

Bethesda Purple Line Minor Master Plan Appendix – Capital Crescent Trail

Capital Crescent Trail Surface Route

As stated in the 1994 Bethesda CBD Sector Plan, the Surface Route of the Capital Crescent Trail is important “since it will allow easy access to many businesses and activities and will contribute to the vitality of the area.” It will be the only branch of the trail open during construction of the Purple Line and if a Tunnel Route is not constructed, this branch of the Capital Crescent Trail will become the mainline.

The Montgomery County Department of Transportation (MCDOT) is in the conceptual phase of design for this segment of the trail. The concept plan deviates from the 1994 Sector Plan in several regards. First, it routes the trail along 47th Street instead of 46th Street. Second, the concept plan envisions implementing the Surface Route as a cycle track and a sidewalk along Bethesda Avenue and Willow Lane instead of a shared use path adjacent to a sidewalk. Planning staff agrees that the trail should be routed along 47th Street, since there will be fewer impacts to the road network and to the residences along 46th Street. Staff also agrees that the trail should be implemented as a cycle track and a sidewalk instead of a shared use path and a sidewalk along Willow Lane and Bethesda Avenue, since these areas have the greatest potential for conflicts between cyclists and pedestrians. While both cycle tracks and shared use paths maintain separation from traffic, a cycle track is a bicycle-only facility that maintains separation from pedestrians, whereas a shared use path accommodates all users (bicycles, pedestrians, joggers, skaters, etc).

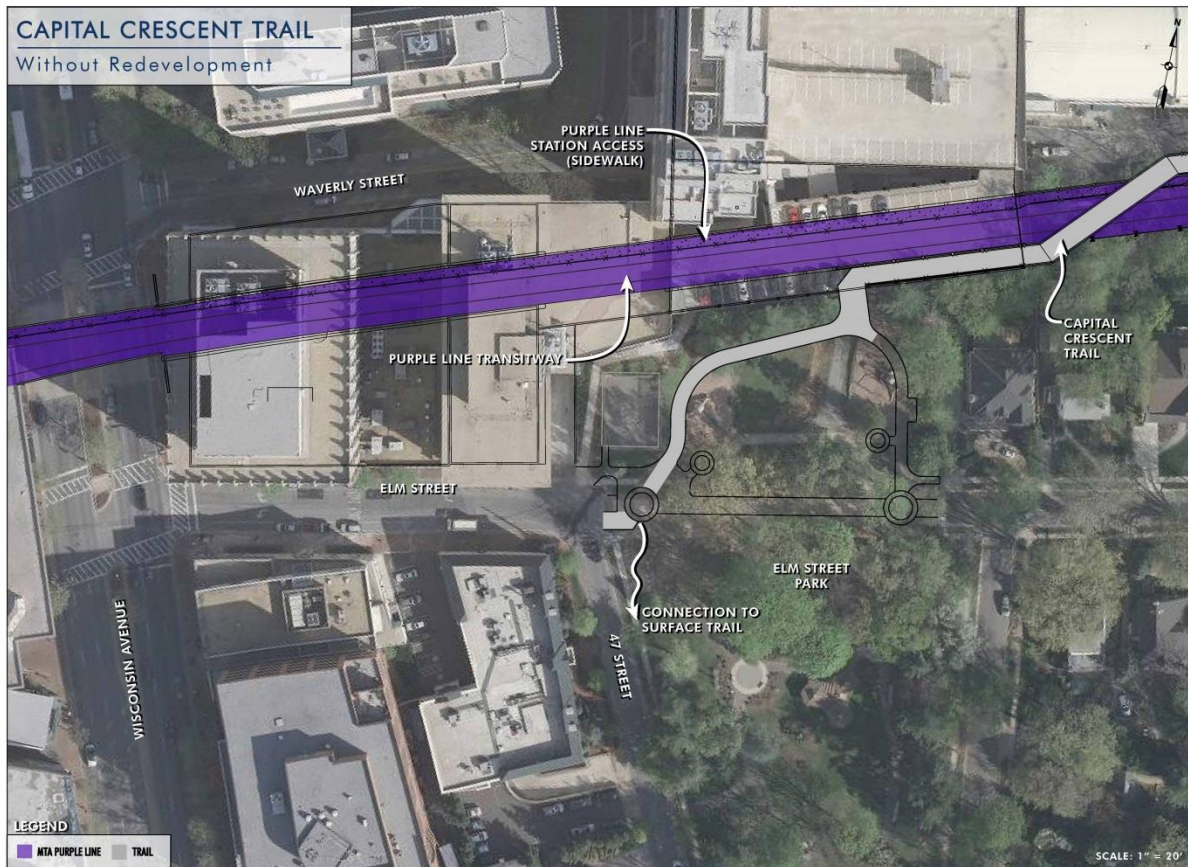
Much of the facility planning discussion regarding the Surface Route is driven by an approval for 7200 / Wisconsin development project, which requires the developer to pay for a cycle-track like facility on the north side of Bethesda Avenue. If a result of this plan is that the approved development along Bethesda Avenue is substantially rethought, it may be possible to improve upon the trail design on Bethesda Avenue by eliminating one or more driveways and widening the trail and sidewalk, especially on the western end.

Comparison of Tunnel Options for the Capital Crescent Trail

Baseline Condition

As noted above and illustrated in Figure 4 below, the current plan is for the Capital Crescent Trail is to utilize the Surface Route as the main connection through downtown Bethesda. Heading in the westbound direction the Capital Crescent Trail crosses over the Purple Line and winds through the northern portion of Elm Street Park. It then transitions into the Surface Route, traveling southbound along the east side 47th Street, heading westbound along the south side of Willow Lane, crossing Wisconsin Avenue, and then heading westbound along the north side of Bethesda Avenue. A narrow 5 to 7 foot wide sidewalk would provide access from the Capital Crescent Trail directly into the Purple Line station, running adjacent to the Purple Line, but would be prohibited for bicycles due to space limitations. The benefits of a new tunnel should be weighed against this Baseline condition.

Figure 4: Capital Crescent Trail without Redevelopment



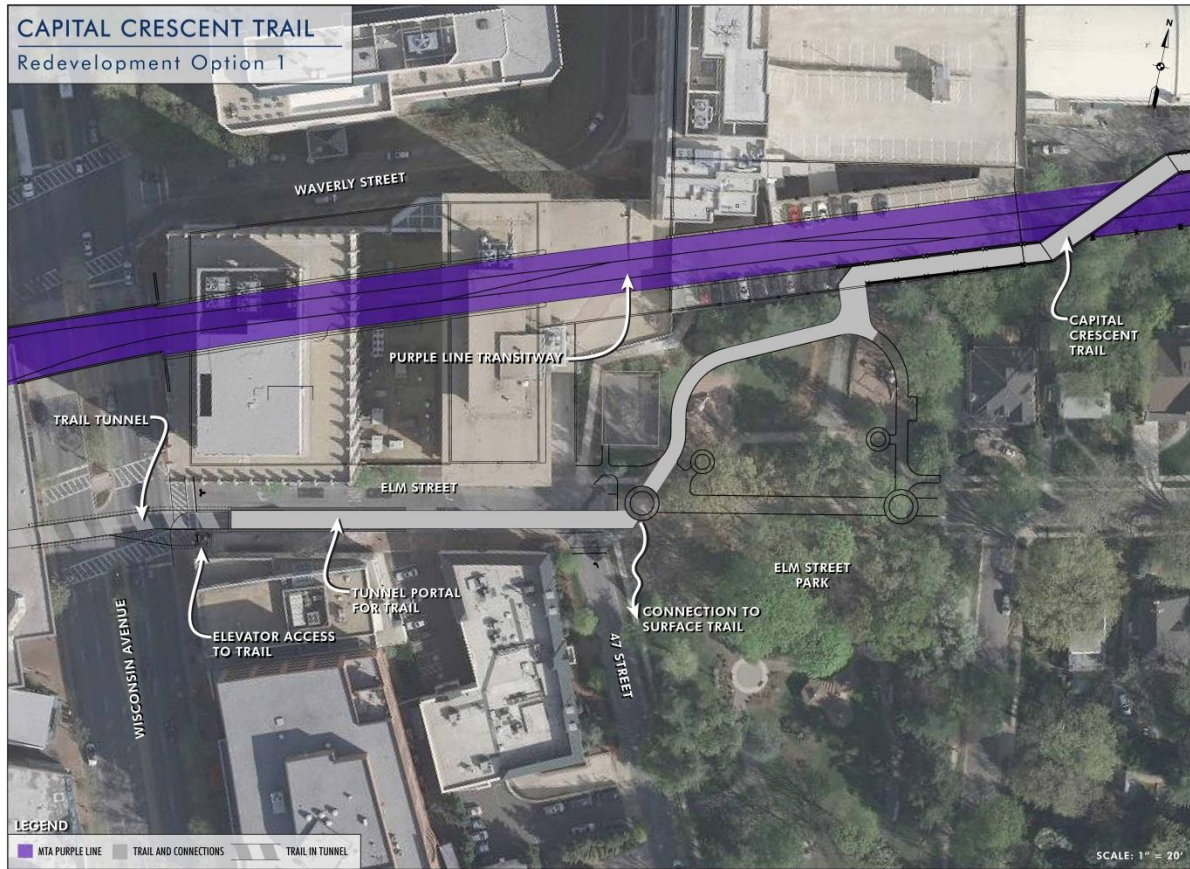
MTA has developed two concepts for a new Tunnel Route for the Capital Crescent Trail. Both options assume the construction of the Surface Route, as described above, though they would not include the narrow 5 to 7 foot wide sidewalk running adjacent to the Purple Line.

Tunnel Option 1

Heading in the westbound direction the Capital Crescent Trail crosses over the Purple Line and winds through the northern portion of Elm Street Park (see Figure 5). At the intersection of Elm Street and 47th Street the trail branches into the Tunnel Route and the Surface Route of the Capital Crescent Trail. The Surface Route heads south along 47th Street. The Tunnel Route crosses 47th Street at grade and travels along the south side of Elm Street. The trail begins to descend at an 8% grade into a 13 foot wide tunnel just west of a driveway to avoid blocking a small parking lot for 4610 Elm Street. It then passes beneath Wisconsin Avenue in a tunnel and enters the Apex Building site at the Purple Line level (about 15 feet below Wisconsin Avenue). Since an 8% grade does not meet ADA requirements, an elevator is provided at the southeast corner of Wisconsin Avenue and Elm Street for trail users that are unable to navigate the steep grade. Tunnel Option 1 would remove both rows of on-street parking on Elm Street (14 parking spaces).

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Figure 5: Capital Crescent Trail Tunnel Option 1

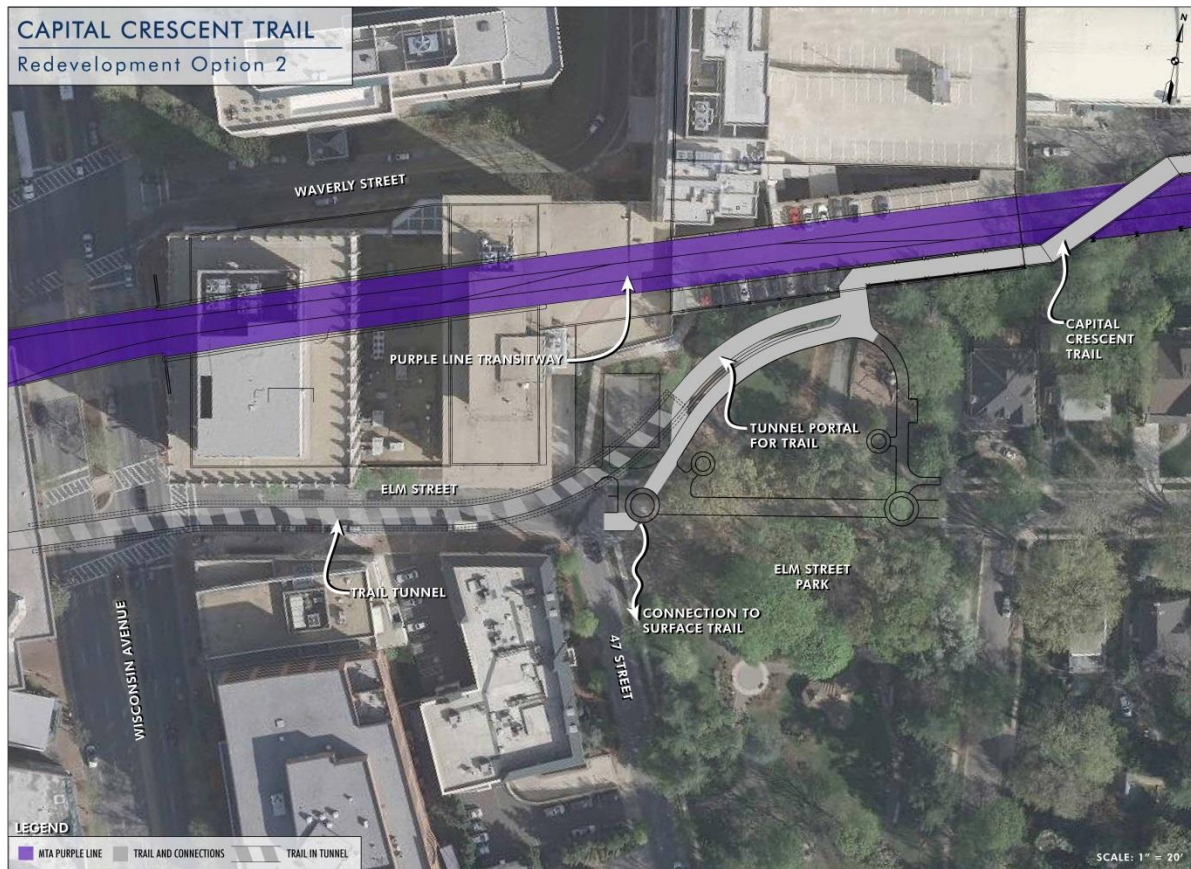


Tunnel Option 2

Heading in the westbound direction the Capital Crescent Trail crosses over the Purple Line and immediately branches into the Tunnel Route and the Surface Route of the Capital Crescent Trail in the northern portion of Elm Street Park (see Figure 6). The Surface Route winds through the park and then heads south along 47th Street. The Tunnel Route parallels the Surface Route for a short period, then enters a tunnel on the east side of the basketball courts. The tunnel curves through Elm Street Park, then travels underneath Elm Street in a 16 foot wide trail. It then passes beneath Wisconsin Avenue in a tunnel and enters the Apex Building site at the Purple Line level (about 15 feet below Wisconsin Avenue).

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Figure 6: Capital Crescent Trail Tunnel Option 2



Comparison of Tunnel Options

Table 4 compares the two tunnel options.

- **Tunnel Length:** In most instances – weather being a notable exception – trail users would prefer a shorter tunnel to a longer tunnel, especially when they are in confined spaces. The tunnel is 225 feet long for Option 1 and 450 feet long for Option 2.
- **Tunnel Width:** To accommodate the potential high usage of the Tunnel Route, the trail should be at least 15 feet wide in the tunnel and tunnel portal. Cyclists tend to shy away from retaining walls and other fixed objects and therefore a 15 foot wide trail would have an effective width of about 11 feet. The current design for Option 1 includes a width of 13 feet (an effective width of 9 feet). While widening the tunnel to 15 feet is technically feasible, it could include a substantial cost if the utility vaults on the north side of Elm Street need to be relocated. MTA will evaluate the location of the electrical vaults (and the additional cost) if the County recommends moving forward with Option 1. Option 2 would be 16 feet wide its entire length.
- **Tunnel Grade:** Perhaps the most important design consideration for Option 1 is the 8% grade over a distance of 225 feet that is needed to avoid cutting off access to the parking lot for 4610 Elm Street (see below). An 8% grade is very steep and would be difficult – if not impossible – for

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several user groups to navigate, including children, elderly, and disabled users. An elevator at the southeast corner of Wisconsin Avenue and Elm Street would provide an ADA compliant alternative route. An 8% grade could be an issue because: 1) it would allow cyclists traveling downhill toward the Purple Line station to reach high speeds on their bikes, and 2) because cyclists traveling uphill typically need additional space to navigate steep grades and could come in contact with other trail users if the trail is only 13 feet wide. Many trail users may opt instead to cross Wisconsin Avenue at grade using the Surface Route or at Elm Street to avoid the tunnel. Tunnel Option 2 has a segment of about 150 feet that has a grade of 4.75%. While this is still steep, it meets ADA requirements and is much more reasonable for various user groups to navigate.



Parking Lot Entrance to 4610 Elm Street

- **Tunnel Curvature:** Perhaps the most important design consideration with Option 2 is the curvature of the tunnel in Elm Street Park. While there is sufficient sight distance to achieve the design speed of the trail, there will be many trail users that are uncomfortable using a tunnel where they cannot see the end of the tunnel, especially during low demand periods. This will be more of an issue for pedestrians who travel at slower speeds than cyclists.
- **Impacts to Elm Street Park:** In Option 1 the junction of the Mainline, Surface Route, and Tunnel Routes of the Capital Crescent Trail occurs at the northwestern edge of Elm Street Park so only a single shared use path passes through the northern section of Elm Street Park. In Option 2 the junction of the Mainline, Surface Route, and Tunnel Routes of the Capital Crescent Trail occurs at the northern edge of Elm Street Park so that two shared use paths pass through this section of the park. Option 2 therefore has a greater impact to the park than Option 1. Option 2 may require removal and replacement of the half basketball court. The Department of Parks is

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concerned about the loss of any recreational facilities in Bethesda, which already has a low level of service for many park facilities.

- Impacts to Elm Street: Option 1 would eliminate 14 on-street parking spaces and a left turn lane. Option 2 would have no impact on Elm Street.
- Street Crossing: Option 1 contains an at-grade crossing of 47th Street, though the volume on this road is low¹. Option 2 contains no street crossings.
- Convergence of Shared Use Paths: In Option 1 the Tunnel Route, Surface Route, and Mainline of the Capital Crescent Trail converge at a single point in a visible location. In Option 2 the convergence of the trail is somewhat more complicated, requiring the Tunnel Route and Surface Route to parallel each other for a short distance.
- Capital Cost: MTA has estimated a preliminary, order-of-magnitude capital cost of \$15 million for Option 1 and \$30 million for Option 2.

¹ A 2004 traffic count showed 1,500 vehicles between 6:00 am and 7:00 pm on a weekday.

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Table 4: Comparison of Tunnel Options

	Tunnel Option 1	Tunnel Option 2	Advantage
Tunnel Length	225 feet	450 feet	Option 1
Tunnel Width	13 ft wide, expandable to 16 ft wide with added cost	16 ft wide	Option 2
Tunnel Grade	Very steep for short distance (8% for 225 feet), requires elevator for ADA	Somewhat steep for shorter distance (4.75% for 140 feet)	Option 2
Tunnel Curvature	Slight bend near station	Slight bend near station; curve in park	Option 1
Impacts to Elm Street Park	One bikeway/shared use path through park (that serves as both the tunnel route and the surface route)	Two bikeways/shared use paths through park (tunnel route and surface route)	Option 1
Impacts to Elm Street	Eliminates on-street parking	None	Option 2
Street Crossing	Crosses 47 th Street at grade (volume is about 1,500 daily vehicles)	No at grade street crossing	Option 2
Convergence of Bikeways/Shared Use Paths	Less complicated convergence at Elm St / 47 th St	More complicated convergence in Elm St Park	Option 1
Capital Cost*	\$15 million	\$30 million	Option 1

*preliminary order-of-magnitude costs

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Recommendation

The baseline condition for our evaluation of the two trail tunnel options was the planned Surface Route for the Capital Crescent Trail and the narrow 5 to 7 foot sidewalk adjacent to the Purple Line. We assessed what the operating conditions for existing and new trail users of that baseline facility would be and determined what incremental benefits would be available for each of the trail tunnel options. After completing that functional assessment, we assessed whether the benefits of each tunnel option would justify the costs.

For bicyclists using the Capital Crescent Trail, both Tunnel Option 1 and Tunnel Option 2 provide good benefits over the baseline condition, but the advantages vary for different user groups. For advanced and intermediate level cyclists who would likely use the Surface Route, the benefits are fewer and are due largely to travel time savings. For basic and child cyclists who might otherwise be deterred from using the trail, the benefits are greater and are due to travel time savings and avoiding an at-grade crossing at Wisconsin Avenue. Tunnel Option 2 is somewhat better than Tunnel Option 1 for bicyclists. The major concern with Option 2 – personal security – is less critical for the cyclists than for pedestrians. Personal security only becomes an issue during periods of low usage. Since cyclists would have the option of using the surface route during these low usage times, it may not be accurate to weigh this issue so negatively for all of users. On the other hand, the average cyclists will be able to travel through the tunnel in about 30 seconds, faster than they would be able to do on the surface route.

For pedestrians using the Capital Crescent Trail, both Tunnel Option 1 and Tunnel Option 2 provide important benefits over the baseline condition, such as a faster travel time, conflicts at driveways and minor roadway intersections, and conflicts at the MD355 intersection. Either tunnel alternative would attract cyclists, thereby decreasing potential conflicts with pedestrians queuing at the MD355 intersection, as well as along the shared use path segment along 47th Street. But because both tunnel options have drawbacks - the 8% grade for Tunnel Alternative 1 and the tunnel length and curve for Tunnel Alternative 2 - and because the Surface Route as currently conceived provides a high quality alternative for many trail users, the benefits of the tunnel options as currently conceived are moderate for pedestrians. Tunnel Option 1 is somewhat better than Tunnel Option 2 for pedestrians, due to the longer tunnel that may deter some pedestrians using it, especially at night and other low-demand periods.

The problem is that while the surface route that is planned would have almost the best accommodation that can be achieved in an urban context, absent a separate right-of-way, it involves more potential conflict than is typical with the rest of the Capital Crescent Trail. From a regional trail perspective, the surface route alone falls short for basic and child cyclists, who may be deterred from using a trail that crosses a major highway. The only way to eliminate those deficiencies is to build a tunnel, an expensive option whose value must be judged in terms of not only how many users' experience would be improved, but also by how many users would no longer perceive the experience as being substandard. Tunnel Option 2 is somewhat better than Tunnel Option 1 for cyclists, but Tunnel Option 1 is somewhat better than Tunnel Option 2 for pedestrians, and both options are better than the baseline. Both options have drawbacks that will limit the benefit for users and that would continue to be perceived by some users as having a substandard experience. However, if Option 1 can be widened to

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16 feet and if the grade can be reduced to below 5 percent, Option 1 would become an excellent connection and would justify the costs. At this time it appears the only way to reduce the grade of the trail without major impacts to Elm Street Park is to close the commercial driveway on the south side of Elm Street and relocate the 10 parking spaces somewhere else. In the longer term, with redevelopment, it may be possible to eliminate the parking lot altogether.