

## MEMORANDUM

To: Emily Dalphy  
District Department of Transportation (DDOT)

From: Daniel Markham, P.E.  
Tracy Lower, P.E.  
Kimley-Horn and Associates, Inc.

Date: September 7, 2017

Subject: High Crash Site Review Summary Memo  
Connecticut Avenue NW and R Street NW/20<sup>th</sup> Street NW  
Connecticut Avenue NW and S Street NW/Florida Avenue NW

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DDOT has identified several high-crash locations in the District for a safety evaluation to identify potential improvements to mitigate observed crash patterns. Short-term improvements will be identified that can be implemented in the next calendar year and may include signing and marking enhancements or signal timing adjustments. Long-term recommendations will also be identified that could be incorporated as part of planned capital improvement projects, such as intersection modification or streetscape projects.

This memorandum provides a summary of the review of crash data, projects that could impact the intersection, the outcome of the field review meeting, and recommendations for the intersections of Connecticut Avenue NW at R Street NW/20<sup>th</sup> Street NW and Connecticut Avenue NW at S Street NW/Florida Avenue NW. A total of 155 crashes were provided to Kimley-Horn for review at the two locations mentioned above. A review of the police report crash descriptions was conducted, and it was determined that 20 (13%) should be removed from the analysis. **Table 1** below, describes the reason for removal and the number of crashes removed for the two intersections on Connecticut Avenue NW.

*Table 1: Summary of Removed Crashes (2013-2015)*

Reason for Removal	Number of Crashes
Crash description not provided	2
Crash location could not be determined	3
Greater than 500 feet from study intersection	11
Occurred on private property	3
Suspected intentional hit	1
<b>TOTAL</b>	<b>20</b>

## Background

The two signalized intersections being evaluated along Connecticut Avenue are located in the Dupont Circle neighborhood. The posted speed limit along the intersecting roadways is 25 mph. Connecticut Avenue NW is a six-lane, two-way principal arterial roadway that carries more than 12,000 vehicles per day (vpd) according to 2014 traffic data published by DDOT. Florida Avenue NW is a four-lane, two-way minor arterial roadway that carries a similar volume of traffic as Connecticut Avenue NW. The remaining roadways are classified as local streets and carry between 2,000 and 5,000 vpd in a single travel lane. R Street NW is one-way in the westbound direction and S Street NW is one-way in the eastbound direction east of Florida Avenue NW and one-way in the westbound direction west of Florida Avenue NW. 20<sup>th</sup> Street NW is one-way in the northbound direction. 21<sup>st</sup> Street NW is one-way in the southbound direction.

At the intersection of Connecticut Avenue NW and R Street NW/20<sup>th</sup> Street NW, left-turn movements are prohibited from Connecticut Avenue NW. A bike lane is provided along R Street NW in the westbound direction. The intersection is just north of Dupont Circle where the local lanes and underpass lanes meet. A Washington Metropolitan Area Transit Authority (WMATA) bus stop is located on the northwest corner of the intersection that serves the 42, 43, H1, L1, and L2 bus routes. A bus stop on the southeast corner also serves the 42 bus route heading away from Dupont Circle. Marked crosswalks are provided across all legs of the intersection.

At the intersection of Connecticut Avenue NW and S Street NW/Florida Avenue NW, northbound and southbound left-turn movements are prohibited at Florida Avenue NW, while southbound left-turn movements are restricted by time of day onto S Street NW, indicated with an LED blankout sign. Along Florida Avenue NW, left-turn movements are restricted in both directions. There are no turning restrictions for travel along S Street NW. A WMATA bus stop is located on the southeast corner of the intersection that serves the 42, 43, and L2 bus routes. Marked crosswalks are provided across all legs of the intersection except the northbound approach to Florida Avenue NW along Connecticut Avenue NW and across Florida Avenue NW at S Street NW.

A streetscape project is planned along the Connecticut Avenue NW corridor north of Dupont Circle. The streetscape project limits are from north of Dupont Circle to California Street NW. The project includes the creation of a park space above Connecticut Avenue where the through lanes are recessed below the surrounding street network between Dupont Circle and Q Street NW. This project is in the early stages of design. Given the early phase of the project, it is possible that recommendations identified through this site review could be incorporated into the streetscape project.

A crash evaluation was conducted for each of the two Connecticut Avenue intersections and site visits were conducted by DDOT staff, community members, and Kimley-Horn and Associates, Inc. on June 27, 2017. Field observations were reviewed in conjunction with the crash evaluations in order to develop short and long-term recommendations for the two intersections. The following sections summarize the crash evaluations and recommendations for each intersection.

## Connecticut Avenue NW and R Street NW/20<sup>th</sup> Street NW

### Crash Evaluation and Site Field Review

A total of 65 crashes occurred at the intersection of Connecticut Avenue NW and R Street NW/20<sup>th</sup> Street NW between 2013 and 2015. There were 42 (65%) documented as property damage only (PDO) crashes, 12 (18%) involving at least one reported injury, and 11 (17%) unreported or unknown crash severity. There were no fatal crashes recorded at the intersection. The predominant crash type was rear end collisions, accounting for 25% of the crashes. Other common crash types include angle, side swipe same direction, and fixed object collisions, which in total account for 92% of all crashes at the intersection. One crash involved a pedestrian and four crashes involved a bicyclist. **Figure 1** summarizes the crash locations and corresponding crash statistics. From the crash data, some of the key issues identified include:

- On-street parking maneuvers near the intersection resulted in 24 (37%) crashes
- Left-turns are not allowed on the northbound approach of Connecticut Avenue, and Left-turn violations account for eight (53%) of the 15 angle collisions
- Weather did not play a significant role in the occurrence of crashes
- Off peak period crashes were the accounted for the highest number of crashes (60%), and more crashes occurred in the PM peak period (29%) than the AM peak period (11%), defined as 6:00-10:00 AM and 3:00-7:00 PM

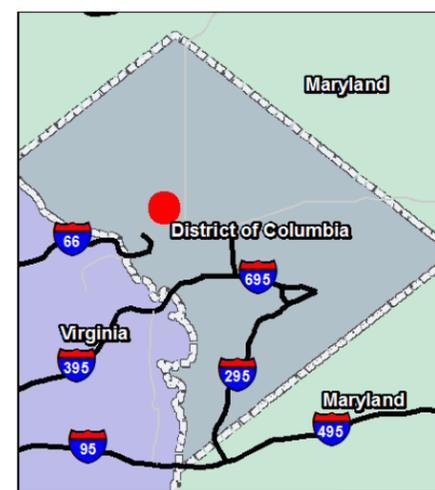
**Figure 2** further identifies some key crash types and indicates other field observations noted during the site visit that relate to safety issues at this intersection. Field observations indicated that there were issues with illegal left-turn maneuvers from both Connecticut Avenue NW and 20<sup>th</sup> Street NW onto R Street NW, which contributed to eight angle crashes. There was one additional left-turn crash resulting from a westbound vehicle turning the wrong way into the oncoming northbound lanes of Connecticut Avenue NW. A weaving issue was also noted as part of the field observations between the Connecticut Avenue tunnel, the Connecticut Avenue service road, and 20<sup>th</sup> Street. Weaving and parking related crashes in that area accounted for 32% of all reported crashes for the intersection, with 11 parked-car crashes and 10 other crashes involving weaving in and out of parking spaces and vehicles turning slightly right from Connecticut Avenue NW onto 20<sup>th</sup> Street NW. Lastly, illegal parking at the bus stop was observed on Connecticut Avenue NW, which further contributed to the weaving problem as buses were unable to access the bus apron north of the tunnel within the service road lanes. Based upon the analysis of field observations and crash data, a variety of short and long-term recommendations are suggested to improve safety conditions at this intersection.

**Table 1** provides a summary of the field observations noted during the site visit along with the crash types that might be attributed to the observed issue. Also indicated in the table with each observation are recommendations for further evaluation where additional considerations may be necessary prior to implementing any short or long-term recommendations.

A leading pedestrian interval (LPI) was identified as a potential consideration during the site visit at the intersection of 20<sup>th</sup> Street NW and R Street NW for pedestrians crossing 20<sup>th</sup> Street NW. While this is retained in the table and as part of the recommendations, DDOT should evaluate the benefits of implementing this change to signal operations. The concern regarding this location was the lack of pedestrian visibility for vehicles turning onto 20<sup>th</sup> Street NW from northbound Connecticut Avenue NW. Given the current signal operations, a pedestrian would not be in conflict with this movement since a green indication would be provided northbound at R Street NW.

Figure 1: Crash Analysis Summary Figure – Connecticut Avenue NW and R Street NW/20<sup>th</sup> Street NW

Crash Analysis 2013-2015  
65 total crashes



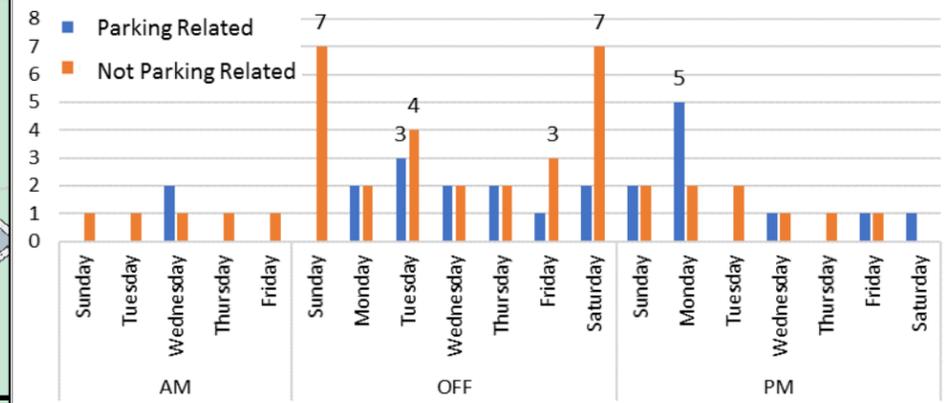
**Legend**

Intersection Study Area

**Collision Type**

- Angle
- Fixed Object
- Head On
- Pedestrian
- Rear End
- Sideswipe OD\*
- Sideswipe SD\*\*
- Bicycle
- Parking

\*Opposite Direction \*\*Same Direction



**Crash Summary**

- High number of crashes occurred on weekends
- 59% of crashes occurred on the northbound approach of Connecticut Avenue
- 37% of crashes were parking-related
- 65% of parking-related crashes occurred on the northbound approach of Connecticut Avenue NW

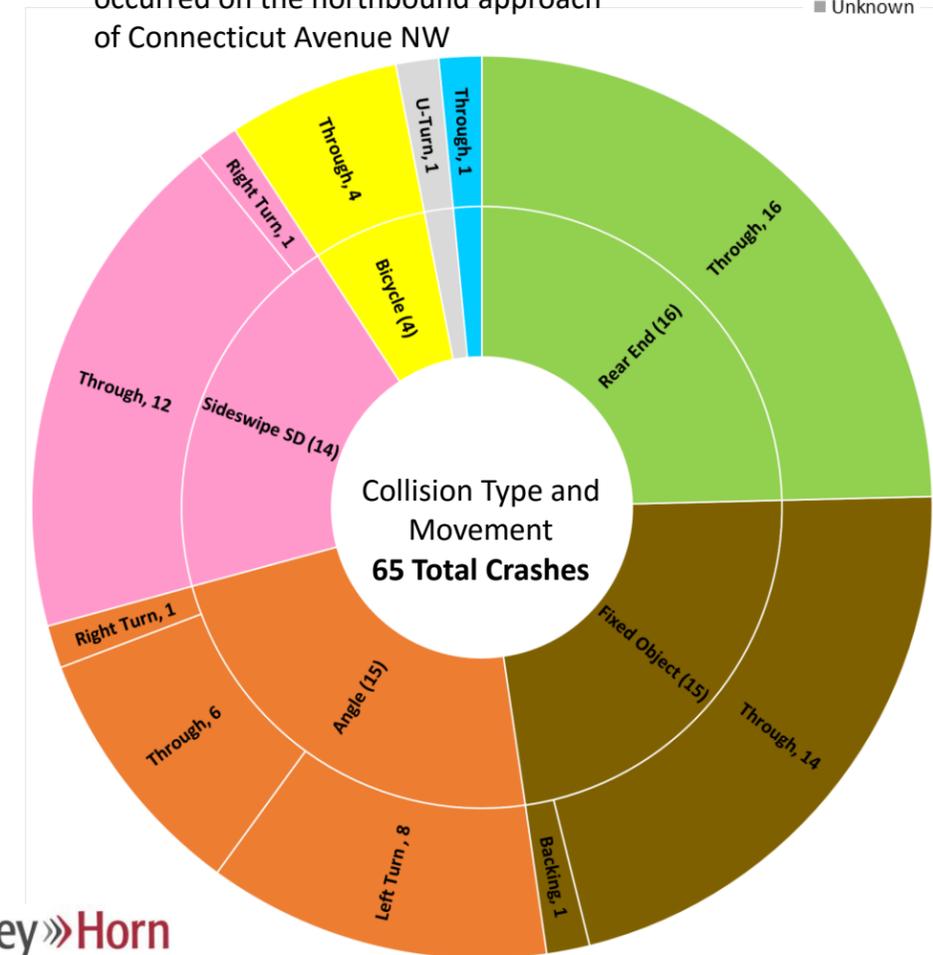
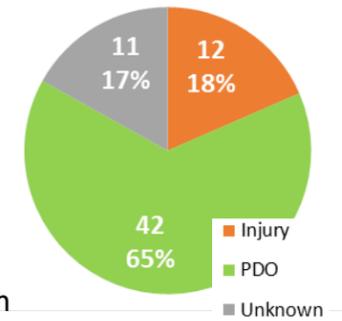
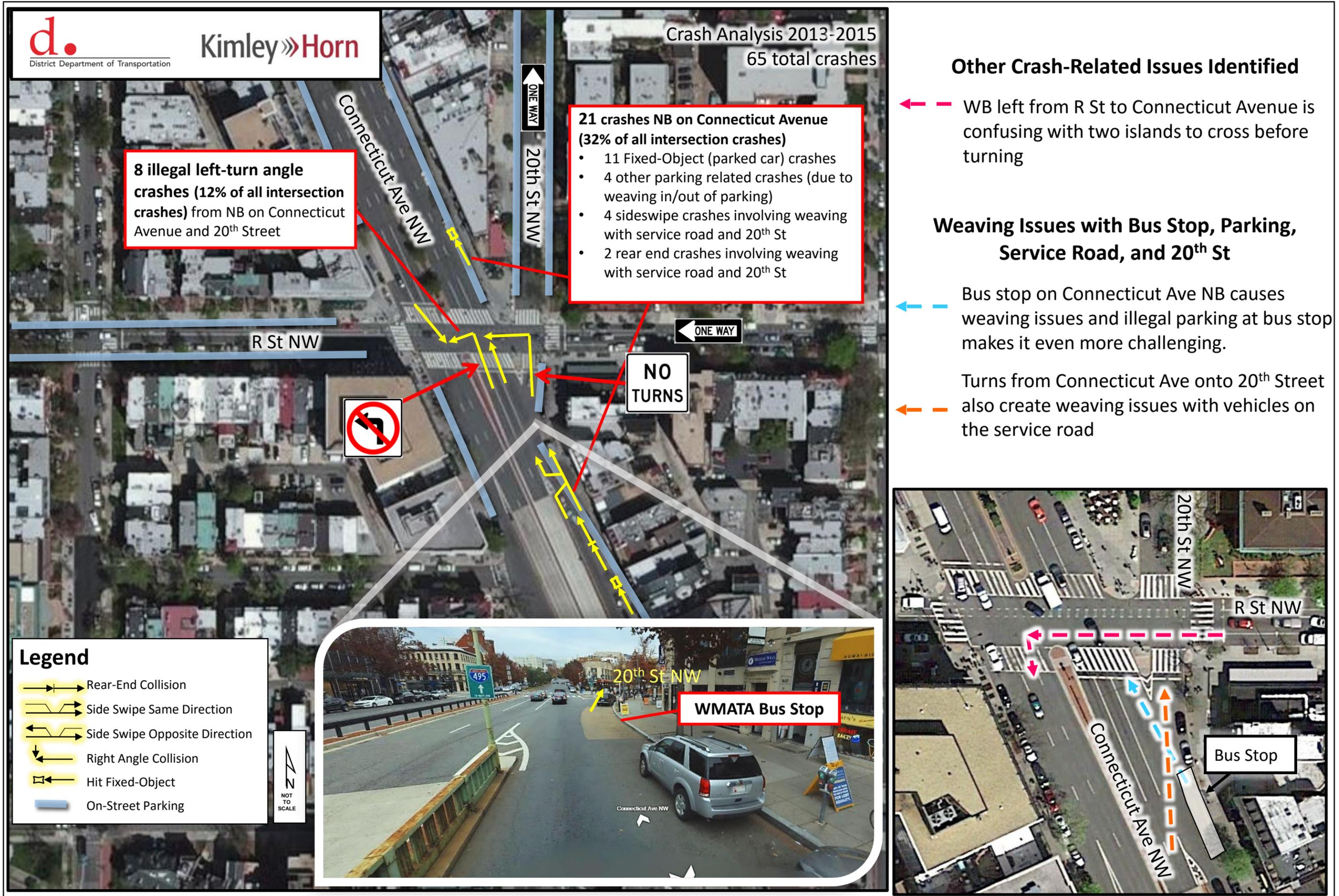


Figure 2: Summary of Field Observations and Associated Crash Types – Connecticut Avenue NW and R Street NW/20<sup>th</sup> Street NW



**Table 2: Summary of Field Review Notes and Related Crash Types - Connecticut Avenue NW and R Street NW/20th Street NW**

Site Visit Notes <i>(provided by DDOT staff, community members, and Kimley-Horn)</i>	Location	Related Crash Types										Further Analysis
		Sideswipe	Rear End	Parking	Bicycle	Left Turn	Right Turn	Pedestrian	Angle	U-turn	Fixed Object	
Issues with slight right turn from NB Connecticut Ave from tunnel onto 20 <sup>th</sup> St.	NBR Connecticut Ave to 20 <sup>th</sup> St	X	X		X		X					
Potential to remove NB bus stop on Connecticut Ave at R St. Illegal parking makes challenging, bus stop one block south and one block north. Need to explore with WMATA	Bus stop on NB Connecticut Ave right before R St	X	X									
When parking is allowed north of R St, NB merge is an issue.	Parking on NB Connecticut Ave, North of R St	X	X	X							X	
Median nose on north side of R St at Connecticut Ave is not ADA compliant.	Connecticut Ave crosswalk north side of R St											
Several turn violations for NB Connecticut Ave left-turns. Some vehicles come NB from Connecticut Ave onto 20th St and then turn left onto R St to make the equivalent movement even though turns are also restricted at 20th St and R St	NB Connecticut Ave at R St		X				X			X		
The leftmost signal head for the NB Connecticut Ave approach to the intersection currently has a green ball.	NB Connecticut Ave at R St		X				X			X		
A thru pavement marking arrow could be added to the left lane of NB Connecticut Ave to reinforce no turns.												
If it is desired to prohibit turns from the NB Connecticut Ave tunnel onto 20th St NB (this causes some blind weaving), then flex posts could be installed between the tunnel lanes and the service lane												
To signify no turns from 20th St at R St, it may be more effective or clearer to have left turn arrow with the red prohibition circle rather than the "NO TURNS" sign. May not need the same for the right turn because "one way" signs are already posted in a couple locations.												
Extending the north leg median further into the intersection (to the edge of the bike lane) and providing an ADA-compliant pedestrian refuge may "tighten" the intersection width and would provide less space for the illegal NB left-turn and any illegal SB U-turns. WB traffic from R St would still have plenty of room to turn left onto SB Connecticut Ave or proceed through the intersection.	Connecticut Ave and R St illegal turns						X	X	X	X	X	
Short time provided to cross Connecticut Ave at R St.									X			
Peds crossing 20th St at R St cannot see cars making right turn from Connecticut Ave.									X			
Investigate leading pedestrian interval (LPI) at 20th/R St												X
Investigate bulb-out on north side of R St between 20th St and Connecticut Ave, maybe realign bike lane with buffer to create more natural cross-bike location												X
Why is parking peak hour restricted when it is a shared parking/travel lane?												
The NW corner pedestrian signal head was observed to be twisted (this was called in during observation)												

## Short-Term Recommendations



*“No Turns” sign at 20<sup>th</sup> St NW and R St NW recommended to be replaced with graphical turn restriction signs*

**Figure 3** illustrates the short- and mid-term improvements for the intersection. To reduce the number of illegal left-turn movements, it is recommended that the leftmost signal on Connecticut Avenue NW on the northbound approach be replaced with through-arrow signal indications and that through-arrow pavement markings be installed both in the leftmost northbound lane on Connecticut Avenue NW and on 20<sup>th</sup> Street NW. It is also recommended that the “No Turns” signs at 20<sup>th</sup> Street NW and R Street NW be replaced with graphical turn restriction signs for left and right-turn movements. The intent with this modification is to symbolically indicate to drivers that turning movements are restricted with signs more commonly seen around the District. Lastly for left turns, it is recommended that pavement markings be installed to guide westbound left turns into the appropriate receiving lane. This could prevent further head-on collisions from occurring between a vehicle turning the wrong way into the oncoming northbound lanes of Connecticut Avenue (one such crash was recorded).

To address the weaving issue, it is recommended that flexible delineator posts be installed where the Connecticut Avenue NW tunnel lanes join the service road lanes, maintaining separation of the two lanes through R Street NW. This will prohibit right turns onto 20<sup>th</sup> Street NW from the Connecticut Avenue NW tunnel. This option changes access to 20<sup>th</sup> Street NW, and would redirect such traffic through Dupont Circle or onto R Street NW. This will not only eliminate weaving maneuvers with vehicles on the service road, it will also improve bus operations into and out of the bus apron and should reduce the rear-end collisions and sideswipe collisions that accounted for 32% of crashes at the intersection. Additionally, to further mitigate the weaving issue in the vicinity of the bus stop, it is recommended that the parking-restricted bus zone around the bus stop be extended to ensure full-access to the stop for WMATA buses. Following field observations, staff also noted that pedestrians crossing 20<sup>th</sup> Street NW at R Street NW cannot see cars making turns onto 20<sup>th</sup> Street NW, so it is recommended that a leading pedestrian interval be investigated at this location.

North of R Street NW, several side-swipe and rear-end collisions were documented (9 crashes in total). It is recommended that DDOT consider removing the rush-hour parking restriction north of R Street NW and permit parking throughout the day. The cross-section of Connecticut Avenue NW was measured to be approximately 41 feet wide in the northbound lane, consisting of two travel lanes measuring 12 and 11 feet, and an outside lane measuring approximately 18 feet, which is insufficient travel space to accommodate two lanes of traffic. If the intended operation of the curbside lane during restricted parking periods is not to provide an additional travel lane, but eliminate parking maneuvers that may hinder through traffic along Connecticut Avenue



*NB Connecticut Ave NW, restricted parking lane during the PM peak period used as two travel lanes. Consider striping a parking lane.*

NW, consider striping parking boxes or a parking lane. The new configuration could consist of three 11-foot travel lanes and an 8-foot parking lane. This could discourage drivers from using the space as a fourth travel lane during restricted parking periods and reduce side-swipe and rear-end collisions.

## Long-Term Recommendations



*Median partially obstructs crosswalk across Connecticut Ave NW. Extend to provide ADA-compliant pedestrian refuge.*

**Figure 4** illustrates long-term recommendations for the intersection. Should the short-term measure of using flex-posts bring about successful results, it is recommended that a raised median be installed between the rightmost lane exiting the Connecticut Avenue NW tunnel and the service road approaching R Street NW. This will permanently prevent right turns from Connecticut Avenue NW onto 20<sup>th</sup> Street NW and will eliminate weaving issues between Connecticut Avenue NW and the service road/20<sup>th</sup> Street NW. Additionally, to improve pedestrian safety at the intersection while also helping to curb illegal left-turn movements, it is recommended that the median on the north leg of Connecticut Avenue be extended into the intersection to the edge of the bike lane and widened to provide ADA-compliant pedestrian refuge. This will provide a safer refuge space for pedestrians when crossing Connecticut Avenue NW and will also tighten the intersection. Reducing the width of the intersection may reduce the number of illegal turning movements as executing a left-turn movement through the narrower passage will be more difficult.

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Figure 3: Short-Term Recommendations

Connecticut Avenue NW and R Street NW/20<sup>th</sup> Street NW

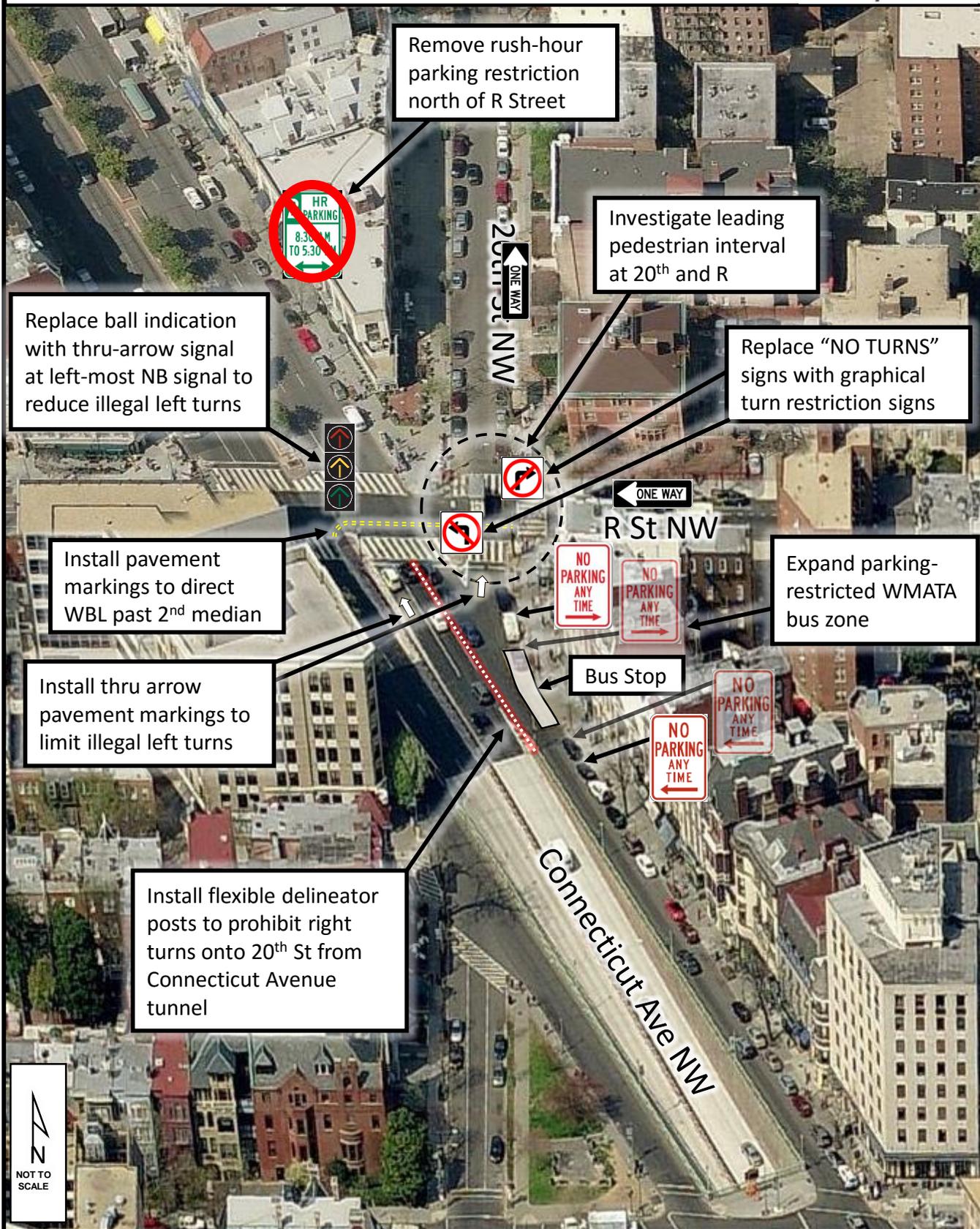
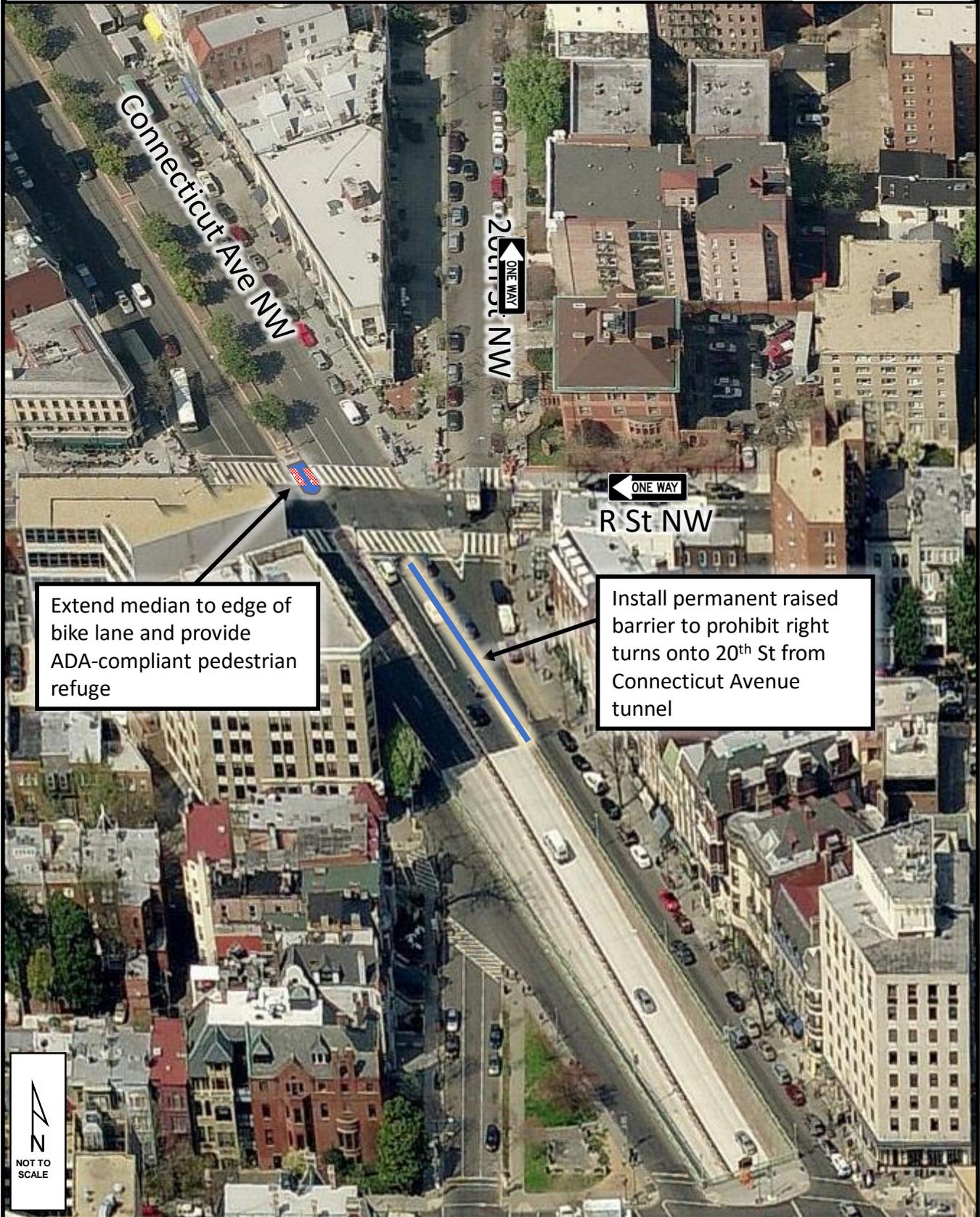


Figure 4: Long-Term Recommendations  
Connecticut Avenue NW and R Street NW/20<sup>th</sup> Street NW



Extend median to edge of bike lane and provide ADA-compliant pedestrian refuge

Install permanent raised barrier to prohibit right turns onto 20<sup>th</sup> St from Connecticut Avenue tunnel

## Connecticut Avenue NW and S Street NW/Florida Avenue NW/21<sup>st</sup> Street NW

### Crash Evaluation and Site Field Review

A total of 70 crashes occurred at the intersections of Connecticut Avenue NW and S Street NW/Florida Avenue NW and the adjacent intersection of Florida Avenue NW and S Street NW/21<sup>st</sup> Street NW between 2013 and 2015. There were 47 (67%) documented as PDO crashes, 10 (14%) involving at least one reported injury, and 13 (19%) unreported or unknown crash severity. There were no fatal crashes recorded at the intersection. The predominant crash type was rear end collisions, accounting for 39% of the crashes. Other common crash types include angle, side swipe, and fixed object collisions. Four crashes involved a pedestrian and two crashes involved a bicyclist. **Figure 5** summarizes the crash locations and corresponding crash statistics. From the crash data, some of the key issues identified include:

- On-street parking maneuvers near the intersection resulted in 12 (17%) crashes
- Left-turns are not allowed on any of the approaches intersecting Florida Avenue, and violations account for five (33%) of the 15 angle collisions
- Less than 15% of crashes occurred with a weather event such as rain or snow
- Off peak period crashes were the accounted for the highest number of crashes (56%), but more crashes occurred in the PM peak period (28%) than the AM peak period (16%), defined as 6:00-10:00 AM and 3:00-7:00 PM

**Figure 6** further identifies some key crash types and indicates other field observations noted during the site visit that relate to safety issues at this intersection. Four angle crashes were identified that relate to an unclear maneuver for vehicles traveling eastbound on Florida Avenue NW intending to turn left onto northbound Connecticut Avenue NW. This is largely attributed to a lack of advance directional signage and the atypical driving pattern required to execute the maneuver. Another field observation indicated that the vehicle clearance intervals along Florida Avenue NW and southbound along Connecticut Avenue NW movements are short. This could have contributed to six crashes that took place on Florida Avenue NW. Driver confusion regarding the “Left Only” pavement markings in the leftmost lane westbound along Florida Avenue NW at 21<sup>st</sup> street NW was also noted in the field. It was observed that most drivers used this lane as a through and left-turn lane; thus, the lack of consistent driver behaviors could have contributed to the six crashes at this intersection.

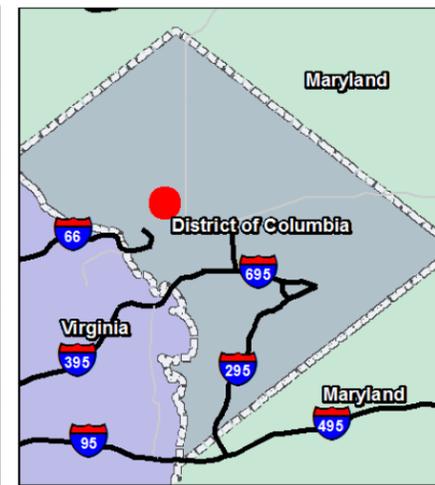
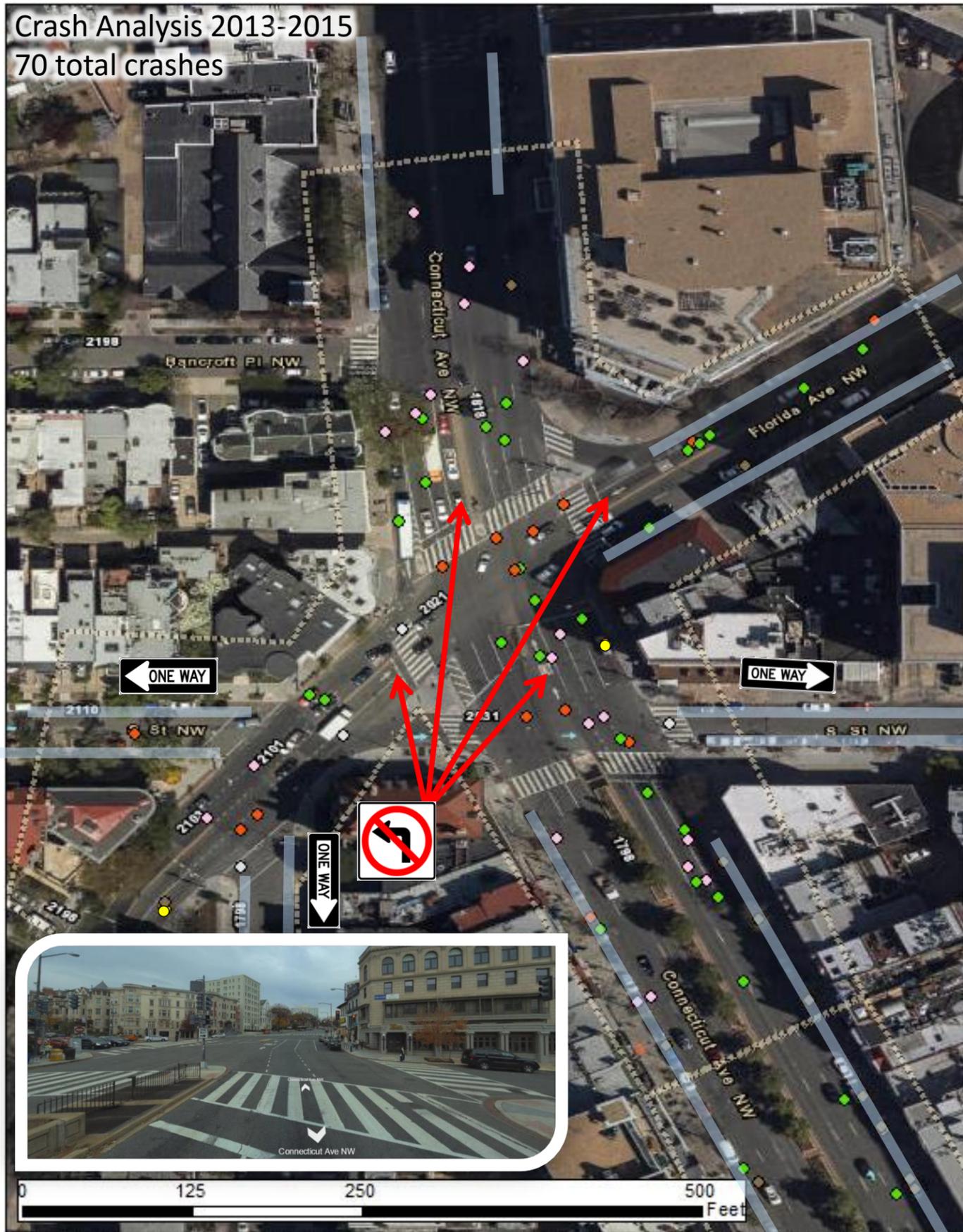
Other field observations noted include the following:

- A lack of pedestrian accommodations to cross Florida Avenue NW at 21<sup>st</sup> street NW
- Vehicle routing recommended by navigation applications directs drivers to make a northbound U-turn at Bancroft Place NW to travel westbound along Florida Avenue NW, thereby avoiding the left-turn restriction
- Drivers traveling westbound on Florida Avenue NW use S Street NW to make left turns to travel southbound along Connecticut Avenue NW, and
- Right turns are made at high speeds traveling southbound on Connecticut Avenue NW and westbound on Florida Avenue NW.
- The refuge island on the west side of the intersection cannot accommodate heavy pedestrian volumes

**Table 2** provides a summary of the field observations noted during the site visit along with the crash types that might be attributed to the observed issue. Also indicated in the table with each observation are recommendations for further evaluation where additional considerations may be necessary prior to implementing any short or long-term recommendations.

Figure 5: Crash Analysis Summary Figure – Connecticut Avenue NW and S Street NW/Florida Avenue NW

Crash Analysis 2013-2015  
70 total crashes



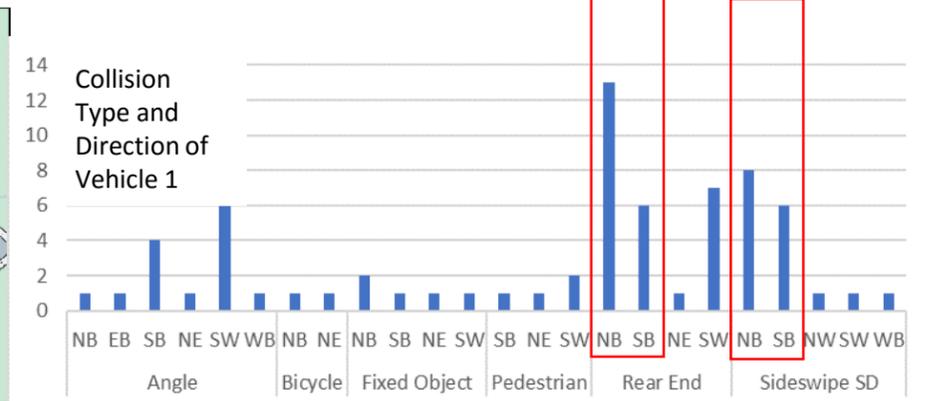
**Legend**

Intersection Study Area

**Collision Type**

- Angle
- Fixed Object
- Head On
- Pedestrian
- Rear End
- Sideswipe OD\*
- Sideswipe SD\*\*
- Bicycle
- Parking

\*Opposite Direction \*\*Same Direction



**Crash Summary**

- Rear end and sideswipe crashes were concentrated on Connecticut Ave NW
- 21% of crashes occurred off-peak hours on a Thursday
- 17% of crashes were parking related
- 5 illegal left turn crashes occurred

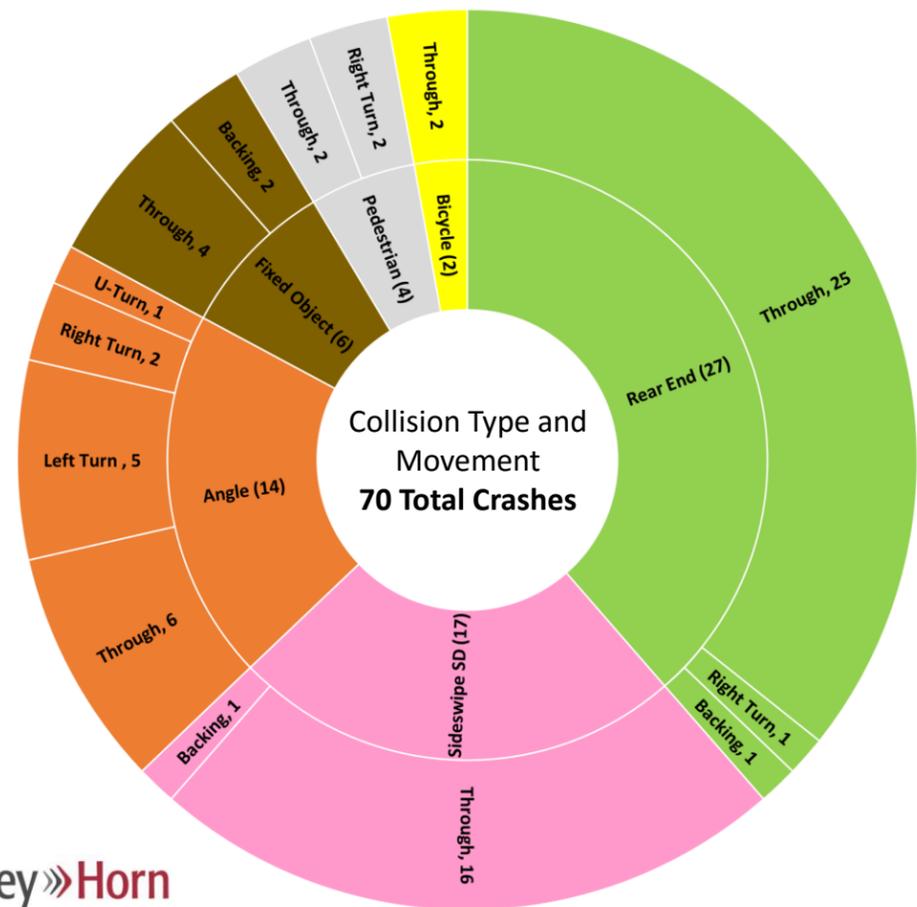
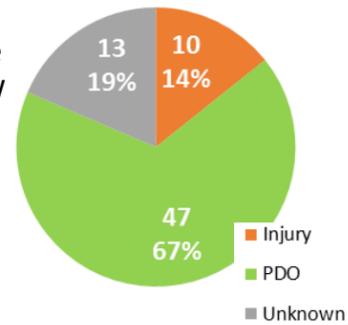
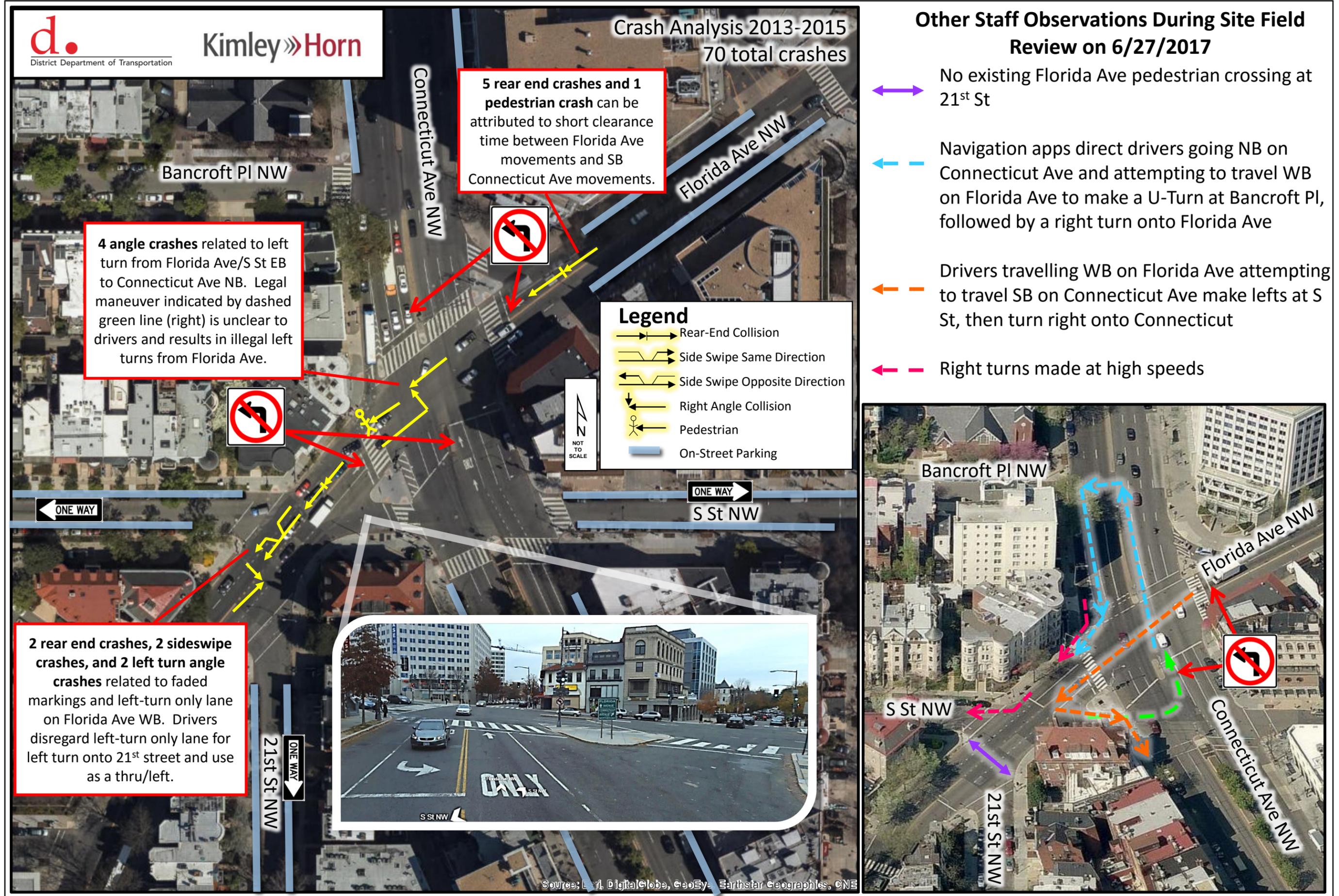


Figure 6: Summary of Field Observations and Associated Crash Types – Connecticut Avenue NW and S Street NW/Florida Avenue NW

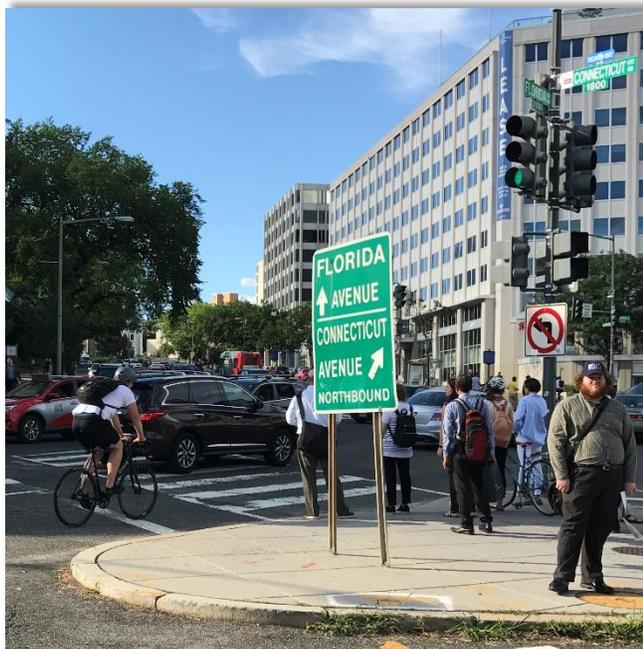


**Table 3: Summary of Field Review Notes and Related Crash Types - Connecticut Avenue NW and S Street NW/Florida Avenue NW**

Site Visit Notes <i>(provided by DDOT staff, community members, and Kimley-Horn)</i>	Location	Related Crash Types										Further Analysis
		Sideswipe	Rear End	Parking	Bicycle	Left Turn	Right Turn	Pedestrian	Angle	U-turn	Fixed Object	
Signs that indicate how to make the turn from Florida Ave EB onto Connecticut Ave NB (via S St) are too difficult to see and too late to make a turning maneuver.	Florida Ave EB to Connecticut Ave NB					X			X			
S St between Florida Ave and Connecticut Ave is wide enough to be effectively two lanes but there are no pavement markings or lane use signs.	S St turn between Florida Ave and Connecticut Ave	X	X			X	X					
Turn radius for the right turn from WB Florida Ave onto WB S St allows for high turning speeds.												
Traffic signal clearance time for WB Florida Ave at the intersection with Connecticut Ave is not long enough. Vehicles are still traveling through the intersection when SB Connecticut Ave pedestrians are released.	Florida Ave and Connecticut Ave					X	X		X			X
Median on north leg of Connecticut Ave intersection with Florida Ave is not wide enough to be considered a pedestrian refuge.								X				
Crosswalk at S St WB and Florida Ave could be hi-visibility and pedestrian warning sign could be moved farther upstream.	S St crosswalk at Florida Ave							X				
There is currently no way for pedestrians to cross Florida Ave at 21st St.	Florida Ave and 21 <sup>st</sup> St							X				
There is a "No Turn on Red" sign posted for WB Florida Ave at Connecticut Ave. This right-turn is permitted on red since it is channelized and not controlled by the signal.												
Markings generally faded. Left turn only arrow is nearly invisible.	Florida Ave WB	X										
Left-Turn only markings are rarely observed, with the majority of vehicles traveling through along Florida Ave in the leftmost lane.	Left lane of Florida Ave WB at 21 <sup>st</sup> St	X	X									
Need for better/clearer lane assignment/directional signage on EB Florida Ave approaching Connecticut Ave, particularly for S St to NB Connecticut Ave movement.	EB Florida Ave approaching Connecticut Ave					X			X			X
At Bancroft PI, Waze/Google directs people to make a U-Turn since the NB left-turn from Connecticut Ave to WB Florida Ave is prohibited. This blocks the intersection. Left-turn from Connecticut Ave to Bancroft PI also creates a hazard for peds on the west side of Connecticut Ave. Potential to force this access from farther north via California/Phelps?	NB Connecticut Ave at Bancroft PI		X			X			X	X		
SB Connecticut Ave channelization median doesn't provide much value.												
Should WB Florida Ave traffic be allowed to access Connecticut Ave SB? Currently, these drivers pass Connecticut Ave, turn left onto S St EB, then turn right onto Connecticut Ave SB.	Florida Ave at 21 <sup>st</sup> St, and S St and Connecticut Ave											
SBR from Connecticut Ave to Florida Ave to S St happens at high speeds, conflicts with peds.												
Inadequate ped queuing space on island between Florida thru and right-turn movements.								X				
Peds crossing north-south at Florida Ave cannot cross in short ped time provided.								X				X
No crosswalk provided in between S St and Florida Ave.								X				
Short flashing don't walk phase at crossing in front of Rite Aid.												X
Existing blank-out signs on SB Connecticut Ave do not have static signs also installed.												
Due to heavy pedestrian volume crossing on west side of the intersection (Florida Ave) that sometimes causes the refuge island to be jammed, it was suggested that DDOT evaluate alternatives to combine two separate movements (φ2P & φ5P) to come up together at all times so that pedestrians can cross the entire width of Florida Ave at once.	Florida Ave EB to Connecticut Ave NB											X

## Short-Term Recommendations

**Figure 7** illustrates the short-term recommendations for this intersection. To address the unclear turning movement for eastbound Florida Avenue NW, it is recommended that through arrow pavement markings be installed on Florida Avenue NW and combined through, left, and right-turn pavement markings be installed on S Street NW. It is also recommended that pavement markings be installed to narrow S Street NW to 12 feet so that drivers do not use it as two lanes. In addition, a comprehensive evaluation of all signing and marking should be performed to develop a signing and marking plan that better informs drivers approaching the intersection from Florida Avenue NW in the eastbound direction. It is recommended that vehicular clearance intervals along Florida Avenue NW and southbound along Connecticut Avenue NW be evaluated. Increasing clearance intervals could decrease rear-end collisions. In addition, pedestrian clearance intervals should be evaluated crossing Connecticut Avenue NW to enhance the safety of the crossing and reduce the potential for pedestrian crashes. To address driver confusion regarding allowable movements in the leftmost lane westbound along Florida Avenue NW at 21<sup>st</sup> Street NW, it is recommended that the existing left only pavement marking be replaced with a through and left-turn pavement marking. This better accommodates observed travel patterns and demand through this intersection. It is recommended that turning volumes be evaluated prior to implementing this improvement to determine the impact on operations of designating a shared travel lane.



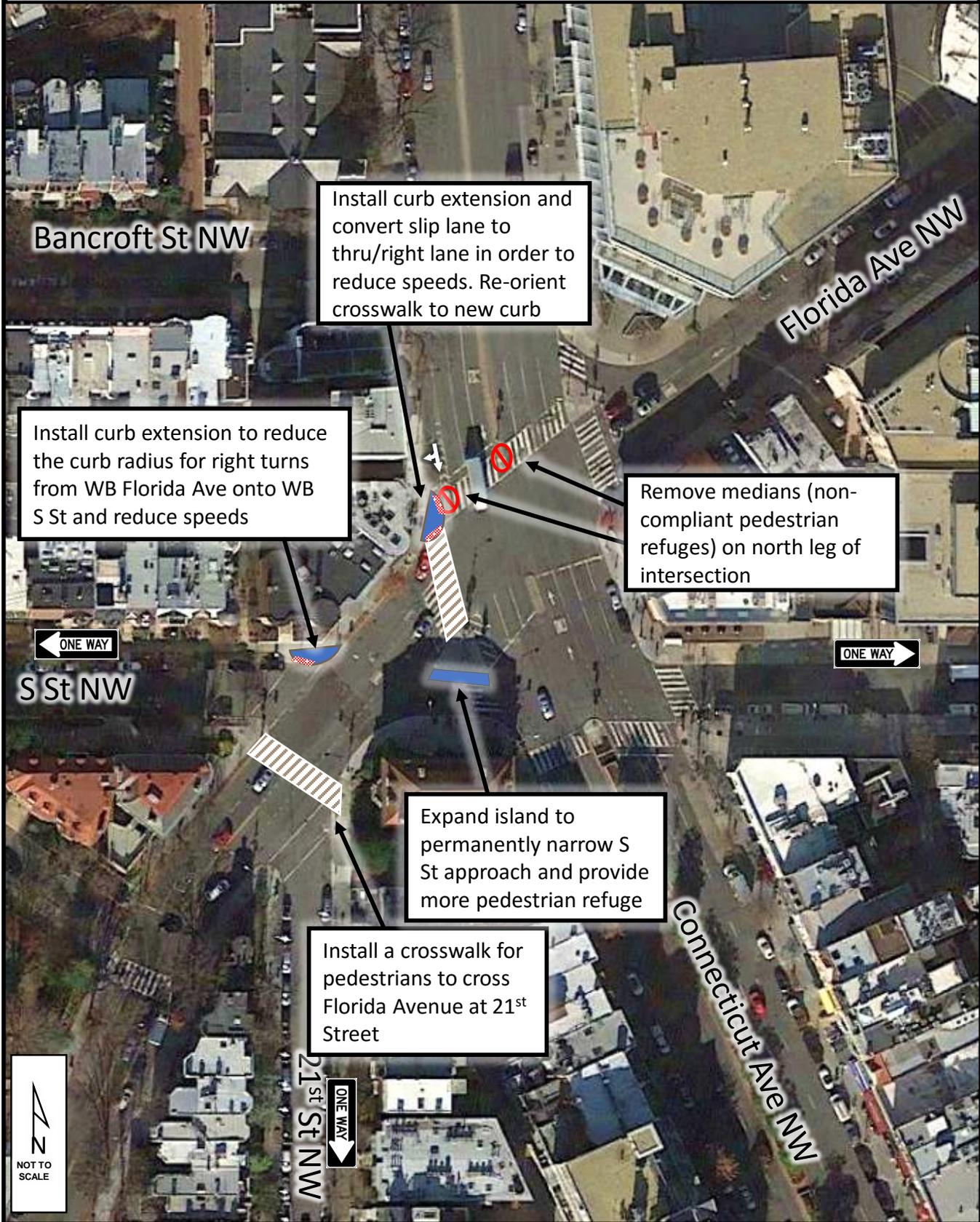
*Directional guide signs at the stop bar for EB Florida Ave provide little advance notice to drivers attempting to access NB Connecticut Ave*

In order to address high speed right turns, it is recommended that flexible delineator posts be installed to reduce the curb radius on the northwest corner of the intersection of Florida Avenue NW and S Street NW. In addition, improved pedestrian warning signs should be installed approaching S Street NW from Connecticut Avenue NW to increase awareness of drivers to pedestrians as they travel along Florida Avenue NW and S Street NW. This could include a “Turning Vehicles Yield to Pedestrians” sign or a combination of the pedestrian warning sign and “Ahead” plaque. It is also recommended that the S Street NW crosswalk be replaced with ladder crosswalk markings. Given the field observations that the island between S Street NW and Florida Avenue NW is too small to accommodate significant pedestrian activity and that the S Street NW approach lane to Connecticut Avenue NW is wider than necessary to accommodate a single lane of traffic, it is recommended that the island be expanded to provide more pedestrian refuge space and reduce the lane width on S Street NW. If a larger pedestrian refuge cannot be installed in the near term, the S Street NW approach can also be narrowed by restriping and the use of flex-posts. Lastly, based upon feedback provided by DDOT staff, consider removing the “No Right Turn on Red” sign at the channelized westbound right turn on Florida Avenue NW and installing a static time-of-day restricted left-turn sign to accompany the blank-out sign on Connecticut Avenue NW in the southbound direction at S Street NW.

## Long-Term Recommendations

**Figure 8** illustrates the long-term recommendations for the intersection. Since the medians on Connecticut Avenue NW on the north side of the intersection are too narrow to be considered pedestrian refuge areas, it is recommended that these be removed from the crosswalk area. In order to increase the curb radius and slow right-turning vehicles, it is recommended that curb extensions be installed on the northwest corner of the intersection of Connecticut Avenue NW and Florida Avenue NW and on the northwest corner of the intersection of Florida Avenue NW and S Street NW. In tandem with the curb extension on Connecticut Avenue NW, consider eliminating the right-turn lane and restriping the rightmost through lane as a shared lane. Prior to doing so, evaluate turning volumes to determine the impact on operations of designating a shared travel lane. To permanently narrow the S Street NW approach to one lane and to provide additional pedestrian refuge on the island on the west side of the intersection, it is recommended that the island be expanded. Lastly, it is recommended that a crosswalk be installed for pedestrians to cross Florida Avenue NW at 21<sup>st</sup> Street NW, which will require the construction of new sidewalk ramps and the installation of pedestrian signal equipment.





Bancroft St NW

Florida Ave NW

Install curb extension and convert slip lane to thru/right lane in order to reduce speeds. Re-orient crosswalk to new curb

Install curb extension to reduce the curb radius for right turns from WB Florida Ave onto WB S St and reduce speeds

Remove medians (non-compliant pedestrian refuges) on north leg of intersection

ONE WAY

ONE WAY

S St NW

Expand island to permanently narrow S St approach and provide more pedestrian refuge

Install a crosswalk for pedestrians to cross Florida Avenue at 21<sup>st</sup> Street

Connecticut Ave NW

21<sup>st</sup> St NW

ONE WAY

NOT TO SCALE

## Implementation

As outlined above, short and long-term recommendations and considerations have been identified for the two intersections evaluated along Connecticut Avenue NW. While some of these may only require the installation of standard signs and pavement markings, others will require further evaluation or perhaps engineering drawings to account for changes in geometry, impacts on drainage, or signal modifications. Below is an outline of a preliminary guide to carry forward the implementation of recommended improvements. A general timeframe for implementation is provided; however, this will be influenced by the scale of the recommendation, cost, and available funding. As streetscape and other roadway infrastructure projects arise in the vicinity of these intersections, opportunities to incorporate these recommendations into the design of these project should be considered.

### Short-Term Recommendations

#### *Connecticut Avenue NW and R Street NW/20th Street NW*

- Pavement markings on northbound approaches
- Turn restriction signs at 20<sup>th</sup> St NW and R St NW
- Pavement markings to guide westbound left-turns from R St NW
- Flexible delineator posts between tunnel lanes and service road lane
- Expand parking-restricted bus zone around WMATA bus stop on service road
- Remove rush-hour parking restriction north of Connecticut Ave NW

#### *Connecticut Avenue NW and S Street NW/Florida Avenue NW*

- Pavement markings on Florida Ave NW and S St NW
- Flexible delineator posts on northwest corner
- Improved pedestrian warning signs approaching WB S St NW from SB Connecticut Ave NW
- High-visibility crosswalk on S St NW
- S St NW and Florida Ave NW island expansion (pavement markings)
- “No Right on Red” sign removal and static sign installation

### Improvements to Evaluate Prior to Implementation

#### *Connecticut Avenue NW and R Street NW/20th Street NW*

- Investigate leading pedestrian interval at 20<sup>th</sup> St NW and R St NW

#### *Connecticut Avenue NW and S Street NW/Florida Avenue NW*

- Signing and marking plan for eastbound Florida Ave NW
- Vehicle and pedestrian clearance intervals for the intersection
- Through and left-turn markings on WB Florida Ave NW
- Elimination of right-turn lane on SB Connecticut Ave NW



3-6 Months



3-9 Months

## Long-Term Recommendations

### *Connecticut Avenue NW and R Street NW/20th Street NW*

- Raised median between tunnel lanes and service road lane
- North leg median modifications

### *Connecticut Avenue NW and S Street NW/Florida Avenue NW*

- North leg median modifications
- Curb extensions on northwest corners
- Crosswalk across Florida Ave NW at S Street NW
- S St NW and Florida Ave NW island expansion

