



MEMORANDUM

To: Alexander Ikefuna
City of Charlottesville Director of Neighborhood and Development Services

CC: Jeanette Janiczek, City of Charlottesville UCI Program Manager, NDS
Tony Edwards, City of Charlottesville Development Services Manager, NDS

From: Brian McPeters, PE
Kimley-Horn and Associates, Inc.

Date: July 28, 2017

Subject: Belmont Bridge Replacement Project
Mid-block Pedestrian Crosswalks on 9th Street

The Belmont Bridge in Charlottesville, Virginia is scheduled for replacement as part of VDOT Project 0020-104-101, UPC 75878. The vision for the Belmont Bridge is to provide a community connection for bikes, pedestrians, buses, and cars between the surrounding neighborhoods and the City's downtown/urban core. The project limits are from the intersection of Avon Street, 9th Street, Garrett Street and Levy Avenue to the intersection of 9th Street and Market Street. Kimley-Horn previously completed a report entitled Belmont Bridge Traffic Report for Existing & In Kind Conditions dated April 2017, which contains existing and future traffic volumes, bicycle counts and pedestrian counts. This document should be consulted for detailed data and analysis not repeated here-in. The purpose of this memorandum is to support the conceptual design efforts for the replacement of the Belmont Bridge concerning the suitability for design and construction of mid-block crosswalks on 9th Street within the project limits.

EXISTING PEDESTRIAN/BICYCLE ACCOMMODATIONS

The existing cross-section of 9th Street varies throughout the project limits. Avon Street, south of Garrett Street/Levy Avenue, is a two-lane undivided roadway with varying lane widths. North of Garrett Street/Levy Avenue, there are two travel lanes on northbound Avon Street until E. High Street, where the left travel lane drops as a northbound left-turn lane, and the right travel lane continues through to the northeast on E. High Street. 9th Street has two travel lanes in the southbound direction between E. High Street and E. Market Street, but the second travel lane drops as a southbound left-turn lane. Just south of E. Market Street, two 9th Street travel lanes merge to one lane near the Sprint Pavilion. 9th Street continues southbound with one travel lane until the Garrett Street/Levy Avenue intersection, where the two-lane undivided section begins.

Sidewalks exist on both the east and west sides of 9th Street/Avon Street throughout the study area; however, the eastern sidewalk across the Belmont Bridge (between north of Graves Street and the Sprint Pavilion) has been closed to pedestrian use since April 2011 because of unsafe conditions. Crosswalks exist on all approaches at 9th Street and Market Street and at Avon Street and Garrett Street/Levy Avenue. In addition, there is a rectangular rapid flashing beacon (RRFB) crossing at Graves Street that allow pedestrians to cross

Avon Street at a mid-block location. There were no dedicated bicycle lanes within the study area during the field review at the start of this study. However, in March of 2017 the City performed a restriping project in advance of maintenance on the western sidewalk of the Bridge. The restriping provided a five-foot-wide on-street bike lane traveling south between the Sprint Pavilion and the intersection of 9th Street and Avon Street/Garrett Street/Levy Avenue.

PROPOSED PEDESTRIAN/BICYCLE ACCOMMODATIONS

The proposed cross section of 9th Street is variable throughout the project limits; however, 9th Street is proposed to only consist of two (2) through lanes with one southbound and one northbound lane. South of the proposed bridge, a southbound left turn lane is proposed allowing traffic to turn left onto Graves Street and Levy Avenue. North of the proposed bridge, a northbound left turn lane and right turn lane is proposed allowing traffic to turn left and right respectively onto Market Street. Sidewalks are proposed on both the east and west sides of 9th Street. In addition, crosswalk and curb ramp improvements are proposed on all approaches to the 9th Street/Avon Street intersection with Garrett Street/Levy Avenue and the 9th Street intersection with Market Street. The proposed cross section also includes separated one-way bicycle lanes (southbound and northbound) along 9th Street from the intersection with Garrett Street/Levy Avenue and Market Street.

CANDIDATE MID-BLOCK CROSSING LOCATIONS

Kimley-Horn conducted a review of the existing project corridor, the City of Charlottesville's Streets that Work Plan and the current edition (dated July 18, 2016) of the Virginia Department of Transportation's Traffic Engineering Division Instructional and Informational Memorandum number 384 (or IIM-TE-384.0) entitled Pedestrian Crossing Accommodations at Un-signalized Locations. Kimley-Horn identified two candidate locations for possible mid-block or uncontrolled pedestrian crosswalks on 9th Street within the project limits. Candidate location A is near the existing RRFB crossing at Graves Street. A second candidate location, identified as candidate location B, is located on the north end of the proposed bridge approximately 300 LF south of the intersection of 9th Street and Market Street. Kimley-Horn evaluated each candidate location regarding the existence or potential for proximity to pedestrian generator(s) and attractor(s), existing/proposed/anticipated pedestrian volumes, proximity to other marked crosswalks, stopping sight distance and impacts to safety.

Candidate location A is located in the vicinity of the existing RRFB crossing of 9th Street north of the intersection with Graves Street. The current conceptual design proposes two concepts to facilitate this crossing. The first concept eliminates the mid-block crossing of 9th Street and replaces it with a pedestrian underpass beneath 9th Street and stairs on the west side of the roadway (see **Figure 1**). The second concept replaces the mid-block crossing of 9th Street with appropriate markings and/or enhanced marking/signage either with or without the pedestrian underpass proposed in the first concept (see **Figure 1**). Candidate location A is located within close proximity to pedestrian generators and attractors including residential/restaurant areas in the Belmont Neighborhood and the commercial/restaurant/municipal uses on the Downtown Mall. The crosswalk currently serves 170 pedestrians in the AM and PM peak periods, and pedestrian volumes are anticipated to increase following completion of the bridge replacement project. Candidate location A is located within 200' of the existing (and proposed) marked and signalized crosswalk at the 9th Street intersection with Avon Street/Garrett Street/Levy Avenue. Lastly, candidate location A provides sufficient stopping sight distance (229 feet northbound and 271 feet southbound) for a mid-block crossing.

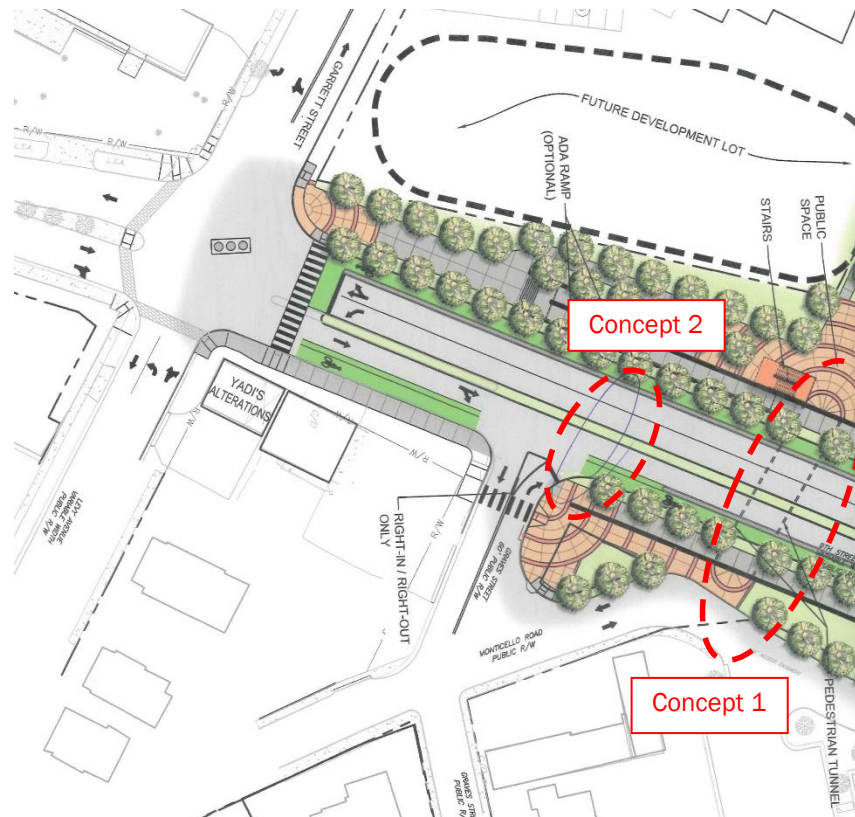


Figure 1: Concept 1 and 2 at Candidate Location A

Candidate location B is located approximately 300 LF south of the 9th Street intersection with Market Street near the existing/proposed pedestrian access to the Downtown Mall and Pavilion. The current conceptual design proposes one concept to facilitate this crossing. The crossing of 9th Street is facilitated by a set of stairs on the east and west sides of 9th Street that connect via a mezzanine level beneath the proposed bridge, but above Water Street (see **Figure 2**). Candidate location B is located within proximity to pedestrian generators and attractors including residential/restaurant areas in the Belmont Neighborhood to the southeast and the commercial/restaurant/municipal uses on the Downtown Mall to the northwest. Pedestrian volumes that may utilize candidate location B are difficult to determine given the lack of an existing safe and marked crosswalk at this location; however, it is assumed some pedestrians using the crossing at candidate location A might consider using the crossing at candidate location B instead. Candidate location B is located within 300' of the existing (and proposed) marked and signalized crosswalk at the 9th Street intersection with Market Street. Candidate location B provides insufficient stopping sight distance in the northbound direction (less than 160 feet) for a mid-block crossing due to a combination of vertical curvature, horizontal alignment and the bridge parapet and railing.

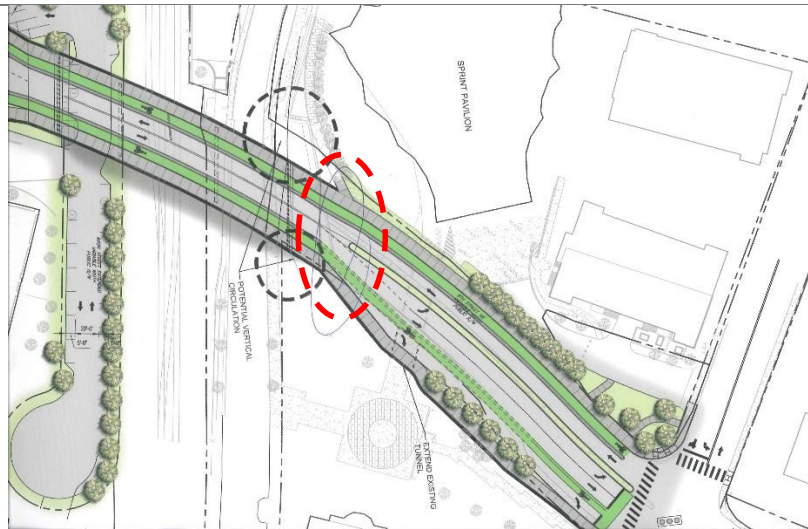


Figure 2: Candidate Location B

RECOMMENDATIONS

Based on Kimley-Horn's review of the existing conditions, conceptual design, consultation with applicable design references and guidance documents and analysis of the identified candidate mid-block crossing locations, the following is recommended.

- While the mid-block at-grade crossing of 9th Street meets most technical criteria at candidate location A, the satisfaction of the technical criteria does not in and of itself require the installation of a marked crosswalk across an uncontrolled location. Engineering judgment must be taken into account to consider if 1) sufficient pedestrian demand warrants a crosswalk and 2) no unacceptable safety hazards will be created with a mid-block crosswalk. The mid-block at-grade crossing of 9th Street was presented to the public at the Open House on June 1 and to the Technical and Steering Committees as an alternative to the proposed pedestrian underpass. Public support for the existing at-grade crossing of 9th Street was mixed with a slim majority desiring to install both the at-grade crossing and a proposed pedestrian underpass. The Steering Committee also expressed support for both the at-grade crossing and pedestrian underpass by a slim majority. It is acknowledged that construction of a pedestrian underpass will require a change in pedestrian habits currently using the at-grade crossing; however, it is also acknowledged that the project will construct a transformative environment that is vastly different for the pedestrian than current conditions that will necessitate changes in pedestrian habits. It is recommended that the existing mid-block at-grade crossing of 9th Street be removed and replaced by the proposed pedestrian underpass. The following observations and facts support the engineering judgement recommendation of elimination of the mid-block at-grade crossing of 9th Street.

 - In the past five years (2012 to 2016) 10 total crashes occurred near candidate location A. Two of the 10 crashes involved pedestrians and resulted in minor/possible injury. Eight of the 10 crashes were property damage only with rear-ends as the predominant crash type.
 - While the mid-block at-grade crossing location does provide unrestricted views of the entire length of the crosswalk for vehicles traveling in the northbound and southbound directions, the crosswalk is located on or near a 6% gradient. This 6% gradient will lead to longer stopping/braking distances for vehicles should a pedestrian enter the crosswalk unexpectedly.

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- The proposed location of the at-grade crossing is less than 300 feet from another marked and signalized crosswalk across 9th Street at the intersection 9th Street/Avon Street and Garrett Street/Levy Avenue.
- The proposed at-grade crossing location can be facilitated by two other means. The first route is for pedestrians to utilize the existing and proposed signalized crosswalk at the 9th Street/Avon Street and Garrett Street/Levy Avenue intersection, which is located approximately 190 LF south of the candidate crossing location. The second route is for pedestrians using the proposed pedestrian underpass and stairs on the west side of 9th Street. It is noted that pedestrians will have to utilize stairs or a longer route, but the inconvenience is deemed to be secondary to the potential safety concerns presented by the pedestrian crash pattern, the proximity to the marked and signalized pedestrian crossing to the south and conflicts with vehicles exiting from Graves Street onto 9th Street NB.
- A mid-block at-grade crossing at candidate location B can be eliminated by technical criteria. Therefore, it is recommended to not install a mid-block at-grade crossing at candidate location B. The mid-block crossing location does not provide unrestricted views of the entire length of the crosswalk for vehicles traveling in the northbound direction. Further, the restricted sight distance at this location could create a potential safety hazard for pedestrians and vehicles. Second, the proposed at-grade crossing location can be facilitated by two other means. The first route is for pedestrians to utilize the proposed signalized crosswalk at the 9th Street and Market Street intersection, which is located approximately 300 LF north of the candidate crossing location. The second route is for pedestrians using a set of stairs on the east and west sides of 9th Street to connect beneath 9th Street (but above Water Street) on a mezzanine level. It is noted that pedestrians will have to utilize stairs or a longer route, but the inconvenience is deemed to be secondary to the potential safety concerns provided by the lack of sufficient stopping sight distance.

The final determination of the appropriate location of mid-block crossings of 9th Street will be evaluated and finalized during final design. The pedestrian underpass at candidate location A and the stair and mezzanine connection at candidate location B should carefully marked, signed, and lit including appropriate wayfinding signage to clearly communicate desired routes to pedestrians.