

October 3, 2022

Mr. Tim Miller  
Yellowstone County  
PO Box 35024  
Billings, MT 59107

Reference: Yellowstone County – Traffic Engineering Services  
Task Order No. 8 – 12 Mile Road & Yeoman Road Intersection Study  
Project No. 21001.08

Dear Tim:

The purpose of this letter is to summarize the results of the study that evaluated sight distance, speed, and general safety conditions of the intersection of 12 Mile Road & Yeoman Road located southwest of Shepherd in Yellowstone County. Yellowstone County has received numerous complaints through the years about the safety at this intersection due to (what is perceived to be) limited visibility to the north (from both the east and west approaches) and to the south (from the east approach). Previous improvements installed by the County to improve safety, including installation of intersection advisory signs and lowering of the grade of 12 Mile Road, have not alleviated the concerns from the public. As such, the purpose of this study is to evaluate safety and operations at this intersection to determine what improvements could be constructed to mitigate the sight distance restrictions and any other issues identified in the study.

### **Existing Conditions**

The intersection of 12 Mile Road and Yeoman Road sits approximately 2 miles southwest of Shepherd, Montana. Twelve Mile Road is a paved, a continuous, two-lane highway from its intersection with Highway 312 to approximately 4 miles north of the project intersection (where it continues as a gravel road) with a posted speed limit of 60 mph in the vicinity of the intersection. Yeoman Road is paved to the east of 12 Mile Road and is a gravel road that ends approximately one mile to the west. The speed limit on Yeoman Road is 35 mph on the gravel portion of the road to the west and 45 mph on the paved portion to the east. The intersection is two-way, stop-controlled with stop signs on Yeoman Road. There is a crest vertical curve approximately 300-feet to the north of the intersection on 12 Mile Road that limits visibility (more discussion on this later in the letter). There is an existing Intersection Warning sign (W2-1) with a 40-mph speed advisory plaque for southbound traffic 500-feet north of the intersection, and an Intersection Warning sign without a speed advisory plaque for northbound traffic 500-feet south of the intersection.

### Traffic Data Collection

Weekday AM and PM peak hour turning movement counts were collected on Thursday, September 8, 2022. The traffic data was collected using Miovision Scout video-based systems. In general, the weekday AM and PM peak hour periods were found to occur from 7:00 to 8:00 AM and 4:15 to 5:15 PM. Raw count data was adjusted for seasonal variation using MDT seasonal adjustment factors. This adjustment normalizes the raw traffic counts from the natural high and low traffic volumes which occur during seasonal variation. Figure 1 on the following page summarizes the seasonally adjusted Existing Conditions (2022) peak hour turning movement volumes for the AM and PM peak hours. Traffic speeds were also measured on both legs of 12 Mile Road using RADAR-based technology. The 85th percentile speeds were calculated based on continuous data collected between September 7th to 12th, 2022. The resulting 85th percentile speeds are also shown in Figure 1. It should also be noted that the existing Intersection Warning sign and speed advisory plaque warn drivers to traverse the vertical curve at a speed that provides adequate sight distance for all. However, the speed analysis on 12 Mile Road determined that the majority of drivers are not adhering to these warning signs. Detailed traffic count data worksheets and speed summaries are included in Appendix A.

**Figure 1: Existing Traffic Data Collection**



## Crash History

Historical crash data for the 12 Mile/Yeoman intersection was obtained from MDT for the 10-year period from January 1, 2011 through December 31, 2020. The data was analyzed for the purposes of calculating intersection crash rate and severity index and for evaluating collision type trends. Table 1 (next page) illustrates the results of the historical crash analysis. The intersection crash rate was calculated on the standard basis of crashes per million vehicles entering (MVE) the intersection. The MVE metric was estimated based on 2022 peak hour traffic counts and collected ADT volumes from the speed cameras. The crash rate for the intersection was 1.51 crashes/MVE, with only five (5) crashes occurring in ten years.

As a means of evaluating the historical crash frequency rate, Sanderson Stewart calculated the predictive crash rate using FHWA’s Safety Performance for Intersection Control Evaluation (SPICE) tool, based on formulas in the American Association of State Highway Transportation Officials (AASHTO) Highway Safety Manual (HSM). The tool calculates the predictive number of crashes in a year based on traffic demand (AADTs) and various physical and traffic environment-based conditions such as lane configurations, traffic control, and approach speeds. The calculations result in a crashes-per-year prediction. Sanderson Stewart then back-calculated a frequency rate on the basis of MVE for the sake of comparison with the actual historical crash rate. The results of the calculations for this study showed that the historical crash rate is equal to the predicted crash rate at the intersection of 12 Mile Road/Yeoman Road. The HSM rate predictions and 5-year crash totals for the intersection are summarized in the table below.

Severity index is defined as the weighted average by crash severity, including fatality, injury, and property damage only (PDO) crashes. The severity index was 1.00 at the intersection due to no injuries resulting from the intersection crashes. Severity index calculation results are also shown in Table 1 below.

**Table 1: Crash History – Frequency and Severity Statistics**

Intersection	2011-2020 DEV <sup>1</sup>	Reported Crashes <sup>2</sup>	Crash Type			Crash Data <sup>3</sup>			HSM Predictions <sup>4</sup>	
			PDO	Injury	Fatality	Average Crash Frequency (Crash/Yr)	Crash Rate (Crash/MVE)	Severity Index	Predicted Average Crash Frequency (Crash/Yr)	Predicted Crash Rate (Crash/MVE)
12 Mile Rd/Yeoman Rd	1812	5	5	0	0	0.50	0.76	1.00	0.50	0.76

<sup>1</sup> Daily Entering Volume (DEV) estimated from 2022 peak hour counts and 2022 collected AADTs

<sup>2</sup> Crashes reported from January 1, 2011 to December 31, 2020

<sup>3</sup> Crash rates expressed as crashes per million vehicles entering (MVE)

<sup>4</sup> Rates calculated using SPICE tool and Highway Safety Manual (HSM) 1st Edition predictive methodology

Sanderson Stewart performed an analysis of collision classification to determine if any patterns could be identified. Throughout the ten-year crash analysis period, 2 right-angle collisions and 3

fixed object crashes occurred at the study intersection. Table 2 on the following page illustrates the results of the types of crashes in the study intersection.

Right-angle collisions often occur at unsignalized intersections after a driver stops at a stop sign and then proceeds when it is unsafe to do so due to limited sight distance or inadequately judging gaps in vehicles. Both of the right-angle collisions occurred when a vehicle was turning right or proceeding straight from the east west (Yeoman Rd) approaches and was struck by a northbound or southbound vehicle. Both crashes occurred during daylight and on dry pavement. The high speeds on 12 Mile Road may make it difficult for Yeoman Road drivers to determine appropriate gaps to proceed. Additionally, trees on the southeast quadrant of the intersection may impair sight distance on the westbound approach.

All three fixed object crashes that occurred at the study intersection involved northbound vehicles traveling during snowy/icy conditions. One vehicle was reported to land in a ditch, and the other two crashes involved vehicles hitting a traffic sign support (on the west side of the roadway) and a utility pole (also located on the west side of the roadway). This portion of 12 Mile Road has more densely populated roadside objects than other portions of 12 Mile Road.

**Table 2: Crash History – Collision Type**

	Collision Type		
	Right Angle	Fixed Object	Total
12 Mile Rd/Yeoman Rd	2	3	5

It is important to note that all the above evaluations are speculative, and more detailed information about individual crashes would be needed to determine exact causes for each collision.

### **Intersection Sight Distance (ISD) via AutoCAD**

Based on preliminary site visits and as supported by our Crash History analysis, it was determined that the Intersection Sight Distance (ISD) for the intersection is potentially impacted by two separate obstructions: the vertical crest curve on 12 Mile Road north of the intersection and a line of trees in the southeast corner of the intersection. Each obstruction was analyzed separately.

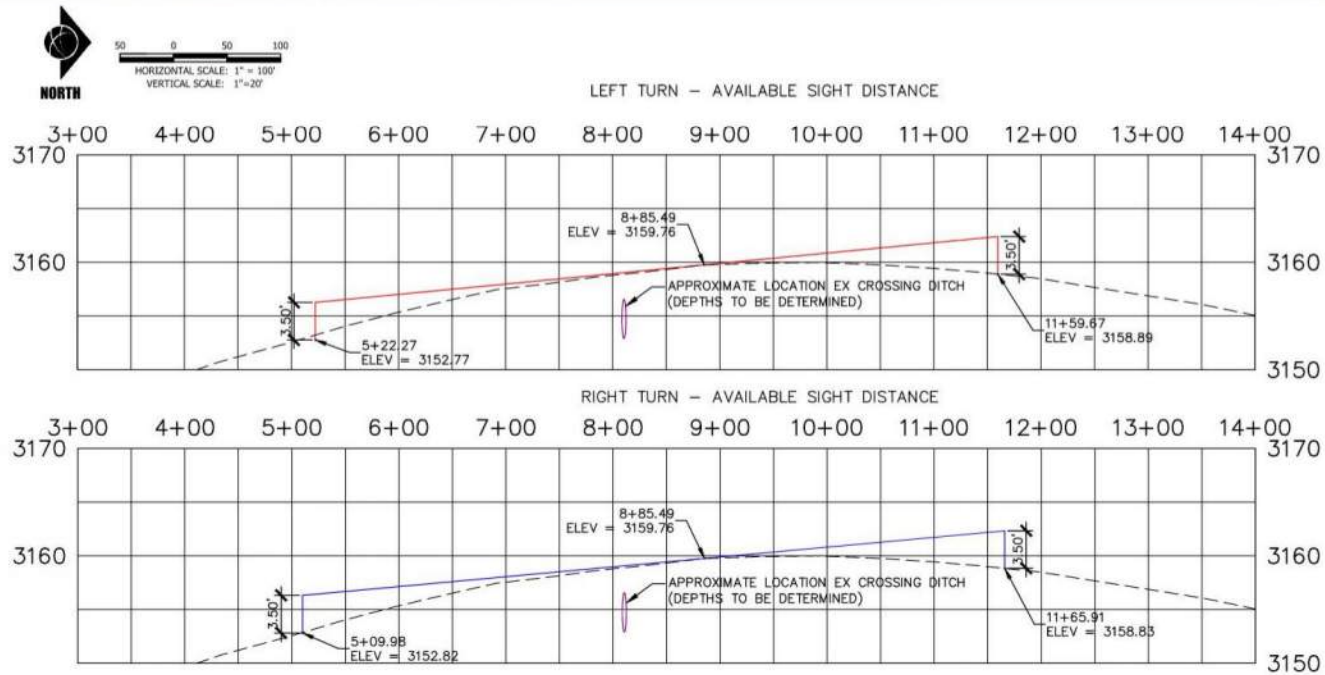
*Vertical Curve:* The required ISD was determined for both the east and west legs of the intersection using tables and equations presented in Appendix F – Sight Distance of the MDT Road Design Manual (RDM). Exhibits F-11 and F-12 in the RDM present the Two-Lane

Intersection Sight Distances (ISD) for Left-Turns and Right-Turns from a Minor Road, respectively. The analyses were performed based on three different design speeds: 40-mph, 60-mph, and 65-mph. The 40-mph design was analyzed to represent the southbound advisory speed limit; the 60-mph design was analyzed to represent the posted speed limit; and the 65-mph design was analyzed to represent an “upper-end” design speed that accounts for the 85th percentile speed. All three analyses were then compared against the amount of sight distance available based on the grade of the existing centerline of 12 Mile Road (Sanderson Stewart performed GPS-survey to determine the existing centerline grades along 12 Mile Road). The available sight distance was determined in AutoCAD based on the survey taken. A driver’s eye height and object eye height of 3.5 feet were used for all analysis scenarios, which is consistent with AASHTO procedures for sight distance analysis. The available sight distances measured from Yeoman Road were 637-feet and 656-feet for left- and right-turns, respectively. All measured and calculated ISDs are shown in Table 3 below. Figures 2 through 5 shown on the following pages detail the required sight triangles for the intersection and the calculated sight distance. As shown below in Table 3, the vertical curve north of the intersection does not impact the visibility for an eastbound right turning movement when evaluated at a 40-, 60-, or 65-mph design speed.

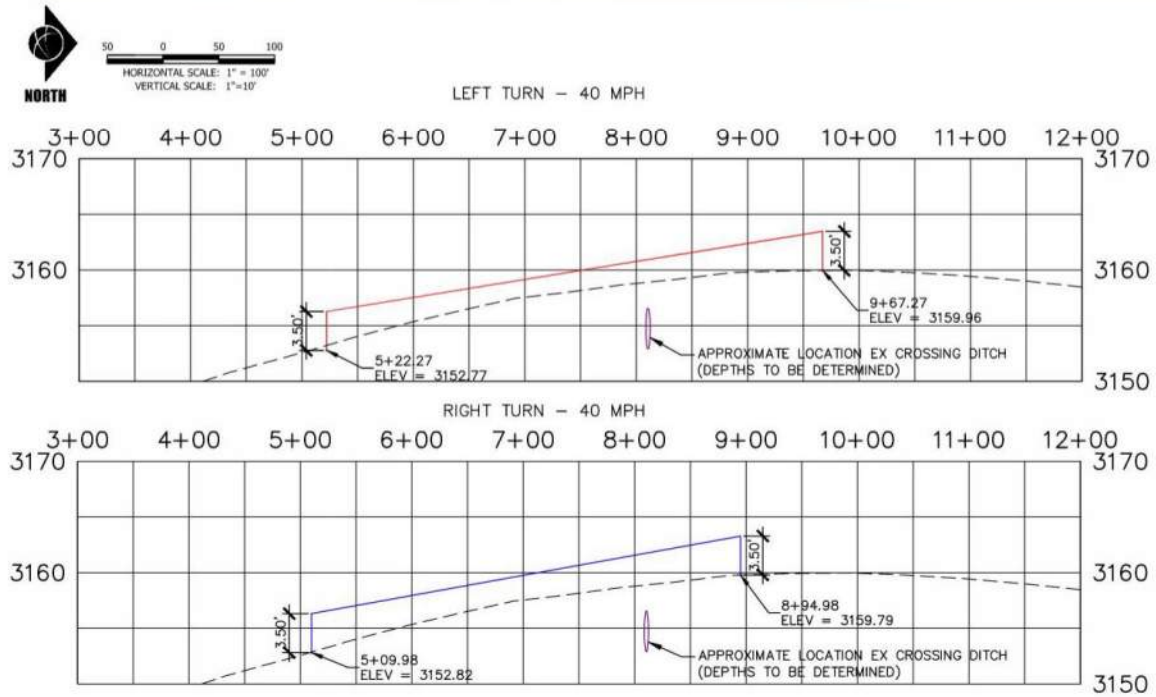
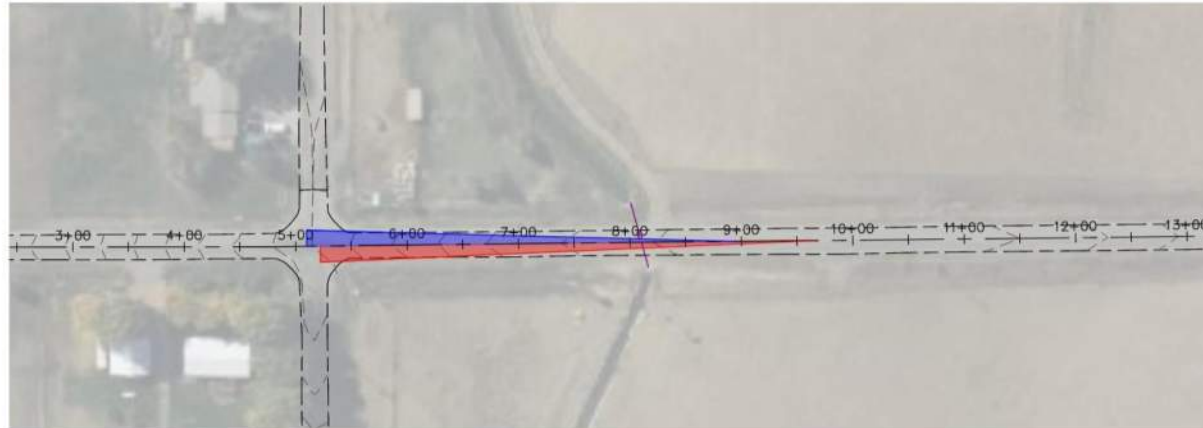
However, the vertical curve creates a vision obstruction for the WB left turn movement that renders the ISD sub-standard by 83-feet (for a design speed of 65-mph) and by 28 feet (for a 60-mph design speed). Further analysis of the existing grades has determined that the vertical curve would need to be lowered by approximately 4-inches and 12-inches for a 60- and 65-mph design speed, respectively to meet AASHTO-recommended intersection sight distance values. It should also be noted that there is an existing irrigation ditch crossing/siphon along this stretch of 12 Mile Road that could impact any potential lowering of the street grades. The siphon was not surveyed and crossing depths were unknown at the time of this analysis. Additional information would be required if a redesigned centerline grade is proposed.

**Table 3: Summary of Intersection Sight Distance (ISD)**

<b>Turning Movement</b>	<b>Design Speed (mph)</b>	<b>Required ISD (ft)</b>	<b>Available ISD (ft)</b>	<b>Add'l ISD Required (ft)</b>
EB Right	40	385	656	0
EB Right	60	575	656	0
EB Right	65	625	656	0
EB Left	60	665	Unobstructed	0
WB Right	60	575	Unobstructed	0
WB Left	40	445	637	0
WB Left	60	665	637	28
WB Left	65	720	637	83



**Figure 2: Intersection Sight Distance - Available**



**Figure 3: Intersection Sight Distance - 40 mph Design**

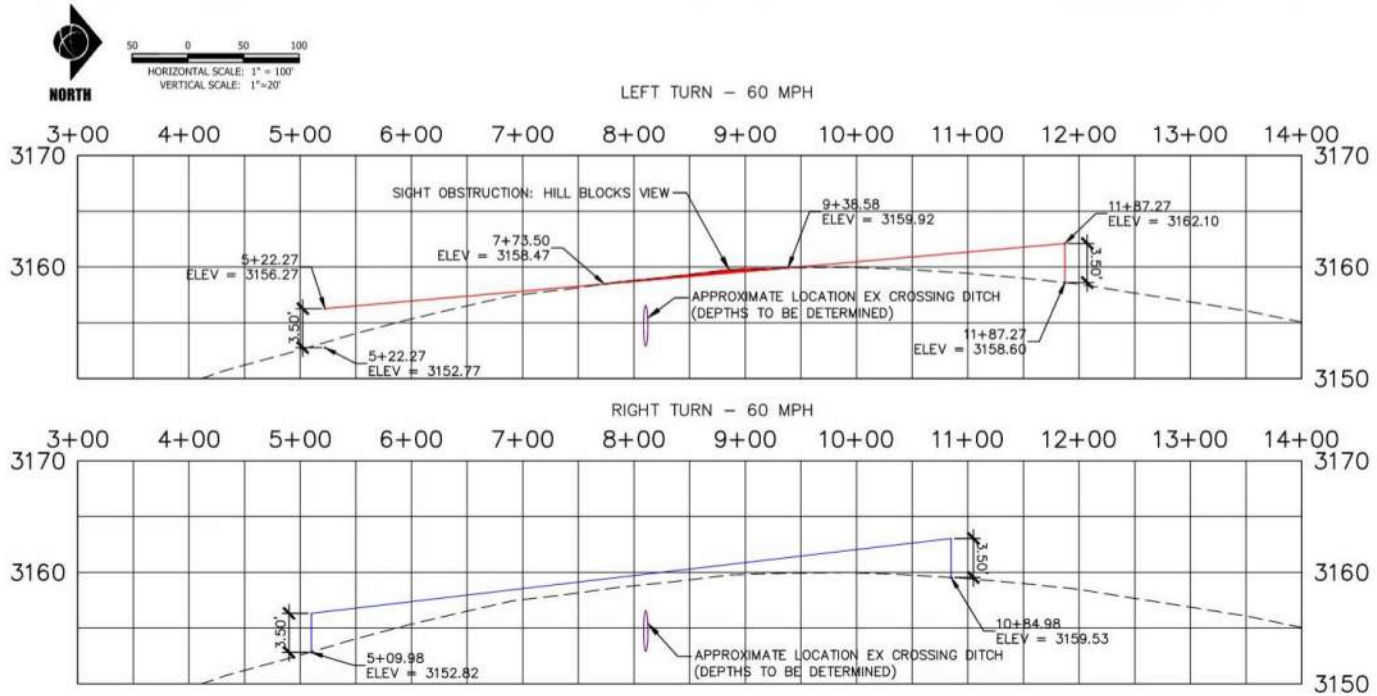
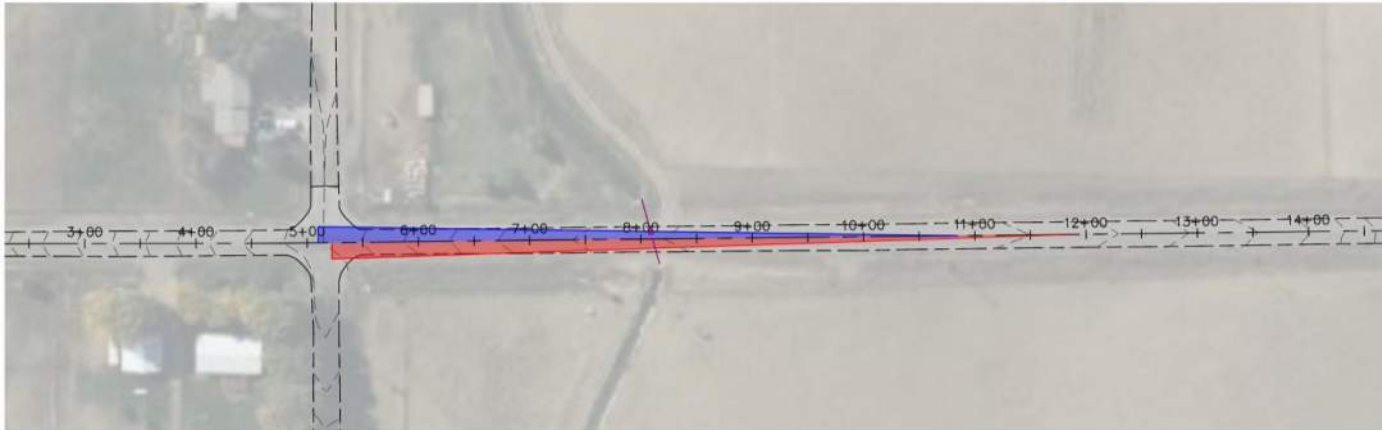
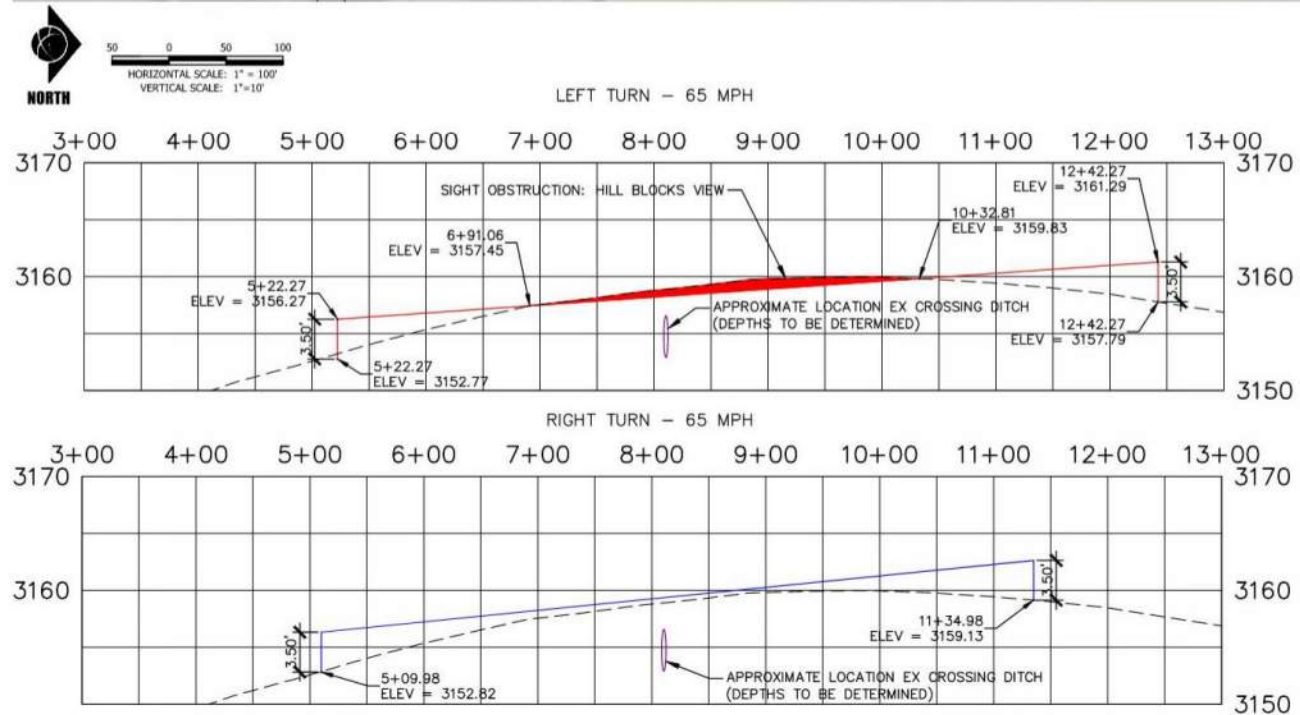


Figure 4: Intersection Sight Distance – 60 mph Design



**Figure 5: Intersection Sight Distance – 65 mph Design**

**Figure 6: Tree Branch Obstructions (Westbound, looking South)**



*Tree Line:* The sight distance to the south of the intersection is available for as far as the eye can see (based on the vertical alignment of the roadway) – with slight impacts from overhanging tree limbs. While there is currently adequate sight distance, the sight distance would be greatly improved with minor trimming to a few particular branches that impact visibility. This trimming will provide more than adequate sight distance for both left- and right-turns off Yeoman Road. Figure 6, above, shows the branches requiring removal.

### **Intersection Sight Distance (ISD) via Field Measurements**

In addition to the sight distance analyses performed from the survey data and AutoCAD, Sanderson Stewart performed a check on the same sight distance analyses for each movement utilizing appropriate field measurements. Staff performed the according field measurements for driver's eye positioning and identified the extent at which an object 3.5-foot tall was visible to. The object height and driver's eye were both modeled using a standard traffic control "candle". Figures 7 through 10 on the following pages show the results of these measurements. The distances measured were to the last point of visibility, or the 65-mph design speed distance.

Mr. Tim Miller  
October 3, 2022  
Page 11

**Figure 7: Field Measurements (Eastbound, looking South at 720-feet)**



Mr. Tim Miller  
October 3, 2022  
Page 12

**Figure 8: Field Measurements (Eastbound, looking North at 600-feet)**



**Figure 9: Field Measurements (Westbound, looking South at 625-feet)**



**Figure 10: Field Measurements (Westbound, looking North at 610-feet)**



As shown in the preceding figures (Figs. 7 and 9), visibility to the south is adequate to allow for a design speed beyond that of 65-mph. Conversely, Figures 8 and 10 show the very tops of the object height to be visible at 600-feet and 610-feet when viewed from the eastbound and westbound approaches, respectively, to the north. This determines that the vertical curve north of the intersection creates a vision obstruction for the WB left turn movement that renders the ISD sub-standard by 110-feet (for a design speed of 65-mph) and by 55 feet (for a 60-mph design speed). The available sight distance to the north for an EB right turn is also 25 feet less than the recommended design ISD for a 65-mph design speed. This confirms the analysis performed with survey data and AutoCAD but showed the available sight distance was slightly less than what AutoCAD determined.

Finally, all the sub-standard sight distances measured in the field or with AutoCAD were converted to the corresponding maximum allowable design speeds that would render the distances adequate utilizing the underlying ISD equation documented in Appendix F – Sight

Distance of the MDT Road Design Manual (RDM). These calculations are included in Appendix B and summarized in Table 4 below.

**Table 4: Summary of Maximum Design Speeds for Available ISD**

<b>Turning Movement</b>	<b>Method of Measurement</b>	<b>Available ISD (ft)</b>	<b>Corresponding Maximum Allowable Speed (mph)</b>
WB Left	ACAD	637	57.8
WB Left	Field	610	55.3
EB Right	Field	600	62.8

## Conclusions

The preceding analyses were used to identify safety concerns for the project intersection. Our crash history analysis determined that there were minimal reported crashes and tendencies. Further, the crash rate at this intersection was within the expected crash rate as determined by formulas within the AASHTO Highway Safety Manual. The intersection sight distance analyses performed at the 12 Mile Road and Yeoman Road intersection determined that there is adequate sight distance to the south of the intersection, although additional improvements could be made with minor pruning of tree limbs. The analyses also determined that the vertical curve to the north of the intersection creates a sight obstruction for any design speed over 55 mph. The existing intersection warning sign and supplemental 40 mph speed plaque for the southbound traffic on 12 Mile Road are sufficient for the vertical curve. However, the speed analysis of prevailing traffic indicates that vehicles are not abiding by the advisory speed zone. The following options could be used to help alleviate the speeds and sight obstruction:

- Speed Reduction
  - Increase conspicuity of the existing warning signs. This could include increasing the sign size, adding flags to the signs, adding flashing lights to the signs, or doubling the signs on each side of the road.
  - Add transverse rumble strips to 12 Mile Road. This would increase drivers' awareness of the advisory speed zone.
  - Install an overhead intersection warning beacon. The beacon would be visible from further away, and it would alert drivers to the upcoming intersection.
  - Add sign-mounted intelligent transportation systems. These lights could be RADAR activated to flash only when traffic is exceeding the advisory speeds.
  - Lower the speed limit to 55 mph. It should be noted that adequate enforcement of the speed limit would likely be required to change the drivers' behaviors.

Mr. Tim Miller  
October 3, 2022  
Page 16

- Sight Obstruction Removal/Improvements
  - Re-grade the existing centerline along 12 Mile Road. This would require a lowering of approximately 4-inches to meet the 60-mph speed limit, or 12-inches to meet a 65-mph design speed. Impacts to the existing siphon should also be considered with this option.
  - Prune the tree limbs to south of the intersection to improve visibility.
  - Cutting the grasses and weeds along the shoulder of the road – particularly at the crest of the vertical curve to the north – will help improve drivers' ability to see oncoming traffic.

Please feel free to contact me at 406/869-3320 or [eclaunch@sandersonstewart.com](mailto:eclaunch@sandersonstewart.com) if you have any questions or would like to discuss this further.

Sincerely,



Erin S. Claunch, PE, PTOE  
Municipal Group Manager/Senior Engineer

ESC/hl

Enc.

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TRAFFIC VOLUME DATA

APPENDIX A

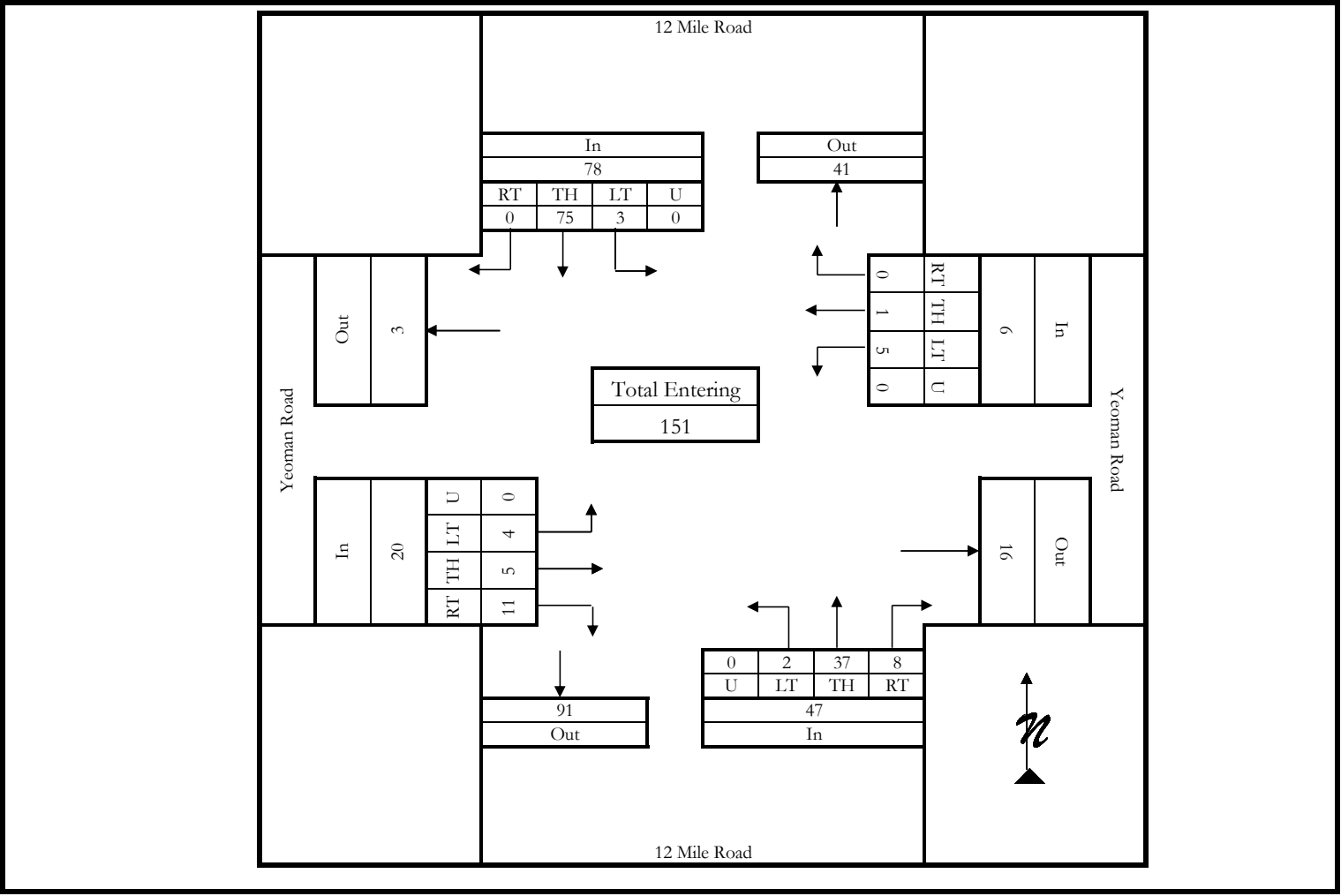
## INTERSECTION TURNING MOVEMENT COUNT SUMMARY

### General Information

Counted By: Keaton Edam	Intersection: 12 Mile Road and Yeoman Road
Agency/Company: Sanderson Stewart	Jurisdiction: Shepherd/MDT
Date Performed: Thursday, September 8, 2022	Project Description: 12 Mile and Yeoman Intersection Study
Count Time Period: AM Peak Hour (7:00 - 8:00 AM)	Project Number: 21001.08
Project Number: 21001.08	Project Description: 12 Mile and Yeoman Intersection Study
North/South Street: 12 Mile Road	East/West Street: Yeoman Road

### Vehicle Volumes and Adjustments

Start Time	12 Mile Road Southbound					12 Mile Road Northbound					Yeoman Road Eastbound					Yeoman Road Westbound					Int. Total
	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	
Factor	0.94	0.94	0.94	0.94		0.94	0.94	0.94	0.94		0.94	0.94	0.94	0.94		0.94	0.94	0.94	0.94		
7:00 AM	0	19	1	0	20	0	6	1	0	7	4	1	3	0	8	0	0	1	0	1	36
7:15 AM	0	32	0	0	32	1	6	1	0	8	4	0	0	0	4	0	1	0	0	1	45
7:30 AM	0	13	1	0	14	4	9	0	0	13	1	1	0	0	2	0	0	2	0	2	31
7:45 AM	0	11	1	0	12	3	16	0	0	19	2	3	1	0	6	0	0	2	0	2	39
<b>Grand Total</b>	<b>0</b>	<b>75</b>	<b>3</b>	<b>0</b>	<b>78</b>	<b>8</b>	<b>37</b>	<b>2</b>	<b>0</b>	<b>47</b>	<b>11</b>	<b>5</b>	<b>4</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>1</b>	<b>5</b>	<b>0</b>	<b>6</b>	<b>151</b>
Medium Truck %	0.0	4.0	0.0	0.0	3.8	12.5	8.1	0.0	0.0	8.5	9.1	0.0	0.0	0.0	5.0	0.0	100.0	0.0	0.0	16.7	
Heavy Truck %	0.0	4.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
<b>Total Truck %</b>	<b>0.0</b>	<b>8.0</b>	<b>0.0</b>	<b>0.0</b>	<b>7.7</b>	<b>12.5</b>	<b>8.1</b>	<b>0.0</b>	<b>0.0</b>	<b>8.5</b>	<b>9.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>5.0</b>	<b>0.0</b>	<b>100.0</b>	<b>0.0</b>	<b>0.0</b>	<b>16.7</b>	
Total %	0.0	49.7	2.0	0.0	51.7	5.3	24.5	1.3	0.0	31.1	7.3	3.3	2.6	0.0	13.2	0.0	0.7	3.3	0.0	4.0	100.0
PHF	0.61	0.61	0.61			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			0.84



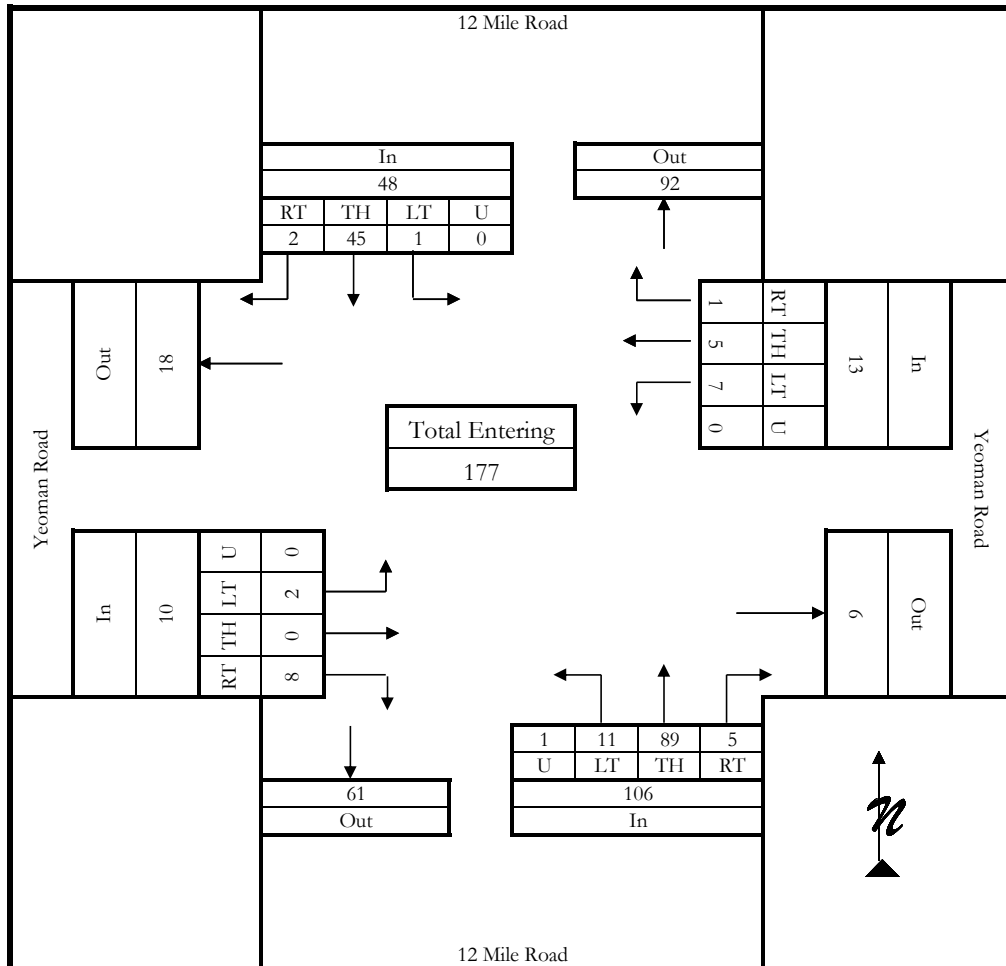
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Date Performed: Thursday, September 8, 2022	Project Description: 12 Mile and Yeoman Intersection Study
Count Time Period: PM Peak Hour (4:15 - 5:15 PM)	Project Number: 21001.08
Project Number: 21001.08	Project Description: 12 Mile and Yeoman Intersection Study
North/South Street: 12 Mile Road	East/West Street: Yeoman Road

### Vehicle Volumes and Adjustments

Start Time	12 Mile Road Southbound					12 Mile Road Northbound					Yeoman Road Eastbound					Yeoman Road Westbound					Int. Total
	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	
Factor	0.94	0.94	0.94	0.94		0.94	0.94	0.94	0.94		0.94	0.94	0.94	0.94		0.94	0.94	0.94	0.94		
4:15 PM	0	11	0	0	11	1	21	2	0	24	1	0	1	0	2	0	4	0	0	4	
4:30 PM	2	11	0	0	13	2	21	3	1	27	4	0	0	0	4	0	0	3	0	3	
4:45 PM	0	14	0	0	14	1	25	5	0	31	1	0	0	0	1	1	1	0	0	2	
5:00 PM	0	9	1	0	10	1	22	1	0	24	2	0	1	0	3	0	0	4	0	4	
<b>Grand Total</b>	<b>2</b>	<b>45</b>	<b>1</b>	<b>0</b>	<b>48</b>	<b>5</b>	<b>89</b>	<b>11</b>	<b>1</b>	<b>106</b>	<b>8</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>10</b>	<b>1</b>	<b>5</b>	<b>7</b>	<b>0</b>	<b>13</b>	
Medium Truck %	50.0	0.0	0.0	0.0	2.1	0.0	4.5	0.0	0.0	3.8	25.0	0.0	0.0	0.0	20.0	0.0	20.0	0.0	0.0	7.7	
Heavy Truck %	0.0	2.2	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
<b>Total Truck %</b>	<b>50.0</b>	<b>2.2</b>	<b>0.0</b>	<b>0.0</b>	<b>4.2</b>	<b>0.0</b>	<b>4.5</b>	<b>0.0</b>	<b>0.0</b>	<b>3.8</b>	<b>25.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>20.0</b>	<b>0.0</b>	<b>20.0</b>	<b>0.0</b>	<b>0.0</b>	<b>7.7</b>	
<b>Total %</b>	<b>1.1</b>	<b>25.4</b>	<b>0.6</b>	<b>0.0</b>	<b>27.1</b>	<b>2.8</b>	<b>50.3</b>	<b>6.2</b>	<b>0.6</b>	<b>59.9</b>	<b>4.5</b>	<b>0.0</b>	<b>1.1</b>	<b>0.0</b>	<b>5.6</b>	<b>0.6</b>	<b>2.8</b>	<b>4.0</b>	<b>0.0</b>	<b>7.3</b>	
PHF	0.87	0.87	0.87			0.84	0.84	0.84			1.00	1.00	1.00			1.00	1.00	1.00		0.91	



ALLOWABLE DESIGN SPEEDS CALCULATIONS

APPENDIX B

INTERSECTION SIGHT DISTANCE (PER EQN. F.3-1 OF MDOT TRAFF. ENG. MAN.)

$$\bullet \quad \text{ISD} = 1.47 (V_m) t_G \Rightarrow \frac{\text{ISD}}{1.47 t_G} = V_{\text{MAT}}$$

$$\rightarrow t_G = 7.5 \text{ SEC FOR LEFT TURNS}$$

$$\rightarrow t_G = 6.5 \text{ SEC FOR RIGHT TURNS}$$

AVAILABLE SIGHT DISTANCES (MEASURED IN CAD):

$$\rightarrow \text{WESTBOUND LEFTS} = 637.40 \text{ FT}$$

$$\rightarrow \text{EASTBOUND RIGHTS} = 655.93 \text{ FT}$$

CALCULATED ALLOWABLE SPEEDS BASED ON ISD:

$$\rightarrow \text{WB LT} \Rightarrow V_{\text{LT}} = \frac{(637.40 \text{ FT})}{1.47 (7.5 \text{ SEC})} = 57.81 \text{ MPH}$$

$$\rightarrow \text{EB RT} \Rightarrow V_{\text{RT}} = \frac{(655.93 \text{ FT})}{1.47 (6.5 \text{ SEC})} = 68.65 \text{ MPH}$$

INTERSECTION SIGHT DISTANCE (PER EQN. F.3-1 OF MDT TRAFFIC ENG. MANUAL)

$$\bullet \text{ ISD} = 1.47 (V_m) t_G \Rightarrow \frac{\text{ISD}}{1.47 t_G} = V_m$$

$$\rightarrow t_G = 7.5 \text{ SEC FOR LEFT TURNS}$$

$$\rightarrow t_G = 6.5 \text{ SEC FOR RIGHT TURNS}$$

 $\bullet$  AVAILABLE SIGHT DISTANCE (MEASURED IN FIELD)

$$\rightarrow \text{WB LEFTS} = 610 \text{ FT}$$

$$\rightarrow \text{EB RIGHTS} = 600 \text{ FT}$$

 $\bullet$  ALLOWABLE SPEEDS CALCULATED PER ISD

$$\rightarrow \text{WB LEFT} \Rightarrow V_{LT} = \frac{(610 \text{ FT})}{1.47 (7.5 \text{ SEC})} = 55.3 \text{ MPH}$$

$$\rightarrow \text{EB RIGHT} \Rightarrow V_{RT} = \frac{(600 \text{ FT})}{1.47 (6.5 \text{ SEC})} = 62.8 \text{ MPH}$$