

McDonald's Cycle Center, November 9, 2007. Courtesy of Diego Ibarra Arceley (Flickr user D13G0)

BICYCLE PARKING STATION LOCATION STUDY

Silver Spring Transit Center Area

Bikestation in Washington DC, March 2010. Courtesy of ITDP (Flickr user itdp)

A Report for the
Maryland-National Capital
Park and Planning Commission
by Toole Design Group





MEMORANDUM of TRANSMITTAL

Date: January 16, 2014
To: David Anspacher, Planner Coordinator, M-NCPPC
Organization: M-NCPPC, Functional Planning and Policy Division
From: Jennifer Toole, President
Project: Recommendations for Silver Spring Transit Center Bicycle Station
Re: Final Report: Assessing bicycle parking demand at the Silver Spring Transit Center, bicycle parking station components, and location recommendations

Enclosed is our Final Report on the bicycle parking station location study you asked us to undertake for the Commission last August. We were excited to take this project on, due to its timely nature and potential to advance bicycling in our new neighborhood (Toole Design Group relocated to Silver Spring in February 2012).

Our senior staff, Jeff Ciaboti and Robert Patten, supported by Bryan Barnett-Woods and Daniel Biggs, ASLA, all enjoyed the challenge of this cutting edge topic, as well as the chance to study a bicycle facility that they one day might use themselves. We recognize that such efforts cannot always be accomplished through formal contracts and are happy to support the Commission with pro bono work as our contribution to a more bicycle-friendly Silver Spring.

This study has been a joint effort, as you and your colleagues Chuck Kines, Thomas Autrey, Matthew Folden, Linda Komes, and Robert Kronenberg all provided helpful information and feedback on early drafts.

We also want to thank the following agency staff for participating in the site visit and for sharing their knowledge about the status of each site that we studied:

- Shri Gondhauekar, MCDOT Division of Parking Management
- Carmen Zaldivar, MCDOT Division of Parking Management
- Jeremy Souders, MCDOT Division of Parking Management
- Pat Shepherd, MCDOT Bicycle Program Manager
- Gary Erenrich, MCDOT, Office of the Director
- Gail Tait-Nouri, WMATA, Project Manager, Office of Parking

We hope that the report will help you garner support for a future bicycle parking station in Silver Spring.

Introduction

The Silver Spring Transportation Management District (TMD) is a County administered organization that encourages the use of transit and alternatives to driving alone. The Silver Spring Sector Plan established a Non-Auto Driver Mode Share (NADMS) goal of 50 percent for commuters coming into the Silver Spring CBD during the peak periods. Other goals of the TMD are:

- Reduce traffic congestion
- Increase transportation capacity
- Reduce air and noise pollution
- Promote bicycle and pedestrian access and traffic safety

There are a number of transportation projects underway that will have a significant impact on the transportation patterns in downtown Silver Spring. These projects include the completion of the Silver Spring Transit Center (SSTC), the construction of the Purple Line Light Rail, and the extension of the Capital Crescent, Metropolitan Branch, and Silver Spring Green regional trails. Additionally, the 2000 Silver Spring Central Business District Sector Plan recommended locating a bicycle station at the SSTC. This bicycle station will help the TMD to achieve its goals. Also, the bicycle parking station will be within the Silver Spring Transportation Management District and could receive support from the large businesses and mixed-use developments that participate in the TMD.

This report assesses the potential locations for a multi-service, staffed bicycle parking station at or near the SSTC, to address expected increases in bicycle parking demand with the anticipated opening of the SSTC, the addition of the Purple Line, and the completion of the Capital Crescent, Metropolitan Branch and Silver Spring Green trail system.

To evaluate the potential for a bicycle parking station, this analysis estimates future demand for bicycle parking at the SSTC and evaluates the amount of space required to meet demand (based on 2030 projections of transit service, projected ridership, and general growth in the Silver Spring CBD and environs). Finally, it examines four potential locations for a bicycle parking station based upon land currently known to have some likelihood of availability in the next five to seven years.

The report includes:

Summary of Findings

- 1. Introduction**
- 2. Existing Conditions: The Silver Spring Transit Center**
- 3. Bicycle Demand Projections for the SSTC**
- 4. Space Needs for a Bicycle Parking Station**

- 5. Potential Locations**
- 6. Recommendations**
- 7. Additional Implementation Considerations**
- 8. Conclusion**
- A. Background Information**
- B. Analysis for Silver Spring Bicycle Parking Station**

Summary of Findings

1. Introduction

Bicycle parking stations¹ are enclosed or covered facilities that offer high volume and high security bicycle parking for use by utilitarian (non-recreational) cyclists. These facilities make bicycle transportation a convenient and more attractive choice for regular commuting, for accessing transit by bicycle, and for a variety of other utilitarian bicycle trips. Bicycle parking stations are different than bicycle parking cages or shelters, because they are staffed facilities that often offer additional services such as bicycle repair, bicycle rental, bicycle retail, food service, showers and changing rooms, lockers for personal belongings, bicycling information, etc. Bicycle parking stations are typically located in dense urban neighborhoods, central business districts (CBDs) and/or near rail transit stations or multi-modal transit hubs.

Bicycle parking stations in the United States vary widely with regard to parking capacity and services provided. Smaller bicycle stations have the capacity to park 20 - 25 bicycles, while the largest bicycle stations can accommodate over 300 bicycles. Moreover, some stations, like the Tri-Met Bike Link facilities in Portland, Oregon, and the Washington Metropolitan Area Transit Authority (WMATA) Bike & Ride Center in College Park, Maryland, offer only secure bicycle parking; while others, like Chicago's Millennium Park Cycle Center, offer secure parking, showers, changing rooms, restrooms, bicycle and bicycle accessory retail, bicycle rentals, bike tours, and lockers for belongings.

Bicycle parking stations provide a public good and as such are generally not self-sustaining financially, often requiring ongoing public subsidy. Many factors, including location, services offered, public support, and financial support all affect the long-term viability of a bicycle parking station. This report specifically looks at potential locations near the Silver Spring Transit Center that are possible sites for a bicycle parking station. This report does not include an evaluation of all factors that contribute to a bicycle parking station's level of use (e.g. amenities provided and public operating subsidies are not part of this study). For this reason, and since some bicycle parking stations in the U.S. have failed even with public subsidy, a business plan including a comprehensive financial analysis is recommended before Montgomery County moves forward with building a bicycle parking station.

2. Existing Conditions: The Silver Spring Transit Center

The Silver Spring Transit Center (SSTC) area is located on Colesville Road, between Wayne Avenue and East-West Highway (see Map 1 on the following page). The SSTC site is adjacent to a WMATA Metrorail Red Line station, a MARC commuter train stop, and a planned Purple Line light rail station. Upon









¹ This report uses the terms *Bicycle Station* or *Bicycle Parking Station* to refer to a multi-service, staffed bicycle parking facility, *Bikestation* is a registered trademark of Bikestation / Mobis Transportation Alternatives, Inc., which operates several bicycle parking facilities around the country and is an early pioneer of the bicycle parking station concept in the U.S. This report does not recommend a specific bicycle parking station operator.

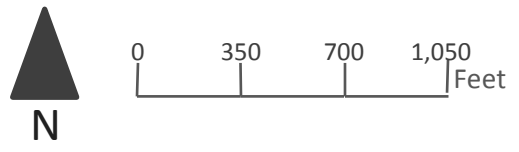
Map 1

Silver Spring Transit Center Area

Cycling Barriers and Neighborhood Quadrants



-  Silver Spring Transit Center
-  Neighborhood Quadrant
-  Cycling Barrier
-  Future Met Branch/ Capital Crescent Bike Trail
-  Silver Spring Green Trail (and planned extension)
-  Metrorail Red Line Entrance
-  Planned Purple Line Entrance
-  District of Columbia - Maryland Boundary












Map 2

Silver Spring Transit Center Area

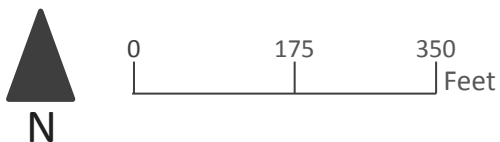
Potential Bicycle Station Location



-  Potential Bicycle Station Location
-  Bikeshare Station
-  Neighborhood Quadrant
-  Silver Spring Green Trail
-  Cycling Barrier
-  Planned Bike Trail Entrance
-  Metrorail Red Line Entrance
-  Planned Purple Line Entrance
-  Existing Bicycle Parking

Rack	Type	Covered	Capacity
1	U Racks	No	34
2	U Racks	Yes	18
3	U Racks	Yes	62
4	U Racks	No	12
5	Lockers		20
6	Lockers		10

* There are additional racks on top of the transit center which are not included in this analysis.



completion, the new SSTC will provide local and intercity bus terminals and kiss and ride drop off aisles to facilitate intermodal transfers. Currently, two Capital Bikeshare stations serve the SSTC area: one near the Discovery Communications building and one at the west end of Ripley Street.

Existing bicycle parking is located in four locations adjacent to the Metrorail station entrances. There are 63 bicycle racks and 30 standard bicycle lockers located in the immediate vicinity of the transit center, accommodating a total of 156 bicycles. (See Map 2 on the previous page).

Currently, there are no designated on-road bicycle facilities in the Silver Spring CBD, although there is a short section of the Silver Spring Green Trail, an off-road path, between Cameron Street and the Whole Foods located east of Fenton Street. Extensions are planned for the Capital Crescent Trail (CCT) and the Metropolitan Branch Trail (MBT) shared use paths, which will converge at the new SSTC, but currently each of these trails ends well before they reach the CBD. The Silver Spring Green Trail is also planned to extend east along Wayne Avenue to connect downtown Silver Spring with the Sligo Creek Trail, the CCT and the MBT.

There are two key barriers to accessing the SSTC by bicycle. The first is the rail line, which runs northwest-southeast through Silver Spring. Although there are points for crossing the tracks, the limited crossings decrease the convenience of cycling to transit for many bicyclists who live west of the tracks. The second barrier is Colesville Road, which runs northeast-southwest, nearly perpendicular to the rail tracks, and passes adjacent to the Silver Spring Transit Center. Colesville Road is six lanes wide and has a high volume of motor vehicle traffic. These barriers divide Silver Spring into four neighborhood quadrants.

These barriers and the lack of on-road bicycle facilities influence the routes that bicyclists use to access the transit station. In particular, it is assumed that a significant portion of the bicyclists coming to the transit station will access the area via one of the off-road trails. Also, the barriers of Colesville Road and the rail line will continue to discourage bicyclists from crossing from one quadrant into another unless absolutely necessary. The existing bicycle racks are located in all four quadrants and each rack area is heavily utilized without being completely full, suggesting that cyclists currently arrive from each direction and park in the closest rack. Because only one multi-service, staffed, bicycle parking station can be built, it is critical that its location is accessible to bicyclists arriving from all directions. A bicycle parking station that is both close to the SSTC (the destination) and the bicycle access points (planned regional bicycle trails) will be best able to serve the area.

3. Bicycle Demand Projections for the SSTC

Four approaches are used to estimate bicycle parking demand for the Silver Spring Transit Center area (see Table 1 below). The recommendations in this report are based on the estimated demand in the “Moderate Estimate,” which is intended to achieve the Silver Spring share of WMATA’s system-wide goal of 3.5% bicycle access in 2030. To meet the Moderate Estimate for 2030 demand (340 bicycle

parking spaces), 214² new bicycle parking spaces are needed (see Appendix B, page 23 for details of demand projection methodology). Considering the typical parking capacity of bicycle parking stations around the country, 214 spaces is well within the range that can be feasibly accommodated by a multi-service high volume, high security bicycle parking facility.

Table 1. 2030 Silver Spring Transit Center Bike Parking Projections				
	Low Estimate	Moderate Estimate	Industry Standard Estimate	Aggressive Estimate
Estimated AM Peak Rail Boardings (Red Line & Purple Line)	9,420	9,420	9,420	9,420
Bike mode share as percent of AM Peak Rail Boardings (Red Line & Purple Line)	1.12%	3.3%	9%	12%
Estimated AM Peak Incoming Auto Trips	2,945	2,945	2,945	2,945
Bike mode Share as percent of Incoming Auto Trips	1%	1%	1%	3%
Total Projected Bicycle Parking Demand	135	340	877	1,219

4. Space Needs for a Bicycle Parking Station

Table 2 shows the additional number of bicycle parking spaces and the square footage requirements for a bicycle parking station that would meet each of the four parking demand estimates shown above. (More detail is provided on space requirements in Appendix B, page 28.)

Table 2. Bicycle Parking Requirements				
(Rounded to the nearest 100 square feet)	Low Estimate	Moderate Estimate	Industry Standard Estimate	Aggressive Estimate
Additional Bicycle Parking Spaces Needed³	None	214	751	1,093
Space Requirements⁴	0 SqF	1,900 SqF	6,800 SqF	9,800 SqF

² 184 new spaces and 30 spaces to replace the 30 existing lockers which WMATA is expected to phase out of service, and would be replaced by the bicycle parking station.

³ In addition to existing 126 parking spaces provided on inverted U racks.

⁴ Based on two-tier high capacity bicycle parking.

In order to meet the 2030 bicycle parking demand and attain the WMATA 3.5% bicycle access goal, 1,900 square feet of space will need to be allocated for additional bicycle parking. Furthermore, it is estimated that at least an additional 700 square feet of space will be required for service amenities.

5. Potential Locations

The project team was asked to examine four locations near the Silver Spring Transit Center (shown in Map 2). All of the locations are in the neighborhood quadrant to the southeast of the Silver Spring Transit Center (identified as quadrant “4” on Map 2).

- Location A.** Property immediately surrounding the Silver Spring Transit Center, divided into two sub-areas, one area at the Metrorail entrance, Location A-1, and another area at the intersection of Bonifant Street and Ramsey Avenue, Location A-2 (owned by WMATA)
- Location B.** Gene Lynch Urban Park (to come under control of M-NCPPC Montgomery Parks)
- Location C.** 1110 Bonifant Street (to be acquired by MTA as part of the Purple Line project)
- Location D.** Bonifant Street Parking Garage (owned by Montgomery County DOT Division of Parking Management)

The siting and location of a bicycle station will not only determine parking capacity and amenities provided, but will also strongly influence the level of use the station is likely to experience. Other bicycle parking stations in the U.S. have experienced mixed success (and some have failed) when placed further from transit facilities. Even bicycle stations located close to transit have varied levels of use. For instance, the Washington D.C. Union Station bicycle parking station is located at the entrance of Union Station and has seen an increase in use since its construction, averaging nearly 1,800 uses per month in 2013.⁵ Conversely, the College Park Bike & Ride, a secure, but unstaffed bicycle parking facility is located outside the immediate vicinity of the Metrorail entrance and has experienced a low level of usage.⁶

Three general criteria are used to evaluate the potential locations: space availability, convenience, and public presence. These criteria included consideration of property ownership, the ability to expand services over time to meet increased demand, proximity/travel time from the bicycle station to the rail stations and from the trails to the bicycle station, and visibility and marketability. (See Appendix B, page 31 for additional description of the criteria.)

6. Recommendations

Location A (see Map 2), the WMATA property adjacent to the SSTC, appears to be the best location for the bicycle station. Within Location A, Location A-1, near the southeast Metrorail Entrance, is most favorable. Both locations A-1 and A-2 are recommended over Locations B, C, and D. These locations are

⁵ Washington Bikestation Usage Summary, November 2013.

⁶ Specific usage rates were unavailable at the time of this report’s publication, however informal interviews with WMATA staff have indicated the Bike & Ride’s level of use to be low.

recommended because they provide direct access to the Metrorail entrance and the SSTC bus terminal, and nearly direct access to the Purple Line Light Rail. Additionally, these locations provide nearly direct access to the Capital Crescent and Metropolitan Branch trails, which will connect bicyclists to the SSTC from both the north and south. Additionally, locations A-1 or A-2 are likely to have space to accommodate full bicycle parking build-out and also room for add-on bicycle station components and amenities. Finally, locations A-1 and A-2 will likely have a significant public presence, in terms of both visibility and potential for marketing alternative transportation options.

Location C, the 1110 Bonifant Street property, appears to be the third best location. This location is convenient to the future Purple Line station, relatively convenient to the Red Line station entrance, and adjacent to the nearby regional trails. Location C is well situated to complement, and be complemented by other factors that could make this southern end of the SSTC a hub of bicycle activity. The ends of Bonifant and Ripley Streets provide access to and from each of the major trails planned for the area—the Metropolitan Branch Trail and Capital Crescent Trail. Also, new high rise residential projects contribute to an active street life and a Capital Bike Share station is located in the area. Ripley and Bonifant are small streets that should remain bicycle and pedestrian friendly. A Rachel Carson-themed public open space/park is planned for the adjacent property.

Location B, the Gene Lynch Urban Park, is ruled out for lack of space and distance to the transit entrances and bicycle trails. Even though the current plans for the park have allocated 1,500 square feet for bicycle parking, this is not an adequate amount of space for full bicycle parking station build out. Furthermore, the park's distance from the Capital Crescent and Metropolitan Branch trails, isolation between two large arterials (Colesville Road and Wayne Avenue), and distance from the transit entrances makes it less convenient for bicyclists.

Location D, the Bonifant Parking Garage, is the only location that is already in public ownership/control and the Montgomery County Parking Division has expressed willingness to dedicate the space for bicycle parking. However, the distance between the parking garage and the Metrorail Red Line entrances will adversely affect its level of use. The low usage rates of the College Park Bike-&-Ride suggest that even with a high proportion of cyclists, secure bicycle parking will not be used if it is not located in the immediate vicinity of the primary destination. Even as a multi-service, staffed bicycle parking station, it may still fail to attract users because of its location.

Since the two preferred locations (Locations A and C) are not available in the near term, and the two locations available in the near term (Locations B and D) have significant drawbacks, a phased approach may be the best course of action at this time.

Interim Solution

An interim solution would be to provide a modest amount (60 bicycle parking spaces) of higher security bicycle parking to meet near-term demands.

Montgomery County could partner with WMATA to provide two intermodal Bike-&-Ride areas: one to the west of the station entrance on the north side of Colesville Road where there are existing bicycle lockers (Map 2, location 6), and one at the south entrance on the west side of the railroad tracks where currently there are inverted U racks (Map 2, location 2). These locations were recommended in the recent WMATA bike parking study and are immediately next to Metrorail entrances. In the event either of these locations is affected by construction of the Purple Line, a third location could be considered: the north side of Colesville Road directly east of the station entrance and under the rail tracks (Map 2, location 3). At a future date, when a multi-service, staffed bicycle parking station is developed in Silver Spring, these interim Bike-&-Ride facilities should be kept at their locations and incorporated into the service mix of the new bicycle parking station, as smaller satellite locations.

WMATA has developed the Bike-&-Ride center concept as a branded, high security bike parking option. While it offers enclosed, covered, self-service bike parking, it is important to note that the College Park Bike-&-Ride is not the equivalent of a multi-service bicycle parking station. The Bike-&-Ride center is unstaffed and customers use a key card for access, paying a nominal hourly fee for each use.

7. Additional Considerations

A Base Model for a Multi-Service Bicycle Station. To understand the total square footage required for a multi-service bicycle parking station in Silver Spring, a calculation was used to determine the space requirements for a basic bicycle parking station that would meet current demand and could be expanded in the future to meet the projected 2030 demand. This calculation, referred to as the *Base Model*, was used to evaluate the potential Bike Parking Station locations in Silver Spring. This *Base Model* is based on the *Full Service Storefront Design Example* bicycle parking station as described in the “Los Angeles Metro Bike-Transit Center Implementation Plan.”⁷ The *base model* totals approximately 1,050 square feet, provides 60 bicycle parking spaces, and is described in table 3:

⁷ Los Angeles County Metropolitan Transportation Authority. “Bike-Transit Center Implementation Plan.” Los Angeles, 2004.

Table 3. Bicycle Station Base Model for 60 Users			
	Units Required	Sq. Ft./ Unit	Space Required (Sq. Ft.)
Bicycle Parking –			
Double Tiered Bicycle Parking Racks	5	114	568
Changing and Restroom Facilities –			
Unisex Changing Rooms	1	40	40
Unisex Restroom	2	57	114
Bicycle Repair –			
Staffed Bicycle Repair Station	1	225	225
Bicycle Retail –			
Limited Retail Section	1	50	50
Food and Beverage –			
Water Fountain	1	8	8
Administration –			
Office	1	50	50
Base Model Total Square Footage			1,054 sq. ft.

Bicycle Station Management: Regardless of the location of the new bicycle parking station or other bike parking facilities, the MCDOT Parking Division or WMATA could be responsible for installing, operating (or choosing an operator), maintaining, and repairing bicycle parking infrastructure. This conclusion is based on the fact that the existing organizational structures used for operating automobile parking would be similar to those used for a bicycle parking station.

Bicycle Station Operator: A common model for a bicycle station combines the services of a typical bicycle shop and bicycle parking. Since there is no bicycle shop in the Silver Spring CBD, the County economic development staff could engage in the discussion to see if there is opportunity for a metro area bicycle shop to open an outlet in Silver Spring in combination with the bicycle parking station. The bicycle shop owner could be the operator of the bicycle parking station.

Bicycle Network: Wide streets, high volumes of traffic, high speeds, and lack of bicycle facilities are barriers to bicycling in Silver Spring. Although the planned Capital Crescent and Metropolitan Branch trail facilities will increase bicycle access to the area, bicycling near the SSTC will remain challenging for cyclists who are not comfortable traveling in mixed traffic. Additional on-street bicycle facilities are needed to encourage higher bicycle mode share, including separated bicycle lanes, cycle tracks, and intersection improvements such as bike boxes, bike signals, and signal design to detect and accommodate bicyclists.

Wayfinding signage: Regardless of the location of the bicycle station, proper wayfinding signage will be needed to direct cyclists to the bicycle station. A signage program with clear and recognizable signs in the Silver Spring area should be implemented to increase use of the bicycle station and help with general navigation throughout the CBD.

8. Conclusion

Bicycle parking stations offer an innovative approach to meeting bike parking demand and can support increased bicycle commuting. Bicycle parking stations significantly increase the convenience and appeal of bicycle commuting by providing a secure place for commuters to store their bicycles and also by providing additional services that bicyclists need. Their success in the United States has been mixed and many stations are not financially sustainable, even with public subsidies. The low usage rate of the College Park Bike & Ride and the relatively higher usage rate of the Washington DC Union Station Bikestation suggest that proximity to transit and dense employment centers are important factors in bike parking station success. Careful consideration must be given to the location, design, proximity to transit, and amenities provided in a future bike parking station in Silver Spring.

The recommended locations for a future bike parking station include two sub-areas within the SSTC property and the property currently located at 1110 Bonifant Street, which will be demolished with the construction of the Purple Line. These locations are nearest the entrances for the Metrorail Red Line, the planned Purple Line Light Rail, and the planned regional trails, and have adequate space for expected bicycle parking demand in 2030. While both locations have the potential to be viable sites, a Business Plan is recommended to evaluate the feasibility and budget implications of a bike parking station in any location.

Appendix A: Background Information on Bicycle Parking Stations

The following appendix discusses background information discussing bicycle parking stations and includes:

- Existing bicycle parking stations in the United States
- Photographs of Selected Multi-Service Bicycle Parking Stations in the US
- Description of typical services provided
- Washington D.C. Bikestation case study
- Potential Bicycle Parking Stations near the Silver Spring Transit Center

Existing Bicycle Parking Stations in the United States

In order to better identify characteristics of existing bicycle parking stations, nineteen bicycle stations in the United States were examined. Through research and phone interviews, data was collected on the characteristics of each bicycle station, including services provided and the station's location relative to rail transit services. The table below provides a list of the stations studied and their characteristics, including the operator's name, parking capacity, and mix of services offered.

Table 4. Researched Bicycle Parking Stations

Bike Capacity	Proximity to Transit	Square Footage	20-24 Hour Self Park	Valet Parking	Day Lockers	Bike Rental	Bike Retail	Staff Repair	Self Repair	Changing Rooms	Showers	Restrooms	Classes	Info Center	Station Name
25	3,340			X		X	X	X							Austin, TX ² Mellow Johnny's
128	0		X												Berkeley-Ashby, CA Alameda Bicycle
268	400	4000 ⁶	X	X		X	X	X					X		Berkeley-Downtown, CA Alameda Bicycle
25	2,200			X		X	X	X					X	X	Chicago-Hyde Park, IL ² Bike and Park
300	1,300	15995 ⁷	X		X	X	X	X		X	X	X	X	X	Chicago-Millennium Park, IL Bike and Park
100	1,800		X		X	X	X	X		X		X	X	X	Cincinnati, OH Bike and Park
50	1,400	1500 ⁸	X		X	X		X		X	X	X		X	Cleveland, OH The Bike Rack
83	495	2290 ⁹	X	X	X	X	X	X		X	X	X		X	Long Beach, CA Bikestation
200	0			X		X	X	X							Oakland-Fruitvale, CA Alameda Bicycle
96	0		X				X	X						X	Palo Alto, CA Bike Station
22	1,280		X		X				X						Pittsburgh, PA ³ Park'n Authority
96	0		X												San Francisco-Embarcadero, CA Alameda Bicycle
78	NA ⁴		X		X		X		X	X	X	X	X	X	Santa Barbara, CA ³ Bike station
170	NA ⁴		X		X	X	X	X					X	X	Santa Monica-Primary, CA Bike and Park
130	NA ⁴		X						X						Santa Monica-Secondary, CA ⁵ Bike and Park
75	1,400		X		X	X	X	X		X	X	X			St. Louis, MO Trailnet - Urban Shark
112	0		X		X	X	X	X		X	X	X			Tempe, AZ The Bicycle Cellar
140	50	1750 ¹⁰	X					X						X	Washington, DC Bikestation

Notes for Researched Bicycle Stations Table

1. Information collected through internet research and informal interviews.
2. The Chicago Hyde Park and Austin locations are primarily bicycle shops, but have reserved space for daily commuter bicycle storage.
3. The Santa Barbara and Pittsburgh station are located inside of parking garages.
4. Santa Monica and Santa Barbara do not have local rail transit.
5. Santa Monica Bike and Park has a primary facility with 170 bicycle parking spaces and full services, and a secondary facility two blocks away, with 130 bicycle parking spots.
6. Berkeley Bike Station Fact Sheet 2010
7. "McDonalds Cycle Center at Millennium Park / Muller&Muller" ArchDaily. Accessed 05 Dec 2013. <<http://www.archdaily.com/?p=31324>>
8. "Development Projects, City of Cleveland" City of Cleveland Planning Commission. Accessed 05 Dec 2013. <<http://www.planning.city.cleveland.oh.us/projects/detail.php?ID=36>>
9. "Bikestation Review" American Architects Review. Accessed 05 Dec 2013. <http://www.american-architects.com/en/projects/project-review-detail/34533_bikestation>
10. "Union Station Bicycle Transit Center" KGP Design Studio. Accessed 05 Dec 2013. <<http://www.kgpds.com/projects/usbtc.html> >

Photographs of Selected Multi-Service Bicycle Parking Stations in the US



Bikestation - Interior, Washington DC
Photo by Toole Design Group, 2013



Bikestation - Exterior, Washington DC
Photo by DCMud blog, 2010



Berkeley Bike Station - Interior, Berkeley CA
Photo by BART 2010



Berkeley Bike Station - Exterior, Berkeley CA
Photo by Rudolph Widmann Blog, 2010



McDonalds Cycle Center - Interior, Chicago IL
Photo by StreetsBlog.org, 2005



McDonalds Cycle Center – Exterior, Chicago IL
Photo by Brian Kusler, 2007

Description of Typical Services Provided

The mix of services provided in a bicycle station is typically determined by the bicycle station sponsor and/or operator. Services are tailored to meet the needs and goals of that particular station and its service area, but may be limited by the space available for each service or cost. Bicycle station services provided in the United States include the following:

Self-serve restricted access parking: All bicycle stations provide secure and covered bicycle parking options for cyclists. Although the type of parking racks or equipment varies, many bicycle stations use high capacity two-tiered bicycle racks, enclosed behind a lockable gate and accessed with an electronic key card or pass code. Inside the parking area, bicycles can be locked to bike racks using the bicyclist's own standard lock. This arrangement allows members to have access to bicycles any time of day. The space requirements for bicycle parking are dependent on the type of equipment used and the projected bicycle parking demand.

Valet bike parking: Another option is valet bicycle parking. In this case, an attendant parks the bicycle in a parking area where only bicycle station staff has access. Bicycles are not locked to racks but are identified to each customer and organized efficiently so that they may be retrieved when the cyclist returns. Cyclists are required to retrieve their bicycle during business hours. Some bicycle stations, such as the Downtown Berkeley Bicycle Station, operated by Alameda Bicycle for BART, offers both valet and self-serve, restricted access bicycle parking.

Day lockers: Day lockers are used by cyclists to store helmets, clothes, or other items while the bicycle is at the station. Day lockers are often provided as an on-demand service, or can be reserved for a particular individual.

Changing rooms: Changing rooms can be a key amenity for daily commuters as they allow users to change from cycling clothes into professional attire.

Restrooms: Often a sink and toilet may be provided in a changing room, which increases services and comfort for customers, and may be required by local building codes.

Showers: Showers are another important amenity for bicyclists commuting to work. Although showers are important, particularly during summer months, the cost of building, maintaining and securing showers may be significant.⁸ If the cost of providing showers is prohibitive for the project, it may be possible to locate bicycle stations adjacent to health clubs or public pools, where shower facilities can be shared or purchased separately by those cyclists that use them.

Self-service bicycle repair: A self-service repair stand allows cyclists to make minor repairs to their bicycles. The stand provides space for cyclists to work on their bicycles and usually has appropriate bicycle tools tethered to the stand. These stands are particularly important for non-staffed bicycle

⁸ RTD Bike Parking Summary Report, September 2013.

parking areas. A bicycle repair stand does not take up significant square footage, but space to maneuver the bicycle is needed.

Full-service bicycle repair: A bicycle repair area that is staffed by a bicycle mechanic and provides comprehensive repairs for cyclists and may include sales of small accessories such as lights, snacks or inner tubes. Although a full-service repair station requires more space and dedicated employees, it provides a convenient service for bicycle station users and other area cyclists, who can have their bikes tuned or repaired during the work day. The size of the repair area is dependent on the number of bicycle mechanics working and the demand for bicycle repairs.

Bicycle and bicycle accessory retail: A retail section is important for both bicycle station users and operators. Bicycle station users are able to purchase items needed for bicycling (e.g. bike lights, helmets, locks, etc.) and operators are able to use retail sales as an additional revenue stream. The amount of space dedicated to retail and the types of items sold varies based on projected market demand and local competition.

Water fountain: Water fountains provide cyclists clean drinking water to fill up water bottles and to hydrate after a bike ride. Plumbing considerations need to be taken into account when planning for a water fountain.

Food retail: Food retail can be provided in many different forms and can be provided by secondary operators. Cafes or snack stands provide additional activity in the bicycle station area. However, food retail can require refrigeration, and extra space for sinks, etc. to meet sanitation standards.

Information kiosk: An information kiosk can provide bicycle station users relevant information about the area, including maps of surrounding neighborhoods, nearby bicycle routes, transit timetables, etc. Kiosks can even include a computer station to update bicycle station membership or to sign up for new services.

Meeting, staging, and equipment storage rooms: Additional space can be reserved at the bicycle station for related neighborhood services. This space can be used for storage by a police bicycle patrol team, a staging area for bicycle tours, or as an information stand hosted by the local business improvement district or tourism bureau. Although these services do not directly impact the core function of a bicycle station, they do attract additional activity to the area and can provide useful information for bicycle station users. The space allocated for ancillary services will depend on the nature of the use.

Case Study – Washington, D.C. Union Station Bicycle Station



Washington DC Bikestation Exterior.
Photo by ITDP, 2010



Washington DC Bikestation Interior, lockers and parked bicycles.
Photo by ITDP, 2010.

One of the more visible bicycle parking stations is the Bikestation at Union Station in Washington, D.C. The facility provides bicycle parking for 126 bicycles as well as a changing room, and rentable day lockers. Users are able to purchase memberships in yearly, monthly, and daily increments. Full service bicycle repairs and bicycle rentals are provided by Bike-n-Roll, an operator that also offers recreational bicycle tours of the city. Members are able to access the facility 24-hours a day with an electronic key fob. This bicycle parking station has seen an overall increase in use since its opening in October 2009, and in 2013 it averaged 1,798 uses per month.

The station is located directly adjacent to Union Station, providing highly visible access to local, regional, and intercity transit connections. Additionally, the bicycle station is less than 500 feet from the nearest marked bicycle lane. The station is a distinctive, modern glass structure that is well-lit on all sides and at all times.

Although the station is an eye catching structure, the building is only 1,750 square feet and would not accommodate the projected bicycle parking demand or amenities that are recommended for Silver Spring. Research suggests that the size of Union Station's Bikestation leads to cramped operating conditions for staff and users.

Potential Bicycle Station Locations near the SSTC

Four locations within Silver Spring Transit Center area were examined. All of the locations are in the neighborhood quadrant to the southeast of the Silver Spring Transit Center (identified as quadrant “4” on the maps).

- A. Property immediately surrounding the Silver Spring Transit Center:** The area surrounding the

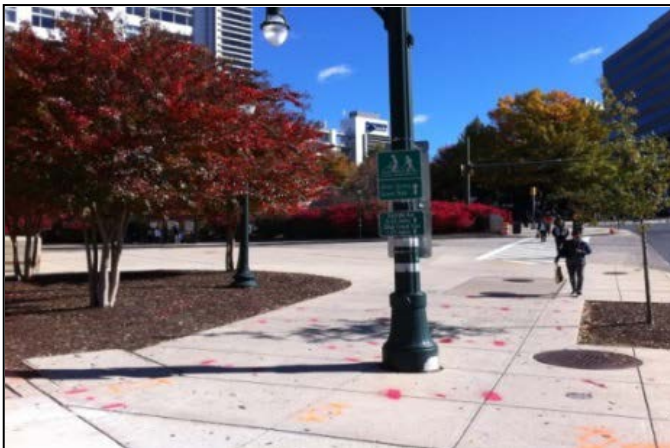


transit center is bordered by the rail tracks, Wayne Avenue, Ramsey Ave, and Colesville Road. Although there are many possibilities to locate a bicycle station, there are two ideal places within this location; north of the transit center, immediately across from the primary entrance to the Metrorail Red Line entrance (identified as A-1), due to its proximity to the Red Line, Purple

Line, and bus station, and east of the transit center, at the intersection of Ramsey Avenue and Bonifant Street (identified as A-2), due to its location on WMATA property and adjacency to Ramsey Street, which is comparably less trafficked than Colesville Road.

The area is owned by WMATA, but is likely to be redeveloped after completion of the Silver Spring Transit Center.

- B. Gene Lynch Urban Park:** This area is a triangular shaped property located on the northeast



corner of Colesville Road and Wayne Avenue and bordered by a small access road into the neighboring Discovery Communications building. The ownership of this property will be transferred to the Montgomery County Parks Department after the completion of the Silver Spring Transit Center. The Parks Department plans to redevelop the area as a memorial park. Even though their plans include

space for bicycle parking, the activity associated with a high capacity bicycle station does not align with the Parks Department vision of this park.

- C. 1110 Bonifant Street: This area is located at the end Bonifant Street and is adjacent to the



southeast side of the Silver Spring Transit Center. The Maryland Transit Administration (MTA) plans to acquire this property for the Purple Line. After construction of the light rail, there will be a triangular space remaining adjacent the light rail line on the property that could be developed for a bicycle station. The building site is currently owned by Bonifant Building LLC.

- D. Bonifant Street Parking Garage: There is available space within the parking garage at the



intersection of Bonifant and Dixon Streets. The property is owned by Montgomery County and the Parking Division has already approved of using the space for bicycle parking. The approved space is at the eastern end of the garage and is adjacent to several new developments in the area.

Appendix B: Analysis for Silver Spring Bicycle Parking Station

This appendix discusses the analysis used in the report and includes:

- Bicycle parking demand methodology
- Methodology for Determining Space Requirements for Multi-Service Bicycle Stations
- Criteria for Siting a Bicycle Station
- Assessment of Potential Bicycle Parking Station Locations

Bicycle Parking Demand Methodology

This section provides a detailed methodology for how bicycle parking demand projections were developed for the Silver Spring Transit Center and the Silver Spring CBD. These projections will help determine the amount and types of bicycle parking infrastructure required to meet potential demand. It is anticipated that future bicycle parking infrastructure in Silver Spring will serve three primary constituencies:

- 1) WMATA Metrorail Red Line users that arrive by bicycle
- 2) Future Purple Line users that arrive by bicycle
- 3) Individuals who work in buildings near the SSTC and want to bike to work but need secure, convenient, and high quality bike parking services.⁹

Red Line Market Potential: The total market potential from users accessing the Red Line at Silver Spring Transit Center in 2030 is projected to be 8,098 during the typical three-hour AM peak period. This projection is based on a 2013 MTA Office of Planning projection that estimates that 9,985 people will board the Red Line during the AM peak period on a typical weekday in 2030. However, 18.9% of daily Red Line boardings at the Silver Spring Transit Center will be transfers from the Purple Line, reducing the potential Red Line market to 8,098 AM peak period boardings. Since there will be multiple Purple Line stations nearby, there is potential for Purple Line trips to switch to bicycle trips for accessing the Red Line. This type of trip was not factored into the demand projection for Red Line users, which indicates that the results for this category of potential users may be conservative.

Purple Line Market Potential: The total market potential from users accessing the Purple Line at Silver Spring Transit Center in 2030 is projected to be 1,322 during the typical AM peak period. This projection

⁹ Additionally, there are an unspecified number of transit users who may use MARC commuter rail services, local buses or intercity buses at the Silver Spring Transit Center; however these riders are not included in this analysis because their numbers are expected to be small. Also, these projections account for total bicycle parking demand and do not differentiate between cyclists who already park in the Silver Spring Transit Center area and new cyclists. Finally, these calculations do not include bike share users.

was derived using several data sources. MTA forecasts 12,490¹⁰ daily weekday boardings at the Silver Spring Transit Center Purple Line station in 2030. To convert this daily number into a AM peak period estimate, a factor was developed using more detailed ridership forecasts that were prepared as part of the Bethesda South Entrance elevator project.¹¹ This factor is the ratio of projected AM peak boardings (non-transfers) to projected daily boardings at the Bethesda South Station. This ratio (10.5%) and MTA's forecasted daily boardings allows an estimated 1,322 AM peak period boardings at the Silver Spring Purple Line Station.

Market Potential from Commuters Biking to Jobs in the Silver Spring CBD: The total market potential from users who work near the SSTC in the Silver Spring Central Business District in 2030 is estimated to be 2,945 inbound trips during the AM peak hour on an average weekday. This projection is based on the number of estimated incoming motor vehicle trips into the area of the Silver Spring CBD (represented by Transportation Analysis Zone 623) during the AM peak hour, as derived from the Metropolitan Washington Council of Governments Cooperative Land Use Forecasts Round 8.0 and using vehicular trip generation rates from the Montgomery County Planning Department Local Area Transportation Review (LATR) guidelines for Silver Spring. Using this methodology, year 2010 and 2040 inbound AM peak hour trips are estimated to be 2,867 and 3,353, respectively. By interpolating between these projections, there is an estimated 2,945 inbound AM peak hour motor vehicle trips in 2030. The equivalent of 1-3% of incoming automobile trips will represent inbound bicycle trips to the CBD needing long-term high-security bicycle parking. This estimate is a conservative approach given the 50% Non-Auto Driver Mode Share goal determined by the Silver Spring Transportation Management District (which includes, pedestrian, bicycle, and transit trips).

Since predicting future bike parking needs at transit stations is an evolving practice (which is as much about setting mode share goals as it is about predicting human behavior) a range of estimates are provided. These estimates provide options based upon how aggressively the County plans to encourage intermodal bike-and-ride transit trips to the SSTC and general bike commuting to the Silver Spring CBD. Four estimates of potential 2030 bicycle parking demand for the Silver Spring Transit Center are described below:

1. Low Estimate / No change: According to a 2010 WMATA Metrorail Bicycle & Pedestrian Access Improvement Study, there is currently a 1.12% bicycle access rate at the Silver Spring Metro Station. The same mode share for bicycle access could be assumed going forward.

¹⁰ Purple Line Final Environmental Impact Statement and Draft Section Evaluation, August, 2013. Additionally, the 2013 Purple Line LPA Daily Boardings and Alightings Report estimates 12,486 average weekday Purple Line boardings.

¹¹ Bethesda Station South Entrance Vertical Circulation Analysis, July, 2013. The station similarities between the Silver Spring Transit Center and the Bethesda station make the Bethesda Station ratio a reasonable proxy; both stations are located in Regional Urban Centers, and both have access to the Metro Red Line and the Purple Line.

2. Moderate Estimate / The WMATA 2030 3.5% goal: WMATA has set a goal of 3.5% bicycle access system-wide for 2030.¹² Recognizing that each Metro station has different characteristics that impact bicycle mode share, WMATA estimated that 3.3% of Silver Spring Red Line users will need to arrive by bicycle in order to meet the system-wide goal of 3.5%.¹³
3. Industry Standard Estimate / Association of Pedestrian and Bicycle Professionals (APBP) Guidelines: The national guidelines developed by the Association for Pedestrian and Bicycle Professionals for a rail station in an urban high demand area, like Silver Spring, recommend supplying bicycle parking infrastructure for nine percent of AM peak boardings.¹⁴ Specifically, APBP recommends 2% parking for short-term bike parking and 7% for long-term or commuter bike parking (nine percent total). The industry standard estimate is based on 9% of AM peak boardings.
4. Aggressive Estimate / High Quality Trail Access: When completed, the Capital Crescent Trail will connect with the Metropolitan Branch Trail and will provide convenient access to the SSTC area. Based on recent WMATA bicycle censuses at Metrorail stations and customer surveys about mode of station access it is clear that a high quality trail will encourage commuters to switch to intermodal bike-and-ride trips as well as increase overall bicycle access to the area. Metro has four stations with good access from major shared use path trail systems where the bicycle access mode share ranges from double to twelve times the system wide average. The aggressive projection is an estimated 12% share of AM peak boardings and is a conservative estimate for bicycle parking demand of stations that have exceptional trail access.

Table 5 (see below) shows the calculations used to determine projected bicycle parking demand for each of the four estimates. To reiterate, the moderate estimate is based upon WMATA's system-wide goal of 3.5% bicycle access in 2030, and is used for the analysis in this report.

Taking into account the existing 156 bicycle parking spaces in the area, 214¹⁵ bicycle parking spaces will need to be added over the next 17 years in order to meet this estimated demand.

¹² WMATA Board of Directors, Resolution 2011-10

¹³ The methodology for projecting 2030 Bike Parking capacity needs are based on 2007 customer service survey data and 2010 bike parking census data to establish a bike parking share index (multiplier) for each of 86 Metrorail Stations. Silver Spring's need is based upon a 3.3% bike arrival rate for projected 2030 AM peak boardings.

¹⁴ National Association of Pedestrian and Bicycle Professionals, Bicycle Parking Guidelines, 2nd Edition 2010.

¹⁵ 184 new spaces and 30 spaces to replace the 30 existing lockers which WMATA is expected to phase out of service, and would be replaced by the bicycle parking station.

Table 5. Silver Spring Transit Center 2030 Bike Parking Demand Calculations

			Silver Spring Transit Center Red Line AM Peak Boardings ⁵	Silver Spring Transit Center Purple Line AM Peak Boardings ⁶	TAZ 623, AM Peak Hour Incoming Motor Vehicle Trips (CBD) ⁷	Total Bike Parking Demand to be Supplied by an On-site Full-Service Bicycle Storage Facility at the Silver Spring Transit Center ⁸
		Adjusted 2030 Demand Projection	8,098	1,322	2,945	12,365
No change over 2013 bike access to transit rates. ¹	Low Estimate	Percent of Bicycle to Silver Spring Station Trips	1.1%	1.1%	1%	
		Count of Bike to Silver Spring Transit Center Trips	91	15	29	135
Goal-Based Growth Estimate (WMATA) ²	Moderate Estimate	Percent of Bicycle to Silver Spring Station Trips	3.3%	3.3%	1%	
		Count of Bike to Silver Spring Transit Center Trips	267	44	29	340
Growth Estimate Consistent with National Guidelines (APBP) ³	Industry Standard Estimate	Percent of Bicycle to Silver Spring Station Trips	9%	9%	1%	
		Count of Bike to Silver Spring Transit Center Trips	729	119	29	877
Goal-Based Growth Estimate (Adjusted for High Quality Trail Access Demand Factor) ⁴	Agressive Estimate	Percent of Bicycle to Silver Spring Station Trips	12%	12%	3%	
		Count of Bike to Silver Spring Transit Center Trips	972	159	88	1,219

AM Peak Bike Arrivals Needed to reach WMATA System Wide 2020 2.1% Target - 252
AM Peak Bike Arrivals Needed to reach WMATA System Wide 2030 3.5% Target - 340

Notes for Bicycle Parking Demand Projections

1. Current bicycle access to the Silver Spring Transit Center is 1.12%; from 2010 WMATA Metrorail Bicycle & Pedestrian Access Improvements Study.
2. WMATA goal is for 3.5% of transit users to arrive by bicycle system wide; to meet this goal, 3.3% of transit users at the Silver Spring Station will need to arrive by bicycle; from WMATA Bike Parking Forecasting Study, 2011.
3. APBP national guidelines recommend providing long term bicycle parking facilities for 7% of AM peak boardings and short term parking facilities for 2% of AM peak boardings (9% total);

from APBP Bicycle Parking Guidelines 2nd Edition, 2010.

4. The 12% share of AM peak boardings is a conservative estimate based on similar Metrorail stations with access to high quality trails. Table 6, shows other Bike Parking Indexes from the 2010 WMATA Bicycle Access Report.

Table 6. Bike parking need index for Metrorail stations near high quality trails

<u>Station Name</u>	<u>Trail Names</u>	<u>2007 Bike Access Share</u>	<u>2030 Bike Parking Need Projection</u>
College Park	Anacostia Tributaries Trail System	1.05%	19.5%
East Falls Church	Custis / 4-Mile Run / W & O D Trail Systems	3.41%	13.0%
Medical Center	Bethesda Trolley Trail and Rock Creek Trail	7.14%	28.8%
West Hyattsville	Anacostia Tributaries Trail System	2.36%	12.3%
System Wide		0.66%	3.5%

5. A 2013 WMATA Office of Planning projection for 2030 estimates 9,985 AM peak boardings at the Silver Spring station, however 18.9% of these boardings are transfers from the purple line and have been removed.
6. The Purple Line AM peak boardings uses a proportion of peak hour non-transfer boardings to daily boardings at the Metrorail Bethesda Station to estimate the Silver Spring boardings. Since the Bethesda and Silver Spring Metrorail stations are on the Red and Purple lines, and are located in Regional Urban Centers, it is reasonable to assume a similar ratio.
7. The 2030 projection for Traffic Analysis Zone (TAZ) 623 is based on the MWCOG Round 8.0 Total Motor Vehicle Trips (which uses a 2010 projection of 2,867 and a 2040 projection of 3,353). 1% of inbound AM peak hour motor vehicle trips to TAZ 623 is a conservative estimate of Bike Parking demand generated by Transit Oriented Development (TOD) surrounding the station, i.e. for which it is reasonable to that the public bike station would draw away from the in-building or on-street bike parking options at each commercial site within 2-3 blocks of the Bike Station. Three percent is a high estimate.
8. This analysis does not account for bicycle parking demand generated by MARC rail trips, however this additional demand is not expected to have an effect on the conclusion of this report.

Methodology for Determining Space Requirements for Multi-Service Bicycle Stations

This analysis required an estimation of the amount of space required to meet anticipated demand for bicycle parking. To accurately determine the space requirements of a future bicycle station, the type of bicycle parking infrastructure had to be identified.

Bike Parking Equipment Mix

The WMATA Pedestrian and Bicycle Capital Improvements Plan (CIP)¹⁶ lists criteria and recommendations for the best mix of parking equipment types based on the type of Metrorail station. Silver Spring is assigned to a category called *regional urban centers*. At regional urban centers, four types of parking infrastructure are recommended in the following percentage range:

- 1) Covered/Unsecure U-Rack Parking (50%)
- 2) Standard Bicycle Lockers (0-5%)
- 3) On Demand Bicycle Lockers (15-25%)
- 4) Bike & Ride Center (25-35%)



Covered Inverted U Racks

Photo by Bike Arlington, Clarendon VA, 2012



Two-Tiered High Capacity Bicycle Parking

Photo by Toole Design Group, Edinburgh, 2010

¹⁶ A memo for the Pedestrian and Bicycle CIP, "Criteria for determining the best mix of parking equipment types for Metrorail stations" Oct. 2011.



Traditional Bicycle Lockers

Photo by Megan Ann, Austin TX, 2008



On Demand Lockers

Phot by Peter Beeler, MTA.ca.gov, 2012

After adopting the above guidelines for the mix of parking types, WMATA adopted a policy to phase out standard bicycle lockers and has elected to not use on demand lockers (bullets 2 and 3 above). While WMATA has not officially revised their guidelines for the mix of parking equipment in regional urban centers, combining the two guidelines would likely result in the following:

- 50% Covered U-Racks
- 50% Two-Tiered High Capacity Bicycle Parking in a secure setting.

The recommended WMATA bicycle parking infrastructure mix guidelines provide a starting point for this analysis, however further adjustments are needed to establish a planning framework for a multi-service bicycle station at Silver Spring. To ensure that the proposed bicycle station can maximize its financial efficiency and viability, it is recommended that no additional U racks be installed and that current plans for all additional capacity be provided in the bicycle station.

This adjustment would result in the following mix of bike parking equipment for the SSTC and would provide the capacity and parking type that could be used to estimate the amount of space the proposed bicycle parking station may need to meet projected 2030 needs (340 total spaces):

- 35% Covered/Unsecured U-Rack Parking (Existing Supply-126 spaces)
- 65% Two-Tiered High Capacity Parking (Proposed Bicycle Station Supply-214 spaces)

The next step is to determine how much space is needed in a bicycle parking station for 214 bicycle parking spaces, based upon use of two-tiered high capacity rack equipment. This space requirement was calculated by first determining a per bike square footage need based upon a realistic layout of this rack type. The analysis examines the layout of two-tiered high capacity racks in the space used for WMATA's College Park Bike-&-Ride Center, and divides the total space used (for bike parking racks, access aisles, and entrance areas) by the total number of bikes accommodated. The result: 9 square feet per bike parked. This per-bike space requirement and the "Moderate Estimate" of project bicycle parking demand were used to determine that 1,900 square feet of space will need to be allocated for parking in the bicycle parking station (see tables 1 and 2 on page 8).

Estimated Space Requirements of Additional Amenities

As discussed, bicycle parking stations also need space for additional services and amenities. Montgomery County may elect to increase the square footage of the station in order to create space for additional bicycle parking in the future, or to accommodate additional services and amenities. Additional services could be added to the bicycle station in future years, as space allows. Table 7 shows optional “add-on” components and their estimated floor space needs.

Table 7. Bicycle Station Add-On Components	
	Sq. Ft./ Unit
Bicycle Parking –	
Double Tiered Bicycle Parking Racks (for 12 users)	114
Self-Service Inverted U Racks (for 12 users)	240
Changing and Restroom Facilities –	
Shower	30
Day Lockers (for 12 users)	36
Bicycle Repair –	
Self-Service Bicycle Repair Stand	20
Bicycle Retail –	
Expanded Retail	500
Food and Beverage –	
Sit Down Café	1,000
Limited Food Retail	250
Meeting/Staging/Storage Room –	
Room	100
Other –	
Information Booth	50
Computer Kiosk	10

This analysis assumes that at least 700 square feet will be required for additional service amenities. It is important to note that add-on services and amenities will have capital and operational cost impacts; as well as potential revenue generation. A variety of other factors will come into play in selecting add-on services: the overall goals for the facility, regulations that may be tied to public or private financial support for the station, market forces, and the preferences and expertise of the bicycle station operator.

Criteria for Siting a Bicycle Station

The siting and location of a bicycle station will not only determine parking capacity and amenities provided, but will also influence the level of use of the station. Three general criteria, described below, are used to compare the potential locations for the Silver Spring Bicycle Station.

Available Space: The bicycle station in the transit center area will need to meet near- and long-term demands, both in terms of the number of users who will park their bicycles at the station and the mix of services that the users will require. Since the bicycle station operator will be able to add parking and services as demand grows, the main constraint to meeting potential future demand is the amount of space available. Additionally, the ownership status of each property will affect the viability to developing a bicycle station.

Convenience: The bicycle station's use will be influenced by how easy it is for bicyclists to access the bicycle station and then reach their final destination after parking their bicycle. It is assumed that bicyclists are more likely to use a bicycle station if it is near their destination.

For this analysis, two measurements are used to compare the level of convenience between the locations; first, the distance from the nearest bicycle trail or planned bicycle trail (the Silver Spring Green Trail, the Metropolitan Branch Trail, and the Capital Crescent Trail); and second, the distance from the bicycle station to a transit station entrance (the Red Line and the Purple Line). These two measurements are a proxy for convenience as they represent likely origins for bicycle trips into the Silver Spring Transit Center area. This analysis assumes that a potential bicycle station user will ride their bike to the area by a bicycle trail, park at the bicycle station, and then walk to the Metrorail or planned light rail.

Public Presence: The bicycle station's presence in the public realm contributes to its marketing potential as well as to a user's sense of personal security. The public presence is a combination of visibility and marketability. A location with high visibility will likely have more street frontage, will be seen by more people, and may have better access. A location with high marketability will be in an area where the immediate neighbors to the bicycle parking station will contribute to a positive synergy of uses and will be able to attract more people to that location.

Currently, all locations are in areas with significant ongoing construction. For this analysis, the likely visibility and the potential for marketability for each location is based on completion of the likely build out for each of the redevelopment sites around the station.

Assessment of Potential Bicycle Parking Station Locations

Each of the four locations was evaluated against the criteria, as presented in the table below. A discussion of the findings follows the table.

Table 8. Potential Bicycle Station Locations and Criteria						
Criteria		A-1 (SSTC Property)	A-2 (SSTC Property)	B (Gene Lynch Urban Park)	C (1110 Bonifant Street)	D (Bonifant Parking Garage)
Available Space	Total Area (sq. ft.)	~2,500-5,000	~2,500-5,000	1,500 ¹⁷	4,000	4,500
	Space for Growth beyond the Base Model (1,100 sq. ft.)	~2,100-3,900	~2,100-3,900	400	2,900	3,400
	Space for growth after Base Model and full parking build-out (2,600 sq. ft.)	~ -100-2,400	~ -100-2,400	-1,100	1,400	1,900
	Potential Timeframe Available for Bicycle Station	Unknown	Unknown	Near Term	Long Term	Immediate
Convenience	Walk to Metro Entrance	1 Min. 200 Ft.	3 Min. 700 Ft.	2.5 Min. 600 Ft.	3 Min. 800 Ft.	6 Min. 1,300 Ft.
	Walk to Purple Line Entrance	2 Min. 500 Ft.	1 Min. 300 Ft.	4 Min. 900 Ft.	1 Min. 300 Ft.	2.5 Min. 600 Ft.
	Walk/Ride from Capital Crescent Trail	1.5 Min. 700 Ft.	1 Min. 300 Ft.	2 Min. 800 Ft.	0.5 Min. 200 Ft.	1.5 Min. 600 Ft.
	Walk/Ride from Metropolitan Branch Trail	2 Min. 800 Ft.	1.5 Min. 500 Ft.	2.5 Min. 1,000 Ft.	1 Min. 300 Ft.	1.5 Min. 600 Ft.
	Walk/Ride from Silver Spring Green Trail	1 Min. 400 Ft.	1 Min. 400 Ft.	0 Min. 20 Ft.	1.5 Min. 600 Ft.	1.5 Min. 600 Ft.
Public Presence	Visibility	Potentially High	Potentially High	High	Medium	Medium
	Marketability	High	High	Low	Medium	Medium

¹⁷ 1,500 sq. ft. of space are allocated as 'Bike Parking' in the Gene Lynch Urban Park Plan, Maryland-National Capital Park and Planning Commission

Accommodating the Base Model

Each of the four locations provides sufficient space for the *Base Model*, as defined in this report. However, there may be difficulties in locating the *Base Model* at Location B due to the use restrictions associated with the property transfer agreement and the goal of creating a memorial park.

Total Parking Capacity

Again, all of the proposed locations would provide enough space for the near term needs for high security bicycle parking, however Location B may not be able to provide sufficient space for future expansion as demand rises.

Space for Add-Ons

Again, Location B is the only location where Add-On services are not likely to be possible due to space constraints. Location A-1 or A-2 is likely to be the best location for Add-On services, including lockers and showers as well as significant bicycle retail offerings and food, because these features can be designed up front into what is assumed to be a mixed use development that will wrap around the north and east side of the SSTC. Location C may offer similar possibilities, because there may be interest in redeveloping what remains of this site after the Purple Line is built.

Convenience

Location A-1 would be very convenient to the Red Line and from the Silver Spring Green Trail. It is somewhat less convenient to the Purple Line and the Capital Crescent Trail than Location A-2 or Location C. While it is the best location at serving bicycle arrivals from each of the four quadrants, Purple Line users from the southeastern parts of quadrant 4 would have to back track to get to the Purple Line platforms.

Location A-2 would be very convenient to the Purple Line, the Capital Crescent Trail and the Metropolitan Branch Trail. It is somewhat less convenient to the Red Line, but fairly accessible to the Silver Spring Green Trail. Arrivals from quadrants 2 and 3 would have to back track to the Red Line and Purple Line entrances after parking their bicycle.

Location B is less convenient to the Red Line and Purple Line and the Capital Crescent and Metropolitan Branch Trails. It is very convenient to the Silver Spring Green Trail. Arrivals from quadrants 2 and 3 would have to back track to the Red and Purple Line entrances after parking their bicycle. Arrivals from quadrants 1 and much of 4 would be required to cross Wayne Avenue or Colesville Road to access the bicycle parking station.

Location C would be very convenient to the Capital Crescent and Metropolitan Branch Trails, as well as the Purple Line entrance area. It is less convenient to the Red Line and to the Silver Spring Green Trail. Red Line users from quadrants 2 and 3 would have to back track to the Red Line station. Location C is somewhat hard to reach from the northeast parts of quadrant 1.

Location D is the least convenient location for walking to the Red Line and Purple Line after parking one's bicycle. It is moderately convenient to the Silver Spring Green Trail, but not to the Capital Crescent and Metropolitan Branch Trails. It is very inconvenient for arrivals from quadrants 2 and 3; and inconvenient for most trip origins in quadrant 1. It is only convenient for arrivals from the southeast portion of quadrant 4.

Public Presence

All of the locations offer the potential for a bicycle station to have a strong presence in the public realm. However, Location B may be limited in the type of signage and street presence the station design can demand due to the potential need to ensure that the facility is an unobtrusive component of the memorial park.

Locations A-1, A-2, C and D all have the potential to have a strong street presence; however a station in either Location A-1 or A-2 could ultimately be part of the SSTC development adding to the level of marketability in the location.

Prioritized locations

Of the four locations studied, Location A is best location for the bicycle station—Location C appears to be the second best location; while Location D and Location B appear to have shortcomings that may make them difficult to develop or difficult to ensure success.

1--Location A-1 & A-2: Both sites are likely to have sufficient space available for the full range of potential services that a bicycle parking station might offer as well as room to grow and accommodate increasing numbers of bicycles. They have good proximity to both the Red Line and Purple Line station entrances as well as the trail access points. They are on par, or better located to serve each of the four quadrants where inbound trips will originate and have great potential for marketability. The primary shortcoming of Location A-1 and Location A-2 is the current lack of clarity regarding its status and prospects for future development (i.e. when it will be available for redevelopment). As a result, Location A-1 and Location A2- cannot be considered in the near term and at the time of this report, it is difficult to predict when or how a bicycle parking station could be integrated into development plans for the site.

2--Location C: The close proximity of 1110 Bonifant Street to transit station entrances and the trail system makes it the second best location for a bicycle parking station. Even though its presence in the public realm is less prominent than that of Location A, the available space and proximity to the planned Metropolitan Branch and Capital Crescent trails ensures that many cyclists would have access to the location. However, this location will also not be available until the completed construction of the Purple Line light rail, currently scheduled to be completed in 2020.

3--Location D: The Bonifant Street Parking Garage is far from the transit entrances and there is only a moderate presence in the public realm. However, there is available space for building a bicycle station

in the near term, and there is enough space to add not only secure bicycle parking, but also sufficient amenities to help generate usage.

4—Location B: Even though the Gene Lynch Urban Park might be available for constructing a bicycle station in the near term, the limited available space, distance from the transit entrances, and poor access to all but the Silver Spring Green Trail are drawbacks to the location. Depending on the vision M-NCPPC has for the memorial park, the potential for marketing the location may be limited. It seems unlikely that a bicycle parking station at this location could include an expanded retail component, commercial food component, lockers and showers, or other activities that would increase its overall patronage and make it a heavily used center of bicycle activity and culture.