

Pedestrian Road Safety Audit

Randolph Road From Hunters Lane to Selfridge Road

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Prepared for



Montgomery County
Department of Transportation

Prepared by



STV Incorporated
7125 Ambassador Road, Baltimore, Maryland 21244

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1. Introduction

1.1 Objective

The objective of this study was to complete a Pedestrian Road Safety Audit (PRSA) for Randolph Road between Hunters Lane and Selfridge Road located in North Bethesda and Silver Spring, Maryland. The study limits are shown in **Figure 1**. For the purposes of this report, Randolph Road is assumed to have an east-west orientation. The corridor was selected for a PRSA based on its inclusion on the Montgomery County Department of Transportation's (MCDOT) list of High Incidence Areas (HIA), and the purpose of this PRSA is to identify safety issues that may be contributing to the reported pedestrian crashes in the study area. As a result of the audit, the PRSA team has identified a variety of issues related to pedestrian and bicycle safety and developed a number of suggestions to improve overall safety in the audit area.

1.2 Background

The study area is an approximately 0.9 mile segment of Randolph Road located in North Bethesda and Silver Spring, Maryland. The study area includes three signalized intersections at Rocking Horse Road/ Gaynor Road, Dewey Road, and Selfridge Road, one unsignalized midblock crosswalk just east of Hunters Lane, and a series of closely spaced unsignalized intersections and driveways. Pedestrian activity throughout the study area is primarily generated by the adjacent residential land uses and the public transit stops within the corridor.

The Randolph Road study area was identified as an HIA for pedestrian-related crashes, as part of the Montgomery County Executives' Pedestrian Safety Initiative. Based on crash data provided by MCDOT, seven pedestrian crashes occurred during the study period from January 2011 through July 2015.

The PRSA was performed on April 13 and April 14, 2016 during daytime and nighttime hours. The PRSA team consisted of nine members with expertise in pedestrian and bicycle safety and traffic engineering, representing:

- MCDOT,
- Montgomery County Division of Transit Services, and
- STV Inc., the PRSA consultant.

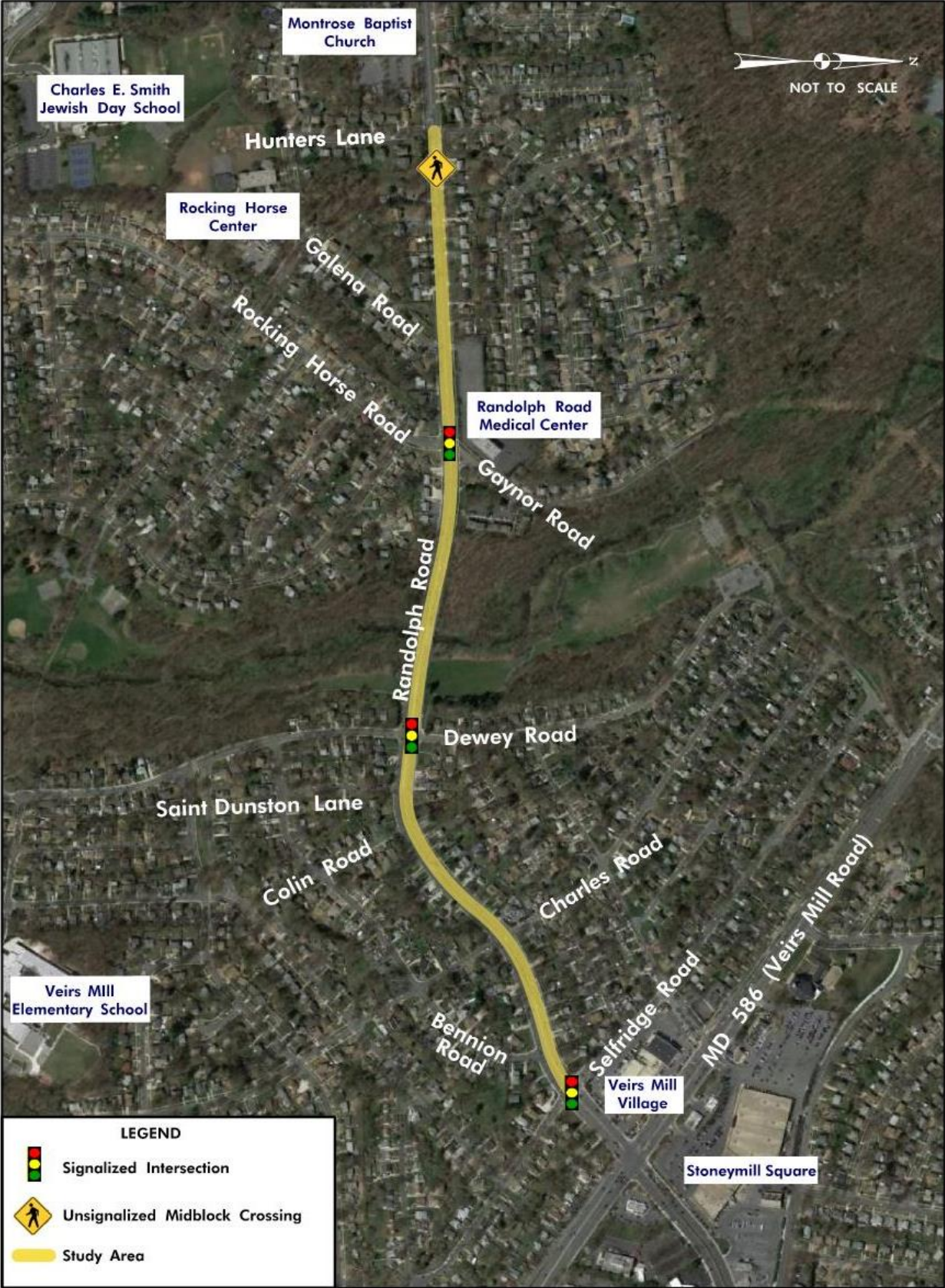


Figure 1: Randolph Road PRSA Study Area

1.3 Organization of the Report

This report first presents a description of the existing geometric, operational, and safety conditions for the study area based on field reviews and available data. Next, the report details the existing conditions and general issues throughout the corridor identified by the PRSA team. Finally, the report presents suggestions for pedestrian safety improvements based on the issues identified throughout the corridor.

This report has served as a resource to SHA and MCDOT, as well as other stakeholders, for implementing pedestrian safety improvements within the audit area. There has been an ongoing vetting of the suggestions and recommendations in this report with collaboration among agencies and stakeholders to implement short- and intermediate-term recommendations and to assess the feasibility and constructability of long-term projects. Ultimately, as a result of this process, a range of pedestrian safety recommendations are anticipated to be implemented.

1.4 Existing Conditions

1.4.1 Site Characteristics

Within the study area, Randolph Road is classified as a divided arterial roadway between Hunters Lane and just east of Rocking Horse Road/Gaynor Road, and as a major highway from just east of Rocking Horse Road/Gaynor Road to Selfridge Road. The roadway varies from four to six through lanes. The posted speed limit on Randolph Road is 35 miles per hour in the study area. The lane geometry throughout the corridor is shown in **Figure 2**. The study area includes three signalized intersections:

- Randolph Road at Rocking Horse Road/Gaynor Road,
- Randolph Road at Dewey Road, and
- Randolph Road at Selfridge Road.

Within the study area, there is also one unsignalized midblock crosswalk which provides access between residential land uses and adjacent bus stops:

- Randolph Road just east of Hunters Lane.

The roadways intersecting Randolph Road at signalized intersections are summarized below:

Rocking Horse Road/Gaynor Road

- Two-lane roadway that runs in the north-south direction
- Consists of a shared through/left-turn lane and a dedicated right-turn lane in the northbound direction
- Consists of a shared left/through/right-turn lane in the southbound direction
- Connects the residential communities to the north and south of Randolph Road and provides access to Randolph Hills Shopping Center approximately 0.5 miles south of Randolph Road

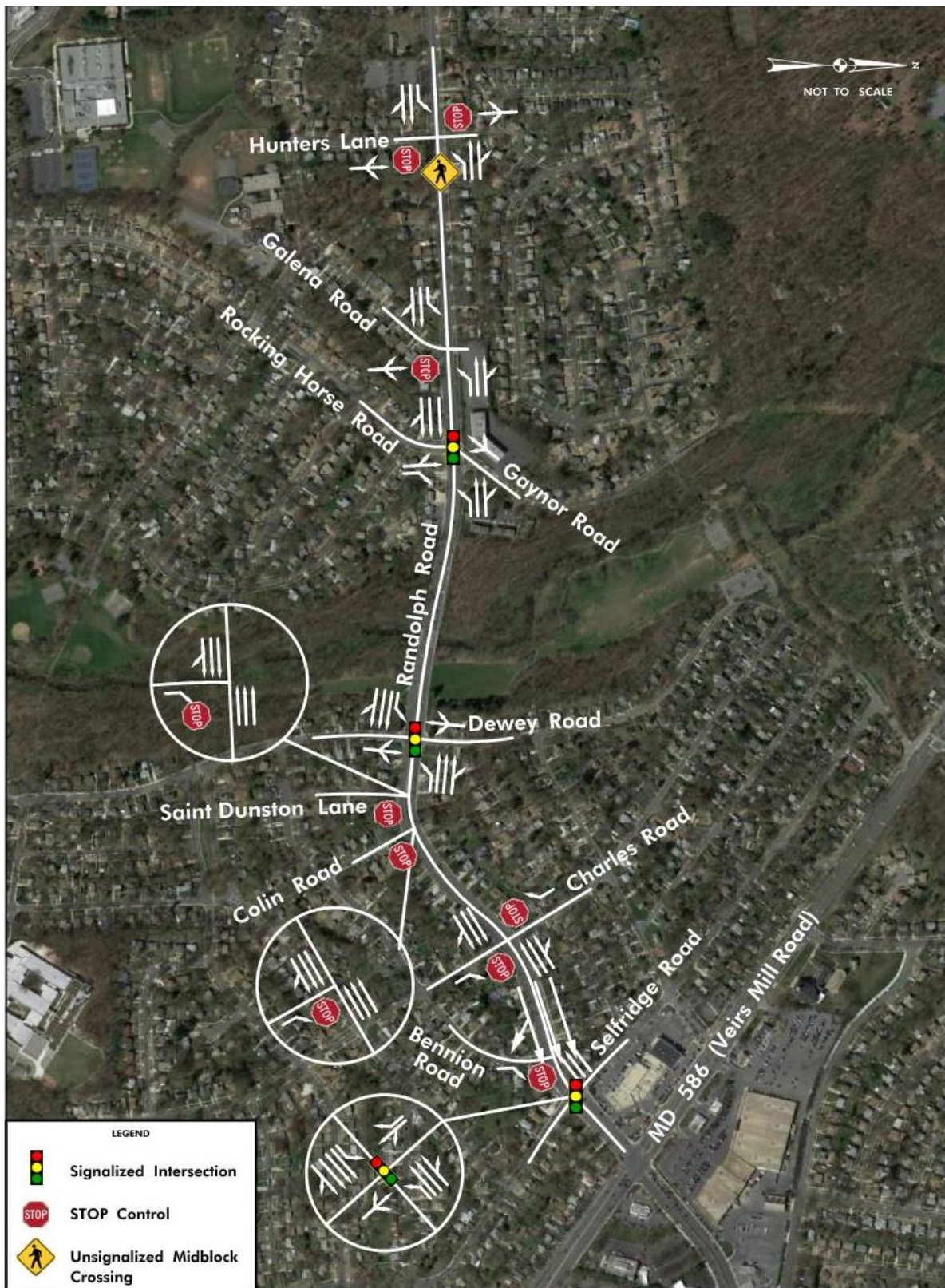


Figure 2: Study Area Lane Geometry

Dewey Road

- Two-lane roadway that runs in the north-south direction
- Consists of shared left/through/right-turn lane in the north- and southbound directions
- Connects the residential communities north and south of Randolph Road and provides access to the Winding Creek Local Park
- The Rock Creek Trail, which runs parallel to Dewey Road in the study area vicinity, crosses Randolph Road on the west leg of the Dewey Road intersection

Selfridge Road

- Two-lane roadway with on-street parking that runs in the north-south direction
- Consists of shared left/through/right-turn lane in the northbound direction
- Consists of a shared through/left-turn lane and a dedicated right-turn lane in the southbound direction
- Connects the residential neighborhoods north and south of Randolph Road and provides secondary access to the Veirs Mill Village Shopping Center in the northeast quadrant of the intersection.

Randolph offers a number of pedestrian accommodations including a concrete sidewalk of varying width along both sides of Randolph Road throughout the entire length of the study area. Marked crosswalks and countdown pedestrian signals are provided at each of the signalized intersections. In addition, there is an unsignalized midblock crosswalk providing additional crossing opportunities just east of Hunters Lane. Although there are currently no bicycle accommodations along Randolph Road, bike lanes are proposed between Parklawn Drive and Veirs Mill Road as part of the 2005 Countywide Bikeways Functional Master Plan.

1.4.2 Traffic Data

Turning movement counts were conducted at six intersections along Randolph Road on Wednesdays, April 6th and 13th, 2016, as well as on Saturday, May 14th and Sunday May 15th, 2016 at the Dewey Road intersection. Annual average daily traffic (AADT) volumes in vehicles per day for Randolph Road west of Dewey Road were obtained from these traffic count records. The 2016 AADT data is provided in **Table 1**.

Table 1: 2016 AADT

Road	Location	AADT
Randolph Road	West of Dewey Road	37,600 vpd

Total peak hour vehicular volumes entering the intersections, provided in vehicles per hour (vph), from turning movement counts for Randolph Road are shown in **Table 2**.

Table 2: Traffic Count Data

Year	Location	AM Peak Hour	AM Peak Volume	PM Peak Hour	PM Peak Volume
2016	Randolph Rd at Hunters Ln	7:30 – 8:30 AM	2,611 vph	5:00 – 6:00 PM	3,071 vph
2016	Randolph Rd at Galena Rd	7:45 – 8:45 AM	2,615 vph	5:00 – 6:00 PM	3,119 vph
2016	Randolph Rd at Rocking Horse Rd	8:00 – 9:00 AM	3,264 vph	4:45 – 5:45 PM	3,757 vph
2016	Randolph Rd at Dewey Rd	7:45 – 8:45 AM	3,500 vph	4:45 – 5:45 PM	3,741 vph
2016	Randolph Rd at Charles Rd	7:30 – 8:30 AM	3,205 vph	4:30 – 5:30 PM	3,373 vph
2016	Randolph Rd at Selfridge Rd	7:30 – 8:30 AM	3,381 vph	5:30 – 6:30 PM	3,670 vph

There are 12 bus stops within the study area, six on the north side and six on the south side of Randolph Road, that serve Montgomery County Ride On route 10 and Metro Bus routes C2, C4, and C8. Headways range from 14 to 34 minutes in the eastbound direction and 6 to 32 minutes in the westbound direction. A map of bus stops is shown in **Figure 3**.

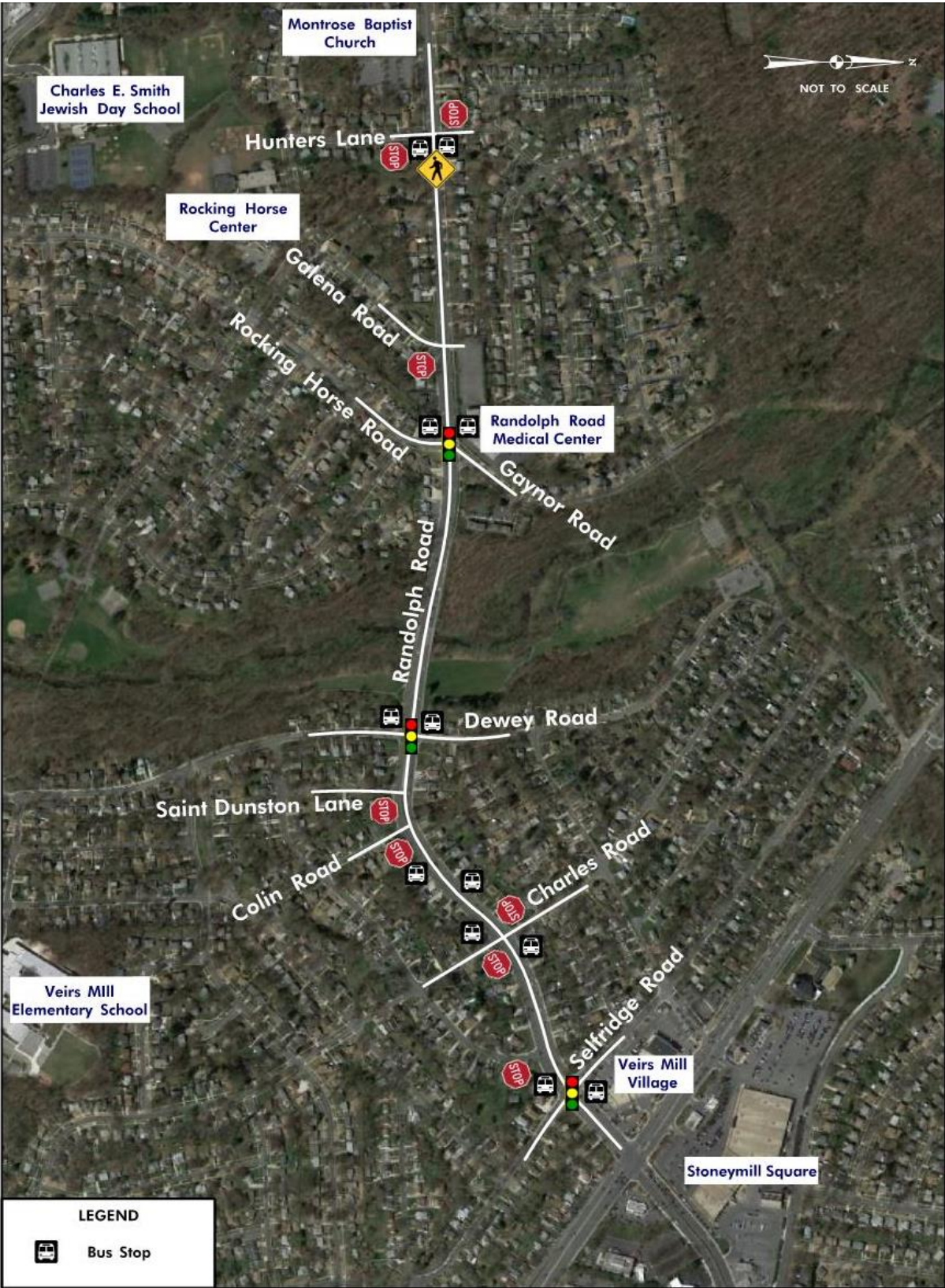


Figure 3: Study Area Bus Stops

1.4.3 Crash Data

The PRSA team reviewed all crash records collected by the Montgomery County Police Department in the study area during the study period from January 2011 through July 2015 to identify the location of all reported pedestrian and bicycle crashes within the corridor. **Figure 4** summarizes the location, date, time, severity, type, and ambient conditions of each reported pedestrian and bicycle crash.

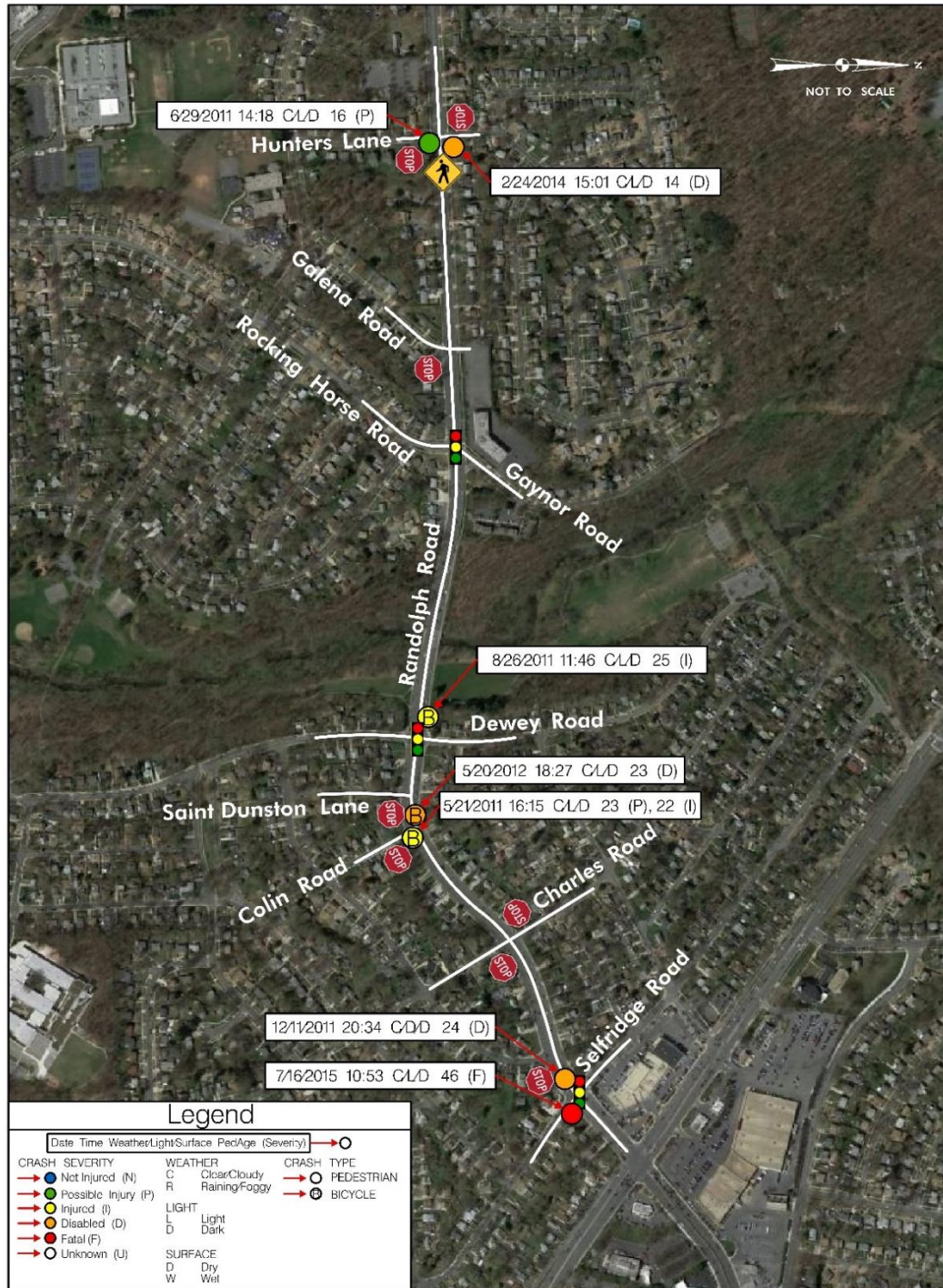


Figure 4: Pedestrian Crashes on Randolph Road between Hunters Lane and Selfridge Road Jan 2011 – Jul 2015

As shown in **Figure 5**, seven pedestrian-related crashes occurred during the study period, with no pedestrian crashes occurring in 2013. There were 133 vehicle crashes within the study limits from 2011 through 2015, of which 37 crashes (28%) occurred at or near the Dewey Road intersection, 33 crashes (25%) occurred at or near the Selfridge Road intersection, and 20 crashes (15%) occurred at or near the Hunter Lane intersection. Although vehicular crashes are not the focus of this audit, additional future study of vehicular crash patterns at these intersections should be considered.

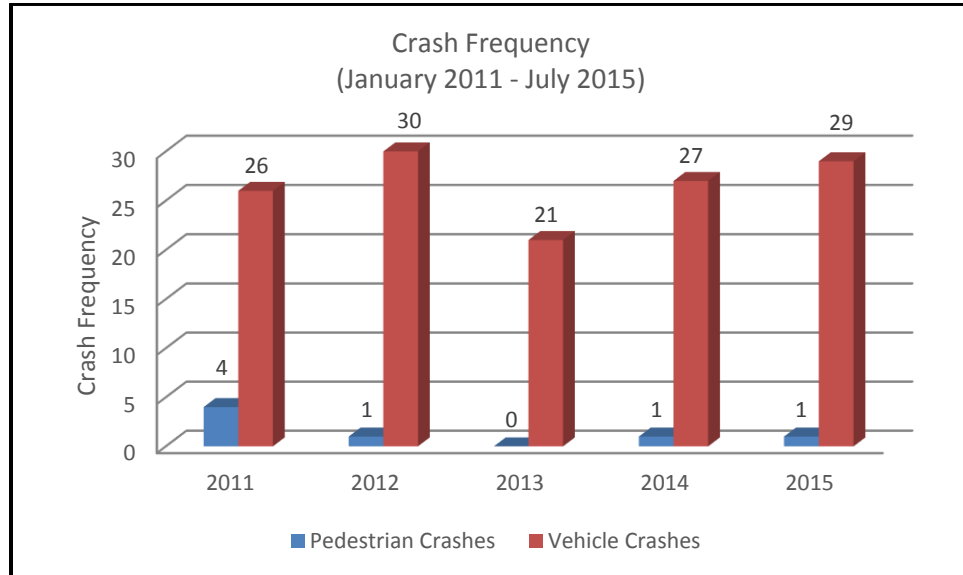


Figure 5: Study Area Crash Frequency

Figure 6 shows the pedestrian crash severity for the seven pedestrian crashes. Crash data indicates that the seven pedestrian crashes involved eight pedestrians. One of the crashes resulted in a fatality, and three crashes resulted in the disablement of the pedestrian. The other four pedestrian crashes resulted in injury or possible injury.

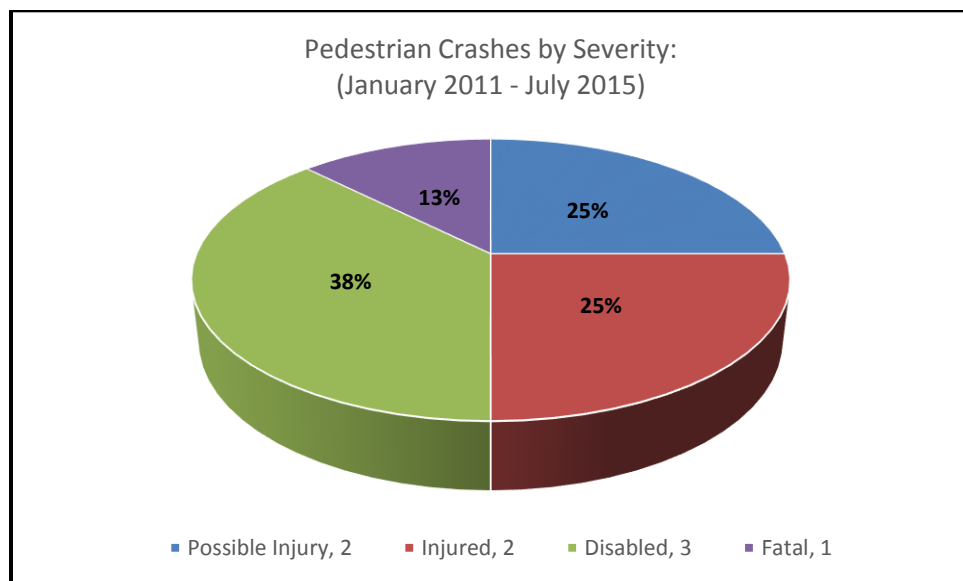


Figure 6: Pedestrian Crashes by Severity

Figure 7 shows the vehicle movements prior to the pedestrian crashes. As shown, four of the eight pedestrians involved in crashes were struck by a vehicle moving at constant speed. Given the low number of total crashes, it is difficult to draw the conclusion that this is statistically significant.

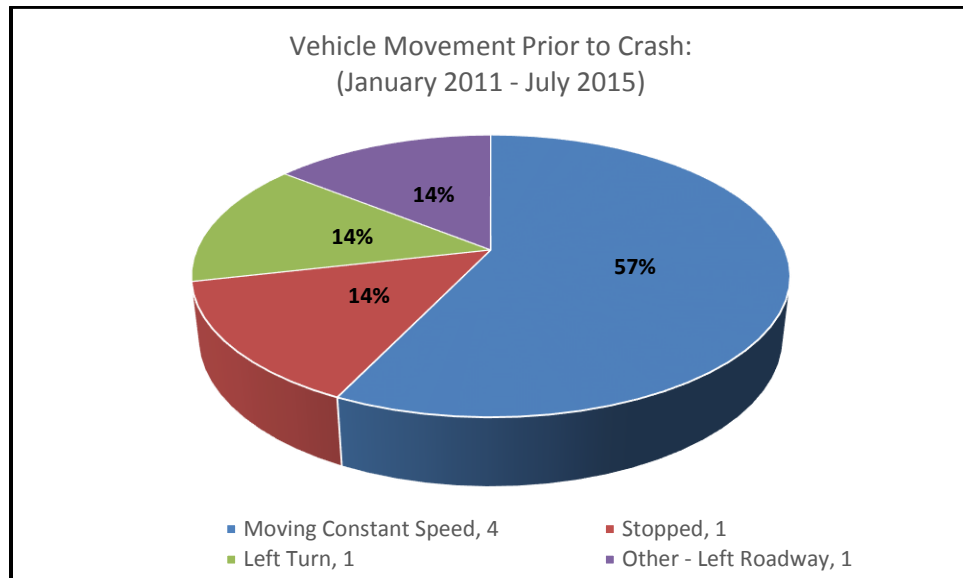


Figure 7: Vehicle Movement Prior to Pedestrian Crash

Figure 8 shows the distribution of pedestrian crashes compared to the distributed frequency of crashes by age group based on study area residential demographics. Based on this data, the number of crashes involving pedestrians under 30 years is higher than the number of crashes distributed by age. It should also be noted that pedestrian crashes in the study area involve pedestrians greater than 50 years of age less frequently than the distributed frequency based on 2010 Census data.

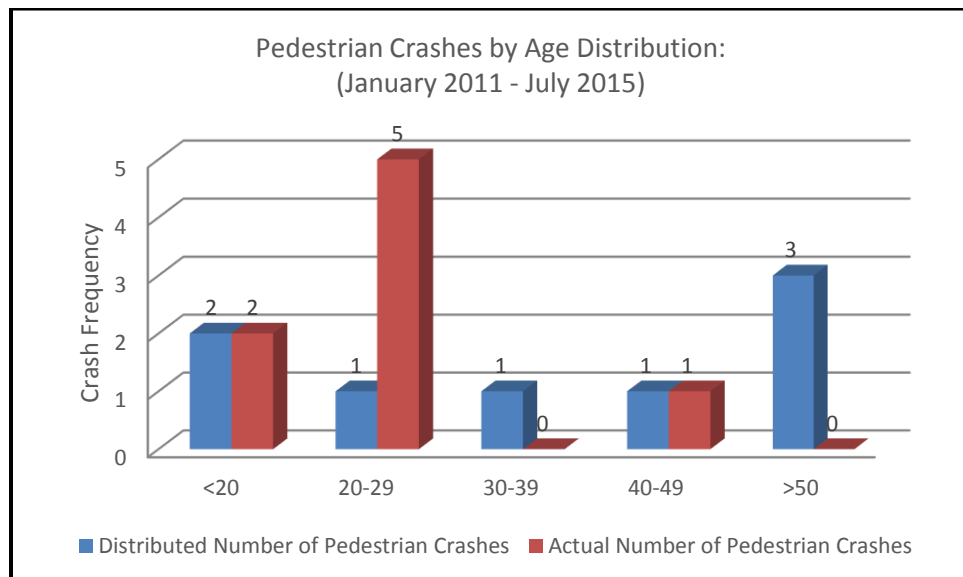


Figure 8: Pedestrian Crashes by Age

As shown in **Figure 9**, the majority of pedestrian crashes occurred during the midday period from 9:00 AM to 4:00 PM when trips to and from retail uses near Selfridge Road and trips along the Rock Creek Trail near Dewey Road tend to be heaviest. Based on the limited number of crashes, it is difficult to draw the conclusion that this is statistically significant.

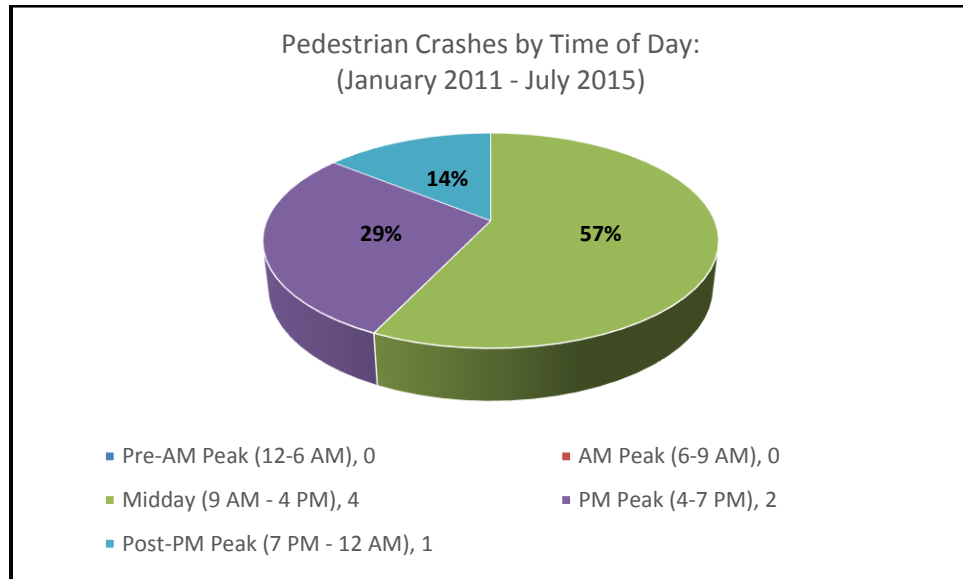


Figure 9: Pedestrian Crashes by Time of Day

Six of the seven pedestrian crashes occurred under daylight conditions. The other crash occurred while dark when street lights were on. The crash reports did not indicate that lighting was a contributing factor in any of the pedestrian crashes.

All seven of the pedestrian crashes occurred under dry pavement conditions, indicating that weather was not a factor in causing pedestrian crashes.

2. Road Safety Audit Findings

2.1 Safety Benefits of Existing Roadway Features

Notable existing roadway features that enhance pedestrian safety in the study area include, but are not limited to:

- **Continuous Sidewalks:** A concrete sidewalk of varying width is present along the north and south sides of Randolph Road throughout the study area. A concrete sidewalk is also provided along both side of Hunters Lane and Rocking Horse Road, and along one side of Dewey Road and Selfridge Road. However, the unobstructed width of a majority of the concrete sidewalk does not appear to meet the five feet required by Montgomery County's Context Sensitive Road Design Standards.
- **Pedestrian Signage:** Pedestrian crossing and advance pedestrian crossing signs are located along east- and westbound Randolph Road leading to the unsignalized pedestrian crossing near Hunters Lane. Advance pedestrian pavement markings are also present leading to the unsignalized midblock crossing.

- **Countdown Pedestrian Signals (CPS):** Countdown pedestrian signals are provided at all three of the study's signalized intersections. Countdown pedestrian signal research has shown that pedestrians easily understand how the signal works, that more pedestrians start during the Walk phase and that fewer people initiate walking late in the clearance phase. Studies have also shown that fewer pedestrians remain in crosswalks during the steady Don't Walk phase where countdown signals are used.
- **Red Light Cameras:** Red light cameras have been installed at the Dewey Road for the east- and westbound approaches of Randolph Road and at Selfridge Road for the westbound approach Randolph Road to record vehicles violating the red light traffic signal indications. Red light violation cameras help to reduce vehicle speeds and deter aggressive driving behaviors that may result in angle and pedestrian crashes.
- **Speed Cameras:** Speed cameras have been installed along east- and westbound Randolph Road near Dewey Road, and near Hunters Lane in the eastbound direction only to record vehicles violating the posted speed limit. Speed cameras help reduce vehicle speeds and deter aggressive driving behaviors that may result in pedestrian crashes.

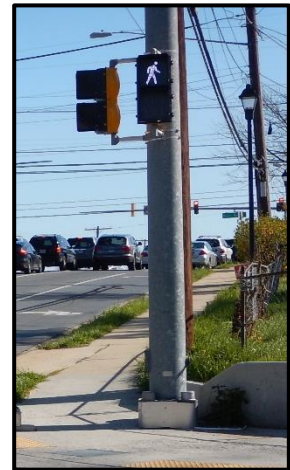


Figure 10: Countdown Pedestrian Signal



Figure 11: Eastbound Speed Camera

2.2 Observed Issues, Contributing Factors, and Opportunities for Improvements

The Randolph Road PRSA team identified a number of pedestrian safety issues in the study area during the audit. These issues were discussed by the team and prioritized to identify the issues presenting the greatest impediments to pedestrian safety in the study area. This section describes the observed safety issues identified by the PRSA team and suggests improvements to address each issue.

Pedestrian-Vehicle Conflicts

At multiple locations along the corridor, pedestrians were observed crossing outside of marked crossings or during the Don't Walk phase of the pedestrian signal. Additionally, the locations of the speed cameras may not be optimal for reducing vehicular speeds where pedestrian volumes are highest. The audit team recommends coordination with the MCDOT Pedestrian Safety Coordinator to increase pedestrian education about where and when to cross. Additionally, the audit team recommends reevaluating the location of the eastbound portable speed camera just east of the midblock crosswalk near Hunters Lane and installing an additional speed camera for westbound vehicles just west of Selfridge Road. The audit team also recommends evaluation of geometric and signal changes to reduce conflicts.

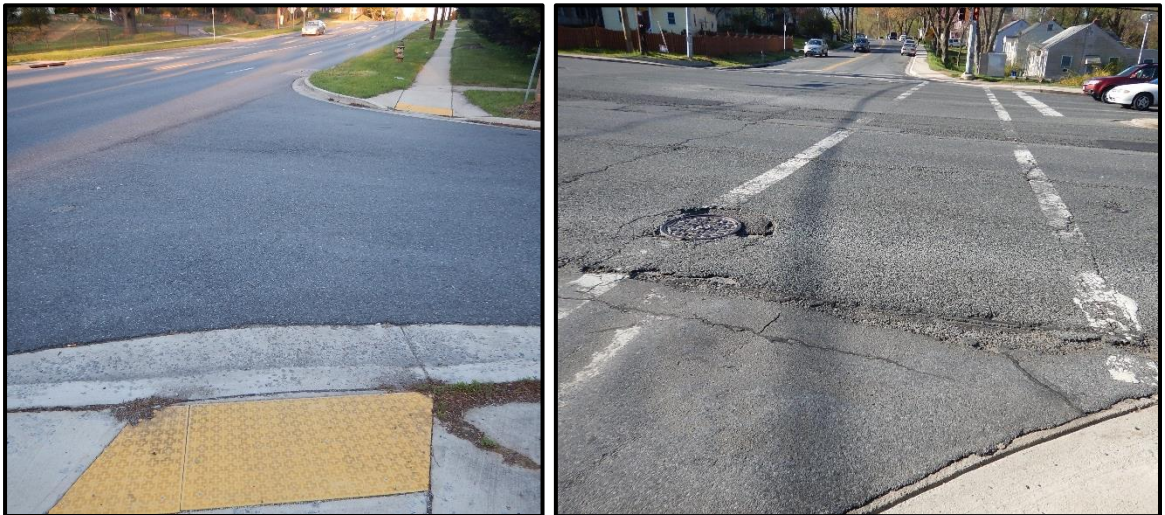


Left: Pedestrian crosses during Don't Walk phase. Right: Pedestrian crosses outside of marked crosswalk.

Figure 12: Examples of Pedestrian-Vehicle Conflicts

Pedestrian Facility Conditions

A number of issues related to pedestrian facilities were observed during the audit. Examples include a lack of crosswalk markings across side-streets, faded crosswalks, and no Accessible Pedestrian Signals (APS) at some intersections.



Left: No marked crosswalks across side streets. Right: Crosswalk markings are faded.

Figure 13: Examples of Pedestrian Facility Issues

The audit team identified a number of suggestions to improve the condition of the existing pedestrian facilities including, but not limited to, the installation of crosswalks across all side-streets, restriping pavement markings for crosswalks and stop bars along Randolph Road, evaluation of increasing sidewalk width, and installing APS where applicable.

Maintenance

A number of conditions were observed that may contribute to pedestrian safety issues and that could be resolved through maintenance improvements. Such issues include signs that are damaged and sidewalk that is damaged or overgrown with vegetation.



Left: Damaged sidewalk on the north side of Randolph Road. Center: Sign is leaning east of Rocking Horse Road. Right: Overgrown vegetation greatly reduces sidewalk width.

Figure 14: Examples of Maintenance Issues

The audit team recommends that all damaged or missing signs be replaced and that all foliage along the sidewalk be trimmed to maintain the full available width of walkable space. The condition of the sidewalk should be assessed along Randolph Road and the feasibility of repairs should be evaluated.

Lighting Conditions

While all of the pedestrian crashes occurred under daylight conditions or while street lights were on, observations during dark conditions indicated that multiple light fixtures were non-functioning and have been reported for repair. Additionally, the midblock crossing near Hunters Lane did not have dedicated lighting to improve pedestrian visibility at night.

Lighting throughout the study area can be improved by inspecting street lighting for repair. The audit team also recommends evaluating the feasibility of additional street lighting at the midblock crosswalk near Hunters Lane.

2.3 Summary of Issues and Suggestions

The following section provides a summary of the issues identified during the PRSA process and the suggestions for improvements at each location discussed in this report. The anticipated timeframe for completion [Short Term (ST), Intermediate (I) and Long Term (LT)] is referenced after each suggestion.

Safety Issue	Suggestion(s)
Vehicle Signage and Pavement Markings	<ul style="list-style-type: none"> Install pavement markings and signage for the westbound lane drop on Randolph Road near Dewey Road per MUTCD standards. (ST)
Pedestrian Vehicle Conflicts	<ul style="list-style-type: none"> Evaluate the placement of the eastbound portable speed camera and consider the installation of a westbound speed camera on the corridor. (ST) Work with MCPD to ensure appropriate levels of enforcement of posted speed limits. (I) Consider coordination with the MCDOT Pedestrian Safety Coordinator to increase pedestrian education and enforcement along Randolph Road. (I) Evaluate the feasibility of lengthening the left turn storage bay and adjusting left turn signal phasing to reduce queues and turn conflicts at the Rocking Horse Road intersection. (LT) Consider installing a context sensitive non-traversable median barrier in areas where pedestrians are crossing at uncontrolled locations to prevent midblock crossings. (LT) Evaluate the need and feasibility of constructing a crossing near Charles Street. (LT) Determine the feasibility of installing a Leading Pedestrian Interval at the Dewey Road intersection to operate on weekends. (LT) Evaluate design alternatives for the lane drop on westbound Randolph Road near Dewey Road in order to reduce road width in this section or create a pedestrian refuge at the Dewey Road intersection. (LT)
Pedestrian Facility Issues	<ul style="list-style-type: none"> Consider installing or restriping stop bars and crosswalks, where applicable, across the side streets at unsignalized intersections. (ST) Consider installing pedestrian warning signs (W11-2), and upgrading existing signs to fluorescent yellow, along the north and south sides of Randolph Road, where applicable. (ST) Consider relocating the pavement markings and signage associated with the midblock crosswalk further from the crosswalk to meet standards. (ST) Consider replacing missing or damaged pedestrian signal visors where applicable. (ST) Consider restriping faded crosswalk markings and updating crosswalk markings to ladder markings at signalized intersections, where applicable. (ST) Consider installing high visibility ladder crosswalk markings across Randolph Road at the Rocking Horse Road/Gaynor Road intersection. (ST) Consider installing APS education signs and removing outdated education signs where applicable. (ST) Work with the Transit Services Division to evaluate the feasibility of consolidating or relocating bus stops along the corridor. (ST) Consider relocating the midblock crosswalk to the unsignalized intersection of Hunters Lane to improve driver expectancy and sight distance. (LT) Evaluate the feasibility of relocating utility poles or signal poles currently impeding the sidewalk. (LT) Consider installing Accessible Pedestrian Signals (APS) where applicable. (LT) Evaluate the pedestrian crossing times at the signalized intersections to ensure that the Flashing Don't Walk interval meets standards. (LT) Evaluate the feasibility of widening sidewalk along the corridor to provide a minimum of five feet of walkable space. (LT)

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Maintenance	<ul style="list-style-type: none">▪ Trim the foliage along and above the sidewalk. (ST)▪ Replace all damaged signage throughout the study area. (ST)▪ Consider replacing the mast arm signal heads on westbound Randolph Road approaching Dewey Road with LED signal heads. (LT)▪ Assess the condition of damaged sidewalk and determine the feasibility of repairs. (LT)
Lighting	<ul style="list-style-type: none">▪ Inspect street lighting throughout the corridor and repair or replace as necessary. (ST)▪ Determine the feasibility of additional street lighting at locations where pedestrians cross Randolph Road. (LT)