Welcoming Capital Bikeshare to Alexandria:
A Proposal for New Routing Options in Old Town

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Invent the Future

Prepared for: City of Alexandria, Virginia
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Introduction

Overview
In light of implementation of the Alexandria Capital Bikeshare Project, the City of Alexandria, through its Department of Transportation and Environmental Services, has sought recommendations from Virginia Tech Urban Planning Affairs on how to improve the cycling infrastructure in Old Town Alexandria. This report presents a project proposal developed by a Transportation Planning class at Virginia Tech during the period of January 18th to March 28th, 2012, under the orientation of Professor Ralph Buehler.

This document is divided in two sections. In the first section we provide a background of the Capital Bikeshare Project in Alexandria, while in the second section we describe the project proposal. Included in this report is an aerial map that displays the proposed facilities, as well as cross-sections of streets and street views. We conclude with a summary of way finding recommendations and a synthesis of the proposed routes and facilities.

Background

A Bike Plan for the City of Alexandria
The City of Alexandria completed its first comprehensive pedestrian and bicycle plan in 2008. During the planning phase, the city was able to locate and prioritize projects with the greatest impact. Currently, the City has identified eighteen projects spanning the City of Alexandria that will be funded by approximately $16 million. These projects focus on areas where connectivity can be increased within Alexandria city and with Arlington and Fairfax County. While improving the infrastructure for cycling, the city also recognizes the importance of providing citizens and potential users with tools to enhance the biking experience.

Capital Bikeshare
Capital Bikeshare, launched in September 20, 2010, is a bike-sharing program developed through a partnership between Washington, DC and Arlington County. The current Bikeshare system has 110 stations and 1,110 bicycles distributed throughout both localities. The network is intended for short trip distances and as alternative means of transportation complementing current travel options. The program has been successful in the DC metro area, exceeding membership and revenue goals within the first year of operation. Capital Bikeshare reached its membership goals in just 6 months and generated enough revenue in its first year to cover operational costs (such achievement was projected for year 4). To date, Capital Bikeshare is the largest bike-sharing program in the nation.

Capital Bikeshare in Alexandria
Following Capital Bikeshare’s (CaBi) success in Washington DC, Alexandria, has planned to incorporate this program into the city—starting with historic Old Town. Characterized by a dense urban fabric, many tourist attractions, and connections to larger trail networks, Old Town Alexandria has great potential for bicycle usage. Capital Bikeshare within DC has maintained great success in attracting tourist users. It is expected a similar trend will occur in Old Town Alexandria.
In deciding where to locate stations, the city utilized an online interactive map to ‘crowdsource’ and gain insight into public preferences. In the near term, eight stations have been identified and will be constructed in Spring/Summer 2012. Five stations will be located along the King Street corridor, from the King Street Metro Station to the waterfront. In addition, three stations will be constructed north of King Street, at the Braddock Road Metro Station, and near north Old Town’s Starbucks and the Trader Joe’s. Nine additional station locations have been identified for a potential expansion of the bike share network.

**Project Research and Design Method**

Our proposal is based on the city’s request to provide recommendations for bike facilities that help Capital Bikeshare users going to, and coming from the King Street’s bike stations.\(^1\) Our research is the culmination of the current transportation infrastructure and traffic patterns of Old Town, surveyed by our team through in-field observation and the examination of Alexandria City’s data. We have honed this research to recommend bike facility solutions that are suitable for the area.

Our team carried out extensive field survey of the Old Town area. Our field survey spans the area within the waterfront and Union Street (East), Pendleton Street (North), the metro line (West) and Prince Street (South). To examine the infrastructure, we took field measurements of street widths for all roads where bike facilities are proposed. In addition, we developed an inventory of traffic signage, parking lanes and traffic circulation through in-field observations. We further refined our research and recommendations through the analysis of documents provided by the City, such as city maps with street parking locations, traffic counts and turn movements at selected intersections. Finally, through walking and cycling in-field observations, we observed current vehicular, pedestrian and bike traffic patterns.

Once the field survey was completed and we had full understanding of Old Town street’s characteristics and traffic patterns, we worked towards recommending facilities that would enhance the biking experience in Old Town, based on the NACTO guide.\(^2\) We have also aimed to minimize interference with the current street characteristics, particularly as it pertains to parking and the conversion of two-way streets to one way.

**Introduction to Proposal – Corridor**

Building on Alexandria City’s primary need for improved facilities to ease movement of Capital Bikeshare users between the King Street Metro and the waterfront (i.e. East-West connections), our proposed facility consists of a pair of interconnected East-West corridors that increase and enhance the biking experience in Old Town Alexandria, for not only CaBi users, but other cyclists as well.

Two East-West corridors run from the Metro to the waterfront, serving the bikeshare users that arrive in Old Town by metro, as well as other bikers crossing Old Town. These two corridors are connected by a

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1. The location of the first CaBi stations on King Street has already been approved by Alexandria’s City Council.
2. http://nacto.org/cities-for-cycling/design-guide/
series of North-South connectors that facilitate bicycle traffic from the East-West corridors to each other, and specifically CaBi stations along each East-West corridor, as featured on Map 1.

Map 1: Old Town Bike Corridors

The two East West corridors can be described as follows:

- **King Street Corridor**: this is the system’s most important corridor, which links King Street Metro Station to the waterfront. This happens through a system of cycle tracks and bike lanes along Prince and Cameron Street. Bike traffic will run eastbound on Prince Street, from King Street metro to St. Asaph Street, and then be diverted to Cameron Street. Cameron Street will have two-way cycle traffic from St. Asaph to the waterfront, and westbound traffic only from St. Asaph to King Street Metro.

- **North Old Town Corridor**: this corridor improves bicycle access between Braddock Road Metro Station and North Old Town. To achieve this, a parallel system of bike lanes is proposed: one bike lane on Pendleton Street and one bike lane on Madison Street. The bike lane on Madison will flow eastward, while the bike lane on Pendleton will flow westward.

In order to connect the King Street Corridor with the North Old Town Corridor, bike infrastructure will be introduced and/or enhanced on St. Asaph Street, Alfred Street, Payne Street, and Union Street. With regard to Union Street, the existing bike lane will be converted to a buffered bike lane. For the other three streets, additional ‘sharrows’ (displaying a bike and chevron) are proposed to communicate which routes are most friendly to bicyclists. However, Payne Street will include enhanced bicycle infrastructure and be designated as a bicycle boulevard.

Map 2, on the next page, illustrates the proposed detailed bike facilities. As a general rule, cyclists in these facilities will move in the direction of traffic. In order, to reduce the risk of collisions at intersections, bike boxes will be introduced at key intersections.
Facility Types
The following are illustrations of the bike facilities recommended in this proposal. The facilities are based on the National Association of City Transportation Officials’ (NACTO) Urban Bikeway Design Guide.

Figure 1. One Way Cycle Track
Source: NACTO Guide

Figure 2. Buffered Bike Lane
Source: NACTO Guide

Figure 3. Bike Lane
Source: NACTO Guide

Figure 4. Sharrow
Source: NACTO Guide

Corridor and Street Specific Facility Descriptions

Old Town’s proposed bicycle facilities try to maintain existing patterns of vehicular traffic and parking. Therefore, it is important to describe the variations that will occur with the bike facilities, by corridor, by street, and by street segment.

The King Street Corridor
King Street is the “Main Street” of Alexandria, between the King Street Metro Station on the western end and waterfront on the eastern end. King Street is home to numerous restaurants, shops and other amenities. The existing street and sidewalk spaces are already crowded with car traffic, car parking, and
pedestrian traffic. As such it is difficult to find room for dedicated facilities on King Street. Instead, dedicated facilities are proposed for Prince and Cameron Streets.

By adding facilities to Prince and Cameron Street, cyclists will be provided with a safe, round trip route to the waterfront and back to the metro. Along much of Prince Street cyclists will be provided with a cycle track, whereas on Cameron Street, except for the narrowest blocks, they will be provided with a buffered bike lane, offering cyclists both a dedicated space within the street and physical protection from auto traffic.

**King Street**

**Current:** King Street is configured as a two-way street with eastbound travel towards the waterfront. The corridor is configured with curbside automobile parking on both sides of the street and two travel lanes in between.

**Proposed:** A comprehensive bicycle way-finding system will guide bicyclist to use the parallel on-street bike facilities on Prince and Cameron Street. However, at two intersections with bike share stations bike boxes will be installed on perpendicular streets crossing King Street. The proposed bike boxes are located at: 1) the southbound travel lane of West Street, adjacent to the bikeshare station on West Street, 2) the southbound travel lanes of St. Asaph and Royal Street, adjacent to the bikeshare station at Market Square.

**Prince Street**

Prince will serve as the eastbound portion of the King Street cycling corridor. Facilities will be provided to lead cyclists from the King Street Metro Station to St. Asaph Street. Coming from the metro cyclists will be routed northeast along Diagonal Road, southeast along Daingerfield Road, and then east on Prince. East of the intersection with St. Asaph, Prince Street switches to two-way traffic, and it is difficult to find space to provide dedicated bicycle facilities. As a result, cyclists will be diverted north onto St. Asaph where they can then cycle in traffic on King Street or on dedicated cycle lanes on Cameron Street.

**Figure 5. Photo representation of bike facility on Prince Street**

Digital manipulation of street view map taken from maps.google.com

The following are descriptions of bike facilities connecting King Street Metro to the waterfront via Prince Street, section by section.
Section 1: Diagonal Road from King Street Metro CaBi Station to Daingerfield Road

Current: Diagonal Road is a two-way street that runs in a quasi West-South-West-East-North-East (WSW-ENE) direction past the King Street Metro Station. From the proposed bike share station location towards King Street, the road has two lanes, with parking on the right side of the road. As parking ends, the road widens to three lanes of automobile traffic (one left turn only lane, a left turn or straight ahead lane, and a right turn only lane) as it approaches the intersection with Daingerfield Road.

Proposed: A right-side bike lane of five feet with a three-foot buffer to moving traffic will be installed. As the road approaches Daingerfield Road, the middle of the current three lanes will be converted to a bike lane. A weave area will allow automobile traffic making a right turn to cross the bike lane. The remaining left lane will be for traffic continuing straight or turning left. MUTCD-compliant road signs will clearly indicate that the bike lane is a facility for those traveling to the Waterfront, the principal anticipated destination for out-of-town visitors and other first-time CaBi users. As for all facilities in this proposal, the bike lane should be painted green to distinguish it from the car travel/parking lanes. The bike lane through intersections should also be demarcated with a continued but hashed green lane.
**Section 2: Daingerfield Road to Prince Street**

**Current:** Daingerfield Road is a two-way street that runs North-West-South-East (NW-SE). In the SE direction it currently has no parking and has two travel lanes between Diagonal Road and Prince Street.

**Proposed:** The left automobile travel lane will be removed. In its place, a left side bike lane will be provided that is buffered and physically separated from both counter-flow traffic and traffic moving in the same direction.

At the intersection with Prince Street, the one travel lane for automobiles will have a left turn, straight, and right turn lane. The bike lane will make a left turn only taking cycling traffic onto the facility that runs the length of Prince Street to St. Asaph Street.
Section 3: Prince Street from Daingerfield to St. Asaph Street

Current: Prince Street is currently configured as a one-way street with eastbound travel toward the Alexandria waterfront. The road is configured with curbside automobile parking on both sides of the street and two travel lanes in between.

Proposed: Left-side parking will be moved away from the curb to provide cyclists with a buffered, physically separated, left-side one-way protected cycletrack between parked cars and the curb. The bike lane will be six feet wide with a three foot buffer area. The road will be reconfigured to include two eight foot parking lanes and one twelve foot travel lane.

At intersections, the left side parking lane will end in advance of the turn, and a left turn bay will take its place. Traffic signals will be changed as follows.

Cycling traffic will be controlled by the left most signal head, which will be a bike-only signal permitting bikes to turn left or continue straight. Wayfinding signs will indicate that King Street is to the left and the waterfront is straight ahead. This light will be given a lead of 5 to 10 seconds to allow cyclists to enter the intersection before automobiles are permitted to move.

A center signal will control automobile traffic making left turns from the left turn bay. This will be a standard left turn signal head with a left turn arrow. Left turning traffic will have a delayed green to allow cyclists to enter the intersection safely and visibly to minimize conflict with left turning automobiles. A sign will notify left turning traffic of the cycling facility and require turning traffic to yield to all bicycle traffic.

The rightmost signal will be a standard automobile traffic signal and the lane shall permit both right turns and straight movements.
Section 4. Prince Street at St. Asaph Street

**Current:** East of St. Asaph Street, Prince Street becomes a two-way street with car traffic moving both east and west. Parking on both sides of the street ends shortly before the intersection. Traffic in the left lane must turn left. Traffic in the right lane may proceed straight or turn right.

**Proposed:** The block leading up to the intersection will be given the same standard treatment as the rest of the preceding blocks on Prince Street. At this light, however, a dedicated signal for bicycles will give cyclists the opportunity to make a left turn onto St. Asaph Street onto a bike facility on the right side of the northbound travel lane without having to cross the path of moving automobiles. Cyclists will proceed northbound towards King Street and the proposed Cameron Street bicycle facility. Bicyclists who wish to continue straight on Prince Street will use the same designated bicycle signal to proceed to the eastbound lane of Prince Street east of St. Asaph Street. Wayfinding signs at the intersection will be altered from the standard treatment to indicate that bicyclists should turn left both to reach King and Cameron Street.

Automobile traffic will not be allowed to proceed in any direction when the cycling signal head is green. Eastbound car traffic will have the same left turn bay as on other blocks. Main travel lane car traffic will be able to continue straight or turn right. Westbound car traffic on Prince Street from the direction of the waterfront wishing to make a right turn to head north on St. Asaph Street will not be permitted to make a right turn on red, as this would cause a potential conflict with cycling traffic turning north onto St. Asaph from the opposite side of the intersection.

**Cameron Street**

Cameron Street will serve as the westbound portion of the King Street cycling corridor from St. Asaph Street to the King Street Metro. From the waterfront to St. Asaph, Cameron Street will carry two-way bicycle traffic, with an eastbound bike lane, and westbound bicycle traffic directed by sharrows. To accommodate a bike lane facility on Cameron Street, between N. Washington and Union Street, the road will be reconfigured to one-way vehicular traffic in the westward direction. This is currently how the remainder of Cameron Street is configured going westward from N. Washington Street.

The following are descriptions of Cameron Street's bike facility, section by section.
**Section 1: N. Union Street to N. Fairfax Street**

*Current:* From N. Union to N. Fairfax streets traffic is two-way. Parking lanes exist on both sides of the street.

*Proposed:* The road will be reconfigured to a one-way travel lane heading west towards King Street Metro Station. The road will also include a right hand angled parking lane and a left hand, 6-foot contra flow bike lane (eastbound.) There will be no parking allowed on the left hand side. One way westbound travel lane will be marked by sharrows for bicycle traffic going in that direction, while the contra flow bike lane will provide a designated facility for cyclist to reach the waterfront, specifically CaBi users using the bikeshare station located near the Torpedo Factory, at the intersection of Union and Cameron Streets. Angled parking will mitigate the loss of parallel parking on the eastbound side of the road.

**Section 2: N. Fairfax Street to N. St. Asaph Street**

*Current:* Street configuration is similar to N. Union Street to N. Fairfax Street, with two-way traffic and curbside automobile parking on both sides of the street.

*Proposed:* Eastbound parallel parking will be moved away from the curb to provide cyclists with a contra flow (eastbound) cycletrack between parked cars and the curb. The cycletrack will vary between 5 and 6 feet wide, while the buffer lane will vary between 2 and 3 feet wide, according to street width. Reconfiguration of the road will include two seven foot parking lanes and one ten foot travel lane going westbound, marked by sharrows for bicycle traffic going westbound.
Section 3: N. St. Asaph Street to Washington Street

Current: The configuration is similar to the previous two sections of Cameron Street above, with two-way traffic and curbside automobile parking on both sides of the street.

Proposed: Sharrows directing westbound cycle traffic will turn into a central one-way buffered bike lane. The left turn car lane to the left of the bike lane will allow cars to enter southbound N. Washington Street. The travel lane to the right of bike lane will take cars westbound on Cameron Street or north on Washington Street. Parking will be permitted on both sides of the street and end in advance of the bike lane.
**Section 4: N. Washington Street to N. Columbus Street**

**Current:** Cameron Street changes significantly in this section, turning into a one way westbound street that narrows to go around Christ Church, atypical from the rest of Old Town’s street grid. There are no parking lanes on this section.

**Proposed:** A left side westbound bike lane facility will begin in this block. The bike lane will be five feet and nine inches wide, with ten-foot travel lanes going westbound. No left turns will be allowed for cars crossing N. Columbus St. and there will not be any car parking.
**Section 5: N. Columbus Street to N West Street**

**Current:** Cameron is a two-lane street with traffic going westbound and curbside parking on both sides of the street.

**Proposed:** After proceeding through the Cameron and N. Columbus Street intersection, the left side westbound bike lane will transition to a buffered six-foot wide cycletrack, with an average buffer lane of two feet. The road will be reconfigured to include two seven foot parking lanes and one ten foot travel lane going westbound.

**Section 6: N. West Street to Buchanan Street**

**Current:** This section of Cameron Street continues to have two westbound travel lanes and two parallel parking lanes. Additionally, there are traffic-calming devices incorporated into the road.

**Proposed:** The road will be reconfigured to include a six foot buffered bike lane, two seven foot parking lanes, and one ten foot travel lane going westbound. However, current traffic-calming devices preclude the buffered bike lane from continuing to run between the curb and parallel parking. Therefore, the buffered bike lane will need to be positioned where the current left most travel lane resides. The bike lane will be separated from the parked cars by a three-foot buffer.
Section 7: Buchanan Street to Commonwealth Street and the King Street Metro

Current: When approaching the King Street Metro Station, and after crossing Buchanan Street, Cameron Street becomes a wide three lane road. At the intersection with Commonwealth Avenue, Cameron Street becomes a one-lane vehicular access street to westbound King Street. This one-way street also provides bike and pedestrian access, with a crosswalk to the King Street Metro Station.

Proposed: Sharrow in the central lane of the three lane section of Cameron Street will direct cyclist to use the access street and crosswalks in reaching the King Street Metro Station and future CaBi station.

North Old Town Corridor
Pendleton and Madison will provide cyclists with a designated bike lane option when moving east and/or westward traveling between the Braddock Road Metro Station and the waterfront.

Pendleton Street
**Current:** Pendleton Street facilitates two-way traffic flow moving east and west from the Braddock Road Metro Station towards the waterfront. There are parking lanes on both sides of the street. All lanes, travel and parking have generous widths. The street is also marked intermittently with bike sharrows.

**Proposed:** Due to the width of Pendleton Street, one bike lane will be installed to move bicycle traffic westward from the waterfront and Union Street bike facilities to West Street, near the Braddock Road Metro Station. The non-buffered bike lane will run between the flow of automobile traffic and on-street parking. For eastward moving traffic, sharrows will mark the travel lane.

*Figure 8. Photo representation of bike facility on Pendleton Street*

Digital manipulation of street view map taken from maps.google.com

**Madison Street**

![Diagram of Madison Street](image-url)
**Current:** Madison Street facilitates two-way traffic flow moving east and west from the Braddock Road Metro Station to the intersection with Henry Street. Moving eastward from Henry Street, Madison turns into a one-way street, directing traffic east towards the water. Madison maintains two parking and two travel lanes for its entire length. The street currently has no bike facilities.

**Proposed:** Madison will have a bike lane that moves with the traffic flow west to east. However, West Street to North Henry Street will be marked with sharrows in each direction. From N. Henry Street to N. Fairfax Street, Madison will have a designated bike lane to move bicycle traffic eastward from Braddock Road toward the waterfront. The bike lane will run on the right side of the one-way traffic between the travel lane and parallel parking. This bike lane will not be “buffered”. For westward moving traffic, sharrows will mark the travel lane.

**Figure 9. Photo representation of bike facility on Madison Street**

Bike boxes may additionally be installed at the larger intersections of Washington, Patrick and Henry Streets to better facilitate cyclist crossing. Accompanying bike boxes, installation of separate bike lights will help direct cyclists at a time separate from automobiles. The combination of these features will
make cyclists more visible and help to mitigate potential points of conflict or confusion between motorists and cyclists.

North-South Connectors, Between North Old Town and King Street

Union Street

**Current:** Union Street facilitates two-way traffic flow moving north and south, parallel to the waterfront. The majority of Union Street is delineated with sharrows. However, Union Street maintains two conventional bike lanes, moving in both the north and south direction between Queen and Oronoco Street. In this same stretch, Union maintains two parking lanes. From Queen moving southward, the street narrows and both bike lanes and one parking lane disappear; sharrows replace the bike lanes.
**Proposed:** Bike and parking lanes along Union Street between Queen and Oronoco Street (along Founders Park) will be rearranged to provide a buffered bike lane for cyclists. The bike lanes will be moved to the interior of the parked cars, running between the on-street parking and curb. The remaining length of the street will maintain more consistent sharrows, preferably each block and in the center of the travel lane.

**Royal Street from Bashford Lane to Capital Beltway Underpass**

![Diagram of Royal Street]

**Current:** Royal Street is configured as a two-way street. The road maintains on-street automobile parking; either parallel or diagonal, on both sides of the street and has two travel lanes in between.

**Proposal:** Royal Street will be enhanced by marked sharrows. The sharrows will be placed in the center of the travel lane, to minimize wear and promote single file travel. Center placement of the sharrows will keep bicycles outside of parked automobile door zones. Road sharrows will be placed on every block of Royal Street.

A bike box will be installed on the southbound travel lane of Royal and Fairfax Street, at the intersection of King Street, adjacent to the bikeshare station at Market Square.

**St. Asaph Street from Prince Street to Madison Street**

St. Asaph Street will become an established and recommended route for bicycle traffic heading from Prince Street eastbound towards the waterfront and for those wanting to travel north-south between Madison Street on the north and Prince Street on the south. Additionally, this route would link the bikeshare station located at the intersection of St. Asaph and Pendleton Street to the bike facilities near King Street.
Current: St. Asaph Street is currently configured as a two-way street with curbside automobile parking on both sides of the street and two travel lanes in between.

Proposed: St. Asaph will be marked with sharrows in the center of the travel lane, to minimize wear and promote single file travel. Center placement of the sharrows will keep bicycles outside of parked automobile door zones. Road sharrows will be placed on every block along St. Asaph Street.

A bike box will be installed on the northbound travel lane of St. Asaph Street, adjacent to the bikeshare station, at the intersection of Pendleton Street.

Alfred Street

Current: Alfred Street runs in a north-south direction. It has two lanes of parking and two travel lanes, one in each direction.

Proposed: Sharrows will consistently be placed on every block along Alfred Street. Sharrows will be placed in the center of the travel lane, to minimize wear and promote single file travel. Center placement of the bike and chevron sharrows will keep bicycles outside of parked automobile door zones.

Payne Street from Duke Street to Wythe Street
Payne Street plays an important role in the north-south bicycle network within Alexandria, particularly as a connector between Braddock Road Metro and the bicycle facilities in the north, and destinations along the King Street corridor. It is the first north-south street east of the Metro/CSX tracks that is appropriate for cycling, as West Street carries relatively high volumes.
Current: Payne Street is a two-way street. The road has two travel lanes and curbside automobile parking on both sides of the street. It is one of two streets in the area (along with Fayette) that restricts through travel: southbound through traffic cannot enter certain blocks between 4:30-6:30 PM, although presumably southbound local traffic is allowed to exit those blocks.

Proposed: Payne Street has low car traffic volumes, which facilitates cycling. It is uniquely situated as the only candidate street for a bicycle boulevard among the routes.

A bicycle boulevard is a local street where physical traffic calming barriers reduce car traffic to low speeds, in a way that encourages through bicycle traffic and discourages high-speed auto traffic. Bicycle boulevards are generally only recommended for streets with annual average daily traffic of less than 1,000 vehicles; although we do not have traffic count data for Payne, we believe that it will fall in this range. Actual counts are needed before proceeding with this proposed design.

Payne Street’s low traffic volumes, current restrictions on through traffic, and narrow sections mean that it currently sees little through auto traffic, and that its residents might welcome permanent restrictions on through auto traffic.

Bicycle boulevards can be built using numerous techniques; these are outlined in the Bicycle Boulevard Handbook. Auto traffic can be diverted through signage or through bulb-outs, roundabouts, and other built interventions.

Two particular street sections that could be used to create a bicycle boulevard along Payne include:

- For the wider sections (south of Queen Street and north of Oronoco Street), a chicane could be

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3 http://www.ibpi.usp.pdx.edu/guidebook.php
built (or just striped). Back-in angle parking⁴ could alternate from one side of the street to the other on each block, creating a gently weaving path that substantially slows car traffic. As a bonus, the number of parking spaces could increase slightly.

- The narrower section, between Queen and Oronoco Street, functions well as a “yield street” as long as parking is maintained on both sides – the street is too narrow for two cars to pass at speed, but bicycles can still pass.

In addition, creating a bicycle boulevard on Payne could also entail:

- Prioritizing traffic on Payne at intersections currently controlled by all-way stops.
- Restricting through traffic by automobile. “Do Not Enter – Local Traffic Only” signs, similar to the existing signs but without hour restrictions, perhaps every three blocks.
- Adding “except bicycles” signage to any signs that restrict through auto traffic.
- Replacing traffic signals and four-way stops with roundabouts.
- Restricting through traffic entering a block with diverters, provided that there is a cut-through for bicycles (or that bicycles are allowed to go to the left of the diverter).

Most intersection treatments for a bicycle boulevard would only apply to Payne Street, not to the cross streets. The few signals on Payne would remain; a more advanced signal treatment could be considered at Cameron, where currently a flashing light alerts traffic on Payne to stop for traffic on Cameron. Four-way stops would ideally be converted to stopping only cross traffic.

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⁴ http://www.bicyclinginfo.org/faqs/answer.cfm?id=3974
Wayfinding

A cohesive, efficient, and user-friendly wayfinding system should complement the implementation of Alexandria’s new bike facilities. Ensuring that cyclists feel confident in where they are going is necessary for sustained use of the facilities, as well as Capital Bikeshare. It is often found in Alexandria a wayfinding system limited to generic “Bike Route” signs such as the example in Figure 10, or similar ones with slight variations in color and shape. More thorough signage is required.

Figure 10. Generic Bike Route Sign

![Generic Bike Route Sign](source: 2009 MUTCD Figure D11-1)

We recommend for more detailed and consistent signage to be used throughout the system. Alexandria does present a few limited examples of better signage such as the one featured below. This type of sign was found on Royal St., and was designed for usage whilst on the Mount Vernon Trail which runs on Royal St. through this section of Old Town. These types of signs could be used more extensively throughout Old Town, instead of being just limited to one major cycling facility such as the Mount Vernon Trail.

Figure 11. Example of existing Alexandria signage - not widely used

![Existing Alexandria Signage](photo credit: Bradley Rawls)
Recently, the District Department of Transportation upgraded their cycling wayfinding signage to present more detail to the user. Information provided includes mileage, a feature that could be used more frequently in Alexandria.

**Figure 12. Example of new DDOT signage**

This is an example of wayfinding that should be pursued for Alexandria's bike routes. Using Alexandria's and DDOT’s newer wayfinding signs as a starting point, Alexandria should look to implement elements of best practices similar to those used in other cities.

**Examples of Best Practices**

The following are best practices used in other cities (which can be seen in Figure 13 below):

In Oakland, a combination of the MUTCD standard “Bike Route” sign is used in conjunction with the destination/mileage signs. Additionally, distance to the nearest rapid transit (BART) station is noted. This is a practice that should be repeated in Alexandria, making 2 Metro stations, as well as an Amtrak/VRE station, more accessible using the new facilities.

Portland uses another unique system that not only notes the mileage but also the biking time to a particular destination. This is a useful method to convey distance to inexperienced riders, such as Capital Bikeshare users.

San Francisco and Berkeley take a different approach in producing an eye-catching signage system that is unmistakable from common road signs. Berkeley created a system using a separate color scheme than the standard MUTCD green, choosing to color all of their signs purple, while San Francisco uses signage with a geographically specific logo, in this case the Golden Gate Bridge.

The development of distinct signage, including an Alexandria specific logo and a separate color scheme, would provide Alexandria with an opportunity to “brand” the city’s bike infrastructure, just as it did with
the trolley service. The Masonic Temple or the ship on Alexandria’s crest are examples of local trademarks that could be used as logos.

**Figure 13. Examples of Wayfinding in U.S. Cities**

![Wayfinding Signs](http://www2.oaklandnet.com/oakca/groups/pwa/documents/procedure/oak026758.pdf)

**Image Credit: City of Oakland, CA**

**Recommendations for a Wayfinding System**

Our recommendations for a wayfinding system include the best features of the examples presented. The system should contain:

- Destinations with time and distance
- Unique color scheme
- Inclusion of large bicycle logo and city specific logo
- Metro/Amtrak/VRE logo used where appropriate

In this way, a new wayfinding system would ensure users of the new bicycle facilities confidence that they will be treated as equals to vehicles, and the certainty that they are going the right way.
Conclusion

Through the implementation of the bike infrastructure described in this proposal, the City of Alexandria has the opportunity to better facilitate cycling by Capital Bikeshare users, while also strengthening a central hub in its overall bicycle network. By highlighting particular corridors and recommending varied treatments, this report seeks to minimize the impact on the limited parking and existing circulation patterns of Old Town. As Alexandria looks to move forward with improvements to its bicycle facilities, we recommend that all facilities within this report should ideally be implemented as they were conceived as a comprehensive network.

If asked to prioritize our recommendations, we suggest:

(a) That focus should initially be placed on Prince Street and Cameron Street, alongside the implementation of a comprehensive wayfinding system. As previously noted, five of the initial Capital Bikeshare stations will be located along the King Street corridor. Providing adequate bike facilities along Prince and Cameron Street, coupled with a simple, consistent and informative wayfinding system will help, at minimum to provide the necessary network to direct bikeshare users to King Street CaBi stations.

(b) The addition of sharrows on north-south streets. Providing these will alert motorists to potentially increased cycle traffic on these streets, as bikeshare users traveled amongst the nine initial CaBi stations.

(c) Bike lanes on Pendleton and Madison Streets. This will help to facilitate cycle traffic to and from the waterfront and Braddock Road Metro Station, in addition to the other CaBi stations located in north Old Town.

(d) Bike boulevard on Payne Street and bike boxes on select north-south streets. The bike boulevard will further improve the current street infrastructure on Payne Street, clearly favoring its usage by cyclists. Inclusion of bike boxes on some north-south streets intersecting King Street will reinforce previously listed recommendations, and better facilitate King Street’s CaBi stations.

Further research and investigation of other measures to improve cycling in Old Town, beyond physical infrastructure improvements should be continued, such as bike maps and bike ambassador programs.