

Appendix A

Knoxville TPO Greenway Signage Guidelines



Guidelines for Signing and Marking Greenways

Overview:

Adequate signing and marking are essential on shared-use paths, especially to alert bicyclists to potential conflicts and to convey regulatory messages to bicyclists, pedestrian and motorists at roadway intersections. Both advanced crossing and crossing warning signs are needed on roadways to provide appropriate warning to the motorists of the upcoming path intersection. In addition, guide signing on a path, such as to indicate directions, destinations, distances and names of crossing streets, should be used in the same manner as they are used on roadways. Occasional signs with maps of the entire path route and indicating important destinations should be placed at major trailheads. The most recent Manual on Uniform Traffic Control Devices (MUTCD) provides minimum traffic control measures that should be applied. Warning signs, directional signs and other devices along the path should also meet the MUTCD guidelines.

Traffic control at path-roadway crossings should be treated so that the intersection looks and functions like a regular road intersection. Path crossings can occur as signalized or unsignalized intersections, depending on the particular attributes of the location. Warrants for signals and beacons are discussed in the MUTCD and could be used as guidance for path crossings as bicycles are considered vehicles. Motor vehicle speeds along the crossing corridor are also an important factor in this analysis.

At unsignalized locations, adequate sight distance should be provided along the roadway approaches to the path and the path approaches to the roadway. In most cases, advance warning signs should be provided on the road, indicating that a path is crossing the roadway. The path crossing of the street should be marked as a crosswalk since it carries a mix of non-motorized users. Due to the potential conflicts at these junctions, careful design is of paramount importance to the safety of path users and motorists. Each roadway/path intersection is unique and will require sound engineering judgment on the part of the designer as to the appropriate solution. The 1999 AASHTO *Guide for the Development of Bicycle Facilities* provides examples and guidelines for various intersection treatments.

Refer to MUTCD Figure and Table 9B-1 for size and sign placement recommendations for shared-use paths.

Sign location types:

The following describes the sign location types and the recommended signage and markings for each.

At major trailheads (these are greenway entrances with parking)

- Greenway symbol sign—the Big G (Figure 1)
- Greenway map (Figure 2)
- Connections map showing how this greenway connects to other greenways, if relevant (Figure 3)
- “No Motor Vehicles” sign (R5-3), if needed
- Courtesy/user behavior sign if desired
- Bollards (see “Bollards” on Page 78)

On roadway next to trailhead parking area (oriented for motorists)

- Greenway symbol sign—the Big G (Figure 1)
- Greenway identifier (e.g. “Third Creek Greenway”) (Figure 4)
- Directional/destination signage with distance (e.g. “To Downtown, 2.4 miles” or “To Sutherland, 1.8 miles”) as needed (Figure 5)

At minor trailheads (walking and bicycling access only)

- Greenway symbol sign
- Greenway identifier (e.g. “Third Creek Greenway”)

At junctions with other trails or splits in the trail

- Directional/destination signage with distance (e.g. “To Downtown, 2.4 miles” or “To Sutherland, 1.8 miles”)

At road crossings, on the greenway

- “No Motor Vehicles” sign (R5-3)
- Yield signs, if sight distance is adequate
- Stop signs, if sight distance is limited
- Directional/destination signage for nearby schools, libraries, shopping malls, KAT stops and parks.
- Street name sign for greenway users
- Bollards (see “Bollards” section)

At road crossings, on roadway

- Crossing warning signs W11-15 and W16-7P, with supplemental plaque W16-9P or W16-2aP for advanced warning
- Marked crosswalk
- Stop or yield line pavement marking, set back from crosswalk (see MUTCD for guidance on distance)

Depending on road type and level of greenway use:

- Consider raised crosswalk
- Consider center line striping on greenway on intersection approach

- On multi-lane roads, consider median refuge island, signals, beacons and other strategies – refer to the MUTCD.
- On roads with posted speed higher than 40 mph, or roads with 4 or more lanes and ADT over 12,000, a marked crosswalk alone is not sufficient. See MUTCD for additional treatments, or another resource. NCHRP report 562 is a good one.

At driveway crossings, especially on greenways parallel to roadways

- At high-volume/commercial driveways, yield signs for greenway traffic, warning sign for driveway traffic (W11-15, W16-7P), and a marked crosswalk.
- For lower-volume driveways, consider signage for greenway users if the driveway is near a curve or is otherwise not obvious, or to warn of a series of driveways.

At railroad crossings

- Railroad crossing sign (R15-1) and advance sign (W10-1 for RR crossings ahead, W10-2, W10-3, or W10-4 for RR crossings following a turn)

Greenway sign examples



Figure 1: Big G sign



Figure 2: Greenway map

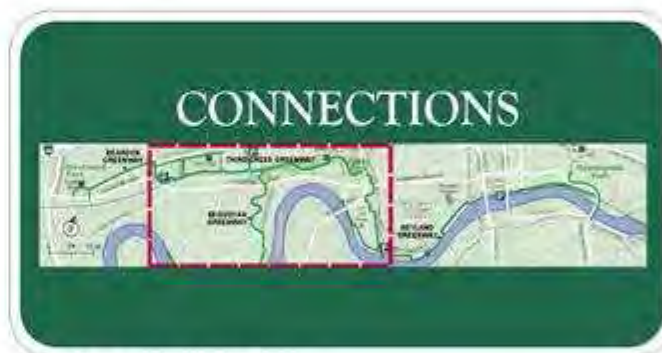


Figure 3: Connections map



Figure 4: Greenway identifier



Figure 5: Directional/destination sign

Other signs and markings may be used where needed for specific situations.

Warning users of potential hazards:

“Slippery when wet” (W8-10 and W8-10p)

“path narrows” (W5-4a)

“Bump” or “Dip” (W8-1,2)

and others as described in the MUTCD

The R9-6 (“Bicyclists yield to peds”) or R9-7 (“Peds keep right, bikes keep left”) signs could be used where user conflicts are occurring. Also consider centerline striping in those areas.

If a greenway must be closed for construction, signage should be used to show where the detour is. There should be an advance notice closure sign, a detour sign with an arrow, and a detour map sign.

Termini Signage

Path/greenway termini at roadways should be designed under the assumption that bicyclists and pedestrians may want to exit the greenway to the roadway and access the greenway from the roadway. Each terminus is different and should be analyzed to see what the appropriate treatment is for that intersection. The following are general guidelines to use:

- Analyze how greenways users (bicyclists, pedestrians, skaters) and motorists are behaving at the location. Is there a difference between desired and actual behavior?
- Provide sidewalks along the intersecting road, and design them knowing that some bicyclists will use them.
- Include positive guidance such as signs, pavement markings, and channelization to induce bicyclists to ride on the right side of the road once they have left the greenway.
- Provide educational materials for greenway users (such as courtesy signs listing proper behavior).

Bollards

Where needed, use bollards to keep unauthorized motor vehicles from entering a greenway. But recognize that bollards can be a hazard themselves, especially to bicyclists. In light of that potential hazard, consider these guidelines:

- Use bollards only where there is a demonstrated need: either a history of unauthorized drivers accessing the greenway, or a specific reason to believe that it will occur.
- Maximize the visibility of bollards by locating them properly and using reflective material on and around them.

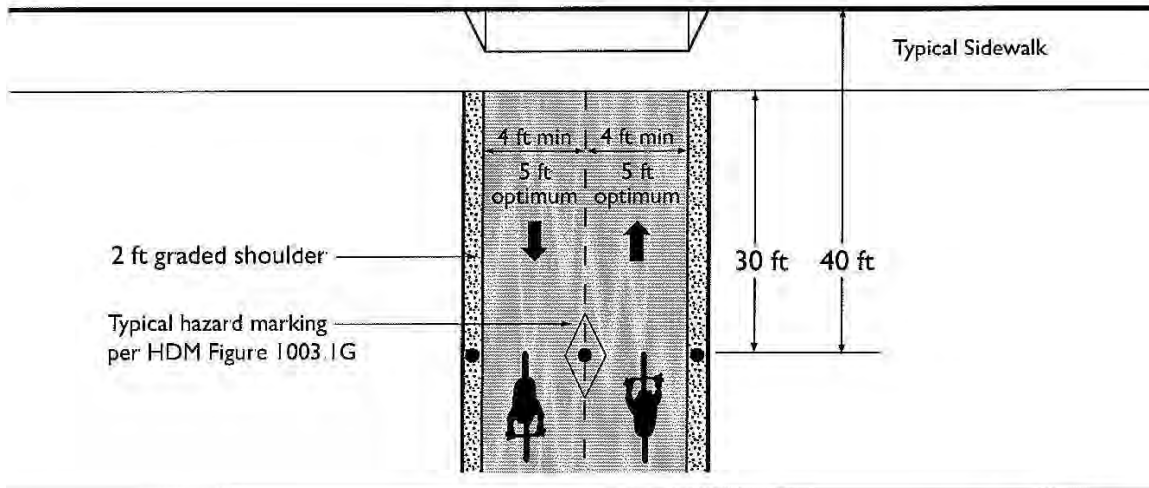


Figure 6: Typical bollard layout

[Illustration source: Contra Costa County Trail Design Guidelines]

As Figure 6 illustrates, it's best to set bollards back from the trail entrance. This gives bicyclists more time to see the bollard after they enter the trail. Use reflective paint or tape on the bollard itself and in markings around the bollard to make it more visible in low-light conditions.

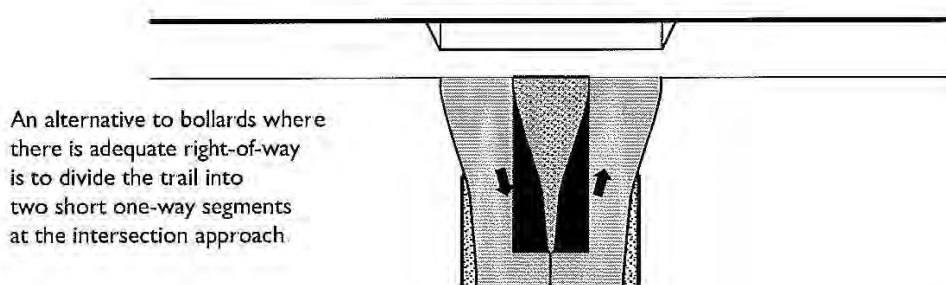


Figure 7: An alternative to bollards

[Illustration source: Contra Costa County Trail Design Guidelines]

As an alternative to bollards, consider constructing or reconstructing trail entrances so that the path separates into two one-way paths, as in Figure 7. This design will help reduce conflicts between greenway users and keep unauthorized motor vehicles off the path.