

Recommendations for Shelbyville Bicycle Routes

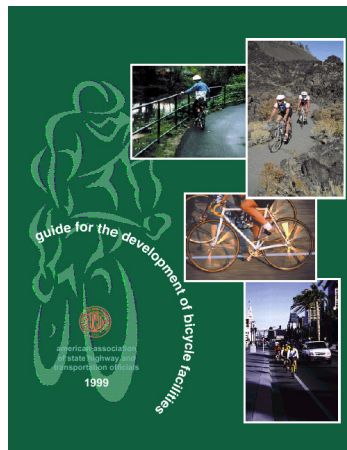
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December 10, 2007 (map edit April 16, 2008)

Introduction

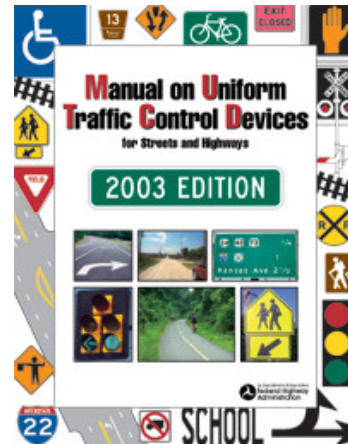
The League of Illinois Bicyclists (LIB) would like to offer Shelbyville the following recommendations for its bike routes proposal. This report is intended to help in the selection of both routes and facility types to connect Shelbyville's downtown with the General Dacey Trail and connect residents with important destinations.

The resources used to make these recommendations are as follows:

1. The AASHTO Guide for the Development of Bicycle Facilities (1999)¹. This industry standard provides design guidelines for both off-road (trail) and on-road facilities.
2. The Manual on Uniform Traffic Control Devices (2003)². This is the Federal Highway Administration's industry standard on signage and road markings. Chapter 9 describes Traffic Controls for Bicycle Facilities.



Left: AASHTO guide.



Right: MUTCD.

¹ Guide for the Development of Bicycle Facilities, American Association of State Highway and Transportation Officials (AASHTO), 1999. Available from AASHTO, www.transportation.org, 800-231-3475.

² Manual on Uniform Traffic Control Devices, Federal Highway Administration, 2003. Available at mutcd.fhwa.dot.gov

3. “Bicycle Level of Service” (BLOS)³. This is a measure of on-street “comfort level” for a wide range of adult cyclists. A number is calculated as a function of traffic conditions and roadway geometry. Lower numbers mean higher bicycling comfort. The BLOS itself is a grade corresponding with ranges of these numbers, with “A” being the best, and “B” being a target for on-street bikeways. BLOS has been used throughout the country, including in the IDOT bicycle maps, and can be used as a planning tool to evaluate options and justify decisions.

Selecting Possible Routes

A major goal is to enhance recreational biking, particularly routes between the General Dacey Trail and downtown. In addition, another goal is for residents to have improved opportunity to bike to other important destinations around town, such as schools. Recommended routes were chosen with this in mind.

Shelbyville has an extensive sidewalk network. Sidewalks are generally recognized in planning practice to adequately meet the bicycling needs of younger children, who are often not mentally or physically ready to “share the road” with motor vehicles. In this report, the target audience is a broad range of other cyclists, including casual adult and teenage riders and competent pre-teens. Sidewalks are not adequate for these bicyclists, which is why other forms of facilities must be considered.

In many situations, designating on-road bikeways (bike lanes, signed routes) is better than making off-road improvements, such as widening sidewalks. While it is counter-intuitive to many who do not bike often, it is actually safer (for mature cyclists) to bike on-road than on parallel sidewalks or trails when there are many crossings (driveways, commercial entrances, sidestreets) – as in Shelbyville. The vast majority of bike-car accidents take place at intersections, not from bikes being hit from behind. Intersection problems increase when bicyclists are off-road due to lack of expectation and visibility and questions about right-of-way. This issue is further detailed and illustrated in the AASHTO guide, at <http://www.bikelib.org/education/tips.pdf>, and at <http://www.bikelib.org/muniguide/#alongroads>.

Shelbyville’s Trail Committee suggested several routes for study. We took these routes into consideration and judged them on many factors. Wider roads with lower traffic volumes and speeds were preferred, as were direct routes with a minimum of stop signs and turns. The recommended routes are included in this report. Several routes were looked at but not chosen as recommended routes because of better alternatives. The routes looked at but not recommended include Morgan between North 1st and North 2nd, Broadway between Main Street and North 9th, Walnut between Main Street and North 2nd, and North 1st Street east of Broadway.

³ B. Landis et al., “Real-Time Human Perceptions: Toward a Bicycle Level of Service,” *Transportation Research Record 1578*, Transportation Research Board, Washington DC 1997. LIB’s own BLOS calculator is on-line at www.bikelib.org/roads/blos

Bikeway Types

We considered the following bikeway types for Shelbyville:



Bike Lanes

Bike Lanes are portions of the roadway designated for exclusive bicycle use. Bike lanes are at least five feet wide (including gutter pan) on each side of the road, marked with a stripe, signage, and pavement markings. Cyclists in each bike lane travel one-way with the flow of traffic.

Sample results around the country for roads with bike lanes include:

- More predictable movements by both cars

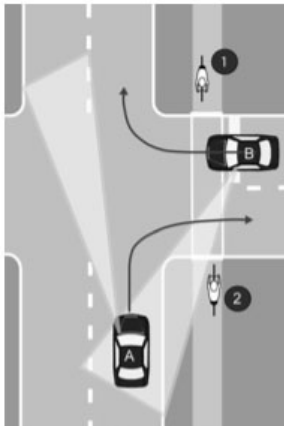
and bikes

- Better cyclist adherence to laws about riding on the right side of the road
- Dramatic increases in bike usage with lower car-bike crash rates
- Decreased car-car crashes too, possibly from a traffic calming effect

Parking is not permitted in designated bicycle lanes. Although not applicable in this plan, when a road has bike lanes and adjacent parking, the bike lanes should be striped between the parking space and the travel lanes. Regular sweeping is important, as bike lanes tend to collect debris.

Sidepaths

Sidepaths are trails running immediately parallel to a roadway, like a sidewalk. Many people mistakenly believe using sidepaths or sidewalks is always safer than on-road bicycling. Surprisingly, this is not the case where there are many side streets, residential driveways, or commercial entrances—especially for “contra-flow” cyclists biking against the traffic flow. The figures in this section illustrate the visibility problems that lead to intersection conflicts. Note that in each case, an on-road cyclist on the right side of the road is within the motorist’s viewing area.



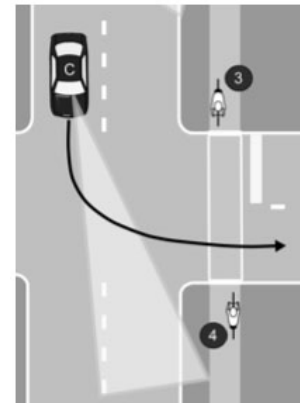
In the figure at left, Car B crosses the sidepath to turn right onto the parallel street. Rarely do motorists stop at the stopline – usually stops are in the crosswalk or at the street edge. Many do not fully stop. Many will look only to their left for cars. Cyclist 2 might be seen, but it is likely that Cyclist 1 will be missed.

Car A turns right off the parallel road then crosses the sidepath. Again, Cyclist 2 might be seen but Cyclist 1 is less visible. Many motorists do not yield to cyclists entering or already in the

crosswalk, particularly when a large turning radius permits fast turns.

In the figure at right, Car C looks ahead, waiting for a traffic gap to turn left, then accelerates through the turn while crossing the crosswalk.

Cyclist 4 might be seen. Again, the contra-flow cyclist, Cyclist 3, is less likely to be seen. If the traffic gap is short, sudden stops for Car C would be difficult, since they could leave it in the path of an oncoming car.



The AASHTO guide describes these and other sidepath issues to discourage sidepath use in inappropriate locations. This report considers the feasibility of the sidepath option in specific cases. In general, sidepaths may be better choices than on-road bikeways for faster, busier roads without lots of crossings and with well-designed intersections. When sidepaths are built, intersection conflicts can be reduced by:

- Bringing the sidepath closer to the road at intersections, for better visibility during all turning motions and better stopline adherence for right-turners
- Using pedestrian refuge islands to break up very wide multilane crossings and right-in-right-out entrances
- Using high visibility crosswalks or color differences – at commercial entrances, too
- Occasional police enforcement of stopline adherence at sidepath crossings.

Bike Routes

Some roads may be identified by signage as preferred bike routes because of particular advantages to using these routes compared to others. These “signed shared roadways” may be appropriate where there is not enough room or less of a need for dedicated bike lanes. AASHTO specifies spacing and placement for Manual of Uniform Traffic Control Devices (MUTCD) standard D11-1 “Bike Route” signs (see figure at right). In urban areas, signs should be placed every 500 meters (approximately 1/4 mile), at every turn, and at all signalized intersections.

For these signs to be more functional, especially for tourists coming off the General Dacey trail, supplemental destination plates (MUTCD D1-1) and arrows (MUTCD M7 series) should be placed beneath them. Key destinations such as downtown, schools, the park, the community center/pool, and the library can be given. Some Illinois towns have put 2-3 destinations on a single sign, with mileages. Further guidance on signage is available in the MUTCD manual.



MUTCD D11-1 Bike Route sign.

A road does not require a specific geometry to be signed as a Bike Route. A Bike Route may be an unstriped street, a road with paved shoulders, or a street with shared bike/parking lanes, described next.

Shared Bike/Parking Lanes



Very often there is not enough roadway width for Bike Lanes, or a town is not willing to remove on-street parking in order to make room for them. An option for roads with *lightly occupied* parking is to stripe off areas that can be used by both parked cars and bikes. These Shared Bike/Parking Lanes are *not* exclusive Bike Lanes and

should not have Bike Lane signage – only the Bike Route signage above. In certain cases where bike lanes cannot be installed for whatever reason, Shared Bike/Parking Lanes should be considered.

Cyclists in a Shared Bike/Parking Lane have to leave the striped-off area to pass the occasional parked car, but this is very similar to road shoulder biking (with parked cars) and riding on “regular” unmarked roads. Most of the time cyclists would ride within the striped lane, which has been shown to increase their comfort level. Also, the occasional parked car benefits from the separation from the travel lane. Shared Bike/Parking Lanes share other benefits of Bike Lanes, too, such as a traffic-calming effect to slow down cars.

It is worthwhile to lessen confusion about parking on the various types of bike routes with signage. A suggestion is to include “parking permitted” or parking informational signs on the same post as Bike Route signs. To differentiate from Bike Lanes with an absence of adjacent parking, Bike Lane signs could include “no parking” signs (R8-3a, R7-9, or R7-9a) on their posts.

Selecting Bikeway Types

Fieldwork was done to investigate which bikeway types would be appropriate for the road segments recommended by the committee. These guidelines were used:

- Where on-road bikeways are recommended, try to achieve a BLOS rating of “B” or better for designation in the network. This is an appropriate goal for accommodating the casual adult bicyclist. Depending on the situation, use Bike Lane or Bike Route signage (and wayfinding directional signage) to indicate inclusion in the network.
- For the Bike Routes and Bike Lanes in the network, raise the priority of filling sidewalk gaps on at least one side of the road. This recognizes that children—and more traffic-intolerant adults—will ride on the sidewalk. However, do not mark sidewalks as Bike Routes.
- Do not recommend sidepaths where there are too many crossing conflicts (driveways, entrances, cross streets). Where sidepaths are recommended, use the design

techniques described above to somewhat reduce the risks at intersections.

- Where there is sufficient width and need, stripe roads for dedicated Bike Lanes—with no parking permitted in the bike lanes.
- On sufficiently wide roads with sparse parking occupancy, stripe a Shared Bike/Parking Lane and sign as a Bike Route.

Specific Recommendations

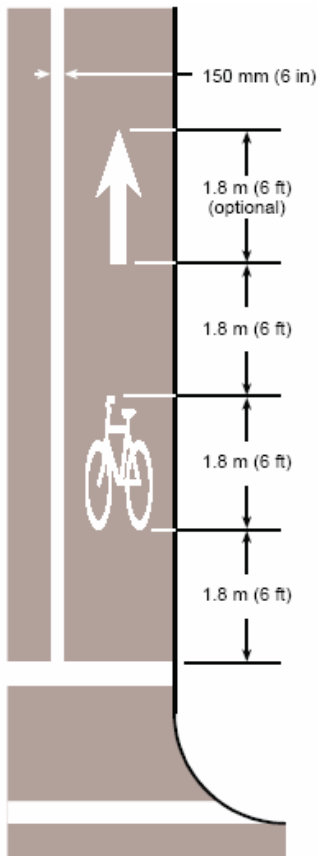
The following are recommendations for each roadway segment that is appropriate for inclusion in Shelbyville’s initial bike network. Existing conditions are described, based on fieldwork and IDOT traffic count data for some roads. Detailed suggestions are offered for each road, including those without many improvement options. A map summarizing recommendations is at the end of this report.

Morgan, North 2nd to North 9th

Morgan is a one-way street going north. Parking is permitted on both sides of the street, but the spots used are sparse. The street is 30 feet across, divided into two 15 foot lanes. Even though there is a white center stripe, most drivers ignore it or end up weaving back and forth due to cars parked on either side. The average daily traffic on this stretch of street is 2,100 on the south end, 3,100 in the middle, and 1,100 on the north end.

Recommendation: Remove parking from the east side of the street. Re-stripe the street with an 8-foot space for parking on the west side delineated by a solid white line, a 16.5-foot travel lane with a 25 mph speed limit, and a 5.5-foot northbound bike lane on the east side. Paint arrows and a bicycle in the Bike Lane as shown in the figure below, left. This Bike Lane adheres to AASHTO standards and provides enough room for comfortable bicycle riding while discouraging parking on that side of the street. These changes would also raise the Bicycle Level of Service (BLOS) from a high “C” to a high “A.” “B” is an acceptable score for on-road bike routes.

In this scenario, MUTCD signage displayed in the figure below, right would be used. The R3-17 sign provides notice of the bike lane and R8-3a prohibits parking. As also shown in the figure, the solid bike lane stripe would become dotted approaching intersections, and would not be painted at all in intersections. (Morgan Street would differ slightly from the figure because it is one-way and parking would be prohibited on the east side of the street. The left side of the figure is most pertinent. On Morgan Street, the bike lane would be directly against the east side curb and parking would be on the west side of the street.)



Bike Lane painting.

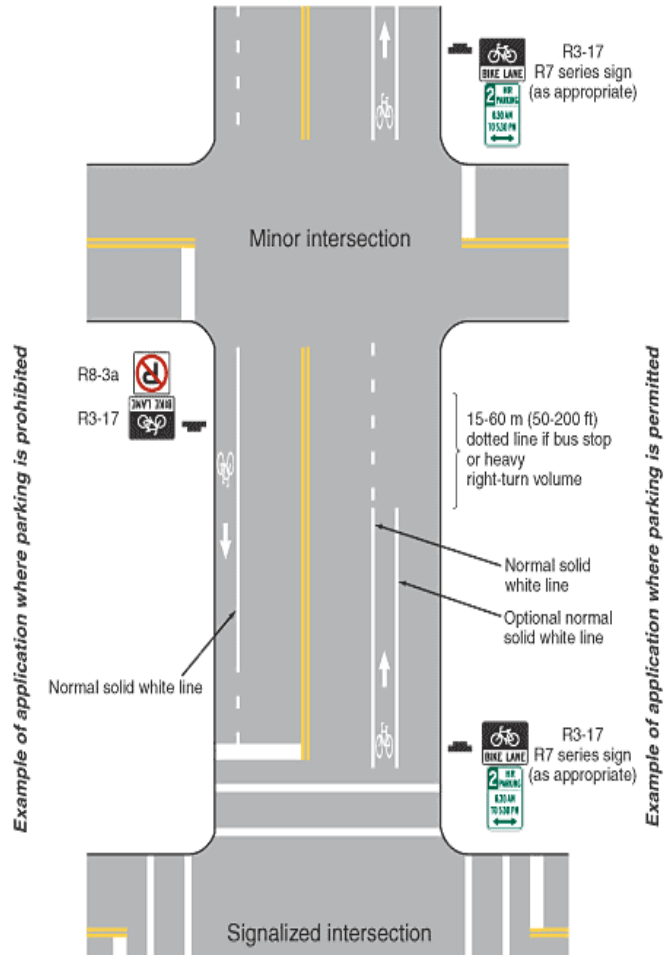


Illustration of MUTCD R3-17 and R8-3a signage.



To forbid bicyclists from illegally riding south on Morgan Street through the parking spots, the use of R5-6 signs is recommended. One north-facing sign could be posted just south of North 9th Street. If wanted, another could be placed just south of North 6th Street. The R5-6 sign is a no bicycles sign displayed in the figure at left.

The following photo shows what Morgan Street would look like after the recommended changes:



Rejected alternatives:

1. *Put a bike lane on the east side of Morgan without removing any parking.* The striping in this case would be 7 feet for the west side parking, 10 feet for the travel lane, 5 feet for the northbound bike lane, and 8 feet for the east side parking (slightly larger to reduce the chance of motorists opening doors into cyclists' paths). This solution barely meets width standards, and would be good only if parking occupancy was high on both sides of the street. Since Morgan has sparse parking, this option would not work well for either motorists or bicyclists. The motorists would only have 10 feet for travel, versus 16.5 feet in the recommended solution. The cyclists would be riding more than 8 feet further into the road than necessary.

2. *Put a Shared Bike/Parking Lane on the east side of the street.* This bikeway type is feasible since there is sparse parking occupancy on Morgan. This option keeps a 7.5-foot parking lane on both sides of the street, with a 15-foot travel lane between them. The east side parking lane would be shared with bicyclists. The D11-1 Bike Route sign would indicate the street as a bike route, but no bike lane signage or pavement markings would be used. Again, R5-6 signs south of North 9th and 6th Streets could be used to forbid southbound bicycle use. This option would be less comfortable than the primary recommendation of a bike lane for some cyclists, as they would have to leave the shared lane to pass the occasional parked car.

3. *Put two-way bicycle lanes on the west side of the road.* While this would be more convenient for southbound users allowed to travel on Morgan southbound instead of going to a street further west, there are technical problems with this option.

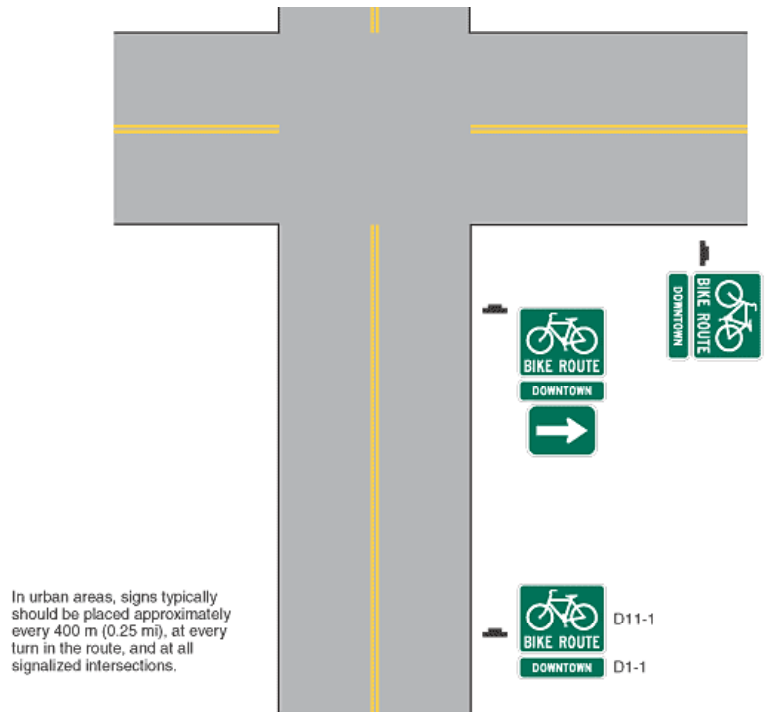
From AASHTO text, Page 22: "On one-way streets, bike lanes should generally be placed on the right side of the street. Bike lanes on the left side are unfamiliar and unexpected for most motorists." However, "Two-way bike lanes on the left side of a one-way street could be considered with a suitable separation from the motor vehicle traffic after a complete engineering study of other alternatives and relative risks." To do this, 10 feet on the west side of the street would be required for two 5-foot bike lanes, with another few feet (possibly four) needed for the "suitable separation." This only leaves 16 feet for the travel lane plus parking—definitely not enough.

Other problems: motorists at cross streets are not looking for southbound bike traffic on Morgan since it is a one-way street. Also, motorists on Morgan may mistakenly use the 10-foot bike lane space as a travel lane. This treatment is not advised here. While it might be inconvenient for southbound cyclists to go out of their way to the west, it is important that Shelbyville meets engineering standards.

Walnut, North 2nd Street to North 9th Street

Walnut is 19 feet 6 inches and has additional width of gravel parking on each side. It has a very low traffic flow and stop signs at many of its cross streets.

Recommendation: Use D11-1 bike route signage (and arrows at turns) for southbound users only. While Walnut has more stop signs, it has fewer problems than Morgan or Broadway. The existing Bicycle Level of Service for Walnut is a high “B.” The figure below shows how to use this signage. This signage should be used throughout the entire network.



MUTCD Figure 9B-6 displaying D11-1 signage.

Vine, South of North 6th Street

Vine does not have lane striping or stop signs at many cross streets. It leads to the high school and middle school. It measures 18 feet and 3 inches, with additional gravel width at some points. South of Main it measures 23 feet and 3 inches, with no curbs. Vine has moderate traffic.

Recommendation: Use D11-1 Bike Route signage in both directions from North 6th Street (location of the school) south to South 4th Street. The existing BLOS score is a mid “B” for traffic count estimates between 500 and 1,000 north of Main. South of Main, there is somewhat more traffic (estimates between 1,500 and 2,500) which puts the BLOS at a low “B.” This is somewhat less comfortable for some cyclists, but still considered acceptable for a designated Bike Route. Continue Bike Route signage west to the park on South 4th Street.

North 2nd Street, between Morgan and Vine

North 2nd Street measures 32 feet and 3 inches including the gutter pan. Curbs exist between Broadway and Morgan. It does not have lane striping. There are several stop signs at cross streets, and some parking occupancy east of Wood.

Recommendation: Despite the stop signs, this is the logical road for the main east-west Bike Route in the central part of town. Use D11-1 Bike Route signage from Vine to Washington, in both directions. The existing BLOS score is a high “B” for traffic count estimates between 1,000 and 2,000. The road is wide enough for exclusive Bike Lanes, but the existing BLOS comfort level does not warrant striping and doing so would necessitate removal of parking. There is not enough room for Shared Bike/Parking Lanes.

North 9th Street, West of Morgan and East of Walnut

West of Morgan, North 9th Street is 27 feet, 8 inches with a 25 mph speed limit. East of Walnut, North 9th Street is 21 feet, 4 inches with a 30 mph speed limit and no parking.

Recommendation: Use this as part of the recommended southbound route, using Walnut to complement northbound Morgan. Bike Route signage (in the westbound direction only) is recommended for this two block segment.



North 9th Street, East of Morgan

North 9th Street provides the only access to Forest Park and its trailhead for the General Dacey Trail (see left). East of Morgan to the railroad tracks, North 9th Street measures 25 feet 2 inches with a few inches of shoulder past the fog lines. The lanes are striped and there are no curbs here. East of the railroad tracks the road is 23 feet, 7 inches asphalt with two feet of gravel shoulders on each side. At the cemetery gravel road North 9th Street measures 22 feet, 6 inches. The average daily traffic count east of Morgan is 4,600.

Recommendation: In the short term, use North 9th Street as an interim on-road Bike Route to the park’s entrances. To serve those coming from northbound Morgan, use D11-1 signs and M7 arrows to the east (northbound) park entrance. For those leaving the park, use D11-1 signs from the west (southbound) exit to Walnut Street. While this short road segment rates a high “C”—slightly worse than the threshold used for the rest of the network—it is acceptable as a short, interim route to Forest Park and the General Dacey Trail. Inside the park, use D11-1 Bike Route signs as wayfinding to the trailhead.

In the long term, the preferred alternative is a sidepath on the south side of North 9th Street from Morgan Street to at least the east (northbound) park entrance. This would consist of widening the existing sidewalk (where feasible) to 10-foot sidepath width and also continuing the sidepath from where the sidewalk now ends to the east park entrance. At both park entrances, create a crosswalk from the park entrance to the sidepath. Include a continental-style crosswalk and MUTCD W11-1 and W16-7P (a bicycle crossing warning sign) for motorists. When the sidepath is complete, remove the interim on-road Bike Route signage.

Extending the sidepath east of the sidewalk's current endpoint would impact the property of six homes. If resident opposition or other factors permit a sidewalk but not a 10 foot sidepath, *do not sign the sidewalk as a bikeway*. Kids and more traffic-intolerant adults will still use it unofficially, but it should not be signed as such since it does not meet standards. In this case—or if no sidewalk can be constructed—keep the on-road Bike Route signage from the short term recommendation above.

Phase IV of the General Dacey trail will make access to the east end of North 9th Street more desirable. Extending the sidepath all the way to the trailhead at this point could be an additional phase, as a future priority.

Rejected Alternative:

Put in striped Bike Lanes. The road is of insufficient width to stripe Bike Lanes, even if the shoulders are paved. In order to consider Bike Lanes, the road would need to be widened.

North 6th Street, East of Morgan

North 6th Street east of Morgan to the cemetery measures 20 feet 10 inches wide and does not allow parking. North 9th can be accessed from North 6th Street using the cemetery's internal roads and a gravel road running north.

Recommendation: If a sidepath is created along North 9th Street, there is no recommendation for North 6th Street. If a sidepath east of Morgan on North 9th Street is not feasible, consider creating a connection through the cemetery. This would work if either a connection to Phase IV of the General Dacey Trail is built, or if the cemetery's north access road to North 9th Street is paved and opened. Instead of a chain at the access road's intersection with North 9th Street, a collapsible locked bollard could be used. This would block motor vehicles, but allow bicycles through. The bollard could then fold down to allow vehicular access when desired. (Example shown above right.)



If this route is desired, North 6th Street from Walnut to the cemetery should be marked with D11-1 Bike Route signs and wayfinding signs should be provided at the cemetery. This is a very low traffic road, particularly east of Morgan, so Bike Route signs alone are sufficient.

Washington, between North 2nd and Main Street

Washington is a brick street with low traffic and low parking occupancy. It is near the visitors' center, in a scenic area.

Recommendation: Even though it is brick, this portion is acceptable for bicycles and worth inclusion in the network because of its other benefits. Use the D11-1 Bike Route

signage. Adhere to one-way directions around the courthouse: northbound Bike Route east of the courthouse, southbound Bike Route west of the courthouse.

Main Street, East of Railroad

There is a sidepath trail adjacent to the road's north side. The trail width is 9 feet 6 inches, with a 5-foot curb and 2 feet 8 inches from the curb to the fogline on Illinois 16 pavement.

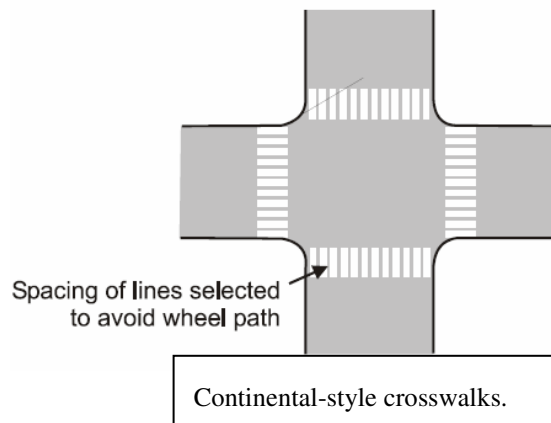
Recommendation: Sign as a Bike Route, but do not add a westbound Bike Route sign approaching the tracks where the trail narrows into a sidewalk. The sidepath east of the railroad tracks does not meet the 10-foot standard, but its construction preceded the issuing of the standard. Also, variances to the 10-foot standard are often issued. The buffer between the trail and the travel lanes is 2 feet short of standard, but this also was built prior to the standard. A long-term goal might be to install a railing or other barrier that is at least 42 inches tall between the sidepath and the road in order to bring it to present-day standards.

Main Street, between Washington and Railroad

There is a sidewalk in front of the visitors' center from Washington to the railroad on the north side of Main Street. It measures 5 feet 8 inches of cement with a 4-foot grass buffer. There is a maximum of 9 feet, 1 inch of unused pavement in the road as it tapers from four lanes down to two going westbound into town. This configuration runs for 55 yards from west of the railroad to northbound Washington.

Primary recommendation: This sidewalk does not meet standards as a bikeway right now and should not be designated as a Bike Route. Focus on two levels of improvement for this sidewalk.

In the near-term, make curb cuts where needed on the sidewalk and paint continental-style crosswalks (see figure at right) at all crossings for side streets and the visitors' center entrance.

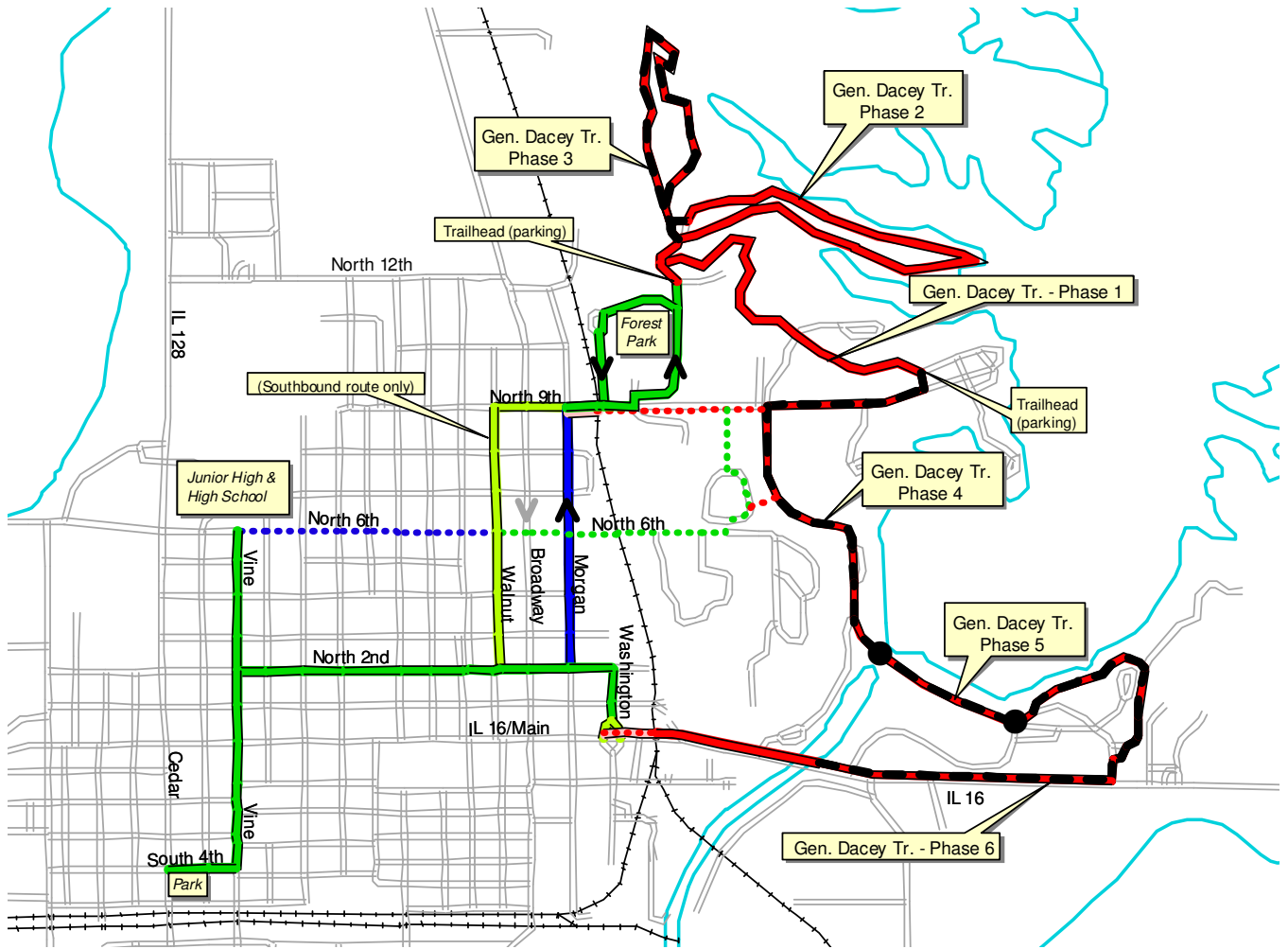


Wayfinding signage depends on the timing of the General Dacey Trail's Phase VI, which would connect to the east end of the Main Street sidepath east of the railroad. Before completion of Phase VI, "start" the Washington Street Bike Route at the Main Street sidewalk, adding a northbound D11-1 sign just at the entrance to Washington Street, east of the courthouse. For those on southbound Washington approaching Main Street, end the Bike Route at the sidewalk. Once Phase VI is complete, wayfinding signage connecting Washington to the sidepath east of the railroad can be added to complete the loop. However, signs such as "To Bike Route—Walk Your Bikes" may be advisable between the railroad and Washington, as long as the sidewalk width remains as it is now.

Long-term recommendation: When Main Street is reconstructed by IDOT—or beforehand if desired—move the westbound curb further into the road to create the space needed for a standard sidepath. Eliminate the unused pavement after the taper from two to one westbound lane, preferably all the way to southbound Washington. Also eliminate the little-used right-turn lane onto Washington. Then, widen the sidewalk to a standard 10-foot sidepath. There will be room left over for at least a 5-foot grass buffer for most of the segment. For the small part near the railroad without room for such a buffer, a minimum 42-inch tall barrier can be used. After these installations are complete, Bike Route signage can be installed. The “before” and “after” photos below simulate a possible reconfiguration.



City of Shelbyville, IL Proposed Bike Routes



Shelbyville Routes

-  Existing Trail
-  Planned Trail
-  Bike Route
-  1-way Bike Lane
-  1-way Bike Route
-  Sidewalk
-  Possible Trail
-  Possible Bike Route
-  Possible Bike Lanes

