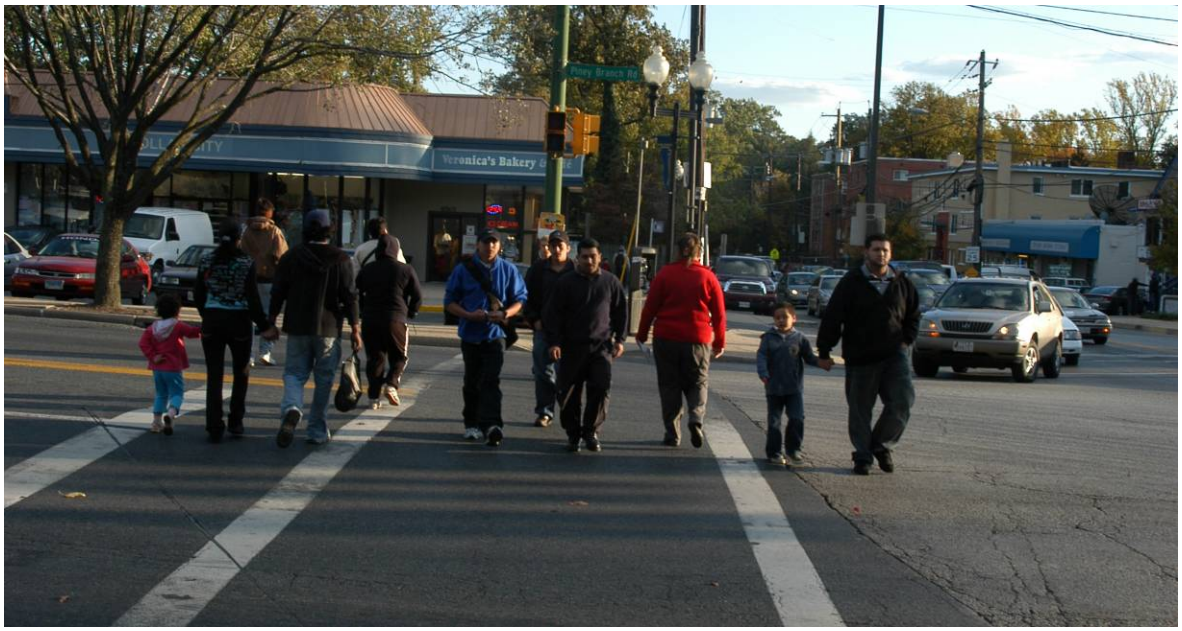
Piney Branch Road (MD 320)
Pedestrian Road Safety Audit

Montgomery County, Maryland



Prepared For:
Department of Transportation
Montgomery County, Maryland

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1. Introduction

1.1. Objectives of the study

The objective of this study was to complete a pedestrian and bicycle road safety audit (PRSA) for Piney Branch Road (MD 320) between Flower Avenue (MD 787) and the Montgomery County–Prince Georges County line in Silver Spring, Maryland (see Figure 1). As a result of the audit, the pedestrian RSA team has identified a variety of issues related to pedestrian and bicycle safety and developed a number of suggestions to improve pedestrian and bicycle safety in the study area.

1.2. Background

Piney Branch Road is a four lane north-south highway in a high-density mixed land use area in Silver Spring, Maryland. This road serves as a major commuter route and provides access to several commercial developments along with high-density residential developments that are dependent on transit. There is a significant volume of pedestrian activity in this area generated by the commercial developments and access to the bus stops.

Based on the crash data provided by Montgomery County, there were 26 pedestrian and one bicycle related crashes in the study area between January 1, 2003 and December 31, 2007. Out of these 27 crashes, one was a fatal crash at the intersection of Barron Avenue and Piney Branch Road. As part of the Montgomery County Executive's Pedestrian Safety Initiative, this area was identified as a "High Incidence Area" (HIA) in Montgomery County. The Maryland State Highway Administration (MDSHA) has a strong safety program focused on pedestrians and has implemented several treatments along MD 320 to reduce the pedestrian related crashes. The purpose of this PRSA was to identify additional safety issues that may be contributing to the observed pedestrian and bicycle crashes in the study area.

The PRSA team consisted of 8 members, representing the consultant, MDSHA, Montgomery County Department of Transportation (MCDOT), Montgomery County Department of Housing and Community Affairs, Montgomery County Police Department, Washington Metropolitan Authority Transit Agency, and Long Branch community residents. The PRSA was performed on October 21 and October 22, 2008, during daytime and nighttime hours.

Since the completion of the PRSA in 2008, MCDOT and MDSHA have been working jointly in the implementation of safety-related improvements within this HIA. Given the State jurisdiction over this roadway, MDSHA has also pursued several projects independently, which address many of the issues contained within this report. Although this report is based on observations made in 2008, updates related to observations and suggestions are provided. Recent projects that MDSHA has undertaken include:

- **Traffic Signal Reconstruction - Piney Branch Road (MD 320) at Flower Avenue (MD 787):** A traffic signal reconstruction project is currently underway at the intersection of MD 320 and Flower Avenue, which will upgrade the intersection to current design standards, with the implementation of countdown pedestrian signals, accessible curb ramps, LED signal indications, and other measures. This project is anticipated to be completed in the fall of 2011.
- **Intersection Improvements - Piney Branch Road (MD 320) at University Boulevard (MD 193):** In 2008, an improvement project was completed at the intersection of University Boulevard and Piney Branch Road, which included the elimination of channelized right turn movements for each approach and the addition of a right turn lane for southbound Piney Branch Road. Additionally, each corner was reconstructed, reducing the curb radii and improving the curb ramps to meet current standards. Lastly, the roadway within the limits of the project was resurfaced.
- **MD 320 (From DC Line to MD 193) Resurfacing Project:** MDSHA advertised a $2.5M project in January 2011 for the resurfacing of Piney Branch Road, which includes the repair/replacement of existing inlets, traffic barrier and end treatment upgrades, curb ramp upgrades, pavement marking (striping) improvements, and loop detector replacement.
- **Piney Branch Road Education and Outreach Program** – In 2009, MCDOT partnered with CASA de Maryland to develop bilingual safety promotion teams to perform targeted education and outreach within the Piney Branch Road HIA, which included the distribution of educational materials and pamphlets between November 2009 and July 2010. This campaign also included bilingual bus shelter and transit ads and public service announcements. The education and outreach effort for this HIA is anticipated to be complete in June 2011.

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 identifies specific pedestrian or vehicular safety issues identified within the corridor by the pedestrian RSA team. Finally, the report presents suggestions for pedestrian safety improvements in the study area.

This report will be a resource to MDSHA and MCDOT, as well as other stakeholders, for implementing pedestrian safety improvements within the audit area. There will be 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 assess the feasibility and constructability of long-term projects. Ultimately, this process will assess the merits of these recommendations and establish a process whereby a range of pedestrian safety recommendations are implemented.

2. Existing Conditions

2.1. Site Characteristics

Piney Branch Road is a four-lane major highway with left-turn lanes at intersections. Sidewalks with curb and gutter are located on both sides of the roadway in the study area. To the north of University Boulevard, Piney Branch Road has narrow shoulders. The posted speed limits for the southern portion of the study area between Flower Avenue and University Boulevard and the section north of University Boulevard are 30 miles per hour (mph) and 40 mph, respectively.

The MDSHA 2007 average annual daily traffic volumes for Piney Branch Road are summarized in Table 1.

Table 1: 2007 Piney Branch Road AADT

Location	AADT
0.1 mile south of University Boulevard (MD 193)	25,200 vpd
0.1 mile south of Prince Georges County line	21,760 vpd

There are ten transit bus stops in each direction on Piney Branch Road serving Ride-on routes 12, 15, 16, and 20 and WMATA route J4. The audit team observed significant use of public transportation throughout the study area.

There are six traffic signals in the study area along the Piney Branch Road corridor, at the following intersections:

- Flower Avenue
- Greenwood Avenue
- Arliss Avenue
- Barron Avenue
- University Boulevard
- Carroll Avenue

Marked crosswalks are located at all signalized intersections. A high-visibility mid-block crosswalk, including flashing beacons, is located to the south of Garland Avenue.

2.2. Crash Data

A review of all collision records collected by Montgomery County allowed the PRSA team to identify the location of all reported pedestrian/bicyclist crashes within the corridor. Between 2003 and 2007, 317 vehicle crashes, 26 pedestrian crashes, and 1 bicyclist crash were reported in along Piney Branch Road, within the study area.

Crash data indicate that all of the pedestrian/bicyclist crashes resulted in injuries. One crash resulted in a fatality. As indicated in Figure 2, five of the 27 crashes resulted in possible injuries, 6 of 27 resulted in non-incapacitating injuries, 6 of 27 resulted in unknown degrees of injury, and 9 of 27 resulted in serious/disabling injuries. The consistent propensity for injuries associated with pedestrian crashes on this corridor supports the pursuit of additional pedestrian safety measures along the corridor.

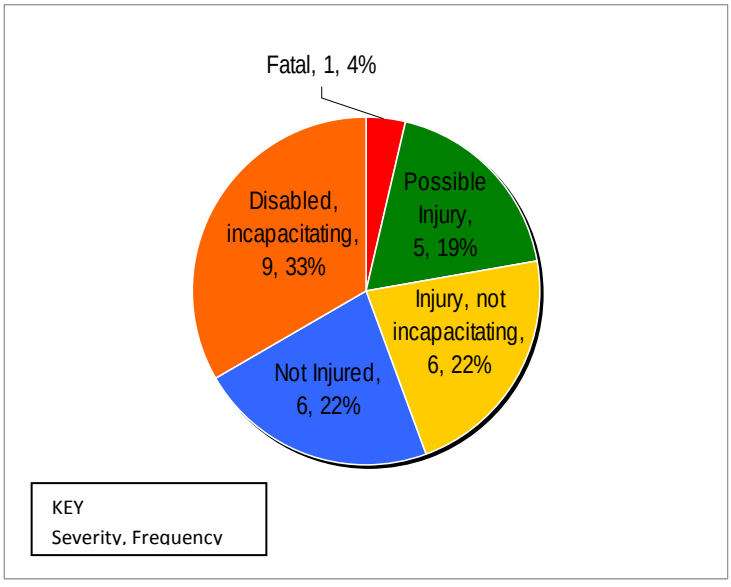


Figure 2: Pedestrian/Bicyclist Crashes by Severity

Twelve of the 27 crashes occurred at intersections. There was one crash involving a bicyclist during the 2003 to 2007 time period. The bicycle crash occurred at the Carroll Avenue intersection during clear conditions and daylight hours, at approximately 8:00 AM in October 2007.

Pedestrian/bicyclist crashes were equally distributed during the daylight and dark hours (13 crashes each), and one crash occurred during the dawn/dusk hours. The fact that there is an equal number of daylight and dark hour crashes is of notable concern, given that the volume of all traffic and the potential for conflicts is typically lower in the evening. This implies that there may be an overrepresentation of pedestrian-related crashes at night. Charts summarizing location and lighting are included in Figure 3. The majority of the pedestrian/bicyclist crashes (19 of 27) also occurred under dry road surface conditions. Totals of 7 of 27 and 1 of 27 crashes were reported under wet road surface conditions and unknown road surface conditions, respectively.

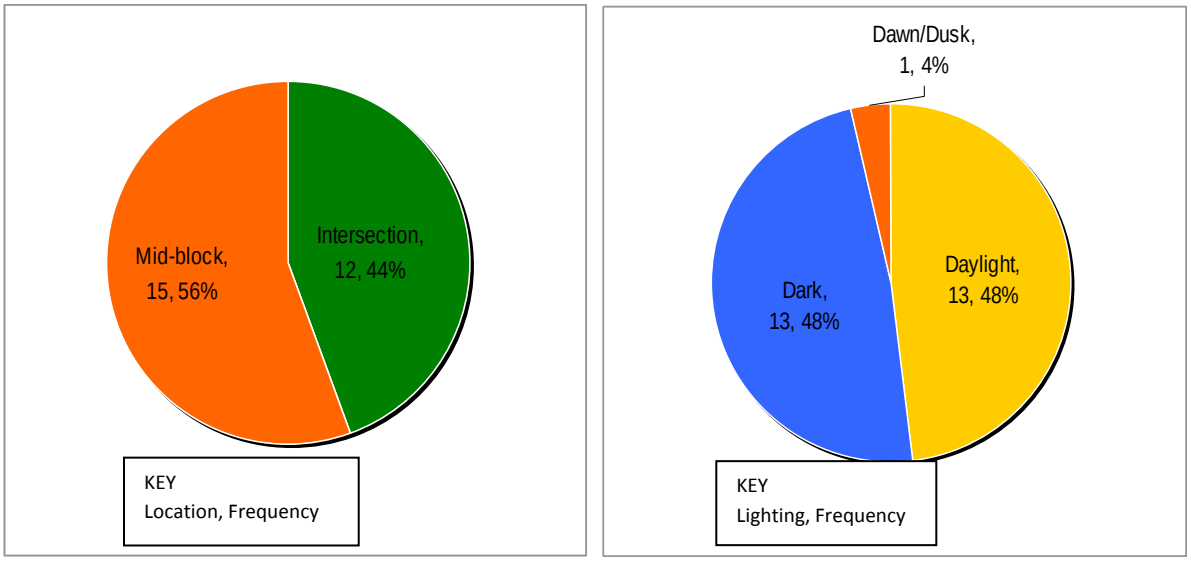


Figure 3: Pedestrian/Bicyclist Crashes by Corridor Location and Lighting Condition

There was one fatal crash reported in 2004 at the intersection of Piney Branch Road and Barron Street. The locations with the highest number of pedestrian and bicycle related crashes in descending order are the intersection of Piney Branch Road and University Boulevard, the area north of University Boulevard between the Panam Latino Market/LA Market Entrances, and the intersection of Piney Branch Road and Barron Street. All pedestrian and bicycle related crashes in the study area are illustrated on an aerial diagram in Figure 4.

Figure 4: Pedestrian Crashes 2003-2007

3. Pedestrian Road Safety Audit Findings

3.1. 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:* Sidewalks within the corridor are continuous and provide a designated space for pedestrians in the corridor.
- *Mid-block crosswalk with raised concrete median and flashing beacons at Garland Avenue:* A pedestrian refuge with flashing beacons was installed just south of Garland Avenue. The median provides disabled access with detectable warning surfaces, and warning signs facing northbound and southbound traffic. The pedestrian path in the median has a "Z" configuration that allows pedestrians to have better visibility of conflicting vehicular traffic by being required to turn and face oncoming traffic before crossing from the median to the curb.

Mid-block Crossing with Flashing Beacons

- *Improved intersection design at University Boulevard and Piney Branch Road*: This project, completed in 2008, modified the radii of all four corners of the intersection of University Boulevard and Piney Branch Road, which resulted in extending the corner further into the intersection. Most significantly, this created shorter crossing distances and eliminated the channelized right turns. In 2010, a preliminary review of crash data revealed that this project has led to a short-term reduction in pedestrian-related crashes at the intersection.
- *Enhanced bus stop shelters:* Most of the bus stop locations have enhanced bus stop shelters, with lighting and seating. Lighting is pending at a few of the bus shelters due to utility issues that are currently being addressed.

Enhanced Bus Shelter

- *Marked crosswalks at all signalized intersections:* Marked crossings are provided at every signalized intersection. Few of these crossings include countdown pedestrian signals. MCDOT recently installed countdown pedestrian signals at the Carroll Avenue intersection, in cooperation with MDSHA. Additionally, a signal reconstruction project at the intersection of Piney Branch Road and Flower Avenue will result in countdown pedestrian signals for each crossing.

These measures help improve driver awareness of pedestrians and compliance of traffic signals. Implementation of these features can reduce the potential for collisions.

3.2. Observed Issues, Contributing Factors, and Opportunities for Improvements

The Piney Branch Road pedestrian RSA team identified a number of pedestrian safety issues in the study area during the audit. Based on a review of crash data and field observations, the section of Piney Branch Road between University Boulevard and Carroll Avenue was determined to be the most notable pedestrian conflict location in the study area. The following section describes the identified pedestrian safety issues, as prioritized by the audit team:

Uncontrolled Midblock Crossings – Uncontrolled mid-block crossings were prevalent and were identified as one of the primary contributing factors to pedestrian collisions in the study area. Possible causes of uncontrolled mid-block crossings were the locations of various commercial and residential properties, locations of bus stops, and long distances between marked crosswalks.

Uncontrolled Mid-block Crossing

Pedestrian-Vehicle Conflicts – Additional pedestrian conflicts observed along the corridor included turning vehicles conflicting with pedestrians at intersections and private driveways. A significant number of pedestrians were observed crossing at crosswalks during the concurrent permissive left-turn phases, which can contribute to vehicle-pedestrian conflicts. The team observed both right and left-turning vehicles improperly yielding to pedestrians. Wide driveways in some locations increased pedestrian exposure to vehicles entering or exiting at these access points.

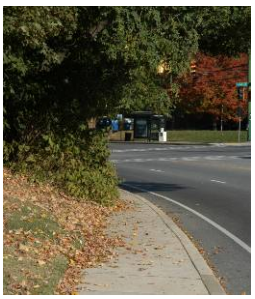
Motorist not Stopping for School Bus

Pedestrian Facility Issues – Some pedestrian push buttons were not easily accessible due to overgrown vegetation or improper location. The PRSA team noted non-functioning pedestrian push buttons in some locations. Few countdown pedestrian signal heads were provided on the corridor. Sidewalks at several locations were narrow by design or limited by over-grown vegetation. Pedestrian signal heads were faded and were not clearly visible in some locations. Marked crosswalks that may have encouraged pedestrians to cross in proper locations were not provided at some driveways. Pedestrian signal heads were missing on some roadway approaches to Piney Branch Road.

Utility Pole in Sidewalk

Vehicles Not Stopping for School Buses –The PRSA team noticed that some vehicles did not stop for a stopped school bus with flashing beacons.

Poor Sight Distance – Drivers may have difficulty seeing pedestrians due to obstructions at sidewalk corner locations. The location of some crosswalks may have further encouraged crossings at locations that were partially obstructed. Sight distances at some driveway locations were also limited by horizontal and vertical curves.



Foliage Encroachment along Sidewalk

Lighting Conditions – Lighting at some crossing locations appeared to be limited during dark conditions. Pedestrians crossing the street, especially at mid-block locations after disembarking buses, are difficult for drivers to see at a distance and may cause unpredictable reactions from drivers attempting to avoid collisions.

Lack of Delineation Between Parking and Travel Lanes – There was no delineation between travel lanes and parking lanes along some parts of Piney Branch Road.

Lack of Pedestrian/Bike Connections – Connections to the Long Branch bike trail were insufficiently identified.

Maintenance – The PRSA team observed some street lights that appeared to be non-functional and some traffic signal heads obscured by trees.

3.3. Summary of Issues and Suggestions

3.3.1. Study Area 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	Suggestions
Uncontrolled Midblock Crossings	▪ Determine the feasibility and constructability of modifications to medians to deter uncontrolled midblock crossings or improve pedestrian refuge space. (LT) ▪ Determine the feasibility and constructability of mid-block crossing treatments, including signalized or flashing equipment that is compliant with SHA standards. (LT) ▪ Partner with the Transit Services Division to assess the possibility of relocating or consolidating bus stops. (I) ▪ Conduct a speed study to determine whether reducing the regulatory speed limit is warranted. (I)
Pedestrian - Vehicle Conflicts	▪ Work with property owners and SHA to pursue channelization at driveways, to provide more right-in/right-out configurations, and consolidate some access points. (LT) ▪ Consider installing signage to improve driver awareness of pedestrians and reduce turning movement conflicts at intersections. (LT) ▪ Determine the feasibility and constructability of geometric roadway improvements to reduce pedestrian crossing distances or improve pedestrian refuge spaces. (LT) ▪ Work with the Transportation Management Section to assess the potential for signal timing modifications. (LT) ▪ Partner with MDSHA to pursue installing pavement marking modifications to increase visibility of pedestrian crossings. (ST) ▪ Partner with MDSHA to pursue installing pedestrian countdown signals via APS/CPS signal upgrades. (I)

Safety Issue	Suggestions
Pedestrian Facility Issues	▪ Partner with MDSHA to pursue installing pedestrian signals (i.e., countdown pedestrian signals) at appropriate intersections and improve old, damaged, or missing pedestrian push buttons. (I) ▪ Partner with property owners and MDSHA to pursue consolidating driveways and relocating traffic control elements, as needed. ▪ Determine the constructability of widening sidewalks. (LT)
Vehicles Not Stopping for School Buses	▪ Implement a driver education program. (I) ▪ Work with the Montgomery County Police to ensure the appropriate levels of enforcement. (I) ▪ Consider signage improvements to inform drivers to stop for school buses. (ST)
Poor Sight Distances	▪ Review the optimal location of existing advance warning signs. (ST) ▪ Determine the feasibility and constructability of modifications to medians to provide adequate refuge areas. (LT) ▪ Consider removing or relocating obstructions along sidewalks. (I)
Lighting Conditions	▪ Assess the need for additional streetlights at crossing locations and bus shelters. (I) ▪ Consider installing raised pavement markers in some locations. (LT)
Lack of Delineation Between Parking and Travel Lanes	▪ Partner with MDSHA to pursue installing white edge lines to delineate travel lanes from on-street parking areas. (I)
Lack of Pedestrian/Bike Connections	▪ Consider installing wayfinding signs to guide trail users. (ST)
Maintenance	▪ Consider repairing street lighting as necessary. (ST) ▪ Trim foliage and vegetation to improve usable sidewalk width and visibility of signal heads. (ST)

Several measures may be considered for application throughout the study area, including:

- Installing countdown pedestrian signals.
- Implementing higher-visibility pavement markings for crosswalks, compliant with MDSHA standards.
- Installing lighting at bus stops.
- Upgrading push button technology.
- Conducting a detailed ADA assessment and correcting deficiencies.
- Implementing educational and enforcement programs.

3.3.2. Other Possible Issues

Proposed improvements to the University Boulevard/Piney Branch Road intersection signal recommended by MDSHA will implement a split phase for Piney Branch Road. While this phasing

reduces the conflicts with the right turning vehicles, pedestrians may have to wait longer at intersections before they can safely cross. The pedestrian RSA team suggests working with the MCDOT Transportation Management Section to assess adjusting the traffic signal timings at this intersection, coupled with continuing the focused public education program.