened if the recommendation for a road diet with bike lanes on Windsor is implemented.

10. Along the north(east) side of **Rand Road**, between Kennicott Avenue and Stonebridge Drive. This segment depends upon a connection across the ComEd ROW to Kennicott Avenue near Hintz Road being made. It would provide a more direct route for the "Kennicott" framework bikeway.

11. Along the north(east) side of **Rand Road**, between the two off-set segments of Wilke Road. This segment provides continuity and connectivity for the N. Wilke Road bike route. Engineering treatments to improve the safety of the crossing of Rand Road would be necessary, such as a pedestrian hybrid beacon or RRFB, a center median, warning signage, high-visibility crosswalk, etc.

12. Along the north side of **Dundee Road** within Village boundaries. This facility would connect to the existing Buffalo Grove sidepath, which runs east to the Des Plaines River Trail, providing regional connectivity. Ideally, this sidepath would continue west, over IL-53, into Palatine.

13. Along the south side of **Lake-Cook Road**, between Highland Lane and Arlington Heights Road. This sidepath will connect bikeways on local streets and the neighborhoods they serve to the signalized intersection at Lake-Cook and Arlington Heights Road, from which the Buffalo Creek Forest Preserve trail and other popular bikeways in the Village of Buffalo Grove can be accessed.

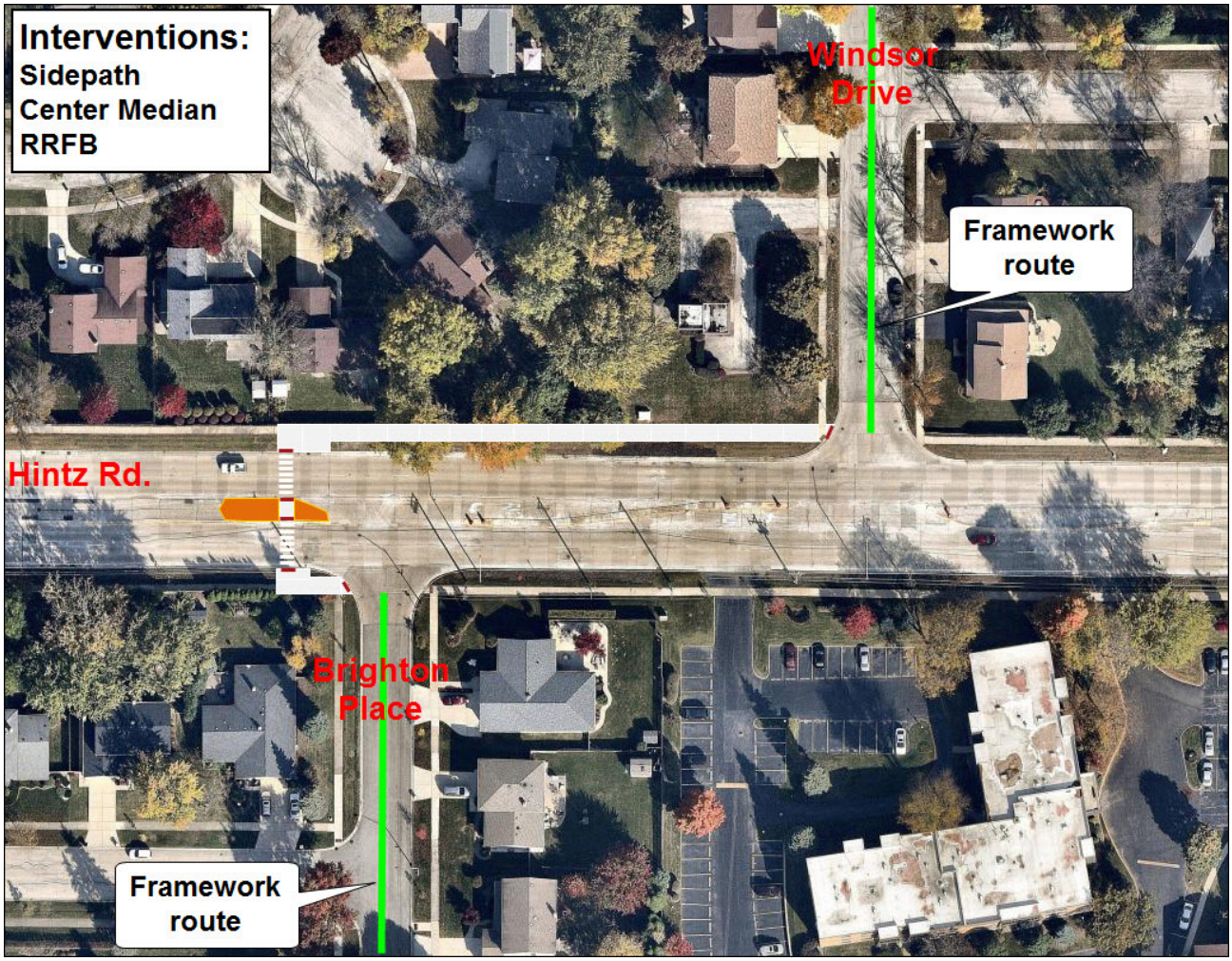
Figure G1 - Current conditions of sidepath (retrofitted from sidewalk) along Central, at Walnut. Although along the framework route, it is not appropriate as a bikeway, due to pavement condition and encroachment of vegetation.

APPENDIX H

Hintz and Central Road crossings Alternative design concepts

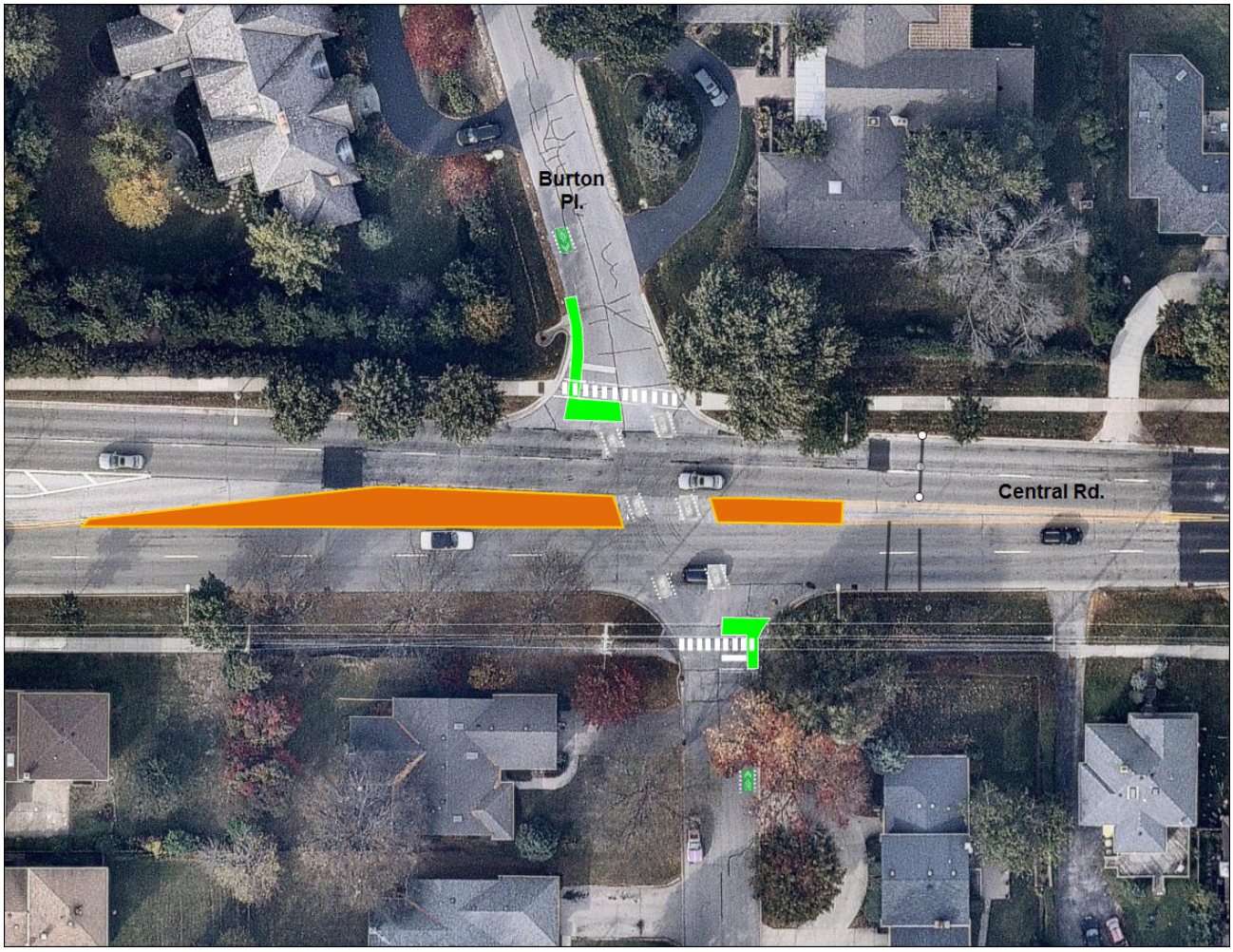
Examples of treatments utilizing short segments of sidepath, raised center medians, RRFBs, enhanced markings, signage, etc.

Figure H1



Crossing of Hintz Road at Brighton-Windsor (Alternative design concept)

Figure H2



Crossing of Central Road at Burton-Haddow (Alternative design concept)

APPENDIX I

Typical treatments for improving Intersections for bicyclists and pedestrians

The following provides basic information on select engineering treatments used at intersections and other crossing locations to improve bicycle and pedestrian safety, access, and mobility. The Village should consider installation/implementation of these treatments whenever feasible. Implementation requires engineering evaluation of specific locations and potential treatments and should be utilized by the Village on a case by case basis – considering such factors as bicycle/pedestrian usage, traffic volumes, traffic speeds, potential safety benefits, adjacent land uses, whether the intersection or crossing is along the recommended bicycle network, costs, timing of intersection investments, and available right-of-way. More information can be found out in CMAP's Complete Streets Toolkit, at http://www.cmap.illinois.gov/programs-and-resources/local-ordinances-toolkits/complete-streets. See especially, the "Select Treatments" section, which is divided into "Intersection and Crossing Locations" and "Traffic Calming and Speed Management."[2]

[2] See also California Department of Transportation's "Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians" (http://www.dot.ca.gov/hq/traffops/engineering/investigations/docs/intersection-guide-bicycles-pedestrians.pdf), as well as the "Intersection Treatments" chapters of NACTO's Urban Street Design Guide, (http://nacto.org/publication/urban-bikeway-design-guide/intersection-treatments/) and its Urban Bikeway Design Guide (http://nacto.org/publication/urban-bikeway-design-guide/intersection-treatments/).

Crosswalk Pavement Markings

A location indicated as an appropriate place for pedestrians to cross a street or vehicular way by marking the crossing location with crosswalk pavement markings. High visibility crosswalks typically make use of longitudinal, "continental," or "ladder" style pavement markings, which are more visible to approaching traffic.

Figure I1

Pedestrian countdown signals

Pedestrian countdown signals consist of a standard pedestrian signal heads, with an added display showing a countdown of the remaining crossing time. The Manual on Uniform Traffic Control Devices (MUTCD) recommends that the countdown timer start at the onset of the flashing DON'T WALK. The timer continues counting down through the pedestrian clearance interval. Countdown signals are required by the MUTCD to be installed whenever pedestrian signal heads are warranted as part of intersection signalization or reconstruction. Signals may be supplemented with audible or other messages to make crossing information accessible for all pedestrians.

Figure I2

Signal timing adjustments

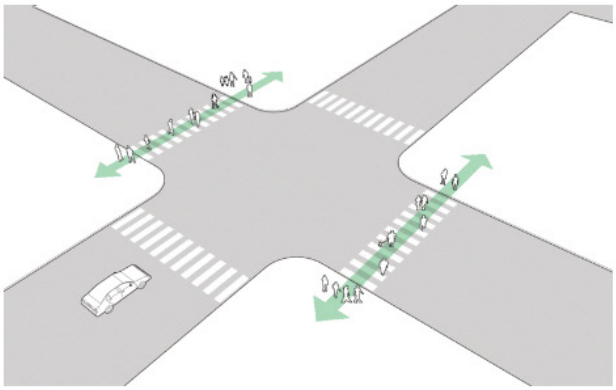
Signal timing adjustments designed to minimize conflicts between pedestrians and motorists.

The five major adjustments are:

- A leading pedestrian interval (LPI) provides pedestrians with a few seconds of lead time prior to the onset of the associated vehicle phase.
- Slower walking rates (two-and-a-half to three-and-a-half feet per second) may be programmed at intersections with or without pedestrian signal heads to account for young children, mobility-impaired, or elderly pedestrians.
- A LPI provides pedestrians with a few seconds of lead time prior to the onset of the associated vehicle phase.
- Lagging left turn provides pedestrian with a few seconds of lead time prior to the onset of a protected left-turn phase.
- Right-turn on red restrictions often improves pedestrian safety

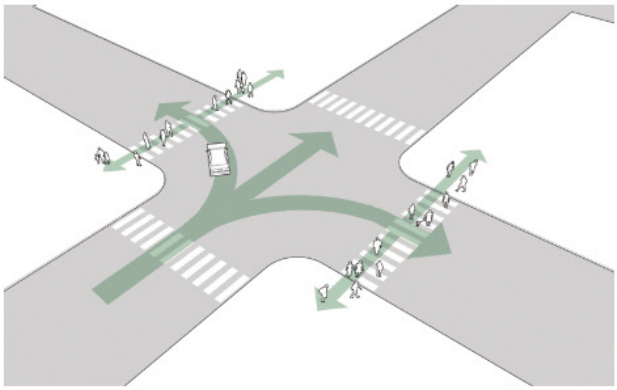
Figure I3

LPIs have been shown to reduce pedestrian-vehicle collisions as much as 60% at treated intersections.



Phase 1: Pedestrians only

Pedestrians are given a minimum 3–7 second head start entering the intersection.



Phase 2: Pedestrians and cars

Through and turning traffic are given the green light. Turning traffic yields to pedestrians already in the crosswalk.

Bicycle detection technology / Signal activation by bicycles

Bicycles (and motorcycles) have difficulty triggering demand-actuated traffic signals, which typically require large metal vehicles placed over in-pavement loop detectors. Cars may not be present to trigger the signal, or cars may be stopped too far back behind a bicyclist who arrived at the intersection ahead of the car. Pedestrian push-button actuation, if present, is often inconveniently located for bicyclist.

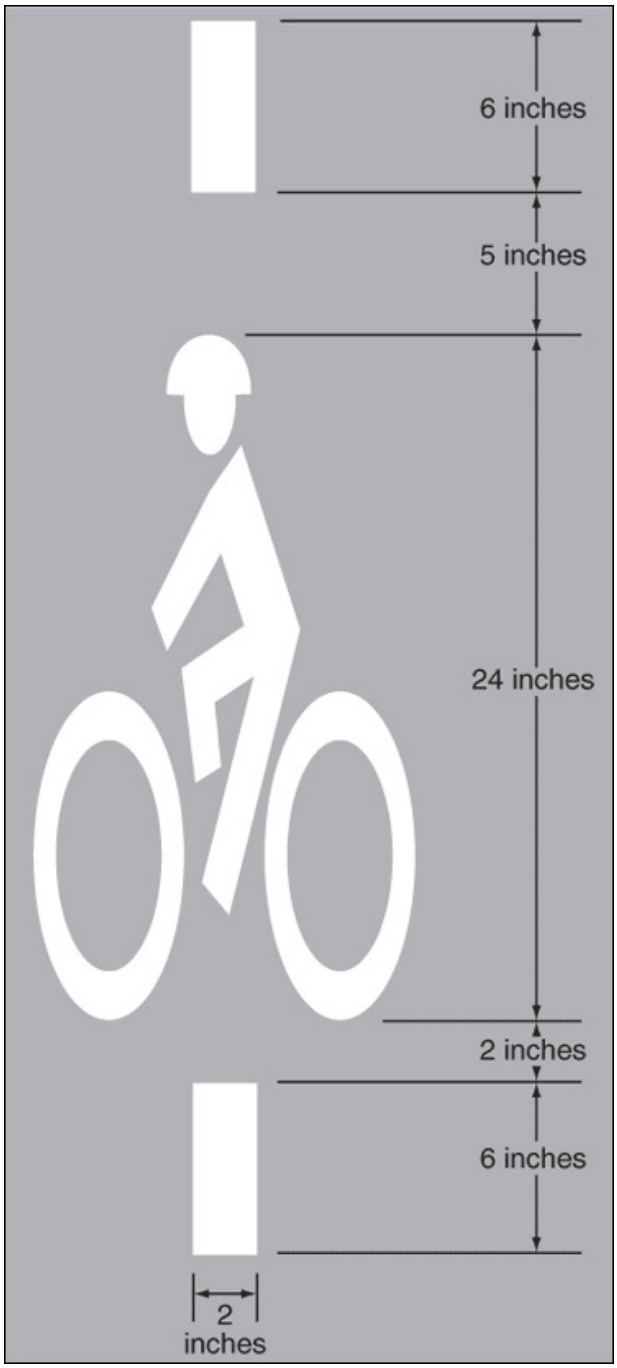
Illinois recently enacted a law, by which bicyclists and motorcyclists may treat stoplights like stop signs, after two minutes of waiting/not being detected. However, engineering solutions are safer and preferred.

For existing intersections, the MUTCD-approved Bicycle Detector Pavement Marking (MUTCD Fig. 9C-7), used together with the R10-22 Bicycle Signal Actuation Sign, to indicate the detector trigger point for actuating the signal. For standard automobile detectors, the detector's perimeter – such as its right edge – is typically more sensitive to bicycles. Correct adjustment of the sensitivity of existing automobile detectors may be needed while the detector pavement marking serves to indicate proper bicycle position at an intersection.

For new intersections, quadrupole loop detectors, or camera detection technology should be used, as they are more sensitive to bikes and motorcycles. The City of Austin, TX recently developed a smartphone app designed to communicate with the existing signal system. The app indicates to the signal that a bicyclist is approaching, which triggers a green light.

Bicycle detection technology should be operationalized at signalized intersections along key (framework) bicycle routes in order to reduce bicyclist wait time and potential confusion and conflict between roadway users.

Figure I4



Advance Stop or Yield lines

Advance stop or yield lines are standard markings that indicate the point behind which vehicles are required to stop or yield (in compliance with the locations traffic control device), but which placed further back on the approach to an intersection or marked crossing. Advance stop/yield lines are typically placed between four and 50 feet in advance of crossing location, and are 12 to 24 inches wide. The objective of this treatment is to encourage motorists to stop farther away from a marked crosswalk in order to improve lines of sight and increase safety at intersections. More information can be found in the MUTCD, Section 3B.16

Figure I5

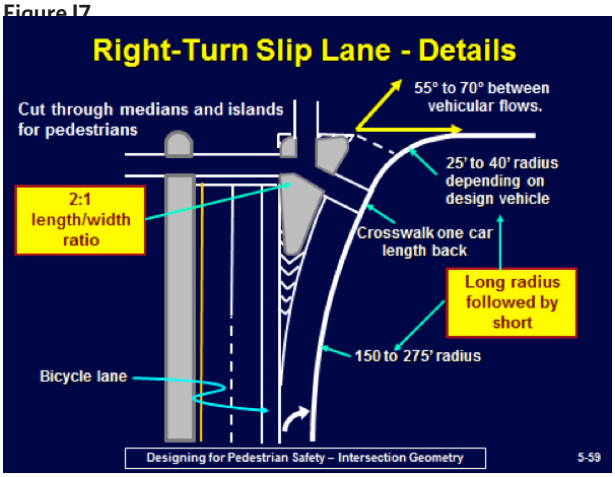
Medians/Refuge islands

Center median refuge islands are raised barrier areas placed in the center of the roadway, separating opposing lanes of traffic, through which a crosswalk passes. They provide a safe place for pedestrians to wait safely to cross, and can also help manage access / reduce conflict points.

Pork chop islands are triangular raised islands placed between a right-turn slip lane and through-travel lanes. They channelize vehicular traffic and also provide a place where pedestrians (and bicyclists) can wait for a suitable gap in traffic or for the WALK phase of a pedestrian signal. When properly designed, they keep turning speeds low and allow for good sightlines for pedestrians and drivers.

Medians and pedestrian crossing islands are one of FHWA's nine proven safety countermeasures and have been shown to reduce pedestrian crashes by 46 percent and motor vehicle crashes by up to 39 percent. They are recommended in curbed sections of multi-lane roadways in urban and suburban areas, particularly in areas where there are mixtures of significant pedestrian or bicycle and vehicle traffic (more than 12,000 ADT) and intermediate or high travel speeds.

Figure I7



Curb extensions

Curb extensions or 'bulb outs' are extensions of the curb line into the street, across the parking lanes to the edge of the travel lane. They are appropriate only where there are on-street parking lanes. Curb extensions have several objectives or benefits, including:

- To improve the visibility of pedestrians waiting to cross the street, and simultaneously improve the pedestrians' ability to see vehicles traveling in the roadway
- To shorten crossing distance/time
- To calm traffic and slow the speed of turning vehicles
- To provide more sidewalk space (for various purposes).

It should be noted that landscaping may be required in order to guide visually-impaired pedestrians to crossing locations. In addition, curb extensions can affect stormwater flow and should therefore be designed to accommodate drainage.

Raised crosswalks and intersections

Raised crosswalks are elevated above roadway pavement in the form of an elongated speed hump with a flat section in the middle and at-grade with adjacent sidewalks. A raised intersection is a plateau covering the entire intersection, including crosswalks, on level with surrounding sidewalks, with ramps on all vehicular approaches.

They are appropriate at locations with large volumes of pedestrians (and bicyclists) – in downtown areas, near schools, transit, etc. – along relatively low-speed roads. The objective of these treatments is to control and calm traffic speeds at crosswalks and/or intersections, increase visibility, and thereby improve the safety of pedestrians at the crossing. They are often combined with beacons, signage, and enhanced markings.

Figure I8

Figure I9

Pedestrian crossing beacons (Hybrid, RRFB, Overhead)

Pedestrian crossing beacons are used to warn and control traffic at unsignalized marked crossing locations in order to assist pedestrians in the crossing the roadway. They encourage drivers to comply with laws requiring that they stop for pedestrians in crosswalks. Beacons are activated by push buttons, so they should include a locator tone to inform visually impaired pedestrians that activation of the signal is required to cross the street, as well as a tone to indicate onset of the WALK interval.

The pedestrian hybrid beacon is a special type of hybrid beacon intended to stop vehicular traffic at unsignalized intersections or mid-block crossings along relatively large, high volume, high-speed, multi-lane roads, where traffic signals are not warranted.

A RRFB device is a pedestrian-activated beacon system located at the roadside (and sometimes on a median in the middle of a road), which acts as a supplement to pedestrian warning signs at non-signalized intersections or mid-block crosswalks. RRFB devices must be used in conjunction with other treatments, such as warning and regulatory signage, advance stop/yield markings, marked and/or raised crosswalks. They are typically utilized along roads with lower vehicle volumes and speeds than those where hybrid beacons are installed.[3]

Overhead flashing beacons are similar to RRFBs, but with lower intensity lights. They consist of pedestrian-activated flashing amber beacons installed on traffic signal poles and mast arms at uncontrolled crossing locations, along with regulatory/ warning signage.

[3] See Vermont's guidelines for pedestrian crossing treatments at http://vtransengineering.vermont.gov/sites/aot_program_development/files/documents/ltf/Crossing%20Treatment%20Guidelines%20January_2015.pdf. The City of Boulder's Pedestrian Crossing Treatment Installation Guidelines are at https://www-static.bouldercolorado.gov/docs/pedestrian-crossing-treamtment-installation-guidelines-1-201307011719.pdf. North Carolina DOT's Pedestrian Crossing Guidance is at https://connect.ncdot.gov/resources/safety/Teppl/TEPPL%20All%20Documents%20Library/Pedestrian_Crossing_Guidance.pdf, with a decision flow-chart at https://connect.ncdot.gov/resources/safety/Teppl/TEPPL%20All%20Documents%20Library/FlowChart.pdf.

Figure I10

Figure I11

In-street pedestrian crossing signs

A regulatory sign mounted in the center of relatively low speed streets at uncontrolled marked crossings, which reminds motorists of the law stating that they must stop for pedestrians in crosswalks. Unless on a median island, the in-street signs must be mounted on support designed to bend over and then bounce back to its normal vertical position when struck by a vehicle.

The in-street pedestrian crossing sign provides additional notice to motorists that they are approaching a pedestrian crossing, and encourages them to slow down and comply with the law to stop for pedestrians in a crosswalk. They calm traffic by visually and literally narrowing the street.

Figure I12

High-visibility signage—Warning and regulatory signs

Florescent, yellow-green signs that visually alert motorists to the potential for pedestrians and bicyclists to be present. The objective is to improve pedestrian safety at crossings and along roadways by increasing the visibility or prominence of crossing locations and other bicycle and pedestrian facilities or activity and to communicate regulations or laws pertaining to the interactions between motor vehicles, pedestrians and bicyclists. The signs encourage motorists to operate their vehicles with caution, to expect pedestrian and bicycle traffic, and to be aware of the legality of their presence. They attract drivers' attention to areas of potential conflict between motorized and non-motorized traffic.

Figure I13

Mini traffic circles

Mini or neighborhood traffic circles are raised circular medians (traffic circles) constructed in the center of intersections of low volume, low speed, primarily residential streets. Vehicles must change their travel path to maneuver around the circle. While the typical application uses traffic circles to replace stop signs, they may also be installed in intersections where stop or yield signs remain in place.

Mini traffic circles are a traffic calming feature and an aesthetic enhancement. As traffic calming device, their purpose is to reduce motor vehicle speeds, manage traffic, and improve safety at intersections in residential areas. As aesthetic elements, they contribute to the quality of the streetscape through landscaping and other enhancements.

Figure I14

APPENDIX J

Sidewalk Zone System

The Sidewalk Zone System is a tool that planners use to ensure that pedestrian ways function appropriately and meet basic Americans with Disabilities Act (ADA) requirements for a continuous, smooth and level sidewalk, free of obstructions. Under the system, it is easier to place ramps correctly and keep the sidewalk level across driveways. Following the system also keeps all potential obstructions, such as utility poles, signs, trees, drinking fountains, and benches, in the furniture or frontage zones.

The Sidewalk Zone System consists of four distinct zones:

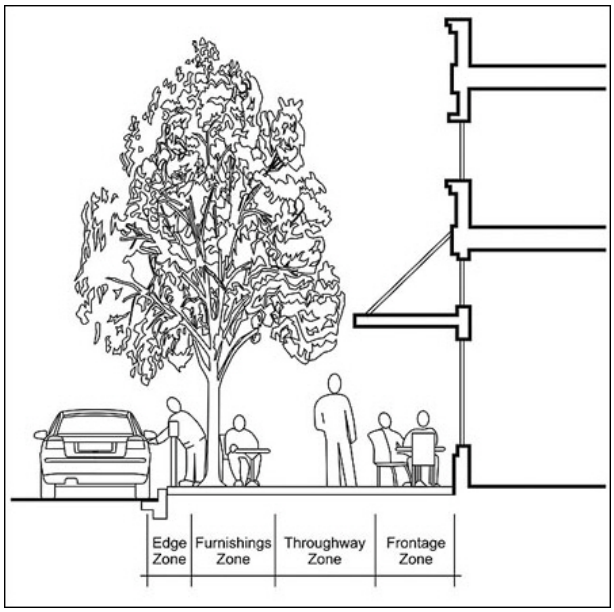
- Curb zone: curbed area between the sidewalk and the vehicle ways; usually includes drain inlets.

- Furniture zone: Area of the sidewalk where refuse receptacles, benches, utilities, and other objects are best placed.

- Pedestrian zone: Area of the sidewalk that should be clear for walking.

- Frontage zone: Area of the sidewalk that transitions to adjacent land uses; commonly used for quasi-public activities, such as outdoor cafes and sidewalk sales.

Figure J1

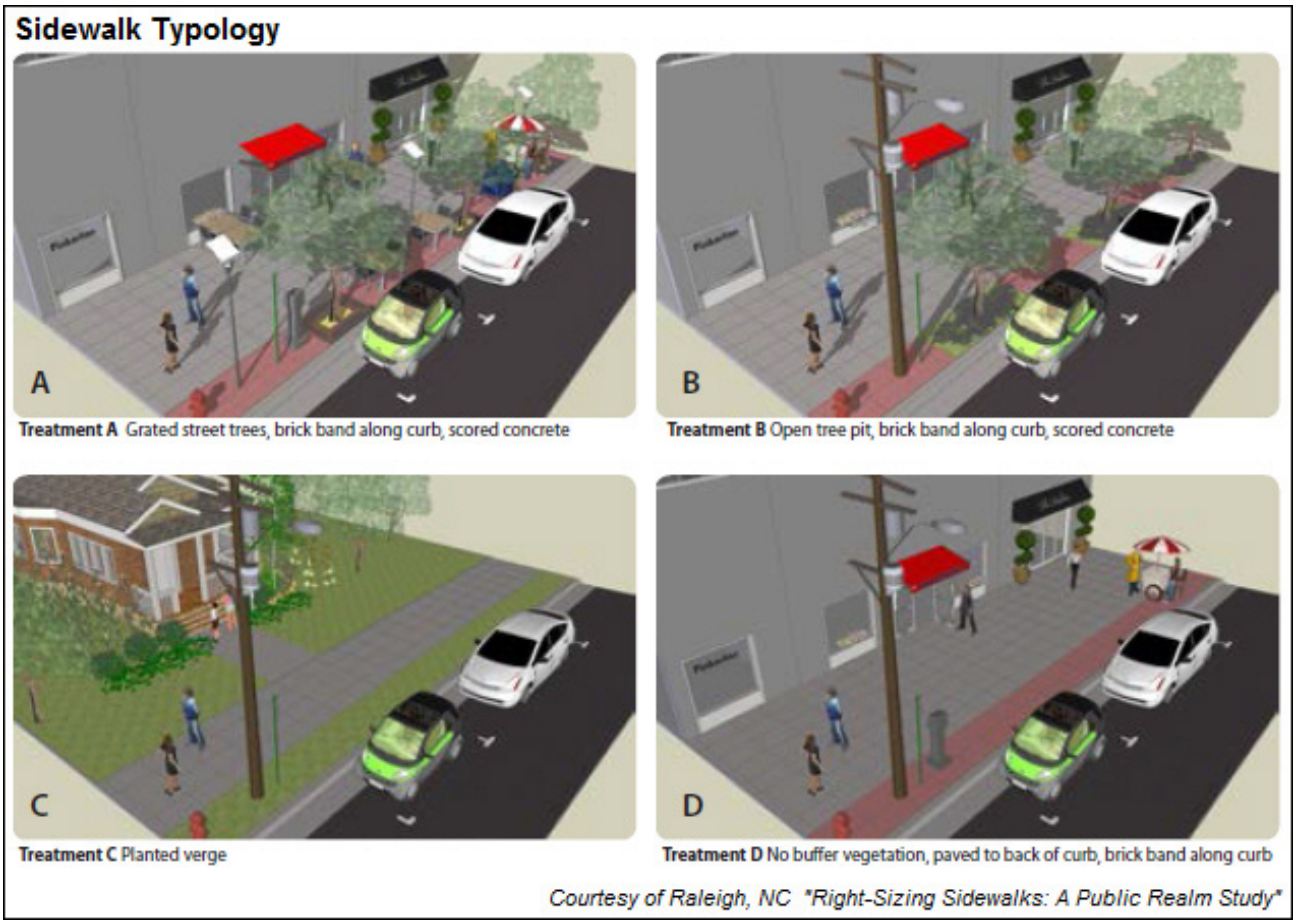


Courtesy of FHWA

[4] See the U.S. Access Board website, https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way.

Geometrics for each zone will look different in residential areas versus commercial districts. Guidance on space allocations can be found in Chapter 3 of the Active Transportation Alliance's *Complete Streets Complete Networks* design manual: http://atpolicy.org/Design. The *Public Rights-of Way Accessibility Guidelines* (PROWAG) offer information and guidance on best practices for accessibility in and along streets.[4] These proposed guidelines are expected to become law in the near future. In general, the provision of ADA-compliant accessibility in public rights-of-way advances community walkability. However, true walkability is about more than access in the sense of that word as used in the ADA. Providing an inviting and comfortable environment for persons on foot, including amenities such as street trees and furnishings, as well as a mix of land uses and architectural forms that cooperate and collaborate with the activity of walking, are also important in creating walkable communities.

Figure J2



Treatment A Grated street trees, brick band along curb, scored concrete

Treatment B Open tree pit, brick band along curb, scored concrete

Treatment C Planted verge

Treatment D No buffer vegetation, paved to back of curb, brick band along curb

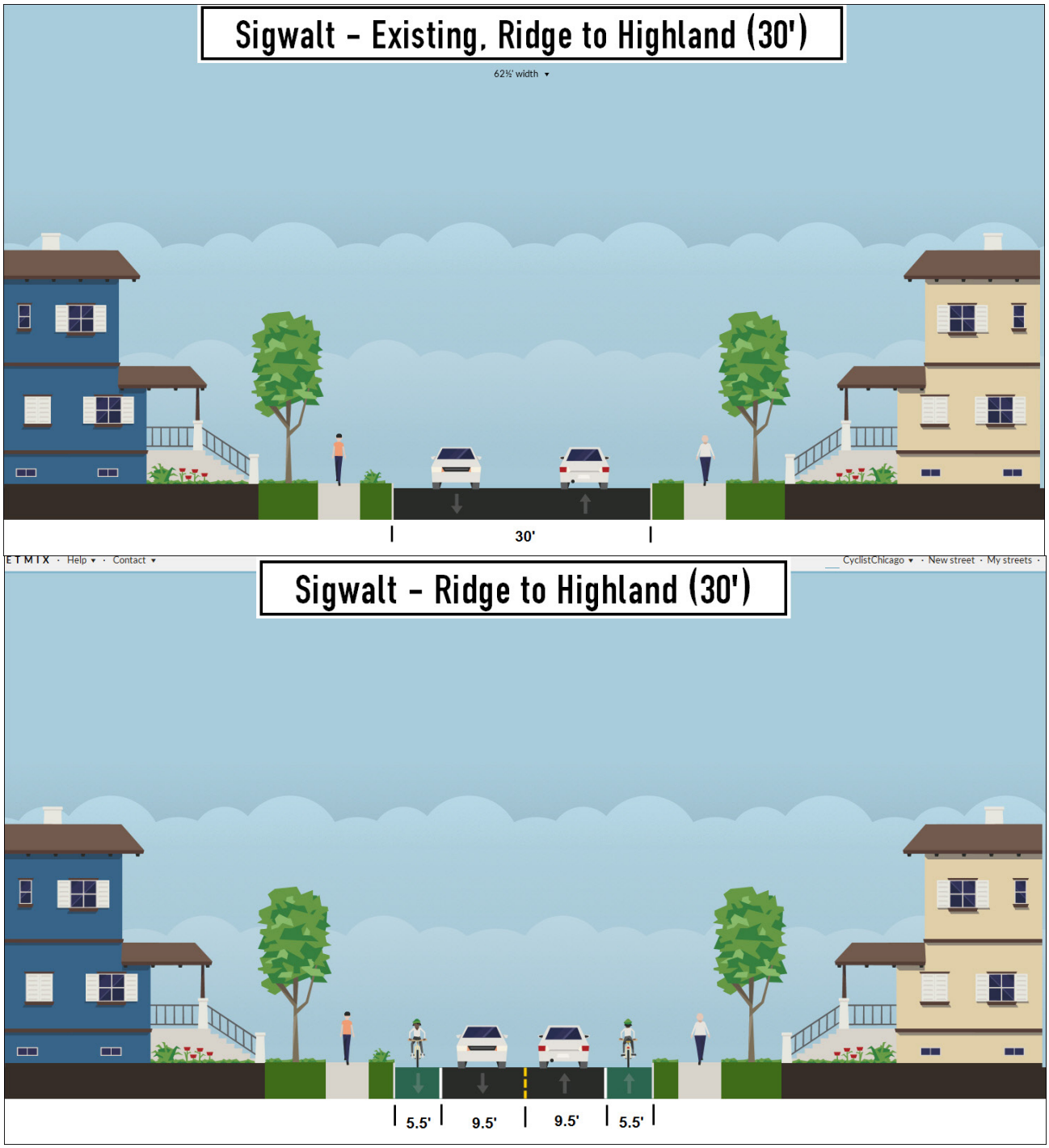
Courtesy of Raleigh, NC "Right-Sizing Sidewalks: A Public Realm Study"

APPENDIX K

Additional facility type cross-sections

Traditional bike lanes (*Illustrative*)

Figure K1 - Sigwalt, Existing and Proposed



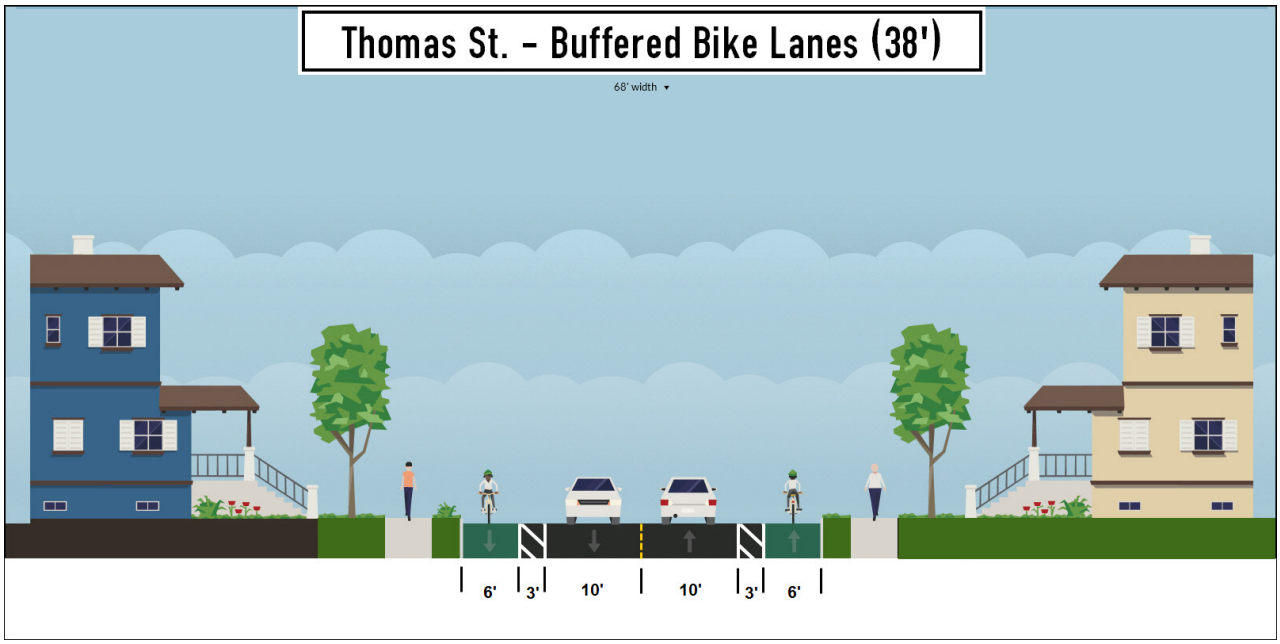
Source: www.streetmix.net

Figure K2 - Douglas, Existing and Proposed

Source: www.streetmix.net

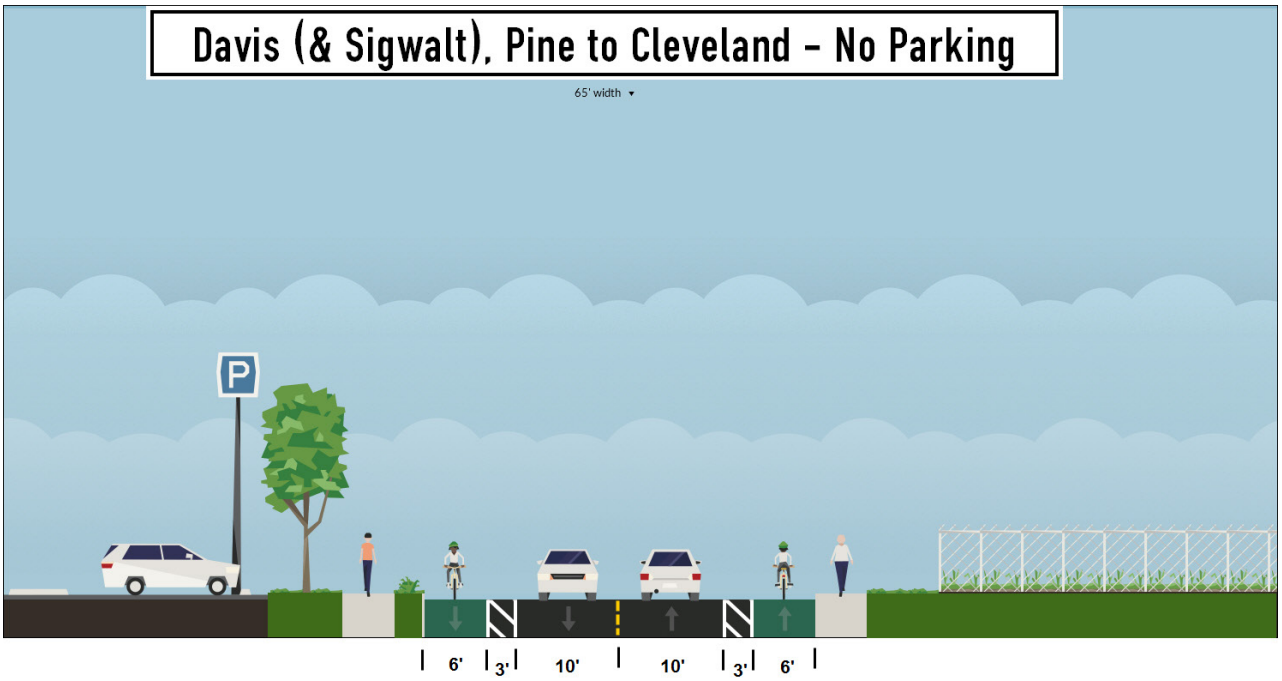
Buffered bike lanes (*Illustrative*)

Figure K3 - Thomas, Proposed



Source: www.streetmix.net

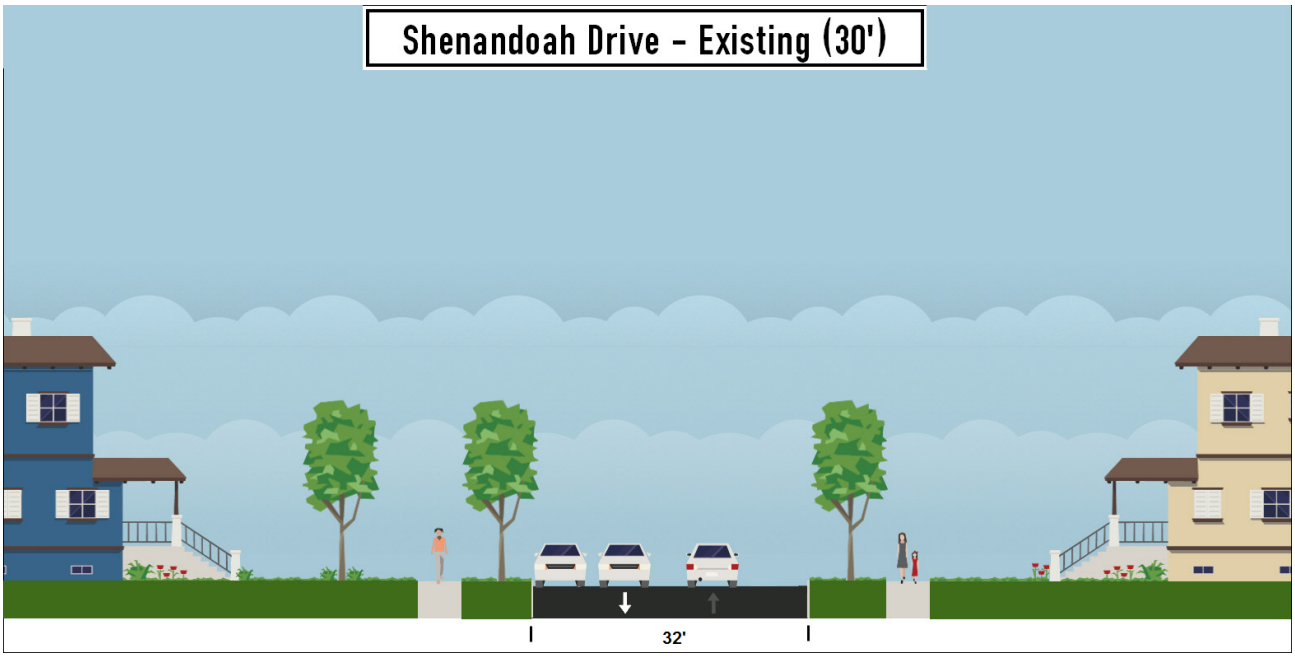
Figure K4 - Davis and Sigwalt (no on-street parking)

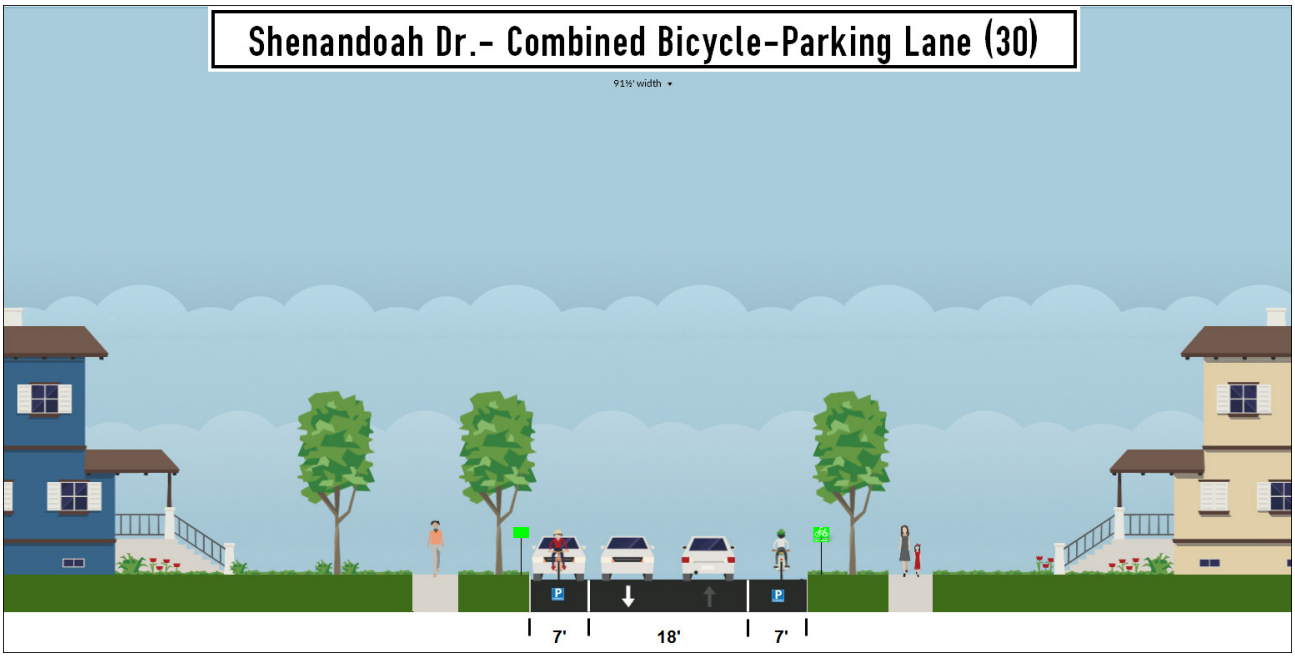


Source: www.streetmix.net

Combined bicycle-parking lanes (*Illustrative*)

Figure K5 - Shenandoah, Existing and Proposed





Source: www.streetmix.net

Signed bicycle route (*Illustrative*)

Figure K6 - Hackberry (local street, bike signage only)

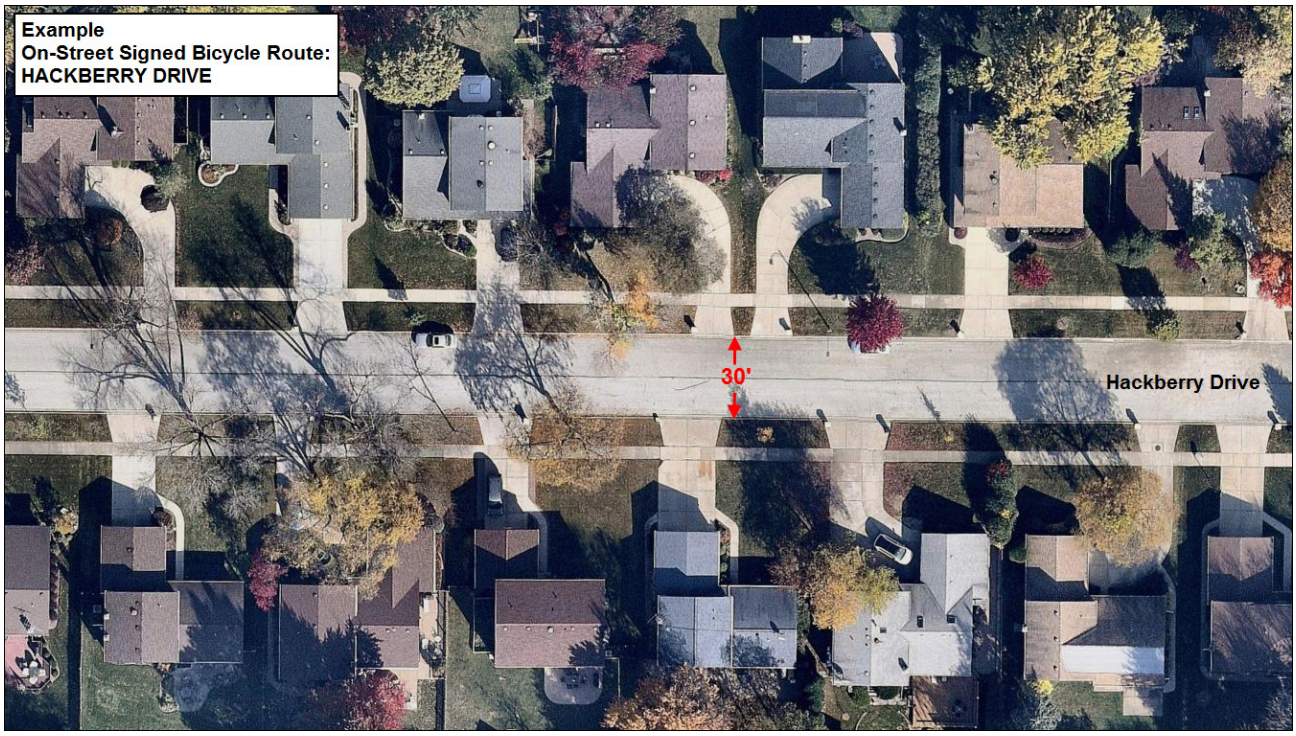
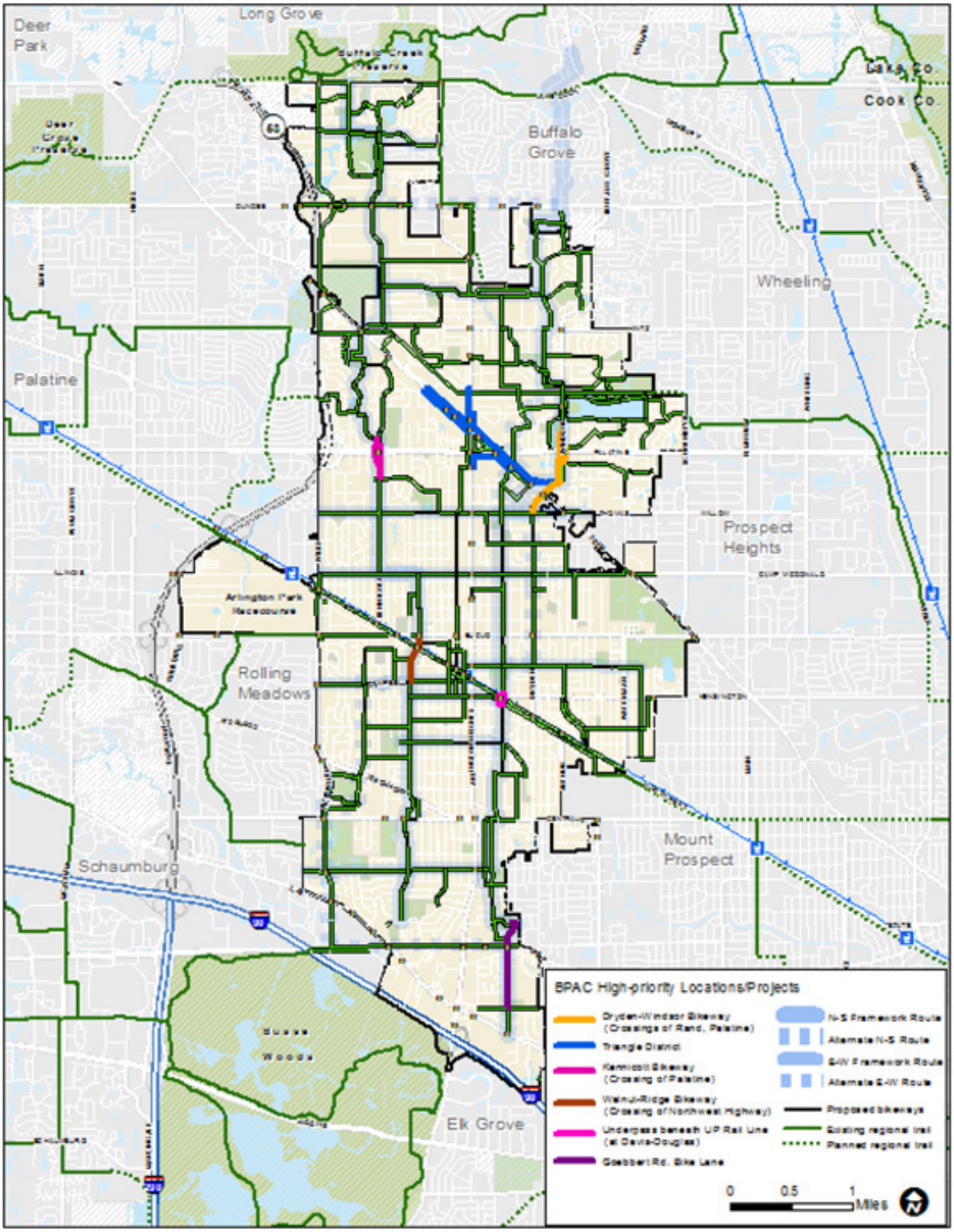


Figure K7 - Hackberry (local street, bike signage only, perspective view)

APPENDIX L

Arlington Heights BPAC - High Priority Locations / Projects



Source: CMAP, 2016

APPENDIX M

Bike Parking Ordinances: A recent exchange on the Association of Bicycle and Pedestrian Professionals Discussion Forum

From: j.f.cinatl@sbcglobal.net [mailto:j.f.cinatl@sbcglobal.net]
Sent: Saturday, December 26, 2015 2:43 PM
To: APBP List Serve; DUNBAR Reed C
Subject: Re: [apbp] Bike Parking Ordinance Examples

Hi Reed (and listserve folks)

I'm finally catching up on some old e-mails - particularly this early December cluster of e-mails in regard to bike parking - one of my favorites subject.

I'd like to add a few additional comments to you excellent list below.

Expand your guidelines/ordinances bike parking pages & diagrams by referencing the APBP *Bicycle Parking Guide 2nd Edition* (or later) which describes many "good" bike rack types and parking scenarios. If you don't detail the type of racks you will get useless rack types being installed (like wave racks) instead of good types - which defeats the whole purpose of a good bike parking guide.

Once these ordinances/guidelines are put in place the Plan Checkers in the jurisdiction's Planning Department must be made aware of these provisions and include bike parking provisions on their Plan Check list. Plan Checkers must be made aware that properly installed racks aren't be located in the alley next to the dumpster - but up front where patrons access them (rear located racks are OK for staff however)

Then, Building Inspectors must be brought on board - when doing building inspections, before signing off for occupancy, they need to check the bike racks, of the correct type and location, are installed.

Anyway, just some additional thought regarding bike parking

John Cinatl
Caltrans - District 6 Bicycle Coordinator - Retired
Clovis (Fresno) & Port Hueneme (Oxnard), CA

From: DUNBAR Reed C
To: Liz Cornish ; Members@lists.apbp.org
Sent: Wednesday, December 09, 2015 9:30 AM
Subject: Re: [apbp] Bike Parking Ordinance Examples

I am currently wading through scores of best practice documents, public input, and staff recommendations in an effort to update our code (I will have a near-final draft to share soon, if interested). Here are a few items that I think belong in a modern bicycle parking code update based on our experiences:

- Provision of Non-Standard bicycle spaces. Cargo bikes, family bikes, and bikes with trailers require more room. Decide on a quantity or percentage of spaces for "big bikes".
- Access to electrical outlets. eBikes are becoming more popular and any long-term bicycle parking should include (at a minimum) the installation of electrical conduit. When I inquired to this listserv about standards Vancouver, BC responded they require 50% of long-term bicycle spaces to have access to electrical outlets.
- Materials for long-term bicycle parking. Cities should prohibit the use of cyclone (or chain link) enclosures. They are too easily defeated by simple tools. Specify wire mesh or perforated steel (or glass, masonry, etc.). If there is an interior bike room, make sure there is an opportunity to see and be seen before entering the room (windows).
- If you allow bicycle lockers ensure there is an opportunity for visual inspection. Usually, this means specifying some level of transparency (wall materials like perforated steel, or durable clear inserts in the door)
- Minimum height requirements for rack elements. Rack characteristics are important, decide on how you wish to regulate the material composition and size of the standard bicycle racks (in addition to spacing characteristics).
- If you have large developments, decide if you want long-term parking dispersed throughout the site or if you will accept a central secure parking enclosure. We have had issues with disuse of centralized facilities and will write requirements for multiple long-term bicycle parking enclosures into the code.
- Best practice documents do a good job of specifying attachment/mounting options. Be clear about how you want racks to be mounted.
- Percentage of covered bicycle parking (short-term). Important in rainy climates. Having a discussion about lighting is also important.
- Decide if you will accept stacked, hanging, or semi-vertical bicycle parking. We will probably end up with a small percentage of stacked and hanging. These types of parking decrease the footprint of bicycle parking areas but

can challenge users with heavy (or non-standard) bikes.

I have a lot of thoughts on this – if you have specific questions please let me know.

Reed Dunbar, AICP | Transportation Planner

City of Eugene | Public Works Engineering
99 E Broadway, Suite 400 | Eugene OR 97401
Phone 541.682.5727 | Fax 541.682.5032

On Wed, Dec 9, 2015 at 2:31 PM, Jessica Roberts <jessicaroberts@ altaplanning.com> wrote:

I agree with Tim that enforcement is the key. Portland has had problems with this, and advocates have taken on the task of monitoring for compliance, which frankly seems ridiculous - that is literally the paid job of city staff, and to have advocates do it out of their personal time....but here we are.

Again to point out Arlington, at least the last time I talked with them about this, the enforcement work they did was outstanding. They had a staff person appointed as the very proactive watchdog, and he took that role really seriously.

Jessica Roberts
Principal
Alta Planning + Design
www.altaplanning.com
Main line: 503-230-9862 | Direct: 503-200-3272 | jessicaroberts@ altaplanning.com
Creating active communities

On Wed, Dec 9, 2015 at 11:14 AM, Tim Potter <pottert@msu.edu> wrote:

[The Meridian Charter Township Bicycle Parking Ordinance] was adopted in 2010 and local bike advocates have learned that enforcement is the difficult part. We've played an informal role in monitoring things on the ground for township staff who are pretty tight for staff time, but can't possibly replace a formal process for ensuring that the ordinance is followed by developers/ property owners. So, I'd recommend having some discussion and agreement with staff re: how and when audits are done on developments that require bike parking by your ordinance.

Tim

****

Tim Potter
Sustainable Transportation Manager
MSU Bikes Service Center
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Direct Ph: 517-432-3414 | Direct Email: pottert@msu.edu