

Bikeway Classification

Classification of bikeway types is an important step to help planners comprehend how parts of the bike network function and work together. Classification can also provide an understanding of the level of bicycle accommodation on streets in the network and give guidance about prioritization and implementation. This paper refers to two types of bikeway classification:

- Facility classification: groups bikeways by the type of facility; for example, separated bike lanes, bike lanes, shared roadways and trails, and
- Network classification: provides a framework for understanding a given bikeway's function or importance in the network, typically by designating a primary and secondary network.

The approach that Montgomery County takes to bikeway classification can play an important role in the County's efforts to create a world-class bicycle plan and to be an exemplar of suburban bicycling in the U.S. Using network classification as a means of indicating critical routes will facilitate creation of a connected low-stress network. This is not to say that every primary bikeway would be separated bike lanes on a major street, but every primary bikeway *would* play a key role in providing a low-stress connection.¹ A higher network classification would indicate a route's fundamental importance to the bike network and give County staff guidance at the time of facility design decisions.

This paper provides an overview of Montgomery County's current classification schemes for bikeways. This is followed by a summary of classification practices from a number of local and national cities. Finally, recommendations are presented for how Montgomery County should move forward with classification in its Bicycle Master Plan update. It should be noted that this paper focuses on bikeway classification for the purposes of master-planning and implementation, not for creating bicycling maps.

Current Montgomery County Bikeway Classification

Montgomery County's existing classification scheme was developed for the 2005 Countywide Functional Bikeways Master Plan and includes both facility classification and network classification. Facilities are classed by type and include:

- Shared use path
- Bike lane
- Signed shared roadway
- Dual bikeway²
- Cycle tracks

¹ It should be noted that network classification and the importance of a given route to the network is only one component of a prioritization scheme. Overall prioritization of the bike network for phased implementation is not addressed in this paper.

² Montgomery County developed the dual bikeway facility type in the 2005 Countywide Bikeways Functional Master Plan to recognize differing levels of ability and comfort among bicyclists and to recognize the two functions (transportation and recreation) that a bike network serves. Dual bikeways include both an on-street bikeway and an off-road shared use path on the same roadway.

Facility types were not grouped by bicyclist level of comfort or degree of separation provided from automobile traffic.

Bikeways are further classified into either countywide or local routes. Countywide routes comprise about two-thirds of the network and were the focus of the 2005 Plan. These routes generally are located on arterial streets and provide longer distance connections, linking major destinations throughout the County. Local routes are those that feed into the county route system, typically from smaller neighborhood origins and destinations. The countywide/local designation has no inherent relationship to the prioritization or implementation of facilities.

Necessity of a New Classification Scheme

The need for a new bikeway classification system springs from the introduction of new facility types in the Bicycle Master Plan update, as well as a need to better link policy objectives to the network classification system.

The Bicycle Master Plan update could include as many as twelve facility classifications, thus grouping facility types may benefit the County so as not to create a greater level of complexity than necessary.

The current network classifications of Local and Countywide route types appear to serve little or no function and likely adds unnecessary complexity to the network definition. Furthermore, since countywide bikeways comprise about two-thirds of all master-planned bikeways, this designation does not indicate those bikeways that are the most important and which therefore should be prioritized in discussions related to limited space and trade-offs between various travel modes, or designed to a higher standard (e.g., separated bike lanes that are wider than typical conditions) in anticipation of large bicycle volumes. Creation of a network classification system that has real policy impacts in the decision-making process can help move the bike plan from lines on a map to a truly useful tool.

Example Classification Schemes

This section reviews bikeway classification schemes in a number of local jurisdictions and exemplary bicycle communities in other parts of the country. Few counties around the country create bike plans to the level of detail and implementation-ready recommendations that Montgomery County does. For this reason, Arlington County and Hennepin County are the only two examples of county-wide plans included here. While the rest of the plans are from cities, they are worth reviewing as exemplar bicycling communities, some of which have suburban-type roadways, such as Portland, Minneapolis and Seattle.

Arlington, Virginia

Arlington County uses a facility classification system and does not have a network classification for its bikeways. Arlington's bikeway classification was last updated in the 2008 Master Transportation Plan,³ though the County is considering updates as they move forward with a countywide LTS analysis that will

³ <http://arlingtonva.s3.amazonaws.com/wp-content/uploads/sites/31/2014/02/DES-MTP-Bicycle-Element.pdf>

lead to identification of new network recommendations. Currently, there are four facility type categories:

- Off-street trails
- Bike lanes
- Sharrows
- Bike routes

To date, the two buffered bike lane and separated bike lane facilities in Arlington have not been differentiated from standard bike lanes and remain in the “Bike lane” category. The County may update this classification as more buffered and separated facilities are implemented. Two facility types that Montgomery County will use in the plan update are not included in Arlington’s scheme: advisory bike lanes and bike boulevards. Arlington is considering implementation of these facility types as well but has not yet decided how to classify them.



Legend from Arlington County's 2015 public bike map update

Additionally, “bike routes” are “roads that have been determined to be bicycle-friendly or [emphasis added] provide important connections to the bicycle network.” These streets have not been improved with signage or markings, and they have not necessarily been vetted for comfort and suitability of crossings for bicyclists. Some streets may not be very bicycle-friendly, but they are included in the route network because they provide an important or direct connection. This route network will also be revisited as the LTS analysis is completed to better identify bicycle-friendly streets and focus on intersection improvements.

Washington, DC

DC’s bikeway classification was last updated as part of the MoveDC⁴ plan completed in 2014. The Plan is not explicit in its classification of facility types as it refers to one set of facility types on maps and another when describing the facility types available to planners. Maps include the following:

- Trail
- Cycle track
- Bike lane, including contraflow and climbing lanes

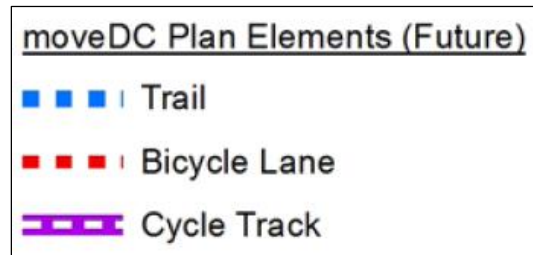
The plan mentions the following commonly used facility types:

- Shared-use paths
- Cycle track
- Bike lane, including climbing and contraflow lanes
- Sharrows

⁴ <http://www.wemovedc.org/>

- Signed shared routes and Neighborhood Bikeways
- Shared roadway (all other roads minus freeways)

However, the planned network does not include any facility types other than the three included on the map. The District has undertaken a separate wayfinding effort to identify signed routes that consist of streets with bike facilities and those local streets that are bicycle-friendly. The Neighborhood Bikeway identification and signage program is also separate from the master planning effort and the wayfinding program.



Legend from MoveDC Bicycle Element map

DC does not have network classification for its bikeways. MoveDC does articulate modal priorities for all DC streets, including the identification of some “bicycle priority” streets. However, these priorities have not yet had any bearing on trade-offs made in the course of design for a multimodal street.

Minneapolis, Minnesota

The City of Minneapolis updated its facility classification in 2015 as part of a bike plan update⁵ aimed at incorporating protected facilities into their toolbox. This update did not define a new bike network for the city, rather focused only on short-term recommendations for the locations of new protected bike lanes. The update includes the following facility classes:

- Protected bikeways
 - Off-street trail
 - Pedestrian/bicycle bridge
 - Sidepath
 - Protected bike lane
- Bike lanes
 - Buffered bike lane
 - Bike lane
 - Contraflow bike lane
 - Advisory bike lane
 - Shoulder accommodation
- Bike boulevards
- Shared lanes
 - Sharrows
 - Signed bike route
 - Shared bus/bike lane

These classes are generally based upon the bicyclist’s experience on the street and the level of interaction he will have with automobiles. Bike boulevards are classed separately from other types of

⁵ <http://www.minneapolismn.gov/www/groups/public/@publicworks/documents/images/wcms1p-144745.pdf>

shared lanes because of their lower volumes and speeds. Signed routes are assumed to be comfortable enough for bicyclists without additional pavement markings.

Minneapolis' 2011 bike network plan⁶ is modeled after roadway classification and states that the classification purpose is to help prioritize projects and make better use of limited funds. The classification is as follows:

- Arterial Bikeway: Routes of regional significance that attract the highest number of bicyclists and are intended to form a “spider web” pattern centered on downtown Minneapolis
 - Principal arterials spaced at two-mile intervals designed for grade separation and faster speed
 - Minor arterials spaced at one-mile intervals
 - May be situations where two arterial bikeways are located parallel to one another in close proximity because their differing facility types serve different user groups
- Collector Bikeway: Feed into arterial bikeways; spaced at half-mile intervals to capture bicyclists from every part of the city
- Neighborhood Bikeway: Feed into collector bikeways; found in every neighborhood and not eligible for regional funding

While the intent of this scheme is to prioritize bikeways, it has not been used this way in practice. Minneapolis maintains a robust bicycle counting program that City staff found to be a better indication of the importance of any given bikeway project than network classification. Connections to locations with higher existing counts or locations with high counts and deficient facilities have been prioritized.

Hennepin County, Minnesota

Hennepin County completed a bike plan⁷ in 2015 that is separate from the Minneapolis one detailed above. The plan classed bicycle facilities in the following groups:

- Off-street
 - Multi-use trail
 - Cycle track
 - Protected bike lane
- On-street
 - Cycle track
 - Protected bike lane
 - Buffered bike lane
 - Bike lane
 - Shoulder

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http://www.minneapolismn.gov/www/groups/public/@publicworks/documents/webcontent/convert_275983.pdf

⁷ <http://www.hennepin.us/~media/hennepinus/residents/transportation/bike/bike-plan/bicycle-transportation-plan.pdf>

- Bicycle boulevard

These broad classes were chosen to avoid being overly prescriptive on facility type throughout the county. Hennepin County recognized that it would not be the implementing agency for many of the recommended facilities and wanted to leave flexibility for other jurisdictions. Additionally, the level of effort needed for further facility specificity throughout the network was not possible in the scope of this planning effort.

Network classification consists of a plan recommendation to designate an “enhanced bicycle network.” This recommendation emerged from the public engagement process where it was clear that bicyclists and potential bicyclists sought a greater amount of separation from automobile traffic. This classification touched on both facility type and network function with the recommended characteristics:

- Facility type is off-street trail, cycle track or protected bike lane
- Part of Minneapolis’ protected bike lane network
- Within a priority regional bikeway corridor as identified in Metropolitan Council Regional Bicycle System Study
- Part of a route that spans major barriers (e.g., river, railroad, highway)
- Connects major activity centers

This framework has not yet been used for implementation in the county, nor has the County used these criteria to identify its enhanced bicycle network.

Boston, Massachusetts

The Boston Bike Network Plan⁸, updated in 2013, identifies five classes of bikeway facilities:

- Off-road path
 - Shared use path
- Protected Bike Lane
 - Cycle track
- Exclusive Lanes

Overview and characteristics of bikeway types from Hennepin County 2040 Bicycle Transportation Plan

- Buffered bike lane
- Bike lane
- Contraflow bike lane
- Climbing lane
- Shared lanes
 - Advisory bike lanes
 - Priority shared lane

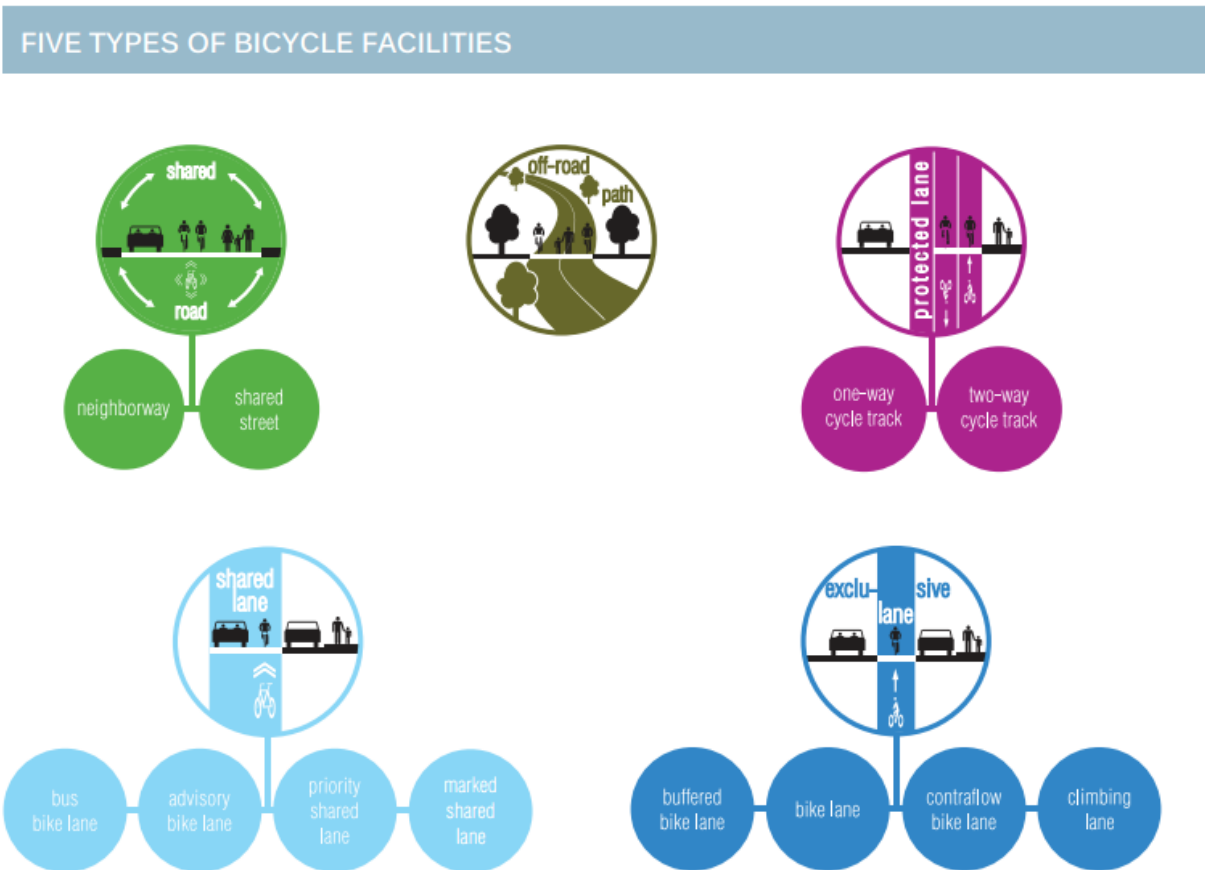
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http://www.cityofboston.gov/images_documents/Boston%20Bike%20Network%20Plan%2C%20Fall%202013_FINAL_tcm3-40525.pdf

- Shared lane: denoted with sharrows and signage; constrained corridors with speed limit 35 mph or less
- Bus-bike lane
- Shared roads
 - Shared street (flush)
 - Neighborway: added traffic calming, prioritizes bicyclists and pedestrians, equivalent to a bicycle boulevard
 - Recommended local route: unimproved route that provides connectivity, generally lower volume and/or speed than a sharrow street

These classes have enabled the City to work with a wide variety of facility types that suit the wide range of street types but also retain a manageable vocabulary of bikeways. Facilities are classed, generally, according to the bicyclist’s experience on the street. For instance, an exclusive lane is roadway space specifically dedicated for bicyclists but not immune from periodic obstructions such as double-parked cars. By classifying buffered bike lanes this way, perhaps the City misses expressing some of the advantage that a wider facility provides, but it also is recognizing the reality of the daily experience.

Facility classification graphic from Boston Bike Network Plan



Boston’s plan does further classify the network into primary and secondary routes with the following definitions:

- “Primary routes connect neighborhood centers, regional multi-use paths, transit hubs, major employment centers, and institutional destinations.”
 - Provide long distance routes
 - Carry the highest volumes
 - Have as much separation from traffic as possible
 - Include all major bridges
- “Secondary routes stretch into neighborhoods and provide access to local businesses and neighborhood destinations.”
 - Connect schools, neighborhood stores, parks, transit hubs and the primary network routes
 - Have varying levels of bicyclist volumes and separation from traffic

These definitions are helpful in conceptualizing the network and prioritizing facilities at a high level, but in practice the designations have not had a clear effect on implementation. Closing gaps in the existing facilities along primary routes was prioritized, but the five-year action plan consists of streets and trails that are both primary and secondary routes. Implementation has been based more on opportunities and in response to problems rather than guided by a goal of improving the primary routes first.

Seattle, Washington

















The 2014 Seattle Bike Plan⁹ identified five facility types for its network, which only group bike lane types together:

⁹ <http://www.seattle.gov/transportation/bikemaster.htm>

- Off-street
- Cycle track
- Neighborhood greenway
- In street, minor separation (buffered bike lane, bike lane, climbing lane)
- Shared street (sharrow)

Each facility type is designated for use on streets with certain speed, traffic and functional classification criteria. Though not every recommendation conforms to these usage standards, they provided a framework for network development that leads to a system with greater separation between bicyclists and automobiles on higher-speed, higher-volume streets.

Seattle’s network classification is the only one examined for this study that links network classification to available facility types by calling for exclusively low-stress facilities to be used in the Citywide network so that Citywide routes are accessible to “all ages and abilities.” In practice, this means that some facility types, such as bike lanes, that may result in a low-stress riding environment on low-volume, low-speed roads are not included in the Citywide network. The classifications are defined as below:

Citywide Network		
Existing	Recommended	
		Off street
		Cycle track (protected bicycle lanes)
		Neighborhood greenway
Local Connectors		
Existing	Recommended	
		Off street
		Cycle track (protected bicycle lanes)
		In street, minor separation
		Neighborhood greenway
		Shared street

Legend from network map in Seattle Bike Plan

- Citywide Network:
 - Provide short distance connections to neighborhood destinations, as well as connections to destination clusters across neighborhoods and throughout the city
 - Allow people of all ages and abilities to access all major destinations on this network
 - Composed of cycle tracks, neighborhood greenways and off-street multi-use trails
- Local Connectors:
 - Provide access to and parallel the Citywide Network and serve destinations
 - Lower level of separation with bike lanes, buffered bike lanes and shared roadways also in facility toolkit
 - May provide a more direct route, but may include facility types and streets that are not appropriate for all ages and abilities

The Citywide and Local classifications have little bearing on facility implementation other than to prescribe a set of facility options. While the plan identifies high-demand segments of the Citywide

Network as a near-term priority, further project prioritization does not rely on a bikeway’s classification as Citywide or Local.

Portland, Oregon

Portland’s 2010 bicycle plan¹⁰ classes facility types by level of separation. These classes are:

- Trails
- Separated in-road bikeway
 - Cycle track
 - Buffered bike lane
 - Bike lane
- Shared roadway bikeway
 - Bicycle boulevard
 - Advisory bike lane
 - Enhanced shared roadway

The enhanced shared roadway facility type is used in locations where bicyclists are not given priority, but signage and markings are used to increase driver awareness and traffic calming or signalization may ease bicyclist travel. These facilities may be later upgraded as money and willingness to adjust the allocation of roadway space to various modes allow.

Trails — Existing or funded trail — Future trail	Bicycle boulevards / advisory bike lanes — Existing or funded bicycle boulevard — Future bicycle boulevard — Future advisory bike lane (suggested) — Future enhanced shared roadway or advisory bike lane — Future bicycle boulevard or advisory bike lane
Separated in-roadway bikeways (bike lanes, buffered bike lanes, cycle tracks) — Existing or funded bike lane or separated in-roadway — Future separated in-roadway — Future separated in-roadway or enhanced shared roadway — Future separated in-roadway or advisory bike lane — Future separated in-roadway, advisory bike lane, or enhanced shared roadway	Enhanced shared roadways — Funded enhanced shared roadway — Future enhanced shared roadway — Future bicycle boulevard or enhanced shared roadway

Legend from Recommended Bikeway Network map in Portland Bicycle Plan

Portland includes a robust, policy-level classification of bikeways by functional class. These classes include:

- Major City Bikeway
- City Bikeway
- Local Service Bikeway

¹⁰ <https://www.portlandoregon.gov/transportation/44597>

This policy-level classification exists for other modes in the city, so adoption of this system for the bicycle mode is recognized as bringing consistency and parity to the modes. Functionally, Major City Bikeways are the most important routes in the city—those that carry the highest volume of bicyclists, connect to major commercial areas or bridges, a long corridor that serves many neighborhoods, or serve to collect traffic from other routes that feed into them. City Bikeways provide direct and convenient access but are do not fit the characteristics of a Major City Bikeway. All modes in the city have a “local service” class that simply includes all other unidentified streets.

The Major City Bikeway designation allows City staff to advocate strongly for the highest order bike facility on those streets. Where trade-offs are needed to accommodate space for these facilities, planners in the bicycle program are in a better position to press their case. The policy that defines each of these types specifically states that travel lanes and/or on-street parking may be removed to accommodate bicycle facility space on streets under both bikeway classes. The designation as a Major City Bikeway does not dictate the facility type recommended for that route; any facility type may be in place on that bikeway as long as it provides an appropriate level of accommodation suited to the street characteristics.

Summary

Municipalities vary in their facility classification schemes. Grouping of facility types was most often based on the level of separation a facility provides the bicyclist from automobile traffic. Boston’s grouping is slightly more granular in that it differentiates shared roadway conditions between those with higher and lower automobile volumes, and Minneapolis does this to some extent, too, by separating bicycle boulevards from other shared roadway facility types.

While approximately half of the examined jurisdictions further differentiate their networks by functional class in some manner, only Seattle and Portland’s network classification schemes have direct implementation impacts by prescribing facility types and a level of importance in trade-off discussions, respectively. In other cities, a project’s network classification may be one factor in the project prioritization process, but network classification does not imply priority in terms of implementation timeline.

Recommendations for Montgomery County

Given the above review of recent bicycle planning efforts and understanding of the Montgomery County context, the following recommendations are made for bikeway classification. These recommendations will help the County achieve its ultimate goal of implementing an extensive, low-stress network. The most important characteristics of this network will be its connectivity and density.

Network Classification

The County should refine its County/Local network classification framework in favor of a policy-level network classification in the style of Portland, OR. An adopted system of Major County Bikeways (MCB) and County Bikeways (CB) would provide a framework for discussions about bikeway design in areas of constrained rights-of-way. All other roadways where bicycle travel is permitted could be designated as Local Serving Bikeways (LSB) if full coverage of county roadways is desired. Similar to Portland, a **MCB would be a bikeway of the highest importance in the county, meaning that the bicycle accommodation should be prioritized in discussions related to limited space and trade-offs between various travel modes. Similarly, MCBs should be designed to a higher standard (e.g., separated bike lanes that are wider than typical conditions) in anticipation of large bicycle volumes.**

Unlike Seattle's network classification, it is not recommended that the County use the MCB/CB structure to require a specific facility type for these bikeways. Not all MCBs would be high-investment facilities such as separated bike lanes on large arterial streets. Some MCBs will be important connections that can be made via low-volume, low-speed streets with facilities such as advisory bike lanes.

The definition of criteria for MCBs should occur during the network-development process. It is impossible to know before the entire network is developed what criteria will best capture those streets that serve a critical network function. A preliminary list is given below, but this list should be viewed as draft and subject to change during the plan development process. One or more of the following could be required for MCB designation:

- Access to major destinations: employment centers, key commercial zones/corridors, transit facilities
- Access to multiple neighborhoods
- Connections to major trails

Network classification should not be viewed as a prioritization scheme, however. The class of a bikeway project will need to be combined with a number of other factors determined by the County in order to create a prioritized project list for the bike plan.

Facility Classification

The County should adopt a grouped classification of facility types in order to make the network easier to comprehend and to better reflect the County's interest in Level of Traffic Stress. Some of the 12 facility types noted below share functional characteristics, and it is unnecessary to differentiate them on a plan map. The simpler map will provide an adequate level of understanding while not being overly detailed.

By defining facility groups based on level of separation from traffic provided, planners with knowledge of the street network will be able to understand how comfortable a given facility type recommendation will be on that street.¹¹

It should be noted, however, that the same facility type has different stress levels in different applications. For instance, a buffered bike lane can be a low-stress facility where speed limit and number of lanes are low, but the extra width between the rider and automobiles cannot overcome the stress of higher speed traffic or a wide roadway.

The County should classify bikeway facilities as outlined below: *[Note that signed shared roadways and dual bikeways are not included in this scheme as their continued use by the County in network planning will be addressed in the Facility Types paper at a later date. This section will be updated as needed, or not, with those facility types.]*

- Shared use paths
 - Trail
 - Sidepath
- Separated bike lanes
- Bike lanes
 - Buffered bike lanes
 - Bike lanes
 - Climbing lanes
 - Contraflow lanes
 - Advisory bike lanes
 - Shoulder accommodation *[Discussion of whether this should be a “facility type” will come up in the signed shared roadways paper, but it is left in for now.]*
- Bicycle boulevards^{12,13}
- Shared roadways
 - Priority shared lane markings
 - Shared lane markings

¹¹ The full level of facility specificity should be maintained in the project/bikeway table portion of the plan so this information is available to readers.

¹² Bicycle boulevards are separated from other shared roadway facilities because they provide a different level of comfort for bicyclists. A bicycle boulevard design will include traffic calming, intersection improvements to ease crossing major streets, and may include some traffic diversion to lower volumes. These elements are not included in the other shared roadway facilities.

¹³ Montgomery County may wish to begin discussions regarding the nomenclature used for these facilities. While “bicycle boulevard” is used by some communities, with Berkeley, CA being a notable pioneering user, many jurisdictions are beginning to use terms that reference the benefit of these streets to a broader audience. “Neighborway”, “Neighborhood Greenway”, “Neighborhood Bikeway” and “Neighborhood Slow Street” have all been used for this facility type and imply a benefit to pedestrians and residents as well as bicyclists.