

August 5, 2025

Austin Blackmon  
Traffic Section Manager  
Public Works / Engineering  
City of Rio Rancho



**Re: Camino Encantadas and Franklin Road/Fairbanks Drive Sight Distance Study**

Mr. Blackmon,

The following technical memo documents procedures and results of a sight distance analysis performed for the Camino Encantadas and Franklin Road/Fairbanks Drive intersection in the City of Rio Rancho. The purpose of this analysis is to measure the actual intersection sight distances at the study location and compare them to the criteria in the AASHTO Green Book (A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials [AASHTO], 2018).

## Project Location

The intersection of Camino Encantadas and Franklin Road/Fairbanks Drive is within the City of Rio Rancho, Sandoval County, New Mexico.

### Camino Encantadas

This section of Camino Encantadas is posted at 35 mph and is classified as an Urban Minor Arterial. It has one 12-foot southbound and one 12-foot northbound through lane separated by an 18-foot landscaped median and includes a 12-foot northbound and southbound left turn lane. It's a two-way stop-controlled intersection with Franklin Road/Fairbanks Drive. Bike lanes are also present along both sides of the roadway.

### Franklin Road/Fairbanks Drive

This section of Franklin Road/Fairbanks Drive is posted at 25 mph and is classified as a minor collector. It has one 12-foot eastbound and one 12-foot westbound through lane. Bike lanes are present on Franklin Road. They are not present on Fairbanks Drive.

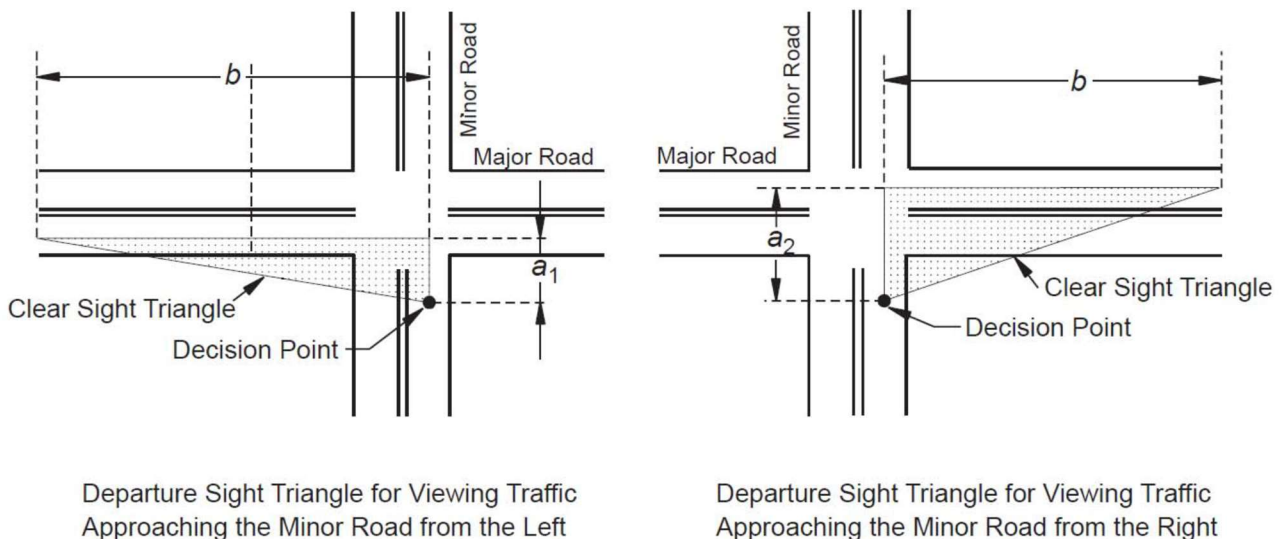
## Methodology

Required sight distance required at the intersection of Camino Encantadas and Franklin Road/Fairbanks Drive was calculated using the procedures of the AASHTO Green Book. Text from Section 9.5.1, which discusses the minimum required and available sight distance is provided below:

*Stopping sight distance is provided continuously along each roadway so that drivers have a view of the roadway ahead that is sufficient to allow drivers to stop. The provision of stopping sight distance at all locations along each roadway, including intersection approaches, is fundamental to intersection operation.*

*If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. However, in some cases, a major-road vehicle may need to slow or stop to accommodate the maneuver by a minor-road vehicle. To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road.*

For the case of a stop-controlled minor road approach to an intersection of a major road, AASHTO defines the required clear sight triangles as shown in Figure 1.



Departure Sight Triangles (Stop-Controlled)

– B –

Figure 1: Clear Sight Triangles figure from AASHTO Green Book

### AASHTO Green Book Input Values

Tables 1-4 are reproduced from the AASHTO Green Book for this analysis. Intersection sight distance for a left turn from a stop is calculated based on Table 1. Time gaps for right turns from a stop are taken from Table 2. Time gaps for left turns from the major road are taken from Table 3. Camino Encantadas is posted at 35 mph and is used in this evaluation. Tables 1-4 and Formula 9-1 are shown on the following pages.

**Table 1: AASHTO Table 9-6 Time Gap Values for Case B1**

| <b>Table 9-6. Time Gap for Case B1, Left Turn from Stop</b> |                                                                    |
|-------------------------------------------------------------|--------------------------------------------------------------------|
| <b>Design Vehicle</b>                                       | <b>Time Gap(<math>t_g</math>)(s) at Design Speed of Major Road</b> |
| Passenger Car                                               | 7.5                                                                |
| Single-unit truck                                           | 9.5                                                                |
| Combination truck                                           | 11.5                                                               |

*Note: Time gaps are for a stopped vehicle to turn left onto a two-lane highway with no median and with minor-road approach grades of 3 percent or less. The time gaps are applicable to determining sight distance to the right in left-turn maneuvers. The table values should be adjusted as follows:*

*For multilane roadways or medians—For left turns onto two-way roadways with more than two lanes, including turn lanes, add 0.5 s for passenger cars or 0.7 s for trucks for each additional lane, from the left, in excess of one, to be crossed by the turning vehicle. Median widths should be converted to an equivalent number of lanes in applying the 0.5 and 0.7 s criteria presented above; for example, an 18-ft [5.5-m] median is equivalent to one and a half lanes, and would require an additional 0.75 s for a passenger to cross and an additional 1.05 s for a truck to cross.*

*For minor-road approach grades—If the approach grade is an upgrade that exceeds 3 percent, add 0.2 s for each percent grade by which the approach grade exceeds zero percent*

**Table 2: AASHTO Table 9-8 Time Gap Values for Case B2**

| <b>Table 9-8. Time Gap for Case B2, Right Turn from Stop</b> |                                                    |
|--------------------------------------------------------------|----------------------------------------------------|
| Design Vehicle                                               | Time Gap( $t_g$ )(s) at Design Speed of Major Road |
| Passenger Car                                                | 6.5                                                |
| Single-unit truck                                            | 8.5                                                |
| Combination truck                                            | 10.5                                               |

*Note: Time gaps are for a stopped vehicle to turn right onto or to cross a two-lane roadway with no median and with minor-road approach grades of 3 percent or less.*

*The table values should be adjusted as follows:*

*For minor-road approach grades—If the approach grade is an upgrade that exceeds 3 percent, add 0.1 s for each percent grade by which the approach grade exceeds zero percent.*

**Table 3: AASHTO Table 9-8 Time Gap Values for Case F**

| <b>Table 9-16. Time Gap for Case F, Left Turns from the Major Road</b> |                                                    |
|------------------------------------------------------------------------|----------------------------------------------------|
| Design Vehicle                                                         | Time Gap( $t_g$ )(s) at Design Speed of Major Road |
| Passenger Car                                                          | 5.5                                                |
| Single-unit truck                                                      | 6.5                                                |
| Combination truck                                                      | 7.5                                                |

*Note: Time gaps are for a stopped vehicle to turn right onto or to cross a two-lane roadway with no median and with minor-road approach grades of 3 percent or less.*

*The table values should be adjusted as follows:*

*For multilane and/or divided roadways—For left turns on two-way roadways across more than one opposing lane, including turn lanes, add 0.5 s for passenger cars or 0.7 s for trucks for each additional lane to be crossed in the left-turn maneuver in excess of one lane. Where the left-turning vehicle must pass through a median, the median width should be converted to an equivalent number of lanes; for example, an 18-ft [5.5m] median would be equivalent to one and a half lanes and crossing through the median would require an additional 0.75 s for a passenger car and 1.05 s for a truck. The table also contains appropriate adjustment factors for the number of major-road lanes to be crossed by the turning vehicle. The unadjusted time gap in Table 9-16 for passenger cars was used to develop the sight distances in Table 9-17.*

**Table 4: AASHTO Table 9-7 and 9-9 Design Intersection Sight Distance**

| Table 9-7. Design Intersection Sight Distance - Case B1 Left Turn From Stop |                              |                                                |             | Table 9-9. Design Intersection Sight Distance - Case B2, Right Turn From Stop, and Case B3, Crossing Maneuver |                              |                                                |             |
|-----------------------------------------------------------------------------|------------------------------|------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------------------------|-------------|
| U.S. Customary                                                              |                              |                                                |             | U.S. Customary                                                                                                |                              |                                                |             |
| Design Speed (mph)                                                          | Stopping Sight Distance (ft) | Intersection Sight Distance for Passenger Cars |             | Design Speed (mph)                                                                                            | Stopping Sight Distance (ft) | Intersection Sight Distance for Passenger Cars |             |
|                                                                             |                              | Calculated (ft)                                | Design (ft) |                                                                                                               |                              | Calculated (ft)                                | Design (ft) |
| 15                                                                          | 80                           | 165.4                                          | 170         | 15                                                                                                            | 80                           | 143.3                                          | 145         |
| 20                                                                          | 115                          | 220.5                                          | 225         | 20                                                                                                            | 115                          | 191.1                                          | 195         |
| 25                                                                          | 155                          | 275.6                                          | 280         | 25                                                                                                            | 155                          | 238.9                                          | 240         |
| 30                                                                          | 200                          | 330.8                                          | 335         | 30                                                                                                            | 200                          | 286.7                                          | 290         |
| 35                                                                          | 250                          | 385.9                                          | 390         | 35                                                                                                            | 250                          | 334.4                                          | 335         |
| 40                                                                          | 305                          | 441.0                                          | 445         | 40                                                                                                            | 305                          | 382.2                                          | 385         |
| 45                                                                          | 360                          | 496.1                                          | 500         | 45                                                                                                            | 360                          | 430.0                                          | 430         |
| 50                                                                          | 425                          | 551.3                                          | 555         | 50                                                                                                            | 425                          | 477.8                                          | 480         |
| 55                                                                          | 495                          | 606.4                                          | 610         | 55                                                                                                            | 495                          | 525.5                                          | 530         |
| 60                                                                          | 570                          | 661.5                                          | 665         | 60                                                                                                            | 570                          | 573.3                                          | 575         |
| 65                                                                          | 645                          | 716.6                                          | 720         | 65                                                                                                            | 645                          | 621.1                                          | 625         |
| 70                                                                          | 730                          | 771.8                                          | 775         | 70                                                                                                            | 730                          | 668.9                                          | 670         |
| 75                                                                          | 820                          | 826.9                                          | 830         | 75                                                                                                            | 820                          | 716.6                                          | 720         |
| 80                                                                          | 910                          | 882.0                                          | 885         | 80                                                                                                            | 910                          | 764.4                                          | 765         |

### Formula (9-1)

Formula 9-1 was used in this analysis to determine the required intersection sight distance for each scenario. **Tables 1, 2, and 3** show the input values and required intersection sight distance for each case using formula 9-1. **Table 4** presents the required and available intersection sight distances for Case B and Case F.

$$ISD = 1.47 V_{major} t_g$$

where:

ISD = intersection sight distance (length of the leg of sight triangle along the major road) (ft)

$V_{major}$  = design speed of major road (mph)

$t_g$  = time gap for minor road vehicle to enter major road(s)

**Table 5: Case B1 Formula 9-1 Input Values:**

| $V_{major}$ | $t_g$ | ISD           |
|-------------|-------|---------------|
| 35 mph      | 9 s   | <b>465 ft</b> |

**Table 6: Case B2 Formula 9-1 Input Values**

|                    |       |               |
|--------------------|-------|---------------|
| $V_{\text{major}}$ | $t_g$ | ISD           |
| 35 mph             | 6.5 s | <b>335 ft</b> |

**Table 7: Case F Formula 9-1 Input Values**

|                    |       |               |
|--------------------|-------|---------------|
| $V_{\text{major}}$ | $t_g$ | ISD           |
| 35 mph             | 7 s   | <b>365 ft</b> |

## Intersection Sight Distance Measurement

A field review of the intersection was completed on Monday, June 30th, 2025. To measure the available intersection sight distance, the decision point on the minor approach was measured at 14.5 feet back from the traveled way, per AASHTO criteria. The available sight distances were measured for Case B1 – Left turn from the minor road, Case B2 – Right turn from the minor road, and Case F – Left turns from the major road. Case B3 was not considered because, although there is space for a small vehicle to wait in the median opening, drivers in the area were not observed to be performing this maneuver. The posted speed limit on Camino Encantadas is 35 MPH and the design vehicle for this evaluation is a passenger car. The measurements are recorded in Table 8.

**Table 8: Sight Distance Evaluation**

| Approach                | Sight Distance Case                    | Measured Sight Distance | Required Sight Distance |
|-------------------------|----------------------------------------|-------------------------|-------------------------|
| EB on Franklin Rd       | B1 – Left Turn from the Minor Roadway  | <b>≈280'</b>            | 465 FT                  |
|                         | B2 – Right Turn from the Minor Roadway | <b>≈250'</b>            | 335 FT                  |
| WB on Fairbanks Dr      | B1 – Left Turn from the Minor Roadway  | <b>≈250'</b>            | 465 FT                  |
|                         | B2 – Right Turn from the Minor Roadway | +1000'                  | 335 FT                  |
| NB on Camino Encantadas | F – Left Turn from the Major Roadway   | ≈670'                   | 365 FT                  |
| SB on Camino Encantadas | F – Left Turn from the Major Roadway   | ≈650'                   | 365 FT                  |

As shown in Table 4, the field investigation results of the available sight distance indicate that the available sight distance for vehicles on Fairbanks Drive and Franklin Road approaching the intersection with Camino Encantadas does not meet the required sight distance in certain scenarios.

- The available sight distance to the left on Franklin Road, looking north toward Camino Encantadas, does not meet the required left-turn distance, as shown in Figure 2. Additionally, the available sight distance to the right on Franklin Road, looking south toward Camino Encantadas, does not meet the required right-turn sight distance, as shown in Figure 3



**Figure 2: Sight Distance looking Right on Franklin Rd**



**Figure 3: Sight Distance looking Left on Franklin Rd**

- The available sight distance to the right on Fairbanks Drive, looking north toward Camino Encantadas, does not meet the required left-turn sight distance, as shown in Figure 4.



**Figure 4: Sight Distance looking Right on Fairbanks Dr**

Available sight distance exceeds the required sight distance in the following scenarios:

- The available sight distance to the left on Fairbanks Drive, looking south toward Camino Encantadas, exceeds the required left-turn sight distance.
- The available sight distance to the facing north and facing south on Camino Encantadas exceeds the required left-turn sight distance.

## Conclusion and Recommendations

Intersection sight distance does not meet minimum AASHTO requirements for right turns and left turns except for the left turn from Franklin Road onto Camino Encantadas.

Sight distance is obstructed by:

- Vegetation
  - Looking right and left on Franklin Road (shown in Figure 5 and 6)
  - Looking right on Fairbanks Drive (shown in Figure 7)
  - Looking north and south on Camino Encantadas (shown in Figures 8 and 9)



**Figure 5: Sight Distance looking Right on Franklin Rd**



**Figure 6: Sight Distance looking Left on Franklin Rd**



**Figure 7: Sight Distance looking Right on Fairbanks Dr**



**Figure 8: Sight Distance looking South on Camino Encantadas**



**Figure 9: Sight Distance looking North on Camino Encantadas**

The following mitigation measure is recommended:

- Trim or remove the bushes along the roadway median of Camino Encantadas between 2 feet and 7 feet high. This modification will provide additional clearance for vehicles to safely see traffic approaching from the north or south when approaching Camino Encantadas from both Franklin Road and Fairbanks Drive.

Sincerely,



Jonathon Kruse, PE PTOE

Senior Project Manager