

TECHNICAL MEMORANDUM

Homewood Active Mobility Improvements

Safety Study Memo

Date:	June 21, 2021	Project #:	24234.001
To:	Department of Mobility and Infrastructure (DOMI)		
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cc:	Panini Chowdhury		

INTRODUCTION

The City of Pittsburgh Department of Mobility and Infrastructure (DOMI) is leading a planning and design project to identify and design pedestrian and bicycle mobility, transit accessibility, and mobility issue improvements in the Homewood Neighborhood (Homewood). The Homewood Active Mobility Improvements Study (the Study) will analyze existing safety and multimodal facility conditions in Homewood, identify locations for improvements, and develop 10% design plans for priority project areas. Once implemented, the project will provide critical connections to important local destinations throughout Homewood, including transportation systems.

As part of the overall Study, Kittelson & Associates (Kittelson) prepared this Safety Study Memorandum (Safety Memo) to summarize mobility safety conditions and potential active mobility improvements in Homewood. The types of analysis included in the Safety Memo are as follows:

- Crash Analysis
- Roadway Speed and Volume Analysis
- General Field Observations
- Neighborhood Safety Audits

The Safety Memo document is broken up into six (6) sections: Introduction, Methodology, Crash Analysis, Speed and Multimodal Conditions, Neighborhood Safety Audits, and Summary of Findings.

Study Area Context

The Homewood neighborhood is a predominately residential neighborhood with a majority African American population located in the easternmost part of Pittsburgh. According the 2020 Homewood Comprehensive Community Plan, the population hovers around 6,500 people; there are 2,684 housing

units in the neighborhood with the vast majority, 1,500, being single-family homes. The study area is bound by the elevated MLK East Busway to the South, 5th Avenue to the West, Lincoln Avenue/Apple Street/Upland Street to the North, and Brushton Avenue/Oakwood Street to the East. A map of the study area is shown in **Figure 1**.

Most streets in Homewood are local roads with lane widths around ten to eleven feet (10-11'), relatively low traffic volumes, two-way vehicular traffic, and parallel parking and sidewalks on both sides of the street. Higher volume arterials and major collector streets that provide connectivity throughout Homewood and into adjacent neighborhoods include Frankstown Avenue, Bennett Street, Homewood Avenue, 5th Avenue, Dallas Avenue, Braddock Avenue, Brushton Avenue, Upland Street, and Oakwood Street. Throughout most of the neighborhood, the posted speed limit is 25 miles per hour (on arterials, collectors, and some local streets) except for 5th Avenue/Washington Boulevard where the posted speed limit is 35 miles per hour. Within school zones, the posted speed limit is 15 miles per hour.

Homewood is served by surface bus transit routes on Hamilton Avenue, Frankstown Avenue, Homewood Avenue/Upland Street, 5th Avenue, and Lincoln Avenue. The southern portion of Homewood also has access to two stations on the elevated MLK East Busway, Homewood Station and Wilksburg Station. There is a Healthy Ride bikeshare location on Bennett Street in front of the Homewood-Brushton YMCA. PikePGH characterizes Homewood Avenue, Upland Street, Lincoln Avenue, Portions of Frankstown Avenue/Bennett Street, Hamilton Avenue, Dallas Avenue, Braddock Avenue, and Oakwood Street as on-street bike routes. These routes are not designated by the City and there are no dedicated bicycle facilities in the neighborhood. Bicycle and transit facilities will be further analyzed as a part of Task 2 Homewood Active Mobility Improvements Study.

Homewood has several local destinations that act as activity generators in the community, including churches, schools, a library, and community centers (YMCA, etc.). These will be analyzed further in the Task 2 Homewood Active Mobility Improvements Study. A few locations that were noted during the safety analysis include Homewood Station, the Frankstown Business Corridor between Lang Avenue and Sterrett Street, Faison Elementary School, and the Homewood Library.

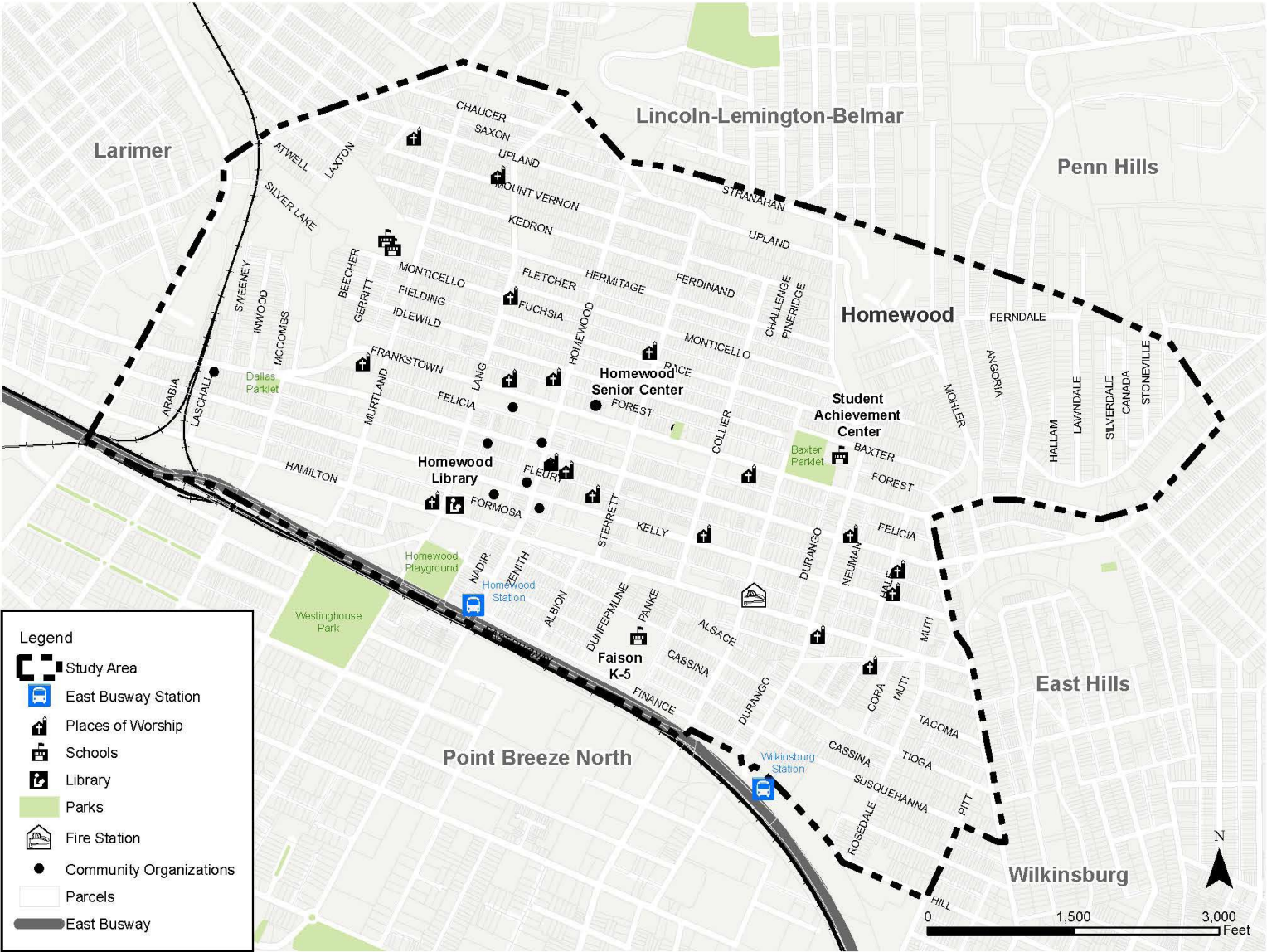


Figure 1: Study Area Map

Previous Studies

A number of previous planning studies were reviewed to provide an understanding of the study area and to help identify locations for the Neighborhood Safety Audits. These plans and their findings will be summarized in Task 2 Homewood Active Mobility Improvements Study.

METHODOLOGY

The following sections provide a summary of the methodology that was used to analyze safety conditions in Homewood.

Crash Analysis

The most recent three years of available crash data within the project study area (January 1, 2017 to December 31, 2019) was analyzed. The data was downloaded from the PennDOT Open Data website portal in April 2021. Crashes were selected within 250 feet of the study area boundary roadways: 5th Avenue to the West, Lincoln Avenue/Apple Street/Upland Street to the north, and Brushton Avenue/Oakwood Street to the East. The data was analyzed by reviewing the spatial location of the crashes, mode involved (pedestrian, bicycle, motor vehicle), crash type, and crash severity. Field observations were also used to understand causes of crashes.

Maps were developed to summarize crash data spatially by total crashes (**Figure 2**), crash type (**Figure 3**), crash severity (**Figure 4**), and pedestrian and bicycle crashes (**Figure 5**); the maps are in the Crash Analysis section of this memo.

Speed and Volume Analysis

Streets with high vehicle speeds create potential conflicts with pedestrians and bicyclists and increase potential for crashes. Speed data (posted speed limits, 85th percentile speeds, and median speeds) and average daily traffic was obtained from the City of Pittsburgh traffic count data website. Kittelson reviewed the available data at the following streets to identify corridors with high vehicular speeds.

- Frankstown Avenue
- Bennett Street
- Hamilton Avenue
- Kelly Street
- Homewood Avenue
- Braddock Avenue

Neighborhood Safety Audits

Kittelson along with DOMI representatives conducted Neighborhood Safety Audits in Homewood to observe traffic, pedestrian conditions, document hazards, and identify opportunities for improvements. The Federal Highway Administration's "Pedestrian and Bicyclist Road Safety Audit (RSA) Guide and Prompt List" was consulted to inform Kittelson's approach to the Neighborhood Safety Audits.

Kittelson identified three corridors to conduct the Neighborhood Safety Audits:

- Corridor 1 – Homewood Avenue (north of Hamilton Avenue to Upland Street)
- Corridor 2 – Frankstown Avenue (5th Avenue to Sterrett Street)
- Corridor 3 – Hamilton Avenue Intersections (5th Avenue, Homewood Avenue, Braddock Avenue, and Oakwood Street-Haverhill Street).

Locations for the Safety Audits were determined by numerous factors including number of crashes, areas identified in previous planning documents, high speeding locations, prevalence of traffic generating community facilities, and DOMI recommendations. Below is a summary of conditions that contributed to each corridor's selection.

1. Homewood Avenue

- Pittsburgh Pedestrian Safety Action Plan (PSAP) identified as a Business District with Frequent Transit Service
- Identified as an "Avenue of Hope" by the Urban Redevelopment Authority of Pittsburgh (URA)
- 85th percentile speeds are eleven miles per hour higher than the speed limit (81% of vehicles are traveling over the speed limit.)
- Future development and improvements identified in URA's Station TOD Plan
- Location for Safe Routes to School Improvements
- Streetscape Improvements identified in the 2020 Homewood Comprehensive Plan completed by the Homewood Community Development Collaborative, Department of City Planning (DCP), and URA
- Bike (+) Plan proposed improvements
- Access to local library
- Healthy ride station location

2. Frankstown Avenue

- Pittsburgh PSAP identified as a High-Risk Corridor and a Business District with Frequent Transit Service
- High crash corridor, including 5 pedestrian crashes
- 85th percentile speeds are ten miles per hour higher than the speed limit. (78% of vehicles are traveling over the speed limit.)
- Homewood Comprehensive Plan
 - Community identified "places to avoid" (potentially due to safety concerns) from Public Meeting #1
 - Recommended streetscape improvements
- Bike (+) Plan proposed improvements

3. Hamilton Avenue

- Pittsburgh PSAP identified as a High-Risk Corridor and a Business District with Frequent Transit Service
- Crash corridor (including Pedestrian crash at Hamilton and Braddock)
- Sidewalk gaps identified in Homewood Comprehensive Plan
- Bike (+) Plan proposed improvements
- Mode Emphasis proposed improvements

The Safety Audits were conducted on Wednesday, April 14 and Thursday, April 15, 2021 by two Kittelson staff; DOMI provided two staff to walk with Kittelson for part of the Safety Audits on April 14th. Site conditions were observed for all three corridors by both walking and driving. Each Safety Audit corridor was observed in three different timeframes: nighttime, daytime peak, and daytime off-peak. These site visits allowed the team to observe vehicular, pedestrian, and bicycle travel behaviors at crash hotspot locations, identify issues and opportunities, and gain a deeper understanding of destinations/high pedestrian traffic corridors previously identified.

CRASH ANALYSIS

Neighborhood Crash Overview

Three (3) of the city's high-risk corridors for future crashes identified in the Pittsburgh Pedestrian Safety Action Plan are in the Homewood neighborhood (Frankstown Avenue, Hamilton Avenue, and Washington Boulevard). Approximately 424 total crashes were reported in the study area from 2017 to 2019. 41 percent of the crashes were angle crashes (172) followed by 16 percent rear end crashes (66) and 15 percent hit fixed object crashes (64). PCIT data shows that many of the angle crashes are a result of red light running or proceeding without clearance at both signalized and unsignalized intersections. Out of the 172 angle crashes, 146 occurred at an intersection and of the 66 rear end crashes, 21 occurred at an intersection. This may suggest that signal timing/phasing and intersection visibility should be reviewed. In general, higher crash locations typically occurred at signalized intersections of principal arterials or higher volume roadways in the study area. **Table 1** displays crashes in the study area by type. **Figure 2** and **Figure 3** show the total crashes and crash type, respectively.

Table 1: Total Study Area Crashes by Crash Type (2017-2019)

Crash Type	Count
Non-collision	6
Rear-end	66
Head-on	44
Backing	1
Angle	172
Sideswipe (Same Direction)	36
Sideswipe (Opposite Direction)	11
Hit Fixed Object	64
Hit Pedestrian*	19
Other	4

Unknown	1
Total	424

*Note: In some of the crashes in which pedestrian were involved there were more than one pedestrian involved. Therefore, the Crash Type summary shows there were 19 “Hit Pedestrian” crashes over the three years, while the pedestrian and bicycle crash summary map displays 22 crashes involving pedestrians.

Five (5) fatal crashes were reported in the study area. All five (5) fatal crashes occurred at night with street lights present. The fatal crash locations are described below and displayed in **Figure 4**.

1. An angle crash at 5th/Frankstown.
2. An angle crash at Dallas/Kelly.
3. A hit fixed object crash at Frankstown/Gerritt.
4. A hit fixed object crash on Frankstown near Wheeler.
5. A head on crash at Bennett/Frankstown/Dornbush.

In the Homewood neighborhood, 22 pedestrian crashes were reported between 2017 and 2019. (In some of the crashes in which pedestrian were involved there were more than one pedestrian involved. Therefore, the crash type summary table shows there were 19 “Hit Pedestrian” crashes over the three years, while the pedestrian and bicycle crash summary map shows 22 crashes involved pedestrians.) Based on Homewood’s population, this suggests an average of 1.12 pedestrian crashes per 1,000 residents per year, which is higher than the 0.83 crashes per 1,000 residents per year identified for the City in the Pittsburgh Pedestrian Safety Action Plan. The pedestrian crash severity consisted of four (4) suspected serious injury, seven (7) suspected minor injury, one (1) possible injury, and ten (10) injury/unknown severity. Nine (9) pedestrian crashes occurred during the nighttime (eight (8) with streetlights present and one (1) with unknown roadway lighting,) one (1) at dusk, and the remaining during daylight. Three (3) bicycle crashes were reported: two (2) were suspected minor injury and one (1) possible injury. Two (2) occurred during daylight and one (1) at night with streetlights present. The pedestrian and bicycle crash locations are displayed in **Figure 6**.

Table 2 displays the crashes for the study area according to lighting conditions. Thirteen (13) crashes in the study area occurred with no streetlights. Nine (9) crashes in the study area occurred with pedestrians at night, with eight (8) with streetlights present and one (1) with unknown lighting conditions. The roadway lighting condition might have contributed to the cause of these pedestrian crashes.

Table 2: Study Area Crashes by Lighting Type (2017-2019)

Lighting Type	Count
Daylight	226
Dark – No Street Lights	13
Dark – Street Lights	170
Dusk	5
Dawn	5
Dark – Unknown Lighting	5
Total	424

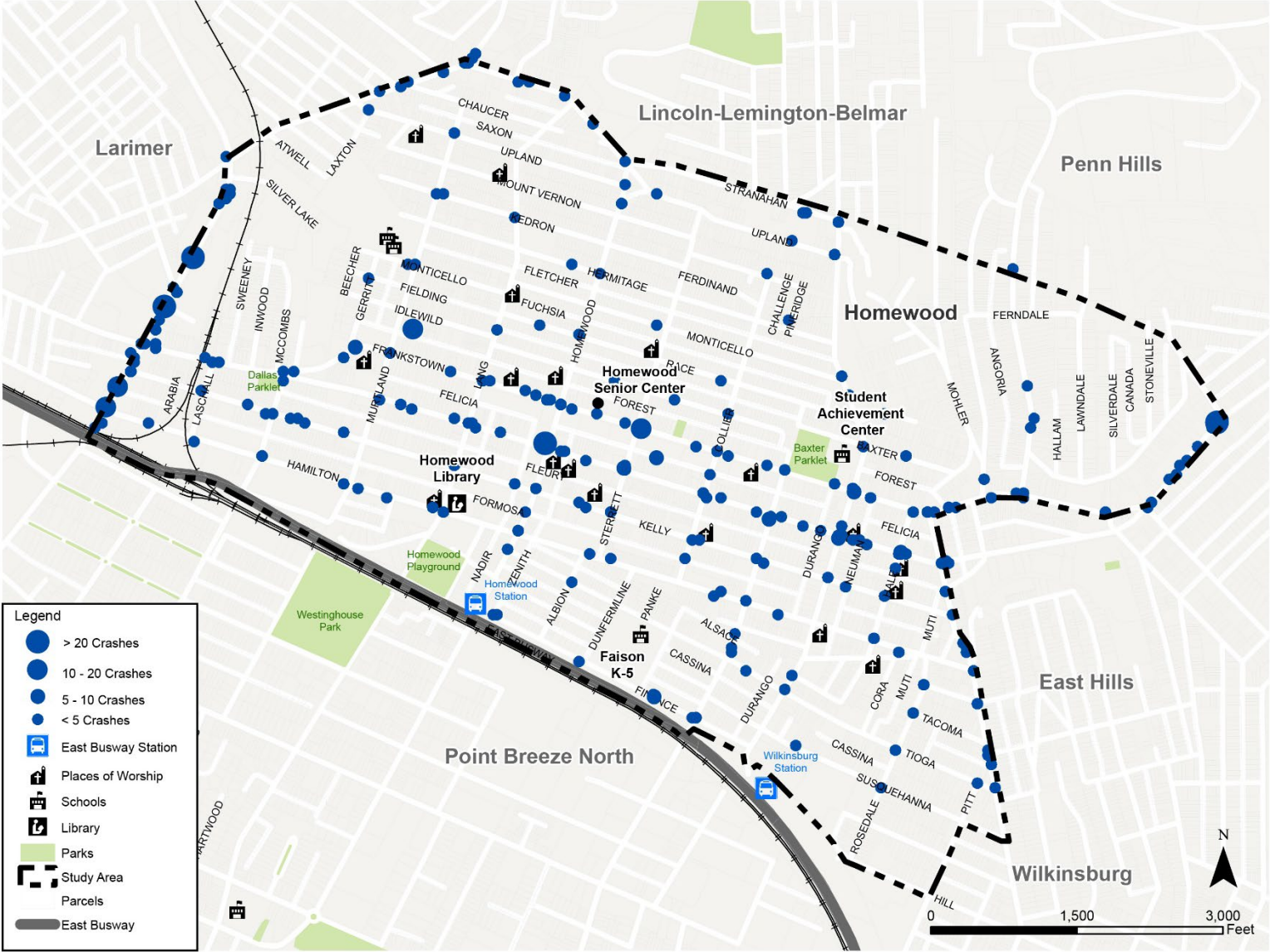


Figure 2: Total Crashes (2017-2019)

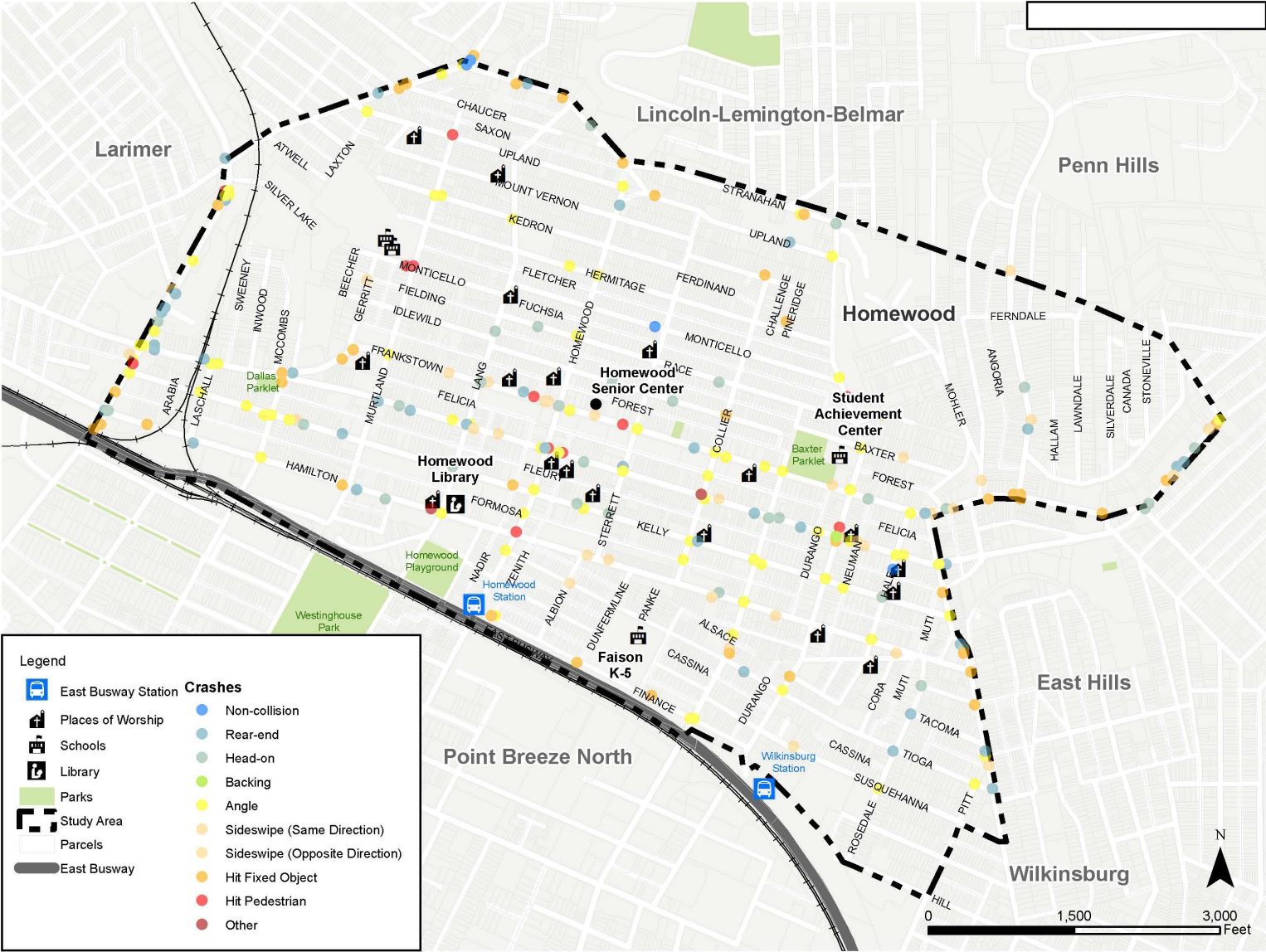


Figure 3: Total Crashes by Crash Type (2017-2019)

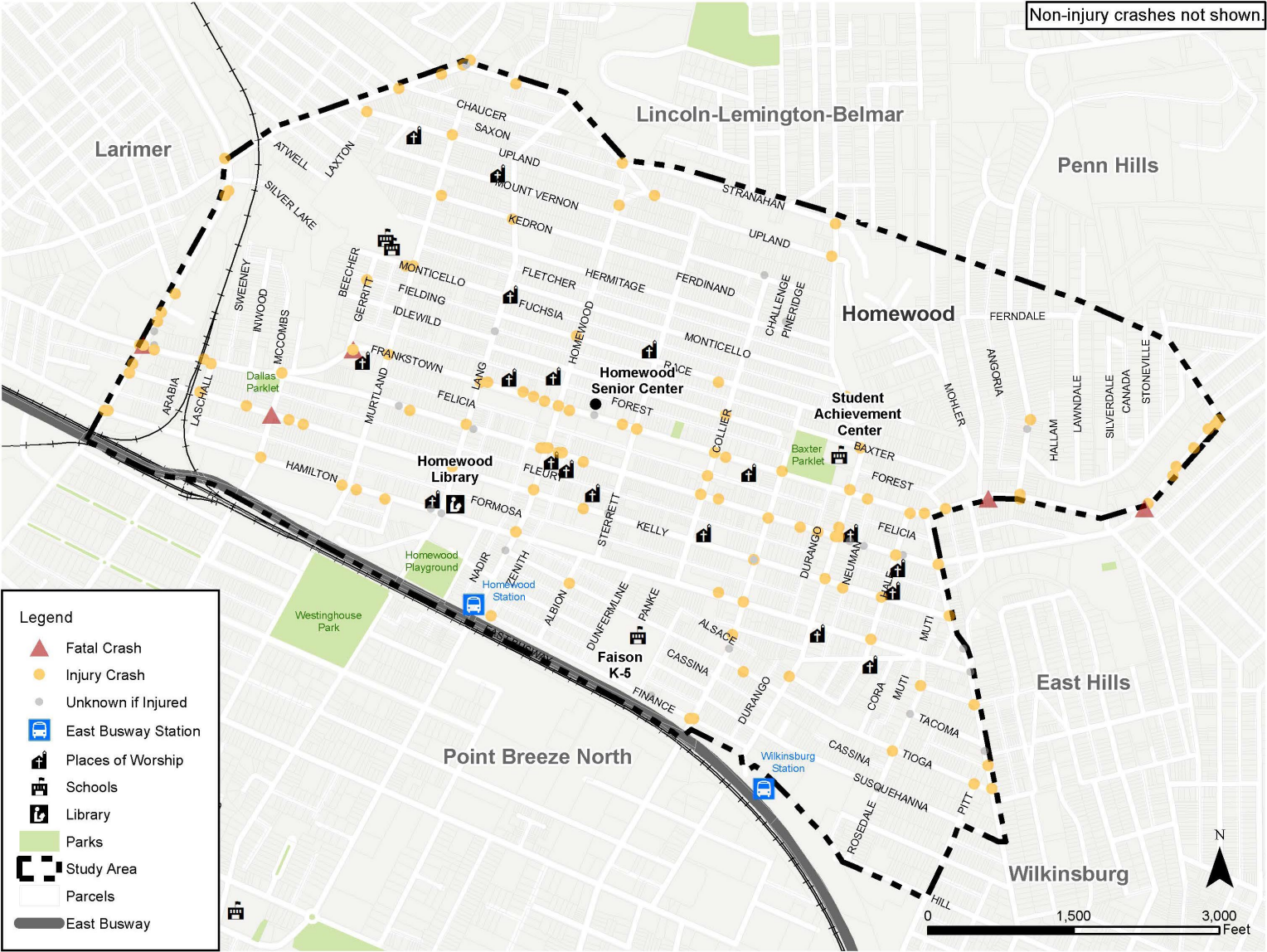


Figure 4: Total Crashes by Crash Severity (2017-2019)



Crash Analysis at Safety Audit Locations

A more detailed analysis of crashes was conducted for the three (3) corridors identified as Safety Audit locations. **Table 3** shows the total number of reported crashes by crash type for each corridor. Total crashes over the three-year reporting period ranged from 27 total crashes on Homewood Avenue to 79 total crashes on Frankstown Avenue. All three corridors reported a high number of angle crashes (11-32 crashes). Detailed crash maps of each Safety Audit location are shown in **Appendix 1**.

Table 3: Safety Audit Location Crashes by Crash Type (2017-2019)

Crash Type	Corridor 1: Homewood Avenue (Hamilton Avenue to Upland Street)	Corridor 2: Frankstown Avenue (5 th Avenue to Sterrett Street)	Corridor 3: Hamilton Avenue Intersections
Non-collision	0	0	0
Rear-end	4	15	4
Head-on	1	8	4
Backing	0	0	0
Angle	19	32	11
Sideswipe (Same Direction)	0	6	3
Sideswipe (Opposite Direction)	0	2	0
Hit Fixed Object	0	10	7
Hit Pedestrian	3	6	2
Other	0	0	0
Unknown	0	0	0
Total	27	79	31

On the Homewood Avenue corridor (just north of Hamilton to Upland Street), 27 total crashes were reported. At the Homewood/Bennett intersection, eleven (11) crashes were reported – nine (9) angle crashes, one (1) rear end crash, and one (1) pedestrian crash. At the Homewood/Frankstown Intersection, fifteen (15) crashes were reported – three (3) of which were pedestrian crashes. Refer to **Table 4**.

Table 4: Safety Audit Location Crashes by Crash Type for Homewood Avenue (2017-2019)

Crash Type	Intersections	
	Bennett/ Homewood	Frankstown/ Homewood
Non-collision	0	0
Rear-end	1	5
Head-on	0	1
Backing	0	0
Angle	9	3
Sideswipe (Same Direction)	0	2
Sideswipe (Opposite Direction)	0	1
Hit Fixed Object	0	0
Hit Pedestrian	0	3
Other	0	0
Unknown	0	0
Total	11	15

On Frankstown Avenue, between 5th Avenue to Sterrett Street, 79 crashes were reported, the highest number of crashes of the three Safety Audit locations. 40 percent (32) of the crashes that occurred on Frankstown Avenue were angle crashes. One of the angle crashes at 5th/Washington/Frankstown resulted in a fatality. Six (6) pedestrian crashes occurred between, Murtland Street to Sterrett Street. Refer to **Table 5**.

Table 5: Safety Audit Location Crashes by Crash Type for Frankstown Avenue (2017-2019)

Crash Type	Intersections			
	5 th /Washington/ Frankstown	Dallas/Bennett/ Frankstown	Gerritt Curve/ Frankstown	Murtland to Sterrett/ Frankstown
Non-collision	0	0	0	0
Rear-end	6	2	0	6
Head-on	3	1	0	4
Backing	0	0	0	0
Angle	13	0	0	17
Sideswipe (Same Direction)	1	0	0	4
Sideswipe (Opposite Direction)	0	0	0	2
Hit Fixed Object	0	2	7	1
Hit Pedestrian	0	0	0	6
Other	0	0	0	0
Unknown	0	0	0	0
Total	23	5	7	40

At four intersections on Hamilton Avenue (5th Avenue, Homewood Avenue, Braddock Avenue, and Oakwood Street-Haverhill Street), 31 total crashes were reported and eleven (11) of these crashes were angle crashes. 20 crashes occurred at the 5th Avenue/Hamilton intersection, nine (9) of these crashes were angle crashes. Three (3) crashes occurred at the Homewood/Hamilton intersection, one (1) rear end crash, one (1) angle crash, and one (1) pedestrian crash. Four (4) crashes occurred at the Braddock Avenue intersection: one (1) head on crash (possible injury), one (1) angle crash (possible injury), one (1) pedestrian crash (injury/unknown severity), and one (1) sideswipe (not injured.) Four (4) crashes occurred at the Oakwood/Hamilton intersection two (2) not injured and two (2) were unknown if injured. A fatal crash occurred at the Oakwood/Hamilton intersection in early 2020. The driver was traveling eastbound on Hamilton Avenue and crashed into the guardrail at the east side of the intersection (not in table). Refer to **Table 6**.

Table 6: Safety Audit Location Crashes by Crash Type for Hamilton Avenue Intersections (2017-2019)

Crash Type	Intersections				Total
	5 th / Hamilton	Homewood/ Hamilton	Braddock/ Hamilton	Oakwood/ Hamilton	
Non-collision	0	0	0	0	0
Rear-end	2	1	0	1	4
Head-on	2	0	1	1	4
Backing	0	0	0	0	0
Angle	9	1	1	0	11
Sideswipe (Same Direction)	1	0	1	0	3
Sideswipe (Opposite Direction)	1	0	0	0	0
Hit Fixed Object	5	0	0	2	7
Hit Pedestrian	0	1	1	0	2
Other	0	0	0	0	0
Unknown	0	0	0	0	0
Total	20	3	4	4	31

SPEED AND MULTIMODAL CONDITIONS

Speed Analysis

Speed data (posted speed limits, 85th percentile speeds, and median speeds) and average daily traffic was obtained from the City of Pittsburgh traffic count data website. Counts were collected February 14, 2020 – February 22, 2020. **Figure 6** shows ten (10) locations where speed and volume data were available in the study area. The project team reviewed this data to inform the selection of safety audit locations, and to understand where speeding is occurring in the neighborhood. **Table 7** shows a summary of the speed data and the average daily traffic and documents the locations where speeding is occurring in the neighborhood. On Frankstown, Bennett, Kelly, Homewood Avenue and Braddock, the 85th percentile

speeds are ten miles higher than the 25 mile per hour posted speed limit (between 34-37 miles per hour). The percent of vehicles traveling over the speed limit on these segments is 75% or higher.

Figure 6: Speed and Volume Data Locations

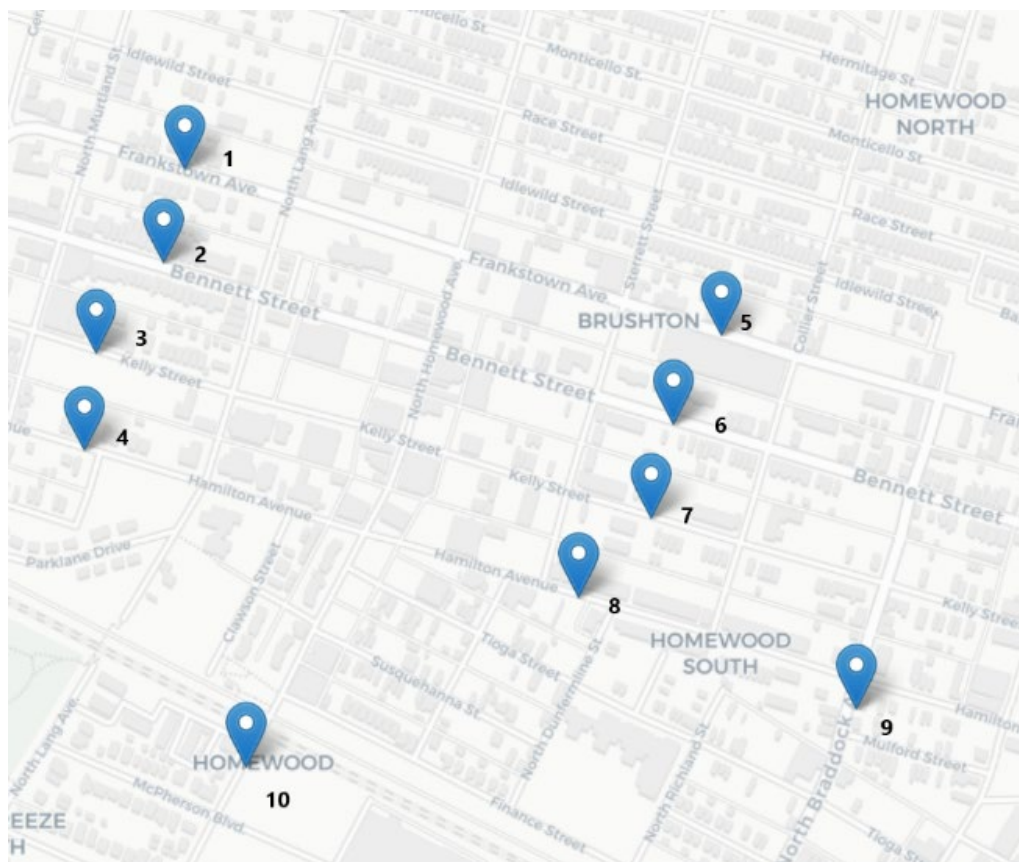


Table 7: Speed Data in Study Area

Location			Average Daily Traffic	Posted Speed Limit (MPH)	Median Speed (MPH)	Percent of Vehicles over Speed Limit	85th Percentile Speed (MPH)
Frankstown	1- Between North Murtland and North Lang	5- Between Sterrett and Collier	5,357	25	29	78%	35
Bennett	2- Between North Murtland and North Lang	6- Between Sterrett and Collier	6,446	25	31	87%	36
Hamilton	4- Between North Murtland and North Lang	8- Between Sterrett and Dunfermline	3,819	25	24	37%	29
Kelly	3- Between North Murtland and North Lang	7- Between Sterrett and Collier	2,253	25	29	75%	34
Braddock	9- South of Hamilton Avenue		7,277	25	32	95%	37
Homewood	10- South of East Busway and Jonathan Place		2,651	25	30	81%	36

Feedback from project stakeholders suggests that speeding is also occurring on Frankstown Road between Homewood and East Hills. Steep topography and ambiguous lane striping lead to high vehicular speeds, confusion for drivers, and conflicts with buses. This street also serves as a walking route for students accessing a nearby school, Faison K-8.

Multimodal Conditions

Sidewalks typically exist on both sides of most streets in the study area; however, many are in poor condition. ADA ramps and striping are present at many intersections. Presently, there are no dedicated bicycle facilities (e.g., bike lanes or cycle tracks) in the study area. BikePGH characterizes Homewood Avenue, Upland Street, Lincoln Avenue, Portions of Frankstown Avenue/Bennett Street, Hamilton Avenue, Dallas Avenue, Braddock Avenue, and Oakwood Street as on-street bike routes; these routes are not designated by the City. There are three (3) Healthy Ride bike share stations housed in the study area. Surface transit facilities consist predominantly of bus stops without bus shelters. The MLK Busway runs at the south of the study area. The Homewood Station provides access to the busway via a well-light elevated platform. A detailed inventory of sidewalk and crosswalk conditions will be completed in Task 2; further transit and bicycle conditions analysis will also be conducted as a part of the task.

FIELD OBSERVATIONS

Conditions in the study area included numerous broken sidewalks and faded pavement markings. **Figure 7** and **Figure 8** show sidewalk conditions and faded pavement markings observed during the site visit. Sidewalk conditions will be inventoried in greater detail in the Task 2 report.



Figure 7: Poor Sidewalk Conditions in Homewood



Figure 8: Faded Pavement Markings in Homewood

Many intersections have ADA accessible ramps at the intersections, even if a sidewalk is currently not present leading to the ramp. In addition, some locations only have a ramp on one side. **Figure 9** displays some of these ramps.



Figure 9: Study Area Ramps

Many streets have cars parked on the sidewalks as shown in **Figure 10**. This may be a result of residents not being comfortable using the parking lane due to high speed neighborhood traffic and subsequent clipping of side mirrors.,



Figure 10: Parking in Homewood

Transit stops are mainly limited to bus stops without shelters throughout the study area. There may be a further demand in some locations for more stops, as evidenced by make-shift benches by the local community, like the one on Hamilton Avenue/Oakwood Street/Havenhill Street shown in **Figure 11**. Some bus stations also were damaged in the study area, like the one shown in **Figure 12** with a missing panel.



Figure 11: Community Created Bus Stop



Figure 12: Bus Stop at Dallas Avenue and Frankstown Avenue

Conditions at night were observed during field visits. In general, the traffic signals which were recently upgraded appear to have newer LED roadway lights installed at the signalized intersections. Other roadway lighting appears to be roadway scale lighting and not pedestrian scale lighting (the only exception noticed was near Homewood Station where pedestrian scale lighting was present). The bridge near Homewood Station also appeared to be well lit. If high pedestrian activity is found near certain transit stops in the next task, there could be specific locations where installing pedestrian scale lighting would benefit the community. Low light levels were observed around a bus at the Lang/Frankstown intersection stopping for passenger alightings, making it difficult to see the pedestrians. The bus shelter near the southeast corner of Hamilton/Fifth also appeared dark during the nighttime site visit. There were many more people out walking on all three study corridors compared to the site visits during the day. Heavy pedestrian activity was observed on Frankstown near the central business area and the Frankstown/Homewood intersection, despite lower observed light levels. Oakwood-Haverhill/Hamilton intersection seems very dark, even with the existing roadway scale streetlights. None of the pedestrian crashes were noted in the data as having occurred with non-lighted streets at night.

NEIGHBORHOOD SAFETY AUDITS

Figure 13 shows where the three Neighborhood Safety Audits were conducted. Methodology for location selection and Safety Audit procedures are summarized in the Methodology section of this memo.

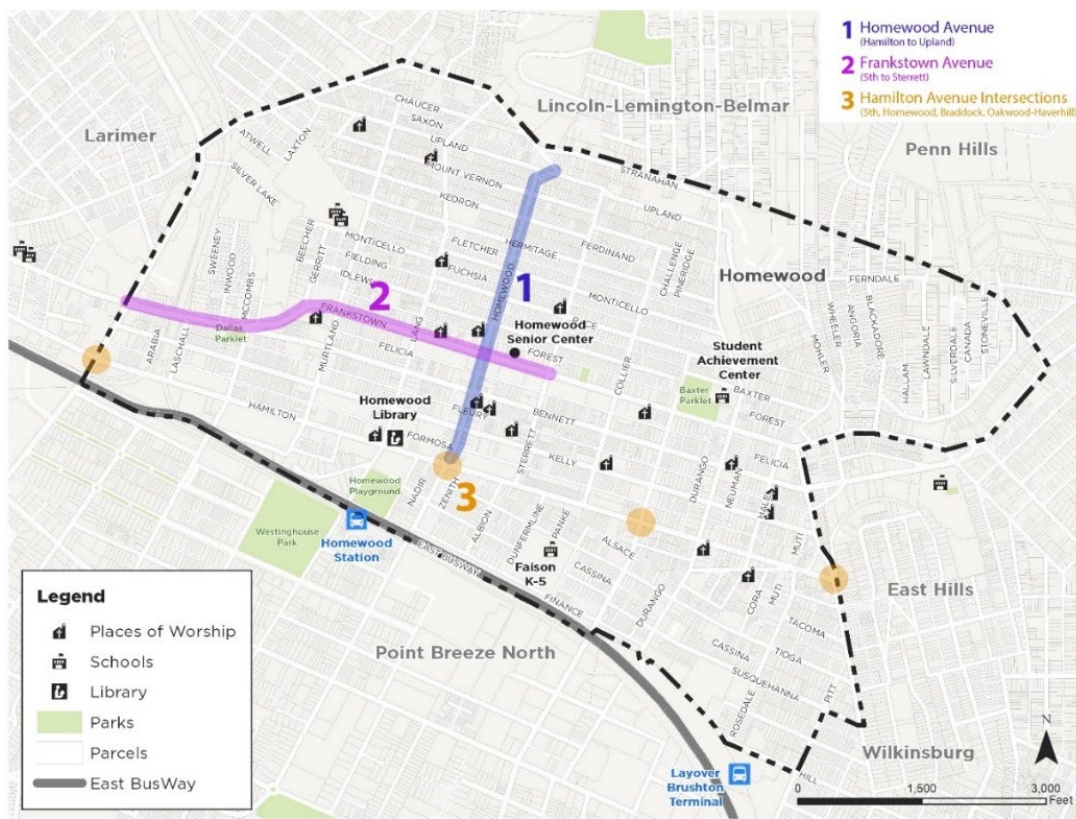


Figure 13: Safety Audit Locations Map

Corridor 1: Homewood Avenue

The Safety Audit on Homewood Avenue was conducted between just north of Hamilton Avenue to Upland Street. The corridor south of Frankstown Avenue is mostly commercial with a mix of active and vacant storefronts and several large surface parking lots. North of Frankstown Avenue, the corridor transitions to residential and institutional uses and is bordered by several vacant parcels. The typical street section consists of a single travel lane in each direction with parallel parking on either side; the posted speed limit is 25 miles per hour. The Port Authority of Allegheny County (PAAC) transit route 74 – Homewood – Squirrel Hill serves this corridor at 35-minute weekday headways. Most intersections along the corridor are stop-controlled; signalized intersections are located in the commercial area at Frankstown Avenue, Bennett Street, and Kelley Street. Homewood Avenue has no dedicated bicycle facilities or signage. The summary of site observations for the Homewood Avenue Corridor are found in

Table 8: Homewood Avenue

Issue	Location	Countermeasure
Poor Sidewalk Conditions: Many side streets which operate as alleyways have no sidewalks. Side streets that do have sidewalks are in very poor condition (gravel, grass, cracked concrete).	• The north side of Bennett Street east of the Bennett/Homewood intersection - overgrown grass, poor sidewalk condition.	Upgrade sidewalks and cut back grass.
	• Frankstown/Homewood intersection – older signal equipment with no pedestrian equipment. Sidewalk is in poor condition on Homewood Avenue just north of Frankstown on the east side of the street.	Upgrade signal equipment to include pedestrian signal heads and upgrade sidewalks.
	• Idlewild Street – sidewalk is in bad condition on the north and south sides of Idlewild (east of Homewood) and on the east side of Homewood north of Idlewild.	Upgrade sidewalks.
	• South of Kedron Street on the east side of Homewood - poor sidewalk conditions.	Upgrade sidewalks.
Parked Vehicles Obscure Intersection Visibility: Many intersections have cars parked on the sidewalk and/or cars parked less than 20 feet from a cross street. This causes potential visibility issues for vehicles	• Hermitage/Homewood intersection – The cross street (Hermitage) has more houses abutting the roadway and there is more parking along the street. There are cars parked right up to the corner of the intersection and on the sidewalk.	Create buffer zone for visibility with parking at intersections.

stopped at stop signs.		
Pavement Marking Issues: Many intersections do not have any pavement markings, such as stop bars at stop signs or crosswalks. Existing crosswalks tend to be faded and/or use parallel lines instead of ladder/high visibility crosswalks.	• Race Street/Homewood intersection – Two-Way Stop Control (TWSC) intersection with no crosswalks across the minor street or stop bars.	Add high visibility crosswalk.
	• Monticello/Homewood intersection – All Way Stop Control (AWSC) intersection with no stop bars or crosswalks on any approaches. Not all approaches have the supplementary “All-Way” plaque below the stop sign. No street sign present.	Add stop bars and high visibility crosswalks to approaches; add plaques and additional street signs.
	• Hermitage/Homewood intersection – AWSC intersection with faded pavement markings and parallel lines crosswalks instead of ladder/high visibility crosswalks.	Upgrade pavement markings; upgrade intersection to a high visibility crosswalk.
	• There are faded shared lane markings (sharrows) in the southern part of Homewood Avenue, but no sharrows are visible north of Hamilton.	Repaint current sharrow markings and add additional ones on corridor.

General Observations

- Generally low pedestrian activity along the corridor; moderate pedestrian activity was observed around the bank/ATM next to the community engagement center south of Homewood Avenue/Kelly Street and at bus stops.
- Transit stops for route 74 are spaced approximately every one-to-two blocks along the Homewood Avenue corridor.
- Heavy pedestrian activity at Homewood/Frankstown intersection; insufficient nighttime lighting due to one of the lights not working.
- The “Walk” pedestrian signal is out in the pedestrian signal head located in the northeast corner (for northbound traveling pedestrians) of the Kelly/Homewood intersection.
- Roadway construction during site walk north of Kedron and south of Upland on Homewood Avenue.
- The ALL WAY plaque (R1-3P) is not present underneath two of the stop signs at the AWSC intersection of Monticello/ Homewood.
- Street light wires are exposed and cut at the northeast corner of Bennett and Homewood.
- Faded bus stop sign in the northwest corner of Hermitage/Homewood intersection.

Safety Audit Photos

Photos from the Safety Audit for Homewood Avenue are shown in **Figure 14 - Figure 19** .



Figure 14: Businesses corridor on Homewood Avenue



Figure 17: Neighborhood Alley on Homewood Avenue



Figure 15: CCAC Homewood – Brushton Center



Figure 18: Sidewalks on Homewood Avenue



Figure 16: Typical Intersection on Homewood Avenue



Figure 19: ADA Crossing on Homewood Avenue

Corridor 2: Frankstown Avenue

The Safety Audit was conducted on Frankstown Avenue from 5th Avenue to Sterrett Street. The corridor is mix of local businesses, institutions including the YWCA, and single and multi-family residential. The blocks between Lang Avenue and Sterrett Street serve as the main commercial corridor for the Homewood Neighborhood with higher pedestrian activity. Commercial uses are also clustered around 5th Avenue. The typical street section consists of a single lane in each direction with parallel parking on either side; the posted speed limit is 25 miles per hour. The Port Authority of Allegheny County (PAAC) transit routes 77 – Penn Hills and 86 - Liberty serve this corridor at 30-minute weekday headways. Most major intersections on the corridor are signalized intersections; Sterrett Street, Gerritt Street, and minor streets are stop-controlled for the streets intersecting with Frankstown Avenue. The list of observations from the Safety Audit are shown in **Table 8**.

Table 9: Frankstown Avenue

Location	Issue	Countermeasure
5 th /Washington /Frankstown Intersection	<ul style="list-style-type: none"> A high number of crashes were reported at this intersection (23 total) of which thirteen (13) were angle crashes. There are currently “No Turn on Red Restriction” signs for vehicle movements traveling in the north and south directions. 	Signal timing should be evaluated further.
	<ul style="list-style-type: none"> Ramps do not appear to be ADA compliant. 	Update ramps.
	<ul style="list-style-type: none"> Pavement markings (crosswalks and stop bars) are faded at this intersection. 	Repaint High Visibility crosswalks and stop bars
Frankstown Ave/Bennett Street/Dallas Street Intersection	<ul style="list-style-type: none"> Excess road space and intersection geometry causes confusing vehicular movements. Frankstown Avenue is approximately 58 to 70 feet wide on the west approach and 38 feet wide on the northeast approach of the intersection. Bennett Street (east approach) is approximately 36 feet wide, and Dallas Avenue (south approach) is 30 feet wide. There is a small median in the center of the intersection that causes westbound vehicles to not travel in a straight line through the intersection. The travel lanes are not properly aligned, and vehicles were observed traveling westbound from the Bennett approach clipping the side of the stop bar/crossing the double yellow centerline on the west approach. An aerial view of the intersection is provided in Figure 20. 	Realign intersection with quick-build materials such as road paint and flexposts

	<ul style="list-style-type: none"> Five crashes occurred at this intersection (two (2) rear end, one (1) head on, and two (2) hit fixed object) which may be a result of the current configuration of the roadway geometry and confusing vehicular movements. 	Evaluate roadway geometry
	<ul style="list-style-type: none"> Signal equipment appears to be recently upgraded. The orange "Don't Walk" pedestrian signal located between Frankstown and Bennett is not working for pedestrians walking northbound across the Bennett leg of the intersection. 	Fix pedestrian signal.
	<ul style="list-style-type: none"> Old utility poles at the intersection that have a white spray painted "X" on them that could be removed. 	Remove old utility pole.
Frankstown Avenue / Gerritt Street Curve	<ul style="list-style-type: none"> No visible pavement markings (crosswalk or stop bar) at the Gerritt Street intersection. An aerial view of the Frankstown/Gerritt curve is displayed in Figure 21. 	Paint stop bars and High Visibility crosswalks.
	<ul style="list-style-type: none"> Seven (7) hit fixed object crashes occurred at the Frankstown/Gerritt curve, one (1) of which was a fatality. Poor vehicle sightline visibility at the curve 	<p>Install daylighting along the curve and at the Gerritt St intersection to enhance visibility for pedestrians and vehicles.</p> <p>Paint parking lane lines to visually narrow the wide travel lanes and to hatch out an area for Sunday only church parking on the south side of the curve.</p>
Murtland/ Frankstown Intersection	<ul style="list-style-type: none"> Old signal equipment. No pedestrian signals or pushbuttons at this intersection. 	Upgrade signal equipment.

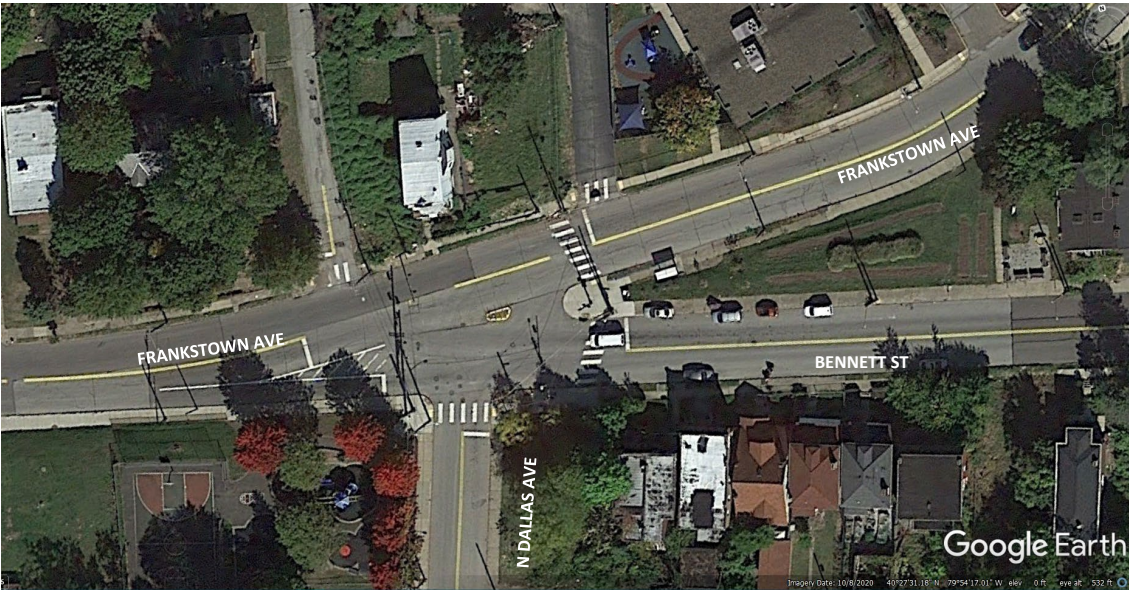


Figure 20. Frankstown Avenue/ Bennett Street/ Dallas Street Intersection Aerial



Figure 21. Frankstown Avenue/ Gerritt Street Curve Aerial

General Observations

- 40 of the reported crashes on the Frankstown Avenue corridor occurred between Murtland and Sterrett Streets. Nearly half of the crashes (17) were angle crashes at Murtland, Lang, Homewood, and Sterrett.) Six (6) of the crashes on Frankstown were pedestrian crashes. This section of Frankstown Avenue is the business corridor for the neighborhood and high pedestrian activity and community gatherings were observed during the site visit.
- Unwelcoming underpass west of La Schall Street – poor sidewalk condition, insufficient lighting.
- Significant pedestrian activity between Lang and Sterrett.
- Cars parked on sidewalks and close to intersections.
- Faded pavement markings (stop bars, and crosswalks).

Safety Audit Photos

Photos from the Safety Audit for Frankstown Avenue are shown in **Figure 22 - Figure 25**.



Figure 22: Busy Pedestrian Corner on Frankstown Avenue



Figure 24: Crossing on Frankstown Avenue



Figure 23: Sidewalk on Frankstown Avenue



Figure 25: Dallas/Frankstown Intersection

Corridor 3: Hamilton Avenue Intersections

Safety Audits were conducted on Hamilton Avenue at four (4) intersections: Hamilton/5th Avenue, Hamilton/Homewood Avenue, Hamilton/Braddock Avenue, and Hamilton/Oakwood Street-Haverhill. Each of these intersections is signalized and most have a single lane that serves as the left, right, and thru movement for each direction. The typical street section throughout the corridor consists of a single lane in each direction with parallel parking on either side; the posted speed limit is 25 miles per hour. The Port Authority of Allegheny County (PAAC) transit route 71D – Hamilton serves this corridor at 15-minute weekday headways. **Table 9** shows the issues and potential countermeasures. The Safety Audit observations for this corridor are as follows.

General Corridor Observations

- Speeding vehicular traffic.
- Cars parked on sidewalks and close to intersections.
- Faded pavement markings (stop bars, crosswalks, shared lane markings.)
- Street is not comfortable for bicycles.

Table 10: Hamilton Avenue

Location	Issue	Countermeasure
Hamilton / 5 th	<ul style="list-style-type: none"> • A high number of crashes were reported at this intersection (23 total) of which thirteen (13) were angle crashes. There are currently “No Turn on Red Restriction” signs for vehicle movements traveling in the north and south directions. 	N/A
	<ul style="list-style-type: none"> • 5th Avenue/Washington is a two-way two-lane roadway with no left-turn lanes. The northbound left turn lane has a short, protected phase and then has permitted phases for the northbound and southbound left turns. At various time periods it was observed that left-turning vehicles are trying to judge the gap while turning left, but their view may be obscured by vehicles in the opposing left-turn lane. This could contribute to the high number of angle crashes (this intersection has 16 total crashes, of which nine were angle crashes). 	Signal timing should be evaluated further.
	<ul style="list-style-type: none"> • Wide intersection curb radii in the southeast corner of the intersection. Vehicles appear to travel fast around this corner. 	Install cur extensions or adjust curb radius to slow down cars.

	<ul style="list-style-type: none"> • Curb ramps do not appear to be ADA Compliant. 	Upgrade curb ramps.
	<ul style="list-style-type: none"> • Pedestrian signal is on recall, there are no pedestrian pushbuttons. 	Add pedestrian push buttons.
	<ul style="list-style-type: none"> • There are “Share the Road” signs on the east and west side of the intersection along Hamilton Avenue, but no shared lane pavement markings are visible. 	Add sharrow road markings.
	<ul style="list-style-type: none"> • There are multiple Bus Stops in the southeast corner of the intersection and further east along Hamilton 215 feet. 	Evaluate consolidating bus stops.
	<ul style="list-style-type: none"> • Lack of adequate street lighting 	Upgrade lighting (.).
	<ul style="list-style-type: none"> • AM peak observations: Observed vehicle traffic traveling in the eastbound direction; coming from the south going right, very few vehicles fully stop on red. 	Evaluate red light camera.
	<ul style="list-style-type: none"> • Excess road space and intersection geometry causes confusing vehicular movements. Frankstown Avenue is approximately 58 to 70 feet wide on the west approach and 38 feet wide on the northeast approach of the intersection. Bennett Street (east approach) is approximately 36 feet wide, and Dallas Avenue (south approach) is 30 feet wide. There is a small median in the center of the intersection that causes westbound vehicles to not travel in a straight line through the intersection. The travel lanes are not properly aligned, and vehicles were observed traveling westbound from the Bennett approach clipping the side of the stop bar/crossing the double yellow centerline on the west approach. An aerial view of the intersection is provided in Figure 20. 	Realign intersection.
	<ul style="list-style-type: none"> • Signal equipment appears older than others in the neighborhood – rusted poles, etc. There are no pedestrian signal heads and no pedestrian pushbuttons present at this signal. There are no Detectable Warning Surfaces (DWS) at the ramp in the southwest corner of the intersection. The other three ramps have DWS but are Apex ramps. 	Upgrade signal equipment.
	<ul style="list-style-type: none"> • Faded shared lane markings south of the intersection on Homewood. 	Repaint shared lane markings
	<ul style="list-style-type: none"> • Sidewalk is in poor condition on the south side of Hamilton west of the intersection. 	Upgrade sidewalks.

Hamilton / Oakwood / Haverhill	<ul style="list-style-type: none"> Conflicting parking signs on the south side of the intersection. 	Remove improper sign.
Hamilton / Braddock	<ul style="list-style-type: none"> Signal appears to be recently upgraded. 	N/A
	<ul style="list-style-type: none"> Pavement marking is worn out at this intersection and specifically across the south approach (Stop bar and crosswalk). 	Repaint High Visibility crosswalks and stop bars.
	<ul style="list-style-type: none"> Poor visibility of Pedestrian signal heads crossing East/West across the south approach due to utility poles in the pedestrian access route. (Old utility poles at the intersection that have a white spray painted "X" on them which might be marked for removal, in addition to newer appearing utility poles). 	Upgrade pedestrian signal heads.
Hamilton / Oakwood / Haverhill	<ul style="list-style-type: none"> Vehicles observed at this intersection do not fully stop at the stop signs. 	Evaluate red light cameras.
	<ul style="list-style-type: none"> Oakwood is approximately 36 feet wide and there are no painted centerlines resulting in wide vehicular travel lanes and longer pedestrian crossing distance. 	Create pedestrian refuge and stripe center lines.
	<ul style="list-style-type: none"> There appears to have been a fatal crash in April 2020 at the intersection where the driver was traveling eastbound on Hamilton Street and crashed into the guardrail on the east side of the intersection. This intersection is a three way stop controlled intersection and there is a steep incline where the individual crashed. 	Evaluate sight distances.
	<ul style="list-style-type: none"> Visibility on all approaches is poor due to steep grades for all approaches. The north and west approaches are an incline. 	Evaluate sight distances.
	<ul style="list-style-type: none"> Visibility is also compromised due to vehicles parking close to the intersection on the southwest corner of the intersection both on the right side of the west approach and the left side of the south approach (obscuring the visibility of oncoming vehicles for both eastbound and northbound traveling vehicles). 	Create no parking zones near the intersection.
	<ul style="list-style-type: none"> Ramps do not appear to be ADA compliant and while there is a crosswalk across the south approach of the intersection, there is no ramp at the east side of the crossing. The 	Upgrade to ADA facilities.

	sidewalk is not present on the east side of the intersection north of Hamilton Avenue.	
	<ul style="list-style-type: none"> • Mulford Street – West of the intersection there is a cut through street which has limited to no visibility of vehicles traveling west on Hamilton Street from the study intersection. 	Cut back brush near roadway.

Hamilton/5th Avenue

- Photos from the site visit for this intersection are shown in **Figure 26** and **Figure 27**.



Figure 26: Intersection



Figure 27: Bus Stop Sign at Intersection

Hamilton/Homewood Avenue

- Photos from the site visit for this intersection are shown in **Figure 28** and **Figure 29**.



Figure 28: Intersection



Figure 29: Crosswalk at Intersection

Hamilton/Braddock Avenue

- Photos from the site visit for this intersection are shown in **Figure 31** and **Figure 32**.



Figure 30: Intersection



Figure 31: Crosswalk at Intersection

Hamilton/Oakwood Street/Haverhill Street

- Photos from the site visit for this intersection are shown in **Figure 32** and **Figure 33**.



Figure 32: Intersection



Figure 33: Crosswalk at Intersection

SUMMARY OF FINDINGS

A list of high level of findings for the study area is provided below.

- A total of four hundred twenty-four (424) crashes occurred in the study area between the years 2017-2019. The majority of the crashes were angle crashes (172) followed by rear end crashes (66) and hit fixed object (64).
- Common operational challenges and design issues that potentially contributed to crashes include a lack of painted stop bars and high visibility crosswalks, poor sightlines at intersections due to parked cars or topography, confusing intersection geometry, permissive left turn phasing, midblock pedestrian crossings due to poor sidewalk condition and/or lack of sidewalks, lack of dedicated bicycle facilities, and lack of pavement markings that clearly delineate vehicular travel lanes and slow traffic.
- Speeding vehicular traffic is documented on multiple streets including Homewood Avenue, Hamilton Avenue, Frankstown Avenue, Bennett Street, Kelly Street, and Braddock Avenue.
- Pavement markings (stop bars, crosswalks, shared lane markings) throughout the study area are missing or faded.
- Existing crosswalks tend to be two parallel lines instead of high visibility crosswalks.
- Many sidewalks are in poor condition.
- Many intersections have ADA accessible ramps at the intersections, even if a sidewalk is currently not present leading to the ramp.
- Most neighborhood streets experience speeding vehicular traffic, leading residents to park on the sidewalks to avoid having their mirrors clipped.
- Intersection visibility is compromised due to cars parked too close to the intersection and on the sidewalk.
- Heavy pedestrian activity was observed on Frankstown Avenue near the central business area and the Frankstown/Homewood intersection.
- Recently upgraded traffic signals provide adequate nighttime lighting at intersections; some locations would benefit from increased pedestrian scale lighting.
- Excess road space and confusing intersection geometry at the Frankstown/Bennett Street/Dallas Street intersection.
- Steep topography and ambiguous lane striping on Frankstown Road between Homewood and East Hills lead to high vehicular speeds, confusion for drivers, and conflicts with buses.
- Unwelcoming underpasses west of La Schall Street on Frankstown Avenue and Hamilton Avenue – poor sidewalk condition and insufficient lighting.
- Bennett Street and Brushton Avenue has several high activity institutions that could benefit from enhanced sidewalk/curb space for pedestrians and pop-up events.

Potential Improvements

Kittelton developed a variety of potential improvements to respond to issues noted throughout the three study area. These include:

- Signing and Pavement Marking improvements:
 - Install stop bars and high visibility crosswalks.
 - Install daylighting at intersections to enhance visibility for drivers and pedestrians and to encourage vehicles to not park on the sidewalk.
 - Install double yellow centerline at intersections.
 - Install shared lane markings (sharrows).
 - Install “All-Way” (R1-3P) plaques under stop signs at All-Way Stop Controlled intersections.

- Traffic calming improvements to slow vehicle speeds:
 - Install speed humps.
 - Stripe parking lanes to visually narrow the roadway.
 - Install curb extensions at intersections using road paint and flexible delineator posts.
- Other Pedestrian Safety improvements:
 - Underpass improvements such as, adding lighting, sidewalk upgrades, and public art.
 - Install Bus Shelters at highly used transit stops.
 - Pedestrian scale lighting in high pedestrian activity areas (long-term improvement).

FHWA has numerous Safety Countermeasures applicable to the Homewood Neighborhood that can be implemented to improve safety. For example, enhanced signing and pavement markings at stop-controlled intersections within a jurisdiction increases driver awareness of potential conflicts. This is applicable to Homewood for the recommendation to add stop bars throughout the area. The removal of vegetation, parking or other obstruction that limits sight distance is another proven safety countermeasure. These simple measures can lead to a 10% reduction in injury and fatal crashes and 15% reduction in nighttime crashes. Specific countermeasures that may be applicable to locations in Homewood are as follows:

- Yellow Clearance Interval Review:
https://safety.fhwa.dot.gov/provencountermeasures/yellow_xhg_intervals/
- Walkways: <https://safety.fhwa.dot.gov/provencountermeasures/walkways/>
- Backplates with Retroreflective Borders:
<https://safety.fhwa.dot.gov/provencountermeasures/blackplate/>
- Systemic Application of Multiple Low-Cost Countermeasures at stop-controlled intersections:
https://safety.fhwa.dot.gov/provencountermeasures/syst_stop_control/

Per FHWA, speed is a main determining factor in fatality and serious injury crashes for pedestrians. As the neighborhood data displayed a trend of speeding, traffic calming (i.e., curb bumpouts) could effectively manage some of the speeding currently occurring in the neighborhood.

Other potential safety improvements that may be considered for Homewood are as follows:

-
- Upgrade non-compliant ADA ramps
- Improve underpasses (lighting, sidewalk, aesthetics)
- Realign Bennet/Dallas intersection and use pavement markings and delineator posts to direct vehicle movements
- Hamilton/Fifth geometric and signal timing adjustments
- Make restaurant curbside space more permanent through the City's Streeter program.

These summary findings and potential improvements will be investigated further in Task 2 along with recommendations for improved access to bicycle, pedestrian, and transit facilities.

Appendix 1 Detailed Crash Maps for Safety Audit Locations