VDOT Virginia Department of Transportation

ROAD SAFETY AUDITS

ROUTE 17 AND SUGAR HILL ROAD
CARROLLTON, VIRGINIA

September 2023

vhb

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Acronyms

AADT – annual average daily traffic

AASHTO – American Association of State Highway and Transportation Officials

ADA – Americans with Disabilities Act

APN – Arterial Preservation Network

CMF – crash modification factor

CRF – crash reduction factor

FHWA – Federal Highway Administration

HOA – Homeowners Association

HSM – Highway Safety Manual

IA – Interim Approval

ICWS – Intersection Conflict Warning System

IIM – Instructional and Informational Memoranda

MPH – miles per hour

MUTCD – Manual on Uniform Traffic Control Devices for Streets and Highways

NCHRP – National Cooperative Highway Research Program

RCUT – Restricted Crossing U-Turn

RSA – road safety audit

RDM – Road Design Manual

TMC – turning movement counts

TOSAM – Traffic Operations and Safety Analysis Manual

VDOT – Virginia Department of Transportation

VPD – vehicles per day

Applicable Guidance and Standards

Manual on Uniform Traffic Control Devices (MUTCD), 2009
https://mutcd.fhwa.dot.gov/

MUTCD Interim Approval for Optional Use of an Alternative Signal Warrant 7 – Crash Experience (IA-19)
https://mutcd.fhwa.dot.gov/resources/interim_approval/ia19/index.htm

AASHTO Policy on Geometric Design of Highways and Streets, 2018
https://store.transportation.org/item/collectiondetail/180

AASHTO Highway Safety Manual (HSM), 2010
https://www.highwaysafetymanual.org/

VDOT IIM-TE-387 Signal Justification Reports (SJRs) For New and Reconstructed Signals
https://www.virginiadot.org/business/resources/iim/te-387_signal_justification_reports.pdf

VDOT IIM-TE-390 Guidance on Light Emitting Diode (LED) Exterior Lighting
https://www.virginiadot.org/business/resources/IIM/TE-390_LED_Lighting.pdf

VDOT Road Design Manual
https://www.virginiadot.org/business/locdes/rdmanual-index.asp

VDOT Supplement to the MUTCD (Version 1)
https://www.virginiadot.org/business/virginia_mutcd_supplement.asp

1. Introduction

1.1. Study Purpose

This report summarizes the findings of a Road Safety Audit (RSA) for the intersection of Route 17 and Sugar Hill Road, which was initiated in response to the community regarding safety concerns with turning movements on and off Sugar Hill Road. The purpose of the study is to identify safety risks and develop potential improvements to address the safety of all road users.

The study team has compiled this report to evaluate potential safety enhancements and understand trade-offs for potential treatments. Safety improvement countermeasures outlined in this report may not all be feasible; thus, engineering assessments and additional field evaluations are likely needed to determine implementation needs. The evaluation focuses on a prioritized list of safety improvements and includes the identification of implementation time frame, dependency on other countermeasures/factors, potential benefits, and potential constraints or challenges.

1.2. Study Area

The study area consists of the intersection of Sugar Hill Road and Route 17 (Carrollton Boulevard). This intersection is situated in Carrollton, Virginia within the Isle of Wight County. Route 17 (Carrollton Boulevard) runs north/south and Sugar Hill Road runs east/west. Route 17 is a principal arterial on Virginia Department of Transportation's (VDOT) Arterial Preservation Network (APN).[1] This means that Route 17 is a critical roadway to the transportation of people and goods on a regional and State-level. Because of this, VDOT in coordination with local partners look to preserve the corridor by adopting innovative solutions to enhance mobility, safety and operations of roadway.[2]

An overview of the study area is shown in Figure 1. The surrounding area primarily consists of some residential neighborhoods and some scattered commercial properties. Trip generators in the study area include the residential neighborhoods present off Sugar Hill Road, Finley's General Store, Oak Grove United Methodist Church, and Studio 17 Dance School on the northern part of the intersection and offices and small commercial businesses to the south. During the past few years, the Founders Pointe neighborhood was fully built out and a small multi-family development was constructed, thus increasing traffic volumes on Sugar Hill Road.

[1] Virginia Department of Transportation. "VDOT Arterial Preservation Program". https://www.virginiadot.org/programs/vdot_arterial_preservation_program.asp
[2] Virginia Department of Transportation. "VDOT Arterial Preservation Program".



Figure 1. Overview of Study Area

1.3. RSA Details

To identify potential safety improvements, the project team held an RSA, which included data analysis, a field review, and post field review analysis. The study team conducted the RSA on Wednesday, June 28, 2023, from 9:30 am to 11:30 am. The site conditions were sunny, hot, and humid.

1.4. RSA Attendees

- Tommy Catlett (VDOT)
- Jason Fowler (VDOT)
- Nathan Milaszewski (VDOT)
- Glenn Hott (VDOT)
- Paul Matticks (VDOT)
- Thomas Elswick (Isle of Wight County)
- Paul Kafer (Founders Pointe HOA representative)
- Clinton Jenkins (State Delegate)
- Taylor Bonner (VHB)
- Colby Schneider (VHB)
- Kirsten Tynch (VHB)

2. Existing Conditions

2.1. Study Area Characteristics

The study intersection is an unsignalized T-intersection with a stop-controlled approach on Sugar Hill Road and no traffic control on Route 17. There are no pedestrian or bicyclist facilities in the area. During the field review meeting it was noted that as properties are redeveloped in the area, sidewalks are required. The land use in the area is suburban and consists of low-density residential, medium-density residential, and commercial uses. The characteristics of the intersection are shown in Table 1.

Table 1. Intersection Characteristics by Approach

Characteristics	Route 17 (Carrollton Boulevard)	Sugar Hill Road
Orientation	North-South	East-West
Functional Classification	Principal Arterial	Local
Annual Average Daily Traffic (AADT) in 2021 (vehicles per day)	15,000	1,000
Speed Limit (miles per hour)	55	35
Number of Lanes	2 in each direction	1 in each direction
Lane Widths (feet)	10′ left turn lanes 11′ right turn lane 11′ through lanes	10′ left turn lane 12′ right turn lane 12′ receiving lane
Roadway Features	• Grass/Raised Concrete Median • Elevated northbound lanes • Horizontal curve on southbound approach	• Driveways to Finley's General Store and Studio Seventeen Dance within 100′ from the intersection
Distance from adjacent signalized intersections (feet)	Approx. 1900′ to the north Approx. 1400′ to the south	
Land Uses	Low-density residential, medium-density residential, commercial, institutional	

2.2. Crash History

Through the RSA, it is crucial to examine both motorized and non-motorized vehicle crashes to obtain a comprehensive understanding of how the intersection operates. Crash data was collected from March 2018 through March 2023 to obtain 5 full years of data for review. The most common crash type at the intersection was angle crashes involving a turning movement. Specifically, 9 of the 15 crashes involved a vehicle making a left turn from Sugar Hill Road. Figure 3 shows the crash diagram of the study area.

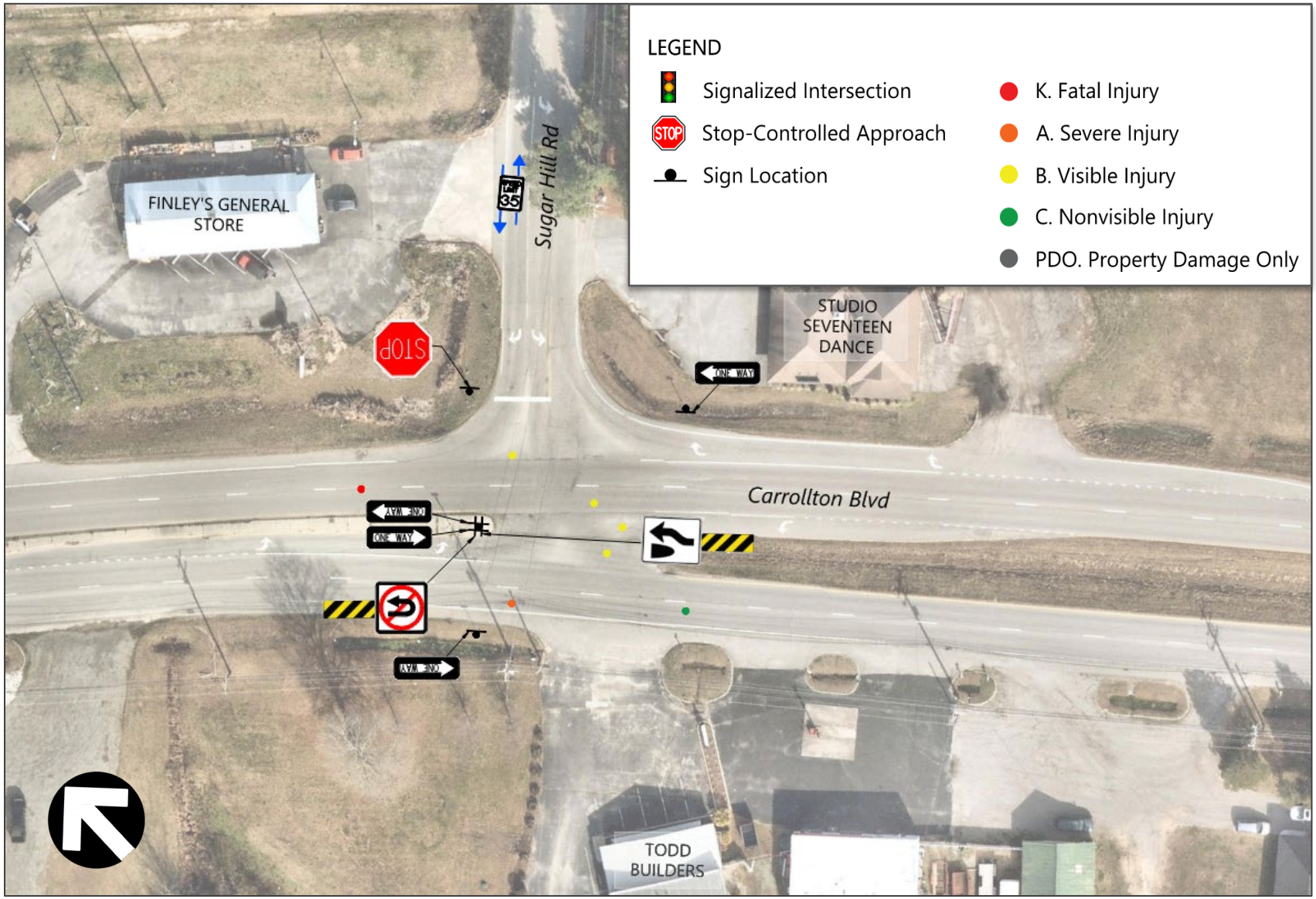


Figure 2. Existing Conditions Map

VDOT ROAD SAFETY AUDITS
ROUTE 17 AND SUGAR HILL ROAD

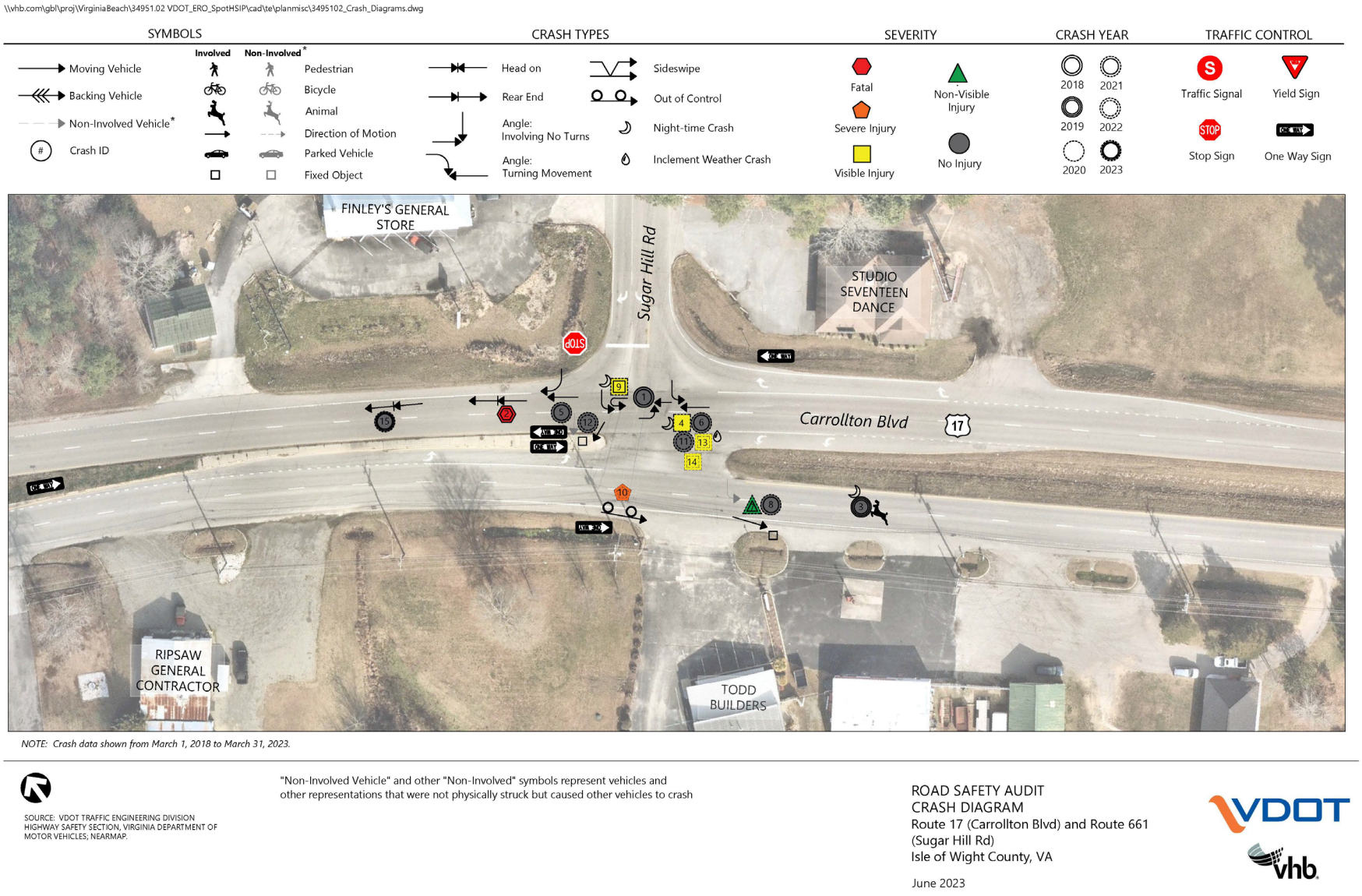


Figure 3. Crash Diagram for Route 17 and Sugar Hill Road

As shown in Figure 3, the intersection experienced a fatal crash in 2018 and multiple injury crashes in 2021 and 2022. Figure 4 breaks down the crash types by year, which reveals the uptick in angle crashes since 2021. The two fixed object crashes in 2021 also involved vehicles avoiding a collision when vehicles turning left from Sugar Hill Road entered their lane while traveling southbound on Route 17. Lighting and weather conditions at the time of the crash are shown in Figure 5, which reveals that most of the crashes occurred in the daylight (12/15) in dry conditions (14/15).

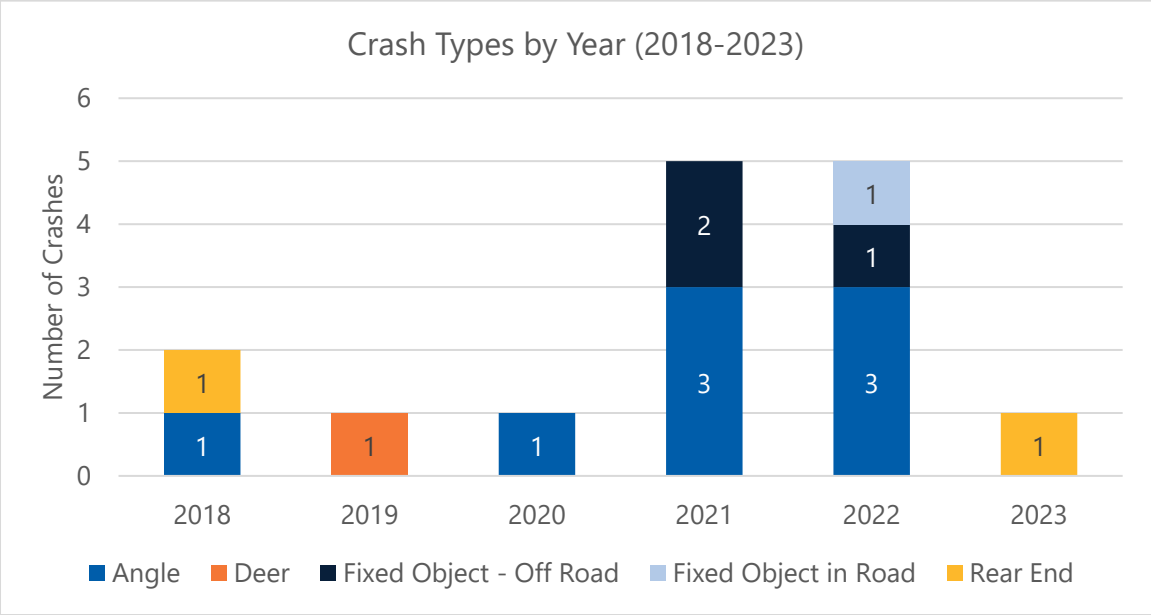


Figure 4. Crash Severity in the Study Zone (2018-2023)

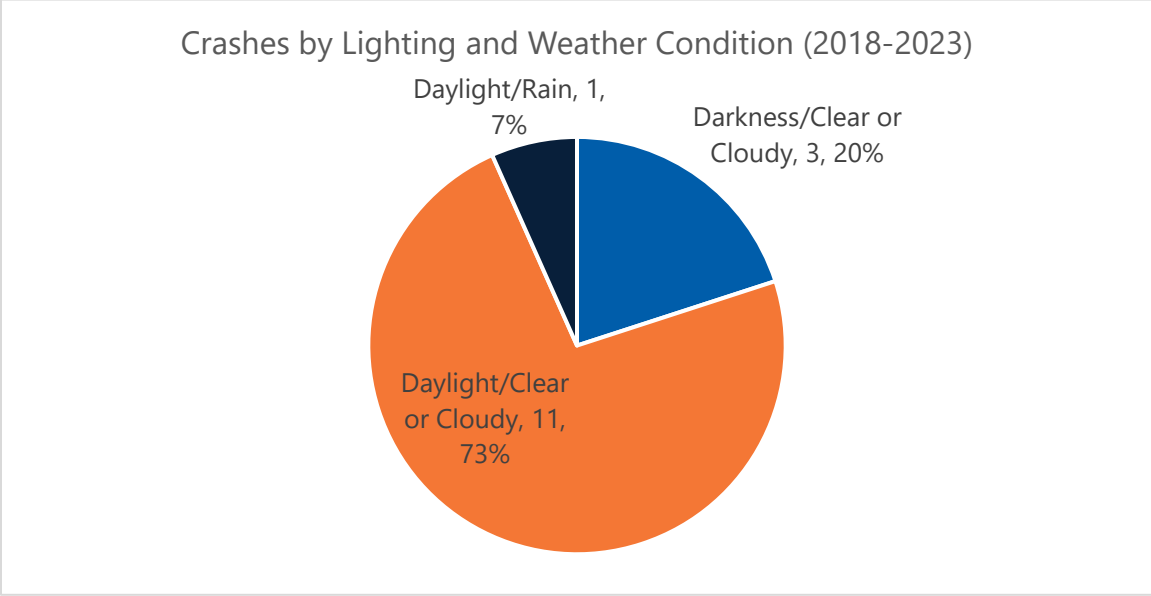


Figure 5. Lighting and Weather Condition During Crashes (2018-2023)

Additionally, 6 crashes (all involving left turns from Sugar Hill Road) occurred during the PM peak between 3:00 pm and 6:00 pm as shown in Figure 6. There was no significant difference to time of year for the crashes. However, January had the most crashes (3) as shown in Figure 7.

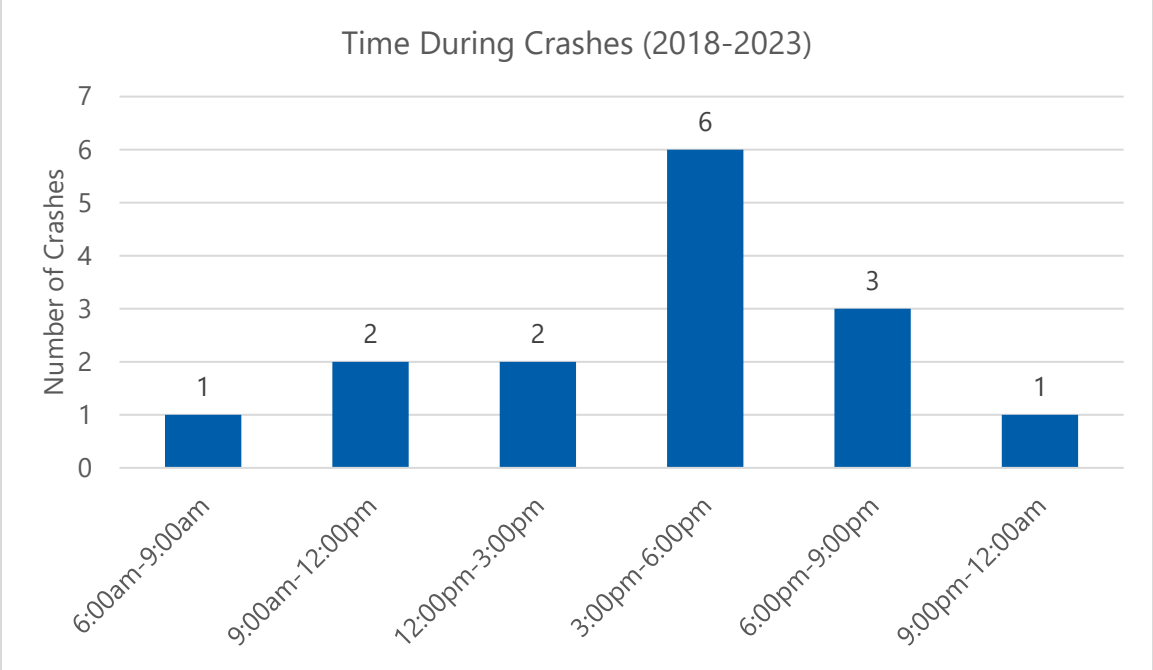


Figure 6. Crash Time in the Study Zone (2018-2023)

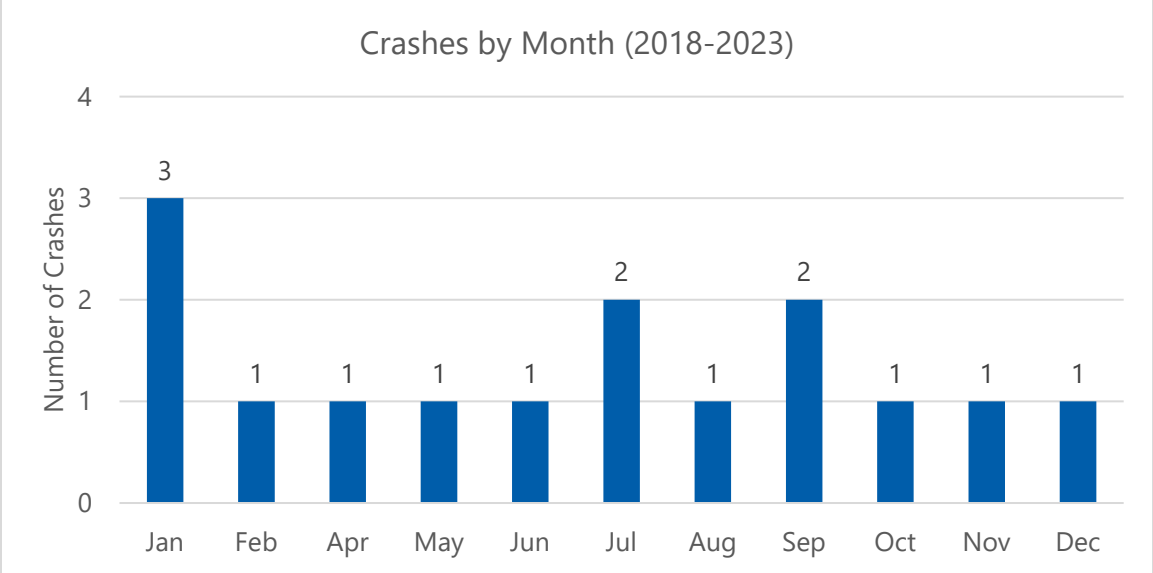


Figure 7. Crash Month in the Study Zone (2018-2023)

2.3. Traffic Data

2.3.1.Turning Movement Counts

Understanding travel patterns is essential to the study as potential treatments at the intersection may require movements to be reassigned to intersections upstream. Additionally, a crash pattern involving left turning vehicles from Sugar Hill Road and northbound Route 17 vehicles is predominant in afternoon and evening hours. Table 2 and Table 3 show the peak hour volumes for the intersection identified using 16-hour turning movement traffic counts collected on Thursday, June 9, 2022.

Table 2. AM Peak Volumes (Cars and Trucks Combined)

	Business Entrance *Eastbound*			**Sugar Hill Road *Westbound***			**Route 17 *Southbound***			**Route 17 *Northbound***		
Start Time	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**
7:00 AM	0	0	0	22	0	32	9	183	0	0	136	2
7:15 AM	1	0	0	18	0	24	15	186	0	1	138	2
7:30 AM	0	0	0	13	0	36	5	209	0	0	152	7
7:45 AM	0	0	0	13	0	23	8	170	0	0	141	6
Total	**1**	**0**	**0**	**66**	**0**	**115**	**37**	**748**	**0**	**1**	**567**	**17**

Table 3. PM Peak Volumes (Cars and Trucks Combined)

	Business Entrance *Eastbound*			**Sugar Hill Road *Westbound***			**Route 17 *Southbound***			**Route 17 *Northbound***		
Start Time	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**
4:45 PM	0	0	0	4	0	23	26	282	0	0	287	12
5:00 PM	0	0	0	5	0	31	38	250	0	3	349	13
5:15 PM	0	0	0	10	0	24	39	299	0	0	330	7
5:30 PM	0	0	0	14	0	19	32	281	0	0	355	18
Total	**0**	**0**	**0**	**33**	**0**	**97**	**135**	**1112**	**0**	**3**	**1321**	**50**

The noteworthy left turning volumes from this sample include left turns out of Sugar Hill Road (66 in the AM Peak, 33 in the PM Peak) and left turns off Route 17 southbound (37 in the AM Peak, 135 in the PM Peak). Both movements face significant opposing traffic in the PM peak hour, which had 1,321 vehicles traveling northbound and 1,112 vehicles traveling southbound on Route 17.

With this considered, measures that improve the safety of those high-demand left turning movements while potentially restricting those low-demand turning movements, can achieve an overall safer arrangement for the intersection while having little effect on mobility.

Figure 8 shows the left turn volumes from Sugar Hill Road along with the respective opposing movement volumes (listed in red) to identify times when such left turns are most inhibited by opposing traffic.

Movement	7:00 AM	7:15 AM	7:30 AM	7:45 AM	8:00 AM	8:15 AM	8:30 AM	8:45 AM	9:00 AM	9:15 AM	9:30 AM	9:45 AM
Sugar Hill Rd Left	22	18	13	13	14	18	13	3	7	8	7	10
US-17 SB Left and Thru	192	201	214	178	167	153	148	143	145	126	122	143
US-17 NB Left and Thru	134	137	152	142	151	131	157	127	96	120	120	119

Movement	10:00 AM	10:15 AM	10:30 AM	10:45 AM	11:00 AM	11:15 AM	11:30 AM	11:45 AM	12:00 PM	12:15 PM	12:30 PM	12:45 PM
Sugar Hill Rd Left	7	9	7	11	8	10	11	6	11	7	10	7
US-17 SB Left and Thru	136	146	137	152	141	138	128	135	141	138	129	135
US-17 NB Left and Thru	133	123	134	116	118	109	129	122	127	140	109	147

Movement	1:00 PM	1:15 PM	1:30 PM	1:45 PM	2:00 PM	2:15 PM	2:30 PM	2:45 PM	3:00 PM	3:15 PM	3:30 PM	3:45 PM
Sugar Hill Rd Left	12	5	6	5	6	2	7	12	10	8	9	8
US-17 SB Left and Thru	169	148	161	152	142	167	178	176	243	170	205	235
US-17 NB Left and Thru	136	125	122	137	129	120	193	200	193	217	226	203

Movement	4:00 PM	4:15 PM	4:30 PM	4:45 PM	5:00 PM	5:15 PM	5:30 PM	5:45 PM	6:00 PM	6:15 PM	6:30 PM	6:45 PM
Sugar Hill Rd Left	8	7	9	4	5	10	14	6	7	15	2	6
US-17 SB Left and Thru	238	226	288	314	296	346	326	259	304	330	218	183
US-17 NB Left and Thru	206	229	212	296	357	336	362	338	326	313	240	151

Figure 8. Sugar Hill Road Left Turning Volume and Opposing Movement Volumes

The green to red color coding of the figure represents the range of traffic volumes within that specific movement, so it is not intended to compare colors between movements, but only between times of day for a single movement. For the left turn out of Sugar Hill Road, it seems there is slightly higher traffic in the morning, while the heaviest opposing volume is in the afternoon and evening.

2.3.2.Vehicular Speed

24-hour speed data was collected on Thursday, August 10, 2023, using Automated Traffic Recorders (ATRs) located approximately 500 feet upstream of the intersection in both directions. In accordance with VDOT's Traffic Operations and Safety Analysis Manual (TOSAM)[3], the data was recorded in 15-minute increments and reported in terms of average (i.e., mean) speed[4] and 85th percentile speed[5] over the data collection period. Figure 9 shows the location of the ATRs for speed data collection.

[3] Virginia Department of Transportation. *Traffic Operations and Safety Analysis Manual*. Virginia Department of Transportation. 2020.
[4] *Average Speed* is the summation of spot-measured speeds of vehicles at a specific location divided by the number of vehicles observed.
[5] *85th percentile speed is the speed at or below which 85 percent of vehicles travel.*

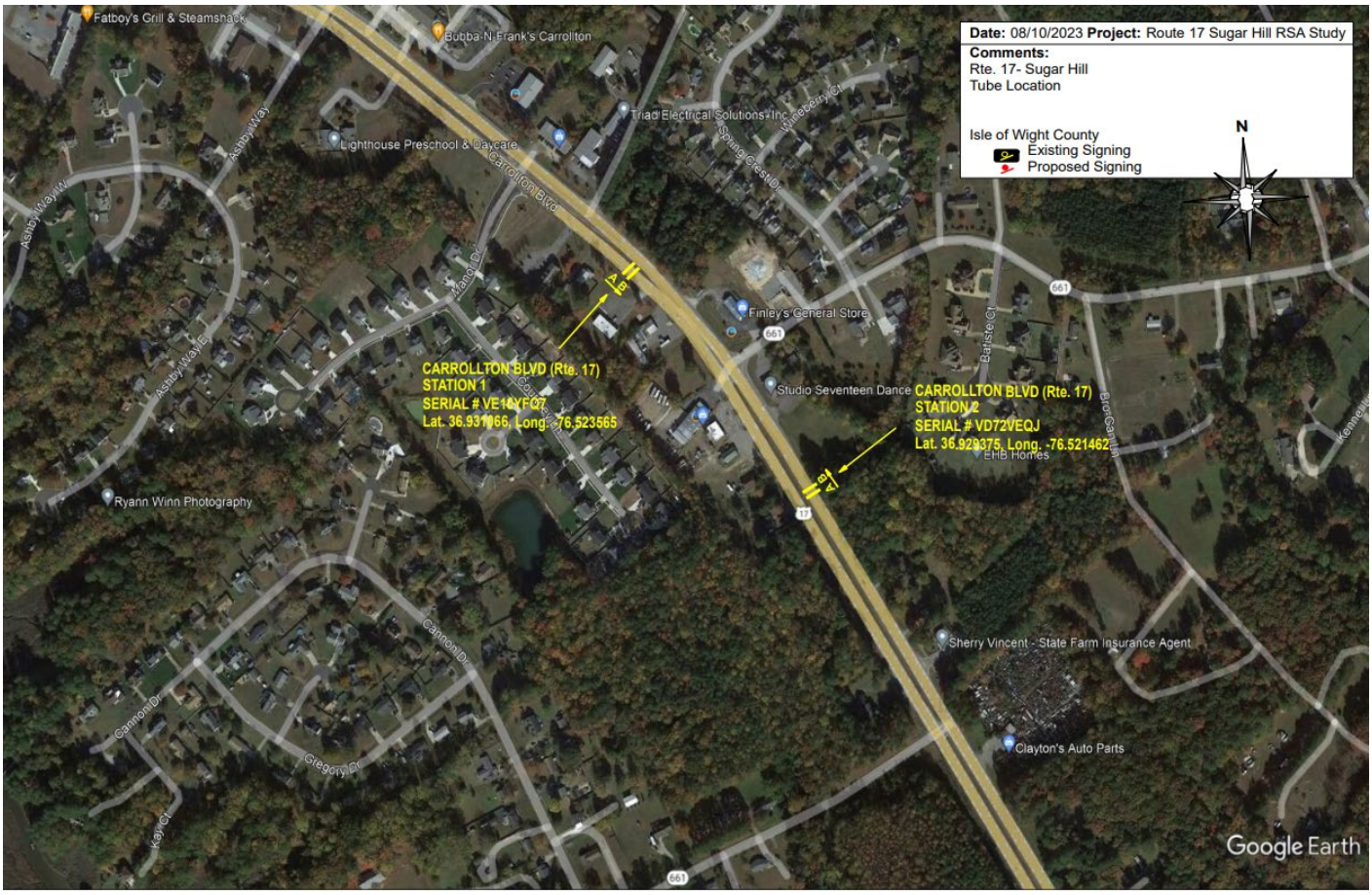


Figure 9. Location of ATRs on Route 17

85th percentile travel speed on Route 17 southbound was found to be nearly equivalent to the posted speed limit, while 85th percentile speed in the northbound direction was nearly 9 mph over the posted speed limit. The following tables show the summaries of speed data for each direction from this sample.

Table 5. Speed data collection findings on Route 17

	Southbound	Northbound
Number of Vehicles	10,033	9,690
Posted Speed Limit	55 mph	55 mph
Number of Vehicles Exceeding Speed Limit	1,532 (15%)	6,437 (66%)
Maximum Speed	75.6 mph	91.2 mph
85th Percentile Speed	55.0 mph	64.0 mph
Average Speed	49.8 mph	58.1 mph

3. Prompt Questions

As part of the field review for the RSA, attendees were asked to consider prompt questions while observing traffic flow and intersection characteristics. The following table summarizes the conditions and characteristics observed by the RSA attendees.

Category	Prompt Question	Observation
General	What is working well at the intersection or on the corridor?	• The Route 17 corridor maintains a high level of service • Short wait time for turning traffic
	What are some positive design features?	• Turn lanes on most approaches
	What is the land use in the study area?	• Residential properties and a church to the north, varied commercial properties on the intersection quadrants
	Are there any challenges with access management?	• Wide commercial entrance on south side of intersection • Drivers using commercial parking area in the northeast quadrant to bypass traffic control at intersection • Several driveways are within the functional area of the intersection, and therefore do not meet current State access management standards
3.1. Intersection Sight Distance	3.1.1. Are there utility poles, signs or other objects blocking the view of traffic?	• Not for the Sugar Hill Road or Route 17 approaches, but the driveway on the south side of the intersection has some utility poles obstructing sight lines looking northbound
	3.1.2. Is sight distance sufficient for all turning movements?	• Sight distance appears to be adequate for most movements, but there are unique challenges at the intersection (see following section for more details)
	3.1.3. Is sight distance adequate for major road through movements? Can drivers see vehicles on side streets?	• If there is a northbound vehicle turning right into the dance studio or onto Sugar Hill, through vehicles on Route 17 may not see vehicles on Sugar Hill Road
	3.1.4. Do turning vehicles obstruct sight lines for other movements? Are there adequate gaps for turning movements?	• Northbound right turn traffic appears to block view of through movement • Southbound left turn lane traffic blocks sight distance for westbound left turn traffic • Westbound vehicles attempting to simultaneously turn left and right from Sugar Hill sometimes block sight for each other

Category	Prompt Question	Observation
3.2. Intersection Features	3.2.1. Describe overall intersection operations.	• Northbound right turn traffic swings into westbound lane during turning movement • Numerous vehicles with trailers and large trucks turning on to and off of Sugar Hill • During off business hours, general store uses cones to block off parking lot to eliminate drivers from cutting through their lot to avoid the Sugar Hill intersection • Commercial access points are within intersection area of influence • Significant elevation differential between northbound and southbound lanes
	3.2.2. Is there sufficient time to clear queues for each movement?	• Wait timing for turning vehicles averaged less than 30 seconds
	3.2.3. Are adjacent signals pre-timed, actuated-coordinated, or actuated-free?	• Adjacent signals are actuated but not coordinated. Operating in free. Future plan to coordinate signals when Nike Park Extension signal comes online.
	3.2.4. Are all signals to the north and south visible?	• Yes
	3.2.5. Would sun glare be an issue for any approaches?	• Glare could be an issue for vehicles turning onto southbound Route 17 given typical sun position, though participants familiar with the intersection did not recall a time when it impacted visibility
3.3. Auxiliary Lanes	3.3.1. Is turn lane storage sufficient for visible queues?	• Southbound left turn storage approx. 100' (3 vehicles filled queue) • Residents expressed desire to extend the southbound left-turn storage because they feel uncomfortable decelerating into that lane given the speed of traffic on Route 17 • Eastbound left turn storage approx. 140' • Northbound left turn lane approx. 100' • Queues cleared in reasonable time frames and didn't extend into through lanes
	3.3.2. Are taper lengths appropriate for the turn lanes?	• Southbound left turn taper should be evaluated for adequacy
3.4. Signs, Markings, Lighting	3.4.1. Are signs visible, clear and appropriate? Are they legible for all drivers?	• Stop sign on Sugar Hill is in good condition • Stop bar is approximately 20' off Rt 17 – cars stop beyond the stop bar for improved visibility
	3.4.2. Are sign supports in good repair?	• Yes, though the sign on the median nose east of the intersection has recently been relocated

Category	Prompt Question	Observation
	3.4.3. What are the conditions of the pavement markings?	• Markings are worn • Sugar Hill will be repaved/remarked this year, but repaving will stop east of Rt 17
	3.4.4. Is lighting present? Is lighting sufficient for the intersection or corridor?	• No lighting in the area • Majority of crashes occurred in daytime (12/15)
	3.4.5. Are pavement markings compliant with the MUTCD and VDOT Road Design Manual?	• Southbound "No U-turn" sign in median is not visible to turning traffic. Need a "No U-turn" sign to median nose east of intersection
3.5. Pavement	3.5.1. Are there pavement defects?	• Some pavement cracks visible
	3.5.2. Is there loose stone or gravel present in the roadway?	• Some aligning with turning movements on and off Sugar Hill Road
	3.5.3. How does the pavement perform during wet conditions?	• Did not observe in wet conditions, however crash data did not indicate any crashes on wet roadway
3.6. Heavy Vehicles	3.6.1. Is the roadway on a truck route?	• On State Truck Route, not National Truck Route
	3.6.2. Are there many heavy vehicles present? If so, what vehicle types?	• Vehicles pulling trailers, commercial single unit trucks and some large trucks turning onto and off of Sugar Hill • Large trucks on Rt 17
	3.6.3. Are turning radii and stop line placement sufficient for heavy vehicle movements?	• Off-tracking visible in northeast and southeast quadrants • Vehicles were observed turning into oncoming lane when turning right onto Sugar Hill from southbound Rt 17
3.7. Human Factors	3.7.1. Are drivers compliant to traffic control signage?	• Most comply • Some rolling stops
	3.7.2. How aggressive are drivers (in terms of passing, gap acceptance, risky maneuvers)?	• Drivers vary by determination of acceptable gaps – some are aggressive, and some are conservative
	3.7.3. Are drivers using turn signal indicators?	• Some use of turn indicators
	3.7.4. How close are drivers following together?	• Average
3.8. Speed Management	3.8.1. How fast are people driving?	• Per VDOT speed data, 85th percentile speed is approx. 64 mph in the northbound direction and approx. 55 mph in the southbound direction.
	3.8.2. Is there significant variation in the speed of vehicles?	• No

Category	Prompt Question	Observation
	3.8.3. Does the existing posted speed limit align with the "comfortable" driving speed of the roadway?	• Yes, but this is a segment of 55 mph between two 45 mph segments
	3.8.4. Are lane widths sufficient for traffic conditions?	• Turn lanes appear to be narrow for mix of traffic and speeds
	3.8.5. Is there a school zone present? If so, what is the posted speed?	• No
3.9. Vulnerable Road Users	3.9.1. Are pedestrians or bicyclists utilizing the intersection or corridor? If so, describe the activity present.	• None present during observations
	3.9.2. Are sidewalks present?	• No • Sidewalks added when properties are redeveloped
	3.9.3. Are bicyclist facilities present?	• No
	3.9.4. Are there marked crosswalks within or near the study area?	• No
	3.9.5. Are there trails or connecting facilities nearby?	• No • The Route 17 Master Plan features a multi-use path along the roadway to be installed in conjunction w/development
	3.9.6. What pedestrian generators are in the area?	• Residential properties in close proximity to general store and church
	3.9.7. Are there any schools, parks, or recreation centers nearby?	• Church on Sugar Hill Road
	3.9.8. Discuss surrounding neighborhood and characteristics (income, household vehicles, mode of transportation).	• New apartment building and single-family homes near intersection • No transit in the immediate area • HOA representative mentioned younger families with new drivers

4. Identified Concerns

4.1. Sight Distance Concerns

4.1.1. Right turn lane onto Sugar Hill Road obstructs sight lines for northbound vehicles.

A prominent concern of the intersection is the obstruction of sight lines between northbound vehicles on Route 17 and left turning vehicles from Sugar Hill Road. This sight line challenge occurs when a northbound vehicle enters the right turn lane to turn onto Sugar Hill Road and blocks the line of sight for vehicles continuing through on northbound Route 17. Due to this potential sight line blockage, the northbound through traffic on Route 17 may not see vehicles turning onto Route 17 from Sugar Hill Road, and correspondingly, vehicles turning off of Sugar Hill Road may not see the northbound through traffic on Route 17. This concern was reflected in the narratives of the crash history as well as observations of visibility on site. A general overview of the sight line challenges at the intersection is demonstrated in Figure 10.

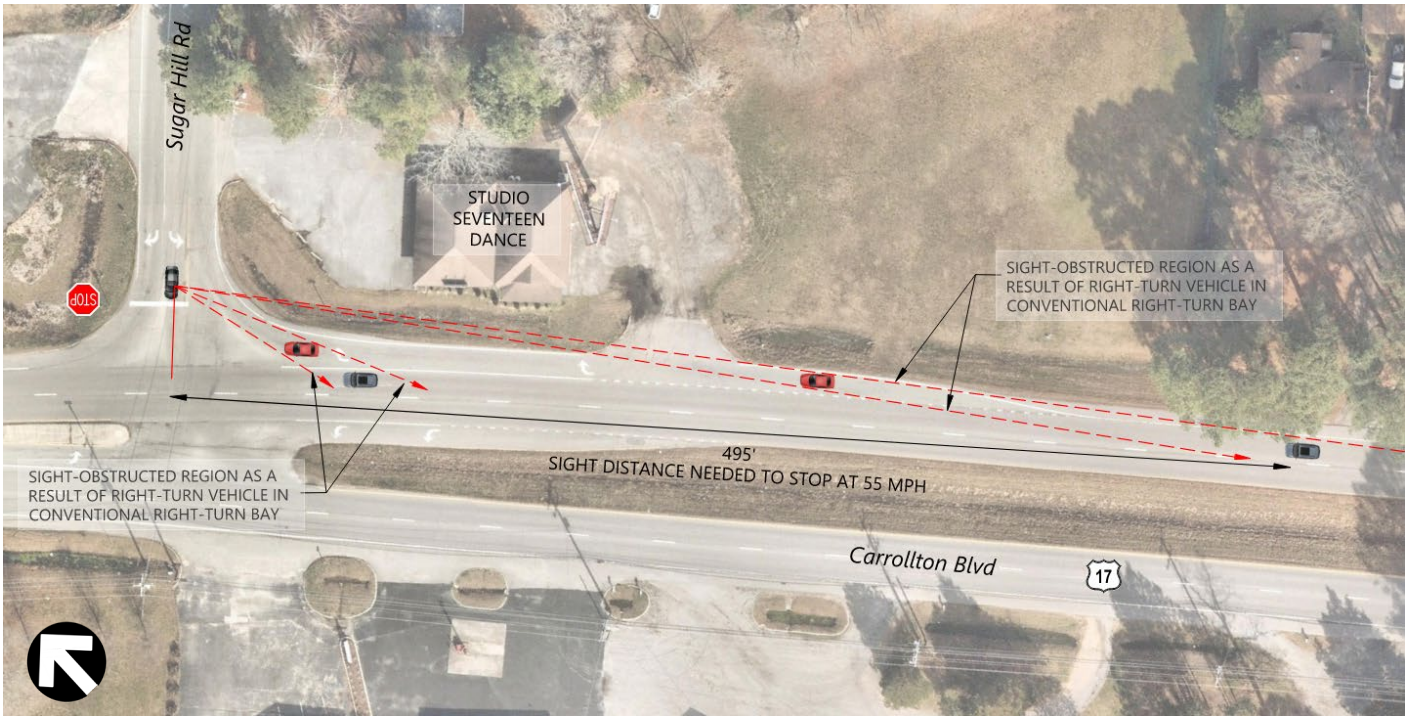


Figure 10. Right Turn Lane Obstructing Sight Lines between Through Vehicles on Route 17 and Sugar Hill Road Approach

The existing northbound right turn lane is currently 350', which is within VDOT Road Design Manual (RDM) standards for urban roadways over 50 mph (100' minimum for turn lane storage length and 200' minimum for taper length). However, 505' is the design standard for a turn lane at 55 mph vehicular speed based on

the 7th Edition American Association of State Highway and Transportation Officials (AASHTO) *Policy on Geometric Design of Highways and Streets* (also known as the "Green Book").[6]

Further enhancing the sight distance challenges demonstrated in Figure 10, the required stopping sight distance for a vehicle traveling 55 mph is 495' on a level roadway. This makes the visibility challenges higher risk because sight lines may not be clear until roughly 250' prior to the intersection if a vehicle enters the right turn lane at the same time a vehicle traveling on northbound Route 17 is in the right through lane. This challenge is reflected in the crash history, which shows a series of collisions between northbound through vehicles and westbound left tuning vehicles on Route 17. The crash severities for such crashes range from property damage only to visible injuries, which may reflect the ability for northbound Route 17 drivers to slow slightly before the crashes, but not stop entirely before colliding with the left turning vehicle. Countermeasures are available to warn through traffic of the potential for turning traffic to provide more awareness and allow additional time to slow.

Potential Safety Treatment(s): Offset Right Turn Lane, Intersection Conflict Warning System, Speed Management

4.1.2. Vehicles turning left from Sugar Hill Road obstruct sight lines for vehicles turning right onto Route 17.

When both a left turning and right turning vehicle approach the intersection on Sugar Hill Road, they often block one another's visibility of traffic on Route 17. This occurs when a left turning vehicle pulls forward past the stop line to see northbound traffic, which then prevents right turning vehicles from seeing upstream. This becomes an issue when the left turning vehicle is waiting for a gap in the southbound traffic, but northbound traffic is clear. Based on the crash history, this may have been a contributing factor in the fatal rear end crash in 2018.

Conversely, right turning vehicles that pull forward past the stop line may obstruct sight lines for left turning vehicles looking for a gap in the southbound direction. There were two crashes involving vehicles turning left from Sugar Hill Road that resulted in southbound vehicles swerving into off-road fixed objects to avoid a collision. From the existing stop line, left turning vehicles have adequate sight distance to see downstream in the southbound lanes unless their sight line is obstructed by adjacent westbound vehicles turning right on Route 17 or vehicles in the southbound left turn lane on Route 17 turning onto Sugar Hill Road. Such sight line obstructions could make it challenging for drivers attempting to turn left on southbound Route 17 to see a gap.

[6] American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Highways and Streets.* Washington, DC: American Association of State Highway and Transportation Officials, 2018.



Figure 11. Sugar Hill Road Approach to Route 17

Some drivers turning right have recognized this sight distance challenge and have since begun cutting through the parking lot of the adjacent Finley's General Store to turn right from the driveway to the north. Alternatively, some right turning drivers were observed to encompass the middle of approach to Route 17, straddling both the left and right turn lane. Minor signs of this behavior can be seen on the pavement from the wear of the lane line and oil marks indicating the path of right turning vehicles (Figure 11).

Potential Safety Treatment(s): Offset Stop Lines, Install RCUT median on Route 17

4.2. Operational / Driver Behavior Concerns

4.2.1. Driver speeds are consistently higher than the 55 mph posted speed limit.

While the posted speed on this portion of the corridor is 55 mph, drivers frequently travel higher than the speed limit. This has been confirmed by speed data indicating that the 85th percentile speed (speed that 85 percent of drivers are travelling at or below) is 64 mph in the northbound direction and 55 mph in the southbound direction. This part of Route 17 is also located between two 45 mph posted speed segments and is a commuter route for people traveling to and from Suffolk, Smithfield, and Newport News.

High vehicle speeds can lead to severe crashes, especially when higher than the posted or design speed. The length of turn lanes, placement of warning signs, determination of yellow and red signal phases, and many other roadway elements rely on speed in the design. When operating speeds exceed the design speeds, it

puts roadway users at higher risk of crashes. This is primarily because of the stopping sight distance required by drivers to react to a change in the roadway. The faster a driver is traveling, the more time and distance they need to slow down or stop. This can lead to an increase in rear end crashes for undersized turn lanes, turning vehicle crashes at intersections with insufficient sight distance to accommodate the operating speeds, or more frequent red light running crashes at signalized intersections.

Potential Safety Treatment(s): Speed Management

4.2.2. Left turn lane for southbound Route 17 is not long enough for demand and speed.

Drivers on Route 17 frequently travel at speeds higher than the posted 55 mph speed, meaning that the design of roadway features such as turn lanes may feel uncomfortable for those higher speed vehicles. This discomfort can be enhanced when there is a queue of vehicles waiting to turn left, thus effectively shortening the deceleration distance in the turn lane. During the RSA, it was observed that three vehicles can be enough to fill the left turn lane for the southbound left from Route 17 onto Sugar Hill Road. This is dependent on a variety of factors, such as vehicle types, whether trailers are present, or spacing between the vehicles. However, this issue can pose a risk of rear end crashes when the effective deceleration distance is significantly shortened at higher vehicular speeds. Proposed improvements to the left turn lane must also consider impacts on sight lines for drivers looking for a gap on southbound Route 17 when turning left from Sugar Hill Road. Although there have been no reported crashes related to this concern during the study period, an investigation into a turn lane extension may reduce future crash risk.

Potential Safety Treatment(s): Left Turn Lane Extension, Intermittent Enforcement

4.2.3. Drivers do not comply with stop control for Sugar Hill Road.

During the RSA, the project team observed several instances of drivers approaching the stop control for Sugar Hill Road and performing a rolling stop. This is likely due to the driver observing a gap in traffic (both directions for left turns, northbound for right turns), and understanding that a stop may require them to wait for the next opportunity. While these occurrences at the time of observations did not result in any crashes or near misses, non-compliance with the stop control indicates the risk of future crashes.

Potential crashes that could occur as a result of this behavior include angle crashes with left turns onto Route 17 and rear end crashes involving vehicles turning right or left onto Route 17. In cases where drivers are not fully stopping in order to make a gap, they may be inadequately judging the amount of time required to make the turning maneuver. This can result in collisions with vehicles traveling on Route 17 that did not see or expect a vehicle to be turning in front of them.

Potential Safety Treatment(s): Tightened Corner Radius, Intermittent Enforcement

4.2.4. Drivers do not comply with posted no U-turn sign for southbound Route 17.

There is a "No U-turn" sign posted in the median adjacent to the left turn lane on southbound Route 17. Despite the sign, the crash history and observations of local residents and the RSA team indicate that drivers do not always comply with the posted sign. This is a concern because of the time needed to make the U-turn given the geometry of the road, as well as the speeds along Route 17.

Significantly more time is needed to make a U-turn than what is needed for a left turning movement. Because of this, drivers need a much larger gap in traffic to make this maneuver, meaning a longer sight distance downstream is also needed. Additionally, a vehicle turning right from Sugar Hill Road onto Route 17 may not expect a vehicle in the southbound left turn lane to enter the northbound lanes. This can result in angle crashes with drivers believing they have the right-of-way when turning right and drivers making an illegal U-turn onto northbound Route 17.

Potential Safety Treatment(s): Additional No U-Turn Signage, Intermittent Enforcement

4.2.5. There are multiple driveways within or near the intersection. Several access points are not compliant with VDOT Road Design Manual.

Access points closely spaced to the intersection introduce additional conflict points for drivers turning onto or off of the major roadway. At the study intersection, there are many driveways along the southbound direction of Route 17, as well as two driveways closely spaced to the intersection on Sugar Hill Road. In Figure 12, some of the driveways along southbound Route 17 are used to access the same business.



Figure 12. Driveways Southeast of the Intersection

Potential Safety Treatment(s): Access Management

4.3. Signing, Pavement Marking, and Lighting Concerns

4.3.1. Right turning vehicles frequently turn close to the edge of pavement, over the existing edge line.

The existing right turn radius from northbound Route 17 onto Sugar Hill Road is 40', which allows for roughly 20 mph turns per the AASHTO Green Book. Oil stains and tire paths on the roadway also indicate that vehicles are using the full radius to turn to maintain higher turning speeds. This can be seen in Figure 13, which shows the edge line for the right turn radius onto Sugar Hill Road very worn, as well as some pavement defects and sediment outlining the outer edge of the vehicle path.



Figure 13. Edge Line for Right Turn Radius onto Sugar Hill Road

The path of right turning vehicles as indicated by sediment, pavement defects, and worn markings also show that some vehicles are tracking over the double yellow centerline on Sugar Hill Road, as seen in Figure 14. Both the closeness of the turning vehicles and tracking over the centerline pose risks to right turning vehicles. Such risks include departing from the edge of pavement, as well as potentially side swiping opposing vehicles waiting to turn left from Sugar Hill Road. While the likelihood of a severe injury or fatal crash occurring as a result is low, there are still countermeasures that could be applied to mitigate these risks.

Potential Safety Treatment(s): Refurbished Markings



Figure 14. Worn Centerline on Sugar Hill Road Approach

4.3.2. Vehicles turning left from southbound Route 17 frequently cross over the centerline on Sugar Hill Road when no vehicles are waiting to turn left.

Observations on site revealed that many drivers turning left onto Sugar Hill Road cross over the centerline and the left turn lane when no vehicles were present on the Sugar Hill Road approach. This common movement was also reflected with the slight wearing of the centerline pavement marking near the stop line for Sugar Hill Road left turns, as shown in Figure 14. The sweep of this movement may indicate opportunity for geometric improvements to better guide vehicle movements at the intersection.

Potential Safety Treatment(s): Intersection Redesign, Refurbished Pavement Markings

4.3.3. No signage to indicate the presence of Sugar Hill Road prior to the intersection.

Drivers approaching the intersection may easily drive past Sugar Hill Road, as there is no traffic control on Route 17 or signage indicating the presence of an intersection. Vehicular speeds on Route 17 are also high with a 55-mph posted speed limit, which requires more time and distance for drivers to prepare for a turn. When the need for a turn is unexpected, drivers may brake harder in order to stop prior to the turn, thus increasing the risk of rear end crashes with unsuspecting drivers traveling behind the turning vehicle. There are currently no intersection warning signs on either approach of Route 17 to Sugar Hill Road.

Potential Safety Treatment(s): Intersection Conflict Warning System

4.3.4. Median object marker sign is frequently struck.

The signpost in the median featuring the object marker, one-way, and "No U-turn" signs is frequently struck and has been relocated 15 feet north (Figure 15). This common occurrence is indicative of turning movements that conflict with the placement of the median.



Figure 15. Relocated Signpost in Median on Route 17

An evaluation of intersection turning movements was performed during the development of potential countermeasures to determine if medians, signs, and pavement markings are adequately placed and designed. Potential improvements to intersection geometry may require the relocation of the sign assembly.

Potential Safety Treatment(s): Intersection Redesign

4.4. Additional Concerns

4.4.1. A variety of roadside objects pose hazards for vehicles departing the roadway in the southbound direction of Route 17.

There were three crashes along the southbound Route 17 involving off road fixed objects. There are utility poles, signposts, and mailboxes all closely located near the curb that pose risks to vehicles departing the roadway. Two of the three crashes along southbound Route 17 were the result of left turning vehicles unexpectedly entering the lane in front of the through traveling vehicle. Figure 16 shows the roadside objects that also obstruct sight lines for vehicles exiting the driveway opposite to Sugar Hill Road.



Figure 16. Utility Poles Obstructing Sight Lines from Driveway Looking North of Intersection

Potential Safety Treatment(s): Access Management, Wider Edge Line

5. Potential Countermeasures

The following section summarizes potential countermeasures to address the issues identified through the RSA outlined in the previous section. When appropriate, the proposed countermeasure lists a crash reduction factor (CRF). A CRF is a multiplicative factor, based on documented safety research studies, used to compute the reduction in the expected number of crashes after implementing a given countermeasure at a specific site.[7] CRFs provide some indication of the potential benefit, or lack thereof, associated with

[7] American Association of State Highway and Transportation Officials. *Highway Safety Manual.* Washington, DC: American Association of State Highway and Transportation Officials, 2010.

specific countermeasures. Later in this report, there is a reference to the crash modification factor (CMF), which is the counter to a CRF, calculated as 1.0 minus the CRF.

This section also outlines the relative cost and implementation time frame for each potential countermeasure. Table 4 shows the approximate time frame for each implementation category (short, intermediate, long) as well as the cost range for each categorization (low, medium, high).

Table 4. Implementation Time Frame and Relative Cost for Potential Countermeasures

Implementation Time	
Short	Within 1 year
Intermediate	1 to 5 years
Long	Longer than 5 years

Cost	
Low	less than $150,000
Medium	$150,000 to $500,000
High	greater than $500,000

5.1. Intersection Design

5.1.1.Offset Right Turn Lane and Offset Stop Line

As discussed extensively in Section 4.1, sight distance challenges between vehicles on the Sugar Hill Road approach are a primary concern at the intersection. A potential countermeasure for correcting the Sugar Hill Road sight distance challenge is the introduction of an offset right turn lane for northbound Route 17 (Figure 17). This positive offset allows for the sight lines between drivers traveling northbound on Route 17 and vehicles turning from Sugar Hill Road to better see one another when a vehicle is utilizing the right turn lane. Furthermore, the removal of the northbound left turn lane for driveway on the west side of the intersection also helps better the sight lines by shifting the travel lanes to get the offset from the right turn lane and moving of the stop lines for Sugar Hill Road. For northbound vehicles needing to access the west side driveway, the next permitted U-turn is 1,000 feet downstream, with features an existing exclusive left turn lane. For vehicles exiting the west-side driveway at the intersection looking to travel north, the next available U-turn is 1,400 feet downstream, which also has an existing exclusive left turn lane.

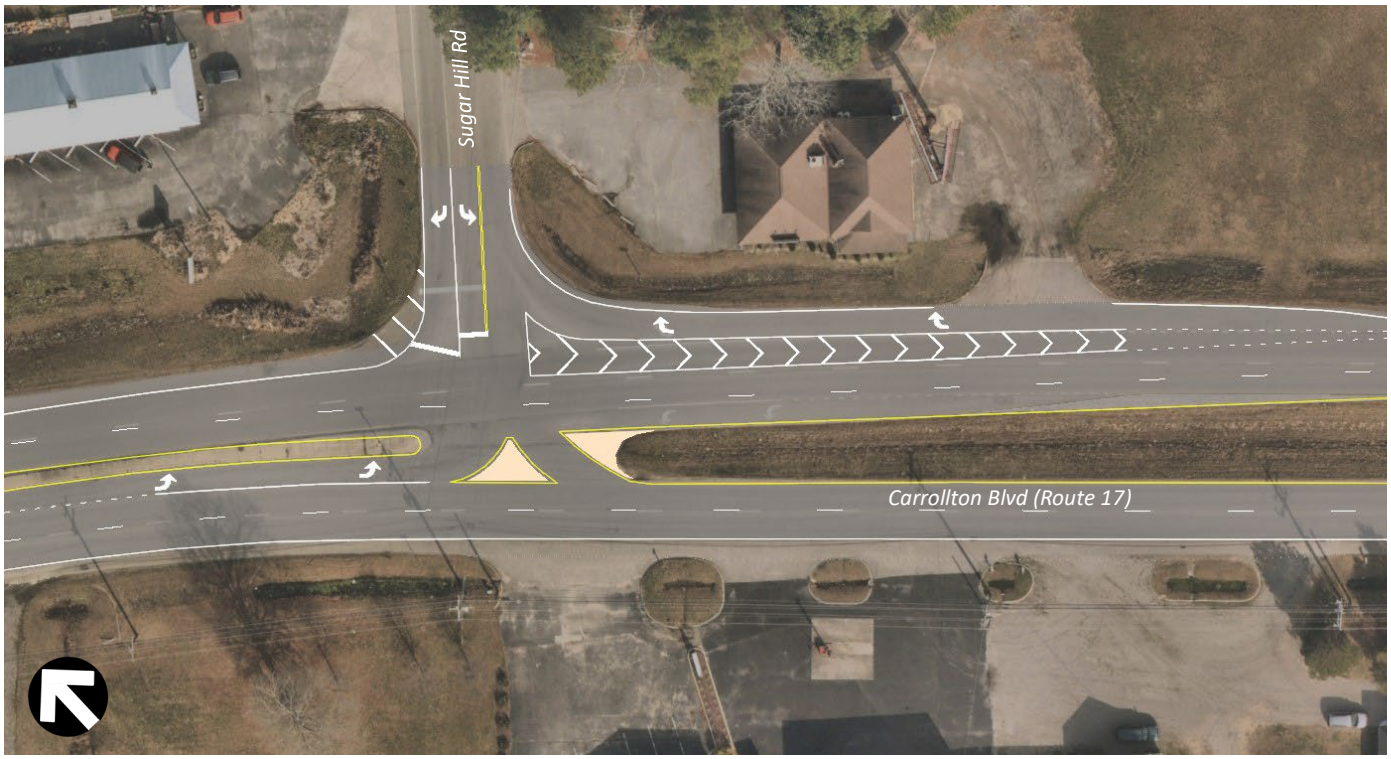


Figure 17. Offset Right Turn Lane Concept

The proposed stop line placement allows for drivers on the Sugar Hill Road approach to easily see northbound Route 17 vehicles even with a vehicle utilizing the right turn lane. By having offset stop lines on Sugar Hill Road, concurrent left and right turning vehicles can have non-conflicting lines of sight looking southbound (as demonstrated in Figure 18).



Figure 18. Offset Right Turn Lane Impacts on Sight Distance

Safety effects of the offset right turn lane have not been extensively studied. However, the recurrence of sight line challenges in the crash narratives, site observations, and crash patterns indicate that the right turn lane's current position relative to the speeds on Route 17 poses a concern. While there is no crash reduction factor for an offset right turn lane, results from recent studies have shown that intersections with offset right turn lanes may have lower crash rates than those with traditional right turn lanes or ones without.[8]

Alternatively, there is a crash reduction factor from NCHRP (National Cooperative Highway Research Program) Report 875 for improved sight distance, which mentions the potential for using offset right turn lanes.[9] The crash reduction potential is calculated through a formula using existing and improved sight distance. Based on the position of a vehicle entering the right turn lane at the same time a vehicle is following behind, the sight distance is drastically improved by an offset right turn lane, which as proposed, would have no sight line obstructions. The estimated crash reduction using the study guidance would be 55 percent for all crashes involving northbound vehicles and those turning from Sugar Hill Road.

Priority: High

[8] Khattak, A. and Kang, Y. *Offset Right-Turn Lanes on State Highway Systems*. Nebraska Transportation Center. 2018.
[9] Eccles, K, Himes, S., Peach, K., Gross, F., Porter, R.J., Gates, T.J., and Monsere. C. *Guidance for Evaluating the Safety Impacts of Intersection Sight Distance.* National Cooperative Highway Research Program, Report 875, Washington, D.C., 2018.

Cost: Medium

5.1.2.Turn Restrictions

The primary turning movements at the intersection involve left and right turns on and off Sugar Hill Road, while very limited vehicles are accessing the driveway on the west side of Route 17. Given the low number of turns involving the driveway, restricting left turns into and out of the driveway at the intersection would allow for geometric improvements that could help improve safety for the left turns on and off Sugar Hill Road. The reduction of the left turn lane into the driveway on the west side of the intersection also allows for the northbound Route 17 lanes to shift away from the right turn lane, allowing for the positive offset to improve sight distance between vehicles traveling northbound on Route 17 and those turning from Sugar Hill Road. It also reduces the number of potential conflict points at the intersection, including diverging conflicts from vehicles entering the northbound left turn lane, crossing conflicts for vehicles entering the intersection from the driveway, and merging conflicts for vehicles turning left onto northbound Route 17.

Additionally, the crash history at the intersection shows that drivers may struggle with finding a gap on Route 17 when entering from Sugar Hill Road. In addition to the improved sight distance in the northbound Route 17 gained by the offset right turn lane, the islands and median extensions allow for the channelization of the left turn from Sugar Hill Road onto Route 17 by allocating a space for drivers to confirm the gap in the southbound direction. This improvement could help reduce the angle crashes between the left turn from Sugar Hill Road and Route 17. This is primarily because of the ability for a driver to make a two-stage left turn if there is not enough time to merge onto Route 17 in front of through traveling southbound vehicles. The protected length of this slip lane would be roughly 25 feet, so heavy vehicles or those with trailers would be unable to make a two-stage left turn out of Sugar Hill Road. In addition, it is also possible that vehicles stopped in the slip lane may obstruct sight distance for left turning vehicles from southbound Route 17.

Lastly, the channelization of the left turn from southbound Route 17 and change in the stop line position for the Sugar Hill Road approach reduces the space and ease of U-turn maneuvers at the intersection. This discomfort and physical limitation may help reduce the number of vehicles making U-turns at the intersection, as supplemented with additional signage (as discussed in Section 5.3).

Priority: High
Cost: Low

Continuous Green T Intersection

Longer term, the intersection design could be modified to include a full Continuous Green T, also known as a Turbo T intersection. [10] The VDOT Arterial Preservation program conducted a study for Route 17 and identified the potential for a Green T installation at the intersection to help reduce the number of crashes involving left turns from Sugar Hill Road onto southbound Route 17. The geometric improvements discussed in the previous section have many of the same features and benefits of the Green T but does not require an acceleration lane. Without the installation of an acceleration lane, the median extension and channelizing island can be installed in phases, with a temporary demonstration using markings and flexible delineators, and a second phase for permanent installation using concrete. In the future, the full Green T with the acceleration lane may help mitigate any risk of sideswipe and rear end crashes for vehicles merging onto southbound Route 17. It should also be noted that a Continuous Green T design is not conducive to non-motorized crossings across the major road, meaning that this intersection could not feature crosswalks across Route 17 if the corridor has shared-use path. A previously developed concept of the Green T is shown in Figure 19.

[10] Virginia Department of Transportation. "Innovative Intersections and Interchanges". https://www.virginiadot.org/info/innovative_intersections_and_interchanges/cgt.asp

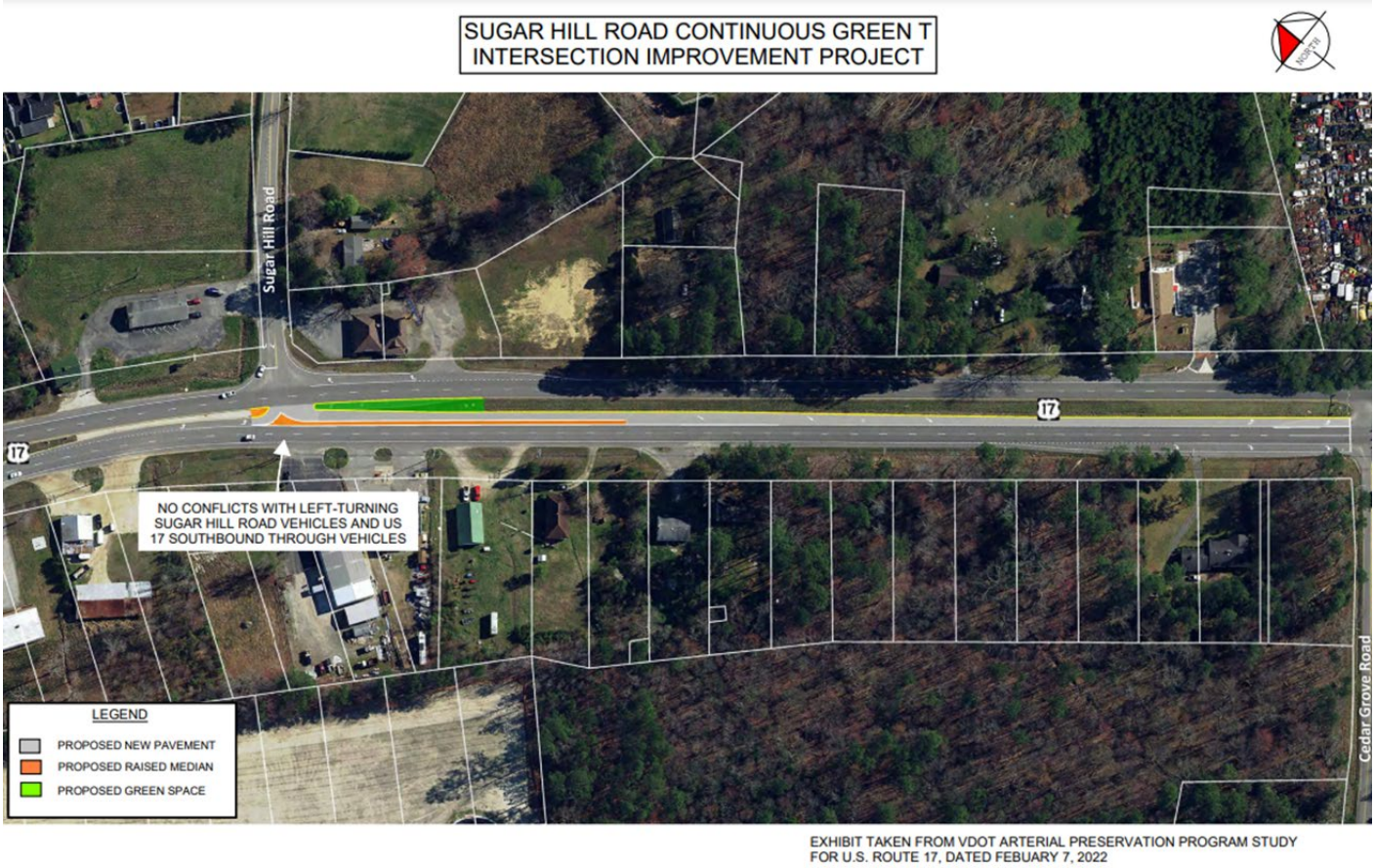


Figure 19. Continuous Green T Concept from Route 17 Arterial Preservation Study

Isle of Wight County applied for funding through the VDOT Smart Scale program in 2022 but was ultimately not awarded funding for the project. This is likely due to the high project cost of roughly $3.7 million and low reduction potential for total crashes (4.2 percent), despite the more significant reduction in fatal and injury crashes (15.4 percent).[11]

Priority: Medium
Cost: High

Restricted Crossing U-Turn Intersection

Because of the challenges with sight distance and the existing roadway geometry, an alternative intersection design or access management may help reduce crashes and improve intersection safety. One type of alternative intersection is a Restricted Crossing U-Turn (RCUT), which has been shown to reduce all crashes by 20 percent. An RCUT also greatly reduces the number of conflict points when compared to a traditional

[11] Wood, J. and Donnell, E.T. *Safety evaluation of continuous green T intersections: A propensity scores-genetic matching-potential outcomes approach*. Accident Analysis and Prevention, Vol. 93, (2016) pp. 1-13.

intersection (32 conflict points to 18 with RCUT design). Figure 20 shows the RCUT design and associated conflict points.

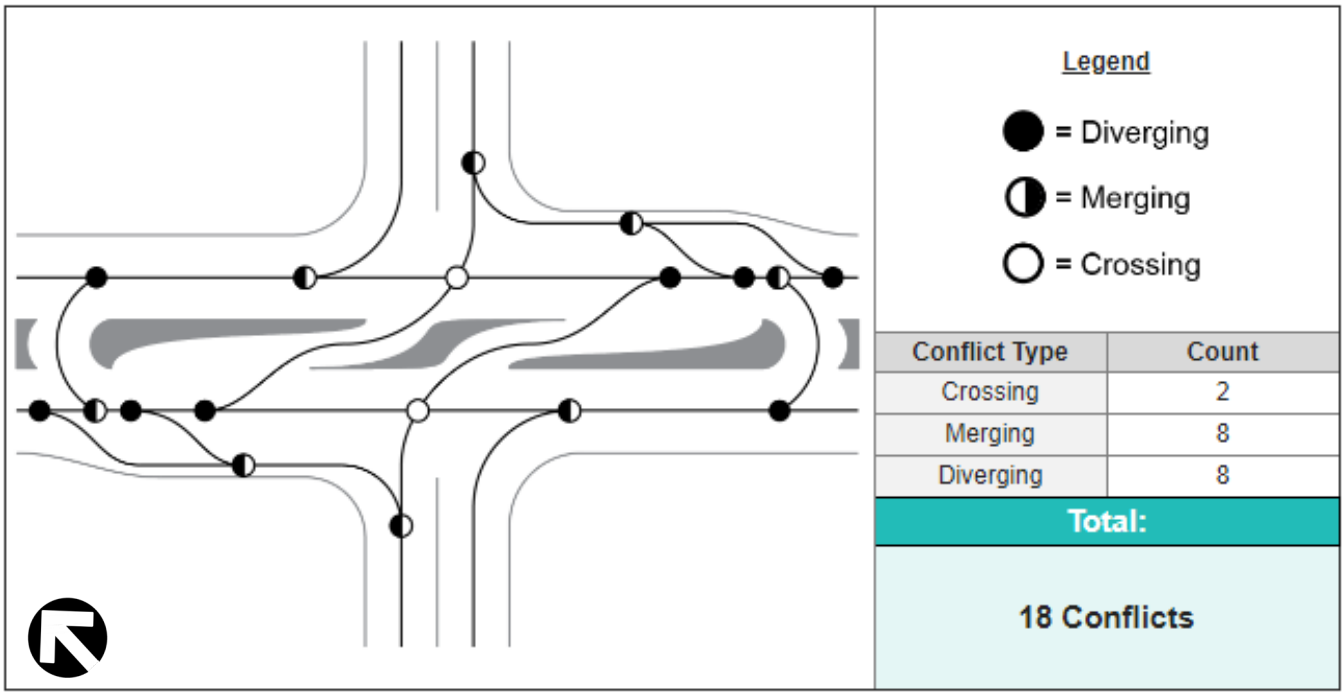


Figure 20. RCUT Intersection Design and Conflict Points (Source: VDOT)

Converting the intersection to an RCUT would allow all turning movements from Route 17 but would restrict Sugar Hill Road from making left turns onto southbound Route 17. Vehicles looking to enter southbound Route 17 would be required to make a U-turn roughly 1,000 feet north of Sugar Hill Road at Manor Drive. Additionally, vehicles looking to head northbound from the business driveway would need to make a U-turn 1,400 feet south at Cedar Grove Road. This intersection design would require further analysis of turning movements, vehicle types, and impacts to safety and operations of adjacent intersections. This safety countermeasure could be installed in the intermediate term if only including a narrow median with bollards, while full construction of concrete channelization could be installed long-term.

Priority: N/A
Cost: Medium (intermediate term), High (full construction)

5.1.3.Tightened Corner Radius for Right Turn onto Route 17

A tightened corner radius for the right turn from Sugar Hill Road onto northbound Route 17 is proposed in the intersection redesign. Tightening the turning radius can have beneficial traffic calming effects by slowing

turning speeds, improved visibility for drivers, and increasing driver yielding behavior.[12] By encouraging this lower speed turn, drivers may be more likely to make a complete stop at the stop line. As stated in the identified concerns, drivers consistently failed to stop when a gap in northbound traffic was present. By requiring them to slow down, drivers may not be able to enter northbound Route 17 as easily, thus increasing the likelihood of stopping. In addition to this countermeasure, intermittent enforcement may also contribute to driver compliance with the stop sign. Pavement markings are an alternative measure to tighten the turn radius to move the stop line forward for the right turn lane, but also allow for turning movements for larger vehicles.

Priority: Medium
Cost: Medium

5.1.4.Extended Turn Lane for Southbound Left from Route 17

Based on field observations, the left turn lane for southbound Route 17 can easily fill up with three or more vehicles, especially when they are larger or hauling a trailer. This left turn is also highest during the afternoon/evening peak hour (135 left turns onto Sugar Hill Road), which is when conflicting volumes on northbound Route 17 are highest (1,321 vehicles heading northbound). Considering the increase in conflicting volumes during the same time as peak left turning movements means that queues for the southbound left turn may extend past the current space that is designated. This is likely the result of the original design for the intersection, prior to the increase in trips generated by new housing developments off Sugar Hill Road. The traffic impact analysis for such housing developments would have predicted this increase in demand through traffic impact studies. Because of this challenge during peak hours, there is an opportunity to extend the southbound left turn lane back a distance allowable by drainage constraints.

Priority: Medium
Cost: Medium

5.1.5.Traffic Signal

Due to the nature of the intersection traffic volumes and crash history, the study team investigated several potential safety countermeasures. A traffic signal was posed as a potential alternative during the field observations, with intent of further investigating the feasibility and safety effects of a signal installation. Upon review of existing turning movement counts, minor road volumes from Sugar Hill Road throughout the course of the day are not typical of what would be required for a traffic signal. Furthermore, a signal at this intersection would not be compliant with the minimum signal spacing standards of the State. Per Table

[12] Fitzpatrick, K., Avelar, R., Pratt, M., Das, S., Lord, D. *Crash Modification Factor for Corner Radius, Right-Turn Speed, and Prediction of Pedestrian Crashes at Signalized Intersections*. Report No. FHWA-HRT-21-105. Federal Highway Administration. 2022.

2-2 in Appendix F of the VDOT RDM, the required signal spacing from the adjacent signals would be 2,640 feet. The adjacent signals to the north and south are roughly 1,400 feet and 1,900 feet from the study intersection, respectively. However, additional considerations such as crash history and potential safety impacts must also be reviewed.

In the 2009 version of the Manual on Uniform Traffic Control Devices (MUTCD), the crash history requirement for this intersection would have been five (5) crashes in a single year that could potentially be *correctable by a traffic signal* (left turn, angle crashes).[13] This arbitrary crash warrant had been in the MUTCD since the original release in 1935. In 2017, the MUTCD issued an Interim Approval (IA-19) for alternative signal warrants relating to the crash history driven by research documented in NCHRP Report 07-19, which VDOT has since adopted as the crash warrant for signalization through IIM-387.[14] Research used to develop the new crash warrants incorporate geometric features of the intersection, AADT, and speed, as well a single year and three-year crash history. The research report also mentions that multilane rural roads have much higher crash thresholds for signals than urban roads because "rural signalized intersections on multilane highways have a predicted average crash frequency that is about three times larger than that for rural stop-controlled intersections on multilane highways".[15] While this intersection is classified as "suburban", per the crash warrants, "rural" is defined as roadways with speeds greater than 40 mph or intersections located communities with populations less than 10,000. Crash thresholds for a rural three-leg intersection are listed below:

- 9 angle or pedestrian crashes in a single year; OR
- 6 fatal/injury angle or pedestrian crashes in a single year; OR
- 13 angle or pedestrian crashes in three years; OR
- 9 fatal/injury angle or pedestrian crashes in three years.

The intersection of Route 17 and Sugar Hill Road does not meet any of the required crash thresholds for signalization per IA-19. This is essential to note as research behind the warrant indicates that improper signalization of a highspeed multilane roadway may not result in safety benefits. Additionally, the installation of traffic signals has a well-documented data-driven history of an increase in rear end crashes, despite the potential reduction in angle crashes.[16] This must be considered when balancing the risk of each crash type, as this intersection has previously experienced a fatal rear end crash. Given the elevated speeds on Route 17, the risk of a severe crash involving a driver not expecting to stop for a red light may result in a

[13] Federal Highway Administration. *Manual on Uniform Traffic Control Devices.* Section 4C.08. Federal Highway Administration, Washington, D.C. 2009.
[14] Virginia Department of Transportation. *IIM TE-387 Signal Justification Reports (SJRs) For New and Reconstructed Signals*. Virginia Department of Transportation. 2019
[15] National Academies of Sciences, Engineering, and Medicine. *Crash Experience Warrant for Traffic Signals*. Washington, DC: The National Academies Press. 2014.
[16] National Academies of Sciences, Engineering, and Medicine. *Accident Modification Factors for Traffic Engineering and ITS Improvements*. Washington, DC: The National Academies Press. 2008.

rear end crash, whereas the same driver may opt to run the red light, which can result in a severe angle crash.

Ultimately, unwarranted traffic signals not only have impacts to operations, but they can result in an increase in crash rate and lead to driver disobedience with the signal.[17] Studies have also shown that the removal of unwarranted signals can lead to a decrease in all crashes (24 percent) and a significant decrease in severe injury crashes (53 percent).[18] Another study conducted by the University of Kentucky showed that total crashes increased at intersections where an unwarranted traffic signal was installed by 28.3 percent.[19] The same study also found that total crashes decreased by 42.9 percent when the study intersection met the criteria for crash warrant, but total crashes at intersections meeting non-crash warrant criteria (such as traffic volume) increased by 11.5 percent. While research into the effects of unwarranted traffic signals is limited, transportation agencies across the country have been investigating the impacts of removing unwarranted signals for safety. For this reason, justification of a traffic signal is an in-depth review of all intersection characteristics and must consider the effect on all road users and potential safety impacts, in addition to MUTCD signal warrant criteria. A signal at the intersection of Route 17 and Sugar Hill Road is not justified given the crash history, traffic volumes, and site conditions.

Priority: N/A
Cost: N/A

5.2. Speed Management for Route 17

As cited in Section 4.2.1, driver speeds are consistently higher than the posted 55 mph on Route 17. Because roadway features such as sign placement, turn lane length, intersection geometry, and signal timing are all designed based on the posted speed, ensuring that vehicles are operating at or near the speed limit is essential to safety. It must also be noted that posted speed limits are only part of the reason why people may drive at a certain speed. Factors such as roadway design, lane widths, signal spacing, adjacent land use, and visual cues all contribute to the speed that people feel comfortable driving. Because of the many variables that contribute to vehicle operating speeds, lowering the speed limit alone does not always result in people driving slower. In fact, lowering the posted speed alone can lead to an increase in total crashes and the severity of crashes.[20] Though lowering the posted speed 5 mph below the design speed can have reductions in total crashes and fatal and injury crashes, lowering the posted speed by 10 mph below the

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[17] National Academies of Sciences, Engineering, and Medicine. *A Guide for Reducing Collisions at Signalized Intersections*. Washington, DC: The National Academies Press. 2004.
[18] National Academies of Sciences, Engineering, and Medicine. *Accident Modification Factors for Traffic Engineering and ITS Improvements*.
[19] Agent, K.R. and Green, E.R. *Crash history after installation of traffic signals: warranted vs. unwarranted*" University of Kentucky Transportation Research Center. 2008.
[20] Gayah, V.V., Donnell, E.T., Yu, Z., and Li., L. *Safety and operational impacts of setting speed limits below engineering recommendations*. Accident Analysis and Prevention, Vol. 121, pp. 43-52. 2018.

design speed can lead to a 42 percent increase in fatal and injury crashes.[21] The findings of the referenced study explained that this could be occurring as operating speed is heavily influenced by road design and visual cues. As a result, some drivers may see the speed reduction as arbitrary and continue operating at comfortable speeds, whereas others may drive at the posted speed limit. This increased differential in vehicle speeds could partially explain the increase in severe crashes.

For this reason, additional safety countermeasures must be employed for speed management given that the corridor has been designed for 55 mph. Speed management countermeasures can be employed to reduce the overall average and 85th percentile speeds closer to the design, or posted, speed. Additionally, intermittent enforcement may also help consistently reduce driver speeds on the corridor. This section addresses the variety of options that could be implemented in this section of Route 17. If, after additional speed management countermeasures are deployed, Isle of Wight County wishes to implement a speed reduction for this corridor segment, then an official request for a comprehensive speed study must be submitted to VDOT. This comprehensive speed study would consider the existing speed data as well as the road characteristics, roadside development, environment, crash analysis, and law enforcement data and input.

5.2.1.Optical Speed Bars or Transverse Markings

There are several options for pavement marking treatments that can be used to raise driver awareness of their driving speed. Both optical speed bar and transverse markings serve a similar purpose, which is to give drivers the perception that their speed is increasing. The intended result is that drivers will slow down on the approach to the change in the road condition, whether that be a horizontal curve, intersection, school zone, or change in speed limit. Studies show that the impacts on speed of optical speed bars or transverse markings are minor (1-2 mph for 85th percentile speeds), the impact was most significant on drivers traveling more than 10 mph and 15 mph over the speed limit.[22] This is an impactful effect, given that speeds significantly higher than the design speed require much more sight distance for drivers entering the major road. Higher speeds also can lead to more severe crashes. Figure 21 demonstrates optical speed bars pavement markings.

[21] Gayah, V.V., Donnell, E.T., Yu, Z., and Li., L.
[22] Hallmark, S. , Hawkins, N. and Knickerbocker, S. *Evaluation of Transverse Markings as a Speed Transition Zone Countermeasures in Small, Rural Communities*. Journal of Transportation Technologies, 11, 61-77. 2021.



Figure 21. Optical Speed Bar Markings on Roadway (Source: Virginia Center for Transportation Innovation and Research)

For a speed limit of 55 mph, FHWA design guidance recommends the placement of optical speed bars at least 300 feet before the intersection.[23] Given the challenges with sight lines at the intersection, optical speed bars or transverse markings should be placed prior to the distance needed for north and southbound to stop for vehicles entering the intersection from Sugar Hill Road (495 feet). The intention of this placement would encourage drivers to slow on the approach to the intersection, which may provide additional clearance time for vehicles turning left from Sugar Hill Road onto southbound Route 17. Both of these potential countermeasures are low-cost treatments that can have impacts on driver speed. Depending on the ease of implementation and maintenance needs, one of the three treatments may be better suited for Route 17 than the others. This study recommends the installation of one of the treatments in tandem with other speed management strategies.

Priority: Medium
Cost: Low

5.2.2.Speed Activated Warning Signs / Dynamic Speed Feedback Signs

A new safety countermeasure that is becoming increasingly popular are speed activated warning signs, also known as dynamic speed feedback signs. The most common speed feedback sign is one that automatically indicates driver speed, with a message saying "YOUR SPEED" underneath a posted speed limit sign. However, there are a variety of speed feedback signs that can be used for many different roadway

[23] Albin, Richard. *Low-Cost Treatments for Horizontal Curve Safety*, Report No FHWA-SA-15-084, Federal Highway Administration Office of Safety, Washington, D.C., 2016

conditions. Newer technology includes signs that provide messaging to drivers that are traveling a certain threshold over the posted or advisory speed. This is being used for approaches to horizontal curves, highway ramps, work zones, school zones, and more. Rather than having the sign activate for each approaching vehicle, a speed-based approach could emphasize the significance of the activation. In the study area scenario, the sign could be an intersection warning sign with an activation for drivers traveling greater than 65 mph. Specific messaging for this sign could be "SLOW DOWN", similar to the example in Figure 22.



Figure 22. Speed Activated Warning Sign (Source: Iowa State University Center for Transportation Research).

This safety countermeasure should only be installed if the Intersection Conflict Warning System, described in the following subsection, is not implemented. Both systems use innovative technology to warn approaching drivers of the same message, which is the intersection ahead. The advantage of this safety countermeasure is that it also has the speed feedback component as well.

Priority: Low
Cost: Medium

5.2.3.Intersection Conflict Warning System

As stated in the identified concerns, Sugar Hill Road may not be readily visible or apparent to drivers approaching the intersection. As a result, people driving on Route 17 approaching the intersection may not see or be aware of vehicles entering the intersection. One countermeasure that states have used to provide awareness for drivers on the major road is an Intersection Conflict Warning System (ICWS) as shown in Figure 23.



Figure 23.Route 17 and Kings Cove Way Dynamic Intersection Warning Sign (Source: Google Street View)

An ICWS is composed of warning signs on the major road approach with flashers, as well as detector loops on the minor road approach. This system is then activated when a vehicle on the minor road approach is detected at the stop line. The warning sign and flashing assembly for the major road approach is then activated to indicate the presence of a vehicle approaching on the minor roadway at the intersection. ICWS with the configuration as described when installed on a four-lane major road with a two-lane minor road intersection approach has demonstrated a potential reduction of 31 percent in total crashes and 24 percent in angle crashes.[24] As stated in the discussion of the speed activated warning sign, this countermeasure

[24] Himes, S., F. Gross, K. Eccles, and B. Persaud. *Multi-State Safety Evaluation of Intersection Conflict Warning Systems (ICWS)*. Presented at the 95th Annual Meeting of the Transportation Research Board, Paper No. 16-4225, Washington, D.C. 2016.

warns drivers of the intersection ahead, meaning that the ICWS should only be implemented without the installation of a speed activated sign.

Potential disadvantages include When the flashers are not activated, mainline vehicle speeds may increase, as drivers would not expect any vehicle to be entering the intersection ahead. The proposed installation would place vehicle detector loops on Sugar Hill Road, with considerations for placement in the driveway directly within the intersection and potentially in the median with the channelized left turn. With several other driveways in the immediate vicinity of Sugar Hill Road, vehicles traveling on Route 17 may not expect others to enter from these access points if the flashers are not activated.

Priority: High
Cost: Medium

5.2.4.Coordinate Adjacent Signals for Platooning

With the future Nike Park Extension traffic signal, the signals along this portion of Route 17 are planned to become coordinated, meaning that the two signals adjacent to the study intersection with operate in tandem. As a result, the coordinated signals may help improve safety at the intersection by creating a platooning effect in both directions. Platoons may also help with speed management along the corridor, as high-speed drivers are subject to travel at speeds similar to that of the group. Often times, the speed of the platoon is dictated by the vehicles at the front of the group when the signal changes to green. Recent studies have investigated the safety effects of signal coordination and found that there is potential for crash reduction on arterials, particularly a result of the speed management effects of platooning.[25]

Priority: Low
Cost: Low

5.3. Additional No U-Turn Signage for Route 17

Given the issues with driver non-compliance making U-turns at the intersection, additional signage may be needed. The existing No U-turn sign for the southbound left turn lane is located in the median behind where drivers would be stopping in the turn lane. While this sign is visible to southbound drivers, it is possible for drivers to miss on the approach. An additional No U-turn could be placed in the grass area of the opposing median to reinforce the message.

Furthermore, new geometric alignment of the intersection will require new No U-turn restrictions to be posted for northbound Route 17, as proposed islands and median extensions would prohibit such

[25] Yue, R., Yang, G., Zheng, Y. et al. *Effects of traffic signal coordination on the safety performance of urban arterials*. Computational Urban Science. 2, 3. 2022.

movement. In addition to the geometric changes and enhanced signage, intermittent enforcement may also help with driver compliance of the no U-turn restriction.

Priority: High
Cost: Low

5.4. Access Management Along Southbound Route 17

Intersections with one driveway on the receiving side of an intersection may have 33 percent more crashes, whereas intersections with two driveways on the receiving side may have 76 percent more crashes than intersections without.[26] The receiving side of southbound Route 17 has two driveways within 50 feet of the intersection and five driveways within 250 feet. While access must be maintained to each parcel along the roadway, 15322 Carrollton Boulevard, Dashiell Landscaping, currently has two driveways, one falling within 50 feet of the intersection. Given that this driveway is also closely located to the driveway for the adjacent parcel at 15314 Carrollton Boulevard, removing the 15322 Carrollton Boulevard access point nearest to the intersection and leaving the driveway roughly 100 feet from the intersection would reduce the potential conflict points for drivers on Route 17, as well as those turning left from Sugar Hill Road.

This reduction in access points could reduce risk of angle crashes for those vehicles exiting the driveway, rear end crashes for those entering the intersection or continuing south on Route 17, as well as overall potential conflicts that drivers must be aware of within the study area. Drivers may not know which driveway the vehicle in front of them may be accessing when indicating a turn. This uncertainty can be lessened by reducing the number of potential driveways closely spaced along the corridor.

Priority: Low
Cost: Medium

5.5. Pavement Marking Improvements

5.5.1.Wider Edge Line Pavement Marking for Route 17

Increasing edge line pavement marking width can help reduce all crashes on rural roadways by 17.5 percent and fatal and injury crashes by 36.5 crashes.[27] This countermeasure targets single vehicle, fixed object, nighttime, and wet crashes. This is primarily because wider edge lines increase driver visibility of the pavement markings, which can help during conditions when visibility may be limited, particularly at night and during inclement weather, which is when many roadway departure crashes occur. Since the study area

[26] Le, T. Q., Gross, F., Harmon, T, & Eccles, K. *Safety Evaluation of Corner Clearance at Signalized Intersections*. Report No. 18-03676, Federal Highway Administration, Washington, D.C. 2018.
[27] Park, E.S., Carlson, P.J., Porter, R.J., and Anderson, C.K. *Safety effects of wider edge lines on rural, two-lane highways*. Accident Analysis and Prevention Vol. 48, pp. 317-325. 2012.

does have an occurrence of roadway departure and fixed object crashes, a wider edge line on Route 17 could be an effective safety countermeasure.



Figure 24. Widened Edge Line along Roadway (Source: Texas Transportation Institute)

The standard installation of edge lines in Virginia is a normal solid line on non-freeway facilities, which constitutes a 4-inch edge line. However, a wide edge line, as defined as twice the width of a normal line, may be used for greater emphasis (Section 3B.06, Line 07).[28] The upgrade of an 8-inch edge line from a 4-inch edge line on Route 17 could be implemented through the VDOT repaving program. This low-cost countermeasure can have significant benefit-cost ratios when installed during roadway resurfacing.

Priority: Medium
Cost: Low

5.5.2.Refurbish Existing Pavement Markings

The existing pavement markings at the intersection vary in condition, ranging from poor to fair. Refurbishing existing pavement markings at the intersection would help driver visibility and awareness of lane designations and stopping locations. Sugar Hill Road is scheduled for repaving during Summer 2023, which provides an opportunity to refurbish existing markings on the approach. Proposed geometric improvements at the intersection would also require new or enhanced pavement markings.

Priority: High
Cost: Low

5.5.3.Install Raised Pavement Markers during Repaving of Route 17

Upon repaving of Route 17, raised pavement markers could be installed along the edge lines and lane lines to help delineate the roadway. This treatment is particularly effective on roadways without any lighting, as

[28] Virginia Department of Transportation. *2011 Virginia Supplement to MUTCD (Revision 1)*. Part 3, Markings Section 3B.06. Virginia Department of Transportation. 2014.

they provide driver guidance through the reflection from headlights. Raised pavement markers are effective in reducing nighttime crashes up to 31 percent and total crashes up to 25 percent on rural roads with an AADT of less than 20,000 VPD when paired with restriping.[29]

Priority: Medium
Cost: Low

5.6. Intersection Lighting

There is currently no lighting present at the intersection, nor along Route 17 between the James River Drawbridge and Suffolk. However, it was noted on site by representatives from the community that the intersection is very dark during night hours. There were three (3) night crashes, with one involving a deer, one involving a northbound U-turn and vehicle turning left from Sugar Hill Road, and another involving a northbound through vehicle and a left turning vehicle from Sugar Hill Road. Although there is not a pattern of nighttime crashes, the study team reviewed lighting as a potential safety countermeasure given the effectiveness in reducing crashes at rural intersections (32.6 percent reduction in angle crashes).[30]

Typical warranting criteria for uncontrolled intersections in rural and suburban areas includes traffic volume, nighttime crash rate or history, presence of pedestrians and bicyclists, and intersection geometry. However, neither Virginia nor Federal guidance currently have warranting criteria for lighting at a free-standing intersection. In this case, VDOT currently has criteria (IIM-TE-390) related to the installation of lighting on roadways, including at intersections and roundabouts. It states that lighting, similar to a traffic signal, must be warranted and justified.[31] Specifically, at uncontrolled intersections the guidance states that lighting may be considered and recommends using selection criteria outlined in the FHWA guide, *Design Criteria for Adaptive Roadway Lighting*.[32] Within the FHWA guide, it states that street lighting should be determined by a classification system including variables such as speed, AADT, median presence, intersection density, parking presence, pedestrian and bicyclist presence, ambient luminance, and roadway guidance. Using the criteria, this intersection is classified as an S5, which does not align with VDOT guidance to install lighting at S1 and S2 locations.

Lighting at the intersection may be considered as a future improvement depending on crash patterns and development of the surrounding land use. However, lighting improvements for the study area are not recommended currently.

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[29] Sun, X. and Das. S. *Developing Louisiana Crash Reduction Factors*, Louisiana DOT Final Report, FHWA/LA.12/506, October 2013.
[30] Ye, X., Pendyala, R.M., Washington, S.P., Konduri, K., and Oh, J. *A Simultaneous Equations Model of Crash Frequency By Collision Type for Rural Intersections*. 87th Annual Meeting of the Transportation Research Board, TRB 2008 Annual Meeting CD-ROM. 2008.
[31] Virginia Department of Transportation. *IIM TE-390 Guidance on Light Emitting Diode (LED) Exterior Lighting*. Virginia Department of Transportation. 2019
[32] Gibbons, Ronald B. et al. *Design Criteria for Adaptive Roadway Lighting*. Report No. HRT-14-051, Federal Highway Administration, Washington, D.C. 2014.

Priority: N/A
Cost: High

6. Conclusions

The study team has taken into consideration the existing conditions, community feedback, and identified safety concerns at the site to develop a prioritized list of recommendations. To determine the benefit-cost ratio for each improvement, the CMF for each countermeasure must be identified using the Virginia List of Preferred CMFs and CMF Clearinghouse. Not all safety countermeasures had a CMF or reliable CMF, so potential benefits of such countermeasure are unable to be determined.

Table 5 outlines a prioritized list of the various countermeasures proposed in this study, along with each of the safety concerns that it addresses. The table also includes the time needed for implementation and cost of each countermeasure in relative terms.

Table 5. Summary of Recommended Safety Countermeasures and Associated CMFs, Implementation Time, and Cost

Time Needed to Implement	Countermeasure	Addresses Concern(s)	CMF	Cost	Unit
Short	Additional No U-Turn Signage for Route 17 (north and southbound)	Driver Noncompliance making U-Turns in Southbound Direction	0.949	$20,000	4 signs
Short	Refurbish Existing Pavement Markings	Worn Pavement Markings	0.75	$20,000	per project
Short	Optical Speed Bars or Transverse Markings	Sight Distance/Gap Acceptance, High Speeds	N/A	$50,000	2-lanes, each direction
Intermediate	Wider Edge Line Pavement Marking for Route 17	Roadside Hazards	0.825	$40,000	Additional cost per mile (4" to 8")
Intermediate	Raised Pavement Markers on Route 17 (with restriping)	Lighting	0.75	$110,000	per mile
Intermediate	Intersection Conflict Warning System	Sight Distance/Gap Acceptance	0.69*	$410,000	each direction
Intermediate	Coordinate Adjacent Signals for Platooning	Sight Distance/Gap Acceptance, High Speeds	N/A	$15,000	2 signals
Intermediate	Access Management Along Southbound Route 17	Noncompliant Access, Roadside Hazards	0.98~	$150,000	1 driveway
Intermediate	Geometric Improvements: Offset Right Turn Lane, Offset Stop Line, Tightened Corner Radius for Right Turn onto Route 17	Sight Distance/Gap Acceptance	0.45~	$320,000	per project
Long	Extend Left Turn Lane	Short Southbound Left Turn Lane	0.95	$1,050,000	per project
Long	Continuous Green T	Sight Distance/Gap Acceptance, High Speeds	0.96	$3,720,000	per project

Some high priority items will require additional time for implementation versus others. For example, the refurbishment of existing markings, installation of the additional no U-turn sign, and intersection conflict warning system are likely to be installed prior to the implementation of the offset right turn lane and geometric improvements. Such redesigns will require additional engineering and assembly of plans for construction. Similarly, medium priority countermeasures may also be able to be installed prior to intermediate term improvements.

Potential long-term improvements at the intersection could include the preferred redesign of the intersection to a full Continuous Green T, which would include an acceleration lane in addition to the proposed channelization discussed in Section 5.1. Another potential intersection design could be an RCUT, which would only allow left turns from Route 17, and no left turns from Sugar Hill Road or the driveway at 15314 Carrollton Boulevard. Both intersection designs should consider the long-term vision for the corridor, which may include a shared use path along Route 17. The Continuous Green T is not conducive to pedestrian crossings on the major road, while the RCUT may be confusing due to the geometry, which requires a diagonal crosswalk across the major road.

Next steps for this study include a formal response from the roadway owner, VDOT, with coordination from Isle of Wight County. This formal response will include a list of preferred alternatives of the several defined in this document, estimated costs, and delegation of the actions to each responsible party. It also includes an explanation on the feasibility and benefit/cost analysis of each of the recommendations proposed, including which safety countermeasures will move forward into implementation. Ultimately, the intent of these actions is to submit the short-term recommendations for funding through the VDOT HSIP program.

Appendix A – Turning Movement Data

Peggy Malone and Associates
904-992-8072

File Name : US 17 & Sugar Hill Rd
Site Code :
Start Date : 6/9/2022
Page No : 1

Groups Printed- Cars

	Business Entrance Eastbound					Sugar Hill Rd Westbound					US 17 Southbound					US 17 Northbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	22	0	32	0	54	9	180	0	0	189	0	129	2	0	131	374
07:15 AM	1	0	0	0	1	18	0	24	0	42	15	181	0	0	196	1	131	2	0	134	373
07:30 AM	0	0	0	0	0	13	0	36	0	49	4	199	0	0	203	0	144	6	0	150	402
07:45 AM	0	0	0	0	0	13	0	23	0	36	6	160	0	0	166	1	133	6	0	140	342
Total	1	0	0	0	1	66	0	115	0	181	34	720	0	0	754	2	537	16	0	555	1491
08:00 AM	0	0	0	0	0	14	0	25	0	39	7	152	0	0	159	3	145	4	0	152	350
08:15 AM	0	0	0	0	0	18	0	36	0	54	11	140	0	0	151	0	120	9	0	129	334
08:30 AM	0	0	0	0	0	13	0	24	0	37	5	134	0	0	139	0	147	5	0	152	328
08:45 AM	0	0	0	0	0	3	0	21	0	24	22	113	0	0	135	0	116	4	0	120	279
Total	0	0	0	0	0	48	0	106	0	154	45	539	0	0	584	3	528	22	0	553	1291
09:00 AM	0	0	0	0	0	7	0	11	0	18	12	123	0	0	135	1	88	8	0	97	250
09:15 AM	0	0	0	0	0	7	0	18	0	25	12	105	0	0	117	0	114	6	0	120	262
09:30 AM	0	0	0	0	0	7	0	13	0	20	7	112	0	0	119	0	111	13	0	124	263
09:45 AM	0	0	0	0	0	9	0	20	0	29	14	119	0	0	133	0	112	13	0	125	287
Total	0	0	0	0	0	30	0	62	0	92	45	459	0	0	504	1	425	40	0	466	1062
10:00 AM	0	0	0	0	0	7	0	15	0	22	10	114	0	0	124	0	128	5	0	133	279
10:15 AM	0	0	0	0	0	8	0	12	0	20	19	116	0	0	135	0	109	6	0	115	270
10:30 AM	0	0	0	0	0	7	0	15	0	22	12	117	0	0	129	0	128	4	0	132	283
10:45 AM	1	0	0	0	1	11	0	15	0	26	17	123	0	0	140	1	106	9	0	116	283
Total	1	0	0	0	1	33	0	57	0	90	58	470	0	0	528	1	471	24	0	496	1115
11:00 AM	0	0	0	0	0	7	0	19	0	26	12	121	0	0	133	0	112	11	0	123	282
11:15 AM	0	0	0	0	0	10	0	14	0	24	12	112	0	0	124	0	103	8	0	111	259
11:30 AM	0	0	0	0	0	11	0	18	0	29	16	107	1	0	124	0	127	16	0	143	296
11:45 AM	0	0	0	0	0	6	0	16	0	22	17	107	0	0	124	0	117	8	0	125	271
Total	0	0	0	0	0	34	0	67	0	101	57	447	1	0	505	0	459	43	0	502	1108
12:00 PM	0	0	0	0	0	10	0	19	0	29	15	117	0	0	132	0	113	9	0	122	283
12:15 PM	0	0	0	0	0	7	0	22	0	29	19	137	0	0	156	0	133	11	0	144	329
12:30 PM	0	0	0	0	0	10	0	22	0	32	20	146	0	0	166	0	102	10	0	112	310
12:45 PM	0	0	0	0	0	7	0	12	0	19	22	88	0	0	110	0	142	5	0	147	276
Total	0	0	0	0	0	34	0	75	0	109	76	488	0	0	564	0	490	35	0	525	1198
01:00 PM	0	0	0	0	0	11	0	20	0	31	17	135	0	0	152	0	126	10	0	136	319
01:15 PM	0	0	0	0	0	5	0	15	0	20	25	115	0	0	140	1	113	8	0	122	282
01:30 PM	0	0	1	0	1	6	0	15	0	21	24	126	0	0	150	0	115	9	0	124	296
01:45 PM	0	0	0	0	0	5	0	18	0	23	11	134	0	0	145	0	128	11	0	139	307
Total	0	0	1	0	1	27	0	68	0	95	77	510	0	0	587	1	482	38	0	521	1204
02:00 PM	0	0	0	0	0	5	0	23	0	28	18	119	0	0	137	1	123	16	0	140	305
02:15 PM	2	0	0	0	2	1	0	24	0	25	28	132	1	0	161	1	114	15	0	130	318
02:30 PM	0	0	0	0	0	7	0	20	0	27	24	140	0	0	164	0	187	10	0	197	388
02:45 PM	0	0	0	0	0	12	0	18	0	30	26	143	0	0	169	0	194	12	0	206	405
Total	2	0	0	0	2	25	0	85	0	110	96	534	1	0	631	2	618	53	0	673	1416
03:00 PM	0	0	0	0	0	9	0	16	0	25	26	207	0	0	233	0	189	8	0	197	455
03:15 PM	0	0	0	0	0	7	0	23	0	30	17	145	0	0	162	0	208	17	0	225	417
03:30 PM	0	0	0	0	0	9	0	21	0	30	24	175	0	0	199	1	219	16	0	236	465
03:45 PM	1	0	0	0	1	8	0	13	0	21	32	188	0	0	220	1	193	14	0	208	450
Total	1	0	0	0	1	33	0	73	0	106	99	715	0	0	814	2	809	55	0	866	1787
04:00 PM	0	0	0	0	0	8	0	15	0	23	31	201	0	0	232	0	202	10	0	212	467
04:15 PM	1	0	0	0	1	7	0	16	0	23	30	189	0	0	219	0	223	15	0	238	481
04:30 PM	0	0	0	0	0	9	0	24	0	33	33	245	0	0	278	0	211	17	0	228	539
04:45 PM	0	0	0	0	0	4	0	23	0	27	26	282	0	0	308	0	287	12	0	299	634
Total	1	0	0	0	1	28	0	78	0	106	120	917	0	0	1037	0	923	54	0	977	2121
05:00 PM	0	0	0	0	0	5	0	31	0	36	38	250	0	0	288	3	349	13	0	365	689
05:15 PM	0	0	0	0	0	10	0	24	0	34	39	299	0	0	338	0	330	7	0	337	709
05:30 PM	0	0	0	0	0	14	0	19	0	33	32	281	0	0	313	0	355	18	0	373	719
05:45 PM	0	0	0	0	0	6	0	22	0	28	33	218	0	0	251	0	333	15	0	348	627
Total	0	0	0	0	0	35	0	96	0	131	142	1048	0	0	1190	3	1367	53	0	1423	2744
06:00 PM	0	0	0	0	0	7	0	18	0	25	27	269	0	0	296	0	318	13	0	331	652
06:15 PM	0	0	0	0	0	15	0	15	0	30	21	304	0	0	325	0	303	19	0	322	677
06:30 PM	0	0	0	0	0	2	0	11	0	13	20	190	0	0	210	1	231	20	0	252	475
06:45 PM	0	0	1	0	1	6	0	13	0	19	31	147	1	0	179	0	151	11	0	162	361
Total	0	0	1	0	1	30	0	57	0	87	99	910	1	0	1010	1	1003	63	0	1067	2165

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904-992-8072

File Name : US 17 & Sugar Hill Rd
Site Code :
Start Date : 6/9/2022
Page No : 2

Groups Printed- Cars

	Business Entrance Eastbound					Sugar Hill Rd Westbound					US 17 Southbound					US 17 Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Grand Total	6	0	2	0	8	423	0	939	0	1362	948	7757	3	0	8708	16	8112	496	0	8624	18702
Apprch %	75	0	25	0		31.1	0	68.9	0		10.9	89.1	0	0		0.2	94.1	5.8	0		
Total %	0	0	0	0	0	2.3	0	5	0	7.3	5.1	41.5	0	0	46.6	0.1	43.4	2.7	0	46.1	

	Business Entrance Eastbound				Sugar Hill Rd Westbound				US 17 Southbound				US 17 Northbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	**22**	0	32	**54**	9	180	0	189	0	129	2	131	374
07:15 AM	**1**	0	0	**1**	18	0	24	42	**15**	181	0	196	**1**	131	2	134	373
07:30 AM	0	0	0	0	13	0	**36**	49	4	**199**	0	**203**	0	**144**	**6**	**150**	**402**
07:45 AM	0	0	0	0	13	0	23	36	6	160	0	166	1	133	6	140	342
Total Volume	1	0	0	1	66	0	115	181	34	720	0	754	2	537	16	555	1491
% App. Total	100	0	0		36.5	0	63.5		4.5	95.5	0		0.4	96.8	2.9		
PHF	.250	.000	.000	.250	.750	.000	.799	.838	.567	.905	.000	.929	.500	.932	.667	.925	.927
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	4	0	23	27	26	282	0	308	0	287	12	299	634
05:00 PM	0	0	0	0	5	0	**31**	**36**	38	250	0	288	**3**	349	13	365	689
05:15 PM	0	0	0	0	10	0	24	34	**39**	**299**	0	**338**	0	330	7	337	709
05:30 PM	0	0	0	0	**14**	0	19	33	32	281	0	313	0	**355**	**18**	**373**	**719**
Total Volume	0	0	0	0	33	0	97	130	135	1112	0	1247	3	1321	50	1374	2751
% App. Total	0	0	0		25.4	0	74.6		10.8	89.2	0		0.2	96.1	3.6		
PHF	.000	.000	.000	.000	.589	.000	.782	.903	.865	.930	.000	.922	.250	.930	.694	.921	.957

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File Name : US 17 & Sugar Hill Rd
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Groups Printed- Trucks

	Business Entrance Eastbound					Sugar Hill Rd Westbound					US 17 Southbound					US 17 Northbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	7	0	0	7	10
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	7	0	0	7	12
07:30 AM	0	0	0	0	0	0	0	0	0	0	1	10	0	0	11	0	8	1	0	9	20
07:45 AM	0	0	0	0	0	0	0	2	0	2	2	10	0	0	12	0	8	0	0	8	22
Total	0	0	0	0	0	0	0	2	0	2	3	28	0	0	31	0	30	1	0	31	64
08:00 AM	0	0	0	0	0	0	0	0	0	0	1	7	0	0	8	0	3	0	0	3	11
08:15 AM	0	0	0	0	0	0	0	2	0	2	0	2	0	0	2	0	11	1	0	12	16
08:30 AM	0	0	0	0	0	0	0	1	0	1	0	9	0	0	9	0	10	1	0	11	21
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	0	11	0	0	11	19
Total	0	0	0	0	0	0	0	3	0	3	1	26	0	0	27	0	35	2	0	37	67
09:00 AM	0	0	0	0	0	0	0	0	0	0	1	9	0	0	10	0	7	1	0	8	18
09:15 AM	0	0	0	0	0	1	0	0	0	1	0	9	0	0	9	0	6	1	0	7	17
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	9	1	0	10	13
09:45 AM	0	0	0	0	0	1	0	0	0	1	0	10	0	0	10	0	7	0	0	7	18
Total	0	0	0	0	0	2	0	0	0	2	1	31	0	0	32	0	29	3	0	32	66
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	12	0	0	12	0	5	0	0	5	17
10:15 AM	0	0	0	0	0	1	0	0	0	1	1	10	0	0	11	0	14	0	0	14	26
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	0	6	1	0	7	15
10:45 AM	0	0	0	0	0	0	0	2	0	2	0	12	1	0	13	0	9	1	0	10	25
Total	0	0	0	0	0	1	0	2	0	3	1	42	1	0	44	0	34	2	0	36	83
11:00 AM	1	0	0	0	1	1	0	0	0	1	0	8	0	0	8	0	6	0	0	6	16
11:15 AM	0	0	0	0	0	0	0	1	0	1	0	14	0	0	14	0	6	0	0	6	21
11:30 AM	0	0	0	0	0	0	0	0	0	0	1	4	0	0	5	0	2	0	0	2	7
11:45 AM	0	0	0	0	0	0	0	1	0	1	1	10	0	0	11	0	5	0	0	5	17
Total	1	0	0	0	1	1	0	2	0	3	2	36	0	0	38	0	19	0	0	19	61
12:00 PM	0	0	0	0	0	1	0	0	0	1	0	9	0	0	9	0	14	0	0	14	24
12:15 PM	0	0	0	0	0	0	0	0	0	0	2	7	0	0	9	0	7	0	0	7	16
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	7	2	0	9	14
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	11	0	0	11	0	5	0	0	5	16
Total	0	0	0	0	0	1	0	0	0	1	2	32	0	0	34	0	33	2	0	35	70
01:00 PM	0	0	0	0	0	1	0	1	0	2	0	17	0	0	17	1	9	1	0	11	30
01:15 PM	0	0	0	0	0	0	0	0	0	0	1	7	0	0	8	0	11	1	0	12	20
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	11	0	0	11	0	7	0	0	7	18
01:45 PM	0	0	0	0	0	0	0	1	0	1	1	6	0	0	7	0	9	2	0	11	19
Total	0	0	0	0	0	1	0	2	0	3	2	41	0	0	43	1	36	4	0	41	87
02:00 PM	0	0	1	0	1	1	0	1	0	2	0	5	0	0	5	0	5	1	0	6	14
02:15 PM	0	0	0	0	0	1	0	0	0	1	0	7	0	0	7	0	5	1	0	6	14
02:30 PM	0	0	0	0	0	0	0	1	0	1	0	14	0	0	14	0	6	0	0	6	21
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	7	0	0	7	0	6	0	0	6	13
Total	0	0	1	0	1	2	0	2	0	4	0	33	0	0	33	0	22	2	0	24	62
03:00 PM	0	0	0	0	0	1	0	1	0	2	2	8	0	0	10	0	4	0	0	4	16
03:15 PM	0	0	0	0	0	1	0	4	0	5	1	7	0	0	8	0	9	1	0	10	23
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	6	0	0	6	12
03:45 PM	0	0	0	0	0	0	0	2	0	2	1	14	0	0	15	0	9	0	0	9	26
Total	0	0	0	0	0	2	0	7	0	9	4	35	0	0	39	0	28	1	0	29	77
04:00 PM	0	0	0	0	0	0	0	1	0	1	1	5	0	0	6	0	4	0	0	4	11
04:15 PM	0	0	0	0	0	0	0	1	0	1	0	7	0	0	7	0	6	1	0	7	15
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	0	1	0	0	1	11
04:45 PM	0	0	0	0	0	0	0	1	0	1	1	5	0	0	6	0	9	0	0	9	16
Total	0	0	0	0	0	0	0	3	0	3	2	27	0	0	29	0	20	1	0	21	53
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	0	5	0	0	5	13
05:15 PM	0	0	0	0	0	0	0	1	0	1	0	8	0	0	8	0	6	0	0	6	15
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	13	0	0	13	0	7	0	0	7	20
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	0	5	0	0	5	13
Total	0	0	0	0	0	0	0	1	0	1	0	37	0	0	37	0	23	0	0	23	61
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	0	8	0	0	8	16
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	10	0	0	10	15
06:30 PM	0	0	0	0	0	0	0	1	0	1	1	7	0	0	8	0	8	0	0	8	17
06:45 PM	0	0	0	0	0	0	0	1	0	1	0	5	0	0	5	0	0	0	0	0	6
Total	0	0	0	0	0	0	0	2	0	2	1	25	0	0	26	0	26	0	0	26	54

Peggy Malone and Associates
904-992-8072

File Name : US 17 & Sugar Hill Rd
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Groups Printed- Trucks

	Business Entrance Eastbound					Sugar Hill Rd Westbound					US 17 Southbound					US 17 Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Grand Total	1	0	1	0	2	10	0	26	0	36	19	393	1	0	413	1	335	18	0	354	805
Apprch %	50	0	50	0		27.8	0	72.2	0		4.6	95.2	0.2	0		0.3	94.6	5.1	0		
Total %	0.1	0	0.1	0	0.2	1.2	0	3.2	0	4.5	2.4	48.8	0.1	0	51.3	0.1	41.6	2.2	0	44	

	Business Entrance Eastbound				Sugar Hill Rd Westbound				US 17 Southbound				US 17 Northbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 10:00 AM																	
10:00 AM	0	0	0	0	0	0	0	0	0	**12**	0	12	0	5	0	5	17
10:15 AM	0	0	0	0	**1**	0	0	1	**1**	10	0	11	0	**14**	0	**14**	**26**
10:30 AM	0	0	0	0	0	0	0	0	0	8	0	8	0	6	**1**	7	15
10:45 AM	0	0	0	0	0	0	**2**	**2**	0	12	**1**	**13**	0	9	1	10	25
Total Volume	0	0	0	0	1	0	2	3	1	42	1	44	0	34	2	36	83
% App. Total	0	0	0		33.3	0	66.7		2.3	95.5	2.3		0	94.4	5.6		
PHF	.000	.000	.000	.000	.250	.000	.250	.375	.250	.875	.250	.846	.000	.607	.500	.643	.798
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:00 PM																	
01:00 PM	0	0	0	0	**1**	0	**1**	**2**	0	**17**	0	**17**	**1**	9	1	11	**30**
01:15 PM	0	0	0	0	0	0	0	0	**1**	7	0	8	0	**11**	1	**12**	20
01:30 PM	0	0	0	0	0	0	0	0	0	11	0	11	0	7	0	7	18
01:45 PM	0	0	0	0	0	0	1	1	1	6	0	7	0	9	**2**	11	19
Total Volume	0	0	0	0	1	0	2	3	2	41	0	43	1	36	4	41	87
% App. Total	0	0	0		33.3	0	66.7		4.7	95.3	0		2.4	87.8	9.8		
PHF	.000	.000	.000	.000	.250	.000	.500	.375	.500	.603	.000	.632	.250	.818	.500	.854	.725

Peggy Malone and Associates
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File Name : US 17 & Sugar Hill Rd
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Groups Printed- Bicycles on Crosswalk

	Business Entrance Eastbound					Sugar Hill Rd Westbound					US 17 Southbound					US 17 Northbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peggy Malone and Associates
904-992-8072

File Name : US 17 & Sugar Hill Rd
Site Code :
Start Date : 6/9/2022

Groups Printed- Bicycles on Crosswalk

	Business Entrance Eastbound					Sugar Hill Rd Westbound					US 17 Southbound					US 17 Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

	Business Entrance Eastbound				Sugar Hill Rd Westbound				US 17 Southbound				US 17 Northbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Peggy Malone and Associates
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Groups Printed- Pedestrians

	Business Entrance Eastbound					Sugar Hill Rd Westbound					US 17 Southbound					US 17 Northbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peggy Malone and Associates
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File Name : US 17 & Sugar Hill Rd
Site Code :
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Groups Printed- Pedestrians

	Business Entrance Eastbound					Sugar Hill Rd Westbound					US 17 Southbound					US 17 Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Grand Total	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Apprch %	0	0	0	100		0	0	0	0		0	0	0	0		0	0	0	0		
Total %	0	0	0	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

	Business Entrance Eastbound				Sugar Hill Rd Westbound				US 17 Southbound				US 17 Northbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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Groups Printed- Combined

	Business Entrance Eastbound					Sugar Hill Rd Westbound					US 17 Southbound					US 17 Northbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	22	0	32	0	54	9	183	0	0	192	0	136	2	0	138	384
07:15 AM	1	0	0	0	1	18	0	24	0	42	15	186	0	0	201	1	138	2	0	141	385
07:30 AM	0	0	0	0	0	13	0	36	0	49	5	209	0	0	214	0	152	7	0	159	422
07:45 AM	0	0	0	0	0	13	0	25	0	38	8	170	0	0	178	1	141	6	0	148	364
Total	1	0	0	0	1	66	0	117	0	183	37	748	0	0	785	2	567	17	0	586	1555
08:00 AM	0	0	0	0	0	14	0	25	0	39	8	159	0	0	167	3	148	4	0	155	361
08:15 AM	0	0	0	0	0	18	0	38	0	56	11	142	0	0	153	0	131	10	0	141	350
08:30 AM	0	0	0	0	0	13	0	25	0	38	5	143	0	0	148	0	157	6	0	163	349
08:45 AM	0	0	0	0	0	3	0	21	0	24	22	121	0	0	143	0	127	4	0	131	298
Total	0	0	0	0	0	48	0	109	0	157	46	565	0	0	611	3	563	24	0	590	1358
09:00 AM	0	0	0	0	0	7	0	11	0	18	13	132	0	0	145	1	95	9	0	105	268
09:15 AM	0	0	0	0	0	8	0	18	0	26	12	114	0	0	126	0	120	7	0	127	279
09:30 AM	0	0	0	0	0	7	0	13	0	20	7	115	0	0	122	0	120	14	0	134	276
09:45 AM	0	0	0	0	0	10	0	20	0	30	14	129	0	0	143	0	119	13	0	132	305
Total	0	0	0	0	0	32	0	62	0	94	46	490	0	0	536	1	454	43	0	498	1128
10:00 AM	0	0	0	0	0	7	0	15	0	22	10	126	0	0	136	0	133	5	0	138	296
10:15 AM	0	0	0	0	0	9	0	12	0	21	20	126	0	0	146	0	123	6	0	129	296
10:30 AM	0	0	0	0	0	7	0	15	0	22	12	125	0	0	137	0	134	5	0	139	298
10:45 AM	1	0	0	0	1	11	0	17	0	28	17	135	1	0	153	1	115	10	0	126	308
Total	1	0	0	0	1	34	0	59	0	93	59	512	1	0	572	1	505	26	0	532	1198
11:00 AM	1	0	0	0	1	8	0	19	0	27	12	129	0	0	141	0	118	11	0	129	298
11:15 AM	0	0	0	0	0	10	0	15	0	25	12	126	0	0	138	0	109	8	0	117	280
11:30 AM	0	0	0	0	0	11	0	18	0	29	17	111	1	0	129	0	129	16	0	145	303
11:45 AM	0	0	0	1	1	6	0	17	0	23	18	117	0	0	135	0	122	8	0	130	289
Total	1	0	0	1	2	35	0	69	0	104	59	483	1	0	543	0	478	43	0	521	1170
12:00 PM	0	0	0	0	0	11	0	19	0	30	15	126	0	0	141	0	127	9	0	136	307
12:15 PM	0	0	0	0	0	7	0	22	0	29	21	144	0	0	165	0	140	11	0	151	345
12:30 PM	0	0	0	0	0	10	0	22	0	32	20	151	0	0	171	0	109	12	0	121	324
12:45 PM	0	0	0	0	0	7	0	12	0	19	22	99	0	0	121	0	147	5	0	152	292
Total	0	0	0	0	0	35	0	75	0	110	78	520	0	0	598	0	523	37	0	560	1268
01:00 PM	0	0	0	0	0	12	0	21	0	33	17	152	0	0	169	1	135	11	0	147	349
01:15 PM	0	0	0	1	1	5	0	15	0	20	26	122	0	0	148	1	124	9	0	134	303
01:30 PM	0	0	1	0	1	6	0	15	0	21	24	137	0	0	161	0	122	9	0	131	314
01:45 PM	0	0	0	0	0	5	0	19	0	24	12	140	0	0	152	0	137	13	0	150	326
Total	0	0	1	1	2	28	0	70	0	98	79	551	0	0	630	2	518	42	0	562	1292
02:00 PM	0	0	1	0	1	6	0	24	0	30	18	124	0	0	142	1	128	17	0	146	319
02:15 PM	2	0	0	0	2	2	0	24	0	26	28	139	1	0	168	1	119	16	0	136	332
02:30 PM	0	0	0	0	0	7	0	21	0	28	24	154	0	0	178	0	193	10	0	203	409
02:45 PM	0	0	0	0	0	12	0	18	0	30	26	150	0	0	176	0	200	12	0	212	418
Total	2	0	1	0	3	27	0	87	0	114	96	567	1	0	664	2	640	55	0	697	1478
03:00 PM	0	0	0	0	0	10	0	17	0	27	28	215	0	0	243	0	193	8	0	201	471
03:15 PM	0	0	0	0	0	8	0	27	0	35	18	152	0	0	170	0	217	18	0	235	440
03:30 PM	0	0	0	0	0	9	0	21	0	30	24	181	0	0	205	1	225	16	0	242	477
03:45 PM	1	0	0	0	1	8	0	15	0	23	33	202	0	0	235	1	202	14	0	217	476
Total	1	0	0	0	1	35	0	80	0	115	103	750	0	0	853	2	837	56	0	895	1864
04:00 PM	0	0	0	0	0	8	0	16	0	24	32	206	0	0	238	0	206	10	0	216	478
04:15 PM	1	0	0	0	1	7	0	17	0	24	30	196	0	0	226	0	229	16	0	245	496
04:30 PM	0	0	0	0	0	9	0	24	0	33	33	255	0	0	288	0	212	17	0	229	550
04:45 PM	0	0	0	0	0	4	0	24	0	28	27	287	0	0	314	0	296	12	0	308	650
Total	1	0	0	0	1	28	0	81	0	109	122	944	0	0	1066	0	943	55	0	998	2174
05:00 PM	0	0	0	0	0	5	0	31	0	36	38	258	0	0	296	3	354	13	0	370	702
05:15 PM	0	0	0	0	0	10	0	25	0	35	39	307	0	0	346	0	336	7	0	343	724
05:30 PM	0	0	0	0	0	14	0	19	0	33	32	294	0	0	326	0	362	18	0	380	739
05:45 PM	0	0	0	0	0	6	0	22	0	28	33	226	0	0	259	0	338	15	0	353	640
Total	0	0	0	0	0	35	0	97	0	132	142	1085	0	0	1227	3	1390	53	0	1446	2805
06:00 PM	0	0	0	0	0	7	0	18	0	25	27	277	0	0	304	0	326	13	0	339	668
06:15 PM	0	0	0	0	0	15	0	15	0	30	21	309	0	0	330	0	313	19	0	332	692
06:30 PM	0	0	0	0	0	2	0	12	0	14	21	197	0	0	218	1	239	20	0	260	492
06:45 PM	0	0	1	0	1	6	0	14	0	20	31	152	1	0	184	0	151	11	0	162	367
Total	0	0	1	0	1	30	0	59	0	89	100	935	1	0	1036	1	1029	63	0	1093	2219

Peggy Malone and Associates
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File Name : US 17 & Sugar Hill Rd
Site Code :
Start Date : 6/9/2022

Groups Printed- Combined

	Business Entrance Eastbound					Sugar Hill Rd Westbound					US 17 Southbound					US 17 Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Grand Total	7	0	3	2	12	433	0	965	0	1398	967	8150	4	0	9121	17	8447	514	0	8978	19509
Apprch %	58.3	0	25	16.7		31	0	69	0		10.6	89.4	0	0		0.2	94.1	5.7	0		
Total %	0	0	0	0	0.1	2.2	0	4.9	0	7.2	5	41.8	0	0	46.8	0.1	43.3	2.6	0	46	

	Business Entrance Eastbound				Sugar Hill Rd Westbound				US 17 Southbound				US 17 Northbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	**22**	0	32	**54**	9	183	0	192	0	136	2	138	384
07:15 AM	**1**	0	0	**1**	18	0	24	42	**15**	186	0	201	**1**	138	2	141	385
07:30 AM	0	0	0	0	13	0	**36**	49	5	**209**	0	**214**	0	**152**	**7**	**159**	**422**
07:45 AM	0	0	0	0	13	0	25	38	8	170	0	178	1	141	6	148	364
Total Volume	1	0	0	1	66	0	117	183	37	748	0	785	2	567	17	586	1555
% App. Total	100	0	0		36.1	0	63.9		4.7	95.3	0		0.3	96.8	2.9		
PHF	.250	.000	.000	.250	.750	.000	.813	.847	.617	.895	.000	.917	.500	.933	.607	.921	.921
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	4	0	24	28	27	287	0	314	0	296	12	308	650
05:00 PM	0	0	0	0	5	0	**31**	**36**	38	258	0	296	**3**	354	13	370	702
05:15 PM	0	0	0	0	10	0	25	35	**39**	**307**	0	**346**	0	336	7	343	724
05:30 PM	0	0	0	0	**14**	0	19	33	32	294	0	326	0	**362**	**18**	**380**	**739**
Total Volume	0	0	0	0	33	0	99	132	136	1146	0	1282	3	1348	50	1401	2815
% App. Total	0	0	0		25	0	75		10.6	89.4	0		0.2	96.2	3.6		
PHF	.000	.000	.000	.000	.589	.000	.798	.917	.872	.933	.000	.926	.250	.931	.694	.922	.952

Appendix B – Speed Data

Hampton Roads Traffic Engineering
Speed Bins with Grand Total

CustomList-156 -- English (ENU)

Datasets:

Site:	**[IW-0017-20230809-SP] Isle of Wight Rte. 17-Sugerhill NB Serial #VD72VEQJ**
Attribute:	Location 1 of 2
Direction:	1 - North bound, A trigger first. **Lane:** 0
Survey Duration:	8:52 Wednesday, August 9, 2023 => 14:01 Friday, August 11, 2023,
Zone:	
File:	IW-0017-20230809-SP 0 2023-08-11 1402.EC0 (Plus)
Identifier:	VD72VEQJ MC5900-X13 (c)MetroCount 09Nov16
Algorithm:	Factory default axle (v5.07)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**0:00 Thursday, August 10, 2023 => 0:00 Friday, August 11, 2023 (1)**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	North, East, South, West (bound), P = North, Lane = 0-16
Separation:	Headway > 0 sec, Span 0 - 300 ft
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F3)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)

Column Legend:

0	**[Time]**	24-hour time (0000 - 2359)
1	**[Total]**	Number in time step
2	**[Vbin]**	Speed bin totals
3	**[Mean]**	Average speed
4	**[Vpp]**	Percentile speed

*** Grand Total**

Time	Total	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Mean	Vpp
<--		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95		85
		10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100		
--	9690	0	0	9	0	0	9	65	285	896	1989	2789	2541	919	151	28	7	1	1	0	57.5	64.0

Vehicles = 9690
Posted speed limit = 55 mph, Exceeding = 6437 (66.43%), Mean Exceeding = 61.20 mph
Maximum = 91.2 mph, **Minimum** = 15.8 mph, **Mean** = 57.5 mph
85% Speed = 63.98 mph, **50% Speed** = 58.05 mph, **Median** = 58.05 mph
10 mph Pace = 53 - 63, **Number in Pace** = 5454 (56.28%)
Variance = 44.68, **Standard Deviation** = 6.68 mph

In profile: Vehicles = 9690 / 18770 (51.62%)

* Thursday, August 10, 2023

Time	Total	Vbin 5	Vbin 10	Vbin 15	Vbin 20	Vbin 25	Vbin 30	Vbin 35	Vbin 40	Vbin 45	Vbin 50	Vbin 55	Vbin 60	Vbin 65	Vbin 70	Vbin 75	Vbin 80	Vbin 85	Vbin 90	Vbin 95	Mean	Vpp 85
<--		10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100		
0000	15	0	0	0	0	0	0	0	0	1	3	1	6	3	1	0	0	0	0	0	60.6	66.1
0015	13	0	0	0	0	0	0	0	1	3	4	2	3	0	0	0	0	0	0	0	54.1	61.3
0030	15	0	0	0	0	0	0	0	0	1	4	4	4	2	0	0	0	0	0	0	57.8	65.0
0045	9	0	0	0	0	0	0	0	1	1	2	3	1	1	0	0	0	0	0	0	55.7	-
0100	8	0	0	0	0	0	0	0	0	0	2	1	2	3	0	0	0	0	0	0	61.0	-
0115	7	0	0	0	0	0	0	0	1	1	2	2	1	0	0	0	0	0	0	0	53.9	-
0130	7	0	0	0	0	0	0	0	0	0	2	1	3	1	0	0	0	0	0	0	59.0	-
0145	7	0	0	0	0	0	0	0	1	0	3	2	1	0	0	0	0	0	0	0	53.8	-
0200	13	0	0	0	0	0	0	1	0	2	2	4	3	1	0	0	0	0	0	0	55.2	64.5
0215	7	0	0	0	0	0	0	0	0	1	1	1	3	1	0	0	0	0	0	0	59.6	-
0230	8	0	0	0	0	0	0	0	0	2	1	2	1	1	0	0	0	0	1	0	60.5	-
0245	4	0	0	1	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	45.0	-
0300	11	0	0	0	0	0	0	0	0	1	2	4	4	0	0	0	0	0	0	0	57.9	62.7
0315	9	0	0	0	0	0	0	0	0	1	2	3	2	1	0	0	0	0	0	0	57.3	-
0330	9	0	0	0	0	0	0	0	1	0	4	1	2	1	0	0	0	0	0	0	56.4	-
0345	9	0	0	0	0	0	0	0	1	0	3	2	0	3	0	0	0	0	0	0	58.1	-
0400	6	0	0	0	0	0	0	0	0	1	0	1	1	2	1	0	0	0	0	0	62.4	-
0415	15	0	0	0	0	0	0	1	0	0	1	4	5	1	2	0	1	0	0	0	61.2	70.9
0430	32	0	0	0	0	0	0	0	0	4	4	9	8	7	0	0	0	0	0	0	58.8	66.0
0445	44	0	0	0	0	0	0	0	1	2	6	11	19	5	0	0	0	0	0	0	59.5	64.3
0500	49	0	0	0	0	0	0	0	1	1	4	16	19	6	2	0	0	0	0	0	60.4	65.4
0515	70	0	0	0	0	0	0	0	1	4	7	18	31	7	0	2	0	0	0	0	60.0	64.4
0530	66	0	0	0	0	0	0	0	0	1	7	21	21	12	3	1	0	0	0	0	60.8	66.8
0545	66	0	0	0	0	0	0	0	0	4	11	18	18	12	3	0	0	0	0	0	60.0	67.0
0600	64	0	0	0	0	0	0	0	1	1	7	17	28	8	2	0	0	0	0	0	60.6	65.7
0615	80	0	0	0	0	0	0	0	0	2	12	23	29	10	3	1	0	0	0	0	60.3	65.6
0630	87	0	0	0	0	0	0	0	0	5	20	22	29	9	2	0	0	0	0	0	58.9	64.4
0645	101	0	0	0	0	0	0	0	1	7	20	24	35	13	1	0	0	0	0	0	59.0	64.9
0700	125	0	0	0	0	0	0	0	1	11	26	40	30	13	4	0	0	0	0	0	58.3	64.5
0715	159	0	0	1	0	0	0	0	0	2	32	42	61	20	0	1	0	0	0	0	59.1	64.9
0730	112	0	0	0	0	0	0	0	1	7	20	37	33	12	2	0	0	0	0	0	58.6	64.5
0745	131	0	0	0	0	0	0	1	1	5	30	52	31	7	2	2	0	0	0	0	58.0	63.5
0800	171	0	0	0	0	0	0	0	3	23	34	55	33	22	1	0	0	0	0	0	57.3	64.9
0815	155	0	0	0	0	0	0	1	3	6	48	50	27	19	1	0	0	0	0	0	57.5	64.6
0830	135	0	0	0	0	0	0	1	5	21	33	39	26	10	0	0	0	0	0	0	55.7	62.6
0845	121	0	0	0	0	0	0	1	2	11	19	37	38	10	3	0	0	0	0	0	58.0	63.5
0900	81	0	0	0	0	0	0	0	6	8	21	27	12	4	1	1	1	0	0	0	56.0	62.3
0915	97	0	0	0	0	0	0	0	1	6	23	28	26	11	2	0	0	0	0	0	58.4	64.6
0930	123	0	0	0	0	0	0	4	9	17	34	38	16	2	3	0	0	0	0	0	54.0	60.4
0945	121	0	0	0	0	0	0	1	4	13	30	44	21	8	0	0	0	0	0	0	56.2	62.4
1000	90	0	0	0	0	0	0	5	5	22	26	14	11	6	1	0	0	0	0	0	53.1	62.4
1015	98	0	0	0	0	0	0	0	3	10	26	38	15	4	2	0	0	0	0	0	56.0	61.4
1030	129	0	0	0	0	0	0	8	9	17	33	29	27	4	2	0	0	0	0	0	54.3	61.7
1045	145	0	0	0	0	0	0	3	6	29	31	43	30	3	0	0	0	0	0	0	54.6	61.2
1100	110	0	0	1	0	0	1	0	2	8	30	37	22	9	0	0	0	0	0	0	56.4	63.4
1115	78	0	0	2	0	0	0	0	5	10	18	20	17	5	1	0	0	0	0	0	55.2	63.2
1130	80	0	0	0	0	0	0	0	1	14	27	14	18	5	1	0	0	0	0	0	55.8	62.7
1145	130	0	0	0	0	0	0	0	10	22	33	38	20	7	0	0	0	0	0	0	54.5	61.2
1200	99	0	0	0	0	0	1	10	9	21	22	21	9	5	1	0	0	0	0	0	52.0	60.4
1215	210	0	0	0	0	0	1	5	26	44	53	38	30	13	0	0	0	0	0	0	53.1	61.7
1230	122	0	0	0	0	0	0	1	3	6	42	36	29	5	0	0	0	0	0	0	56.5	62.2
1245	132	0	0	0	0	0	0	0	2	9	24	45	42	8	2	0	0	0	0	0	58.2	63.9
1300	170	0	0	0	0	0	0	1	7	16	39	47	35	18	7	0	0	0	0	0	57.2	64.9
1315	196	0	0	0	0	0	0	1	12	24	36	51	60	11	1	0	0	0	0	0	56.8	63.2
1330	250	0	0	1	0	0	1	0	14	45	65	53	57	11	3	0	0	0	0	0	55.1	63.0
1345	211	0	0	0	0	0	1	0	1	20	39	72	60	17	1	0	0	0	0	0	57.6	63.3
1400	177	0	0	1	0	0	0	0	1	5	35	44	66	22	2	1	0	0	0	0	59.3	64.9
1415	174	0	0	0	0	0	0	0	3	12	28	55	46	21	8	1	0	0	0	0	59.0	65.4
1430	159	0	0	0	0	0	0	0	6	8	22	55	44	20	1	1	1	1	0	0	58.9	65.0
1445	193	0	0	0	0	0	0	0	4	13	49	63	49	12	3	0	0	0	0	0	57.3	63.4
1500	187	0	0	0	0	0	0	0	3	16	34	45	59	26	3	1	0	0	0	0	58.9	65.4
1515	193	0	0	0	0	0	1	1	6	21	42	62	51	7	1	0	1	0	0	0	56.5	62.5
1530	189	0	0	0	0	0	0	0	2	14	34	65	52	20	2	0	0	0	0	0	58.4	64.2
1545	240	0	0	0	0	0	0	1	6	20	50	80	54	25	3	1	0	0	0	0	57.6	63.9
1600	207	0	0	0	0	0	0	0	2	16	37	46	70	27	7	2	0	0	0	0	59.3	65.5
1615	223	0	0	0	0	0	0	0	3	15	49	61	62	27	4	2	0	0	0	0	58.4	65.0
1630	217	0	0	0	0	0	0	0	1	13	28	56	74	40	4	1	0	0	0	0	60.1	65.8
1645	189	0	0	0	0	0	0	1	5	22	26	43	61	25	5	1	0	0	0	0	58.6	65.4
1700	237	0	0	0	0	0	0	2	8	30	40	72	61	22	2	0	0	0	0	0	57.2	63.7
1715	208	0	0	0	0	0	1	0	2	14	43	59	54	30	4	0	1	0	0	0	58.7	65.2
1730	214	0	0	0	0	0	0	3	14	28	45	62	49	13	0	0	0	0	0	0	55.6	62.2
1745	192	0	0	0	0	0	0	0	2	16	48	53	50	20	3	0	0	0	0	0	57.8	63.9
1800	170	0	0	0	0	0	0	3	10	17	42	42	40	12	3	1	0	0	0	0	56.2	63.2
1815	144	0	0	0	0	0	0	0	2	10	39	35	37	17	4	0	0	0	0	0	58.2	64.6
1830	151	0	0	0	0	0	0	1	6	13	38	39	29	17	6	2	0	0	0	0	57.7	65.8
1845	145	0	0	0	0	0	0	0	2	7	19	41	47	23	6	0	0	0	0	0	60.0	66.0
1900	117	0	0	0	0	0	0	0	4	12	24	31	32	11	2	1	0	0	0	0	57.4	63.7
1915	111	0	0	0	0	0	0	0	3	8	11	34	32	19	4	0	0	0	0	0	59.7	66.9
1930	102	0	0	0	0	0	0	0	6	14	19	23	31	9	0	0	0	0	0	0	56.7	63.6
1945	104	0	0	0	0	0	0	1	2	0	20	38	30	10	1	2	0	0	0	0	58.9	64.7
2000	98	0	0	0	0	0	0	0	0	2	14	39	33	9	1	0	0	0	0	0	59.3	63.9
2015	80	0	0	0	0	0	0	1	1	10	15	27	22	4	0	0	0	0	0	0	56.7	63.5
2030	97	0	0	2	0	0	0	2	2	9	19	29	26	7	1	0	0	0	0	0	56.3	63.3
2045	83	0	0	0	0	0	0	1	0	7	17	30	27	1	0	0	0	0	0	0	57.0	62.1
2100	63	0	0	0	0	0	0	0	2	2	13	20	18	4	4	0	0	0	0	0	58.8	64.7
2115	74	0	0	0	0	0	0	0	1	6	9	32	21	4	0	1	0	0	0	0	58.2	63.7
2130	36	0	0	0	0	0	1	1	1	4	6	11	5	6	1	0	0	0	0	0	56.5	65.8
2145	55	0	0	0	0	0	1	1	1	5	7	19	17	4	0	0	0	0	0	0	57.2	62.9
2200	46	0	0	0	0	0	0	0	2	3	11	10	13	5	1	1	0	0	0	0	58.1	65.3
2215	40	0	0	0	0	0	0	0	1	1	5	9	15	7	2	0	0	0	0	0	60.6	66.2

2230	41	0	0	0	0	0	0	1	2	3	5	8	16	3	0	1	2	0	0	0	59.0	65.4
2245	27	0	0	0	0	0	0	0	2	1	4	11	7	1	1	0	0	0	0	0	57.2	62.3
2300	27	0	0	0	0	0	0	0	2	1	1	10	8	4	1	0	0	0	0	0	59.1	65.6
2315	27	0	0	0	0	0	0	0	1	3	4	8	9	2	0	0	0	0	0	0	57.8	64.5
2330	21	0	0	0	0	0	0	0	2	2	2	11	4	0	0	0	0	0	0	0	56.2	63.2
2345	20	0	0	0	0	0	0	0	0	0	3	9	4	4	0	0	0	0	0	0	59.5	65.8
07-19	**7590**	**0**	**0**	**6**	**0**	**0**	**7**	**55**	**239**	**757**	**1642**	**2163**	**1891**	**695**	**112**	**18**	**4**	**1**	**0**	**0**	**57.2**	**63.9**
06-22	**8942**	**0**	**0**	**8**	**0**	**0**	**9**	**62**	**264**	**851**	**1875**	**2582**	**2306**	**823**	**134**	**23**	**4**	**1**	**0**	**0**	**57.4**	**63.9**
06-00	**9191**	**0**	**0**	**8**	**0**	**0**	**9**	**63**	**276**	**865**	**1910**	**2658**	**2382**	**849**	**139**	**25**	**6**	**1**	**0**	**0**	**57.4**	**64.0**
00-00	**9690**	**0**	**0**	**9**	**0**	**0**	**9**	**65**	**285**	**896**	**1989**	**2789**	**2541**	**919**	**151**	**28**	**7**	**1**	**1**	**0**	**57.5**	**64.0**

Peak step 13:30 (250) **AM Peak step** 8:00 (171) **PM Peak step** 13:30 (250)

Vehicles = 9690
Posted speed limit = 55 mph, Exceeding = 6437 (66.43%), Mean Exceeding = 61.20 mph
Maximum = 91.2 mph, **Minimum** = 15.8 mph, **Mean** = 57.5 mph
85% Speed = 63.98 mph, **50% Speed** = 58.05 mph, **Median** = 58.05 mph
10 mph Pace = 53 - 63, **Number in Pace** = 5454 (56.28%)
Variance = 44.68, **Standard Deviation** = 6.68 mph

Hampton Roads Traffic Engineering
Speed Bins with Grand Total

CustomList-157 -- English (ENU)

Datasets:

Site:	**[IW-0017-20230809-SP] Isle of Wight Rte. 17-Sugarhill SB # VE10YFQ7**
Attribute:	Location 2 of 2
Direction:	3 - South bound, A trigger first. **Lane:** 0
Survey Duration:	8:55 Wednesday, August 9, 2023 => 14:00 Friday, August 11, 2023,
Zone:	
File:	IW-0017-20230809-SP 0 2023-08-11 1400.EC0 (Plus)
Identifier:	VE10YFQ7 MC5900-X13 (c)MetroCount 09Nov16
Algorithm:	Factory default axle (v5.07)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**0:00 Thursday, August 10, 2023 => 0:00 Friday, August 11, 2023 (1)**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	North, East, South, West (bound), P = South, Lane = 0-16
Separation:	Headway > 0 sec, Span 0 - 300 ft
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F3)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)

Column Legend:

0	**[Time]**	24-hour time (0000 - 2359)
1	**[Total]**	Number in time step
2	**[Vbin]**	Speed bin totals
3	**[Mean]**	Average speed
4	**[Vpp]**	Percentile speed

*** Grand Total**

Time	Total	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Vbin	Mean	Vpp
<--		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95		85
		10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100		
--	10033	0	0	0	0	13	49	323	1442	3340	3334	1326	182	17	6	1	0	0	0	0	49.7	55.0

Vehicles = 10033
Posted speed limit = 55 mph, Exceeding = 1532 (15.27%), Mean Exceeding = 57.58 mph
Maximum = 75.6 mph, **Minimum** = 25.4 mph, **Mean** = 49.7 mph
85% Speed = 55.03 mph, **50% Speed** = 49.77 mph, **Median** = 49.77 mph
10 mph Pace = 45 - 55, **Number in Pace** = 6679 (66.57%)
Variance = 28.24, **Standard Deviation** = 5.31 mph

In profile: Vehicles = 10033 / 19672 (51.00%)

* Thursday, August 10, 2023

Time	Total	Vbin 5	Vbin 10	Vbin 15	Vbin 20	Vbin 25	Vbin 30	Vbin 35	Vbin 40	Vbin 45	Vbin 50	Vbin 55	Vbin 60	Vbin 65	Vbin 70	Vbin 75	Vbin 80	Vbin 85	Vbin 90	Vbin 95	Mean	Vpp 85
<--		10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100		
0000	13	0	0	0	0	0	0	0	1	6	4	2	0	0	0	0	0	0	0	0	50.6	58.8
0015	14	0	0	0	0	0	0	2	2	3	4	3	0	0	0	0	0	0	0	0	49.1	57.9
0030	8	0	0	0	0	0	0	0	1	1	2	3	1	0	0	0	0	0	0	0	54.0	-
0045	10	0	0	0	0	0	0	0	2	3	4	0	1	0	0	0	0	0	0	0	50.6	-
0100	6	0	0	0	0	0	0	0	1	2	1	2	0	0	0	0	0	0	0	0	50.2	-
0115	8	0	0	0	0	0	0	0	0	3	4	0	1	0	0	0	0	0	0	0	51.3	-
0130	13	0	0	0	0	0	0	0	1	7	3	2	0	0	0	0	0	0	0	0	49.5	54.8
0145	9	0	0	0	0	0	0	1	1	3	0	3	1	0	0	0	0	0	0	0	50.4	-
0200	8	0	0	0	0	0	1	0	2	1	2	0	0	1	1	0	0	0	0	0	51.1	-
0215	14	0	0	0	0	0	0	0	3	4	1	3	2	1	0	0	0	0	0	0	52.2	61.3
0230	5	0	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	48.5	-
0245	9	0	0	0	0	0	0	1	0	5	3	0	0	0	0	0	0	0	0	0	48.3	-
0300	7	0	0	0	0	0	0	0	0	1	3	2	1	0	0	0	0	0	0	0	55.3	-
0315	11	0	0	0	0	0	0	1	2	1	5	2	0	0	0	0	0	0	0	0	50.0	56.9
0330	21	0	0	0	0	0	0	0	6	1	8	5	1	0	0	0	0	0	0	0	50.9	56.5
0345	16	0	0	0	0	0	0	0	2	4	3	6	1	0	0	0	0	0	0	0	52.8	59.8
0400	28	0	0	0	0	0	0	0	1	6	12	8	1	0	0	0	0	0	0	0	53.4	59.2
0415	26	0	0	0	0	0	0	0	2	3	7	13	1	0	0	0	0	0	0	0	53.9	58.6
0430	30	0	0	0	0	0	0	0	0	4	13	12	1	0	0	0	0	0	0	0	54.3	57.9
0445	35	0	0	0	0	0	1	0	0	3	14	11	3	2	1	0	0	0	0	0	55.2	61.0
0500	54	0	0	0	0	0	0	0	2	10	19	20	2	1	0	0	0	0	0	0	54.0	58.7
0515	101	0	0	0	0	0	0	1	1	10	41	40	8	0	0	0	0	0	0	0	54.8	58.8
0530	82	0	0	0	0	0	0	2	3	9	32	32	4	0	0	0	0	0	0	0	53.6	58.0
0545	117	0	0	0	0	0	0	0	4	12	59	35	6	0	1	0	0	0	0	0	54.0	58.4
0600	134	0	0	0	0	0	1	1	4	32	56	36	4	0	0	0	0	0	0	0	52.5	56.8
0615	153	0	0	0	0	0	0	5	7	33	65	36	5	1	1	0	0	0	0	0	52.1	56.8
0630	153	0	0	0	0	0	0	0	0	31	66	45	11	0	0	0	0	0	0	0	53.5	57.3
0645	158	0	0	0	0	0	0	2	6	43	58	43	6	0	0	0	0	0	0	0	52.3	57.2
0700	188	0	0	0	0	1	1	2	11	40	86	42	5	0	0	0	0	0	0	0	51.8	56.5
0715	175	0	0	0	0	0	0	3	5	38	77	43	9	0	0	0	0	0	0	0	52.6	57.4
0730	168	0	0	0	0	0	0	2	14	42	88	22	0	0	0	0	0	0	0	0	51.0	54.8
0745	161	0	0	0	0	1	1	1	17	50	52	37	2	0	0	0	0	0	0	0	50.9	56.1
0800	149	0	0	0	0	1	1	2	11	50	60	23	1	0	0	0	0	0	0	0	50.6	55.4
0815	139	0	0	0	0	0	0	1	14	43	68	11	2	0	0	0	0	0	0	0	50.2	54.0
0830	146	0	0	0	0	0	0	2	12	48	51	29	4	0	0	0	0	0	0	0	51.0	56.3
0845	143	0	0	0	0	0	1	4	26	46	51	15	0	0	0	0	0	0	0	0	49.0	53.4
0900	135	0	0	0	0	0	1	3	15	37	61	17	1	0	0	0	0	0	0	0	50.4	54.7
0915	130	0	0	0	0	0	0	1	22	51	42	13	1	0	0	0	0	0	0	0	49.2	54.1
0930	124	0	0	0	0	0	0	6	12	35	49	19	3	0	0	0	0	0	0	0	50.4	55.5
0945	112	0	0	0	0	0	0	2	8	31	50	15	5	1	0	0	0	0	0	0	51.5	56.4
1000	108	0	0	0	0	0	1	5	19	43	31	9	0	0	0	0	0	0	0	0	48.1	52.3
1015	125	0	0	0	0	0	1	2	15	46	50	9	0	2	0	0	0	0	0	0	49.7	54.6
1030	138	0	0	0	0	1	2	2	20	69	37	6	1	0	0	0	0	0	0	0	48.4	53.5
1045	127	0	0	0	0	0	0	4	24	39	47	13	0	0	0	0	0	0	0	0	49.0	53.3
1100	115	0	0	0	0	0	2	4	22	30	48	9	0	0	0	0	0	0	0	0	48.8	53.9
1115	138	0	0	0	0	1	1	6	24	47	39	17	3	0	0	0	0	0	0	0	48.9	54.9
1130	105	0	0	0	0	0	0	11	20	38	25	9	2	0	0	0	0	0	0	0	47.8	52.9
1145	123	0	0	0	0	0	0	6	23	54	29	11	0	0	0	0	0	0	0	0	48.1	53.1
1200	135	0	0	0	0	0	4	15	42	37	30	7	0	0	0	0	0	0	0	0	46.4	52.1
1215	154	0	0	0	0	0	3	12	39	71	20	4	4	1	0	0	0	0	0	0	46.7	51.0
1230	121	0	0	0	0	0	0	1	30	38	38	11	3	0	0	0	0	0	0	0	49.2	54.4
1245	134	0	0	0	0	1	1	10	23	49	36	12	2	0	0	0	0	0	0	0	47.9	53.5
1300	165	0	0	0	0	1	3	12	38	60	36	14	1	0	0	0	0	0	0	0	47.1	52.9
1315	130	0	0	0	0	0	1	7	32	55	30	5	0	0	0	0	0	0	0	0	47.2	51.9
1330	154	0	0	0	0	0	0	11	37	63	33	10	0	0	0	0	0	0	0	0	47.3	52.5
1345	136	0	0	0	0	1	0	8	28	48	42	9	0	0	0	0	0	0	0	0	48.1	53.6
1400	142	0	0	0	0	0	0	8	16	47	56	13	2	0	0	0	0	0	0	0	49.4	54.2
1415	152	0	0	0	0	0	0	6	15	61	52	16	2	0	0	0	0	0	0	0	49.5	53.6
1430	118	0	0	0	0	0	0	5	21	47	35	10	0	0	0	0	0	0	0	0	48.3	53.1
1445	162	0	0	0	0	1	1	2	17	67	52	17	5	0	0	0	0	0	0	0	49.7	54.8
1500	205	0	0	0	0	0	3	9	33	72	57	26	5	0	0	0	0	0	0	0	49.0	55.0
1515	194	0	0	0	0	0	1	12	37	71	54	19	0	0	0	0	0	0	0	0	48.1	54.2
1530	227	0	0	0	0	0	1	6	54	108	42	15	1	0	0	0	0	0	0	0	47.6	52.0
1545	215	0	0	0	0	1	0	5	26	78	76	26	2	1	0	0	0	0	0	0	49.8	54.8
1600	221	0	0	0	0	0	0	3	26	83	78	29	2	0	0	0	0	0	0	0	49.7	54.8
1615	211	0	0	0	0	0	0	2	36	86	66	18	2	1	0	0	0	0	0	0	49.1	53.4
1630	210	0	0	0	0	0	1	3	22	100	61	19	4	0	0	0	0	0	0	0	49.5	54.1
1645	228	0	0	0	0	0	1	12	68	80	53	11	3	0	0	0	0	0	0	0	47.2	52.9
1700	244	0	0	0	0	0	4	9	46	93	75	17	0	0	0	0	0	0	0	0	48.1	53.1
1715	225	0	0	0	0	0	2	7	29	81	85	17	4	0	0	0	0	0	0	0	49.3	53.9
1730	208	0	0	0	0	0	0	6	51	75	53	19	3	1	0	0	0	0	0	0	48.7	54.1
1745	187	0	0	0	0	0	0	7	15	63	73	25	3	1	0	0	0	0	0	0	50.3	55.0
1800	211	0	0	0	0	1	1	3	29	69	78	25	5	0	0	0	0	0	0	0	49.9	54.7
1815	141	0	0	0	0	0	0	1	18	54	51	12	3	2	0	0	0	0	0	0	49.9	53.9
1830	113	0	0	0	0	1	0	3	15	39	36	16	2	0	1	0	0	0	0	0	50.1	55.4
1845	134	0	0	0	0	0	2	2	17	56	34	19	4	0	0	0	0	0	0	0	49.7	55.4
1900	93	0	0	0	0	0	1	4	11	29	30	14	2	1	0	1	0	0	0	0	50.3	56.1
1915	98	0	0	0	0	0	0	1	17	27	33	18	2	0	0	0	0	0	0	0	50.4	55.8
1930	81	0	0	0	0	0	0	6	13	23	27	11	1	0	0	0	0	0	0	0	49.0	54.9
1945	89	0	0	0	0	0	0	0	16	31	30	10	2	0	0	0	0	0	0	0	49.5	54.4
2000	94	0	0	0	0	1	0	4	17	37	25	8	2	0	0	0	0	0	0	0	48.8	54.0
2015	91	0	0	0	0	0	1	4	16	34	26	10	0	0	0	0	0	0	0	0	48.7	54.2
2030	90	0	0	0	0	0	0	9	10	34	27	8	2	0	0	0	0	0	0	0	48.4	53.1
2045	88	0	0	0	0	0	1	4	18	27	24	13	1	0	0	0	0	0	0	0	48.8	55.1
2100	80	0	0	0	0	0	0	5	13	26	29	6	0	0	1	0	0	0	0	0	48.7	53.3
2115	55	0	0	0	0	0	0	3	14	10	21	7	0	0	0	0	0	0	0	0	49.1	54.9
2130	55	0	0	0	0	0	0	2	14	12	18	9	0	0	0	0	0	0	0	0	49.0	56.1
2145	37	0	0	0	0	0	0	3	5	12	11	5	1	0	0	0	0	0	0	0	49.3	55.8
2200	35	0	0	0	0	0	0	2	6	13	11	3	0	0	0	0	0	0	0	0	48.6	53.3
2215	36	0	0	0	0	0	0	1	7	10	9	6	3	0	0	0	0	0	0	0	50.7	57.9

2230	34	0	0	0	0	0	2	1	2	13	9	6	1	0	0	0	0	0	0	0	49.5	56.1
2245	21	0	0	0	0	0	0	1	0	4	12	3	1	0	0	0	0	0	0	0	51.9	55.3
2300	40	0	0	0	0	0	0	0	9	12	11	7	1	0	0	0	0	0	0	0	49.8	56.1
2315	21	0	0	0	0	0	0	1	2	9	6	2	1	0	0	0	0	0	0	0	49.2	55.3
2330	13	0	0	0	0	0	0	0	0	3	5	5	0	0	0	0	0	0	0	0	53.3	57.9
2345	13	0	0	0	0	0	0	0	3	3	6	1	0	0	0	0	0	0	0	0	49.5	54.5
07-19	**7626**	**0**	**0**	**0**	**0**	**12**	**41**	**256**	**1194**	**2728**	**2473**	**810**	**101**	**10**	**1**	**0**	**0**	**0**	**0**	**0**	**49.2**	**54.4**
06-22	**9175**	**0**	**0**	**0**	**0**	**13**	**45**	**309**	**1375**	**3169**	**3019**	**1089**	**140**	**12**	**3**	**1**	**0**	**0**	**0**	**0**	**49.4**	**54.7**
06-00	**9388**	**0**	**0**	**0**	**0**	**13**	**47**	**315**	**1404**	**3236**	**3088**	**1122**	**147**	**12**	**3**	**1**	**0**	**0**	**0**	**0**	**49.4**	**54.7**
00-00	**10033**	**0**	**0**	**0**	**0**	**13**	**49**	**323**	**1442**	**3340**	**3334**	**1326**	**182**	**17**	**6**	**1**	**0**	**0**	**0**	**0**	**49.7**	**55.0**

Peak step 17:00 (244) **AM Peak step** 7:00 (188) **PM Peak step** 17:00 (244)

Vehicles = 10033
Posted speed limit = 55 mph, Exceeding = 1532 (15.27%), Mean Exceeding = 57.58 mph
Maximum = 75.6 mph, **Minimum** = 25.4 mph, **Mean** = 49.7 mph
85% Speed = 55.03 mph, **50% Speed** = 49.77 mph, **Median** = 49.77 mph
10 mph Pace = 45 - 55, **Number in Pace** = 6679 (66.57%)
Variance = 28.24, **Standard Deviation** = 5.31 mph

Date: 08/10/2023 **Project:** Route 17 Sugar Hill RSA Study

Comments:
Rte. 17- Sugar Hill
Tube Location

Isle of Wight County
Existing Signing
Proposed Signing

N

CARROLLTON BLVD (Rte. 17)
STATION 1
SERIAL # VE10YFQ7
Lat. 36.931066, Long. -76.523565

CARROLLTON BLVD (Rte. 17)
STATION 2
SERIAL # VD72VEQJ
Lat. 36.929375, Long. -76.521462

Fatboy's Grill & Steamshack
Bubba-N-Frank's Carrollton
Triad Electrical Solutions, Inc
Lighthouse Preschool & Daycare
Ashby Way
Ashby Way W
Ashby Way E
Carrollton Blvd
Manor Dr
Courtney Ln
Spring Crest Dr
Wineberry Ct
Finley's General Store
Studio Seventeen Dance
Batiste Ct
Bro-Gan Ln
Kennel Ln
EHB Homes
661
17
Ryann Winn Photography
Cannon Dr
Gregory Dr
Kay Ct
Sherry Vincent - State Farm Insurance Agent
Clayton's Auto Parts
Google Earth