

NM599 RE-PRIORITIZATION PLAN • FINAL REPORT • CNS100490



FOR



NMDOT
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U.S. Department of Transportation
**Federal Highway
Administration**

SUBMITTED BY:



WITH:

**PARAMETRIX, NORTH SOUND CONSULTING,
& ECO RESOURCE MANAGEMENT SYSTEMS**

Executive Summary

NM 599 (Veterans Memorial Highway) serves as a route for regional traffic whose destination is not Santa Fe and provides local access for north Santa Fe to connecting facilities including I-25 to the south and US 285/US 84/St. Francis Drive to the north. The facility still serves as a Waste Isolation Pilot Project (WIPP) route transporting low-level nuclear waste from various sites to the Waste Isolation Pilot Project facility just east of Carlsbad, NM. NM 599 provides access to several local land uses including the following:

- Santa Fe Municipal Airport
- Various residential developments north and south of NM 599
- Various recreational land uses along the corridor including several hiking and biking trails

The NM 599 is also intended to provide congestion relief for both St. Francis Drive and Cerrillos Road.

A. Purpose & Need

The need for this re-prioritization study is similar to that of the original study; namely, the NM 599 relief route was constructed to ultimately be an access-controlled freeway facility with interchange access. The NM 599 facility currently has a mix of freeway and arterial characteristics with both interchanges and at-grade intersections. This mixture of facility types leads to increased risk for crashes, large variances in operating speeds, and mixed driver perceptions on how to negotiate the facility. This is especially true for drivers who are using the facility as a bypass, as these drivers may not be as familiar with the facility as local drivers. Since regional model traffic demand projections are much less aggressive than they were ten years ago when the original study was conducted, capacity and connectivity needs are much less urgent than what was shown in the original prioritization study. Therefore, the main needs for this corridor are to improve safety and ultimately usher this corridor toward its final limited-access configuration. To do this, this project will take the following approach:

1. Assessment of existing traffic operations and safety.
2. Projection of 2040 traffic demands under “No-Build” conditions based on the latest Santa Fe Metropolitan Planning Organization (SFMPPO) regional model inputs, projected road network, and economic development.
3. Assessment of traffic operations under 2040 “No-Build” conditions.
4. Safety assessment of the 2040 “No-Build” condition applying 2010 Highway Safety Manual (HSM) methodology by applying the Interactive Highway Safety Design Model (IHSDM) software to predict future crash rates.

5. Development and assessment of potential interim design alternatives at each at-grade intersection location that could be implemented in the short- to mid-term to reduce predicted crashes.
6. Review and refinement, if needed, of the proposed alternatives in the original prioritization study.
7. Assessment of potential interim and ultimate design alternatives for traffic operations and predicted safety.
8. Building of a matrix to update the 2010 priority plan for the corridor.
9. Providing updated interchange priority rankings.

B. Evaluation of Alternatives

A detailed design alternative analysis for each potential interchange location identified in the original study was completed for this study. Alternative design analyses for this re-prioritization study includes a review of potential impacts of the ultimate interchange configuration as well as potential interim projects that could be put in place prior to the ultimate design. These assessment areas include the following:

1. Traffic Operations – A review of level of service and traffic capacity based on principals of the Highway Capacity Manual.
2. Safety – A comparison of predicted crashes and crash rates between alternatives using the 2010 HSM predictive method and the IHSDM software.
3. Connectivity – A review of access, available routes, and presence of out of way pathing.
4. Constructability – A review of design and construction challenges including construction phasing, grading challenges and impact on traffic operations during construction.
5. Right-of-Way – A review of the need, if any, for additional right-of-way. It should be noted that the right-of-way necessary to construct interchanges has already been purchased at most locations.
6. Construction Cost – Planning-level construction cost estimates of the build alternatives.
7. Interim Alternatives – Identification of interim construction projects that could provide safety improvements until funding for the ultimate configuration can be secured.

Most preferred alternatives from the original 2010 Priority Study were carried forward into this Re-prioritization Study with some refinements at certain locations.

C. Project Re-Prioritization

Based on the alternatives analysis contained herein, the priority of interchange projects along NM 599, and the estimated construction cost of each, is as follows:

- | | |
|---------------------------|--------------|
| 1. Via Veteranos (CR 70) | \$7,650,000 |
| 2. Camino de Los Montoyas | \$10,220,000 |
| 3. Airport Road | \$11,640,000 |

- 4. West Frontage Road \$6,430,000
- 5. Ephraim Road \$8,000,000
- 6. Caja Del Rio \$8,130,000

If private funding is proposed for one of the above locations and is needed due to adjacent development, construction of that interchange could be made a higher priority.

D. Interim Project Options

Interim alternatives were reviewed and assessed at all locations to provide more short-term safety benefits. Two options combining several of these interim alternatives have been described within this report with both providing significant crash reductions in the interim before full interchanges can be constructed. While both options will provide crash reduction benefit, one option, which includes limiting left-turns from Via Veteranos and Camino de Los Montoyas, provided the greater crash reduction to construction cost ratio.



1.0 Introduction

NM 599 (Veterans Memorial Highway) serves as a route for regional traffic whose destination is not Santa Fe and provides local access for north Santa Fe to connecting facilities including I-25 to the south and US 285/US 84/St. Francis Drive to the north. The facility still serves as a Waste Isolation Pilot Project (WIPP) route transporting low-level nuclear waste from various sites to the Waste Isolation Pilot Project facility just east of Carlsbad, NM. A vicinity map is provided in Figure 1 and depicts the study corridor and surrounding area. NM 599 provides access to several local land uses including the following:

- Santa Fe Municipal Airport
- Various residential developments north and south of NM 599
- Various recreational land uses along the corridor including several hiking and biking trails

NM 599 is also intended to provide congestion relief for both St. Francis Drive and Cerrillos Road.

A. Past Studies

Phase A Study

Due to past safety concerns and changing regional traffic demands, the New Mexico Department of Transportation (NMDOT) commissioned a study of the NM 599 corridor per procedures in the NMDOT Location Study Procedures Manual. A Phase A study was completed in September 2009 and the result of that study was the identification of viable design alternatives to achieve the purpose and needs of the NM 599 corridor. The executive summary of the NM 599 Phase A study is provided in **Appendix A**.

Prioritization Study

Upon completion of the 2009 Phase A study, a prioritization study was commissioned to conduct a detailed analysis of each viable alternative identified in the Phase A study, to identify a preferred alternative for each existing at-grade intersection along the corridor, and to prioritize each alternative considering capacity, safety, connectivity, environmental impact, and right-of-way needs. The executive summary of the original prioritization study, which was completed in spring of 2010, is provided in **Appendix A**.

B. Current Study

The NMDOT wanted to re-study and re-prioritize preferred improvements along the corridor due to the following:

- There has been a significant reduction in projected traffic demand and development growth in the Santa Fe Metropolitan Planning Organization (SFMPPO) regional model compared to what was projected in the original 2010 study.
- Since the last study there have been several significant crashes, including two fatal crashes occurring at the Via Veteranos intersection.
- Since the 2010 study there have been significant advances in the assessment of safety. Specifically, the 2010 Highway Safety Manual has been published providing a predictive method to determine expected numbers of crashes based on traffic demands and lane geometry. Additionally, the impact of a particular road improvement on predicted crashes for a given facility can be determined through the use of crash modification/crash reduction factors.
- Some improvements have been made along the corridor since the original study including the construction of a new interchange at Jaguar Road and Meadows Road (County Road 62).



Figure 1 Project Area

2.0 Purpose and Need

A. Project Need

The need for this re-prioritization study is similar to that of the original study; namely, the NM 599 relief route was constructed to ultimately be an access-controlled freeway facility with interchange access. As shown in Figure 2, the NM 599 facility currently has a mix of freeway and arterial characteristics with both interchanges and at-grade intersections. This mixture of facility types leads to increased risk for crashes, large variances in operating speeds, and mixed driver perceptions on how to negotiate the facility. This is especially true for drivers who are using the facility as a bypass, as these drivers may not be as familiar with the facility as local drivers. Since regional model traffic demand projections are much less aggressive than they were ten years ago when the original study was conducted, capacity and connectivity needs are much less urgent than what was shown in the original prioritization study. Therefore, the main needs for this corridor are to improve safety and ultimately usher this corridor toward its final limited-access configuration. To do this, this project will take the following approach:

1. Assessment of existing traffic operations and safety.
2. Projection of 2040 traffic demands under “No-Build” conditions based on the latest SFMPO regional model inputs, projected road network, and economic development.
3. Assessment of traffic operations under 2040 “No-Build” conditions.
4. Safety assessment of the 2040 “No-Build” condition applying 2010 Highway Safety Manual (HSM) methodology by applying the Interactive Highway Safety Design Model (IHSDM) software to predict future crash rates.
5. Development and assessment of potential interim design alternatives at each at-grade intersection location that could be implemented in the short- to mid-term to reduce predicted crashes.
6. Review and refinement, if needed, of the proposed alternatives in the original prioritization study.
7. Assessment of potential interim and ultimate design alternatives for traffic operations and predicted safety.
8. Building of a matrix to update the 2010 priority plan for the corridor.
9. Providing updated interchange priority rankings.

B. Statement of Purpose and Need

The purpose of this study is to update the original prioritization plan based on the latest traffic demands, updated road conditions, and the 2010 HCM methodology of crash prediction. The goals of this project are not only to update which at-grade intersections are priority for construction of the ultimate design alternative, but also provide some

interim design options that may also achieve crash reduction along the corridor in the short-term until funding, which has been relatively constrained in recent years, can be available to implement the ultimate corridor configuration. These goals could be achieved by restricting minor street movements, providing dilemma zone protection, implementing peak hour protected-only left-turns at signalized intersections, and eliminating at-grade intersections altogether.

3.0 Stakeholder Participation

The NM 599 facility is one which impacts many stakeholders across several agencies and their citizens. These include the NMDOT, the City of Santa Fe, Santa Fe Municipal Airport, Santa Fe County, Santa Fe Parks and Recreation, SFMPO, and the Department of Energy (WIPP). Therefore, it was important to get input and feedback into this re-prioritization process. With that in mind, a stakeholder meeting and an interchange workshop were planned and facilitated during the course of this study.

A. Stakeholder Meeting

A stakeholder meeting was held September 6, 2017, to present the stakeholders with the purpose and need of the project, existing conditions of the NM 599 corridor, the approach to the safety analysis, and the project schedule. At the end of the presentation portion of the meeting, a group discussion was encouraged to discuss the needs and wants for the corridor from the stakeholders’ perspectives. In summary, one of the greatest concerns from the City of Santa Fe, Santa Fe County, NMDOT and SFMPO was the recent fatalities that have occurred at the Via Veteranos stop-controlled at-grade intersection. Detailed stakeholder meeting notes are provided in **Appendix B** documenting feedback, questions, and concerns for the corridor.

B. Interchange Workshop

On October 11, 2017, an interchange workshop was held with a representative from each of the NM 599 stakeholders who attended the September 6 stakeholder meeting. The goal of the workshop was the following for each current at-grade intersection or planned interchange location:

1. Present both interim and ultimate design alternatives.
2. Provide capacity analysis and predicted crash rate data.
3. Present constructability and design challenges of each alternative.
4. Provide a planning-level cost estimate for each alternative.
5. Facilitate a roundtable discussion from each of the stakeholder attendees.
6. Summarize potential combinations of interim design alternatives.

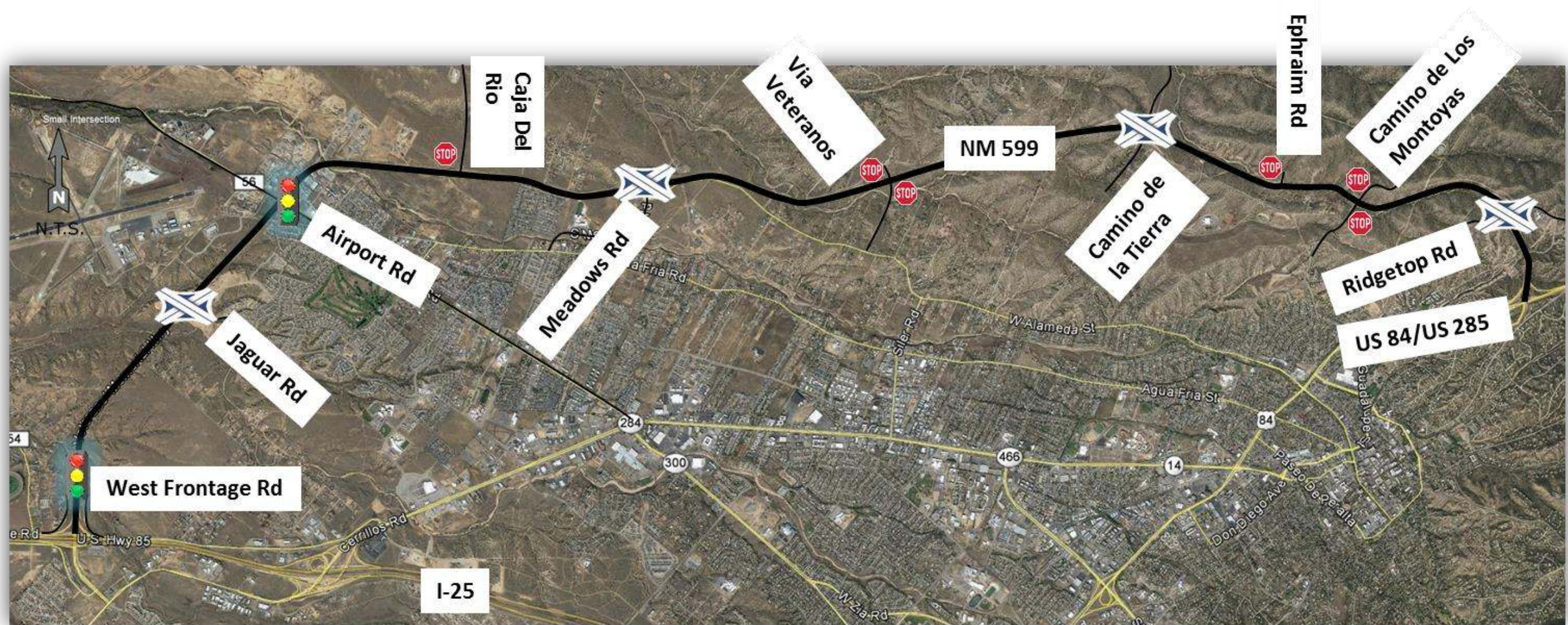


Figure 2 Current Interchange and At-Grade Intersection Locations along NM 599

More detailed meeting notes documenting questions, comments, and feedback are provided in **Appendix B**.

5. Existing Conditions

A. Overall Corridor Conditions

Currently, NM 599 is a four-lane divided highway with two 12-foot through lanes in each direction, an approximately 40-foot non-raised median, outside shoulders varying from six to 14 feet, and four-foot inside shoulders. As shown in Figure 3, there are existing interchanges at the following locations:

- Jaguar Road (constructed in 2015 and opened to traffic in November 2017)
- Meadows Road (County Road 62, constructed in 2013)
- Camino La Tierra (existed in original 2010 study)
- Ridgetop Road (existed in original 2010 study)

As noted, both Jaguar Road and Meadows Road interchanges have been constructed since the original 2010 study. The Jaguar Road interchange has only recently been built and opened to traffic, in November 2017. The Meadows Road interchange incorporates roundabout control at both ramp terminals. The Jaguar Road interchange was privately funded by the adjacent developer and the Meadows Road interchange was publicly funded under CN 5100390 as well as federal sources.

The NM 599 facility still has at-grade intersections at the following locations:

- West Frontage Road (currently signal control)
- Airport Road (currently signal control)
- Via Veteranos (currently two-way stop control on the Via Veteranos approaches)
- Ephraim Road (currently stop control with right-in/right-out access)
- Camino De Los Montoyas (currently two-way stop control on the Camino De Los Montoyas approaches)

There are segments of two-lane, two-way, undivided frontage roads located north and south of NM 599. The North Frontage Road runs from just north of the Santa Fe River bed to the Camino La Tierra interchange. Alameda Street serves as a frontage road on the south side of NM 599 running from the Meadows Road interchange but separating from the NM 599 facility approximately halfway between the Meadows Road interchange and the Via Veteranos intersection. Buckman Road also serves as a frontage road on the south side of NM 599 running from just west of the Camino La Tierra interchange to the Camino De Los Montoyas interchange.

Speed limits along the NM 599 study corridor vary from 45 MPH to 65 MPH with speed limits graphically depicted in Figure 3.

B. Future Developments and Projects

Currently, there are some projects in development that could be constructed within the next couple of years. These projects include the following known at the time of this report:

Jaguar Road Interchange

This facility was constructed by a private developer as part of off-site improvement requirements for the Village Plaza development. The Village Plaza development is expected to bring over 250,000 square feet of commercial retail and mixed-use development to southwest Santa Fe. The interchange has been opened as of late November 2017. This interchange will not only provide access to NM 599 for the proposed Village Plaza development, but also the Tierra Contenta neighborhood and SWAN Park. It also provides a new access point to the Santa Fe Municipal Airport.

Via Veteranos Reconstruction

Due to crash fatalities occurring at the Via Veteranos at-grade intersection within the past two years, the NMDOT is in the process of redesigning the Via Veteranos intersection to eliminate left-turn and through movements from both of the Via Veteranos approaches. Only right-in/left-in/right-out turn movements would be allowed once construction of this project is completed. The goal of this project is to eliminate the highest crash-risk movements, the minor street left-turn and through movements which have led to the recent crash fatalities. This project is currently at the 60% design phase. The proposed plans per the 30% design are shown on page 52. Although this project is in the process of design, currently there is no construction funding and therefore it is unknown when construction of this improvement will start.

Plaza la Tierra Development

The developer of Las Campanas master plan community is planning to subdivide 304 acres at the northeast and northwest quadrants of the La Tierra interchange into a residential and commercial center. Plaza La Tierra is currently being presented as a development with 250 residential units and 20,000 square feet of commercial space on both sides of Camino La Tierra north of NM 599.

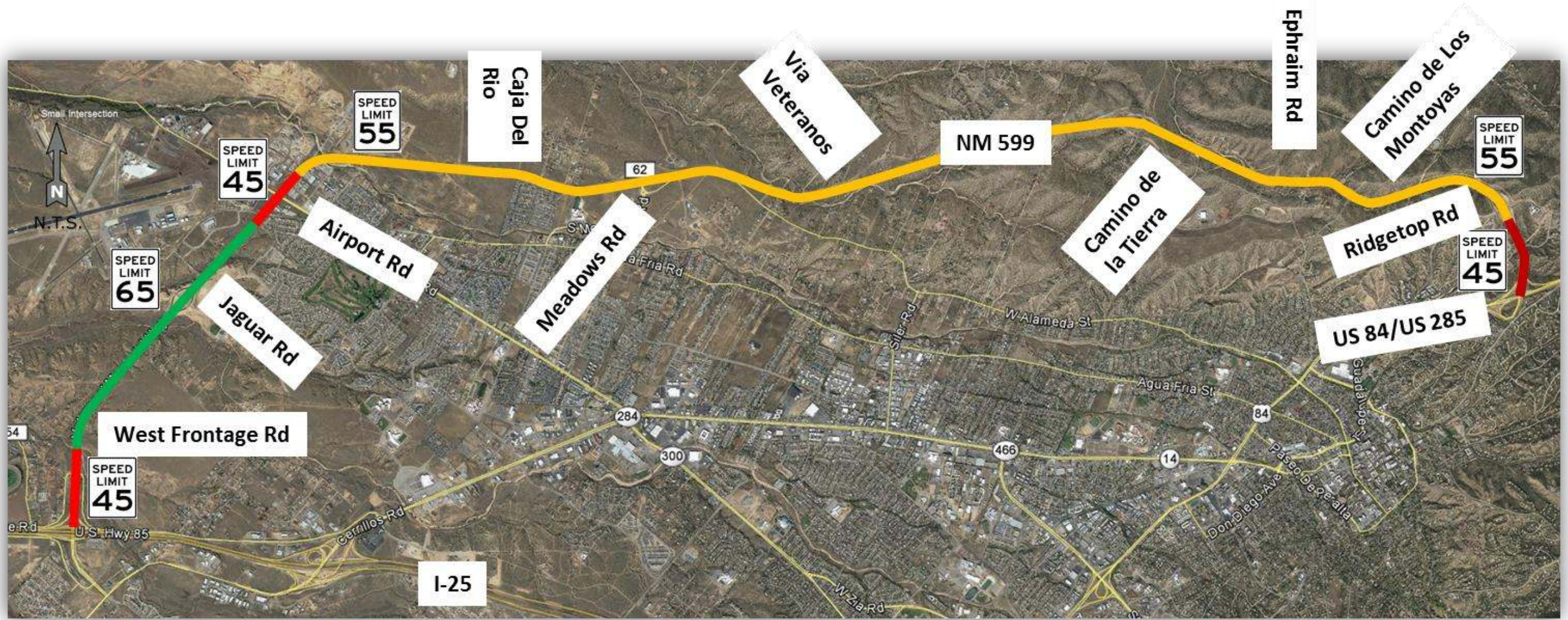


Figure 3 Current Posted Speed Limits along NM 599

interchange north of NM 599. However, this development will require a change in zoning which will be either approved or rejected in early 2018. Therefore, at this time it is unknown when this development will be constructed.

US 285 Ramp Project

The NMDOT is in the process of redesigning the eastbound-to-southbound on-ramp from NM 599 to US 285. Improvements include the lengthening of this on-ramp and have recently completed 60% design. Final plan production was expected to be completed at the end of 2017 with construction following some time in 2018; however the schedule is in the process of changing.

The Legacy of Santa Fe Retirement Center

A retirement center has recently been constructed north of NM 599 at the intersection of Avenida Aldea and Camino Botanica, approximately midway between the Via Veteranos intersection with NM 599 and the Camino La Tierra interchange. The project includes 84 retirement living units offering a mix of limited assistance, traditional assistance, and memory care. The facility also will house a restaurant, a movie theater, a general store, a gym, and a library.

The Place at Caja Del Rio

Another retirement complex is being planned to break ground this spring near the NM 599 corridor along Caja del Rio Road. The Place at Caja del Rio has been given full development approval by the Santa Fe County Commission and is expected to be completed in several phases over the next five years. The first phase will open in 2021 and will have 180 units for independent living, 200 for assisted living, 120 skilled nursing beds, and 80 units for memory care.

C. Traffic Analysis of Existing Conditions

Data Collection

Data collection for this project included the following:

1. NMDOT provided 24-hour counts at all ramps
2. NMDOT provided 24-hour counts along NM 599
3. The consultant team collected 12-hour turning movement counts at the study intersections
4. The consultant team collected spot speed data at five locations along NM 599
5. NMDOT provided data for the years 2013 through 2015 for crashes occurring within the project area

Twenty-Four Hour Data Collection

NMDOT completed all 24-hour ramp counts between April and July of 2017. AM and PM peak hour ramp volumes for all existing interchanges including the directional ramps between NM 599 and US 285 and all on- and off-ramps at I-25, Meadows Drive, Camino La Tierra and Ridgetop Road are provide in **Appendix C**. Twenty-four hour average daily traffic volumes (ADTs) collected in 2015 were also provided by the NMDOT via their permanent and temporary count stations.

Daily traffic volumes on NM 599 range from 10,000 vehicles per day (vpd) between Meadows Road and Via Veteranos to 16,000 vpd between Ridgetop Road and US 285. Side street ADTs range from 1,124 vpd on Meadows Road up to 17,160 vpd at Airport Drive. It should be mentioned that overall traffic demands along NM 599 have remained relatively steady since 2010, fluctuating between a slight increase and decrease. This is reflected in Table 1, which presents data from the SFMPO website collected from NMDOT and SFMPO permanent count stations within the Santa Fe metropolitan area.

Table 1 Historical ADTs (2010 to 2015, in vehicles per day) on NM 599 and Major Corridors in Santa Fe

Location	2010	2011	2012	2013	2014	2015
NM 599 (North of I-25 & South of Airport)	11,342	11,037	11,407	11,568	11,766	11,281
Cerrillos Road (North of Alta Vista)	32,489	28,903	30,819	31,760	32,053	32,149
St. Francis Dr. (Between Alta Vista and Cordova)	41,833	42,162	40,415	41,085	41,939	39,353
St. Francis Dr. (Between Zia Rd. and Siringo Rd.)	45,784	45,212	43,507	43,714	43,799	44,703

As shown, traffic demands throughout the Santa Fe region have not grown significantly since 2010 and in some cases, demands appear to have reduced slightly.

Turning Movement Counts

Lee Engineering counted 12-hour turning movement volumes at the study intersections during the timeframe of February 28 to April 13, 2017. Each intersection was counted from 6:00 AM to 6:00 PM on a Tuesday, Wednesday, or Thursday. Raw data sheets can be found in **Appendix C**, and AM and PM peak hour turning movement counts at all study intersection are shown in Figure 4, Figure 5, and Figure 6. The heaviest turning movement volumes occurred at the NM 599/West Frontage Road and NM 599/Airport Road intersections; lighter turn movement volumes were counted at the study intersections east of Airport Road.



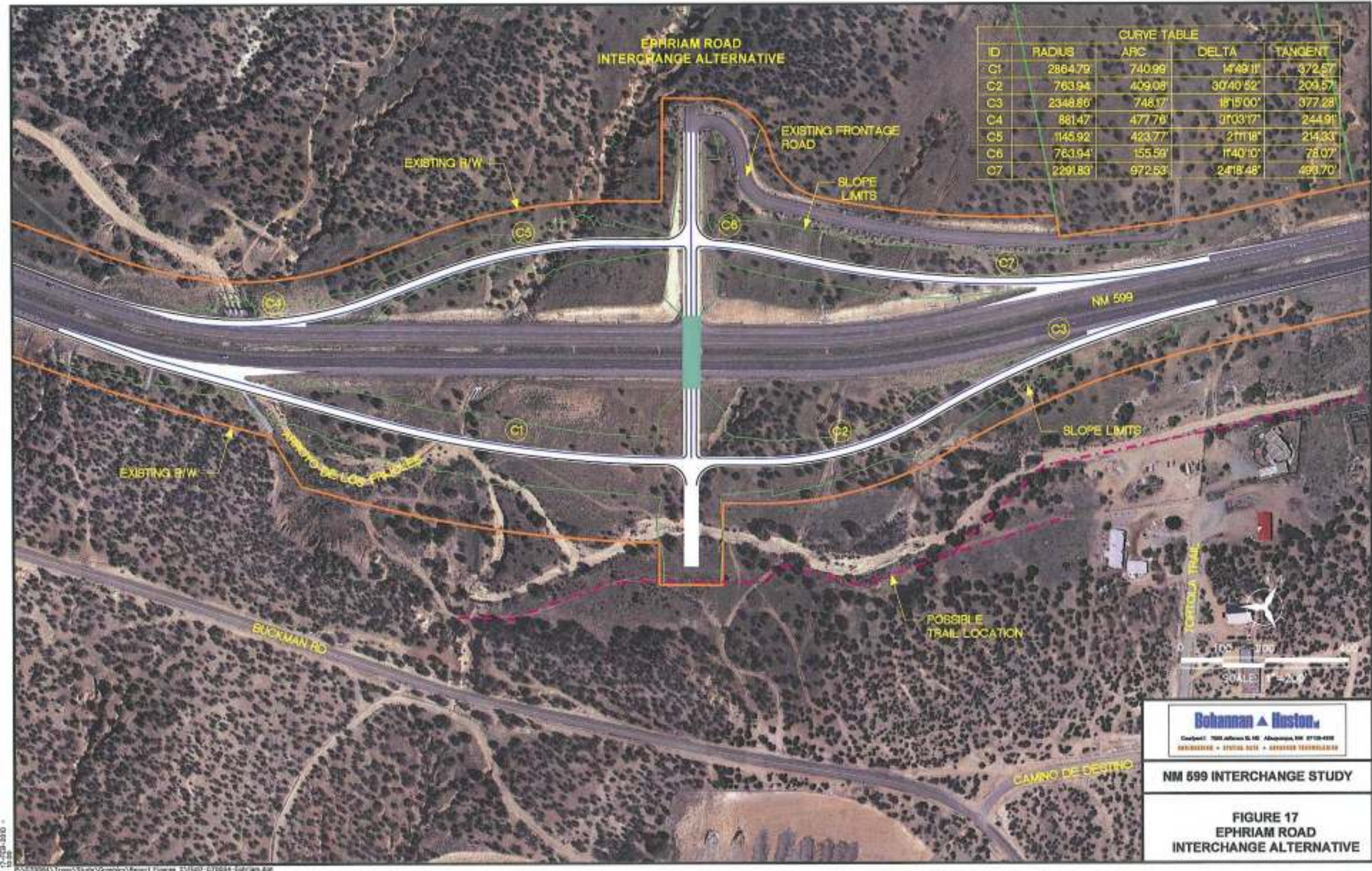


Figure 47 Ephraim Interchange Concept (Exhibit from 2010 Prioritization Study: BHI)

G. Camino de Los Montoyas

Ultimate Configuration

Similar to Via Veteranos, a full interchange is ultimately proposed for the Camino de Los Montoyas intersection with stop control ramp terminals, single-lane ramps, and a single lane in each direction on Camino de Los Montoyas. Per the 2010 Prioritization Study, right-of-way has been already been purchased for construction of an interchange approximately 1,000 feet east of the current Camino de Los Montoyas alignment. Furthermore, the original study reviewed three alternatives including a full interchange just east of the Camino de Los Montoyas alignment with connecting roadways back to Camino de Los Montoyas on either side of NM 599. Another two alternatives proposed an overpass at the current Camino de Los Montoyas alignment with frontage road/access road connections to either a full interchange at Ephraim Road or a full interchange just east of the current Camino de Los Montoyas alignment. The preferred alternative, per the 2010 study, was a full interchange just east of the Camino de Los Montoyas alignment with access road connections to Camino de Los Montoyas on either side of NM 599. That preferred interchange alternative is depicted as Figure 48 Camino de Los Montoyas Interchange Concept from 2010 Priority Study. If an interim construction approach is taken with the Camino de Los Montoyas access, particularly if an overpass with Frontage Road expansion is opted for at the Camino de Los Montoyas alignment, the alternative with an overpass at Camino de Los Montoyas and a full interchange to the east would be able to integrate interim construction into the final interchange alternative.

Traffic Operations

Traffic operational analysis for the “No-Build” Alternative and the proposed interchange alternative are summarized in Table 22.

Table 22 Traffic Operations Comparison for Camino de Los Montoyas Interchange (2040 Demands)

Scenario	Facility	Worst-Case Movement			
		AM		PM	
		v/c	LOS	v/c	LOS
"No Build"	Camino de Los Montoyos (Stop Control)	1.63	F	8.2	F
Camino de Los Montoyos Interchange	North Ramp Terminal (Stop Control)	0.01	A	0.19	A
	South Ramp Terminal (Stop Control)	0.21	A	0.16	A
	Westbound Off-Ramp	0.22	A	0.36	B
	Westbound On-Ramp	0.24	A	0.39	B
	Eastbound Off-Ramp	0.36	B	0.27	B
	Eastbound On-Ramp	0.34	B	0.25	A

Much like the Via Veteranos intersection, the minor street left-turns from Camino de Los Montoyas are currently operating at an unacceptable LOS of F and are expected to continue to operate at LOS F with greater delays under a 2040 “No-Build” Alternative. An interchange, including all ramps and ramp terminals, would improve operations to an acceptable LOS of B or better under forecasted 2040 demands.

Safety

The replacement of the current at-grade signalized intersection with the proposed interchange configuration may significantly reduce crashes at this location. Unlike the Via Veteranos intersection, there were no fatal crashes at Camino de Los Montoyas since 2013. However, minor street and through movement crash risks are similar to those that are present at Via Veteranos due to similar existing traffic control and intersection geometry. The proposed interchange would significantly reduce the number of crashes that are predicted to occur at this intersection under a “No-Build” Alternative. The IHSDM predictive model was run for both “No-Build” and interchange options to predict expected crash occurrences from 2025 to 2040. Table 23 summarizes the comparison between both options and the expected crash savings by implementing the full interchange.

Table 23 Predicted Crash Reduction of a Camino de Los Montoyas Interchange

Scenario	Predicted Crashes 2025-2040		
	Fatal/Injury	PDO	Total
"No Build"	36.26	47.59	83.85
Camino de Los Montoyos Interchange	12.06	24.13	36.19
Crash Difference	-24	-23	-48

As shown, a total reduction of 24 fatal/injury crashes and 23 property damage only crashes would be expected between 2025 and 2040 if the overpass option were constructed. Crash rates at the Camino de Los Montoyas intersection were observed to be 0.42 per million entering vehicles (MEV) which would be reduced to ramp terminal intersection rates of 0.27 per MEV for the westbound ramps and 0.26 per MEV for the eastbound ramps. This reduction is attributed to the fact that the ramp terminal intersections will have slower approach speeds and a minor street left-turn lane will be eliminated.

Connectivity

Connectivity will be enhanced for this location with the addition of on- and off-ramps for vehicles exiting and entering the NM 599 facility. All routes that are feasible under today’s single at-grade intersection will be maintained under the proposed interchange facility provided access/frontage road connections are provided from the proposed interchange to the current Camino de Los Montoyas alignment.

Right-of-Way

If the preferred alternative from the 2010 Prioritization Study is constructed, an additional seven acres of right-of-way would be required to connect the proposed interchange to the Camino de Los Montoyas alignment. If the overpass plus interchange east of Camino de Los Montoyas option is constructed no additional right-of-way would be required.

Construction Impacts

Utilities – Utilities are expected to include existing water with no impacts expected.

Environmental- No significant impacts expected; however an Environmental Assessment or a Categorical Exclusion will be required for NEPA. Possible impacts to noise and visual resources. An individual 404 permit may be required for an interchange at this location.

Construction Traffic – Lane shifts on NM 599 for bridge construction and one-lane closures on NM 599 will be required for the ramp tie-ins. Flagmen control at Camino de Los Montoyas for frontage road tie-ins.

Construction Cost

The estimated cost of the overpass alternative is **\$10,650,000**. A detailed breakdown of this cost estimate is provided in **Appendix F**.

Safety Benefit vs. Construction Cost

Assuming the construction year 2025, safety benefits, construction costs and a benefit/cost ratio were calculated in 2017 dollars and summarized in Table 24.

Table 24 Predicted Crash Savings/Construction Cost Ratio for Camino de Los Montoyas Interchange

	Savings/Costs		
	Fatal/Injury	PDO	Total
Camino de Los Montoyas Interchange Predicted Crash Savings	-\$78,828,843	-\$174,757.67	-\$79,003,601
Camino de Los Montoyas Interchange Construction Cost			\$10,220,000
Safety Benefit/Construction Cost Ratio			7.73



Figure 48 Camino de Los Montoyas Interchange Concept from 2010 Priority Study

Interim Opportunities

Similar to Via Veteranos, there are opportunities to implement interim treatments in an effort to mitigate crash risk, especially for minor street left-turn and through movements from Camino de Los Montoyas. The interim alternatives which would reduce predicted crash incidences at Camino de Los Montoyas include:

1. **Right-In/Right-Out/Left-In Alternative** – The same mitigation currently being designed by the NMDOT for Via Veteranos could also be applied at Camino de Los Montoyas. Left-turn and through movements from Camino de Los Montoyas would be eliminated from the current at-grade intersection. Right-turns from all approaches and left-turn from NM 599 would still be allowed. The proposed configuration would look similar to the 30% design prepared by the NMDOT for the Via Veteranos intersection and shown in Figure 44.
2. **Grade Separation and Frontage Road Alternative** – Another option would be to construct a bridge carrying Camino de Los Montoyas over NM 599 without providing direct access between the two roads. This would eliminate the current at-grade intersection. To provide a connection to Ephraim Road and Camino La Tierra, the existing North Frontage Road, which currently terminates on the west side of the Camino la Tierra interchange, could be extended eastward eventually connecting to Ephraim Road and Camino de Los Montoyas. This extension would not only provide a mitigating interim alternative for Camino de Los Montoyas but would also provide an alternative access for the six private parcels at Ephraim Road, which currently only have right-in/right-out access to NM 599 today. A concept of this interim alternative is shown in Figure 49. An additional option for Alternative 2 Grade Separation and Frontage Road Alternative would involve extending the north frontage road further east from Camino de Los Montoyas to the Ridgetop Road interchange. This option would provide further connectivity and access to traffic demands from Camino de Los Montoyas wanting to head east on NM 599. This alternative is depicted in Figure 51.

Traffic Operations

Traffic operational analysis for the “No-Build” Alternative, and the grade separated interim alternative are summarized in Table 25. It should be noted that impacts at Camino La Tierra are presented due to the potential for rerouted trips from the eliminated direct NM 599 access to/from Camino de Los Montoyas. No impacts were calculated for the additional Frontage Road Alternative as there is not much traffic accessing to the northeast on NM 599 to/from

Table 25 Traffic Operations Analysis Comparison for Interim Alternatives at Camino de Los Montoyas

Scenario	Facility	Worst-Case Movement			
		AM		PM	
		v/c	LOS	v/c	LOS
"No Build"	Camino de Los Montoyos (Stop Control)	1.63	F	8.2	F
Camino de Los Montoyos Grade Separation	Camino de Los Montoyos/N. Frontage Rd (Stop Control)	0.217	A	0.202	B
	Camino La Tierra/N. Frontage Rd (Stop Control)	0.672	C	0.173	A
	North Camino La Tierra Ramp Terminal	0.304	A	0.145	B
	South Camino La Tierra Ramp Terminal	0.64	D	0.55	B

As shown, the grade separated alternative is expected to mitigate the failing minor street left-turn movements from Camino de Los Montoyas under a “No-Build” Alternative all operating at LOS CD or better. It should be noted that no LOS was calculated for Alternative 3 (Additional Frontage Road Alternative) as this alternative would have minimal impact on capacity calculations at both Camino de Los Montoyas and Ridgetop Road. Since the Grade separated option is expected to operate at an acceptable LOS, the less restrictive, Right-In/Right-Out/Left-In Alternative is also expected to operate acceptably.

Safety

All interim options are intended to increase safety at the intersection and reduce predicted crash occurrences to varying degrees. Table 26 summarizes the reduced number of predicted crashes based on IHSDM calculations.

Table 26 Predicted Crash Reduction of Interim Alternatives at Camino de Los Montoyas

Scenario	Predicted Crashes 2020-2040		
	Fatal/Injury	PDO	Total
"No Build" 2020-2040	44.58	58.77	103.35
"No Build" 2025-2040	36.26	47.59	83.85
Right-In/Right-Out/Left-In	28.53	52.31	80.84
Crash Difference	-16	-6	-23
Camino de Los Montoyas Grade Separation & Frontage	6.79	14.78	21.57
Crash Difference	-29	-33	-62

As shown, the grade separated alternative is expected to reduce predicted crashes, with the Grade Separation and Frontage Road Alternative expected to reduce crashes more than the Right-In/Right-Out/Left-In alternative. The safety impact of the additional frontage road connection to Ridgetop Road would have minimal impact on crash reduction, therefore it was not analyzed.



Connectivity

Right-In/Right-Out/Left-In Alternative – Just like this option at Via Veteranos, this interim alternative would eliminate direct left-turns from the Camino de Los Montoyas approaches as well as through movements crossing NM 599. Unlike current conditions at Via Veteranos, there is less Frontage Road infrastructure to provide convenient alternative routes for left-turn and through demands. For northbound to westbound left-turn demands, which are projected to be the greatest turning demand at this intersection, motorists can use Buckman Road south of NM 599 to eventually access the Camino la Tierra interchange with very little out of path routing. Southbound to eastbound and southbound through demands are currently and forecasted to be relatively low compared to other movements at this intersection. Furthermore, the southbound left-turn movement is likely a backtracking movement, which may explain the lower demand as it is more likely that vehicles coming from the north with an eastern destination would more likely use Tano Road to ultimately gain access to US 285 north or south. Through movements coming from the south or north could use either Camino la Tierra or US 285 instead of Camino de Los Montoyas as well.

Grade Separation and Frontage Road Alternative – This alternative will accommodate only the through movement at the Via Veteranos intersection. All other turn demands to or from Camino de Los Montoyas would be required to use either the Camino la Tierra interchange to the southwest or the Ridgetop Road interchange to the northeast (if the additional frontage road is built to the east). Again, due to the adjacent interchanges on either side of Camino de Los Montoyas, turn movements will not need to route to far out of the way to be perceived as an inconvenience to drivers provide the frontage road is constructed from Camino de La Tierra to Ridgetop Road. Out of way routing would arise if one or all sections of the north frontage road is not constructed.

Right-of-Way

All interim alternatives, including all frontage road options, can be constructed within existing right-of-way.

Construction Impacts

Utilities – Utilities are expected to include underground electric for existing street lighting and water. Utility impacts for all interim alternatives are expected to be minimal.

Environmental- No significant impacts expected for any of the alternatives; however an Environmental Assessment or a Categorical Exclusion will be required for NEPA in all alternatives.

Construction Traffic – Minimal traffic impacts are expected for the Right-in/Right-Out/Left-In option. Lane shifts on NM 599 for the overpass will be required for the Grade Separation and Frontage Road alternative. One-lane closures on NM 599 may be required for the frontage road construction. Flagmen control will be required for all frontage road tie-ins at Camino La Tierra, Ephraim Road, Camino de Los Montoyas, and Ridgetop Road.

Construction Cost

Estimated interim construction costs are \$2,000,000 for the Right-In/Right-Out/Left-In Alternative, \$4,940,000 for the Camino de Los Montoyas Overpass Alternative, and an additional \$3,000,000 if the North Frontage Road were extended to Ridgetop Road. A detailed breakdown of these cost estimates is provided in **Appendix F**.

Safety Benefit vs. Construction Cost

Assuming the construction year of 2020 for Right-In/Right-Out/Left-In and 2025 for the Grade Separation and Frontage Road Alternative, safety benefit, construction costs, and benefit/cost ratios were calculated in 2017 dollars and summarized in Table 27.

Table 27 Predicted Crash Savings/Construction Cost Ratios for Camino de Los Montoyas Interim Alternatives

	Savings/Costs		
	Fatal/Injury	PDO	Total
Right-In/Right-Out/Left-In Predicted Crash Savings	-\$52,277,204	-\$48,156.69	-\$52,325,361
Right-In/Right-Out/Left-In Construction Cost			\$500,000
Safety Benefit/Construction Cost Ratio			104.65
Camino de Los Montoyas Overpass Predicted Crash Savings	-\$95,995,290	-\$244,407.46	-\$96,239,697
Camino de Los Montoyas Overpass Cost			\$4,940,000
Safety Benefit/Construction Cost Ratio			19.48

While both interim alternatives are expected to provide significant benefit-cost ratios, the Right-In/Right-Out/Left-In Alternative is expected to offer the greatest benefit for the cost. It should be noted that the third alternative would add more accessibility to either interim alternative, it does not offer any significant reduction in the number of predicted crashes.



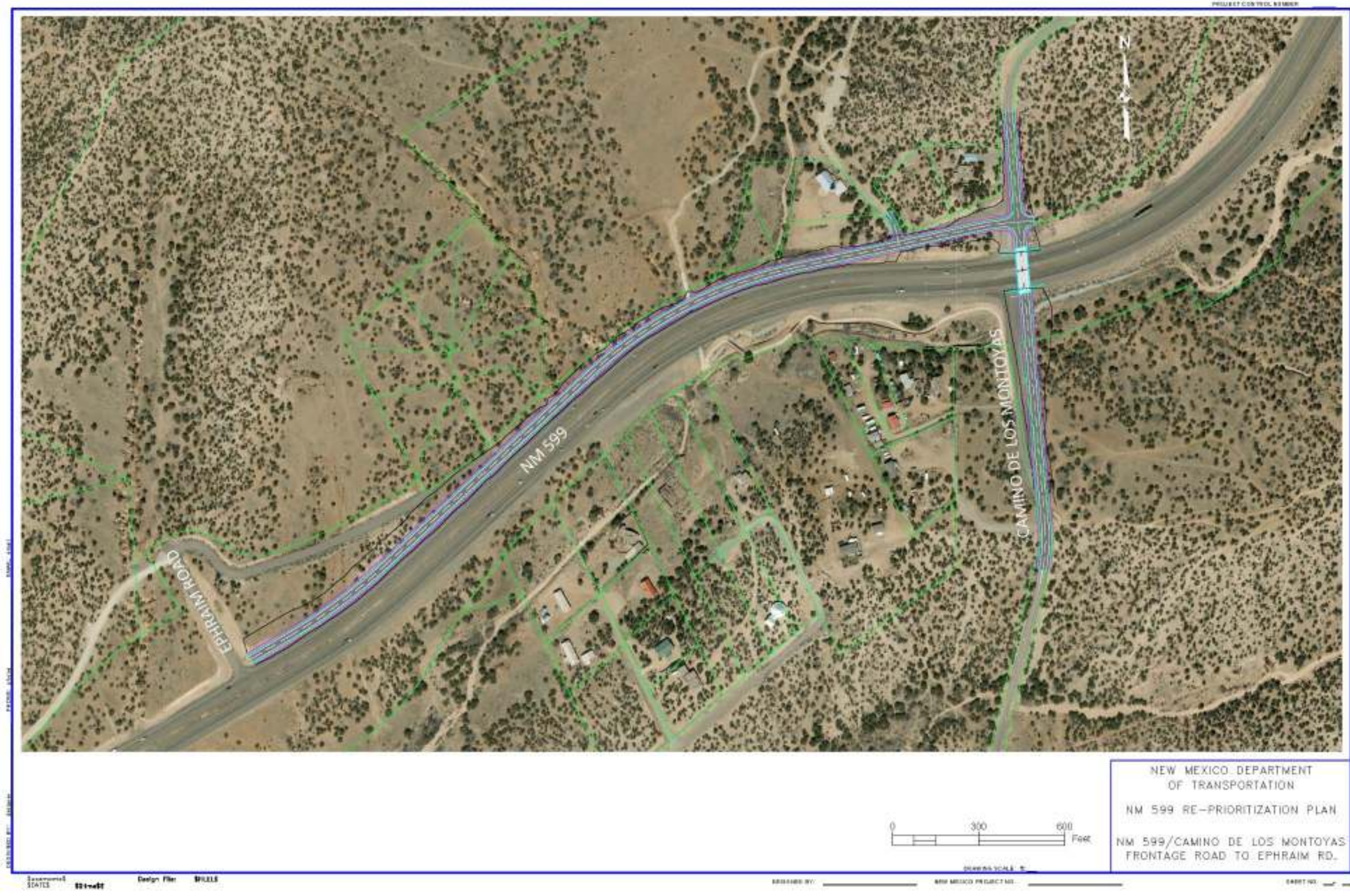


Figure 49 Grade Separation and Frontage Road Extension Alternative (Camino de Los Montoyas to Ephraim Rd)



Figure 50 Grade Separation and Frontage Road Extension Alternative (Ephraim Rd to Camino la Tierra)

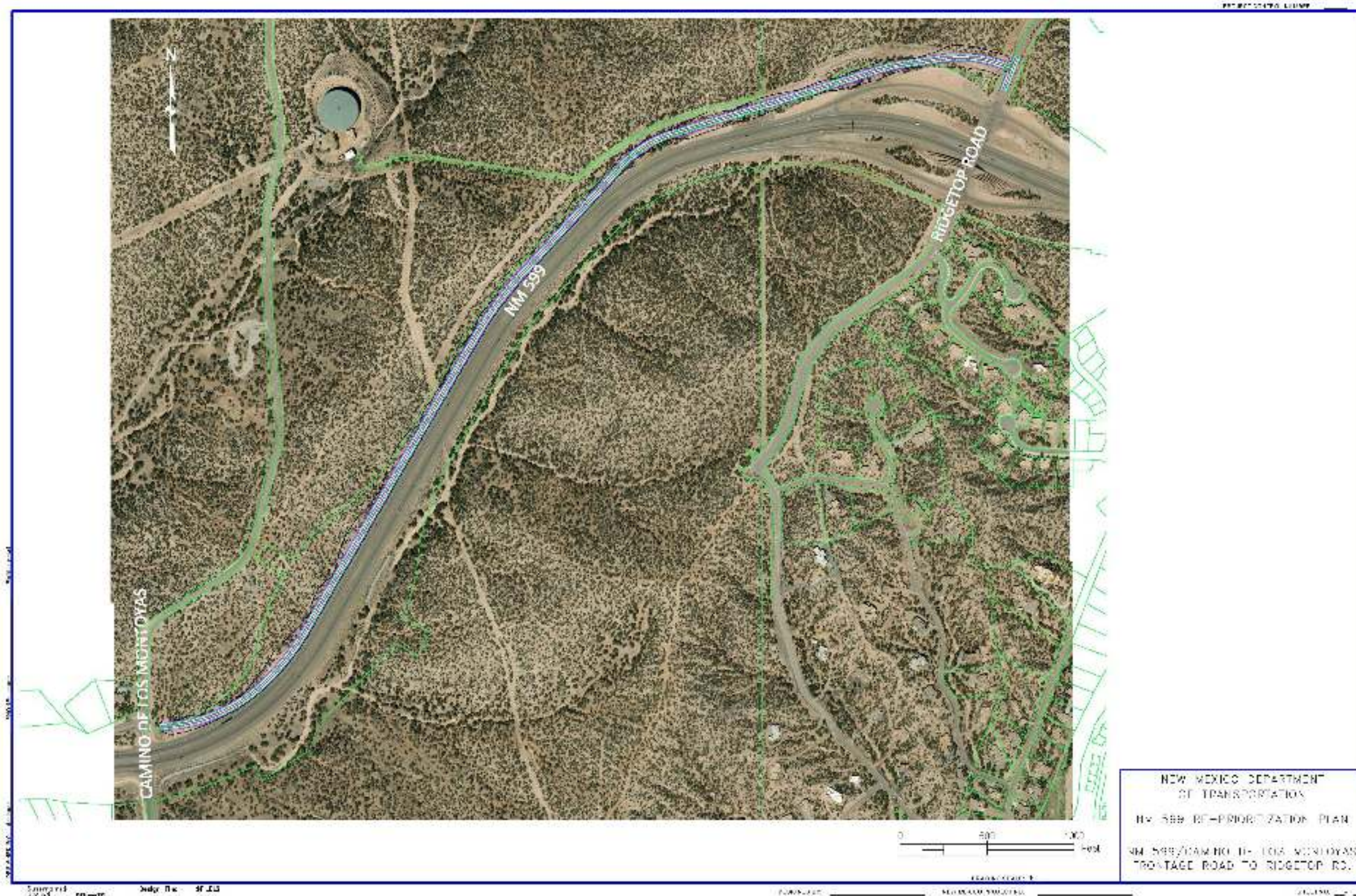


Figure 51 Frontage Extension Option from Camino de Los Montoyas to Ridgetop

7.0 Priority Matrix

A priority matrix was created to assist in the reprioritization of new interchanges along NM 599 based on discussion presented in the Alternatives Analysis Section and on the following focus areas:

1. Traffic Operations
2. Safety Benefit (Predicted Crash Reduction)
3. Connectivity
4. Right-of-Way
5. Construction Impacts
6. Cost
7. Safety Benefit/Construction Cost Ratio

The above focus areas were then weighed and scored for a full interchange alternative at each study location. The resulting decision matrix is provided in Table 28. As indicated, each focus area was weighed differently with Safety Benefit/Construction Cost Ratio weighed the heaviest at 25%. Safety Benefit, Construction Cost, and Right-of-Way were next at 15% each, and the remaining focus areas were weighed at 10% each. The resulting interchange priority is as follows:

- | | |
|---------------------------|--------------|
| 1. Via Veteranos (CR 70) | \$7,650,000 |
| 2. Camino de Los Montoyas | \$10,220,000 |
| 3. Airport Road | \$11,640,000 |
| 4. West Frontage Road | \$6,430,000 |
| 5. Ephraim Road | \$8,000,000 |
| 6. Caja Del Rio | \$8,130,000 |

Table 28 NM 599 Priority Matrix

Focus Area	I-25 Frontage Road		Airport Road		Caja Del Rio		Via Veteranos (CR 70)		Ephraim Road		Camino de Los Montoyas	
	Score	Comments	Score	Comments	Score	Comments	Score	Comments	Score	Comments	Score	Comments
Traffic Operations (10 Possible)	6	Traffic Operations will slightly improve over "No-Build".	6	Traffic Operations will slightly improve over "No-Build".	6	Traffic Operations will slightly improve over "No-Build"	8	Traffic Operations will improve failing minor street left-turn movements to acceptable operating levels.	6	Traffic Operations will slightly improve over "No-Build"	8	Traffic Operations will improve failing minor street left-turn movements to acceptable operating levels.
Safety Benefit (Crash Reduction) (15 Possible)	3	Predicted crashes from 2025 to 2040 will be reduced slightly.	8	Crashes will be more significantly reduced with this alternative. Some of the potential crash savings are offset by predicted crash rates for the new ramp terminal intersections.	0	There are little to no crashes now or under "No-Build" and this option would provide little if any crash reduction.	8	Crashes will be most significantly reduced with this alternative compared to the other locations.	0	Little, if any, crash reduction expected due to very low demands.	6	More modest crash reductions than Airport or Via Veteranos but significantly more than West Frontage Road.
Connectivity (10 Possible)	6	This option will maintain connectivity with slightly out of way routing compared to the current intersection.	10	This alternative will maintain connectivity with the added convenience of on-off ramps.	6	While connectivity would be improved over today's conditions; there are few adjacent developments to connect to.	10	This alternative will maintain connectivity with the added convenience of on-off ramps.	4	While connectivity would be improved over today's conditions; there are few adjacent developments to connect to.	10	This alternative will maintain connectivity with the added convenience of on-off ramps.
Right-of-Way (15 Possible)	15	No new Right-of-Way Required.	15	No new Right-of-Way Required.	3	Approximately 31 Acres of new Right-of-Way is required.	15	No new Right-of-Way Required.	15	No new Right-of-Way Required.	9	Approximately 7 acres of new Right-of-Way required.
Construction Impacts (10 Possible)	8	Minimal utility and environmental impacts.	4	Utility and environmental impacts anticipated	4	Utility and environmental impacts anticipated	4	Utility and environmental impacts anticipated	8	Minimal utility and environmental impacts.	6	Minimal utility impacts with some environmental impacts.
Construction Cost (15 Possible)	12	\$6,430,000	3	\$11,640,000	6	\$8,130,000	9	\$7,650,000	9	\$8,000,000	6	\$10,220,000
Safety Benefit/Construction Cost Ratio (25 Possible)	5	Crash reduction benefit to cost ratio is 1.30	10	Crash reduction benefit to cost ratio is 2.52	0	NA	20	Crash reduction benefit to cost ratio is 15.49	0	NA	15	Crash reduction benefit to cost ratio is 7.73
Total	55		56		25		74		42		60	

8.0 Interim Opportunities

Based on construction cost estimates from this study and the previous 2010 Prioritization Study, it is estimated that construction of interchanges at all study intersections will cost a total of **\$52,070,000** and construction costs at the current major at-grade intersections (I-25 Frontage Road, Airport Road, Via Veteranos [CR 70], and Camino de Los Montoyas) will total **\$35,940,000**. With currently limited budgets, the construction of full interchanges for the entire NM 599 corridor is a long way off. Therefore, as previously outlined there are opportunities for interim or phased projects that work toward the ultimate goal of a limited-access freeway and provide potential safety benefits (predicted crash reductions) in the shorter term. Furthermore, a combination of interim options could be packaged together into one corridor-wide project with the expressed goal of reducing predicted crashes and transitioning NM 599 from a mix of surface arterial and freeway elements to a more consistent limited access facility. Two potential interim packages are summarized in Table 29. It should be noted that the cost for the overpass at Camino de Los Montoyas does assume frontage road extension east of Camino de Los Montoyas.

As shown, both options can provide significant crash saving. Although Option 1 provides less predicted crash reduction, it is the less expensive option with lower construction impacts and could be constructed in the shorter term. Option 2 provides the greater predicted crash reductions (in some cases as much as the full interchange counterpart) and include facilities that could be considered phased construction for the ultimate interchange (bridge overpasses at Via Veteranos (CR 70) and Camino de Los Montoyas). However, Option 2 is significantly more costly and construction would be longer term than Option 1. Additionally, Option 1 offers a slightly higher safety benefit-to-construction cost ratio than Option 2.

Table 29 Interim Alternatives Comparison for NM 599

	West Frontage	Airport Road	Caja del Rio	Via Veteranos	Ephraim Road	Camino de Los Montoyas		
	Signal and Median Mods	Signal and Median Mods	Santa Fe Bridge Connection	Right-In/Right-Out/Left-In	Frontage Road Extension	Right-In/Right-Out/Left-In	Total	Savings/Cost Ratio
Option 1								
Crash Savings	\$17,737,314	\$94,028,513	NA	\$71,020,105	NA	\$52,325,360	\$235,111,294	30.98
Construction Cost	\$300,000	\$300,000	\$2,310,000	\$500,000	\$3,680,000	\$500,000	\$8,590,000	
	Signal and Median Mods	Signal and Median Mods	Santa Fe Bridge Connection	Grade Separation	Frontage Road Extension	Grade Separation	Total	Savings/Cost Ratio
Option 2								
Crash Savings	\$17,737,314	\$94,028,513	NA	\$142,442,761	NA	\$96,239,697	\$350,448,287	23.84
Construction Cost	\$300,000	\$300,000	\$2,310,000	\$3,870,000	\$3,680,000	\$3,610,000	\$14,700,000	



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