Road Safety Audit

Summit Point Road

Shirley Road to Lloyd Road

Jefferson County, West Virginia

Conducted on:

December 11, 2018

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Table of Contents

Overview

A Road Safety Audit (RSA) was conducted on Summit Point Road (between Shirley Road and Lloyd Road) in Jefferson County, West Virginia. An RSA is a formal safety review of a defined section of roadway in which most safety aspects are reviewed and evaluated. Once completed, the group's findings were documented in a report. The RSA team consisted of members representing HEPMPO, WVDOH District 5, WVDOH Traffic Engineering, FHWA-WV Division, Jefferson County Sheriff's Office, and Michael Baker International. The attending members are identified in **Table 1**.

The study area is a 1.4-mile-long section of Summit Point Road that spans from Shirley Road to Lloyd Road. The study area consists of an elementary school zone, various horizontal and vertical curves as well as sporadic intersections and driveways throughout the section.

Summit Point Road has a 2017 Annual Average Daily Traffic (AADT) volume of 2,237 vehicles and a crash rate of 735 crashes per 100 million vehicle-miles of travel (MVMT) within the study area. This is significantly higher than the 2013 Average Statewide Crash Rate of 300 crashes per 100MVMT (see Crash Data section chart). The highest number of intersection-related crashes occur at or near Lloyd Road. Aggregating crashes at or near the intersection and 2017 estimates of approach traffic volume, the resulting intersection crash rate is 2.3 crashes per million entering vehicles (MEV). This value is typically considered of concern and warrants consideration of potential safety improvement strategies.

Upon completion of the review, suggestions and opportunities for improvement to safety were developed. General observations and corresponding recommendations related to traffic operations and the roadway/roadside features can be found in the Observations and Recommendations Sections. The suggestions were divided into three categories. Those categories were:

- **Short Term** – Improvements that could be accomplished in a relatively short timeframe with existing funds.
- **Intermediate** – Improvements that would require development of plans and identification of funding source. These improvements typically would not require permitting and would be constructed within existing right of way.
- **Long Term** – Improvements that require coordination outside of the Division of Highways in addition to development of plans including permitting and/or right of way and are not currently funded.

Short Term Improvements

1. Conduct speed study to reduce speed limit
2. Conduct curve speed study (using ball-bank indicator) and vertical curve sight distance study
3. Add signing and pavement marking improvements (Detailed signing and pavement marking recommendations can be found in the Pavement Markings and Signing Recommendations Section)

Intermediate Improvements

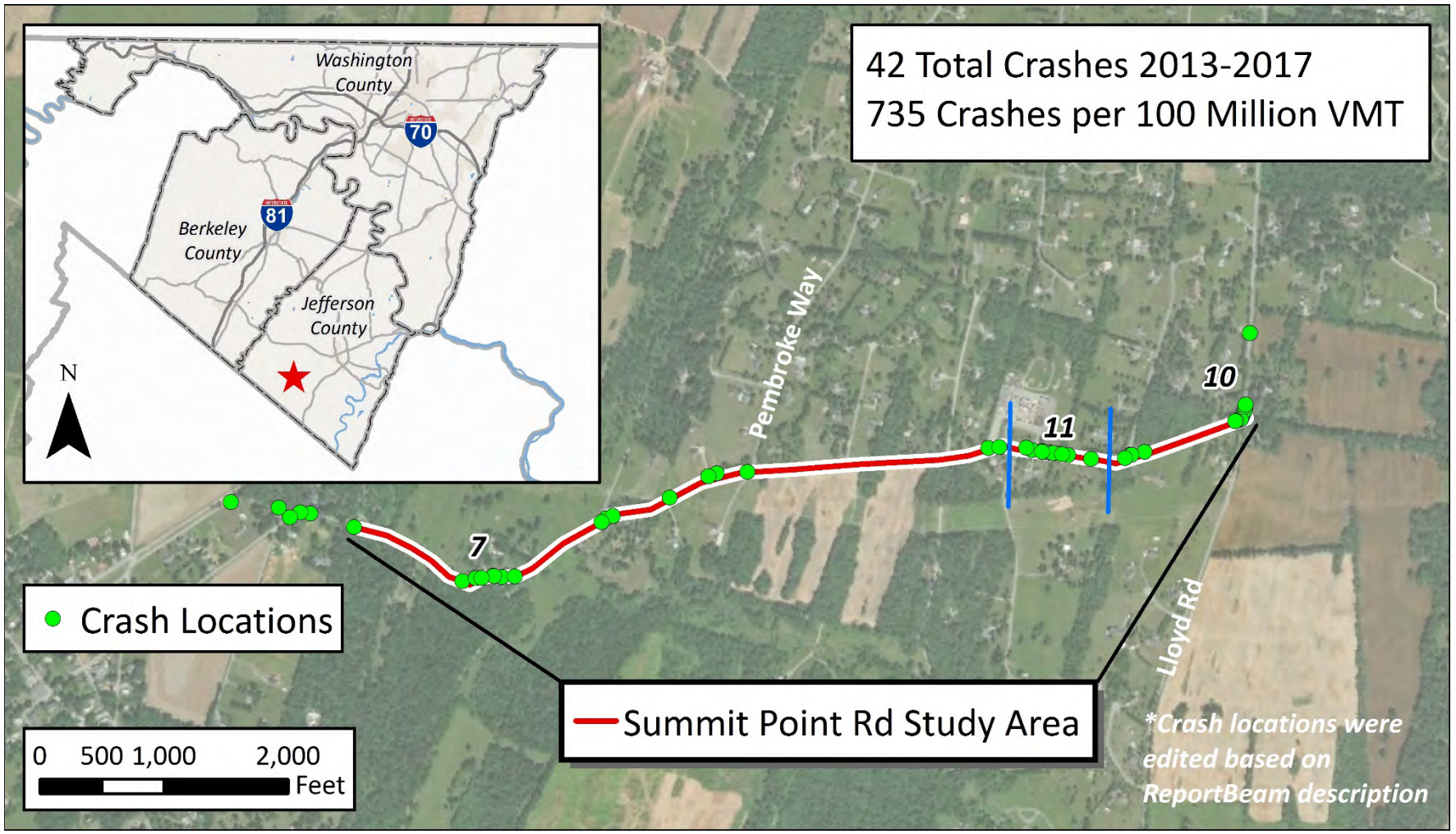
1. Add shoulder stone
2. Adjust/relocate ditches farther from pavement edge
3. Add guiderail along drop offs west of Pembroke Way
4. Consider removing trees and other fixed objects that are within the clear zone
5. Add High Friction Surface Treatment (HSFT) to curves with wet weather crash history
6. Add intersection street lighting at Lloyd Road curve
7. Add safety edge during next resurfacing
8. Inspect and improve culverts and drainage issues at curves with wet weather crash history

Long Term Improvements

1. Consider widening and reprofiling to meet current typical sections

Crash Data

Figure 1: Summit Point Road Crash Data



RSA Team

The RSA team comprised of members representing HEPMPO, WVDOH District 5, WVDOH Traffic Engineering, FHWA-WV Division, Jefferson County, and Michael Baker International. The RSA team's various experience and safety concerns allowed for adequate discussion throughout the RSA process. **Table 1** lists the attendees and their organizations that were involved in the field study.

Table 1: Summit Point Road RSA Field Team

Name	Organization
Matt Mullenax	HEPMPO
Steve Thomas	HEPMPO
Shaneka Owens	FHWA-WV Division
Chandra Inglis-Smith	FHWA-WV Division
David Chappell	WVDOH
Ken Clohan	WVDOH District 5
Donna Hardy	WVDOH
Donald Meadows	WVDOH Operations
Ryan Satterfield	WVDOH
Matthew Skiles	WVDOH
Sheriff Pete Dougherty	Jefferson County
Rebecca Christman	Michael Baker International
Jim Frazier	Michael Baker International
Rebecca Bankard	Michael Baker International
Dan Szekeres	Michael Baker International

Observations and Recommendations: Traffic Operations

During the field visit, the Audit team walked the study location while taking photographs and documenting general traffic observations related to operating speeds, traffic volumes, intersections, driveways, and the traffic mix. Recommendations were suggested based upon the general observations and data. Each issue observed during the field visit is identified with further detail within this section. **Table 2** indicates the observations and corresponding recommendations related to traffic operations.

Table 2: Observations and Recommendations Related to Traffic Operations

Traffic Operation	Observations	Recommendations	Link to Issue
Operating Speeds	The general perception is that motorists are going too fast for available sight distances (vertical and horizontal)	• Conduct speed study, ball bank curves, vertical curve sight distance study • Reduce speed limit	1.1
Volumes	Generally low volumes	General observation – no recommendation	Low traffic volumes observed
Intersections	Sight distance issues at the following intersections: • Summit Point Road/Lloyd Road • Summit Point Road/Locust Hill Road	• Advance intersection sign (W2-2) with distance plaques (W16-2aP) • Consider widening and reprofiling roadway	2.1 2.2
Driveways	Anecdotal evidence indicated that heavy traffic volumes utilize school driveways at the beginning of the school year. Queueing on Summit Point Road is a resulting problem	• Upgrade school zone flashers (S5-1) • Additional/revised signing and pavement markings	3.1
	Remainder of driveways with low volumes resulted with no notable concerns other than universal sight distance issues associated with the entire study area	• Conduct Speed Study • Reduce speed limit • Consider removing roadside obstructions/vegetation within clear zone	3.2
Traffic Mix	No pedestrian or bicycle traffic noted, however there is a 'Share the Road' sign located on Lloyd Road approximately 700 ft. south of the Summit Point Road intersection	General observation – no recommendation	No noted pedestrian or bicycle traffic

Traffic Operation	Observations	Recommendations	Link to Issue
	No unusual heavy vehicle percentage noted, however a number of utility trucks were observed at the Shirley Road intersection at the western terminus of the project limits	General observation – no recommendation	Normal heavy vehicle traffic
	Anecdotal evidence suggests road is frequently used to access Summit Point Motor Sports Park; resulting in an expectation that traffic mix includes many drivers unfamiliar with roadway geometry, especially on weekends	• Additional/revised signing and pavement markings • Reduce speed limit	4.1

Issue 1: Operating Speeds

1.1 Motorists are Driving Too Fast

Observations

The general perception is that motorists are going too fast for available sight distances (vertical and horizontal)

Based on crash data from 2013 to 2017, 71% of the reported crashes throughout the section were single vehicle crashes. 87% of those crashes were run off the road/hit fixed object crashes (embankment, fence, pole, tree, roll-over).

Suggestions

Short-term

- Conduct speed study (using ball-bank indicator) and vertical curve sight distance study
- Reduce speed limit

Issue 2: Intersections

2.1	Sight Distance at Summit Point Road/Lloyd Road Intersection

Observations

Sight distance issue at the Summit Point Road/Lloyd Road intersection

Based on crash data from 2013 to 2017, 23% of the reported crashes along the corridor occurred at this intersection. 60% of those crashes being either right-angle or head-on.

Suggestions

Short-term

- Advanced intersection sign (W2-2) with distance plaques (W16-2aP)

Long-term

- Consider widening and reprofiling roadway

2.2	Sight Distance at Summit Point Road/Locust Hill Road Intersection

Observations

Sight distance issue at the Summit Point Road/Locust Hill Road intersection

Picture taken facing west at Locust Hill Drive/Summit Point Road intersection

Suggestions

Short-term

- Advanced intersection sign (W2-2) with distance plaques (W16-2aP)

Long-term

- Consider widening and reprofiling roadway

Issue 3: Driveways

3.1	Queueing on Summit Point Road

Observations

Anecdotal evidence indicated that heavy traffic volumes utilize school driveways at the beginning of the school year. Queueing on Summit Point Road is a resulting problem

The picture shows the current westbound school zone flasher along Summit Point Road. Based on crash data from 2013 to 2017, 83% of the reported crashes through the school zone were single vehicle (hit animal or run off the road) crashes.

Suggestions

Short-term

- Upgrade school zone flashers(S5-1)
- Provide additional signing and pavement markings

3.2	Universal Sight Distance Issues for Driveways

Observations

Remainder of driveways with low volumes resulted with no notable concerns other than universal sight distance issues associated with the entire study area

Suggestions

Short-term

- Conduct speed study
- Reduce speed limit

Intermediate-term

- Consider removing roadside obstructions/vegetation within clear zone

Long-term

- Consider widening and reprofiling roadway to meet current typical sections

Issue 4: Traffic Mix

4.1	Drivers Unfamiliar with the Roadway

Observations

Anecdotal evidence suggests that Summit Point Road is frequently used to access Summit Point Motor Sports Park; resulting in an expectation that the traffic mix includes many drivers that are unfamiliar with the roadway geometry, especially on weekends

Based on crash data from 2013 to 2017, 43% of the reported crashes within the study section occurred on the weekend. 89% of those crashes occurred in wet road conditions.

Suggestions

Short-term

- Reduce speed limit
- Additional/revised signing and pavement markings

Observations and Recommendations: Roadway/ Roadside Features

During the field visit, the Audit team walked the study location while taking photographs and documenting the general roadway and roadside features. Recommendations were suggested based upon the general observations and issues. Each issue observed during the field visit was identified with further detail within this section. **Table 3** indicates the observations and corresponding recommendations related to roadway/roadside features.

Table 3: Observations and Recommendations Related to Roadway/Roadside Features

Roadway/ Roadside Features	Observations	Recommendations	Link to Issue
General Roadway Features	Very narrow lanes and no shoulders	• Long term – Consider widening and reprofiling to meet current typical sections	1.1
	Roadway resurfaced recently with skid resistant mix	• Add safety edge during next resurfacing	1.2
	A large portion of the study section includes vertical and/or horizontal curves	• Additional curve signage	1.3
	A large portion of the study section is posted with and/or should be posted with advisory reduced speed limit signs associated with curves or sight distance	• Reduce speed limit • Add High Friction Surface Treatment (HSFT) to curves with wet weather crash history	1.4
	Each of the following sections exhibit unique roadway attributes:	Recommendations are specific to each unique roadway section	
	• Lloyd Road curve area	• Add intersection street lighting • Revise and/or provide additional signing and pavement markings • Add HFST	1.5
	• Locust Hill Drive intersection area	• Revise and/or provide additional signs	1.6
	• South Jefferson Elementary school zone influence area	• Update existing school zone flashers • Add advance school zone flashers	1.7
	• West of the School to McCormack Lane	• Add guiderail along drop offs west of Pembroke Way	1.8
	• Winding/rolling section adjacent to White House Farm	• Add HFST to curves • Revise and/or provide additional signing and pavement markings	1.9
	• Shirley Road intersection	• Revise and/or provide additional signing	1.10

Roadway/ Roadside Features	Observations	Recommendations	Link to Issue
Roadside Features	No shoulders	• Add shoulder stone	2.1
	Greater than 3" pavement edge drop-off throughout the section	• Add shoulder stone • Add safety edge during next resurfacing	2.2
	Vegetation and fixed objects (trees, poles, fences) along the corridor in close proximity to the roadway. Many exhibited signs of having been hit	• Delineate fixed objects that are close to the roadway using post mounted delineators or retro-reflective tape as appropriate • Consider removing trees and other fixed objects that are within the clear zone	2.3
	Drainage ditches close to roadway edge in many locations	• Adjust/relocate ditches farther from pavement edge	2.4

Issue 1: General Roadway Features

1.1 Narrow Lanes and No Shoulders

Observations

Very narrow lanes and no shoulders

Based on crash data from 2013 to 2017, 71% of the reported crashes throughout the section were single vehicle crashes. 87% of those crashes were run off the road/hit fixed object crashes (embankment, fence, pole, tree, roll-over)

Suggestions

Long-term

- Consider widening and reprofiling to meet current typical sections

1.2	Roadway Resurfaced with Skid Resistant Mix

Observations

Roadway resurfaced recently with skid resistant mix

Based on crash data from 2013 to 2017, 69% of the reported crashes through the section occurred in wet conditions and 62% of the reported crashes were run-of-the-road crashes.

Suggestions

Intermediate-term

- Add safety edge during next resurfacing

1.3	Vertical and Horizontal Curves

Observations

A large portion of the study section includes vertical and/or horizontal curves

Suggestions

Short-term

- Additional curve signage

1.4 Advisory Reduced Speed Limit Signs

Observations

A large portion of the study section is posted with and/or should be posted with advisory reduced speed limit signs associated with curves or sight distance

Suggestions

Short-term

- Reduce speed limit

Intermediate-term

- Add High Friction Surface Treatment (HSFT) to curves with wet weather crash history

1.5 Lloyd Road Curve Area

Observations

Lloyd Road intersects with Summit Point Road in a sharp curve, creating sight distance issues and confusion to drivers traveling southbound on Summit Point Road

Based on crash data from 2013 to 2017, 23% of the reported crashes along the corridor occurred at this intersection. 60% of those crashes being either angle or head-on.

Suggestions

Short-term

- Revise and/or provide additional signing and pavement markings

Intermediate-term

- Add intersection street lighting
- Add High Friction Surface Treatment (HSFT)

1.6	Locust Hill Drive Intersection Area

Observations

Locust Hill Drive intersects with Summit Point Road between two horizontal curves, creating sight distance issues for drivers turning in/out of Locust Hill Drive

Picture taken facing east from Locust Hill Drive/Summit Point Road intersection.

Suggestions

Short-term

- Revise and/or provide additional signs

1.7	South Jefferson Elementary School Zone Area

Observations

The South Jefferson Elementary School is located within a vertical crest curve and a horizontal curve. School zone flashers are out of date.

Based on crash data from 2013 to 2017, 83% of the reported crashes through the school zone were single vehicle (hit animal or run off the road) crashes.

Suggestions

Short-term

- Update existing school zone flashers
- Add advance school zone flashers
- Provide additional signing and pavement markings

1.8 West of the School to McCormack Lane

Observations

McCormack Lane intersects with Summit Point Road

Based on crash data from 2013 to 2017, 100% of the reported crashes in the vicinity of the McCormack Lane intersection were single vehicle (hit animal or run-off-the-road) crashes and occurred at night.

Suggestions

Short-term

- Revise and/or provide additional signs

Long-term

- Add guiderail along drop-offs west of Pembroke Way

1.9 Section Adjacent to White House Farm

Observations

Windy/rolling section of roadway limits sight distance throughout area adjacent to White House Farm

Based on crash data from 2013 to 2017, 100% of the reported crashes in the curves around White House Farm were single vehicle (hit embankment, tree, other fixed object) crashes and in the eastbound direction.

Suggestions

Short-term

- Revise and/or provide additional signs and pavement markings

Intermediate-term

- Add High Friction Surface Treatment to curves

1.10	Shirley Road Intersection

Observations

Summit Point has a low ground clearance at the point where Shirley Road intersects. Limited sight distance for vehicles turning onto Summit Point Road from Shirley Road.

Suggestions

Short-term

- Revise and/or provide additional signs

Issue 2: Roadside Features

2.1	No Shoulders

Observations

Sections of roadway with no shoulders

Suggestions

Intermediate-term

- Add shoulder stone

2.2	Pavement Edge Drop-off

Observations

Greater than 3” pavement edge drop-off throughout the section

Suggestions

Intermediate-term

- Add shoulder stone
- Add safety edge during next resurfacing

2.3 Vegetation and Fixed Objects

Observations

Vegetation and fixed objects (trees, poles, fences) along the corridor in close proximity to the roadway. Many exhibited signs of having been hit.

Suggestions

Short-term

- Delineate fixed objects that are close to the roadway using post mounted delineators or retro-reflective tape as appropriate

Intermediate-term

- Consider removing trees and other fixed objects that are within the clear zone

2.4 Drainage Ditch

Observations

Drainage ditches close to roadway edge in many locations

Suggestions

Intermediate-term

- Adjust/relocate ditches farther from pavement edge

Pavement Markings and Signing Recommendations

Signing and pavement marking improvements were recommended following the field visit and analysis of crash history. Generally, signing and pavement markings are suggested to be added throughout the study area to advise drivers of intersections, horizontal and vertical curves, and the school zone. Additional delineation and warning signs are recommended for various, unique, elements of the section. **Table 4** indicates the recommended signing and pavement marking recommendations for each section of the study area.

Table 4: Summit Point Road Signing and Pavement Marking Recommendations

Signing and Pavement Marking Recommendations		Figure Reference
Lloyd Road curve area (See Figures 2 through 5)	• Add plowable RPMs to centerline and edge lines (Raised Pavement Markings)	A.
	• Add dotted extension lines through intersection	B.
	• Add stop bar to Lloyd Road	C.
	• Add "Slow Curve Arrow" pavement marking in advance of curve for both directions	D.
	• Increase size of 'Large Single Arrow' signs (W1-6)	E.
	• Add chevrons (W1-8) along curve on either side of Lloyd Road in both directions	F.
	• Add appropriately colored reflectorized strips to warning sign posts	G.
Locust Hill Drive intersection area (see Figure 6)	• Add 'Side Road' sign (W2-2) and distance plaque 200' (W16-2aP) in advance of intersection to the west (due to sight distance issue)	H.
	• Add chevrons (W1-8) for both approach directions of curve west of Locust Hill Road	I.
South Jefferson Elementary school zone influence area (see Figure 6)	• Add advance School Zone Speed Limit flashing warning signs (S4-5)	J.
	• Update school zone speed limit flashing signs and flashing lights (S5-1)	K.
	• Add plowable RPMs through section on centerline and edge lines	L.
West of the school to McCormack Lane (see Figure 6)	• Add chevrons (W1-8) for both approach directions along 3 curves within section	M.
Winding/rolling section adjacent to White House Farm (see Figure 8)	• Add advance 'Winding Road' (W1-5R, W1-5L) sign and reduced speed limit plaque (W13-1p) for both approach directions	N.
	• Add plowable RPMs through section on centerline and edge lines	O.
	• Add chevrons (W1-8) with sign post reflectorized strips on 3 curves within section	P.
Shirley Road intersection (see Figure 8)	• Relocate and update 'Low Ground Clearance' RR signing (W10-5) to Shirly Road – visible to turning traffic for Summit Point Road	Q.
	• Add 'Stop Ahead' sign (W3-1) to address alignment and advance visibility of existing Stop Sign	R.
	• Add 'Large Double Arrow' (W1-7) sign at T-intersection	S.

Figure 2: Signing and Pavement Marking Recommendations for the Lloyd Road Curve Area

Figure 3: Signing and Pavement Marking Recommendations WB approach to Lloyd Road

Figure 4: Signing and Pavement Marking Recommendations at Lloyd Road Intersection

Figure 5: Signing and Pavement Marking Recommendations EB approach to Lloyd Road

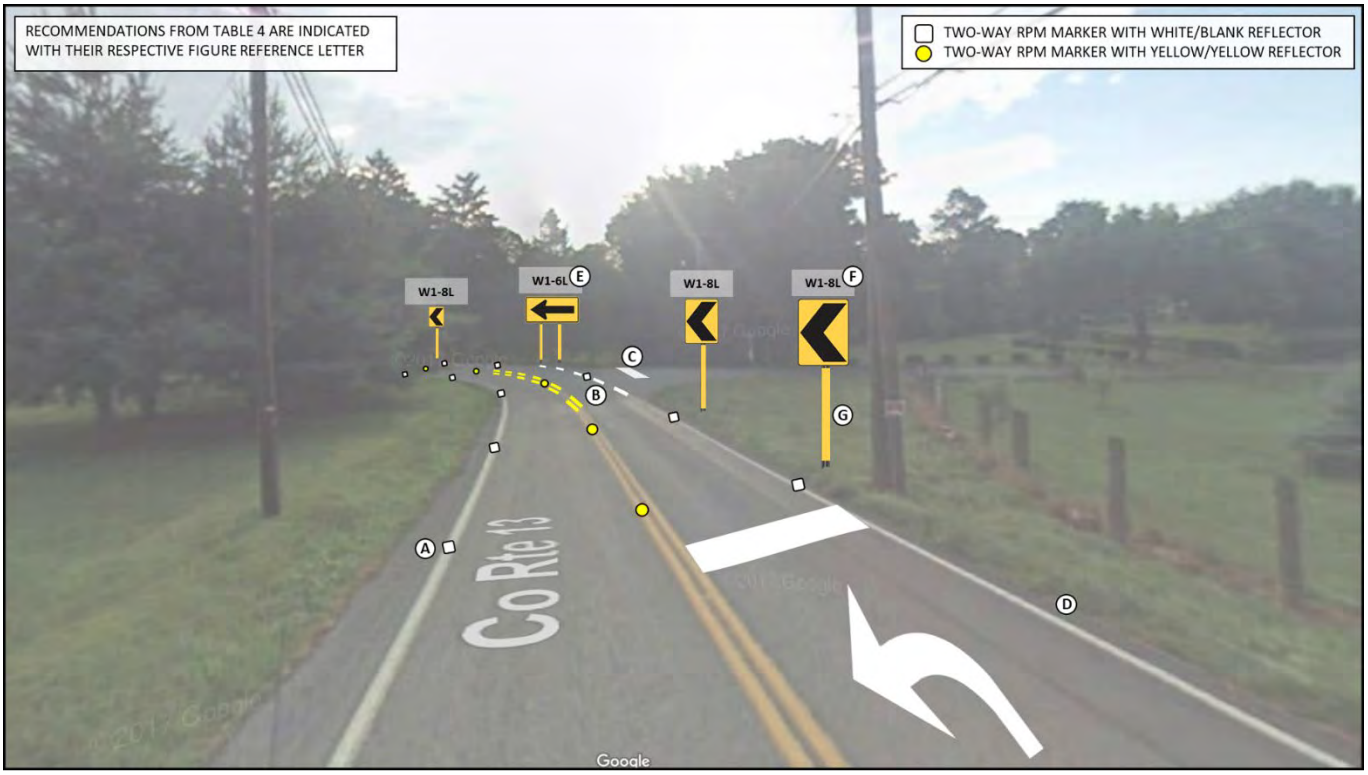


Figure 6: Signing and Pavement Marking Recommendations for Locust Hill Drive Intersection and School Zone Area

Figure 7: Signing and Pavement Marking Recommendations West of the School to McCormack Lane

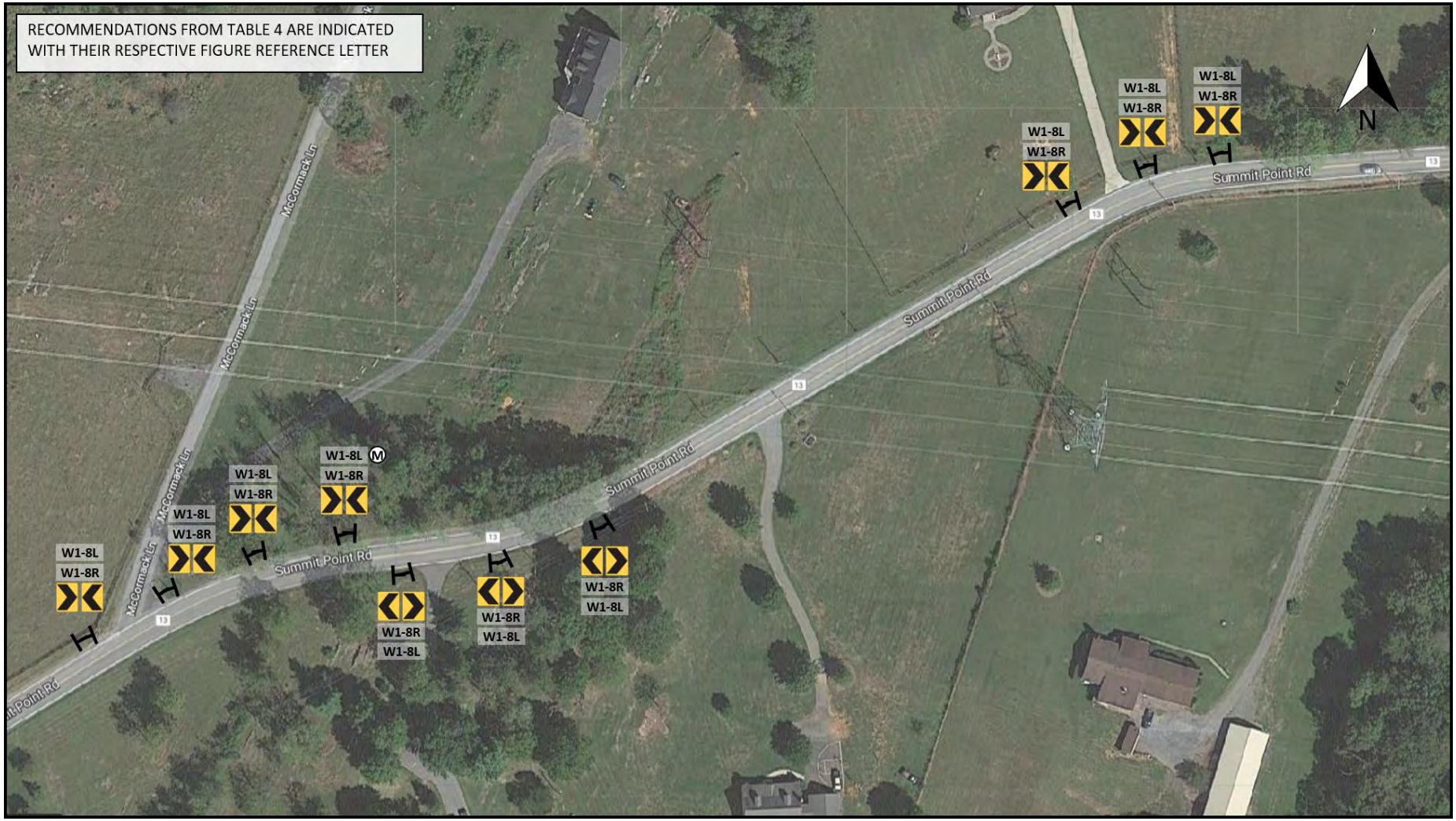


Figure 8: Signing and Pavement Marking Recommendations through Winding/Rolling Section adjacent to White House Farm