DOWNTOWN NEIGHBORHOOD AREA

TRAFFIC STUDY

FINAL REPORT

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PREPARED FOR:

CITY OF ALBUQUERQUE

COUNCIL SERVICES

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INTRODUCTION

STUDY PURPOSE

The City of Albuquerque approved the Downtown Neighborhood Area (DNA) Sector Development Plan in June 2012. The DNA Sector Plan calls for the City of Albuquerque to initiate a Neighborhood Transportation Study to follow-up on the recommendations presented in the DNA Sector Plan. The scope of this study was to collect data and perform more detailed analysis of those recommendations. Traffic volume and speed data was collected using tube counters and crash data was received from MRCOG. In addition the study team conducted a walking survey to observe existing traffic operations, existing signs, note deficient pedestrian facilities, etc. The study also consisted of two public involvement meetings to meet with residents of the neighborhood, listen to their concerns with traffic in the area, and present recommendations.

EXISTING AREA CHARACTERISTICS

GENERAL AREA CHARACTERISTICS AND AREA STREET NETWORK

As shown on Figure 1 on this page, the boundaries of the Downtown Neighborhood Area (DNA) are Mountain Road to the north, Central Avenue to the south, 19th Street to the west and 4th/5th/7th and

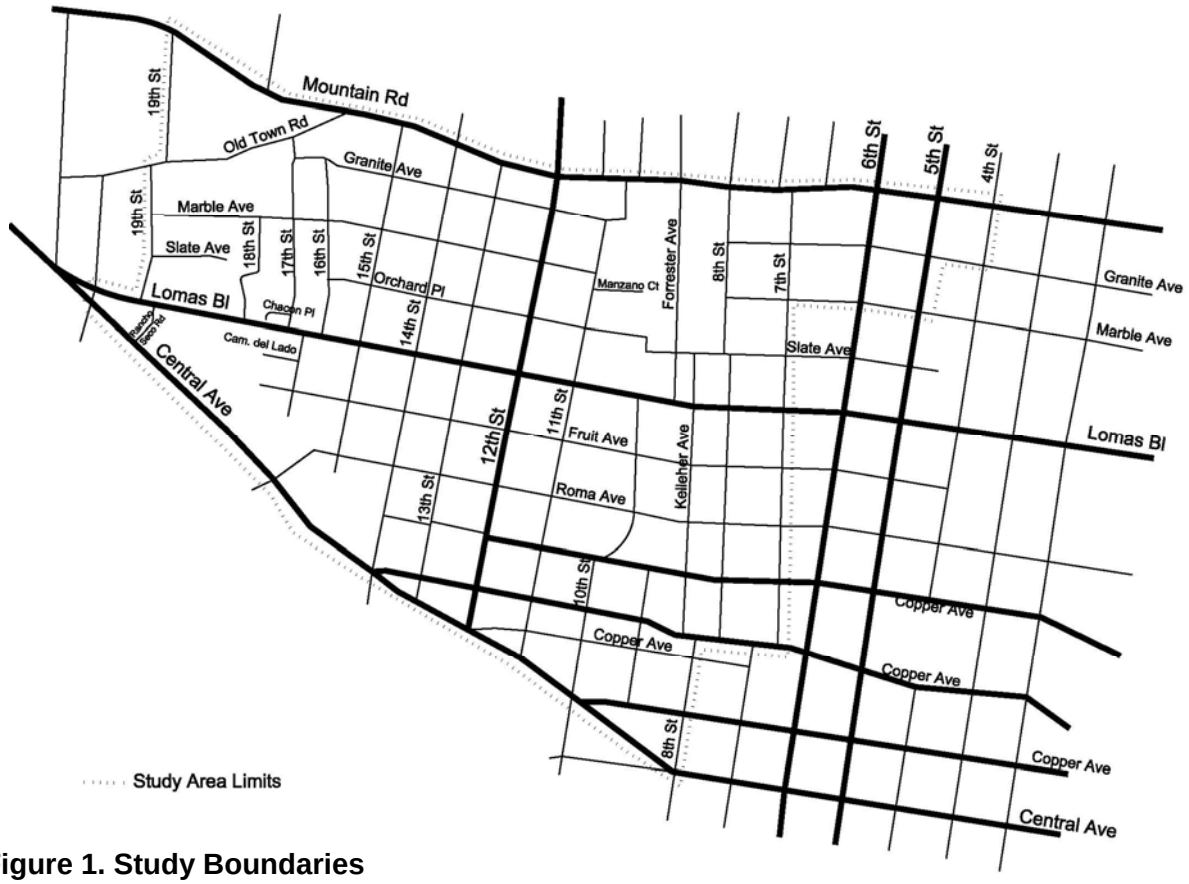


Figure 1. Study Boundaries

8th Streets to the east. The Downtown Neighborhood is an older area of Albuquerque dating to around 1900 that includes the 4th Ward Historic District.

Central Avenue and Lomas Boulevard are the major east/west streets in the study area. Both streets are classified as major arterials. Other east/west streets in the study area include Tijeras Avenue and Copper Avenue, which are classified as minor arterials. Collector streets include Mountain Road and Marquette Avenue. There are no north/south streets in the study area that are classified as major arterials. North/south minor arterials include the 5th-6th Street one-way couplet, 4th Street and 12th Street north of Lomas Boulevard (south of Lomas, 12th Street is classified a local street).

EXISTING TRAFFIC VOLUMES

Volume and speed data was collected using tube counters at twelve intersections in the study area. The data was collected over a period of two days, from Tuesday, May 8, 2012, to Wednesday, May 9, 2012. The locations of the tube counters are listed below and are shown in Figure 2.

- 7th Street, between Marble and Granite
- 8th Street, between Marble and Granite
- 11th Street North, between Marble and Manzano Court
- 11th Street South, between Roma and Fruit
- 16th Street, between Orchard and Marble
- 17th Street, south of Marble
- Fruit Avenue, between 13th Street and 14th Street
- Granite, between 14th Street and 15th Street
- Luna Boulevard, between Roma and Fruit
- Marble Avenue, between 19th Street and 18th Street
- Marquette Avenue, east of Luna
- Roma Avenue, between Keleher and 8th Street.

Traffic turning movement counts, also summarized in Figure 2, were collected for nine hours per day at the intersections listed below. These counts were all collected on either May 8, 2012 or May 9, 2012. Counts were collected at each intersection for vehicles as well as pedestrians and bicyclists. The count times were 6:45 am to 9:45 am, 11:00 am to 2:00 pm, and 3:00 pm to 6:00 pm each day. The complete turning movement count data is attached as Appendix A.

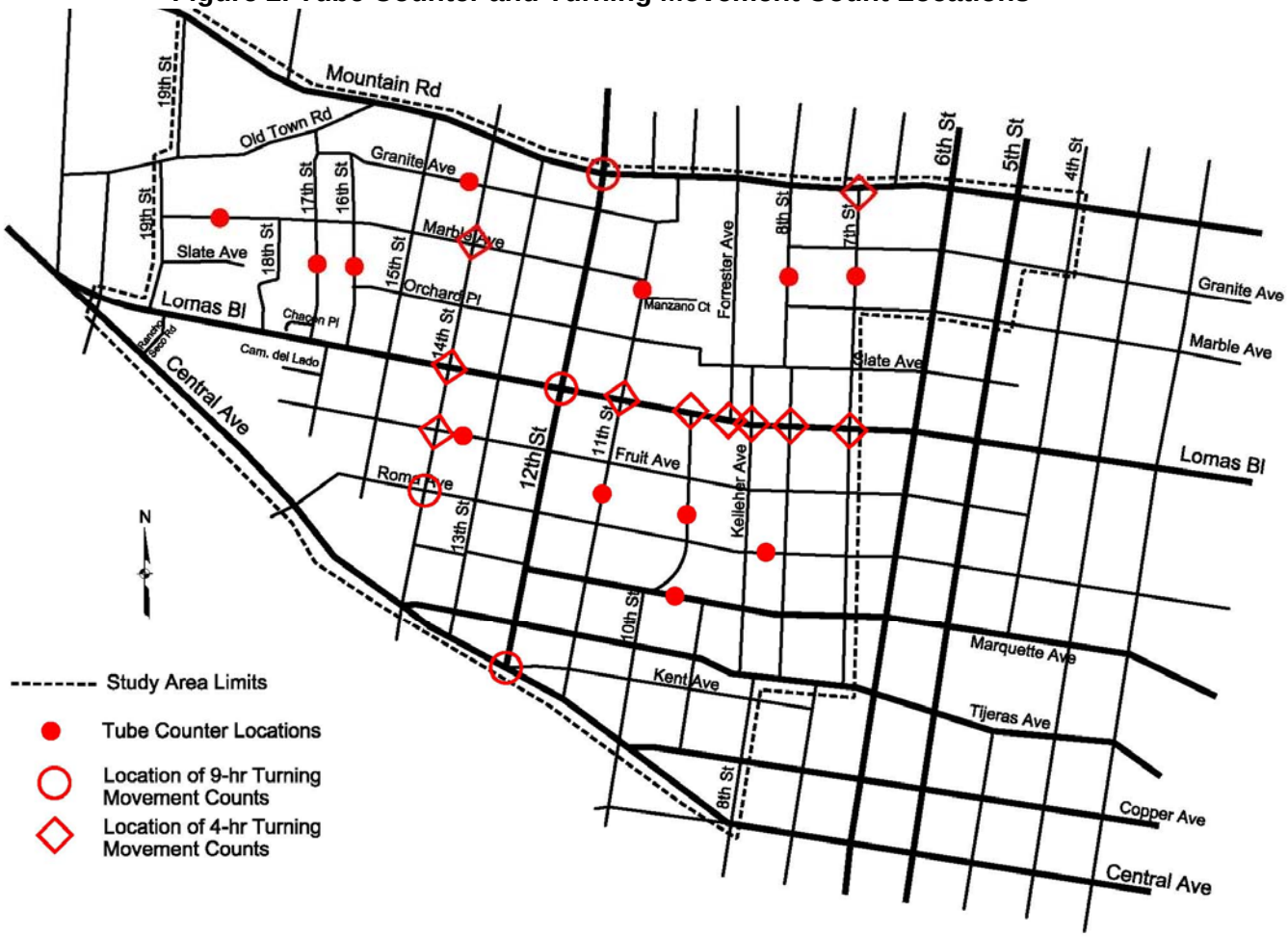
- Central Avenue and 12th Street
- Lomas Boulevard and 12th Street
- Mountain Road and 12th Street
- Roma Boulevard and 14th Street

Four-hour traffic turning movement counts, shown below in Figure 2, were collected from 6:45 am to 8:45 am and 4:00 pm to 6:00 pm each day. Counts were collected at each intersection for

vehicles as well as pedestrians and bicyclists. The complete turning movement count data is attached as Appendix A.

- Fruit and 14th Street
- Lomas Boulevard and 7th Street
- Lomas Boulevard and 8th Street
- Lomas Boulevard and 11th Street
- Lomas Boulevard and 14th Street
- Lomas Boulevard and Forrester
- Lomas Boulevard and Keleher Avenue
- Lomas boulevard and Luna
- Marble Avenue and 14th Street
- Mountain Road and 7th Street

Figure 2. Tube Counter and Turning Movement Count Locations



ACCIDENT DATA

Accident data was received from the Mid-Region Council of Governments (MRCOG) for 2007-2009, the most recent three years available. In addition, according to MRCOG, the average intersection crash rate for the City of Albuquerque is 1.36 crashes per million entering vehicles. The crash rate for each intersection was calculated and the data is shown in Table 2 below. Two intersections, 2nd/Mountain and 3rd/Mountain, a one way couplet, have crash rates that exceed the average of 1.36.

Table 1. Accident Data

Street	ADT	Street	ADT	Intersection ADT	# of Crashes	# of Years	Crash Rate
1st Street	1400	Mountain	5500	6900	10	3	1.32
2nd Street	5300	Mountain	5500	10800	24	3	2.03
3rd Street	4600	Mountain	5500	10100	30	3	2.71
4th Street	9300	Mountain	6200	15500	16	3	0.94
5th Street	7500	Mountain	4600	12100	10	3	0.75
6th Street	6600	Mountain	5600	12200	9	3	0.67
12th Street	9100	Mountain	6100	15200	16	3	0.96
6th Street	5900	Lomas	19200	25100	15	3	0.55
7th Street	1091	Lomas	18100	19191	8	3	0.38
8th Street	526	Lomas	18100	18626	3	3	0.15
11th Street	807	Lomas	18100	18907	9	3	0.43
12th Street	4700	Lomas	18100	22800	26	3	1.04
14th Street		Lomas	12900	12900	2	3	0.14
12th Street	3800	Roma	369	4169	5	3	1.10
12th Street	3800	Marquette	900	4700	3	3	0.58
Marquette	1201	Luna	786	1987	0	3	0.00

DNA SECTOR PLAN

The Downtown Neighborhood Area Sector Development Plan (Sector Plan) was approved by the City of Albuquerque City Council on June 4, 2012. The Transportation Issues and Goals from the Sector Plan are summarized in the following sections.

TRANSPORTATION ISSUES

Listed below are the five transportation issues and how they are addressed in this study.

1. *Lomas Blvd is the major east-west corridor through the Plan area. Lomas Boulevard appears to have excess right-of-way, and consideration should be given to the implementation of traffic "calming" techniques, such as curb extensions (bulb-outs) and lane narrowing in order to ease north-south pedestrian flow across the roadway. Pedestrian amenities, such as benches and street trees, are lacking or inconsistent along Lomas Boulevard.*
2. *Central Avenue has been the subject of several studies looking at streetscape, cross sections, land uses, etc. There is an on-going study that is being coordinated by the City Council (West*

Central Avenue Corridor Concept Plan). The City and several neighborhoods adjoining Central Avenue are working on specific improvements that will narrow Central Avenue between 8th and Lomas, create bike lanes, and expand sidewalks. The Sector Development Plan should review these studies and include the relevant information as a part of the Sector Development Plan update process.

3. *Pedestrian accessibility is a challenge in many parts of the Plan area. There are numerous streets with missing sidewalk sections, deteriorated, or very narrow sidewalks. Many intersections are missing one or more ADA-compliant curb ramps. Some curb ramps are significantly offset from the intersection.*
4. *Many sidewalk sections without parkway strips have ADA deficient driveway cut designs.*
5. *The intersection of 12th Street and Mountain has functional issues. Mountain Road has a left turn east of Seventh Street within a 32 foot face-to-face (curb-to-curb) roadway section. Can this be applied to 12th Street with is 31 feet face-to-face?*
6. *Maintenance of alleys is a concern within the Plan area. Most of the alleys are not maintained well, and some have become a nuisance to the neighborhood, attracting homeless people and trash accumulation.*

TRANSPORTATION GOALS OF THE SECTOR PLAN

In addition to the transportation issues stated in the previous section, the DNA Sector Plan also listed five transportation goals.

1. *The Downtown Neighborhood Area will be the City's most walkable neighborhood.*
    - Improve, install, and maintain sidewalks, and ensure handicap accessibility.
    - Maintain the width and location of existing parkway strips between the curb and sidewalk.
    - Slow traffic on neighborhood streets to encourage walking.

2. *The Downtown Neighborhood Area will have a coordinated roadway system that improves safety and function.*
    - Coordinate with and support the West Downtown Corridor Plan (Central Avenue) and other transportation corridor planning studies.
    - Redesign the 12th Street/Mountain Road and 12th Street/Lomas Blvd intersections to improve safety and traffic flow.
    - Redesign Lomas Boulevard to slow traffic and make it easier for bicyclists and pedestrians to cross, and to foster the development of a pedestrian-oriented commercial district while maintaining its function as a major thoroughfare.

3. *The Downtown Neighborhood Area will have excellent access to transit services.*

- Improve bus stops (e.g., signage, seating, shade cover) and bus route coverage for regular routes and special events.
- Encourage the use of the public transportation by workers and residents of the Downtown Neighborhood Area.

4. *The Downtown Neighborhood Area will have a comprehensive, safe and convenient bicycle network for commuter and recreational users.*
    - Increase bicycle facilities to provide greater access, mobility, and safety.
    - Encourage existing businesses to provide bicycle racks for patrons.
    - Coordinate with the City's bicycle planning documents.

5. *The Downtown Neighborhood Area will contain alleys that are attractive and provide alternative access to garages and safe pedestrian pathways.*
    - Encourage property owners to add lighting and landscaping to adjacent alleys.
    - Encourage property owners to maintain alleys adjacent to their properties.
    - Identify and vacate only those alleys that are discontinuous and do not serve a purpose for the property owners.

In summary, the issues and goals of the DNA Sector Plan have been addressed by this study in the following manner:

- To increase walkability and provide traffic calming on Lomas, this study recommends adding bump-outs to delineate on-street parking and facilitate pedestrian movements (see Figure 3 on this page). These bump-outs will improve pedestrian flow and safety across Lomas Blvd by narrowing the width of asphalt to be crossed. It will also help delineate for drivers the driving and parking areas of the roadway. Pedestrians using the bump-outs to cross Lomas will be safer as they will be protected by the curb from vehicles on Lomas.

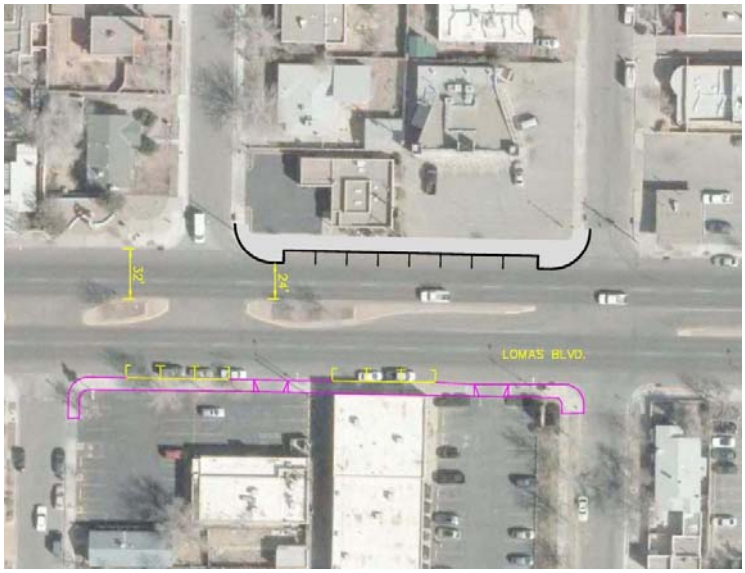


Figure 3. Proposed Bump-outs on Lomas

- Central Avenue is currently being studied by HDR in separate study and is not part of this traffic report. Traffic management for multi-modal purposes and to facilitate pedestrian crossings is required for the segment of Central Ave that forms the southern boundary of the DNA and will be addressed in a separate study.
- To enhance pedestrian functions, the City of Albuquerque currently has a project to correct the deficient sidewalks and handicap ramps in the DNA on the north side of Lomas. This

study recommends an additional City project to correct the ADA sidewalk and handicap ramp issues located south of Lomas Blvd.

- To facilitate Goal #2 regarding safety and function of a coordinated roadways system and Issue #5, the 12th Street/ Mountain and 12th Street/ Lomas intersections were analyzed. The analysis of the 12th Street /Mountain Road intersection indicates that north and southbound left turn lanes on 12th Street will help with the operation of the intersection. The left turn lanes can be added by restriping the existing lanes without affecting the existing curbs. The existing street width for 12th Street is 31 feet so the new left turn lane will fit if the lanes are restriped to widths of 10 feet for the through lanes with an 11 foot left turn lane. This requires no additional right-of-way for the proposed improvements.

Photo 1. 12th and Mountain Intersection

Photo 2. Bicycle Boulevard Sign

- To provide better bicycle facilities per Goal #4, a pedestrian and bike crossing should be added at 14th Street and Keleher. This would enhance the functionality of the 14th Street Bicycle Boulevard by allowing bikes on 14th Street a convenient and safe location for crossing Lomas Boulevard.
- According to the City of Albuquerque, alleys are maintained by the adjacent homeowner and no recommendations for alleyways are included in this report.

TRAFFIC STUDY AND ANALYSIS

INTERSECTION AND ROADWAY ANALYSES

Using the turning movement counts collected for the project, the levels of service for two scenarios (existing and proposed) at the intersections of 12th Street/Lomas and 12th Street/ Mountain, were determined for the AM and PM peak hours. Appendix B contains the capacity analysis worksheets.

Assumptions:

1. Each alternative was evaluated separately, without other alternatives included.
2. The City timing parameters were used to the extent possible with all fixed parameters input.
3. Cycle lengths were estimated based upon previous experience and the fixed parameters.
4. Peak Hour Factors were estimated by approach as 0.80 below 500 vehicles per hour (vph) and 0.85 for greater than 500 vph. This permits a relative comparison of the results.

5. The Lomas Blvd northbound right-turn appears to have a maximum length of 50' given proximity to the large trees on the right side of the road.
6. The 12th St left-turn lanes at Mountain Rd were assumed to be 75' in length. An exclusive left-turn phase was not added.

Lomas/12th St.

An intersection analysis was performed using SYNCHRO to see how adding a left turn phase to the signal for southbound 12th Street would affect the signal operations. A second scenario modeled for the intersection was the addition of a new northbound right turn lane.

Table 2. 12th Street/Lomas Signal Analysis Results

AM Peak Hour

			Existing				With SB Left-Turn Phase				With NB Right-Turn Lane			
Approach	Cycle Length	Volume	LOS	Ave Delay	Max v/c	95% Queue	LOS	Ave Delay	Max v/c	95% Queue	LOS	Ave Delay	Max v/c	95% Queue
Intersection	***75***		***B***	***15 s***	***0.74***		***B***	***16 s***	***0.64***		***B***	***15 s***	***0.73***	
EB LT		59	A	10 s	0.14	50'	B	10 s	0.15	50'	B	10 s	0.14	50'
EB Th/RT		928	B	12 s	0.56	225'	B	14 s	0.64	225'	B	12 s	0.56	225'
WB LT		30	B	13 s	0.19	25'	B	15 s	0.24	25'	B	13 s	0.19	25'
WB Th		352	A	9 s	0.23	75'	A	10 s	0.26	75'	A	9 s	0.23	75'
WB RT		58	A	3 s	0.08	25'	A	3 s	0.09	25'	A	3 s	0.08	25'
NB Approach		151	B	18 s	0.36	100'	C	27 s	0.56	100'				
NB LT/Th		127									B	18 s	0.30	75'
NB RT		24									A	6 s	0.06	25'
SB LT		164	C	27 s	0.61	125'	C	24 s	0.62	100'	C	26 s	0.57	125'
SB Th/RT		318	C	28 s	0.74	200'	C	20 s	0.63	175'	C	28 s	0.73	200'

PM Peak Hour

			Existing				With SB Left-Turn Phase				With NB Right-Turn Lane			
Approach	Cycle Length	Volume	LOS	Ave Delay	Max v/c	95% Queue	LOS	Ave Delay	Max v/c	95% Queue	LOS	Ave Delay	Max v/c	95% Queue
Intersection	***90***		***B***	***17 s***	***0.79***		***B***	***19 s***	***0.83***		***B***	***17 s***	***0.77***	
EB LT		74	B	16 s	0.37	75'	C	26 s	0.47	75'	B	15 s	0.36	75'
EB Th/RT		407	A	9 s	0.24	100'	B	13 s	0.27	125'	A	9 s	0.24	100'
WB LT		43	A	10 s	0.10	50'	B	13 s	0.12	50'	A	9 s	0.10	50'
WB Th		875	B	11 s	0.49	225'	B	16 s	0.55	275'	B	11 s	0.48	225'
WB RT		203	A	4 s	0.24	50'	A	6 s	0.26	75'	A	4 s	0.23	50'
NB Approach		324	D	39 s	0.79	250'	D	44 s	0.83	275'				
NB LT/Th		306									D	38 s	0.77	225'
NB RT		18									B	14 s	0.05	25'
SB LT		81	D	44 s	0.64	100'	C	25 s	0.47	75'	E	57 s	0.74	100'
SB Th/RT		213	C	24 s	0.51	150'	B	18 s	0.42	125'	C	24 s	0.53	150'

All analyses conducted using Synchro 7.0, Synchro format.
"Existing" - Existing signal operations with an estimated cycle length.
"With SB Left-Turn Lane" - A SB left-turn phase is added to the cycle. No other modifications included.
"With NB Right-Turn Lane" - A NB right-turn lane of 50' is added to the approach. No other modifications included.

Adding a left-turn phase for southbound 12th St will increase overall average delay slightly because an extra phase is added. All approach movements will result in minor average delay increases except for the southbound approach which will be reduced. The reason for the southbound left-turn phase is to improve southbound operations and safety, and given the minor delay induced, it would likely be worth the additional delay during the peak periods. It may be most efficient to operate the signal without the left-turn phase through much of the day, and this could be programmed into the controller.

The guidelines for left turn phasing in the Traffic Signal Timing Manual were reviewed for the 12th /Lomas intersection. According to the guidelines, this signal does not meet the requirements for a

protected left turn. However, the operation analysis indicates that a protected left turn during the AM peak hour would improve the function of the intersection. The left turn could be permitted at non-peak hours.

The northbound right-turn lane provides a negligible improvement, likely not cost effective given the very low volumes. The analysis also does not account for the queue blocking of the right-turn lane that will occur in the AM rush hour with 75 cars using the lane and in the PM rush hours with 225 vehicles entering the lane, making it very ineffective. The right-turn lane does not appear to be a good improvement alternative. See Table 2 for analysis results.

Mountain/12th St.

Two scenarios were modeled with SYNCHRO for the Mountain and 12th Street intersection. These are a split phase signal and adding left turn lanes on the north and south bound directions. The signal operation for a split phase signal would be changed so that the north and southbound lanes of 12th Street would operate independently. This has the advantage of allowing left turn movements continuously during the length of the green time on the signal. An analysis showed that providing split phase operations will significantly degrade operations (see Table 3). This primarily results from the low approach volumes and the impact of introducing a new phase. The new phase is timed to accommodate the pedestrian phase, which requires an extra 23 seconds or so. This additional time is translated to the other approaches, significantly increasing their average delay per vehicle. Given the volumes, this does not appear to be a viable alternative.

Table 3. 12th Street/ Mountain Analysis Results

AM Peak Hour

			Existing				With North-South Split Phase (90s)				With North-South LT Lanes			
Approach	Cycle Length	Volume	LOS	Ave Delay	Max v/c	95% Queue	LOS	Ave Delay	Max v/c	95% Queue	LOS	Ave Delay	Max v/c	95% Queue
Intersection	***60***		***B***	***17 s***	***0.70***		***D***	***46 s***	***0.91***		***B***	***15 s***	***0.65***	
EB Approach		310	C	24 s	0.70	175'	D	45 s	0.82	275'	B	20 s	0.65	150'
WB Approach		148	B	15 s	0.33	75'	C	27 s	0.40	125'	B	13 s	0.31	75'
NB Approach		260	B	10 s	0.35	100'	E	56 s	0.85	275'				
NB LT		9									A	10 s	0.04	25'
NB Th/RT		251									B	11 s	0.35	125'
SB Approach		505	B	16 s	0.67	250'	D	48 s	0.91	475'				
SB LT		56									B	11 s	0.13	50'
SB Th/RT		449									B	15 s	0.59	225'

PM Peak Hour

			Existing				With North-South Split Phase (90s)				With North-South LT Lanes			
Approach	Cycle Length	Volume	LOS	Ave Delay	Max v/c	95% Queue	LOS	Ave Delay	Max v/c	95% Queue	LOS	Ave Delay	Max v/c	95% Queue
Intersection	***60***		***B***	***19 s***	***0.77***		***E***	***65 s***	***1.00***		***B***	***18 s***	***0.72***	
EB Approach		218	B	20 s	0.54	125'	D	48 s	0.78	225'	B	17 s	0.5	125'
WB Approach		342	C	28 s	0.77	200'	E	63 s	0.94	350'	C	23 s	0.72	175'
NB Approach		579	B	17 s	0.73	275'	E	65 s	1.00	575'				
NB LT		23									A	9 s	0.06	25'
NB Th/RT		556									B	18 s	0.71	275'
SB Approach		309	B	11 s	0.43	125'	E	79 s	0.99	350'				
SB LT		21									B	11 s	0.12	25'
SB Th/RT		288									B	11 s	0.4	125'

All analyses conducted using Synchro 7.0, Synchro format.
"Existing" - Existing signal operations with an estimated cycle length.
"With North-South Split Phase" - A N-S split phase operation is analyzed. Cycle Length extended to 90 sec. No other modifications included.
"With North-South LT Lanes" - 75' North-South LT Lanes are added to the approach. No other modifications included.

Figure 4. Existing and Proposed Conditions on 12th Street/Mountain

A second scenario would provide new left turn lanes on northbound and southbound 12th Street and have the signal operate as a standard phased signal. Providing north and south left-turn lanes will reduce average delays and improve safety by providing refuge for left-turning vehicles and reducing blocking potential. A left-turn phase was not added, resulting in permitted only left-turn phasing. This will maintain the existing 2-phase operations which will result in better operations and safety. This appears to be a cost effective solution, especially if only restriping is required. See Figure 4 on the previous page for an exhibit of the existing and proposed conditions at Mountain/12th Street. The existing street width on 12 Street is 31 feet and the lanes can be restriped to 10 feet for the through lanes with a new 11 feet left turn lane.

MID BLOCK CROSSINGS

AASHTO's Guide for the Planning, Design, and Operation of Pedestrian Facilities states: "In most cases, marked crosswalks alone should not be installed within an uncontrolled environment when speeds are greater than 40 mph. Under certain circumstances, marked crosswalks may be used to supplement an existing or new traffic control feature. Research indicates that where crosswalk markings are used at uncontrolled crossing locations along multi-lane roads (i.e., roads with four or more lanes) on which traffic volumes exceed approximately 12,000 vehicles per day (vpd) with no raised medians, or exceed 15,000 vpd with raised medians that could serve as crossing islands, the potential for motor vehicle-pedestrian crashes increases". In addition, the FHWA publication Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations provides guidelines on locations for unmarked and marked crosswalks. Table 11 of the report is reproduced on the following page.

Mid-block crossings are desired by the neighborhood to facilitate crossing Lomas Boulevard and Mountain Road. The existing signals on portions of Lomas Blvd and Mountain Road are greater than the one-quarter mile spacing generally recommended for pedestrian crossings in order to create a maximum out-of-direction length of approximately two blocks one-way (one-eighth of a mile) for crossing pedestrians.

The proposed locations for mid-block pedestrian crossings are noted below.

Photo 3. Raised median at Lomas and 11th Street

Locations:

- Lomas Blvd between 6th and 12th (approximately 2100 feet). Lomas has 18,400 vpd between 6th and 12th. Between 11th and Keleher Avenue, a 15-foot raised median is located in Lomas that is of sufficient width to function as a pedestrian refuge. With the raised median, Lomas meets the location guidelines for a mid-block pedestrian crossing. The

mid-block crossings on Lomas should not be striped with a crosswalk, but a pedestrian refuge should be created in the median.

- Lomas Blvd at 14th Street to facilitate use of Bicycle Boulevard on 14th. The distance between 12th Street and San Pasquale is approximately 1940 feet. The distance from 12th Street to 14th Street is 665 feet. It is unlikely that the bike traffic from the Bicycle Boulevard will travel out of direction to 12th Street to cross Lomas. Due to the Bicycle Boulevard traffic, a mid-block crossing would be beneficial at this location.

- Mountain Road between 6th and 12th (approximately 2000 feet) at 7th. Mountain has 5400 vpd and has no raised median. This meets the AASHTO recommendations for a mid-block pedestrian crossing. Due to the lower traffic volumes at this location, Mountain Road could be striped with crosswalk striping.

Table 11. Recommendations for installing marked crosswalks and other needed pedestrian improvements at uncontrolled locations.*

Roadway Type (Number of Travel Lanes and Median Type)	Vehicle ADT ≤ 9,000			Vehicle ADT >9,000 to 12,000			Vehicle ADT >12,000–15,000			Vehicle ADT > 15,000		
	Speed Limit**											
	≤ 48.3 km/h (30 mi/h)	56.4 km/h (35 mi/h)	64.4 km/h (40 mi/h)	≤ 48.3 km/h (30 mi/h)	56.4 km/h (35 mi/h)	64.4 km/h (40 mi/h)	≤ 48.3 km/h (30 mi/h)	56.4 km/h (35 mi/h)	64.4 km/h (40 mi/h)	≤ 48.3 km/h (30 mi/h)	56.4 km/h (35 mi/h)	64.4 km/h (40 mi/h)
Two lanes	C	C	P	C	C	P	C	C	N	C	P	N
Three lanes	C	C	P	C	P	P	P	P	N	P	N	N
Multilane (four or more lanes) with raised median***	C	C	P	C	P	N	P	P	N	N	N	N
Multilane (four or more lanes) without raised median	C	P	N	P	P	N	N	N	N	N	N	N

* These guidelines include intersection and midblock locations with no traffic signals or stop signs on the approach to the crossing. They do not apply to school crossings. A two-way center turn lane is not considered a median. Crosswalks should not be installed at locations that could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices. Adding crosswalks alone will not make crossings safer, nor will they necessarily result in more vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g., raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions), as needed, to improve the safety of the crossing. These are general recommendations; good engineering judgment should be used in individual cases for deciding where to install crosswalks.

** Where the speed limit exceeds 64.4 km/h (40 mi/h), marked crosswalks alone should not be used at unsignalized locations.

*** The raised median or crossing island must be at least 1.2 m (4 ft) wide and 1.8 m (6 ft) long to serve adequately as a refuge area for pedestrians, in accordance with MUTCD and American Association of State Highway and Transportation Officials (AASHTO) guidelines.

C = Candidate sites for marked crosswalks. Marked crosswalks must be installed carefully and selectively. Before installing new marked crosswalks, an engineering study is needed to determine whether the location is suitable for a marked crosswalk. For an engineering study, a site review may be sufficient at some locations, while a more indepth study of pedestrian volume, vehicle speed, sight distance, vehicle mix, and other factors may be needed at other sites. It is recommended that a minimum utilization of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians) be confirmed at a location before placing a high priority on the installation of a marked crosswalk alone.

P = Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancements. These locations should be closely monitored and enhanced with other pedestrian crossing improvements, if necessary, before adding a marked crosswalk.

N = Marked crosswalks alone are insufficient, since pedestrian crash risk may be increased by providing marked crosswalks alone. Consider using other treatments, such as traffic-calming treatments, traffic signals with pedestrian signals where warranted, or other substantial crossing improvement to improve crossing safety for pedestrians.

SAFETY ANALYSIS OF MOUNTAIN FROM 1ST THROUGH 6TH STREETS

The most recent three years (2007 to 2009) of accident data was collected for the intersections of Mountain Road and 1st, 2nd, 3rd, 4th, 5th and 6th Streets from the Mid Region Council of Governments

(MRCOG). The table below shows the number of crashes, the volume of traffic on each road and a crash rate. According to MRCOG information, the average crash rate for intersections in the City of Albuquerque is 1.36 crashes per million entering vehicles (MEV). As shown in Table 4 on the following page, the crash rate at the intersections of 2nd and 3rd Streets are higher than the City average rate of 1.36 crashes per MEV.

The intersections of 4th, 5th, and 6th Streets are signalized with left turn lanes on Mountain. These intersections have crash rates that are less than the City average. One of the long-term recommendations (see Long Term Recommendations) is to add left turn lanes at 12th Street and Mountain. Although the left turn lanes on 4th, 5th and 6th Streets are east/west as opposed to the north/south left turn lanes proposed at 12th Street and Mountain, the crash rates at these intersections suggest that adding left turn lanes will not increase the crash rate to be higher than the citywide average. The higher than average crash rates at 2nd and 3rd Streets may be due to those streets being one-way which can cause driver confusion.

Table 4. Crash Rates for Safety Analysis

Intersection	Intersection ADT (vehicles per day)	# of Crashes	Crash Rate	Higher than City Average of 1.36 crashes per MEV (yes/no)
1st	6900	10	1.32	No
2nd	10800	24	2.03	Yes
3rd	10100	30	2.71	Yes
4th	15500	16	0.94	No
5th	12100	10	0.75	No
6th	12200	9	0.67	No
12th	15200	16	0.96	No

MULTI-WAY STOP ANALYSIS

It was requested that several intersections be evaluated for a multi-way (4-way) stop – 12th Street/ Roma, 12th Street/ Marquette, 15th/Roma/Laguna, and Luna/Marquette. The intersection of Luna/ Marquette is irregular with a small island that does not lend itself to a multi-way stop configuration. For this reason it was not analyzed for a multi-way stop. The *Manual on Uniform Traffic Control Devices* (MUTCD) contains guidance on the installation of multi-way stops. In order for an multi-way stop sign to be recommended, an engineering study should be conducted. The following criteria should be considered in the engineering study for a multi-way stop sign installation:

A. Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.

B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.

C. Minimum traffic volumes:

Photo 4. Intersection of Luna/Marquette

1. The vehicular volume entering the intersection from both directions of the major street approaching the intersection, consisting of the traffic entering the intersection from the street carrying the higher volume of vehicular traffic, averages at least 300 vehicles per hour for any 8 hours of an average day; and

2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from both directions of the minor street approaching the intersection, which consists of the traffic entering the intersection from the street carrying the lower volume of traffic, averages at least 200 vehicles per hour for the same 8 hours, with an average delay to the minor street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but

3. If the 85th percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volumes required to warrant a multi-way stop sign are 70 percent of the values provided in Items 1 and 2.

D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

Other criteria that may be considered include:

A. The need to control left-turn conflicts;
B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;
C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and
D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operations characteristics of the intersection.

The chart below shows how each intersection met the criteria stated above.

Criteria	12th Street/ Roma	12th Street/ Marquette	Roma/ 15th Street/ Laguna
A. As interim measure where traffic signal is warranted	No	No	No
B. 5 or more crashes in last year	Not met	Not met	N/A
C1. Minimum Volumes - **300 vehicles per hour (major street) for any 8 hours of average day (total of both approaches)**	Not met	Not met	Not met
C2. 200 combined vehicular, pedestrian and bicycle volume (minor street) for any 8 hours of average day (total of both approaches)	Not met	Not met	Not met
C3. If the 85th % speed exceeds 40 mph, than 70% of warrants in C1 and C2.	N/A	N/A	N/A
Other Criteria			
A. Need to control left-turn conflicts	No	No	No
B. Need to control vehicle/pedestrian conflicts	No	No	No
C. Needed due to obstructions in sight lines	No	No	Yes
D. Would improve traffic operations at intersection of two residential streets	Yes	No	No

Although none of the intersections meet the initial criteria pertaining to traffic volume, crashes and speeding, a stop sign at the intersection of 12th/ Roma may help area traffic operations by reducing cut-through traffic on 12th Street. There are currently no stop signs on 12th Street between Lomas and Marquette. Adding one at Roma would be consistent with the roadway grid and stop sign locations in the area. A stop sign at 12th/Roma approximately halfway between the two existing stop signs and could potentially slow traffic on 12th Street, which is a concern for the adjacent neighbors. The intersection of 15th Street/Laguna/Roma is a blind corner and would benefit from a stop sign to increase safety in the area.

PUBLIC INVOLVEMENT

Three public meeting have been held for this study at this time. The purpose of the meetings was to solicit input from the neighborhood on problems and concerns they might have about traffic in

the DNA and to keep the public informed of the study progress. In addition, at the second public meeting, long and short term solutions were presented to the traffic problems observed by the study team and brought up by the attendees of the first meeting. The third public meeting presented modifications to the long and short term recommendations based on input from attendees of the second public meeting.

FIRST MEETING

The first public meeting for the Downtown Neighborhood Area Traffic Study was held on September 15, 2012. The meeting was held in the conference room of the Mid Region Council of Governments (MRCOG) and was attended by approximately 60 people, including area residents, City of Albuquerque staff, and the District 2 City Councilor, Debbie O'Malley. Members of the consultant team were also present but are not included in this number. The meeting was an open house format that began at 8:00 am and ended at 12:00 pm.

The purpose of the meeting was to:

- Receive input from the public on traffic related concerns in the neighborhood.
- Keep the public informed of study progress and involved in the study.
- Provide information about why the study is being conducted.
- Provide information about data that has been identified and evaluated so far.

The meeting was an open house format that included displays for review along with the project team representatives to answer questions. Display boards presented included:

- Two Aerial maps of the study area with traffic signals and stop signs noted. Residents were asked to mark their address on one map and draw or write comments on the second map.
- Purpose, Summary of Data Collection and Timeline.
- Summary of Downtown Neighborhood Area Sector Plan transportation issues and goals.
- Speed and Traffic Volume Data.
- Turning Movement Data.
- Accident Data
- Traffic calming examples

Photo 5. Open House

All meeting participants were provided with a comment form and handout with information about the project. Attendees were able to provide written comments. The questions and comments are included in their entirety in Appendix A of this report. A general summary of comments made by the public at the meeting is presented below:

- Speeding on 12th Street
- Blind corner at Roma and Laguna
- Congestion at 12th and Mountain

- Congestion at 12th and Lomas
- Blind corner and speeding at 11th and Granite
- Comments both for and against the Central Road Diet
- Complaints about sidewalk disrepair on 14th Street
- Bikes crossing at 14th and Lomas have difficult time during peak traffic hours
- Speeding on 7th Street
- Parking on both sides of 7th Street makes street very narrow
- Speeding on Tijeras and Marquette in neighborhood areas
- Parking along Old Town Road makes street very narrow
- Speeding, cut-through traffic at Luna/Marquette

SECOND MEETING

The second public meeting for the Downtown Neighborhood Area Traffic Study was held on December 4, 2012. The meeting was held in the conference room of the Mid Region Council of Governments (MRCOG) and was attended by approximately 26 people, including area residents and City of Albuquerque staff. Members of the consultant team were also present but are not included in the attendance number. The meeting included a presentation with a question and answer session afterwards. The same presentation was given at 4:30 pm and at 6:00 pm to provide more opportunities for people to attend the meeting.

The purpose of the meeting was to:

- Receive input from the public on traffic related concerns in the neighborhood.
- Keep the public informed of study progress and involved in the study.
- Provide information about data that has been identified and evaluated so far.
- Provide information about possible short and long term solutions to neighborhood traffic issues.

In addition, display boards presented included:

- Aerial map of the study area with traffic signals and stop signs noted.
- Purpose, Summary of Data Collection and Timeline.
- Summary of Downtown Neighborhood Area Sector Plan transportation issues and goals.
- Speed and Traffic Volume Data.
- Turning Movement Data.
- Accident Data
- Traffic calming examples

All meeting participants were provided with a comment form and handout with information about the project from the presentation. Attendees were able to provide written comments at the meeting mail the comments to the City of Albuquerque or send their comments to the City in an email. The questions and comments are included in their entirety in Appendix A of this report. A general summary of comments made by the public at the meeting is presented below:

- Old Town Road – maybe make one way, which direction would be one-way?

- Add speed humps at Laguna, Roma and 15th Street
- Speed humps or closing off Granite/11th
- Add turn lanes to 12th/Mountain and 12th/Lomas
- Add traffic calming such as bulb-outs on 12th Street at Fruit, Roma, Marquette, and Tijeras.
- Add speed bumps on 12th Street
- Repair sidewalks and ramps on Laguna, Roma, and 15th Street.
- Add striping to delineate allowed street parking areas
- Add pedestrian crossing on Lomas
- Reclassify Tijeras and Marquette from arterials to collectors to discourage cut-through traffic
- Traffic from St. Mary's school
- Convert 12th and Mountain into 3-phase signal
- Remove parking from east side of 14th Street

THIRD MEETING

The third public meeting for the Downtown Neighborhood Area Traffic Study was held on June 5, 2014. The meeting was held in the conference room of the Mid Region Council of Governments (MRCOG) and was attended by approximately 18 people, including area residents and City of Albuquerque staff. Members of the consultant team were also present but are not included in the attendance number. The meeting included a presentation with a question and answer session afterwards. The presentation started at approximately 6:15.

The purpose of the meeting was to:

- Keep the public informed of study progress and involved in the study.
- Provide information about data that has been identified and evaluated so far.
- Provide information about the status of the recommended short and long term solutions to neighborhood traffic issues from the draft traffic study.
- Receive input from the public on the recommendations that were presented.

In addition, display boards presented included:

- Aerial map of the study area with traffic signals and stop signs noted.
- Purpose, Summary of Data Collection and Timeline.
- Summary of Downtown Neighborhood Area Sector Plan transportation issues and goals.
- Speed and Traffic Volume Data.
- Turning Movement Data.
- Accident Data
- Traffic calming examples

All meeting participants were provided with a comment form and handout with information about the project from the presentation. Attendees were able to provide written comments at the meeting mail the comments to the City of Albuquerque or send their comments to the City in an

email. The questions and comments are included in their entirety in Appendix A of this report. A general summary of comments made by the public at the meeting is presented below:

- Lomas striping – who implements the petition? How do you get the property owners signatures?
- City should be able to stripe road where necessary, petition shouldn't be required.
- Laguna/Roma
  - Add rumble strips
  - Maybe a raised median could be used
  - May need a stop sign at 15th/Roma
- "One-Way" on Old Town Road will increase speeding
- Lomas/14th – there are bad sidewalks north of Lomas, not just south.
- 14th Street – maybe paint bike crossing on Lomas with purple paint to delineate – like it recommends in Sector Plan.
- There is a speeding problem in Marquette.
- Sidewalks – where does the money come from? Benton is looking for funding.
- 14th Street – should stop signs be changed so bike boulevard has right-of-way? Or maybe change stop signs to 4-way.
- Lots of discussion about project hiatus – people wanted to know the reasons, who was responsible, if it could happen again, etc. Isaac Benton and Tom Menicucci responded to concerns.
- Roma/12th Street – if a stop sign is added, the queue at the stop sign might block driveways.
- 11th Street south of Lomas has a speeding problem.
- Vague recommendations in the report should be clarified.
- I have concerns about the intersection of 15th and Roma and the blind corner on Laguna that turns into Roma. Also, the elimination of stop signs at 14th and Roma concerns me as I have a house on the corner and see the need for a stop sign at this intersection.
- Concerns about changes at I-40.

RECOMMENDATIONS

The recommendations have been divided into two categories – short term and long-term. Short-term recommendations are those than can be done in a shorter time frame using readily available funds. Long-term improvements typically cost more and will require the acquisition of funding from additional sources.

SHORT TERM

1. **Speed hump on 12th Street between Marquette and Roma.**
   Speed humps are located on 12th Street south of Lomas on all the major blocks except between Marquette and Roma. Adding a hump here would be consistent with the rest of 12th Street and keep motorists from speeding through this section of 12th Street.

Photo 6. Double yellow stripe on Marquette near 13th Street

2. **Paint white line where parking is allowed on west side of 12th Street**
   Parking is allowed on the west side of 12th Street between Lomas and Tijeras. However, it is not obvious and a white stripe would make the parking lane more apparent. This would also have the effect of visually narrowing the lane which could slow traffic in the area.

3. **Add a 4-way stop sign at 12th/Roma**
   A 4-stop at 12th Street and Roma may help with operations and reduce cut-through traffic on 12th Street in this location

4. **Marquette between 12th and 14th – remove double yellow line, allow parking.**
   Marquette between 12th and 14th is a residential street and the double yellow line is not appropriate. The double yellow appears to indicate the street is a major thoroughfare and removing the line would help indicate the residential status of the street. In addition, parking should be considered on one or both sides of the street.

Photo 7. Blind corner at 11th Street and Granite

5. **Add rumble strips and signing on 11th Street at 90 degree corner with Granite.**
   The sharp corner at 11th Street and Granite is used as a cut-through route from Mountain. As such, motorists speed through the corner and have run

over curbs. Providing signing and two rumble strips prior to the corner, one on 11th and one on Granite would potentially slow down traffic and make the corner safer.

6. **Repair sidewalks on 14th and 15th Streets south of Lomas**
   The City of Albuquerque currently has a project to repair the broken and missing sidewalk sections on 14th and 15th Streets north of Lomas, but does not have such a project planned for the area south of Lomas. South of Lomas, both streets have many broken or missing sidewalk segments. A new project for south of Lomas to repair the sidewalks would improve the pedestrian accessibility of this area of the Downtown Neighborhood.

7. **Add "No Parking" sign on south side of Roma between 7th and 8th.**
   Roma between 7th and 8th Streets is narrow and vehicles parking on the street make it difficult for two-way traffic and reduce visibility for motorists leaving residential driveways. Eliminating parking on the street would allow the street to function in a safer condition.

8. **Add speed limit signs on 7th between Lomas and Mountain**
   Adding speed limit signs would remind motorists of the speed limit and potentially slow down speeders on the street.

9. **Reclassify Marquette and Tijeras – no longer function as principal and minor arterials in the Downtown neighborhood.**
   East of 6th Street, Marquette and Tijeras should be reclassified on the Metropolitan Area Long Range Roadway System map as residential streets instead of collector and minor arterials, respectively. This area is residential with narrower street sections and neither street functions as a collector or arterial.

10. **Delineate allowed parking on Lomas Blvd with white striping.**
    On-street parking is allowed on Lomas Blvd but many people do not realize it. Striping would make the parking locations more obvious. This would also have the effect of narrowing the seemingly wide outside lanes and potentially slowing down traffic.

11. **Add double yellow center stripe at blind corner of Laguna/Roma.**
    Vehicles turning from Laguna to Roma or Roma to Laguna frequently make a wide turn and infringe of the lane for oncoming traffic. A double yellow stripe would indicate to cars to stay on the correct side of the street and increase safety at the blind corner. Other options for this corner consist of adding a stop sign at 15th/Laguna/Roma in advance of the blind corner and adding traffic delineators to further separate traffic at the corner. Any improvements need to take into account the intersection with the alley that extends north and not prevent turns to or from the alley.

12. **Sign Old Town Road adjacent to Tiguex Park as "One Way"**
    Old Town Road adjacent to Tiguex Park is used for parking by park users. This makes the road very narrow and difficult for cars traveling in opposite directions to pass each other.

On-street parking is necessary in this area due to the limited availability of parking near the park. Signing the street as one-way may allow the street to function in a safer manner as only one lane would be necessary in addition to the on-street parking.

The estimate cost for each short term improvement is listed in Table 5 below.

Table 5. Short Term Improvements Costs

Item	Improvement	Cost
1	Speed hump on 12th between Marquette and Roma	$3,000
2	Paint white stripe on 12th Street	$1,400
3	Add 4-way stop on 12th/Roma	$300
4	Remove double yellow line on Marquette between 12th and 14th Streets	$1,200
5	Speed humps on 11th and Granite at 90° corner	$5,700
6	Repair sidewalks on 14th and 15th Streets, south of Lomas	$114,000
7	Add "No Parking" sign on south side of Roma between 7th and 8th Streets	$300
8	Add speed limit signs on 7th between Lomas and Mountain	$900
9	Reclassify Marquette and Tijeras to collector streets instead of principal and minor arterials	N/A
10	Delineate parking on Lomas with striping (between Central and 7th)	$12,000

11	Add double yellow stripe at Laguna/Roma, add stop sign at 15th/Laguna/Roma, add traffic delineators	$2500
12	Add "One Way" signs on Old Town Road	$800

LONG TERM

1. **12th Street/Mountain Road – add north and south-bound left turn lanes on 12th Street**
   In the section of the DNA Sector plan on Transportation Issues, the intersection of 12th Street and Mountain Road is mentioned. The Sector Plan questions whether a left turn lane can be added at this location. The intersection was analyzed and there is room to stripe northbound and southbound left turns on 12th Street, which will improve the intersection operations. The existing street width on 12 Street is 31 feet and the lanes can be restriped to 10 feet for the through lanes with a new 11 feet left turn lane.

2. **12thStreet/ Lomas Blvd – Add dedicated left turn signal for southbound to eastbound left during peak times.**
   Currently, there is a left turn lane on southbound Lomas at 12th Street but no dedicated arrow at the signal. During peak times the traffic on Lomas is heavy enough to cause long queue times for motorists trying to turn left from southbound Lomas. Analysis of the intersection indicates that a protected left turn signal during AM peak hours would improve the intersection operations. During non-peak hours the intersection would function as a permissive, not protected, left turn for maximum efficiency.

3. **Add bicycle crossing at 14th Street.**
   14th Street is labeled as Bicycle Boulevard on the City of Albuquerque Bike Map, but there is no crossing at Lomas Blvd. One option for the signage and striping of the crossing is shown in Photo 7. This has been used recently in other locations by the City of Albuquerque.

Photo 7. Bike Striping and Signage at Silver/University

4. **Add mid-block pedestrian crossing on Lomas near Keleher with crosswalk and signing.**
   The crossing could consist of modifications to the existing median in Lomas to allow for a pedestrian refuge area and handicap ramps installed on either side of the crossing. No crosswalk striping would be added.

5. **Add bulb-outs and neighborhood signs for traffic calming at entrance to neighborhood on 12th Street, Marquette, Roma and Tijeras.**
   Curb bulb-outs at the entrance to the neighborhood would alert motorists that the area is residential in nature and slower speeds are required. In addition, notifying motorists of the residential nature of the streets could reduce cut-through traffic.

6. **Consideration to close off 11th Street at Mountain Road.**
   One recommendation presented to the public was to close off 11th Street at Mountain Road to prevent cut-through traffic and speeding through the blind corner at 11th Street and Granite. There is presently not enough ROW to create a turn-around area at the end of 11th Street. Right-of-way needs to be acquired to implement this recommendation.

7. **Complete Streets study/plan for Lomas Blvd.**
   A separate Complete Streets study/plan for Lomas Blvd should be initiated that takes into account current traffic conditions and neighborhood changes. The study/plan should look at streetscape schemes that incorporate landscaping, pedestrian access, bicycle facilities, transit facilities, and on-street parking.

8. **Delineate allowed parking on Lomas Blvd with curb bulb-outs.**
   This would further delineate the allowed on-street parking on Lomas Blvd. The curb bulb-outs would also allow pedestrians a refuge and reduce the street width making pedestrian crossings safer.

9. **Add mid-block pedestrian crossing on Mountain between 6th and 12th with crosswalk and overhead signing.**
   Crosswalk striping and handicap ramps would be installed on either side of the crossing location.

The estimated cost for each long term improvement is listed in Table 6 on the next page.

Table 6. Long Term Improvement Costs

Item	Improvement	Cost
1	12th Street/Mountain Road – Add north and south-bound left turn lanes on 12th Street	$6,300
2	12th Street/Lomas – Add dedicated left turn signal for SB to EB left turns	$3,800
3	Add bicycle crossing at Lomas and 14th Street	$8,200
4	Add mid-block pedestrian crossing on Lomas near Keleher	$6,600
5	Add bulb-outs and neighborhood signs at entrance to neighborhood at 12th Street, Marquette, Roma, and Tijeras	$3200 (Each)
6	Consideration to close off 11th Street at Mountain Road	
7	Complete Streets Study/Plan for Lomas Blvd	$60,000
8	Delineate allowed parking on Lomas with bump-outs	$96,000
9	Add mid-block pedestrian crossing on Mountain between 6th and 12th Streets	$6,700