

Pedestrian Road Safety Audit

East Gude Drive

From Calhoun Drive to Southlawn Lane

May 2015

Prepared for



Montgomery County
Department of Transportation

Prepared by



STV Incorporated
7125 Ambassador Road, Baltimore, Maryland 21244

Table of Contents

1. Introduction	1
1.1 Objective.....	1
1.2 Background.....	1
1.3 Organization of the Report.....	3
1.4 Existing Conditions	3
2. Road Safety Audit Findings	12
2.1 Contributing Factors.....	12
2.2 Observed Issues and Opportunities for Improvements	14
2.3 Summary of Issues and Suggestions.....	17

List of Figures

Figure 1: Study Area	2
Figure 2: Study Area Peak Hour Lane Geometry	4
Figure 3: Study Area Bus Ridership.....	7
Figure 4: Pedestrian Crashes on East Gude Drive between Calhoun Drive and Southlawn Lane 2008 – 2013.....	8
Figure 5: Study Area Crash Frequency 2008 – 2013	9
Figure 6: Pedestrian Crashes by Crash Severity 2008 – 2013.....	9
Figure 7: Vehicle Movement Prior to Pedestrian Crash 2008 – 2013.....	10
Figure 8: Pedestrian Crashes by Age 2008 - 2013.....	10
Figure 9: Pedestrian Crashes by Time of Day 2008 - 2013	11
Figure 10: Pedestrian Crashes by Road Surface Conditions 2008 - 2013	11
Figure 11: Examples of Non-Compliance with Signals and Signing/Marking.....	15
Figure 12: Examples of Pedestrian Facility Issues.....	15
Figure 13: Examples of Drainage Conditions	16
Figure 14: Examples of Maintenance Issues.....	17

List of Tables

Table 1: 2012 AADT	6
Table 2: Traffic Count Data	6

1. Introduction

1.1 Objective

The objective of this study was to complete a Pedestrian Road Safety Audit (PRSA) for East Gude Drive between Calhoun Drive and Southlawn Lane, located just beyond the city limits of Rockville, Maryland. The study limits are shown in Figure 1. 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 audit was conducted to identify safety issues related to pedestrian and bicycle safety 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 one-mile segment of East Gude Drive located just beyond the city limits of Rockville, Maryland. For the purpose of this report, East Gude Drive is assumed to run east-west, and all references to direction are consistent with this assumption. East Gude Drive varies from a four lane to five lane divided roadway. The study area includes three signalized intersections, at Calhoun Drive, Dover Road, and Southlawn Lane, and one modified High-Intensity Activated Crosswalk (HAWK) signal at Display Court adjacent to the Montgomery County Coalition for the Homeless. Pedestrian activity throughout the study area is primarily generated by the adjacent homeless shelter.

The East Gude Drive study area was identified as an HIA for pedestrian-related collisions, as part of the Montgomery County Executives' Pedestrian Safety Initiative. Based on collision data provided by MCDOT and the Maryland State Highway Administration (SHA), 18 pedestrian collisions occurred during the study period of January 2008 through December 2013. The purpose of this PRSA is to identify safety issues that may be contributing to the observed pedestrian collisions in the study area.

The PRSA was performed on May 6 and May 7, 2014 during daytime and nighttime hours. The PRSA team consisted of seven members with expertise in pedestrian and bicycle safety and traffic engineering, representing:

- MCDOT,
- SHA,
- City of Rockville,
- Montgomery County Police, and
- STV, the PRSA consultant.

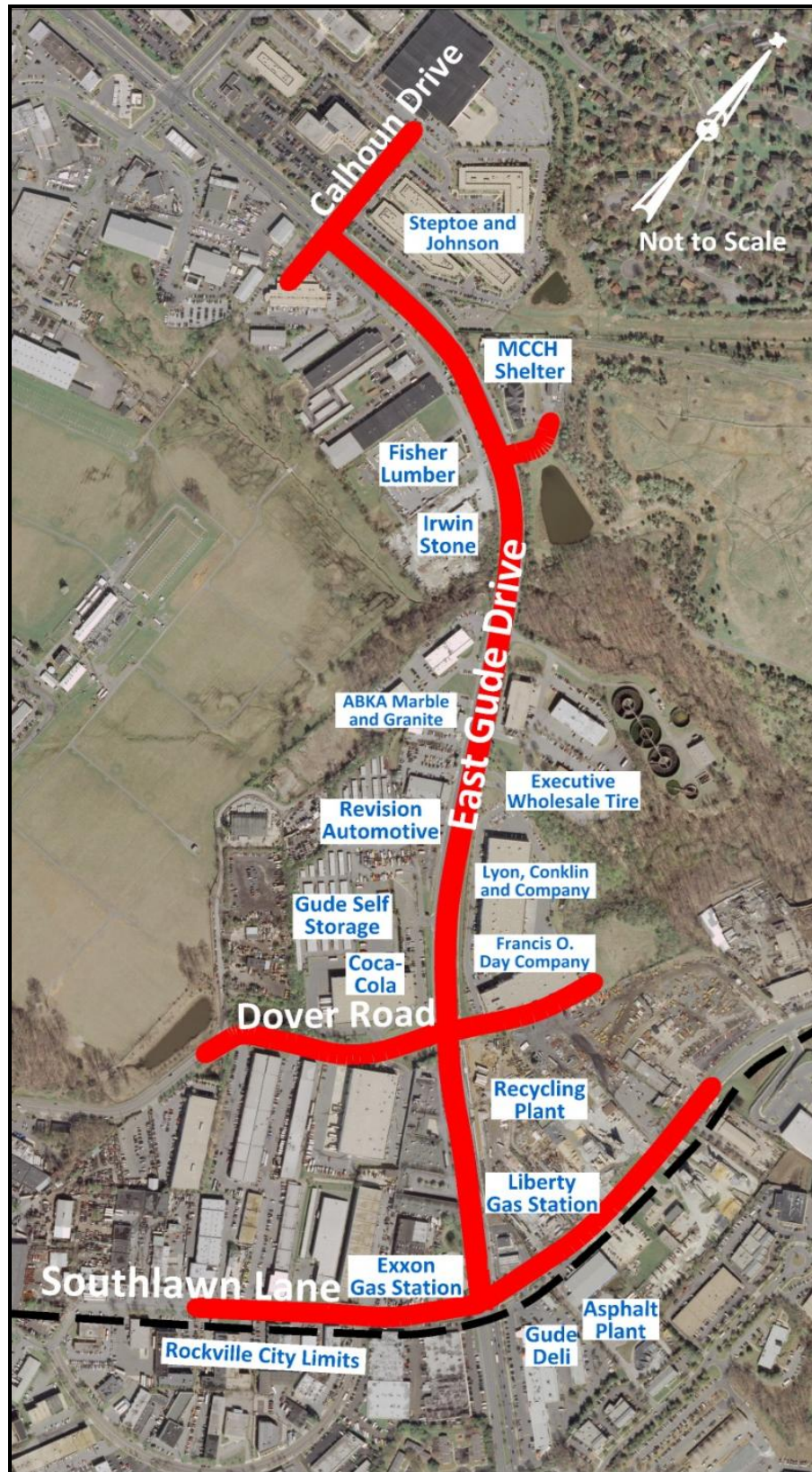


Figure 1: Study Area

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 will be implemented.

1.4 Existing Conditions

1.4.1 Site Characteristics

Within the study area East Gude Drive ranges from a four lane to five lane divided major highway that serves Rockville, Maryland. The posted speed limit on East Gude Drive is 40 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:

- East Gude Drive at Calhoun Drive,
- East Gude Drive at Dover Road, and
- East Gude Drive at Southlawn Lane.

One modified HAWK signal, which is described in detail in Section 2.1 of this report, is also included within the study area:

- East Gude Drive at Display Court (MCCH shelter driveway).

Within the study area, there are also three unsignalized intersections which serve as entrance/exits to the nearby commercial and industrial lane uses.

The roadways intersecting East Gude Drive at signalized intersections are summarized below:

Calhoun Drive/Display Court

- Two-lane roadways that runs in the north-south direction
- Calhoun Drive connects East Gude Drive to Calhoun Place and Standish Place and is approximately 0.10 miles in length
- Calhoun Drive consists of a dedicated left-turn lane and a shared through/right-turn lane in the southbound direction
- Display Court is a driveway that provides access to the commercial properties to the south of East Gude Drive between Calhoun Drive and the MCCH shelter driveway to the east.



Figure 2: Study Area Peak Hour Lane Geometry

Dover Road

- Two-lane roadway that runs in the north-south direction
- Extends from East Gude Drive to North Horners Lane and is approximately 0.4 miles long
- Consists of one dedicated left-turn lane, a shared through/left-turn lane, and a dedicated right-turn lane in the northbound direction

Southlawn Lane

- Varies between a two-lane and a four-lane roadway that runs in the north-south direction
- Extends from North Horners Lane to Avery Road and is approximately 1.8 miles long
- Consists of a dedicated left-turn lane, a through lane, and a shared through/right-turn lane in the northbound direction
- Consists of a dedicated left-turn lane, a through lane, and a dedicated right-turn lane in the southbound direction

East Gude Drive offers a number of pedestrian accommodations including sidewalks, which are present along portions of East Gude Drive within the study area. Marked crosswalks are provided at each of the study intersections; however, the east leg of the intersection of East Gude Drive at Dover Road and the west leg of the intersection of East Gude Drive at Calhoun Drive do not have marked crosswalks. It should be noted that because of the distance between the study intersection, limited crossing opportunities exist along the corridor. Countdown pedestrian signals are provided at each of the signalized intersections. In addition, there is a modified HAWK signal and marked crosswalk at the intersection of East Gude Drive at Display Court, adjacent to the MCCH shelters, to assist pedestrians in crossing East Gude Drive. The study area also includes the Carl Henn Millennium Trail (Millennium Trail), a shared-use path that circles the City of Rockville, running along the south side of East Gude Drive. However, the trail is narrow and has overgrown vegetation, cracks, and uneven segments as well as frequent domed gas meter covers which present obstacles for cyclists. There are no other bicycle facilities present along this portion of East Gude Drive.

1.4.2 Traffic Data

Average annual daily traffic (AADT) volumes in vehicles per day for East Gude Drive were obtained from SHA traffic count records. The 2012 AADT data is provided in Table 1.

Table 1: 2012 AADT

Road	Location	AADT
E Gude Drive	0.5 Miles South of Southlawn Lane	43,760 vpd

Peak hour vehicular volumes, provided in vehicles per hour (vph), from SHA traffic volume counts for East Gude Drive are shown in Table 2.

Table 2: Traffic Count Data

Year	Location	AM Peak Hour	AM Peak Volume	PM Peak Hour	PM Peak Volume
2011	E Gude Drive at Calhoun Drive	7:30 – 8:30 AM	3,722 vph	4:45 – 5:45 PM	4,117 vph
2000	E Gude Drive at Dover Road	7:45 – 8:45 AM	3,729 vph	4:30 – 5:30 PM	3,838 vph
2012	E Gude Drive at Southlawn Lane	7:30 – 8:30 AM	4,254 vph	4:45 – 5:45 PM	4,280 vph

There are eight bus stops within the study area that serve Montgomery County Ride On route 59. Headways range from 5 to 50 minutes in the eastbound direction and 14 to 48 minutes in the westbound direction. In addition, there are Capital Bikeshare stations located on East Gude Drive south of Southlawn Lane, on Crabbs Branch Way just west of Calhoun Drive, and on Frederick Avenue south of Dover Road. A map of bus stops and Capital Bikeshare stations is shown in Figure 3.



Figure 3: Study Area Bus Stops and Capital Bikeshare Stations

1.4.3 Crash Data

The PRSA team reviewed all crash records collected by Montgomery County Police in the study area during the study period from January 2008 through December 2013 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. As shown in Figure 5, 18 pedestrian-related crashes occurred during the study period. Five of the 18 crashes involved bicyclists.

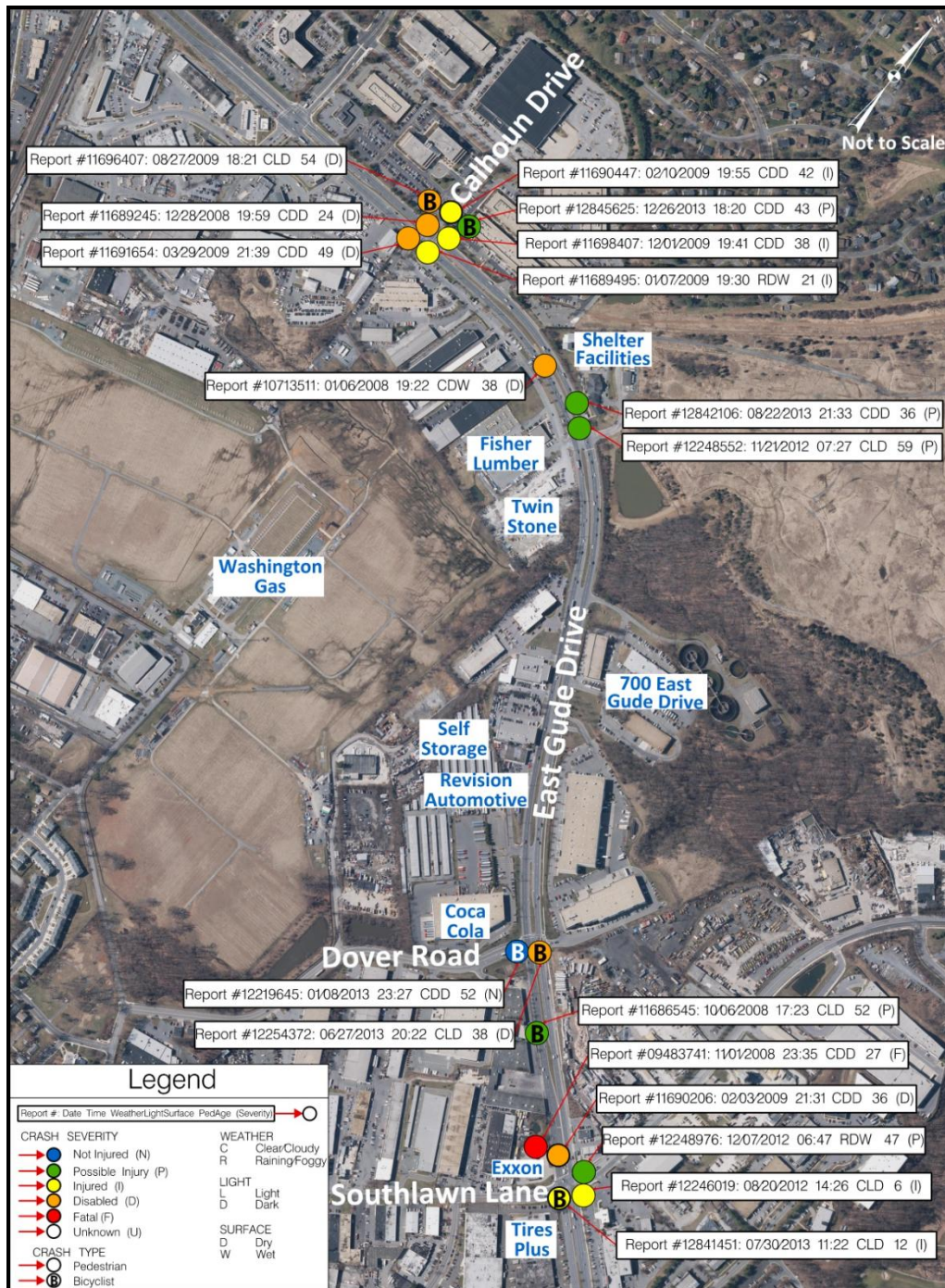


Figure 4: Pedestrian Crashes on East Gude Drive between Calhoun Drive and Southlawn Lane 2008 – 2013

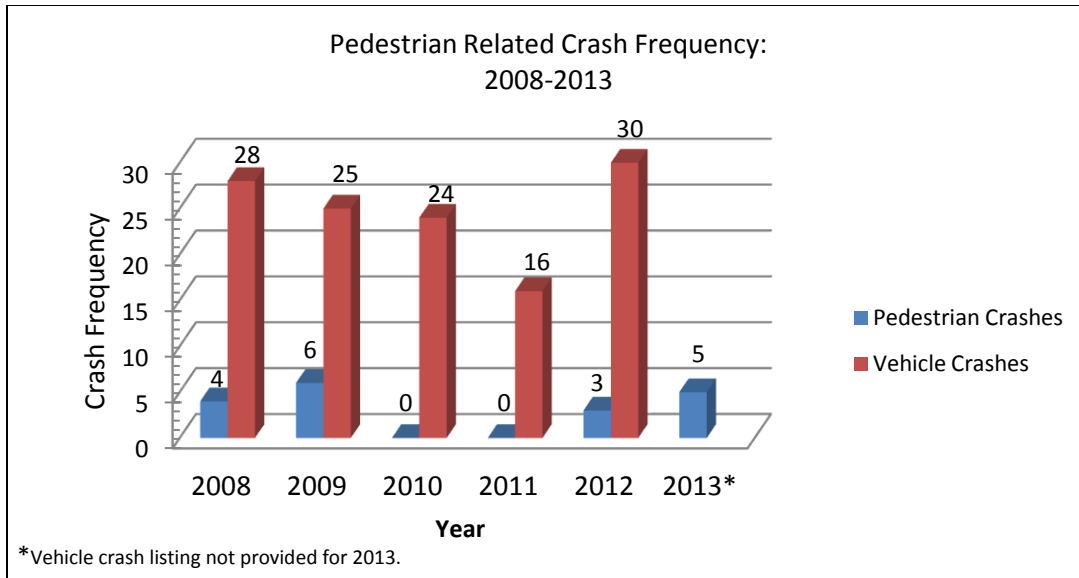


Figure 5: Study Area Crash Frequency 2008 – 2013

Crash data indicates that of the 18 pedestrian crashes, 17 resulted in injuries or possible injuries, as shown in Figure 6. One of the pedestrian crashes resulted in a fatality which occurred approximately 150 feet north of the intersection of East Gude Drive at Southlawn Lane, and six resulted in disablement.

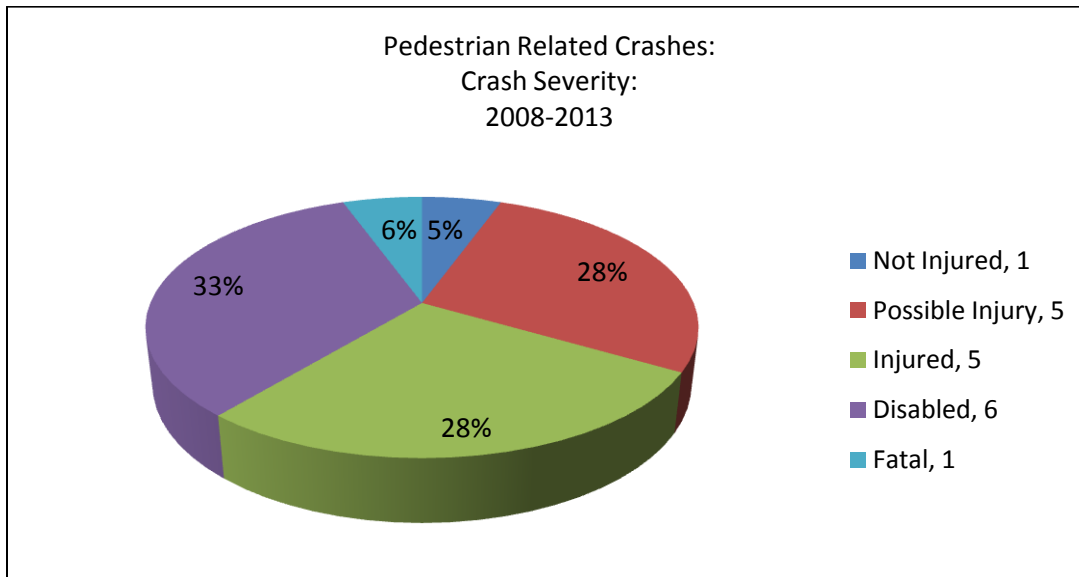


Figure 6: Pedestrian Crashes by Crash Severity 2008 – 2013

Figure 7 shows the vehicle movements prior to the pedestrian crashes. Five of the 18 crashes involved vehicles moving at constant speed. This finding suggests that drivers typically may not have seen pedestrians in the roadway or may not have expected pedestrian activity at the location of the crash. The second most common movement prior to a pedestrian crash was making a right-turn (22%).

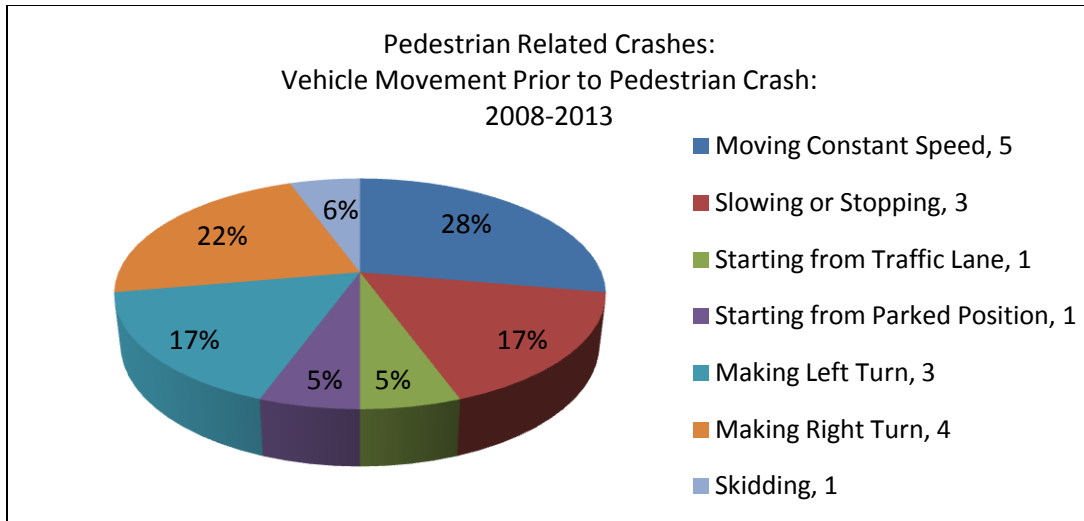


Figure 7: Vehicle Movement Prior to Pedestrian Crash 2008 – 2013

Figure 8 shows the distribution of pedestrian crashes compared to the expected frequency of crashes by age group based on study area residential demographics. The number of crashes involving pedestrians between the ages of 20 through 59 is higher than the number of expected crashes based on study area demographics obtained from Census data (www.census.gov). It should be noted that pedestrian crashes in the study area involve pedestrians less than 20 and older than 60 years of age significantly less frequently than would be expected based on 2010 Census demographics. Based on discussions with the MCCH shelter staff, many of the clientele are between the ages of 20 and 60, which may explain the increased frequency of crashes involving these pedestrians compared to the expected frequency. This pattern also matches field observations where almost no children, teenagers, or elderly pedestrians were noted within the study area.

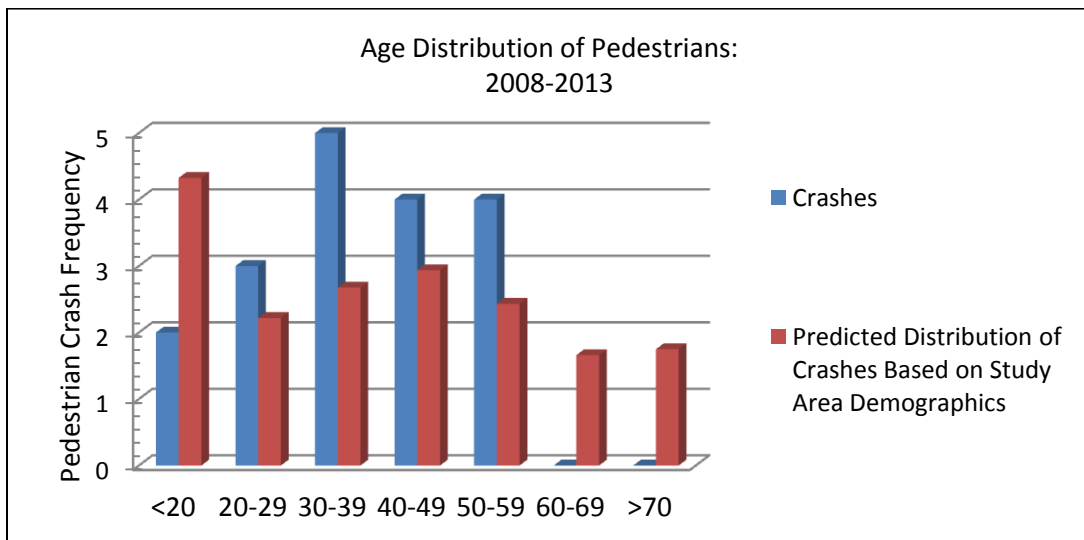


Figure 8: Pedestrian Crashes by Age 2008 - 2013

As shown in Figure 9, a majority of pedestrian crashes occurred during dark hours. Twelve of the 18 crashes occurred during nighttime conditions, with three of the 12 occurring in areas without street lighting.

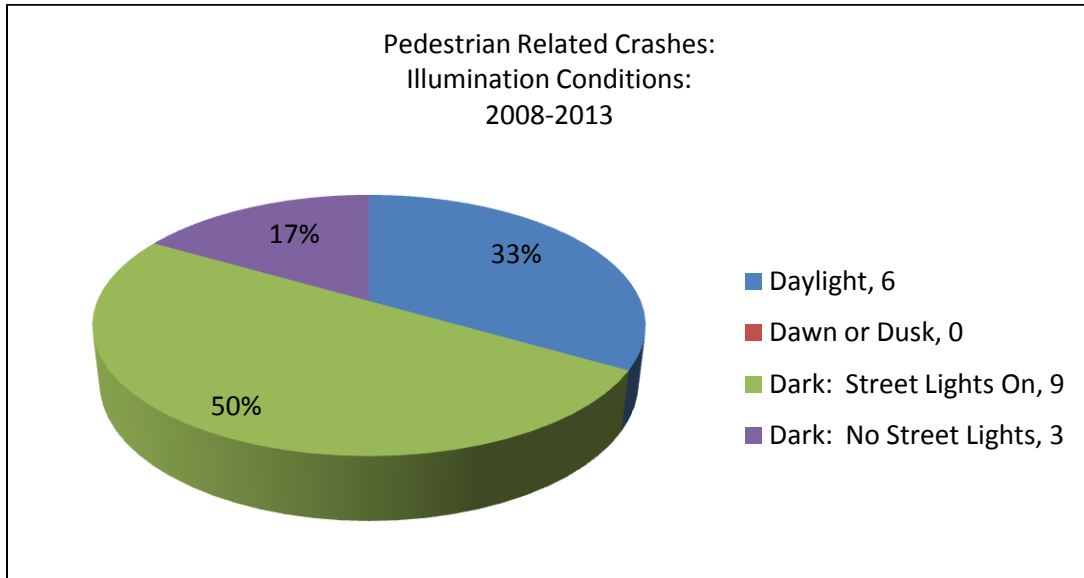


Figure 9: Pedestrian Crashes by Time of Day 2008 - 2013

As shown in Figure 10, 15 pedestrian crashes occurred under dry surface conditions, while three occurred under wet surface conditions. This distribution implies that the roadway surface conditions were not a primary factor in pedestrian crashes on East Gude Drive.

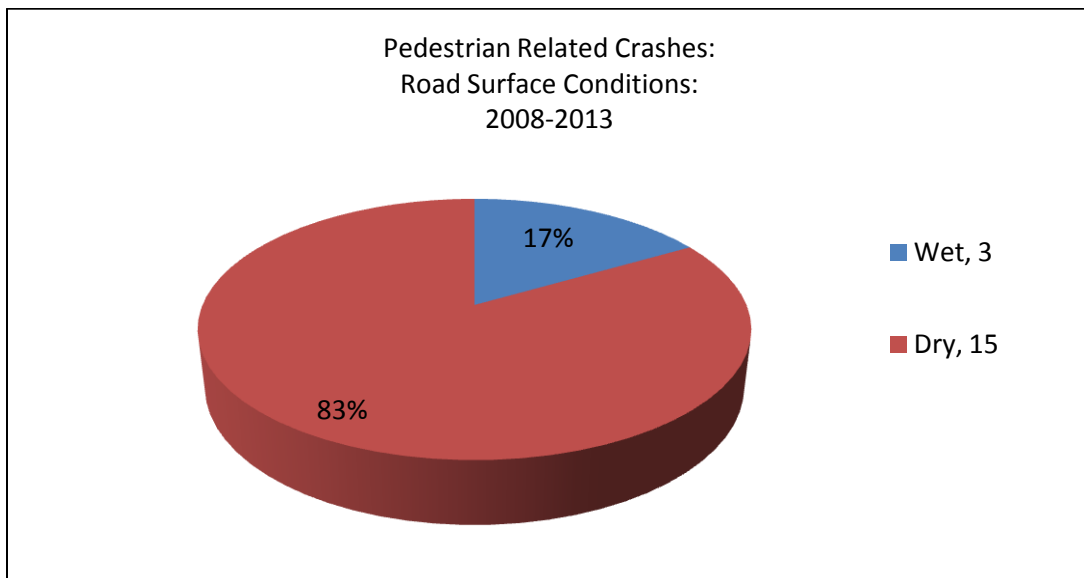


Figure 10: Pedestrian Crashes by Road Surface Conditions 2008 - 2013

2. Road Safety Audit Findings

2.1 Contributing Factors

The East Gude Drive PRSA team identified a number of contributing factors to the existing safety issues discovered during the audit and through the above crash data. This section describes the contributing factors to pedestrian safety within the corridor.

The Montgomery County Coalition for the Homeless

The Montgomery County Coalition for the Homeless (MCCH) is located on the north side of East Gude Drive, across from Display Court, and operates two shelters: a 24/7 emergency shelter called the Home Builders Care Assessment Center (HBCAC), as well as the Adrian's Safe Haven for men experiencing both chronic mental illness and homelessness. Catholic Charities also operates the Chase Partnership House at this location, which serves men who are homeless and working to overcome addiction. Based on crash data from 2008-2013, it was determined that the majority of pedestrian related crashes involved pedestrians believed to be clients of the shelters; including one fatality that occurred along eastbound East Gude Drive near Southlawn Lane. The crashes involving shelter clients tended to be clustered at times that correspond to transition hours when clients are coming from or going to the shelters, based on daily scheduled breakfast, dinner, and curfew times for the HBCAC.

Modified HAWK Signal

The modified HAWK signal is located adjacent to the driveway of the shelters and provides pedestrian access to and from the bus stop and the Millennium Trail on the eastbound side of East Gude Drive. During the stakeholder meeting, several stakeholders indicated that the modified HAWK signal may be confusing to both drivers and pedestrians. The modified HAWK signal may be confusing for pedestrians since a push button must be activated for each stage of the crossing. During the stakeholder meeting, the topic of the two stage crossing was discussed and several of the representatives from MCCH were not aware that a push button must be activated for each stage of the crossing.

The majority of pedestrians were observed crossing either without activating the modified HAWK signal or crossing midblock to the west of the marked crosswalk. Between the hours of 7:00 PM and 8:00 PM, 14 pedestrians were observed alighting at the Display Court bus stop, located approximately 50 feet west of the signal, and each crossed East Gude Drive without activating the modified HAWK signal. The lack of pedestrian compliance could be due to the alignment between the Display Court bus stop and the entrance to the shelters located behind the bus stop along the shelters' property line. Pedestrians traveling from the Display Court bus stop must walk approximately 50 feet to the east to reach the modified HAWK signal, wait for each stage of the crossing, then walk 50 feet west to reach the entrance to the shelters. The extra distance and time required to use the modified HAWK signal likely deters pedestrians originating at the Display Court bus stop from utilizing the modified HAWK signal.

Based on field observations during the audit, in general, drivers seem to comply with the modified HAWK signal during the steady red/pedestrian walk interval. However, some drivers were observed stopping for pedestrians prematurely during the flashing yellow phase, while others did not come to a complete stop during the flashing red phase.

Unlike the signal phasing recommended in the 2009 Manual on Uniform Traffic Control Devices (MUTCD), the modified HAWK signal located adjacent to the driveway of the shelters never goes dark and is always flashing yellow. Upon pedestrian activation, the signal immediately begins rapidly flashing yellow, and then follows the typical HAWK signal phasing outlined in the 2009 MUTCD. The modified HAWK signal is also equipped with two yellow indicators, contrary to the single yellow indication shown in the 2009 MUTCD. The additional yellow indicator is located directly under the single yellow indicator of a standard HAWK signal. It should be noted that while the modified HAWK signal phasing varies from what is recommended in the 2009 MUTCD, it was approved by SHA prior to installation.

Carl Henn Millennium Trail

As noted previously, six of the 18 pedestrian crashes involved bicycles. The presence of the Millennium Trail and the Capital Bikeshare stations is likely to increase bicycle traffic within the study area. The Millennium Trail runs along the south side of East Gude Drive and, based on input from the Rockville Advisory Bike Council, is mostly used by commuters rather than recreational cyclists due to the degrading condition and surrounding features. Unlike many other sections of the trail, there is not a grass buffer separating the trail from East Gude Drive through the study area. Further, the trail intersects many commercial and industrial driveways, which present a variety of challenges for cyclists traveling westbound along the trail, including the fact that many of the driveways intersecting the Millennium Trail are right in/right out only and motorists exiting the driveways may not realize the need to look right for westbound cyclists after looking left for vehicular traffic. As previously stated, the trail is narrow and has overgrown vegetation, cracks, and uneven segments as well as frequent domed gas meter covers which present obstacles for bikes.

2.2 Observed Issues and Opportunities for Improvements

The East Gude Drive 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

Pedestrian-vehicle conflicts, not including those involving uncontrolled midblock crossings, are comprised of turning movement conflicts at intersections and nearby access points. In many locations, drivers appeared to focus more on finding acceptable gaps in traffic to make their maneuver rather than on potential pedestrian and bicycle conflicts. At the unsignalized intersection of East Gude Drive at the Steptoe and Johnson driveway, the sweeping radius of the right turn into the parking lot allows for swifter turns. The audit team recommends that signage be installed to alert motorists to yield to pedestrians, where necessary, and to evaluate the feasibility of reconfiguring the curbline at the aforementioned driveway to make turning maneuvers more gradual and consistent with pedestrian and cyclist expectations.

Uncontrolled Midblock Crossings

Uncontrolled midblock crossing was observed between the Liberty and Exxon gas stations north of Southlawn Lane. Pedestrians are likely crossing here due to the existence of the bus stop on the north side of East Gude Drive. The audit team recommends that a context-sensitive, non-traversable barrier be installed in the median at this location to deter pedestrians from crossing midblock. In addition, the feasibility of relocating the bus stop closer to the East Gude Drive at Southlawn Lane intersection should be evaluated and coordinated with Montgomery County's Transit Services Division in order to discourage midblock crossings.

Pedestrian and Motorist Compliance with Signals

Modified HAWK Signal

Pedestrians were observed crossing at the modified HAWK signal without using the push-button. Additionally, pedestrians were observed crossing outside of the marked sidewalk due to the location of the bus stops on the north and south sides of East Gude Drive near the modified HAWK signal. Motorists appeared to be confused by the modified HAWK signal as the north- and southbound approaches stop independently and motorists did not usually come to a complete stop during the flashing red indication. Observations during the audit indicated that the existing pedestrian clearance intervals at some intersections may be shorter than recommended by guidance from the 2009 MUTCD, which may lead to pedestrians starting to cross during the Flashing Don't Walk indication.

The audit team identified a number of suggestions to improve compliance and understanding at the modified HAWK signal. During the stakeholder meeting, the MCCH representatives were unaware that a push button must be activated for each stage of the crossing. The audit team recommends coordinating with the MCCH to implement a pedestrian safety program for its clients. As of the date of this report, coordination is underway between the MCCH staff and the Montgomery County Pedestrian Safety Coordinator. In addition, it is suggested the use of an alternative mode of operation be considered to

reduce pedestrian and driver confusion. Police enforcement to target drivers that do not comply with the modified HAWK signal should be considered, as well.

Lane Configurations

During the audit, motorists were observed ignoring the existing lane configuration pavement markings on the southbound approach at Calhoun Drive and the eastbound approach at Dover Road. At locations where compliance with lane use is low, lane use signs should be installed and pavement markings should clearly indicate the lane use on the approach to reduce confusion.



Left: Pedestrian crossing at the modified HAWK signal without activation and outside of the crosswalk.
Right: Lane configurations are not supported by lane use signs on the eastbound approach at Dover Road.

Figure 11: Examples of Non-Compliance with Signals and Signing/Marking

Pedestrian Facility Conditions

A number of issues related to pedestrian facilities were observed during the audit. Examples include a lack of detectable warning surfaces, missing sidewalks, faded crosswalks, and insufficient crossing times. Further, the existing pedestrian ramps at some intersections are not aligned correctly and direct pedestrians into the center of the intersection, and did not appear to comply with ADA requirements.



Left: Crosswalk at E Gude Drive at Southlawn Lane is faded. Center: Missing Detectable Warning Surface near Liberty Gas Station. Right: Sidewalk ends prior to the MCCH driveway.

Figure 12: 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 detectable warning surfaces on all pedestrian ramps and high-visibility pavement markings for crosswalks along East Gude Drive. Additionally, ADA compliance should be verified at all existing pedestrian ramps and the adequacy of pedestrian signal timings should be verified, as well. The sections of missing sidewalk, particularly near high pedestrian generators such as the MCCH, should be constructed to ensure connectivity of the pedestrian network.

Drainage Conditions

A number of drainage issues were observed during the audit, including ponding at several intersections. Water was also observed ponding on the Millennium Trail, which may deter pedestrians or cyclists from using the trail during or after inclement weather.



**Left: Ponding near the intersection of E Gude Drive at Calhoun Drive.
Right: Water ponds along the sidewalk between the MCCH and Dover Road.**

Figure 13: Examples of Drainage Conditions

The audit team recommends that surface improvements be considered along East Gude Drive and the Millennium Trail to prevent the formation of standing water.

Lighting Conditions

During the study period, 12 of the 18 pedestrian crashes occurred during dark conditions, with nine of those 12 occurring when the street lights were on. The visibility of pedestrians may be reduced due to limited lighting near unsignalized intersections and along the sidewalks. During the audit, multiple light fixtures were observed as non-functioning and have been reported for repair. The audit team recommends that an evaluation of street lighting be conducted to determine if additional street lighting is necessary. As of the date of this report, a roadway lighting analysis is underway along E. Gude Drive. Lighting improvement design plans will be developed based on the findings of the roadway lighting analysis.

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 deteriorating pavement markings, missing, faded or non-retroreflective signage, and overgrown vegetation. Additionally, multiple pedestrian signal heads along the corridor were observed to be nonfunctioning.



Left: Lane drop pavement marking arrows near Calhoun Drive are faded. Center: Sign is faded and is non-retroreflective. Right: Overgrown vegetation on the Millennium Trail reduces the effective trail width.

Figure 14: Examples of Maintenance Issues

The audit team recommends that all signage and pavement markings be replaced or updated to meet the 2011 Maryland Manual on Uniform Traffic Control Devices (MdMUTCD) standards. In addition, overgrown vegetation should be trimmed or removed to increase the effective sidewalk widths and allow all signage and signals to be seen or accessed.

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)
Pedestrian Vehicle Conflicts	<ul style="list-style-type: none"> Install signage to remind drivers to yield to pedestrians where applicable. (ST) Consider reconfiguring the curbline radius of the channelized right-turn lane to reduce the speed of vehicles entering the parking lot to the east of Calhoun Drive. (LT)
Uncontrolled Midblock Crossings	<ul style="list-style-type: none"> Evaluate the feasibility of installing context-sensitive, non-traversable barriers in the medians to discourage midblock crossings at locations where midblock crossings are prevalent. (LT) Coordinate with Montgomery County's Transit Services Division to evaluate the feasibility of moving bus stops closer to signalized intersections to discourage midblock crossings. (LT)

Safety Issue	Suggestion(s)
Pedestrian Compliance with Signals	<ul style="list-style-type: none"> Consider coordinating with the shelters to implement a pedestrian safety program for its clients. This could include coordination with individuals from the Street Smart safety program to distribute pamphlets, retroreflective materials, and display posters. (ST)
Motorist Compliance with Signals	<ul style="list-style-type: none"> Replace existing advanced warning signage with fluorescent yellow-green signs to raise driver awareness of pedestrian crossings. (ST) Install lane use signage at intersections, where applicable, to inform drivers of the lane configuration. (ST) Consider police enforcement at the modified HAWK signal to educate drivers that do not comply with the flashing red indication. (ST) Consider the use of an alternative mode of operation at the modified HAWK signal to reduce driver confusion. (LT)
Pedestrian Facility Issues	<ul style="list-style-type: none"> Install Detectable Warning Surfaces (DWS), where necessary, to comply with ADA requirements. (ST) Replace crosswalk pavement markings that are faded and difficult to see. (ST) Verify the adequacy of pedestrian signal timing and adjust as necessary to comply with 2011 MdMUTCD guidance. (ST) Verify that all curb ramps and driveways are ADA compliant. (ST) Consider installing gas main covers that are mounted flush with the trail surface. (ST) Consider installing shared-use signage along the Millennium Trail. (ST) Consider installing shared-use crosswalk markings for the Millennium Trail crosswalks. (ST) Evaluate the possible need for additional pedestrian signal heads. (I) Consider reconstructing sidewalk ramps to align with adjacent crosswalks and comply with ADA requirements. (LT) Install push buttons with APS. (LT) Consider reconstructing medians to provide a pedestrian refuge area, if feasible and evaluate the need for push-buttons in the median. (LT) Install the missing sections of sidewalk along the corridor. (LT) Consider building shelters at bus stops where applicable. (LT) Consider geometric modifications at some intersections to reduce crossing distances. (LT) Install the missing section of sidewalk along the northern side of East Gude Drive between the shelters' driveway and Executive Wholesale Tire. (LT) Consider installing a buffer along the Millennium Trail where feasible. This could include installing a context-sensitive, non-traversable buffer and/or utilizing excess median width to shift existing travel lanes and increase shoulder width to allow for a grass buffer to be installed. (LT)
Drainage Conditions	<ul style="list-style-type: none"> Consider surface improvements at intersections and along the Millennium Trail where water pooling occurs. (LT)

Safety Issue	Suggestion(s)
Lighting Conditions	<ul style="list-style-type: none"> ▪ The roadway lighting analysis currently underway is inspecting lights for repair. Lights should be repaired as necessary. (ST) ▪ The need for additional street lighting is being evaluated as part of a roadway lighting analysis currently underway. (I) ▪ Lighting improvement design plans will be developed based on the findings of the roadway lighting analysis. (LT)
Maintenance	<ul style="list-style-type: none"> ▪ Replace deteriorated pavement markings. (ST) ▪ Trim trees and remove overgrown vegetation along the corridor and the Millennium Trail. (ST) ▪ Replace dated traffic signal heads with heads that meet current standards. (I) ▪ Repair pedestrian signal heads and countdown displays, where applicable. (ST) ▪ Inspect and replace intersection signage that is faded or damaged with retroreflective signs that meet 2011 Md-MUTCD standards. (ST) ▪ Replace missing or damaged Detectable Warning Surfaces. (ST) ▪ Remove debris from the pedestrian ramps. (ST) ▪ Verify the mounting height of signs along the corridor. (ST) ▪ Consider replacing all "SNOW EMERGENCY ROUTE" signs. (ST)
Other	<ul style="list-style-type: none"> ▪ Coordinate with the winter maintenance crews to ensure that areas around push buttons remain clear and accessible to the extent possible. (ST) ▪ Consider conducting a traffic signal warrant study to determine if a full signal is warranted at the modified HAWK signal. (LT) ▪ Conduct an intersection study at East Gude Drive at Southlawn Lane to evaluate the signal timing and phasing and identify any possible improvements. (LT)