PRELIMINARY TRAFFIC ANALYSIS

Data Collection

Lee Engineering deployed pneumatic tube data collectors on US 550 at four locations collecting 48 hours worth of data on Wednesday, May 8th and Thursday, May 9th at Camino Don Tomas. Resulting daily traffic was the following:

East of Sprint Boulevard	23,516 ADT
West of Jemez Dam	32,292 ADT
At Rio Grande Bridge	32,315 ADT

24-hour tube counts were collected at both Dimas Way and Santa Ana Road with the following results:

Dimas Way	3,258 ADT
Santa Ana Road	959

Turning movement counts were also collected by Lee Engineering on May 8th and 9th for the following study US 550 intersections:

- NM 347 (Paseo del Volcan)
- Sprint Boulevard
- NM 528 (Pat D'Arco Hwy/Tamaya Boulevard)
- Jemez Dam
- Kuaua Road
- Sheriff's Posse Road
- Camino Don Tomas
- NM 313 (Pan American Central)

Raw data collection sheets for these turning movement counts are included in **Appendix B**. All existing counts, lane geometry, and traffic control are summarized in **Figure 3**.

Figures 4a through 4c graphically illustrate the weekday hourly traffic volume data at each count location for a 24-hour period. Shown in the graphs are the westbound, eastbound, and total hourly volume at each count location. As expected, all location directional demands indicate a definite eastbound AM peak and a westbound PM peak. As indicated, these peaks become more defined between the Rio Grande Bridge and NM 313. Additionally, traffic demands in general appear to reduce the farther west one is within the study corridor. For all locations, there appears to be a less defined midday peak demand.

Historical traffic counts were researched and correlated with the count locations chosen for this project. As indicated in **Table 2** below, a declining trend in traffic volume is observed each year over the past four years with the exception of the segment between Paseo del Volcan and NM 528, which indicated steady growth between 2007 and 2010. The observed traffic demand reduction is likely due to the economic recession that began around 2009, and is considered anomalous. The US 550 corridor has great commercial and residential development potential with many adjacent parcels currently undeveloped. Therefore it is expected that traffic demands will significantly grow over the next 20 to 25 years as the City of Rio Rancho, Santa Ana Pueblo, and Town of Bernalillo continue to develop.

Table 2. Historical Growth along US 550

Year	Segment							
	PDV to 528		528 to Jemez Dam		Jemez Dam to Camino Don Tomas		Camino Don Tomas to 313	
	ADT	Growth	ADT	Growth	ADT	Growth	ADT	Growth
2007	16,100		42,300		41,900		40,800	
2008	19,500	21.1%	41,600	-1.7%	42,800	2.1%	39,500	-3.2%
2009	19,600	0.5%	40,600	-2.4%	42,900	0.2%	39,300	-0.5%
2010	20,400	4.1%	40,500	-0.2%	42,100	-1.9%	38,200	-2.8%
2011	20,000	-2.0%	39,900	-1.5%	41,400	-1.7%	37,100	-2.9%
Average Annual Growth Factor	5.6%		-1.4%		-0.3%		-2.3%	

Figure 3. Existing 2013 Peak Hour Traffic Demands

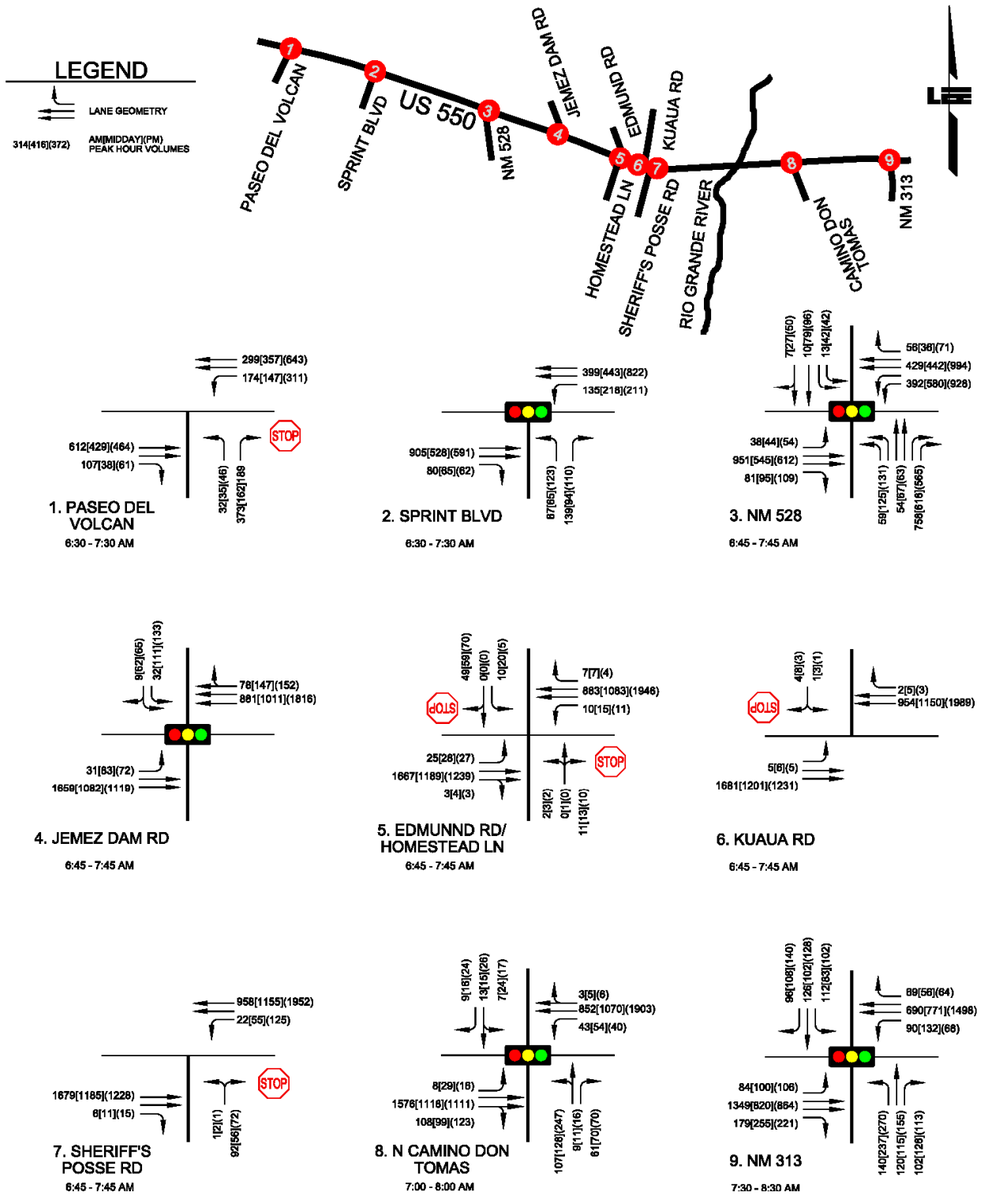


Figure 4a. Count Data East of Sprint Blvd

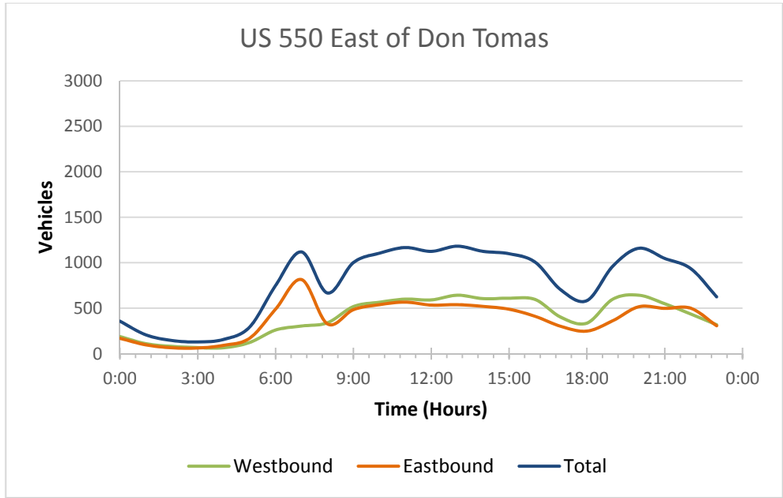


Figure 4b. Count Data West of Jemez Dam

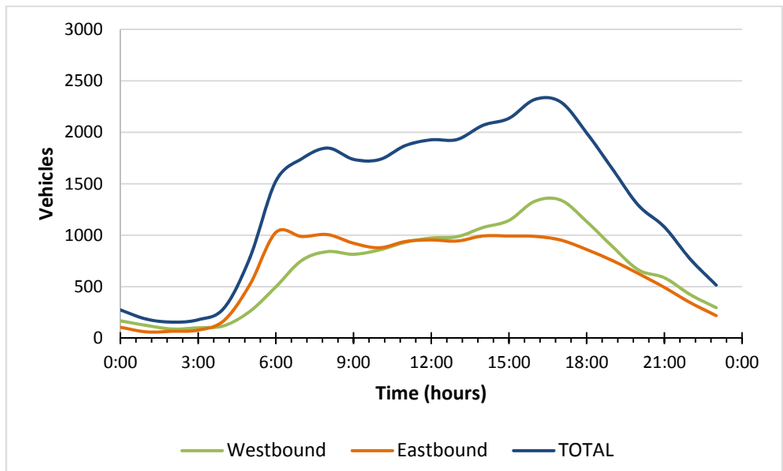
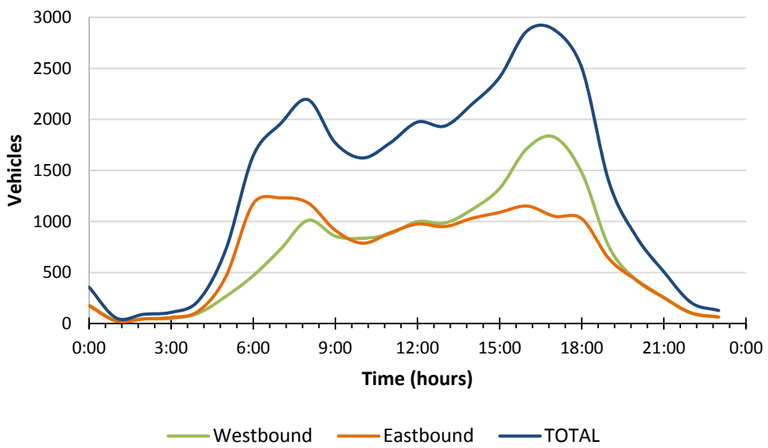
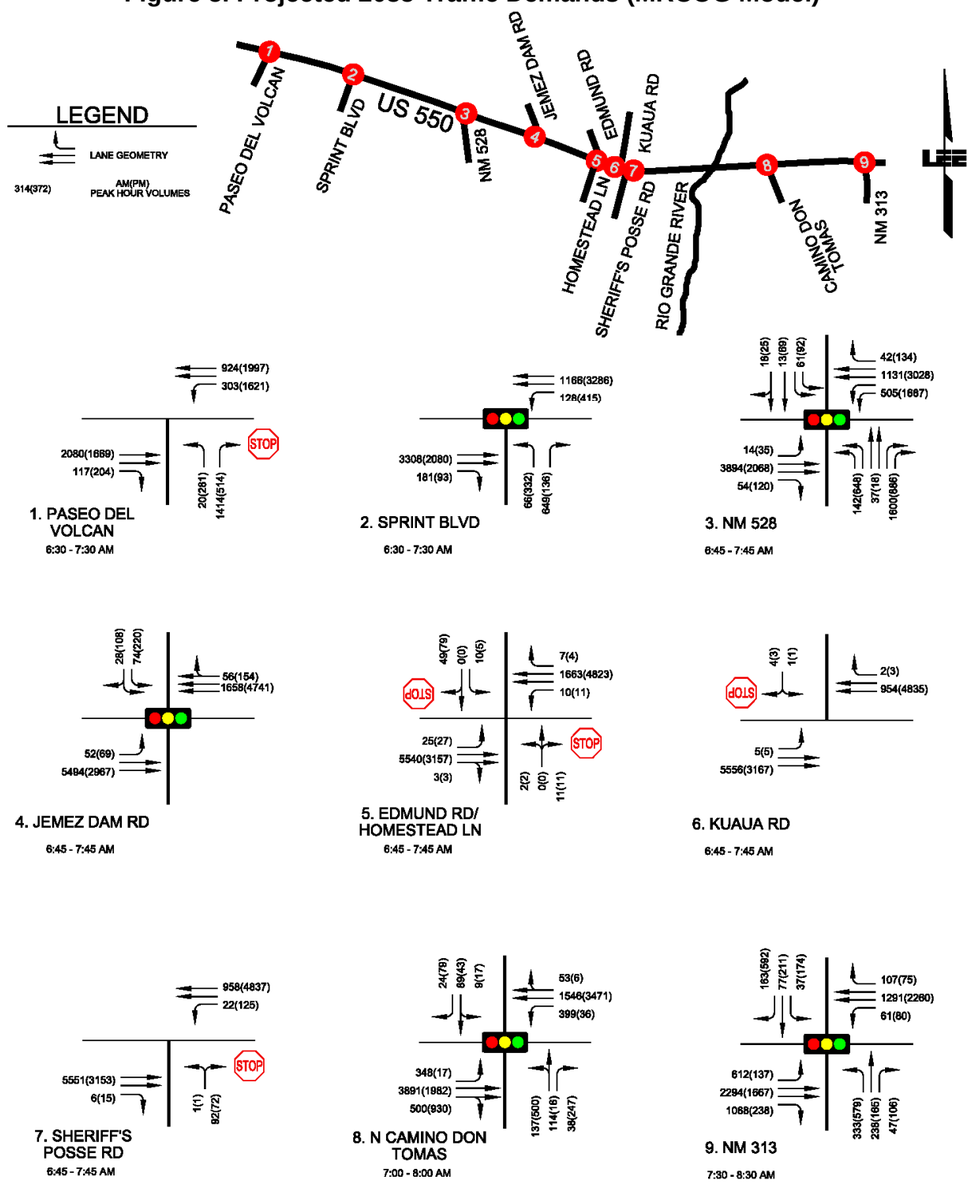


Figure 4c. Count Data at Rio Grande Bridge



2035 projected peak hour directional traffic demands for the study area were obtained from the MRCOG traffic model. Raw data is provided by the MRCOG in **Appendix B.** By knowing the entering and exiting traffic demands for all approaches at an intersection and utilizing existing traffic data turning movement proportions, 2035 directional demands were converted to intersection turning movements using an algorithm known as the “Fratar” or “Furness” method. This algorithm maintains 2035 entering and exiting demands and finds a unique algebraic solution for left, through, and right-turn movements on each approach that match existing turning proportions as closely as possible. For this study, the “TurnsW32” program was used to develop 2035 turning demands at major study intersections. Calculation sheets indicating input and output at each intersection are provided in **Appendix B**. Resulting 2035 AM and PM peak hour projected turning movement demands are depicted in **Figure 5**.

Figure 5. Projected 2035 Traffic Demands (MRCOG Model)



Preliminary Traffic Capacity and Storage Analysis

Study intersections were analyzed using the methodologies presented in the *Highway Capacity Manual* and evaluated using the Synchro software package (Version 8) for the weekday AM and PM peak hours of both existing and 2035 traffic demands under existing conditions and geometry. **Table 3** shows the intersection capacity analysis results under existing and 2035 "No-Build" conditions.

Table 3. "No-Build" LOS and Capacity Analysis

Intersection	Traffic Control	Timing Plan	AM Peak			Mid-day Peak			PM Peak		
			v/c	Delay[1]	LOS[2]	v/c	Delay	LOS	v/c	Delay	LOS
Paseo Del Volcan/ US 550	Stop Control	Existing	0.68	70.8	E	0.36	37.4	D	1.75	-	F
	Signal	2035 "No Build"	Over Cap.	-	F		NA		Over Cap.	-	F
Sprint Blvd NE/US 550	Signal	Existing	0.77	12.6	B	0.63	9.3	A	0.81	11.3	B
		2035 "No Build"	Over Cap.	264.1	F		NA		1.59	236.8	F
NM 528/US 550	Siganl	Existing	0.82	22.0	C	0.61	31.7	C	0.84	30.9	C
		2035 "No Build"	Over Cap.	-	F		NA		Over Cap.	-	F
Jemez Dam Rd/US 550	Signal	Existing	0.60	4.6	A	0.72	8.6	A	0.64	9.2	A
		2035 "No Build"	Over Cap.	-	F		NA		1.56	196.2	F
Homestead Ln-Edmund Rd/US 550	Stop Control	Existing	0.59	255.1	F	1.44	-	F	1.98	-	F
		2035 "No Build"	Over Cap.	-	F		NA		Over Cap.	-	F
Kuaua Rd/US 550	Stop Control	Existing	0.07	26.2	C	0.19	35.7	D	0.24	115.7	F
		2035 "No Build"	0.60	-	F		NA		2.00	-	F
Sheriff's Posse Rd/US 550	Stop Control	Existing	0.54	38.1	D	0.25	20.9	C	0.41	27.7	C
		2035 "No Build"	Over Cap.	-	F		NA		Over Cap.	-	F
Camino Don Tomas/US 550	Signal	Existing	1.07	24.6	F[3]	0.68	18.3	B	1.89	93.2	F
		2035 "No Build"	Over Cap.	-	F		NA		Over Cap.	-	F
NM 313/US 550	Signal	Existing	0.77	20.4	C	0.64	16.8	B	0.83	27.6	C
		2035 "No Build"	1.70	135.8	F		NA		1.87	173.0	F

[1]Volume to capacity ratio
[2]Level of Service
[3]LOS is F due to worst-case v/c greater than 1.0
"-" = Volume to capacity and delay is very high

Based on the above summary, the following 2013 observations and conclusions are made:

- US 550 intersections with Sprint Boulevard, NM 528, Jemez Dam, Sherriff's Posse Road, and NM 313 all operate at an LOS of D or better and under capacity except at Jemez Dam.
- Paseo del Volcan was analyzed under both its current stop control and under signal control; due to the fact that a NMDOT Warrant Study has recently indicated that the intersection does warrant a signal. As indicated, the intersection demonstrates an LOS F under current stop control, but operates at LOS A or better under signal control.
- Left-turn movements from the minor street stop control intersections of Edmund Road and Kuaua Road both operate at an LOS of F with the Homestead Lane-Edmund Road intersection operating over capacity.
- The northbound left-turn movement at the Camino Don Tomas intersection is operating at LOS F and over capacity and thereby causing the entire intersection to operate at LOS F and over capacity.
- It should be noted that the maximum through volumes observed on US 550 occurs westbound during the PM peak at just under 2,000 vehicles. This is just at the threshold for two lane capacity with approximately half mile to mile signal spacing. Therefore, the need for three through lanes on US 550 is a near term need rather than long term.
- Although Jemez Dam currently operates at an acceptable level of service overall, southbound demands are such that dual left-turn lanes will need to be maintained if development occurs to the south and the south leg becomes operational. Two thousand and thirteen demands were analyzed under both minor mitigation scenarios and under a six lane section scenario. All signalized intersections are projected to operate at an acceptable level of service.
- As shown, Sherriff's Posse Road was analyzed as a signalized intersection under the six lane section geometry. A signal is anticipated to operate at a LOS of A.

The following 2035 observations and conclusions are made:

- Under no-build conditions, all study intersections will operate at a LOS F and over capacity under 2035 traffic demands.
- An eight lane section appears to accommodate 2035 projected demands between NM 313 and Paseo del Volcan. Triple left-turns and right-turns would be needed at westbound Paseo del Volcan and northbound NM 528 respectively.
- Some sort of free flow movement would likely be required for westbound left-turn movements at NM 528.

Implementing the above analysis, existing 2013 turning demands were re-analyzed under mitigated lane geometry and under mitigated lane geometry with a six lane cross-section on US 550. Resulting LOS are shown in **Table 4**. As indicated, all intersections would be anticipated to operate at LOS C or better under the mitigated scenarios. Mitigation for 2013 traffic demands are summarized in **Figure 6**. The 2035 projected traffic demands were also reanalyzed under mitigated lane geometry described in the list above. Analysis indicates that all signalized intersections would be anticipated to operate at a minimum LOS of D except at Jemez Dam, Sheriff's Posse Road, and Camino Don Tomas where a worst case movement will be over capacity.

The minor street movements from the two-way stop controlled intersections would still be LOS F. This would likely become a moot point as left-out turn movements would be recommended to be eliminated from these intersections for safety purposes if the mitigated eight lane section is constructed. 2035 lane and traffic control mitigation is summarized in **Figure 7**.

Table 4. "Mitigated" LOS and Capacity Analysis

Intersection	Traffic Control	Timing Plan	AM Peak			Mid-day Peak			PM Peak		
			v/c[1]	Delay[2]	LOS[3]	v/c[1]	Delay[2]	LOS[3]	v/c[1]	Delay[2]	LOS[3]
Paseo Del Volcan/ US 550	Signal	2013 Mitigated	0.77	4.5	A	0.76	4.6	A	0.77	5.0	A
		2035 Mitigated	0.83	7.9	A	NA			0.98	33.2	C
Sprint Blvd NE/ US 550	Signal	2013 Mitigated	0.77	11.7	B	0.63	10.3	B	0.81	11.3	B
		2035 Mitigated	0.99	32.1	C	NA			0.88	15.6	B
NM 528/ US 550	Siganl	2013 Mitigated	0.84	23.4	C	0.67	34.4	C	0.84	32.4	C
		2035 Mitigated	0.87	12.4	B	NA			0.99	35.1	D
Jemez Dam Rd./ US 550	Signal	2013 Mitigated	0.58	2.9	A	0.78	9.2	A	0.65	18.2	B
		2013 3-lanes	0.40	2.5	A	0.78	8.9	A	0.68	18.4	B
		2035 Mitigated	0.94	3.4	A	NA			1.00	23.1	C
Homestead Ln-Edmund Rd. / US 550	Stop Control	2013 3-lanes	0.28	79.4	E	0.72	198.8	F	0.88	Over Cap	F
		2035 Mitigated	Over Cap.	-	F	NA			Over Cap.	-	F
Kuaua Rd. / US 550	Stop Control	2013 3-lanes	NA			NA			NA		
		2035 Mitigated	0.39	181.3	F	NA			Over Cap.	-	F
Sheriff's Posse Rd./ US 550	Stop Control	2013 Mitigated	0.69	9.9	A	0.54	7.8	A	0.72	9.1	A
		2013 3-lanes	0.78	6.1	A	0.38	7.4	A	0.78	5.3	A
		2035 Mitigated	1.10	55.6	F[4]	NA			0.89	13.5	B
Camino Don Tomas/ US 550	Signal	2013 Mitigated	0.73	13.5	B	0.51	10.5	B	1.17	35.2	D
		2013 3-lanes	0.65	12.6	B	0.48	9.1	A	0.84	19.4	B
		2035 Mitigated	1.01	42.0	F[4]	NA			0.91	29.0	C
NM 313/ US 550	Signal	2013 Mitigated	0.77	21.6	C	0.75	18.8	B	0.87	30.3	C
		2013 3-lanes	0.65	17.0	B	0.75	18.2	B	0.90	25.8	C
		2035 Mitigated	0.93	26.8	C	NA			0.99	51.5	D

[1] Volume to Capacity Ratio
[2] Average delay per vehicle in seconds
[3] Level of Service
[4] LOS is F due to worste case movement above 1.00

Traffic Signal Warrant Analysis

Traffic signal warrant analyses were conducted for both the Paseo del Volcan, and Sheriff's Posse Road/Kuaua Road intersections. The summary of all warrant study results are provided in **Table 5**. It should be noted that the warrant study results at Paseo del Volcan reflect a NMDOT District 3 completed study prepared prior to this study. Excerpts from the NMDOT prepared study are provided in **Appendix C**.

The offset intersections of Sheriff's Posse Road/Kuaua Road were analyzed as a single intersection, assuming realignment, for this analysis.

Table 5. Warrant Analysis

Intersection	MUTCD WARRANTS SATISFIED							
	1	2	3	4	5	6	7	8
US 550/Paseo Del Volcan	YES	YES	YES	NO	NO	NO	NO	NO
US 550/ Sheriff's Posse Kuaua Rd. (1 Lane Minor Approach)	YES	YES	NO	NO	NO	YES	NO	NO[1]
US 550/ Sheriff's Posse Kuaua Rd. (2 Lane Minor Approach)	NO	NO	NO	NO	NO	YES	NO	NO[1]

[1] There is potential for future development in this area, but it is unknown how much will occurr within the next 5 years.

As indicated the Paseo del Volcan intersection currently warrants a signal due to the westbound left-turn analyzed as the minor street approach and the eastbound through as the major approach.

Current demands at the Sheriff's Posse Road intersection satisfies Warrants 1B and 2 assuming only one lane on the minor street approaches for both condition with or without left-turn demands included. However, if minor street approaches are assumed to incorporate two lanes, which is the anticipated lane geometry should the intersection become signalized, these warrants would not be satisfied. While Warrant 3 peak hour volume thresholds were satisfied under both scenarios, Warrant 3, per MUTCD, is intended for unusual cases such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities, all of which do not apply at Sheriff's Posse Road. Therefore, Warrant 3 would not be considered satisfied. Additionally, Warrants 6 is dependent on engineering judgment, which in the case of this intersection would be satisfied. However, Warrant 6 is not usually used as the sole warrant to implement signals and is more strongly considered if other demand threshold warrants are satisfied.

It is noted that much of the traffic demands on Sheriff's Posse Road is likely cut-through traffic resulting from what looks to be a non-permanent access point at the end of a cul-de-sac on Venada Plaza Drive. Therefore current demands may be based on temporary inflated traffic demands and thus Warrants likely would not be satisfied.

Signal control should only be implemented at Sherriff's Posse Road if both Sheriff's Posse Road and Kuaua Road approaches have been aligned properly across from each other. This will likely require ROW acquisition on one side of US 550 or the other. If signal control was constructed

Figure 6. Proposed Lane Geometry & Traffic Control (2013 Mitigated Scenarios)

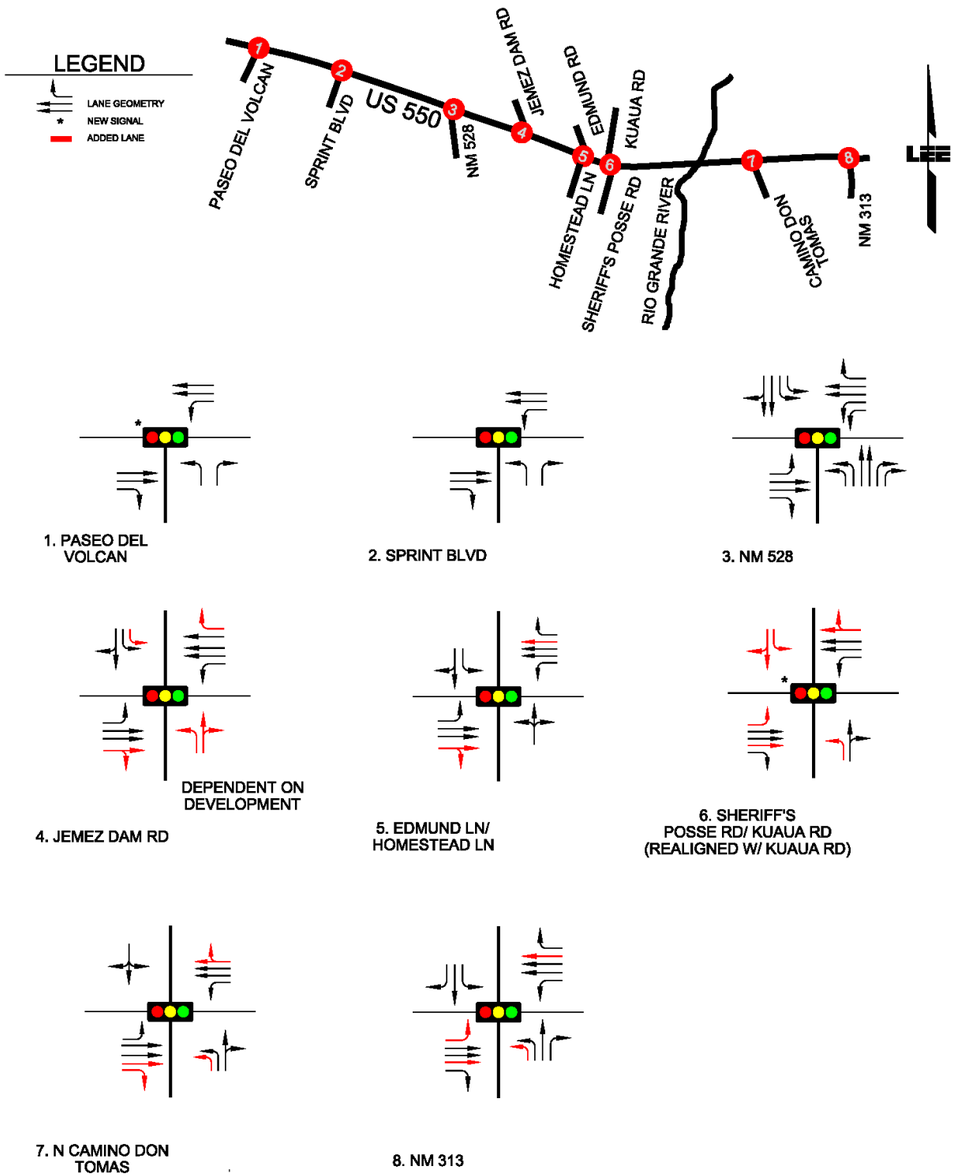
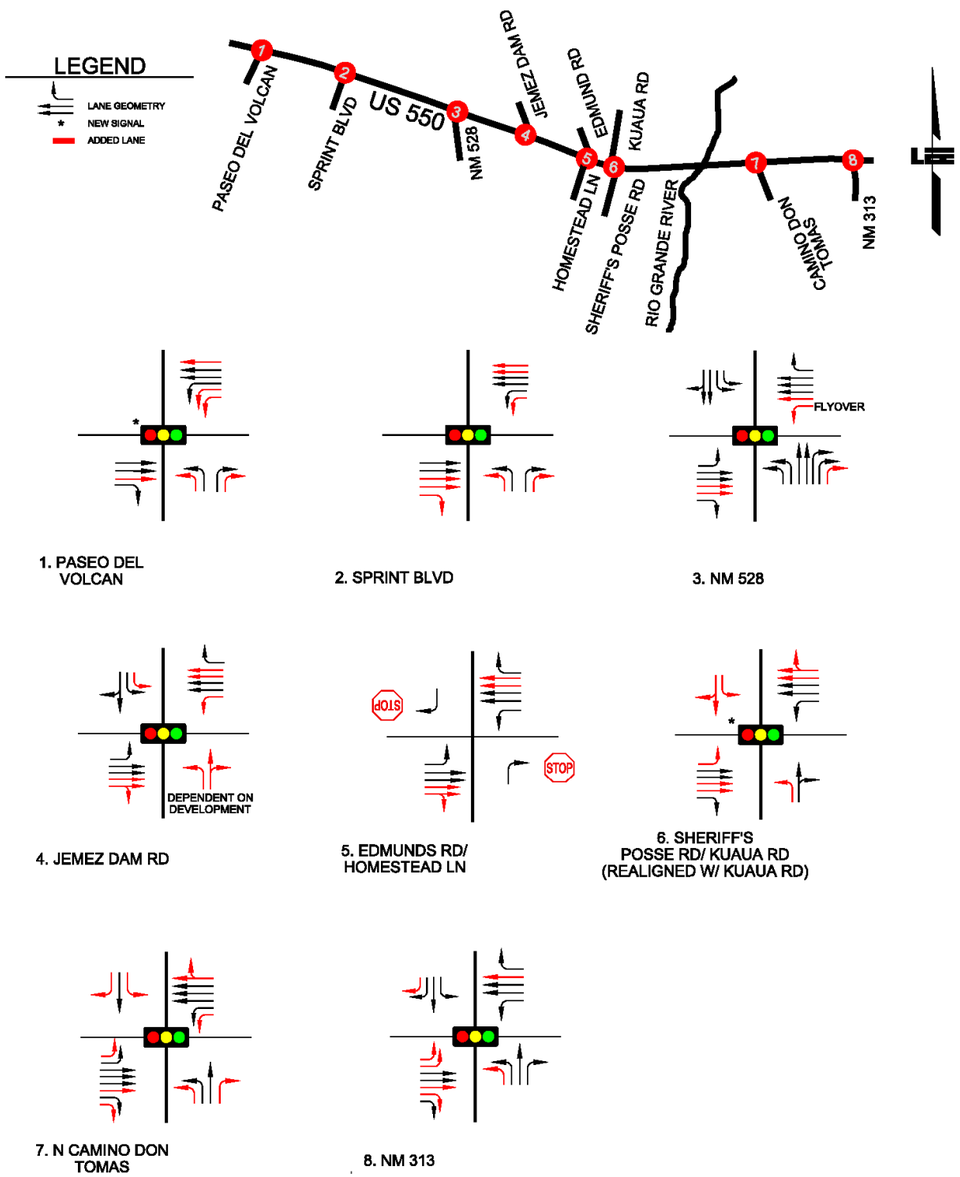


Figure 7. Proposed Lane Geometry & Traffic Control (2035 Mitigated Scenarios)



without this realignment, the new signal would be much more complicated with both intersections requiring signalization. A single signalized intersection is more efficient, less expensive to maintain, and provides less risk for crashes.

Therefore it is recommended that a signal be constructed at the Sherriff's Posse Road/Kuaua Road intersection if the following is satisfied:

- The access from Venada Plaza Drive is permanent and remains in place.
- Sherriff's Posse Road or Kuaua Road is aligned into one four-leg intersection.

Unsignalized intersections such as Homestead Lane and Santa Ana Road were not analyzed due to their poor spacing between existing signals. Not only would the spacing conflict with current NMDOT access management policies on urban arterials, but it has been recognized that poor signal spacing leads to poor signal coordination. It is therefore recommended that the only the Sheriff's Posse Road/Kuaua Road be a future signal location candidate, as its location provides acceptable signal spacing between the existing Jemez Dam and Camino Don Tomas signalized intersections.

Intersection Auxiliary Lane Evaluation

A review of the NMDOT criteria for auxiliary deceleration lanes was conducted to determine if traffic conditions at any of the five study area intersections meet installation requirements for a right-turn or left-turn deceleration lane. US 550 is considered an urban multi-lane arterial having a posted speed limit of 40 mph (east of Camino Don Tomas) or 45 mph (Camino Don Tomas to Paseo del Volcan). Right and left-turn lane criteria for this roadway classification type is identified in **Table 17.B-2** (enclosed as **Appendix C**).

For the counts collected, the following intersections that do not already have auxiliary lanes satisfy NMDOT criteria for deceleration lanes (Table 17.B.2).

- **Camino Don Tomas** – Although right-turn demands are very light, the through traffic demand exceeds the NMDOT access management threshold warranting a right-turn auxiliary lane. As will be discussed in the Safety Analysis section, Camino Don Tomas was observed to have the greatest crash occurrences and therefore a right-run lane should be added by any additional development projects to the north accessing this street.
- **Santa Ana Road/Bosque Trail Entrance** – Although, turn movements were not collected at this location, the adjacent through traffic is far greater than the 450 vehicles per hour per lane needed to satisfy an eastbound and westbound right-turn lane with five or less right-turns in an hour. Therefore, a right-turn lane currently is warranted. Right-turn lanes should eventually be constructed. However, currently there is no observed crash history suggesting a problem at this intersection. Construction of right-turn lanes at this intersection could wait for further development north of the intersection along Santa Ana Road.
- **Homestead Lane** – An eastbound right-turn lane currently satisfies the NMDOT auxiliary lane warrants. As development continues at this location, the need for a right-turn lane will only increase and should be required as part of any development project.
- **Jemez Dam** – A westbound exclusive right-turn lane easily satisfies NMDOT auxiliary lane warrants with 152 vph in the PM peak. Currently there is an auxiliary lane pocket, but this also serves as an additional through lane and is needed to meet the peak hour demands. Therefore, a right-turn lane is recommended at the east leg of Jemez Dam, especially if US 550 becomes a six lane arterial. An eastbound right-turn lane should be added as a part of any development project that is proposed to the south of this intersection.

Additionally, another short term recommendation is to re-time the corridor based on the latest collected data. This recommendation is discussed in much greater detail in the section entitled "**Signal Timing Improvements**."

Queue Storage Analysis

Analysis of left-turn queue demands and storage lane lengths for existing conditions are summarized in **Table 6**.

Table 6. Summary of Queue Analysis and Storage Demands

Intersection	Movement	Existing Queue Storage	2013 95th Percentile Queue			2035 95th Percentile Queue		
			Time Period	Volume (VPH)	Feet	Time Period	Volume (VPH)	Feet
NM 550/ Paseo Del Volcan	EB Right	710'	PM	61	<25	PM	319	0
	WB Left	545'	PM	311	48.45	PM	2161	1880
	NB Left	N/A[1]	PM	46	204.13	PM	502	464
	NB Right	463'	AM	373	132.95	AM	1683	>1500
NM 550/Sprint Blvd	EB Right	340'	PM	90	11	AM	262	8
	WB Left	300'	PM	285	26	PM	561	640
	NB Left	N/A[1]	PM	178	167	PM	481	532
	NB Right	N/A[1]	AM	154	58	AM	721	532
NM 550/ NM 528	EB Left	825'	PM	98	54	PM	64	81
	EB Right	400'	PM	116	71	AM	128	9
	WB Left	775'	PM	1105	412	PM	2008	955
	WB Right	915'	PM	129	23	PM	244	29
	NB Left	430'	PM	177	79	PM	876	578
	NB Right	402'	AM	842	67	AM	1778	1415
	SB Left	365'	PM	84	28	PM	184	69
	SB right	110'	PM	100	0	PM	50	0
NM 550/ Homestead Ln	EB Left	100'	PM	82	55	PM	78	93
	WB Left	150'	PM	27	<25	PM	27	150
	WB Right	175'	PM	11	<25	AM	10	89
	SB Left	100'	PM	4	<25	AM	7	0
NM 550/ Kuaua Rd	EB Left	40'	PM	5	50	PM	5	321
	WB Right	150'	PM	5	7.3	PM	5	86
NM 550/ Sheriff's Posse Rd	WB Left	65'	PM	3	<25	PM	3	0
	EB Right	170'	PM	125	49	PM	103	125
NM 550/ Camino Don Tomas	EB Left	372'	PM	15		PM	15	0
	WB Left	230'	PM	21	<25	AM	464	196
	NB Left	115'	PM	73	<25	AM	725	595
	NB Right	70'				PM	685	396
NM 550/ NM 313	EB Left	65'	PM	86	56	PM	305	232
	EB Right	120'	PM	139	147	AM	805	107
	WB Right	100'	PM	325	123	AM	1571	13
	WB Left	400'	PM	94	<25	AM	157	28
	NB Left	255'	AM	115	53	PM	103	129
	NB Right	276'	PM	370	133	PM	793	337
	SB Left	250'	PM	126	52	PM	118	24
	SB Right	134'	AM	124	141	PM	193	143
		220'	PM	165	53	PM	696	194

[1]Extends into through lane

From **Table 6** the following issues are identified:

- 95th percentile queue demands exceed current storage lengths as proposed by the current I-25/US 550 interchange project at both the eastbound left and right-turn lanes at NM 528.
- The 95th percentile queue demands slightly exceed available storage at the southbound left-turn at Homestead Lane. This is due to the unusual road alignment along with the close proximity of the adjacent gas station driveway.
- Projected 95th percentile queues under 2035 traffic demands are for a “No-Build” Scenario and do not take into account expansion of left and right-turn lanes to duals and triples.
- A great many of existing storage length capacities will be exceeded under 2035 demands especially at the WB left and NB right-turn movements at Paseo del Volcan and NM 528. As discussed in the LOS and capacity analysis, these movements will require triple and sometimes free flow facilities.

Per the NMDOT Access Management Manual (SAMM) (**Table 18K-1**), the NMDOT requires that auxiliary lane storage length should comply with the greater of queue length demand and deceleration length requirements. It should be noted however, due to the relatively frequent driveway and side street spacing this will not be easily complied with and still maintain existing access. Per the NMDOT access management manual, deceleration length will control at some locations (400 feet for 45 mph and 325 feet for 40 mph). However, at most study intersections, queue storage requirements will control.