TEAYS VALLEY ROAD AND MOUNT VERNON ROAD

ROAD SAFETY ASSESSMENT

Regional Intergovernmental Council

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March 2024

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1.0 Executive Summary

The purpose of this study is to analyze the existing safety and capacity conditions and to determine potential countermeasures to reduce crash frequency at the intersection of Teays Valley Road and Mount Vernon Road in Putnam County, West Virginia. A Sheetz gas station is the fourth leg of the intersection.

Crash data from January 1, 2017 through December 31, 2021 was downloaded from AASTHOWare Safety and the crash reports were obtained through ReportBeam. In the five-year study period, there were 21 total crashes with five (24 percent) resulting in injury. No fatalities were reported in the study area. Rear end collisions were the most prominent crash type, accounting for 10 collisions with one (10 percent) resulting in injury. All of the rear end collisions occurred along Teays Valley Road, with the highest crash pattern occurring on the westbound approach of the intersection. The rear end crashes occurred due to inattentive drivers and sun glare during the afternoon/evening commute. Angle collisions were the second most frequent crash type with five crashes and two injury collisions.

Based on the crash patterns and traffic operations in the study corridor, the following countermeasures are recommended:

Short-Term

- Modify the signal heads by installing wider reflective borders for improved visibility.
- Install supplemental signal heads on the near side of the intersection on the signal poles. Side-mounted signal heads are mounted at a different height than overhead signal heads which may make them easier to see when sun glare is an issue. A secondary benefit is providing visibility around large trucks that may block the view to the overhead signals.
- Ensure the functionality of the pedestrian signal heads at the intersection. West Viriginia Division of Highways (WVDOH) was notified regarding this issue.

Medium-Term

- Conduct a speed study along Teays Valley Road to determine the appropriate speed limit based on land uses, traffic volumes, and pedestrian and bicycle activity along the corridor. During off peak times, speeding is noted as an issue by a law enforcement officer.
- Realign the crosswalk on the west leg and adjust the curb return to provide a shorter, more direct pedestrian crossing. At this time, also reconstruct new compliant curb ramps and crosswalks. This improvement is especially critical with the increase in pedestrian traffic expected as a result of the Mount Vernon Road sidewalk project ($232,000 in 2024 dollars).

Long-Term

- Perform a corridor study for a portion of Teays Valley Road to identity and evaluate system-wide solutions, such as access management through the installation of roundabouts.

2.0 Purpose

The purpose of this study is to analyze the existing safety and capacity conditions and to determine potential countermeasures to reduce crash frequency at the intersection of Teays Valley Road and Mount Vernon Road in Putnam County, West Virginia. The study area is shown below in **Figure 1.**

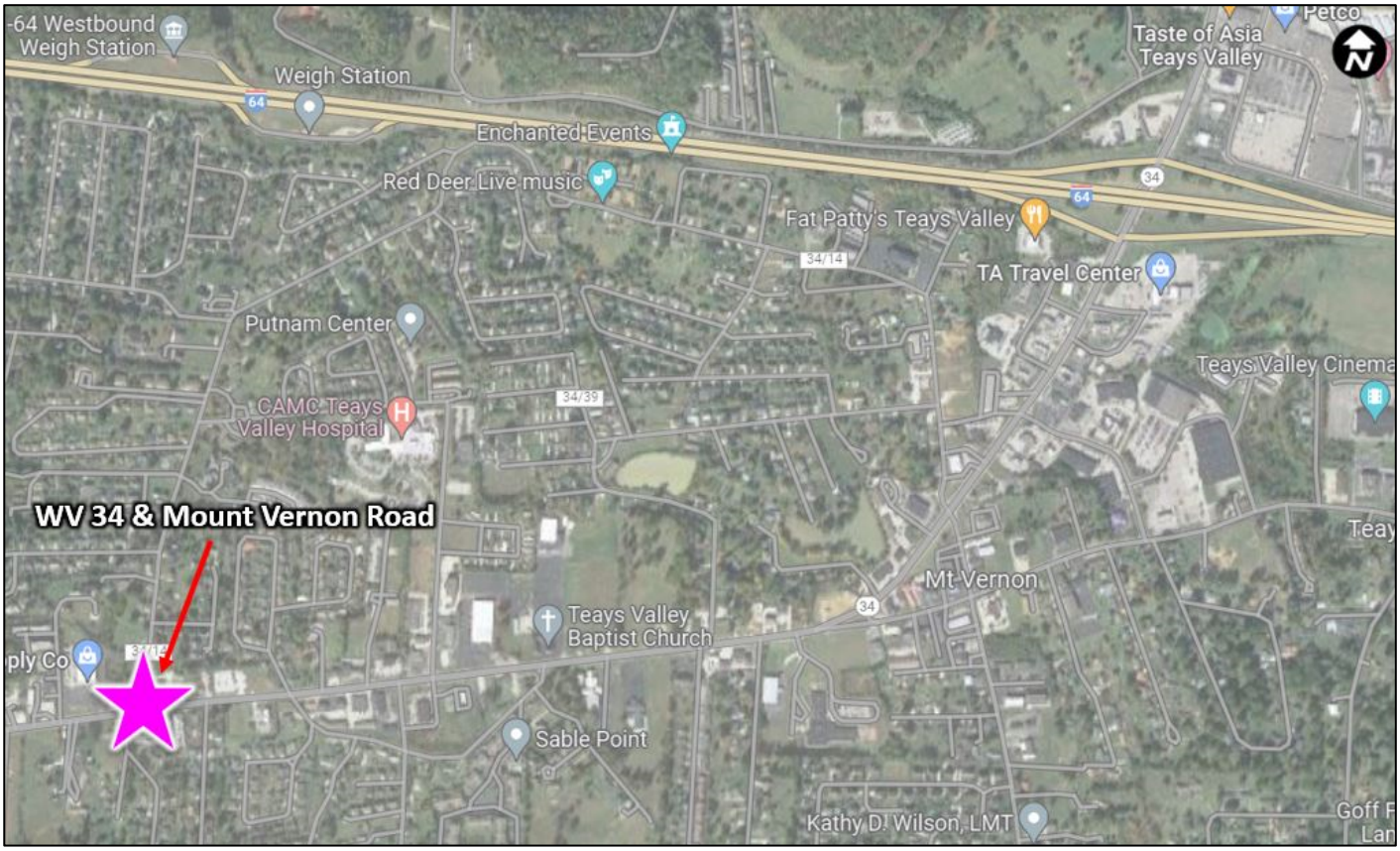

Figure 1: Study Area

3.0 Existing Conditions

Roadway Conditions

Teays Valley Road is an east/west three-lane two-way roadway with a center two-way left-turn lane (TWLTL). It has a posted speed limit of 45 mph. There are sidewalks along both sides of the roadway. Overhead lighting is provided at the intersection; however, corridor lighting is not provided.

Mt Vernon road is a narrow two-lane two-way roadway without striped edgelines or paved shoulders. The posted speed limit is 25 mph. There is no overhead lighting or sidewalks provided along the roadway, although a sidewalk project is planned for this route.

Intersection Conditions

The lane configuration for this signalized intersection is illustrated in **Figure 2**. Mount Vernon Road is the north leg of the intersection while the Sheetz Driveway is the south leg. Pedestrian facilities (i.e., crosswalks, pedestrian push buttons, pedestrian signal heads) are provided across all legs of the intersection. Overhead lighting is provided at the intersection. Backplates are provided on the eastbound and westbound approaches.

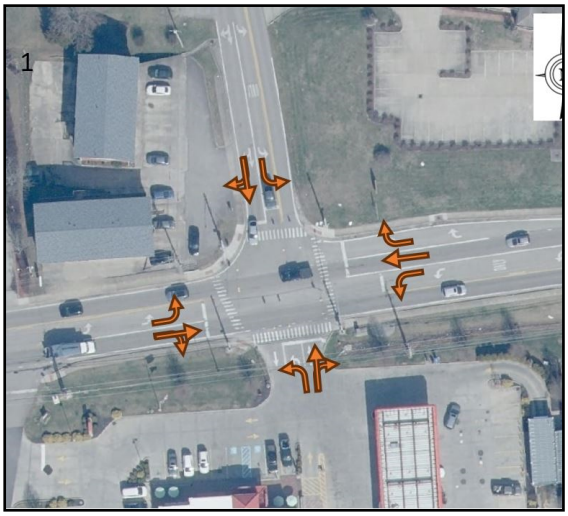

Figure 2: Lane Use Configuration

Site Visit Observations

A site visit was performed at the intersection on Novemeber 15th, 2023 from 9:00 AM to 11:00 AM. The attendess were from Burgess and Niple, Regional Intergovernmental Council (RIC), West Virginia Department of Transportation (WVDOT), and the Putnam County Sherriff's Department. Observations from the site visit are summarized below:

- Because of the east/west configuration of Teays Valley Road, sun glare affects visibility of the signal heads during the morning and evening commute. Backplates are provided on the east and west leg signal heads; however, they are still difficult to see during sun glare conditions as illustrated in **Photo 1**.
- Pedestrian facilities are provided across all legs of the intersection (see **Photo 2**). However, the pedestrian push buttons did not actuate the pedestrian signal. This was reported to WVDOH for repair.

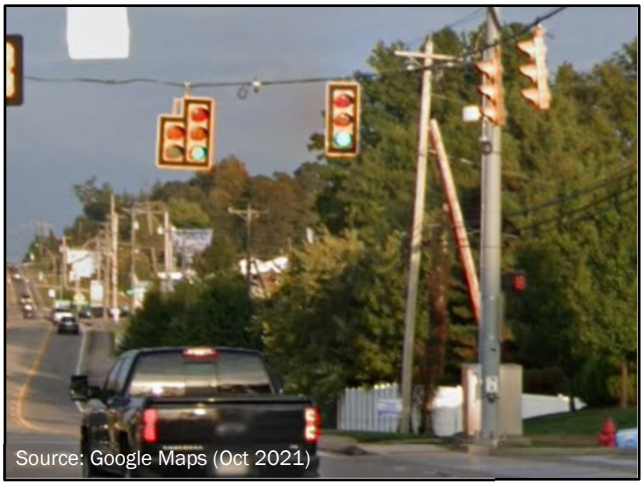

Photo 1: Signal Visibility Issues on Eastbound Approach

- During morning and evening peak periods, congestion occurs along Teays Valley Road. However, during off peak times, speeding becomes an issue as indicated by the Putnam County Sheriff's Department. Officers feel that they do not have an adequate way to perform traffic stops in this section of the corridor.
- The intersection is situated at a high point along the vertical crest of the roadway reducing sight distance as motorists approach from the east and west directions as indicated in **Photo 3**.

Photo 2: Pedestrian Crosswalk along South Leg

Photo 3: Crest Vertical Hill on Westbound Approach

4.0 Data Collection

Turning movement counts were collected for 24 hours on Wednesday, November 15th, 2023 for the intersection of Teays Valley Road and Mount Vernon Road. The peak hours were determined to be 7:15 AM to 8:15 AM and 4:15 PM to 5:15 PM. The 2023 rounded peak hour counts are shown in Figure 3. Raw traffic counts are provided in **Appendix A**.

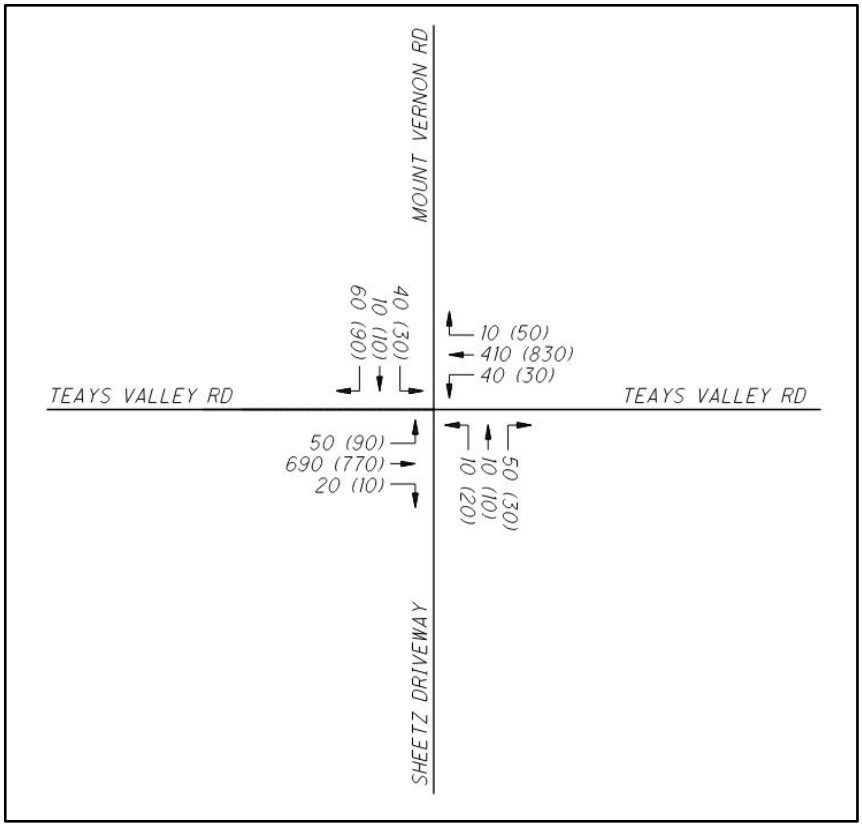

Figure 3: 2023 Rounded Peak Hour Volumes

5.0 Existing Capacity Analysis

Intersection capacity was evaluated at the intersection of Teays Valley Road and Mount Vernon Road using the existing peak hour traffic volumes, existing lane configurations, and existing traffic control using Synchro, Version 11. Signal timings for the intersection were provided by WVDOH. Analysis results are according to the Highway Capacity Manual (HCM) 6th Edition. Queue analysis was evaluated using *SimTraffic*, a microsimulation package included with Synchro. The results of ten simulation runs were averaged to obtain the 95th percentile queue lengths. The existing conditions analysis is summarized in **Table 1** with analysis output provided in **Appendix B.**

Table 1: Existing Operational Analysis (2024) at Teays Valley Rd & Mount Vernon Rd

		Eastbound Teays Vally Rd		Westbound Teays Vally Rd			Northbound Sheetz		Southbound Mount Vernon Rd	
AM Existing		LT	TH RT	LT	TH	RT	LT	TH RT	LT	TH RT
LOS	B	A	B	A	A	A	D	D	D	D
Delay	12.8	3.9	10.2	5.9	7.4	5.0	41.3	40.2	42.3	41.2
v/c		0.07	0.61	0.08	0.37	0.01	0.09	0.39	0.29	0.48
QSR				0.48	0.65	0.43			0.72	0.17
95th %ile Queue		86'	351'	60'	175'	39'	51'	81'	90'	85'
		A - 9.8		A - 7.2			D - 40.4		D - 41.7	
PM Existing										
LOS	B	A	A	A	B	A	E	D	D	E
Delay	14.6	7.6	9.6	5.9	11.6	5.2	57.9	51.4	53.7	56.6
v/c		0.19	0.59	0.07	0.65	0.04	0.23	0.26	0.21	0.63
QSR				0.92					0.74	0.29
95th %ile Queue		110'	515'	115'	529'	110'	81'	87'	93'	145'
		A - 9.4		B - 11.1			D - 53.9		E - 55.9	

Currently, the intersection and all movements operate at level of service (LOS) E or better during both peak hours. Based on the volume-to-capacity ratios, the intersection is operating well under capacity with the highest volume-to-capacity ratio being 0.65 for the westbound through movement.

6.0 Existing Safety Analysis

Crash Trends and Analysis

Crash data from January 1, 2017 through December 31, 2021 was downloaded from the AASTHOWare Safety and the crash reports were obtained through ReportBeam. Each crash report was reviewed to determine potential factors contributing to crashes. A collision diagram that shows crash patterns by illustrating the approximate location of each reported crash is provided in **Appendix C.** In the five-year study period, there were 21 total crashes with five (24 percent) resulting in injury. No fatalities were reported in the study area. **Figure 4** shows the frequency of crashes by severity per year. There were no injury collisions at this intersection in 2018 or 2020.

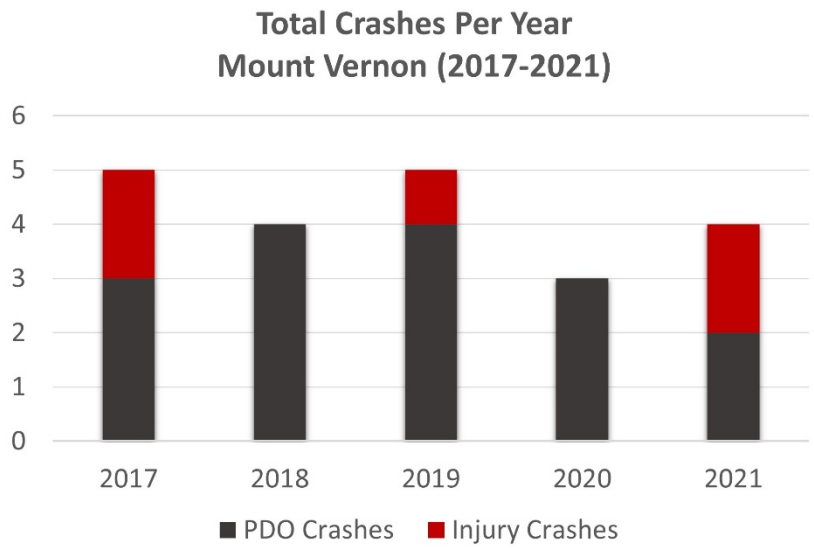

Figure 4: Frequency of Crashes by Year and Severity

Figure 5 shows the crash frequency in the study area by the crash type. Rear end collisions were the most prominent crash type, accounting for 10 collisions with one (10 percent) resulting in injury. All of the rear end collisions occurred along Teays Valley Road, with the highest crash pattern occurring on the westbound approach of the intersection. The rear end crashes occurred due to inattentive drivers and sun glare during the afternoon/evening commute.

Angle collisions were the second most frequent crash type with five crashes and two injury collisions. Three out of the five angle collisions occurred at the Sheetz driveway entrance.

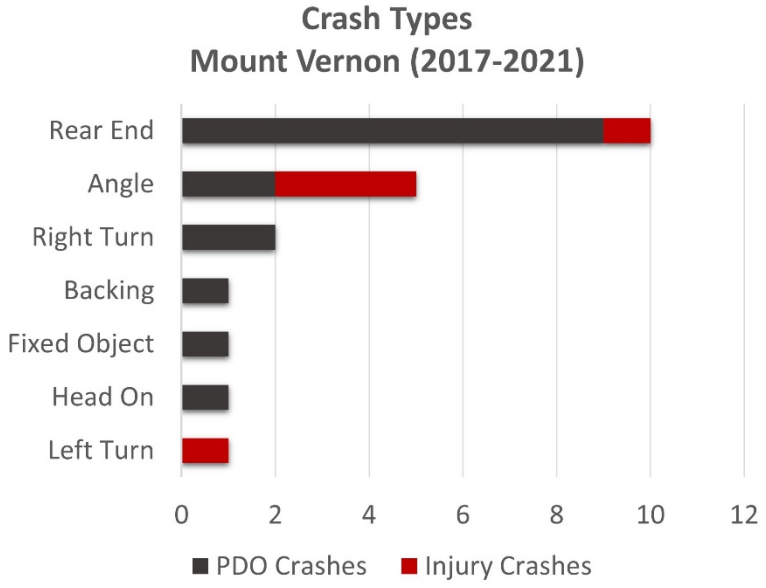

Figure 5: Frequency of Crashes by Type

7.0 Countermeasures for Consideration

The following countermeasures were identified to mitigate crashes and improve safety within the study area.

Short-Term

- **Modify the signal heads by installing wider reflective borders for improved visibility.** Rear end collisions are the most common crash pattern and occur on Teays Valley Road. They generally happen during morning and evening periods when the sun glare makes the signal heads difficult to see. Installing wider reflective borders may assist motorists during times of sun glare.
- **Install side-mounted supplemental signal heads on the near side signal poles.** Side-mounted signal heads are mounted at a different height than overhead signal heads which may make them easier to see when sun glare is an issue. A secondary benefit to installing these signal heads is providing visibility around large trucks that may block the view to the overhead signals.
- **Repair non-functional pedestrian push buttons and signal heads.** WVDOH was notified that the pedestrian signal heads were not functioning during the field visit, but they should be repaired so pedestrians can safely traverse the intersection.

Medium-Term

- **Conduct a speed study along Teays Valley Road to determine the appropriate speed limit.** A speed study would determine an appropriate speed limit based on land uses, traffic volumes, and pedestrian and bicycle activity along the corridor. An appropriate speed limit could help provide a better environment for all road users.
- **Realign the crosswalk on the west leg and adjust the curb return to provide a shorter, more direct pedestrian crossing.** This improvement is especially critical with the increase in pedestrian traffic expected as a result of the Mount Vernon Road sidewalk project. As part of this effort, the curb ramps for the entire intersection should be updated. A layout of this improvement is provided in **Figure 6**.

Long-Term

- **Perform a corridor study for a portion of Teays Valley Road to identify and evaluate the system-wide solutions that could improve safety.** Such improvements may include access management changes and the installation of roundabouts to slow travel speeds. While a roundabout may be effective at this intersection, it would be better to implement a corridor of roundabouts rather than isolated roundabouts along a corridor with many traffic signals.

Mt Vernon Rd

Teays Valley Rd

Figure 6: Crosswalk and Curb Ramp Improvements

1:20 20 40

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8.0 Countermeasure Evaluation

8.1 Operational Evaluation

None of the proposed alternatives will significantly impact the traffic operations of the intersection. Therefore, capacity analysis was not performed for proposed conditions. A shorter crossing distance for pedestrians will reduce the total amount of time needed for that phase which could benefit vehicular traffic, especially on Teays Valley Road. Additionally, high-level analysis indicates that a single lane roundabout would adequately accommodate traffic currently at the intersection as well as into the future.

8.2 Cost Considerations

The costs for the short-term countermeasures are minimal and can likely be included as part of maintenance activities. Prior to the installation of wider reflective backplates, calculations should be conducted to ensure the existing signal poles can support the added wind load. Additionally, controller improvements may be needed to accommodate the additional signal heads.

The cost estimates for the curb reconstruction and crosswalk realignment are $232,000. A detailed breakdown of these costs is provided in **Appendix D**. Cost estimates included a 30 percent contingency and 20 percent design costs. All costs are in 2024 dollars. Costs do not account for utility relocation which may be required for this improvement. Right-of-way acquisition is not expected.

9.0 Conclusions and Recommendations

Based on the crash patterns and traffic operations at the study intersection, the following countermeasures are recommended:

<u>Short-Term</u>

- Modify the signal heads by installing wider reflective borders for improved visibility.
- Install supplemental signal heads on the near side of the intersection on the signal poles. Side-mounted signal heads are mounted at a different height than overhead signal heads which may make them easier to see when sun glare is an issue. A secondary benefit is providing visibility around large trucks that may block the view to the overhead signals.
- Ensure the functionality of the pedestrian signal heads at the intersection. West Viriginia Division of Highways (WVDOH) was notified regarding this issue.

Medium-Term

- Conduct a speed study along Teays Valley Road to determine the appropriate speed limit based on land uses, traffic volumes, and pedestrian and bicycle activity along the corridor. During off peak times, speeding is noted as an issue by a law enforcement officer.
- Realign the crosswalk on the west leg and adjust the curb return to provide a shorter, more direct pedestrian crossing. This improvement is especially critical with the increase in pedestrian traffic expected as a result of the Mount Vernon Road sidewalk project.

Long-Term

- Perform a corridor study for a portion of Teays Valley Road to identify and evaluate system-wide solutions, such as access management through the installation of roundabouts.