LOS LUNAS
TRANSPORTATION STUDY

Phase 1 Report

Project Number: LL301-11.s20

October 2003

Submitted to:

The Village of Los Lunas

Submitted by:

MOLZEN-CORBIN & Associates

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TRANSPORTATION STUDY

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INTRODUCTION

I
INTRODUCTION, PURPOSE, AND OVERVIEW

Project Introduction

The Village of Los Lunas and Valencia County have experienced a great deal of growth in the last decade. The Village of Los Lunas (the Village) also plays a primary role in the transportation of the region because it functions as a gateway for many Valencia County residents east of the Rio Grande; it contains one of the few Valencia County bridge crossings over the river.

With that growth has come increased traffic and traffic congestion. Main Street (New Mexico 6) through the heart of the Village presently serves from about 19,000 to almost 28,000 vehicles per day with a very restricted right-of-way. Congestion, largely when the schools release for the day, has been a regular occurrence on this major roadway in the recent past. This is most evident at the intersection of Main Street and NM314.

Village officials have been very proactive in planning for the future transportation needs of the Village. As another part of that planning, the Village in January 2003 commissioned Molzen-Corbin & Associates to conduct a Village-wide transportation study. This report summarizes the findings in Phase 1 of this Study.

Project Purpose

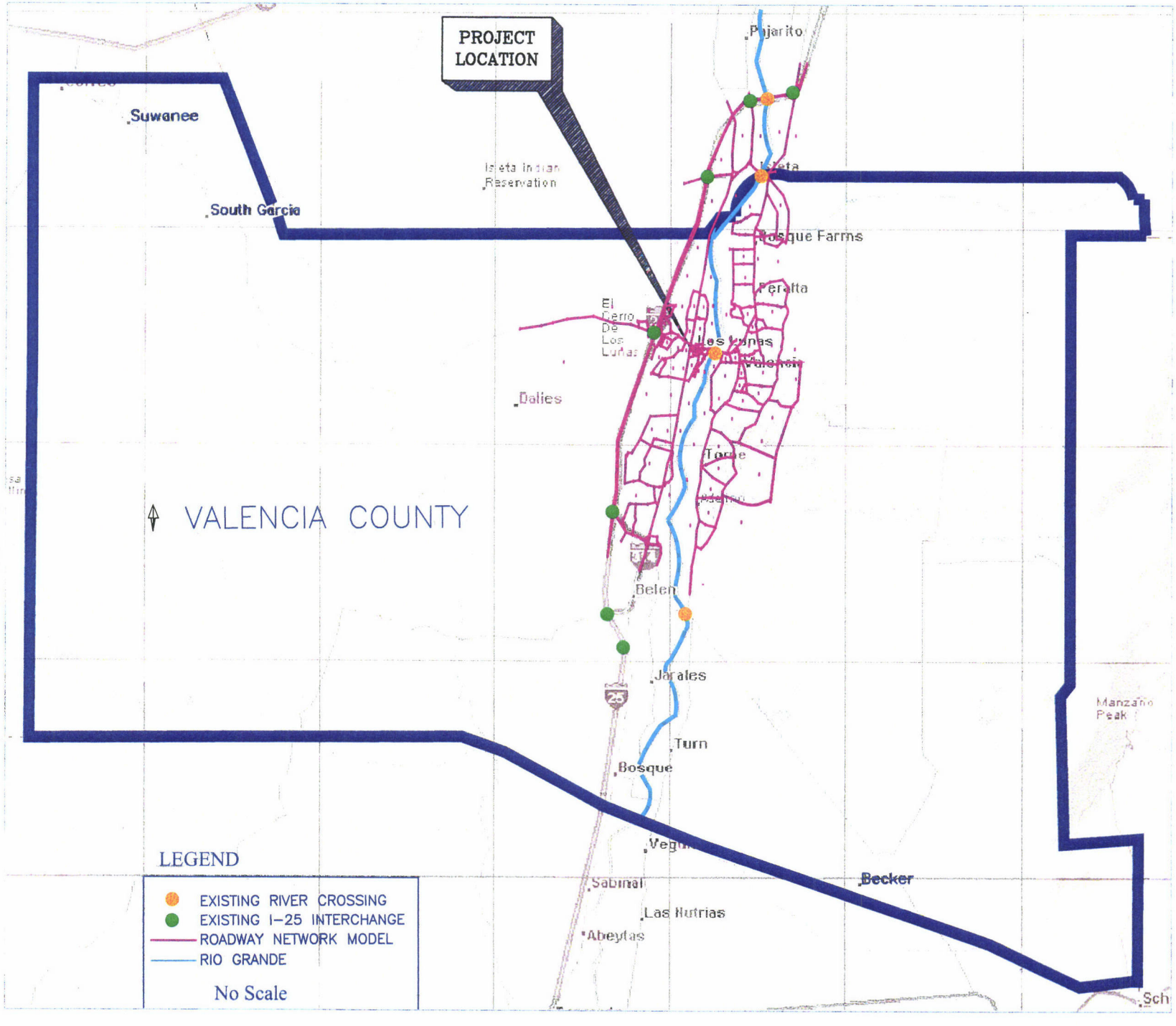
The overall purpose of the Comprehensive Transportation Study is to provide planning level information and recommendations for the roadway transportation capacity issues in the Village of Los Lunas for the next 20 years.

A roadway traffic computer model, called TMODEL, is at the heart of this effort. This computer model at Phase 1 shows the existing roadway system with existing traffic demand. After Phase 2 the model will show the existing roadway system with traffic demand at 20-years in the future, the effects on traffic demand of specific improvements to the existing system, and the effects on traffic demand of specific major improvements in the future. The other useful feature of this model is future flexibility. If land-use projections, population projections, or development locations change in the future from forecasts, the model can be updated with the changes and used to reevaluate the roadway transportation needs of the community. It should be noted that the Phase 1 computer model of existing conditions will be further refined during Phase 2 even though it currently exceeds statistical benchmark minimums for computer traffic modeling.

Figure I-1 shows the network model of the existing system within the Valencia County area. Figure II-1 shows a more detailed view of the existing system model.

Figure I-1

Study Vicinity Map



Project Overview

The study is divided into two phases. Phase 1 is primarily for gathering data and developing the base traffic model. Phase 2 is developing projections for future traffic demands, analyzing the system for capacity deficiencies, and developing improvement concepts to reduce or eliminate those deficiencies. This report summarizes the work in Phase 1. This work has consisted of:

1. Obtaining traffic counts on the existing roadway system of the Village and at key locations outside of the Village. These counts were intersection counts, tube counts, and a license plate study at key locations. The counts allow the computer model to get a snap-shot of the existing roadway network. This provides for proper calibration of the model.

2. Obtaining other pertinent information required for the computer model and subsequent analyses. This information included land-use, population, existing network characteristics (posted speed, number of lanes, etc.), planning documents created by other governmental agencies, accident data, and other pertinent information.

3. Developing the computer model for the existing roadway network. This required the input of the required information acquired above to initially build the model. The model was then calibrated to the existing traffic conditions so that it currently represents the present traffic demand characteristics of the Village. During Phase 2, the model of the existing system will be further refined in conjunction with the forecast model.

4. Providing the TMODEL Software and initial training. Personnel from the Village, Molzen-Corbin, and other possible entities will be trained this fall on the inputs and general behavior of the computer model.

5. Preparing a Phase 1 Summary Report (this report) and providing a Phase 1 Summary Public Meeting to explain the progress of the study and to receive additional public feedback, comment, and information. This meeting is anticipated to occur in November 2003.

The work in the upcoming Phase 2 of this study will consist of:

1. Assessing the capacity of the existing roadway network under existing traffic loads and locating deficiencies. This effort will also use existing accident data.

2. Evaluating the existing criteria for roadway classification and recommend adjustments if needed.

3. Developing recommendations for improvements to the existing system and associated costs for planning purposes. These improvements, for example, could be additional lanes, left-turn bays, right-turn bays, improved signal timing, etc.

4. Developing projections of traffic demand on the existing roadway network 20-years in the future. The roadway traffic computer model will be used in this effort. Future population projections, future land-use projections, and other pertinent information will be used in this effort.

5. Assessing the capacity of the existing roadway network under future traffic loads and locating deficiencies. This effort will also use existing accident data.

6. Developing recommendations for improvements to the existing system at 20-years in the future. Again, costs at a planning level will be provided. These improvements, for example, could be additional lanes, new facilities, left-turn bays, right-turn bays, improved signal timing, etc.

7. Developing major route recommendations to reduce deficiencies in the roadway network at 20-years in the future. This will involve analyzing the deficiencies in the traffic network already found above and determining, through use of the computer model, whether or not a new traffic route would be beneficial. This effort could, for example, provide information on the impact of a new east-west arterial on the existing roadway network. This would also include improvement costs at a planning level.

8. Combining the above recommendations and prioritizing them to allow the Village to plan for the design and construction of improvements in the future.

9. Preparing a Phase 2 Summary Report providing the recommendations developed above.

10. Providing additional TMODEL training. Personnel from the Village and Molzen-Corbin will be trained on additional features of the network model to allow model manipulation in the future by local personnel.

11. Providing a Final Public Meeting to explain the results of the study.

The purpose of the recommendations and costs in this study will be to provide a planning and budgeting tool for the Village of Los Lunas. Therefore, the improvements mentioned above will be described in general terms with associated costs. The improvements will still need to go through the engineering design process for final configurations and costs. Any recommendations for major new roadways will not include the detail of a corridor study. The information will be only for general location and scope of needed improvements.

Intergovernmental Coordination and Cooperation

Because the traffic model area is influenced by so many different governmental agencies, we intend to keep governmental agencies in the primary study area aware of our efforts. In addition to the Village of Los Lunas, we have already met with Mid-Region Council of Governments (MRCOG) to discuss the study and to coordinate our efforts with their transportation planning for the area. We have also informed the New Mexico Department of Transportation (NMDOT) of the study. During phase 2 we intend to coordinate further with the NMDOT and MRCOG and to initiate coordination with Valencia County and Los Lunas Public Schools as well as others as needed.

Project Study Area

The project study area is broken into two categories:

- The Roadway Network Computer Model Study Area
- The Traffic Report Study Area

The Roadway Network Computer Model Study Area is described in Section IV and shown in Figure II-1. This study area extends from just I-25 to the north, just north of Belen to the south, the Village Limits to the west, and the Manzano Expressway to the East. The extent of this study area was dictated by the potential traffic impacts on the Village of the surrounding area. Therefore, the potential impacts dictated that this study area extend well beyond the Village limits.

The Traffic Report Study Area, on the other hand, is primarily within the current Village Limits. This area, described in Section III, is a subset of the Roadway Network Computer Model Study Area and is the area of the detailed intersection analyses, level of service analyses, and accident analyses. This latter study area was restricted to the approximate Village Limits as this study is for the primary benefit of the Village of Los Lunas, and it is not meant to be a detailed analysis of northern Valencia County.

Phase 1 Report

The remainder of this report consists of the following:

- Section II-Data Gathering
- Section III-Traffic Report
- Section IV-Traffic Network Modeling
- Section V-Initial Findings and Phase 2 Efforts

LOS LUNAS
TRANSPORTATION STUDY

PHASE 1 REPORT

II
DATA GATHERING

II
DATA GATHERING

Introduction

In order to properly evaluate the transportation system in the Los Lunas area, a great deal of information needed to be gathered. Some of the information is for use in the computer traffic model, some of it is for use in capacity analyses, and some of it is for use in other analyses including accident analyses and signal timing analyses. The following paragraphs discuss briefly the type of information collected for Phase 1 of this transportation study.

Traffic Counts

Traffic counts are vital to the building of the roadway network model and the analysis of the operational capacity of the roadway system. For this study, two types of counts were conducted. First, tube counts were conducted at major locations along the roadway network. These counts were conducted over several weeks beginning in late February 2003 and ending in mid-March 2003, prior to the Spring Break for the Los Lunas Public Schools. The counts provided traffic volume in each direction in 15 minute intervals for a minimum of 48 hours. The counts also provided information on speed of vehicles and number of trucks verses cars. Furthermore, these counts were only conducted on Tuesdays, Wednesdays, and Thursdays to avoid the volume distortion that can occur with Monday and Friday traffic. The locations of these counts are shown in general terms in Figure II-1. Due to the large number of counts taken for this model, the raw data from the counts will not be reproduced within this report, but is available for inspection at the offices of Molzen-Corbin & Associates. These counts were used to develop peak hour volumes and average weekday traffic. The peak hour volumes were used for the roadway network computer model as well as for capacity analyses. The average weekday traffic is used for roadway classification, roadway priority, and future pavement design. Summaries of this information are shown in Section III, Traffic Report, of this document.

The second type of count conducted was intersection counts. These intersection counts were conducted at major locations within the roadway network. The intersection counts were taken during the same time period as the tube counts to provide consistency between counts. An intersection count provides the number of cars and trucks that make various turning and thru movements at the intersection counted. This information provides peak turning movement information needed to analyze the capacity of a particular intersection. The locations of these counts are shown in Figure II-1. These counts, unlike the tube counts, are done for a nine-hour period. The nine hours is usually spread out throughout a 12-hour period to be able to capture the traffic at peak times during the morning peak, mid-day peak, and late afternoon peak. For this study, the times of the intersection counts were adjusted to fit the particular characteristics of the traffic peaks in Los Lunas. The times used for this study were:

- 6:30 am to 9:30 am
- 11:45 am to 1:15 pm

- 2:00 pm to 4:00 pm
- 4:30 pm to 7:00 pm

The times were adjusted for schools, especially release time, and for the extended early morning and the late afternoon/evening commute. These counts were done by manual counts and the breaks in the counts were to allow breaks for those individuals counting. The counts were conducted after the openings of both the new Home Depot and Wal-Mart near I-25 and Main Street. Summaries of this information are shown in the Sections III and IV of this document

License Plate Survey

A license plate survey was also conducted for this transportation study to be able to provide improved information about the number of vehicles that pass through the Village limits without any major stops. The license plate survey, done from 3:15 pm to 6:15 pm on Wednesday, 5 March 2003, was conducted at the following five primary entrance and exit points to the Village:

- NM314 north at the approximate north Village limit
- NM314 south at the approximate south Village limit
- NM6 just east of Interstate 25
- NM47 north near the Valencia Road intersection
- NM47 south just south of NM263

A summary of the results of this survey is shown in Section III of this document.

The license plate survey was conducted by writing down the license plate number, or specified fraction thereof, of vehicles passing each point in each direction, entering and leaving the Village. The time of the sighting was also recorded for each plate. The plate information was then entered into spreadsheets and entered into a program from T-Model Corporation that matches an in-coming plate with an out-going plate, the locations of the sightings, and the time differential between the two. This information is then used to determine if a vehicle was passing through the Village without a major stop, entering the Village as its primary destination, leaving the Village, or passing through the Village with major stops. This information is primarily for use in the computer traffic modeling efforts.

For example, if a plate is read at NM6 and I-25 entering the Village at 4:00 pm and the same plate is read exiting the Village at NM47 and Valencia Road at 4:15 pm, it is a fair assumption that the vehicle did not have a major stop within the Village. Similarly, if a plate is read at NM6 and I-25 entering the Village at 4:00 pm and the same plate is read exiting the Village at NM47 and Valencia Road at 6:00 pm, it is a fair assumption that the vehicle had a major stop somewhere within the Village.

License plate surveys will only assess a representative sample of the vehicles entering and leaving the Village. With current common practices it was impossible to write down every plate that passed a point with the large volumes present on the major entrance/exit roads of the Village.

Land Use Data

Land use and population data is vital to the success of the computer traffic model process. For this study we obtained population, dwelling types, employment and employment types, and student populations for various zones. This information was initially obtained from the Mid-Region Council of Governments (MRCOG) for the zones that are used in their traffic modeling. From that point we refined the information from MRCOG using updated school populations, employment data from major new employers (Wal-Mart, Home Depot, etc.), data from the 2000 United States Census blocks, and consultation with Village officials to adapt the data for the numerous smaller zones that are used in this study. The smaller zones should provide more accurate representation of the traffic in the area as well as provide for a more detailed result of impacts in the future.

Existing Transportation System Evaluation

The existing roadways that are part of the computer traffic model were inventoried for capacity analyses and for inclusion into the computer traffic model. The evaluation consisted of number of lanes, lane widths, and roadway posted speeds among other items.

Public Meetings

A public meeting will be held in conjunction with this Phase 1 Report to be able to obtain input from the residents of the area about the traffic problems, problem locations, problem times, and suggestions. This meeting is scheduled for November 2003. A public meeting will also be conducted at the end of Phase 2 to provide the community with the findings of the study and to receive feedback on the findings.

Numerous Site Visits and Field Inventories

Another part of the information gathering was numerous site visits by various members of the study team to evaluate aspects of the computer traffic model and to gather traffic information in a first-hand manner. Some of those site visits were also used in preparing field inventories of existing conditions such as locations of access points and lane information. An effort was made by some study team members to drive on Main Street several times at about the same time the schools were releasing to be able to better assess the difficulties along Main Street and at the intersection of NM314 and Main Street.

Local Consultation

Discussions were held several times with members of Village staff to provide local insight into the traffic problems the Village currently faces. Also, because Molzen-Corbin has had a long term engineering relationship with the Village and several employees of the firm also live in Los Lunas, various Molzen-Corbin employees who are not on the study team were consulted about traffic and traffic problems in the area. More local input will also be received during the public meetings and throughout the Phase 2 analysis.

Accident Data

Accident data was also gathered and is shown in Section III of this document. Accident data gathered shows the location, time, and type of accident (rear-end collision, etc.). This information is vital to the assessment of the safety of particular areas and is often relied upon by the state and federal agencies to determine if traffic signals or other improvements are warranted. Additional accident data only gathered by the Village of Lunas Police Department was not yet fully received at the time of this report but will be included in the Phase 2 analysis.

Other Information

Other information was gathered for this study through a literature search of pertinent reports and documents. For example, the River Crossing Corridor Study done for the State Highway Department was obtained to provide any needed background information.

LOS LUNAS
TRANSPORTATION STUDY

PHASE 1 REPORT

III
TRAFFIC REPORT

III
TRAFFIC REPORT

Introduction

As part of the Los Lunas Transportation Study, a traffic study was conducted by HDR Engineering, Inc. to provide additional traffic engineering services outside of the capabilities of the traffic network computer model. For Phase 1 these services included descriptions of major street system facilities, analysis of the traffic count data to provide daily average volumes and peak hour volumes, traffic signal analysis, and traffic operations analysis. The following is the Traffic Report prepared by HDR Engineering, Inc.

Existing Transportation System

The existing transportation system was evaluated in order to assess the operational adequacy of the roadway network. In the process of developing recommended improvements to the existing roadway network, several measures of effectiveness were considered, including operational characteristics and geometric configurations of roadways and intersections. Data for the existing network was obtained from the Village of Los Lunas, New Mexico Department of Transportation (NMDOT) records, traffic counts, license plate survey and field inventories. The results of these efforts are summarized in this section.

Study Area Network

The study area for this traffic report includes the Village limits and immediately adjacent roadways and intersections as shown in Figure III-1. The study focuses on the major streets system including the roadways shown in Table III-1. The key intersection locations that were counted and analyzed in the study area are listed in Table III-2. The number and type of lanes on the approaches to the intersections are shown in Figure III-2.

Table III-1
Description of Major Street System Facilities

Major Street	Type of Facility	Functional Classification *	Posted Speed Limit
NM 6 (From I-25 west to Village Limits)	4-lane, divided / 2-lane, undivided	Rural 2-Lane Highway	60/45 mph
Main Street (NM 6) (From I-25 east to NM 47)	4-lane, w/ center turn lane	Arterial (varies Class I, II, III, IV)	45/40/35/30 mph
Emilio Lopez Road	4-lane / 2-lane	Collector	30/20 mph
Camelot Boulevard	2-lane, undivided	Collector	30/20 mph
Grant Boulevard	2-lane, undivided	Collector	20 mph
Los Cerritos Road	2-lane, undivided	Collector	30 mph
Canal Boulevard	2-lane, undivided	Collector	20 mph
Don Pasqual	2-lane, undivided	Collector	25 mph
Sichler Street	2-lane, undivided	Collector	30 mph
NM 314 (north of Main Street)	4-lane, undivided / 2-lane, undivided	Arterial (varies Class I, II, III, IV)	30/35/45/55 mph
NM 314 (south of Main Street)	4-lane, undivided	Arterial (varies Class I, III)	35/45/55 mph
Luna Avenue	2-lane, undivided	Collector	20 mph
Don Diego Street	2-lane, undivided	Collector	20 mph
Los Lentes Road	2-lane, undivided	Collector	30 mph
Carson Drive	2-lane, undivided	Collector	20 mph
Aspen Drive	2-lane, undivided	Collector	20 mph
Morris Road	2-lane, undivided	Collector	30/35 mph
Interstate 25	4-lane, divided	Freeway	75 mph
Griego Road	2-lane, undivided	Collector	30 mph
Trujillo Road	2-lane, undivided	Collector	25 mph
Tondre Road	2-lane, undivided	Collector	25 mph
NM 263	2-lane, undivided	Collector	35 mph
NM 47	4-lane, undivided	Arterial Class I	45 mph
Lujan Road	2-lane, undivided	Collector	30 mph
Valencia Road	2-lane, undivided	Collector	30 mph

Note: "*" Denotes Functional (Link) Classification for Use in T-MODEL (see Section IV – Traffic Network Modeling for a detailed description of the T-MODEL Functional Classifications).

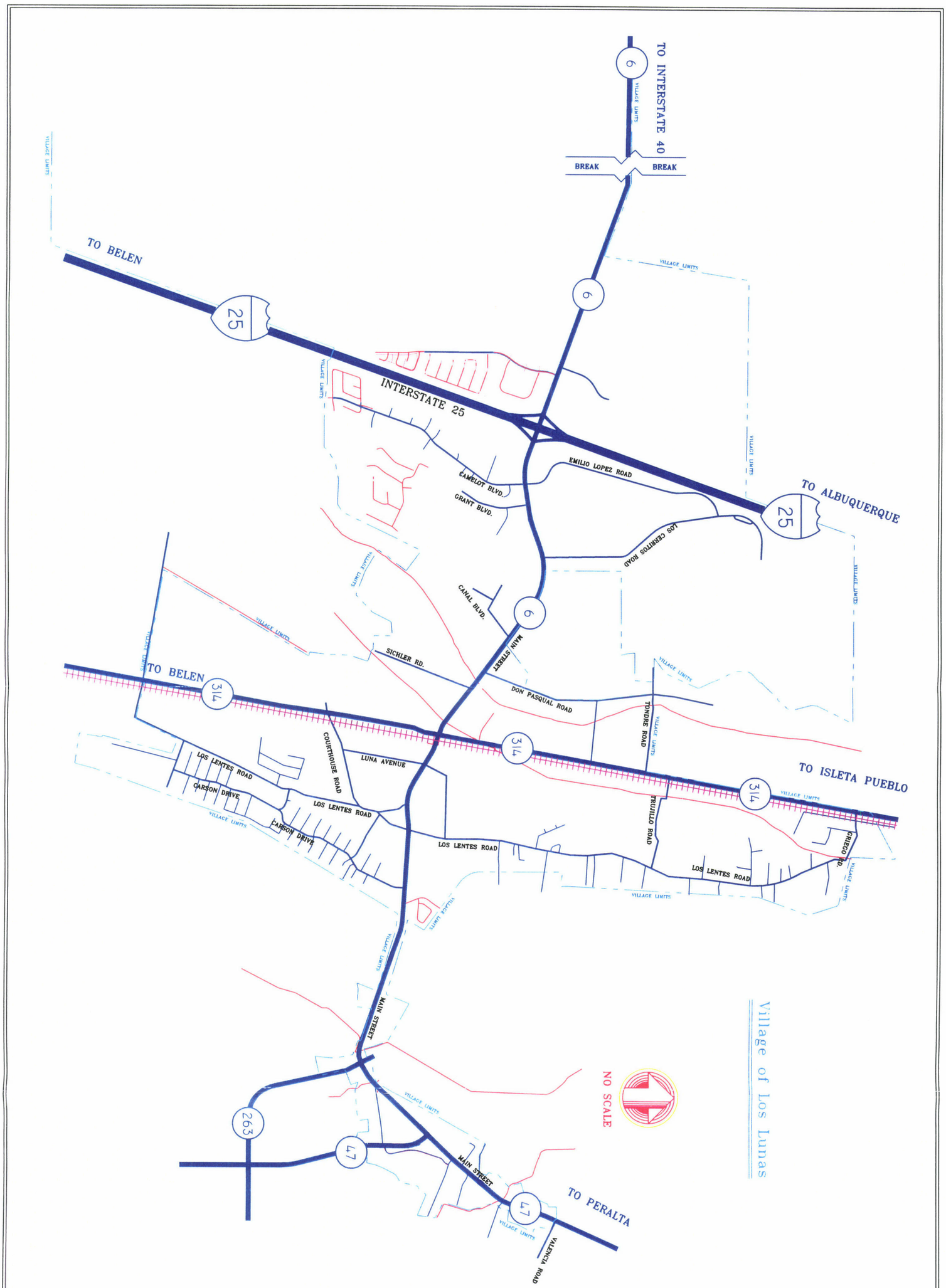


FIGURE III-1
PROJECT STUDY AREA MAP

VILLIAGE OF LOS LUNAS TRANSPORTATION STUDY
VALENCIA COUNTY
LOS LUNAS, NEW MEXICO

REV NO	REV DATE	DESCRIPTION

PROJECT NO: 00000000001143
DESIGNED BY:
DRAWN BY:
CHECKED BY:
PROJECT DATE: JULY 2003

HDR, Inc.
2155 Louisiana Blvd., N.E.
Suite 9500
Albuquerque, NM 87110
Phone (505) 884-6065
Fax (505) 884-5989

Existing Street Functional Classification

The functional classification of roadways forms the framework of the transportation system and defines its function and use related to access and mobility. Design and operational parameters, such as roadway capacity and posted speed limits, are designated relative to the roadway functional classification. A hierarchy of roadway classification, consisting of *Local Streets, Collectors, Arterials* and *State* facilities, was established to serve the transportation needs for the Village of Los Lunas, as described below.

Local Streets. The purpose of local streets is to provide access to adjacent land uses. Local streets account for the highest number of lane-miles in a roadway network but carry the lowest volume of traffic. They are typically designed to discourage through traffic while providing access from properties to the roadway network via collector streets. These base level facilities were not analyzed in the study, as their purpose is to provide access and not traffic mobility.

Collector Streets. These facilities serve as intermediate links between local and arterial streets, serving both access and mobility needs. Their primary function is to collect local traffic from adjacent neighborhoods and transport traffic to the arterials where the lengthier trips are made. Some collectors are discontinuous; however, they provide good connectivity to the arterial streets.

Arterial Streets. Mobility is the main purpose of an arterial street. While they serve a secondary function of access to properties along the corridors, their primary function is servicing the most traffic; therefore, arterials typically have the most lanes and higher speeds in order to provide greater capacity.

State Highways. State highways in the project area function as arterials for travel on a more regional scale. These roadways serve as primary routes for longer trips into and out of the study area. They carry high traffic volumes and are higher type designs. All of the state highways in the Village of Los Lunas except I-25 (i.e., NM 6, NM 47, NM 314, and NM 263) serve as arterial streets in terms of their function, while I-25 is a freeway with a high capacity and no access within the Village except for the NM 6 (Main Street) interchange.

Inventory of Existing Conditions – State Highways / Arterials

A brief description of the major street system facilities is shown in Table III-1; a more detailed description of select roadways is shown in the following paragraphs. Additional details for the study area roadways and intersections can be found in the remaining sections of this report, including traffic volumes, number of accesses, accident frequency and severity, and capacity analyses.

NM 6 (Main Street)

West of I-25 to west Village limits: Beginning at the southbound exit / entrance ramps and extending west past the intersections with Desert Willow, Los Morros, and Sand Sage Roads, this segment of NM 6 has two driving lanes in each direction with center turn lanes and acceleration / deceleration lanes at most driveway and intersection locations. To the west of Sand Sage Road, NM 6 becomes a two-lane highway that extends to the Village limits and

beyond to tie in to I-40 west of Albuquerque. Driving lanes are 12 feet in width with shoulders.

East of I-25 to east Village limits: NM 6 through this segment is also known as Main Street. This entire segment has two 12-foot travel lanes in each direction with shoulders. A continuous center turn lane also runs through this segment except for the segment immediately east of the intersection with Don Pasqual. Note that for the segment of Main Street to the northeast of its intersection with NM 47, Main Street is shown on the state system as NM 47. NM 47 provides an arterial connection to communities to the north of Los Lunas, including Albuquerque.

NM 314

Immediately to the north and south of NM 6, NM 314 has two 12-foot lanes in each direction with little or no shoulder width and curb and gutter. Approximately 0.3 mile north of the intersection with NM 6, NM 314 narrows to one 12-foot lane in each direction and this roadway cross section continues north to the Village limit. South of NM 6, NM 314 has two travel lanes in each direction to the Village limit.

NM 47

The segment of NM 47 extending through the Village has two 12-foot travel lanes in each direction with shoulders that are signed for use as bicycle lanes. A continuous center turn lane also runs through this segment. NM 47 provides an arterial connection to communities to the north and south of Los Lunas, including the Pueblo of Isleta, Albuquerque, and Belen.

I-25

I-25 is a four-lane, divided highway facility with full control of access and two lanes for the exclusive use of traffic in each direction. There are no at-grade intersections and direct access to or from adjacent property is not permitted. Access to and egress from I-25 is limited to the ramp locations that provide traffic access to the Village at NM 6 (Main Street).

Traffic Volumes, Vehicle Classification, and Speed Data

The project team collected the existing traffic data in March 2003. The data collection effort included 9-hour intersection-turning movement counts, and pneumatic tube counts conducted over a two- to three-day period. Digital Traffic Systems, Inc., of Santa Fe, NM, was responsible for collecting the traffic volume data. The count locations are listed in Tables III-2 and III-3.

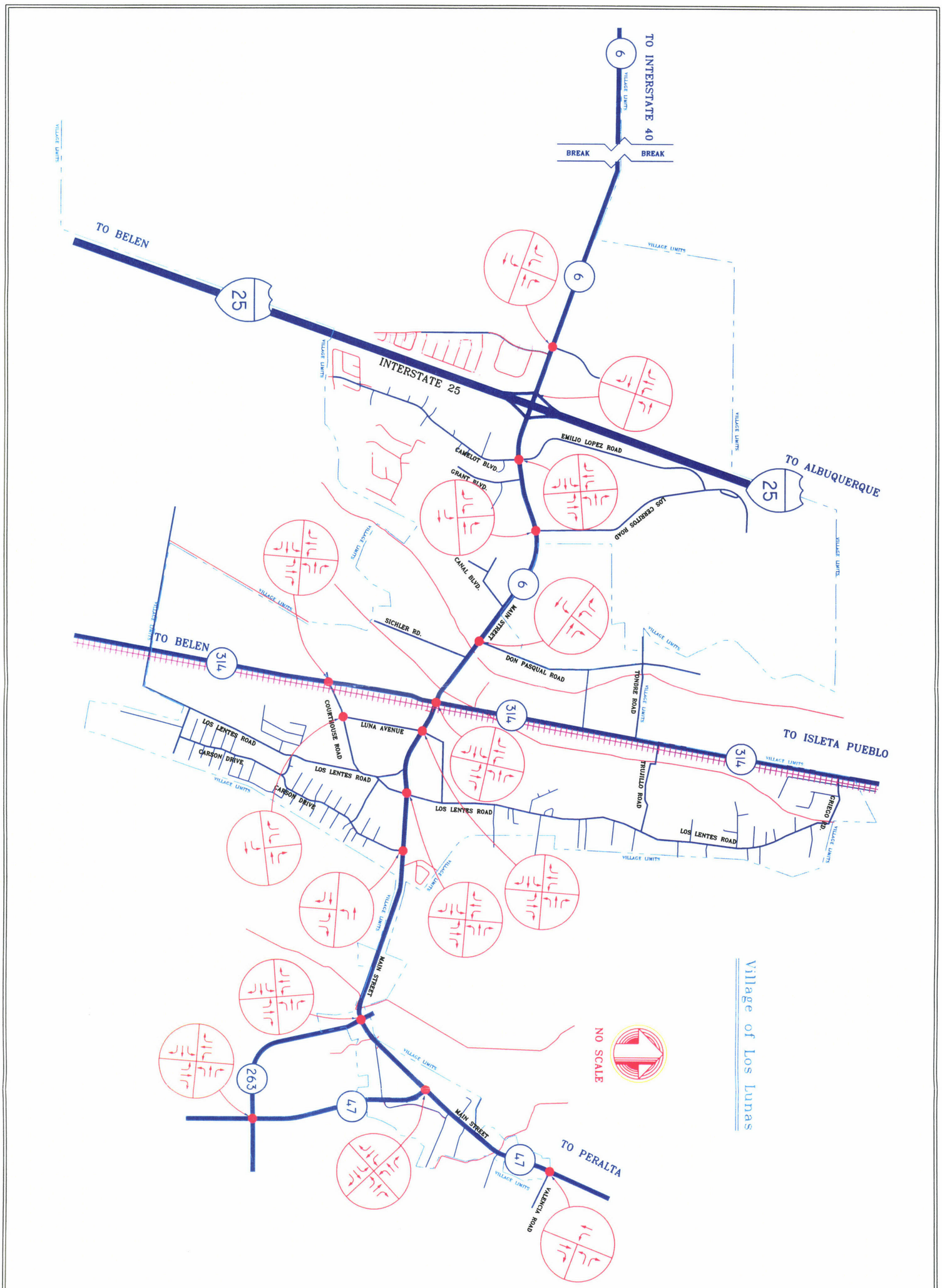


FIGURE III-2
INTERSECTION LANE
CONFIGURATION MAP

REV NO	REV DATE	DESCRIPTION

VILLIAGE OF LOS LUNAS TRANSPORTATION STUDY
VALENCIA COUNTY
LOS LUNAS, NEW MEXICO

PROJECT NO:	00000000001143
DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	
PROJECT DATE:	JULY 2003

HDR, Inc.
2155 Louisiana Blvd., N.E.
Suite 9500
Albuquerque, NM 87110
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Fax (505) 884-5969

Table III-2
9-Hour Turning Movement Count Locations (15 Intersections), March 2003

NM 6 (Main St.) & Desert Willow Road
NM 6 (Main St.) & I-25 Southbound Ramps (1)
NM 6 (Main St.) & Emilio Lopez Road / Camelot Boulevard
NM 6 (Main St.) & Los Cerritos Road
NM 6 (Main St.) & Don Pasqual Road
NM 6 (Main St.) & NM 314
NM 6 (Main St.) & Luna Avenue
NM 6 (Main St.) & Los Lentes Road
NM 6 (Main St.) & Carson Drive
NM 314 & Courthouse Road / Gensen Drive
Courthouse Road & Luna Avenue
NM 6 (Main St.) & NM 263 / Lake View Drive
NM 6 (Main St.) & NM 47 / commercial access
NM 47 & NM 263 / El Cerro Loop (outside Village Limits)
NM 47 & Valencia Road

Note: (1) This location was counted in June 2003.

Table III-3
Pneumatic Tube Count Locations (40 Locations), March 2003

NM 6 – 2 miles west of Walmart	NM 6 – 250' west of I-25 exit ramp
I-25 SB exit ramp to NM 6	I-25 NB entrance ramp (from NM 6)
NM 6 (Main St.) – 200' east of I-25 ramps	NB I-25 exit ramp to NM 6 (Main St.)
SB I-25 entrance ramp from NM 6 (Main St.)	Emilio Lopez Road – 2000' south of Avenida Sierra
Grant Boulevard – 50' north of Rio Grande Blvd.	Los Cerritos Road – 150' north of entrance to baseball fields
NM 6 (Main St.) – 500' east of Los Cerritos	Canal Boulevard – 200' south of NM 6 (Main St.)
Sichler Street – 100' south of Sichler Drive	NM 6 (Main St.) – 150' east of Don Pasqual
NM 314 – 200' north of NM 6	NM 6 (Main St.) – 100' east of NM 314
NM 314 – 100' south of NM 6	Don Diego Street – 300' south of NM 6 (Main St.)
Los Lentes Road – 150' north of NM 6	Los Lentes Road – 150' south of NM 6
Carson Drive – 30' south of Pine Court	Aspen Drive – 100' east of Los Lentes
NM 314 at Milepost 6	Morris Road – 150' west of NM 314
Morris Road – 50' east of NM 314	NM 314 – 150' south of Courthouse Road
NM 314 – 50' north of Courthouse Road	I-25 Mainline – NB at Milepost 202 / SB at 0.5 M south of NM 6
I-25 Mainline – NB at Milepost 204 / SB at MP 204	NM 314 – 1000' north of NM 6
Griego Road – 300' east of NM 314	Trujillo Road – 150' east of NM 314
Tondre Road – 2000' west of NM 314	NM 6 (Main St.) – 50' east of Rio Grande River
NM 263 – 200' west of NM 47	NM 47 – 200' north of NM 263
NM 263 – 500' east of NM 47	NM 47 – 500' south of NM 263
Valencia Road – 200' east of NM 47	NM 47 – 500' north of Valencia Road

The existing traffic data is summarized in Figures III-3 through III-5 and includes average weekday traffic (AWDT), and weekday AM and PM peak hour intersection turning movements, respectively. Table III-4 also shows the AWDT for each tube count location, as well the estimated percentages of heavy vehicles and the 50th and 85th percentile speeds.

The complete set of traffic count data collected for this project is on file and available for review at the Albuquerque offices of Molzen-Corbin & Associates.

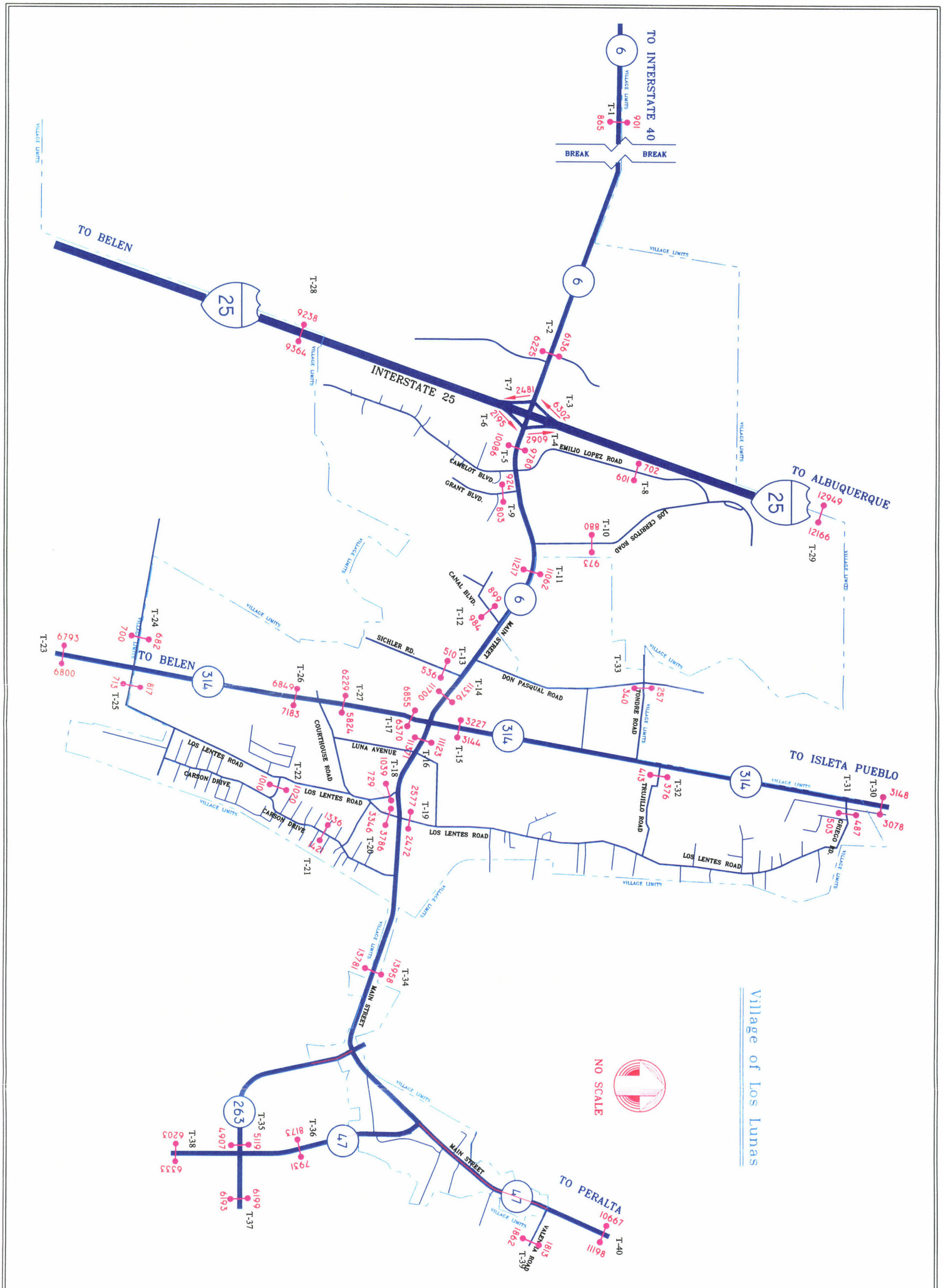

FIGURE III-3
2003 AVERAGE WEEKDAY TRAFFIC

VILLIAGE OF LOS LUNAS TRANSPORTATION STUDY
VALENCIA COUNTY
LOS LUNAS, NEW MEXICO

REV NO	REV DATE	DESCRIPTION

PROJECT NO: 00000000001143
DESIGNED BY:
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PROJECT DATE: JULY 2003

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Table III-4 Summary of Roadway Tube Count Data

Location ID	Major Roadway	Count Location	Average Weekday Traffic		Percent Heavy Vehicles		Percentile Speed (mph) 50th		85th	
T-1	NM 6	2 Miles West of Walmart Eastbound / Westbound	865	901	16.0	13.7	63	62	*	*
T-2	NM 6	250' West of I-25 exit ramp Eastbound / Westbound	6225	6136	10.3	9.1	37	33	43	41
T-3	I-25 SB Exit Ramp	I-25 SB Exit Ramp to NM 6 Southbound	6302		9.7		49		56	
T-4	I-25 NB Entrance Ramp	From Main Street to I-25 NB Northbound	6062		5.4		43		48	
T-5	Main Street	200' East of I-25 Ramps Eastbound / Westbound	10086	9780	6.8	14.3	40	41	45	47
T-6	NB I-25 Exit Ramp	NB I-25 Exit Ramp to NM 6 (Main Street) Northbound	2195		6.7		48		55	
T-7	SB I-25 Entrance Ramp	SB I-25 Entrance Ramp from NM 6 Southbound	2481		9.1		39		44	
T-8	Emilio Lopez Road	2000' South of Avenida Sierra Northbound / Southbound	601	702	2.9	2.7	34	32	41	39
T-9	Grant Boulevard	50' North of Rio Grande Boulevard Northbound / Southbound	803	924	1.5	2.5	26	25	33	32
T-10	Los Cerritos Road	150' North of Entrance to Baseball Fields Northbound / Southbound	973	880	2.2	3.1	34	37	41	44
T-11	Main Street	500' East of Los Cerritos Eastbound / Westbound	11217	11062	6.1	5.2	47	42	53	46
T-12	Canal Boulevard	200' South of NM 6 (Main Street) Northbound / Southbound	984	899	1.6	1.9	27	30	33	36
T-13	Sichler Street	100' South of Sichler Drive Northbound / Southbound	536	510	2.6	1.3	34	35	42	42
T-14	Main Street	150' East of Don Pasqual Eastbound / Westbound	11700	11376	9.6	10.1	32	32	38	38
T-15	NM 314	200' North of NM 6 (Main Street) Northbound / Southbound	3144	3227	4.7	5.5	41	41	46	48
T-16	Main Street	100' East of NM 314 Eastbound / Westbound	11371	11123	10.0	11.6	27	28	32	34
T-17	NM 314	100' South of NM 6 (Main Street) Northbound / Southbound	6370	6855	6.1	6.3	32	38	38	43
T-18	Don Diego Street	300' South of NM 6 (Main Street) Northbound / Southbound	729	1039	0.9	1.4	26	23	32	28
T-19	Los Lentes	150' North of NM 6 (Main Street) Northbound / Southbound	2472	2577	12.9	4.3	26	26	33	33
T-20	Los Lentes	150' South of NM 6 (Main Street) Northbound / Southbound	3786	3346	6.8	5.4	29	28	34	33

Table III-4 shows the AWDT for each tube count location. This table also shows the approximate percentages of heavy vehicles and the 50th and 85th percentile speeds for each location. These latter measurements are estimates only – using pneumatic tube counters for AWDT produces very accurate results; however, the accuracy for measuring percent heavy vehicles and speeds is relatively limited.

For the purposes of this analysis, heavy vehicles are defined as all vehicles that are not passenger cars or passenger trucks (pick up trucks), i.e., single-unit trucks, combination trucks, buses, and large recreational vehicles.

The 50th percentile speed is the middle speed of all vehicles measured. In other words, 50% of all vehicles are traveling slower than this speed and 50% of all vehicles are traveling faster than this speed.

The 85th percentile speed shows the speed at which 85% of all vehicles are traveling slower than and 15% are traveling faster than. The 85th percentile speed is often used to evaluate and make adjustments to the speed limit set for a given roadway. As a part of Phase II of the Los Lunas Transportation Study, the speed data will be analyzed to determine any recommendations for increased enforcement and / or changes to the existing traffic control.

Table III-4 Summary of Roadway Tube Count Data (continued)

Location ID	Major Roadway	Count Location	Average Weekday Traffic		Percent Heavy Vehicles		Percentile Speed (mph) 50th		85th	
T-21	Carson Drive	30' South of Pine Court Northbound / Southbound	1421	1336	2.1	3.3	23	26	28	32
T-22	Aspen Drive	100' East of Los Lentes Eastbound / Westbound	1010	1020	3.7	1.9	*	*	*	*
T-23	NM 314	At MP 6 Northbound / Southbound	6800	6793	2.3	4.1	61	62	67	69
T-24	Morris Road	150' West of NM 314 Eastbound / Westbound	700	682	2.8	3.1	43	38	51	44
T-25	Morris Road	50' East of NM 314 Eastbound / Westbound	713	817	3.0	2.6	29	31	34	36
T-26	NM 314	150' South of Courthouse Road Northbound / Southbound	7183	6849	6.1	8.9	44	42	53	48
T-27	NM 314	50' North of Courthouse Road Northbound / Southbound	5824	6229	6.8	7.6	36	38	42	43
T-28	I-25 Mainline	NB at MP 202 / SB at 0.5 M South of NM 6 Northbound / Southbound	9364	9238	10.5	7.8	*	*	*	*
T-29	I-25 Mainline	NB at MP 204 / SB at MP 204 Northbound / Southbound	12166	12949	10.2	14.7	*	*	*	*
T-30	NM 314	1000' North of NM 6 Northbound / Southbound	3078	3148	3.8	3.0	56	53	62	58
T-31	Griego Road	300' East of NM 314 Eastbound / Westbound	503	487	2.9	3.4	27	27	32	32
T-32	Trujillo Road	150' East of NM 314 Eastbound / Westbound	413	376	2.7	1.9	23	24	28	28
T-33	Tondre Road	2000' West of NM 314 Eastbound / Westbound	340	257	1.9	1.9	33	33	42	39
T-34	Main Street	50' East of Rio Grande River Eastbound / Westbound	13781	13958	9.8	9.2	41	43	47	48
T-35	NM 263	200' West of NM 47 Eastbound / Westbound	4907	5119	5.4	7.9	39	36	44	41
T-36	NM 47	200' North of NM 263 Northbound / Southbound	7931	8173	4.0	2.4	45	43	51	49
T-37	NM 263	500' East of NM 47 Eastbound / Westbound	6193	6199	8.1	16.3	39	44	44	51
T-38	NM 47	500' South of NM 263 Northbound / Southbound	6333	6203	4.5	7.2	49	51	56	57
T-39	Valencia Road	200' East of NM 47 Eastbound / Westbound	1862	1813	4.0	2.6	36	32	43	37
T-40	NM 47	500' North of Valencia Northbound / Southbound	10667	11198	6.8	14.3	46	47	52	53

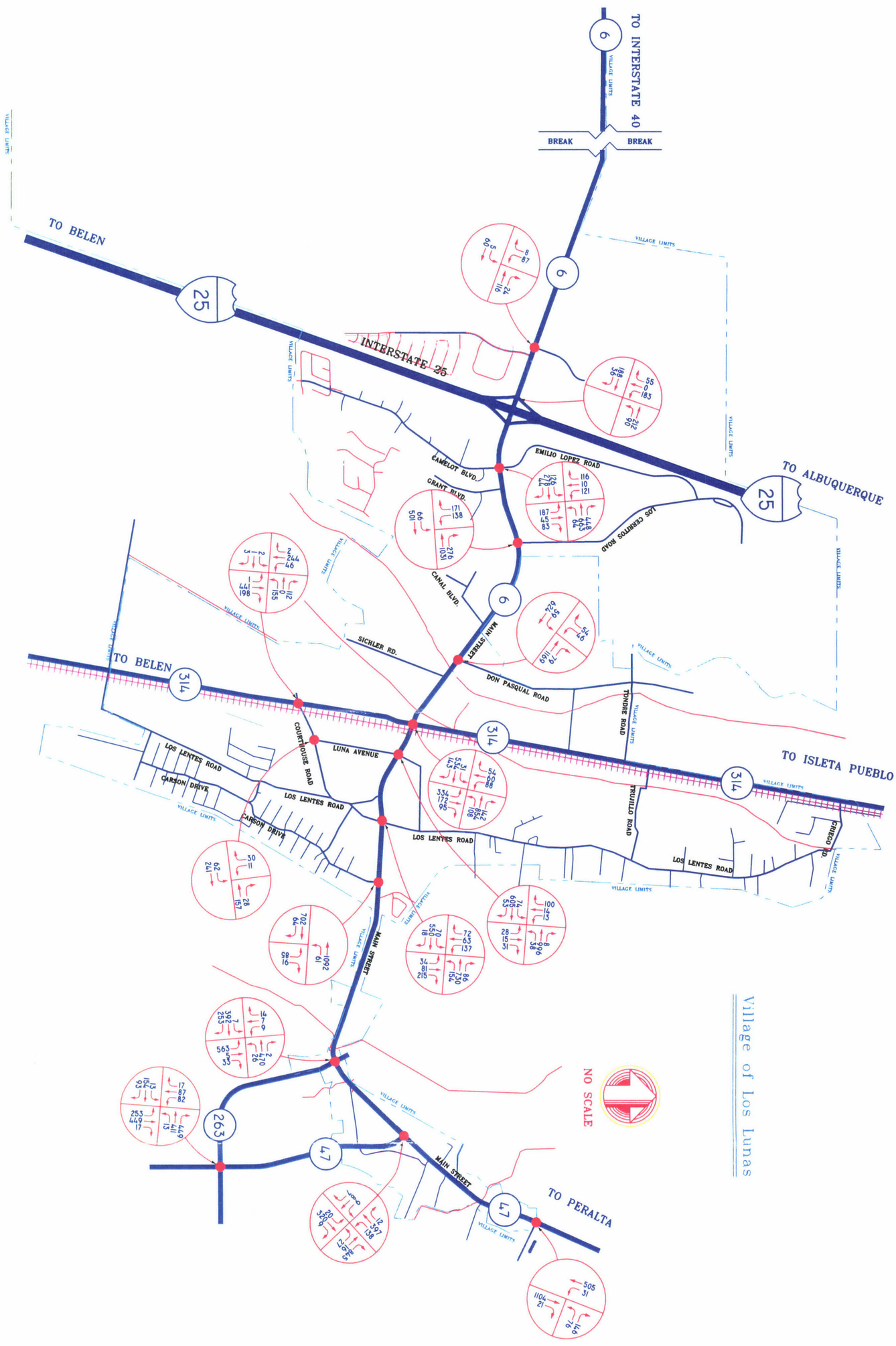

FIGURE III-4
2003 AM PEAK HOUR
TURNING MOVEMENT COUNT

VILLIAGE OF LOS LUNAS TRANSPORTATION STUDY
VALENCIA COUNTY
LOS LUNAS, NEW MEXICO

REV NO	REV DATE	DESCRIPTION

PROJECT NO: 000000000001143
DESIGNED BY:
DRAWN BY:
CHECKED BY:
PROJECT DATE: JULY 2003

HDR, Inc.
2155 Louisiana Blvd., N.E.
Suite 9500
Albuquerque, NM 87110
Phone (505) 884-6065
Fax (505) 884-5969

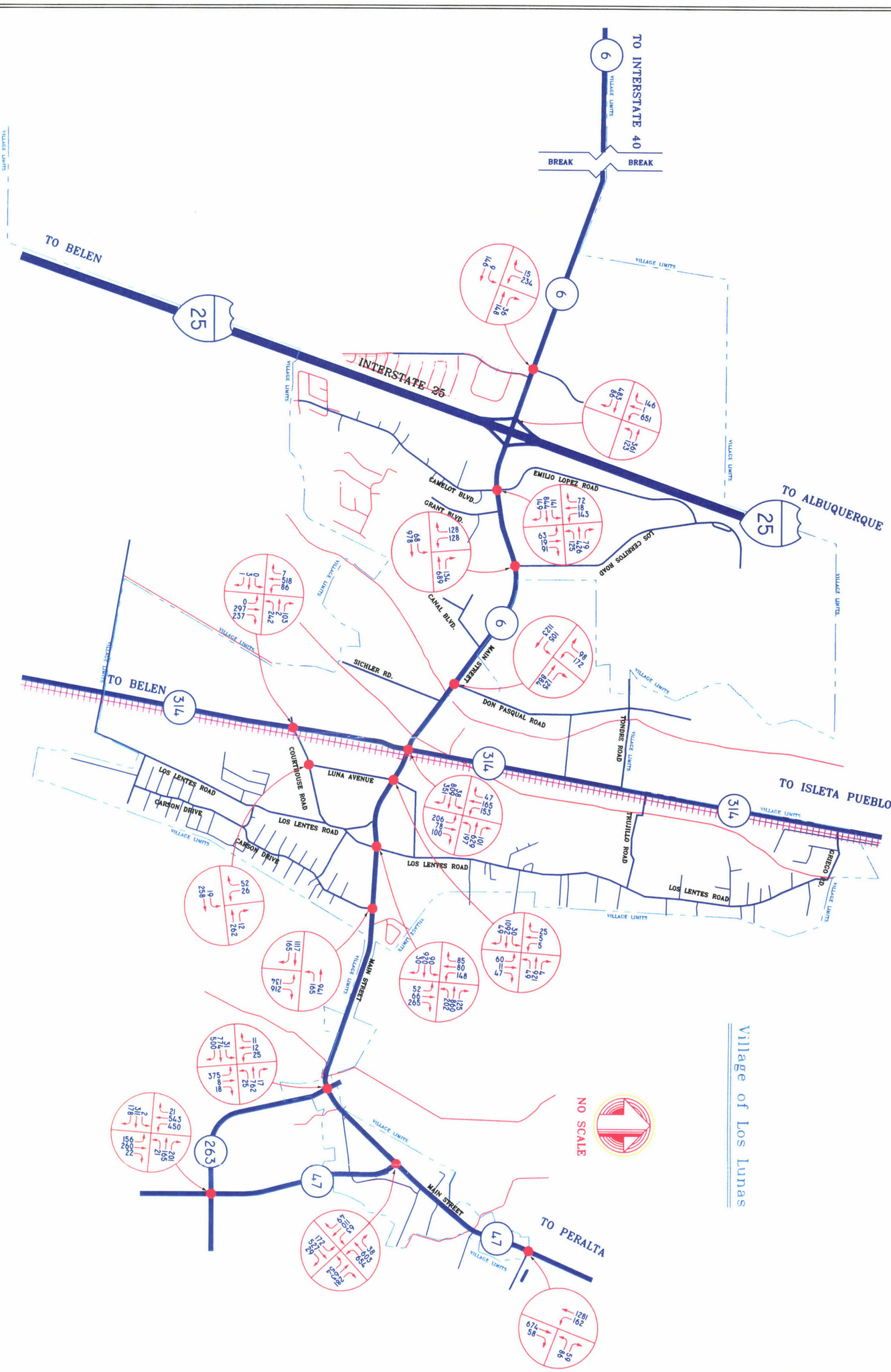

FIGURE III-5
2003 PM PEAK HOUR
TURNING MOVEMENT COUNT

VILLIAGE OF LOS LUNAS TRANSPORTATION STUDY
VALENCIA COUNTY
LOS LUNAS, NEW MEXICO

REV NO	REV DATE	DESCRIPTION

PROJECT NO: 00000000001143
DESIGNED BY:
DRAWN BY:
CHECKED BY:
PROJECT DATE: JULY 2003

HDR, Inc.
2155 Louisiana Blvd., N.E.
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Albuquerque, NM 87110
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Traffic Signal Information

Twelve signalized intersections were studied within the Village of Los Lunas. These locations are listed in Table III-5.

Table III-5
Signalized Intersection Locations

NM 6 (Main St.) & Desert Willow Road
NM 6 (Main St.) & I-25 SB Ramps
NM 6 (Main St.) & Emilio Lopez Road / Camelot Boulevard
NM 6 (Main St.) & Don Pasqual Road
NM 6 (Main St.) & NM 314
NM 6 (Main St.) & Luna Avenue
NM 6 (Main St.) & Los Lentes Road
NM 6 (Main St.) & Carson Drive
NM 314 & Courthouse Road / Gensen Drive
NM 6 (Main St.) & NM 263 / Lake View Drive
NM 6 (Main St.) & NM 47 / commercial access
NM 47 & Valencia Road

Current signal timing data was obtained from the Traffic Signal Laboratory at the New Mexico Department of Transportation (NMDOT) for use in evaluating existing traffic operations at each of the signalized intersections. All traffic signal timing data is shown in Appendix III-B. Based on the information provided, all signalized intersections within the Village of Los Lunas operate in isolated mode with no coordination to adjacent signalized intersections. An important aspect of a traffic signal system is the spacing between signalized intersections. Table III-6 provides a summary of the traffic signal spacing along NM 6 (Main Street). The signalized intersection spacing along this route is not consistent which may make it difficult to coordinate the signals for traffic progression.

Table III-6
Signalized Intersection Spacing

Highway Segment	Estimated Signalized Intersection Spacing
NM 6 / NM 49 / NM 47 (Main Street)	
Desert Willow Road to I-25 SB Ramps	0.24 miles / 1254 feet
I-25 SB Ramps to Emilio Lopez Road / Camelot Blvd.	0.34 miles / 1775 feet
Emilio Lopez Road / Camelot Blvd. To Don Pasqual Road	0.96 miles / 5083 feet
Don Pasqual Rd. to NM 314	0.36 miles / 1903 feet
NM 314 to Luna Avenue	0.15 miles / 808 feet
Luna Avenue to Los Lentes Road	0.32 miles / 1714 feet
Los Lentes Road to Carson Drive	0.26 miles / 1397 feet
Carson Drive to NM 263 / Lake View Drive	0.84 miles / 4457 feet
NM 263 / Lake View Drive to NM 47 / commercial access	0.46 miles / 2440 feet
NM 47 / commercial access to Valencia Road	0.73 miles / 3845 feet

Access Points

A field review was conducted to determine the approximate number of access points along NM 6 (Main Street), NM 47, NM 263, and NM 314. The findings are summarized in Table III-7 on the following page. Access frequency along these facilities varies and in most cases is higher than desired, but not unusual for commercialized highways in urban areas. For an urban principal arterial, the desired spacing between access points is 325 feet, which is difficult to achieve in historically developed areas.

Table III-7
Access Points

Major Roadway	Roadway Segment	# Of Access Points		Segment Length (mi)		# Of Access Points (per mi)		Average Spacing (ft)	
NM 6	Desert Willow Road to I-25 SB Ramps								
	Eastbound / Westbound	2	1	0.24	0.24	8	4	634	1267
	I-25 SB Ramps to Emilio Lopez Road								
	Eastbound / Westbound	1	1	0.34	0.34	3	3	1795	1795
	Emilio Lopez Rd./Camelot Rd. to Don Pasqual Rd.								
	Eastbound / Westbound	38	10	0.96	0.96	39	10	133	506
	Don Pasqual Road to NM 314								
	Eastbound / Westbound	29	31	0.36	0.36	80	86	66	61
	NM 314 to Luna Avenue								
	Eastbound / Westbound	5	6	0.15	0.15	33	40	158	132
	Luna Avenue to Los Lentes Road								
	Eastbound / Westbound	14	14	0.32	0.32	44	44	121	121
	Los Lentes Road to Carson Drive								
	Eastbound / Westbound	10	17	0.26	0.26	38	65	137	81
	Carson Drive to NM 263 / Lakeview Drive								
	Eastbound / Westbound	7	9	0.84	0.84	8	11	633	493
	NM 263 / Lakeview Drive to NM 47 / Comm. Access								
	Eastbound / Westbound	9	16	0.46	0.46	20	35	270	152
NM 47	Valencia Road to NM 6								
	Northbound / Southbound	11	35	0.73	0.73	15	48	350	110
	NM 6 to Village Limits								
	Northbound / Southbound	0	4	0.35	0.35	0	11	0	462
NM 263	NM 6 to Village Limits								
	Northbound / Southbound	5	3	0.20	0.20	25	15	211	352
NM 314	Village Limits to Trujillo Road								
	Northbound / Southbound	2	8	0.96	0.96	2	8	2539	635
	Trujillo Road to NM 6								
	Northbound / Southbound	2	44	1.10	1.10	2	40	2900	132
	NM 6 to Courthouse Road								
	Northbound / Southbound	0	26	.53	.53	0	49	0	108
	Courthouse Road to Morris Road								
	Northbound / Southbound	0	20	.87	.87	0	23	0	230

License Plate Survey

The purpose of the license plate survey was to obtain information on external trip characteristics for the Village of Los Lunas study area. Traffic patterns for trips both internal and external to the study area were measured and included in the traffic model. License plate surveys were conducted at five locations within the study area and are listed below:

- NM 6 (Main Street) (near I-25)
- NM 314 North (approximately at the north Village limits)
- NM 314 South (approximately at the south Village limits)
- NM 47 North (near Valencia Road)
- NM 47 South (south of NM 263)

The license plate survey was conducted from 3:15 pm to 6:15 pm on Wednesday, March 5, 2003 at the above locations to obtain conditions that are representative of a typical weekday. As a part of the survey, the following information was collected:

- Time license plate was registered in military hours (15:45, 16:30, 17:00, etc.)
- State license plate registration (NM, CO, AZ, TX, etc.)
- Three-plus digits of the license plate (**343**-KFM); ideally six digits were noted
- Direction of travel (inbound/outbound)

If the license plate was personalized or different than that of a New Mexico license, as much information as possible on the license plate was obtained. The findings of the license plate study are compiled below in Table III-8, which displays the percentage of traffic that travels through the Village of Los Lunas (i.e. external to external trips) and that have a destination within the Village of Los Lunas (i.e. external to internal). The table below also identifies how the external-to-external trips occur by travel route for each location.

Table III-8
License Plate Survey Data

Entering Location	Percent of Entering Vehicles Exiting to:					External to External	External to Internal	Total
	NM 6	NM 314 North	NM 314 South	NM 47 North	NM 47 South			
NM 6 near I-25 (Main Street)		3%	7%	2%	8%	20%	80%	100%
NM 314 North	3%		9%	1%	13%	26%	74%	100%
NM 314 South	5%	3%		3%	6%	17%	83%	100%
NM 47 North	3%	0%	4%		1%	8%	92%	100%
NM 47 South	2%	2%	3%	5%		11%	89%	100%

Based on the analysis conducted and the percentages shown in Table III-9, the results of the license plate survey for each location indicate the following:

- NM 6 (near I-25): 20% of the trips entering the Village via NM 6 near I-25 travel through the Village, while 80% entering at this location stay within the Village.
- NM 314 North: 26% of the trips entering the Village via NM 314 near the north Village limits travel through the Village, while 74% entering at this location remain within the Village.
- NM 314 South: 17% of the trips entering the Village via NM 314 near the south Village limits travel through the Village, while 83% entering at this location stay within the Village.

- NM 47 North: 8% of the trips entering the Village via NM 47 near the north Village limits travel through the Village, while 92% entering at this location remain within the Village.
- NM 47 South: 11% of the trips entering the Village via NM 47 near the south Village limits travel through the Village, while 89% entering at this location stay within the Village.

The percentages of vehicles exiting the Village are further explained in Table 9 in the columns labeled "Percent of Entering Vehicles Exiting to". This data provides some understanding of the routes followed through the Village by vehicles entering at each location.

The results of the license plate survey are used in the process of calibrating the transportation demand model, T-MODEL. For a complete description of this process see Section IV – Traffic Network Modeling.

Accident Data Analysis

Accident data was obtained from the NMDOT Traffic Safety Bureau and the Division of Government Research at the University of New Mexico for this report. The time period analyzed was from 1997 to 2001. The focus of the accident listings was for intersections, which typically exhibit the greatest number of conflicts. A comprehensive list of accident data for the study area was analyzed to identify safety concerns. Intersections were ranked, from highest to lowest, according to the number of accidents in the five-year time period. A summary of the accident data analysis is presented in Table III-9. This table shows all of the locations studied where two or more accidents were reported in the five-year period.

The diagram shown in Figure III-6 was prepared to graphically show areas with high accident frequencies. The diagram indicates that the greatest number of accidents occur along NM 6. The following five intersections ranked highest (worst) in number of accidents among all intersections studied within the Village of Los Lunas:

- NM 47 at NM 6
- NM 6 at Los Lentes Road
- NM 47 at Valencia Road
- NM 6 at NM 314
- NM 6 at Carson Road

It was noted during the accident analysis that over 53% of all the accidents at intersections within the Village of Los Lunas over the five-year period studied were rear-end collisions, 32% were angle type accidents, 10% were other types of accidents (head-on, sideswipe, pedestrian, etc.), and 5% were alcohol-related accidents. Rear-end type accidents are most common in urban areas with signalized intersections and recurring traffic queues. The incidence of left-turn and angle accidents at study intersections were also typical for urban signalized intersections.

A more detailed assessment of the accident data will be conducted for Phase II of the Los Lunas Transportation Study resulting in a priority list of recommended improvements. This will include an analysis of the traffic accident data that is being prepared by the Village of Los Lunas Police Department. At the time that the Phase I report was being finalized, the Village Police Department was working with HDR Engineering to produce a summary of traffic accident data for use at the public meeting and for use in Phase II of the Los Lunas Transportation Study.

Table III-9
Accident Data Summary

Major Street	Minor Street	1997	1998	1999	2000	2001	Total	*R.E.*	*Angle*	*Other*	*Alcohol*	*Total*
NM 47	NM 6	30	36	36	17	2	121	70	40	6	5	*121*
NM 6	Unknown	21	25	17	23	9	95	*46*	*30*	*17*	*2*	*95*
NM 6	NM 314	30	25	15	9	3	82	43	22	14	3	*82*
NM 6	Los Lentes Road	14	15	16	8	3	56	*29*	*24*	*2*	*1*	*56*
NM 6	Carson Drive	16	9	8	4	5	42	*25*	*8*	*7*	*2*	*42*
NM 47	Valencia Road	4	8	3	9	1	25	*14*	*9*	*1*	*1*	*25*
NM 6	NM 263	4	10	3	3	2	22	*17*	*1*	*3*	*1*	*22*
NM 314	Courthouse	4	3	5	5	4	21	*12*	*6*	*0*	*3*	*21*
NM 6	Emilio Lopez Road / Camelot Boulevard	4	3	7	2	2	18	*10*	*7*	*1*	*0*	*18*
NM 6	Bluebonnet	3	7	2	3	2	17	*5*	*10*	*1*	*1*	*17*
NM 6	Los Cerritos	2	7	4	1	3	17	*7*	*8*	*1*	*1*	*17*
NM 6	Mission	5	1	3	7	1	17	*9*	*6*	*2*	*0*	*17*
NM 6	Luna Avenue	8	2	3	3	0	16	*9*	*5*	*2*	*0*	*16*
NM 6	Grant	6	3	4	1	0	14	*6*	*5*	*3*	*0*	*14*
NM 6	Sichler	2	4	3	4	0	13	*9*	*3*	*1*	*0*	*13*
NM 6	Lujan	2	5	0	3	2	12	*6*	*4*	*0*	*2*	*12*
NM 6	Canal	3	1	4	2	1	11	*4*	*6*	*1*	*0*	*11*
NM 6	Edeal	2	0	2	5	1	10	*6*	*3*	*1*	*0*	*10*
NM 6	Diana	1	2	2	1	2	8	*5*	*2*	*1*	*0*	*8*
NM 6	Don Diego	1	2	1	3	0	7	*3*	*2*	*1*	*1*	*7*
NM 6	Don Pasqual Road	3	3	0	0	1	7	*6*	*1*	*0*	*0*	*7*
NM 6	Lakeview	1	1	2	3	0	7	*3*	*2*	*2*	*0*	*7*
NM 6	Sandoval	2	1	3	1	0	7	*4*	*2*	*1*	*0*	*7*
NM 47	Algodones	1	3	0	2	0	6	*1*	*5*	*0*	*0*	*6*
NM 6	Vaisa	0	4	2	0	0	6	*3*	*1*	*0*	*2*	*6*
NM 47	MP 31	1	2	0	2	0	5	*2*	*1*	*2*	*0*	*5*
NM 6	SB I-25 off-ramp	2	0	0	1	2	5	*2*	*2*	*1*	*0*	*5*
NM 6	Vallejos	5	0	0	0	0	5	*2*	*3*	*0*	*0*	*5*
NM 6	Calle de las Familias	0	2	1	0	1	4	*3*	*0*	*0*	*1*	*4*
NM 6	Stover	2	0	1	1	0	4	*1*	*3*	*0*	*0*	*4*
NM 47	Sunflower	0	3	0	0	0	3	*2*	*1*	*0*	*0*	*3*
NM 6	Appaloosa	1	1	1	0	0	3	*1*	*2*	*0*	*0*	*3*
NM 314	Peyton	0	1	0	1	0	2	*0*	*1*	*1*	*0*	*2*
NM 47	Chughole Road	0	0	0	2	0	2	*1*	*1*	*0*	*0*	*2*
NM 6	Chavez	1	0	1	0	0	2	*2*	*0*	*0*	*0*	*2*
NM 6	Mountain Laurel	0	1	1	0	0	2	*1*	*1*	*0*	*0*	*2*
NM 6	River Bridge	1	0	0	1	0	2	*1*	*0*	*1*	*0*	*2*
NM 6	Roberts Circle	1	1	0	0	0	2	*0*	*1*	*0*	*1*	*2*
Totals		192	197	150	130	47	716	376	232	75	33	716

The number of accidents reported for 2001 is significantly lower than for previous study years. Correspondence has taken place with the NMDOT to determine what is responsible for this decrease, i.e., to determine if there is missing data. This issue will be clarified in Phase II of the Los Lunas Transportation Study. The accidents shown in the second row in Table III-9 (*NM 6 and Unknown*) are those that were reported without indicating the specific cross street location.

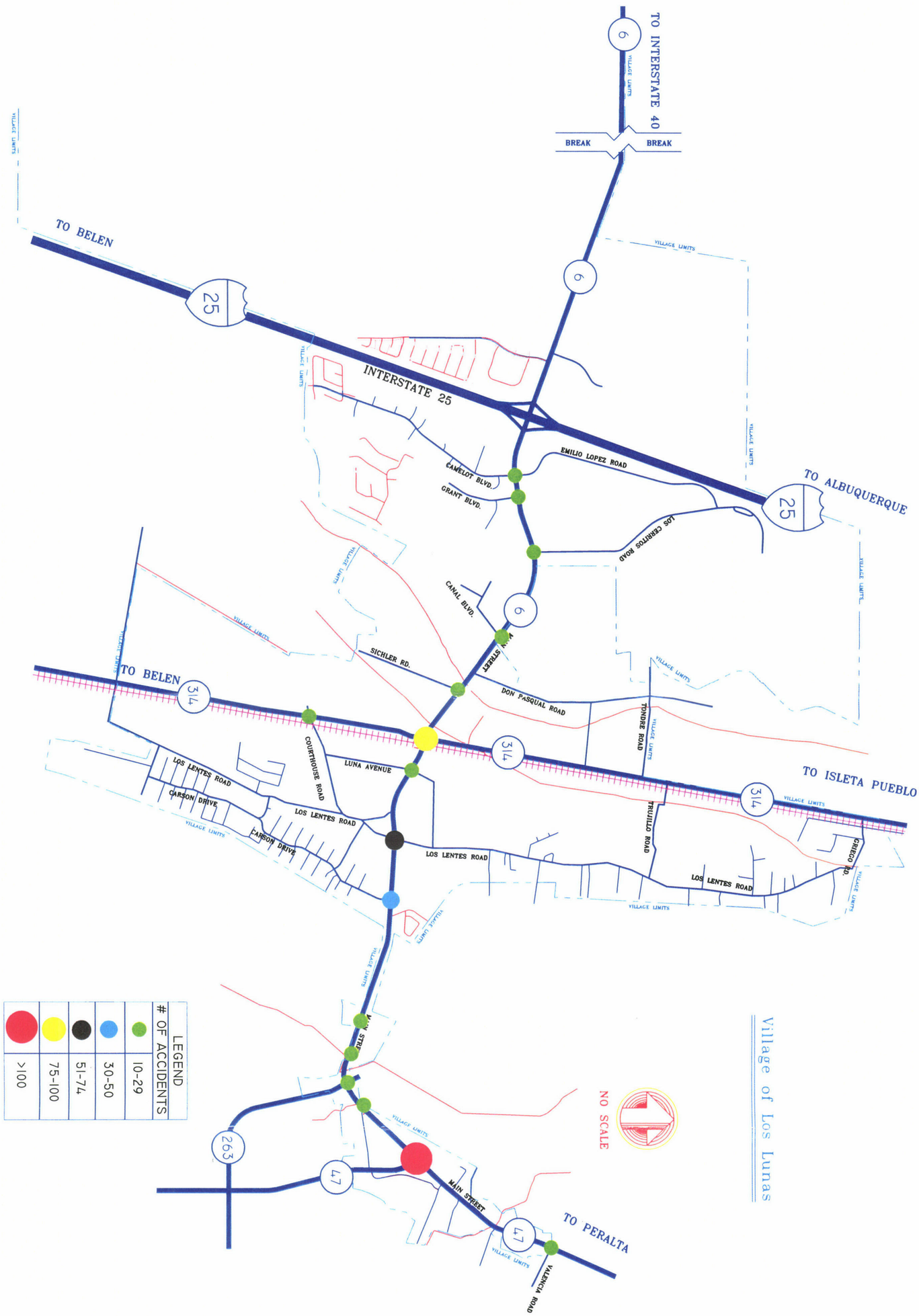

FIGURE III-6
ACCIDENT DATA DIAGRAM

VILLIAGE OF LOS LUNAS TRANSPORTATION STUDY
VALENCIA COUNTY
LOS LUNAS, NEW MEXICO

REV NO	REV DATE	DESCRIPTION

PROJECT NO: 00000000001143
DESIGNED BY:
DRAWN BY:
CHECKED BY:
PROJECT DATE: JULY 2003

HDR, Inc.
2155 Louisiana Blvd., N.E.
Suite 9500
Albuquerque, NM 87110
Phone (505) 884-6065
Fax (505) 884-5969

Traffic Operations

Traffic operations analysis was completed for 12 signalized intersections and two unsignalized intersections within the study area. The signalized intersections were analyzed using Synchro 5.0, and the unsignalized intersections were evaluated using the latest *Highway Capacity Manual* (HCM 2000) methodologies. The intersection approach lanes used for the analysis are shown in Figure III-2 and the peak hour turning movement volumes are shown in Figures III-4, and III-5. The operational analyses were completed for the AM and PM peak hours of a typical weekday.

The operational performance of an intersection or highway facility is based on a *Level of Service* (LOS) criteria. LOS is a term used to qualitatively describe roadway and intersection traffic operations. Level of service is expressed as letters from A to F, with LOS A representing the best operating conditions and LOS F the worst. General description of level of service is as follows:

LOS A: Travel time is as efficient as the roadway or intersection facility can provide. Individual users virtually travel unaffected by the presence of others in the traffic stream.

LOS B: Travel time remains efficient. Motorist have a high degree of freedom to select speed and operating conditions, but are slightly influence by other road users.

LOS C: The efficiency of travel is reduced, but delays are well within reasonable limits. Traffic flow is becoming more restricted as individual users interact substantially with other road users.

LOS D: Travel time continues to increase, and motorist delay approaches but still within reasonable limits. Motorists are able to travel at designated speeds for the facility, but freedom to maneuver in the traffic stream is restricted.

LOS E: Travel time is substantially affected. Delays have reached and may exceed reasonable limits. The capacity of the facility is fully utilized.

LOS F: Travel along the roadway or through an intersection is very inefficient. Traffic flow is forced in that the amount of traffic approaching a point exceeds the amount that can be served. The roadway facility fails.

The LOS criteria as defined in the HCM 2000 for signalized and unsignalized intersections are shown in Tables III-10 and III-11, respectively.

Table III-10
Level of Service Criteria for Signalized Intersections

LOS	Delay per Vehicle (sec/veh)
A	Less than or equal to 10
B	> 10 – 20
C	> 20 – 35
D	> 35 – 55
E	> 55 – 80
F	> 80

Table III-11
Level of Service Criteria for Unsignalized Intersections

LOS	Delay per Vehicle (sec/veh)
A	Less than or equal to 10
B	> 10 – 15
C	> 15 – 25
D	> 25 – 35
E	> 35 – 50
F	> 50

Facilities in New Mexico are usually designed for a LOS C or D to ensure that a reasonable level of service is provided to facility users. For facilities in urban areas, LOS D or better traffic operations represents a reasonable performance goal for highway segments and for intersections that are controlled by traffic signals. A higher LOS is desirable but may not always be attainable given the many competing interests for transportation infrastructure funds.

The intersection analysis results for the weekday AM and PM peak hours are summarized in Tables III-12 and III-13. The analysis output reports are provided in Appendix III-A. The findings of the operational analysis indicate the following:

- The analysis and field observations identify that the signalized intersection located at NM 6 and NM 314 experiences significant delay in the PM peak hour. The analysis does not show significant delays at the intersection of NM 6 and Luna Avenue; however, field observations of this intersection show that there are significant delays in the PM peak hour. This delay and congestion is caused by uncoordinated signal timing plans and the close spacing of this intersection with NM 6 / NM 314 that does not allow for good traffic progression through this area. This condition is especially evident during the after-school hours.

- Many of the signalized intersections within the Village are operating at acceptable levels of service in both the AM and PM peak hours for the existing conditions; however, another notable exception is:
    - At NM 6 and Los Lentes Road the northbound left turn and northbound through movements are operating at LOS F for both the AM and PM peak hours. This is due to the heavy volumes that are sharing a single lane for left turning and through traffic.

- At NM 6 and Los Cerritos Road, an unsignalized intersection, the analysis showed significant queuing for the southbound left-turn movement. This intersection was analyzed using the unsignalized methodology in both Synchro and HCS. Neither program produced a valid LOS for this turning movement; therefore, it is a good assumption that the southbound left-turn movement is operating at LOS F.

Table III-12
Intersection Traffic Operations Analysis Summary – AM Peak Hour

INTERSECTION	CYCLE LENGTH (secs)	Level of Service by Approach Movement												Average Delay (sec/veh)	Intersection LOS	Max v/c
		EB			WB			NB			SB					
		L	T	R	L	T	R	L	T	R	L	T	R			
Signalized																
NM 6 (Main St.) & Desert Willow Road	45	B	A	-	-	A	A	-	-	-	B	-	A	7.9	A	0.45
NM 6 (Main St.) & I-25 Southbound Ramps	65	-	A	A	B	A	-	-	-	-	B	B	A	8.3	A	0.31
NM 6 (Main St.) & Emilio Lopez Rd. / Camelot Blvd.	90	D	B	B	C	C	A	D	B	B	C	A	A	18.6	B	0.77
NM 6 (Main St.) & Don Pasqual Road	80	C	A	-	-	A	A	-	-	-	C	-	A	8.5	A	0.68
NM 6 (Main St.) & NM 314	120	D	C	C	D	C	C	D	C	C	D	C	C	27.4	C	0.79
NM 6 (Main St.) & Luna Avenue	80	C	A	A	C	A	A	B	B	B	A	A	A	9.5	A	0.57
NM 6 (Main St.) & Los Lentes Road	80	C	C	B	E	D	D	F	F	A	E	A	A	54.4	D	(1)
NM 6 (Main St.) & Carson Drive	75	A	A	A	C	A	A	B	A	A	A	A	A	7.6	A	0.54
NM 314 & Courthouse Road / Gensen Drive	50	A	A	A	A	A	A	A	A	A	A	A	A	5.9	A	0.42
NM 6 (Main St.) & NM 263 / Lake View Drive	90	D	C	C	D	C	C	D	D	A	B	B	A	29.4	C	0.91
NM 6 (Main St.) & NM 47 / commercial access	75	B	B	B	B	B	A	B	A	A	B	A	A	4.7	A	0.55
NM 47 & Valencia Road	70	-	-	-	B	-	B	-	B	B	C	A	-	10.7	B	0.77
Unsignalized (Stop Controlled)																
NM 6 (Main St.) & Los Cerritos Road	TWSC	C	A	-	-	A	A	-	-	-	(2)	-	C	-	-	-
Courthouse Road & Luna Avenue	TWSC	A	A	-	-	A	A	-	-	-	B	-	B	-	-	-

Notes: 1: Synchro shows max v/c=11.73; HCM-Synchro shows v/c=0.77

2: Neither HCS nor Synchro produces a valid LOS for this movement; assume LOS E or F

Table III-13
Intersection Traffic Operations Analysis Summary – PM Peak Hour

INTERSECTION	CYCLE LENGTH (secs)	Level of Service by Approach Movement												Average Delay (sec/veh)	Intersection LOS	Max v/c
		EB			WB			NB			SB					
		L	T	R	L	T	R	L	T	R	L	T	R			
Signalized																
NM 6 (Main St.) & Desert Willow Road	50	B	A	-	-	A	A	-	-	-	B	-	A	9.1	A	0.57
NM 6 (Main St.) & I-25 Southbound Ramps	65	-	B	B	C	A	-	-	-	-	B	B	A	14.1	B	0.68
NM 6 (Main St.) & Emilio Lopez Rd. / Camelot Blvd.	90	C	B	B	D	B	A	C	A	A	D	B	B	19.9	B	0.74
NM 6 (Main St.) & Don Pasqual Road	60	C	A	-	-	B	B	-	-	-	B	-	A	13.2	B	0.62
NM 6 (Main St.) & NM 314	120	D	C	C	E	B	B	E	C	C	D	D	D	33.0	C	0.90
NM 6 (Main St.) & Luna Avenue	80	C	B	B	C	A	A	B	B	B	B	B	B	9.9	A	0.57
NM 6 (Main St.) & Los Lentes Road	90	D	D	A	E	C	C	F	F	A	E	B	B	55.6	E	(1)
NM 6 (Main St.) & Carson Drive	75	A	B	B	D	A	A	C	A	A	A	A	A	14.5	B	0.83
NM 314 & Courthouse Road / Gensen Drive	50	A	A	A	B	A	A	A	A	A	A	A	A	7.0	A	0.55
NM 6 (Main St.) & NM 263 / Lake View Drive	90	D	C	C	D	B	B	D	D	A	B	B	A	25.1	C	0.90
NM 6 (Main St.) & NM 47 / commercial access	90	C	C	C	C	C	A	C	C	A	D	B	B	23.1	C	0.91
NM 47 & Valencia Road	65	-	-	-	B	-	B	-	B	B	C	A	-	9.2	A	0.57
Unsignalized (Stop Controlled)																
NM 6 (Main St.) & Los Cerritos Road	TWSC	B	A	-	-	A	A	-	-	-	(2)	-	C	-	-	-
Courthouse Road & Luna Avenue	TWSC	A	A	-	-	A	A	-	-	-	B	-	B	-	-	-

Notes: 1: Synchro shows max v/c=18.86; HCM-Synchro shows v/c=0.85

2: Neither HCS nor Synchro produces a valid LOS for this movement; assume LOS E or F

Recommendations

Phase II of the Los Lunas Transportation Study will include detailed recommendations for improvements, which will be based on existing operational deficiencies. Recommendations will also be made for improvements to meet the demands of horizon year traffic conditions. It is anticipated that the recommended improvements will include some or all of the following.

- Traffic Signal Improvements
  - Additional protected phasing
  - Implementation of future traffic signals
  - Adjustments to signal timing and phasing
  - Coordination of traffic signals
- Intersection Geometric Improvements
  - Addition of appropriate transition tapers
  - Addition of storage lanes (or lane length) for left turn movements
  - Addition of right turn storage lanes
  - Addition of sidewalks and ramps that meet current ADA standards
- Roadway Network Improvements
  - Addition of travel lanes and shoulders
- Access Control
  - Installation of raised median
- Increased Enforcement
  - Targeted for selected signalized intersections and other locations within the study area.

References

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LOS LUNAS
TRANSPORTATION STUDY

PHASE 1 REPORT

IV
TRAFFIC NETWORK MODELING

IV-A
TRAFFIC NETWORK MODELING
GENERAL CHARACTERISTICS

Traffic Modeling

A computer traffic model provides a way to evaluate the varied interrelationships in a roadway network and provide a quantification of the interrelationships. A model uses population, land use, employment, roadway characteristics, equations relating to travel behavior, existing traffic counts, and the experience of the modeler to create a computer simulation that closely mirrors the actual traffic and behavior patterns in an area. This simulation can then be updated for inclusion of new roads, changes in land use such as new developments, increased traffic from external sources, or other characteristic changes to then simulate possible traffic volumes resulting from those changes. This system of analysis provides a much more useful tool to evaluate an entire area and the ripple effect of change throughout an area than would just traffic counts alone or analysis in a small area.

Village of Los Lunas Traffic Model

Because of the usefulness of traffic modeling, at the heart of this transportation study is a roadway traffic computer model called TMODEL. During Phase 1 this computer model was developed for the existing conditions. Future conditions will be incorporated into Phase 2 of this study. It should be noted that the computer model of existing conditions developed in Phase 1 will be further refined during Phase 2 even though it currently exceeds statistical benchmark minimums for computer traffic modeling.

Presently, the Mid-Region Council of Governments (MRCOG) has a computer traffic model that includes the Los Lunas area. However, that model includes the entire Albuquerque area and as such, is not as detailed in the Los Lunas area. This model and study are being done for the Village to provide better local detail in the modeling, more local control over the model to be able to determine impacts of future developments, better information for determining development impact requirements, and better information for planning level services for future transportation needs of the Village. Included as part of this study is training in use of the software. This training will allow trained Village staff to continuously update the model to new conditions providing for much better information in decision making and planning for the future.

Los Lunas Traffic Model Limits

The network was built first by assessing the needed roadways in the model. The first roads incorporated into the model were the arterial roads and collectors within the Village limits. In some cases local roads were also included within the Village where these roads had special characteristics. Don Diego Street from Main Street to Los Lentes Road, for example, was included because it often provides a short cut from east-bound Main Street to Los Lentes Road.

Next, roads outside of the Village limits were assessed for inclusion into the network. These areas were assessed for inclusion because the Village of Los Lunas is a central figure in the transportation system for northern Valencia County. This is primarily due to the freeway interchange at NM 6 and the bridge crossing over the Rio Grande on NM6 (see Figure I-1). Because of these two features, much of the traffic of the northern portion of Valencia County passes through the Village. An increasing commercial district near the interstate is also making the Village much more of a central figure in providing services for the surrounding communities.

The results of the assessment of the roads outside of the Village limits are shown in Figures I-1 and II-1. For the southern network limit the importance of the river crossings and freeway interchanges in northern Valencia County dictated that the traffic network model needed to extend to the south to the next freeway interchange and far enough south to extend past the break point at which drivers would, in all likely hood, use the river crossing at Belen instead of Los Lunas.

For the northern network limit, the model needed to extend up to I-25 because of the large numbers of vehicles that enter the Village via NM314 and NM47 after exiting the interstate. This extension also provides good locations for coordination assessment with the MRCOG traffic model.

For the eastern network limit, the model needed to reasonably estimate the traffic demands on the Village. Therefore, the model was extended to the Manzano Expressway. Traffic inputs from areas further east, such as Meadow Lake, were accounted for by the use of external zones. The Manzano Expressway, although quite east of the Village, was included because of its future importance in the transportation system of the area and because of its impact on the input locations of the external traffic generators in far eastern Valencia County. Land use information was likewise extended to the Manzano Expressway to provide improved information on the traffic coming into the Village from those areas.

For the western network limit, the model was extended to the Village limit. There is currently very little development in this area and it was determined that the current size of the model to the west should include development that may occur within the time frame studied by this model.

Model Data Input and Output

After the roadway network was determined, additional information about those roads was input into the computer model. This information included the number of lanes, road class, intersection types, and road speed. Land use and population characteristics were then incorporated into the model as part of the land use and traffic analysis zones that relate particular segments of network roadway. These zones are shown in Appendix IV. Next, the traffic count information, part of the data gathering portion of the study, was incorporated into the model. Finally, the model was calibrated or adjusted to properly reflect the existing conditions and provide a useful model of existing conditions and characteristics. The results of this existing model are shown in the figures provided in Appendix IV. Through the cooperation of the MRCOG, the model of the existing system will be compared to the MRCOG model for consistency between models and for understanding of the differences in model output.

The model output shown in Appendix IV also provides a capacity analysis portion that helps to find deficiencies in the roadway. The traffic report was to supplement the capacity analysis of the model because of the more accurate level of analysis in the traffic report.

Using the model and traffic engineering, Phase 2 of this study will provide traffic forecasts, an analysis of the existing system under future demand, an analysis of proposed improvements to the existing system, an analysis of any proposed new system components. The remainder of this section is detailed information regarding the inputs and workings of the computer model.

IV-B
BACKGROUND DATA AND MODELING ASSUMPTIONS FOR THE LOS LUNAS TRANSPORTATION MODEL

The primary goal of this transportation planning model is to simulate the PM peak hour of travel on the roadway network in the Los Lunas area. In order for this simulation to be effective, it is important to obtain all transportation related data for that peak hour (a "snapshot" of time). It was also decided that the traffic model would replicate a 2003 weekday afternoon evening (PM) peak-hour.

The following section describes the various data used to develop the model. It is subdivided into two sections corresponding to the two primary components of a transportation planning model:

- Network Characteristics Data
- Land Use and Travel Characteristics Data.

NETWORK CHARACTERISTICS DATA

After establishing the model area, the existing model was reviewed and updated. In the model, all roadways classified as collector or greater throughout the study area were included. Data is encoded to describe both the links and the nodes. A link is a vector that describes connectivity between two nodes. A node is an end point of a link. Typically, a node can be an intersection or an intermediate point between intersections.

Roadway (Link Data)

Each street in the model is represented by a link or a group of links. Each link contains attribute data that defines the operation of that link. A link is a directional description of connection between beginning and ending node points. Data attributes needed for a link file (.LNX) in TMODEL include:

- Link Classification (user-specifiable)
- Link Area (user-specifiable)
- Link Type (user-specifiable)
- One- or Two-way Direction
- Number of Lanes
- Capacity
- Length
- Design Speed (or posted speed limit)
- Link Delay Coefficients

Link Classification-The numeric codes for link classification used in the link file are listed in Table IV-1. Link classifications were used to define link capacities and to set the speed-delay functions used in the simulation process. Classification data was provided by Molzen-Corbin

staff. Note that all of these classifications may not be currently used in Los Lunas. These designations were also included for possible future use with the analysis of alternatives.

Table IV-1
Link (Roadway) Class
2003 Los Lunas Transportation Planning Model

Class Number	Facility Type
1	Freeway
2	Ramps
3	Multi-Lane Highway
4	Arterial Class I
5	Arterial Class II
6	Arterial Class III
7	Arterial Class IV
8	Collector
9	Rural Two-Lane Highway
10	Centroid Connector
11	Unpaved

These are defined in more detail as follows:

1) Freeway - Divided highway facility with full control of access and two or more lanes for the exclusive use of traffic in each direction. There are no at-grade intersections and direct access to or from adjacent property is not permitted. There are no signalized or stop-controlled at grade intersections, and access to and egress from the freeway are limited to ramp locations.

2) Ramps - A ramp is a length of roadway providing an exclusive connection between two highway facilities. Ramps are generally designed to permit high-speed merging and diverging maneuvers, thus minimizing disruptions to mainline traffic.

3) Multi-lane Highway - Multilane Highways generally have posted speed limits between 55 and 65 mph. They usually have four or six lanes, often with physical medians or two-way left-turn lane medians, although they may also be undivided. Traffic signals may be found along such highways, although traffic signals spaced at 2 miles or less typically create urban arterial conditions. Vehicles may enter and leave the highway at intersections and driveways and through the median at selected points. The general design standards of multilane highways tend to be lower than those found on freeways, although an ideal multilane highway approaches freeway conditions as access point and turning volumes approach zero.

4) Arterial Class I - These are defined as *Principal* arterials with *Suburban* design. A *Principal* arterial serves major through movements between important centers of activity and a substantial portion of trips entering and leaving the area. Its importance is derived from the service provided to traffic passing through the urban areas. Service to abutting

land is subordinate to the function of moving through traffic. *Suburban* design represents an arterial with a low driveway access-point density, separate left turn lanes, and no parking. It may be multilane divided or undivided or a two-lane facility with shoulders. Signals are spaced for good progressive movement (one to five signals per mile or at even greater distances). Roadside development is of low to medium density, and the speed limits are usually 45 to 55 mph.

5) Arterial Class II - These are defined as *Principal* arterials with *Suburban* design. A *Principal* arterial serves major through movements between important centers of activity and a substantial portion of trips entering and leaving the area. Its importance is derived from the service provided to traffic passing through the urban areas. Service to abutting land is subordinate to the function of moving through traffic. *Suburban* design represents an arterial with a low driveway access-point density, separate left turn lanes, and no parking. It may be multilane divided or undivided or a two-lane facility with shoulders. Signals are spaced for good progressive movement (one to five signals per mile or at even greater distances). Roadside development is of low to medium density, and the speed limits are usually 40 to 45 mph.

6) Arterial Class III - These are defined as *Principal* arterials with typical *Intermediate* design or *Minor* arterials with *Suburban* design or *Intermediate* design. A *Principal* arterial serves major through movements between important centers of activity and a substantial portion of trips entering and leaving the area. Its importance is derived from the service provided to traffic passing through the urban areas. Service to abutting land is subordinate to the function of moving through traffic. A *Minor* arterial is a facility that connects and augments the principal arterial system. Although its main function is still traffic mobility, it performs this function at a somewhat lower level and places more emphasis on land access. A system of minor arterial serves trips of moderate length and distributes travel to geographical areas smaller than those served by the principal arterial. *Intermediate* design represents an arterial with a moderate driveway access-point density. It may have some separate or continuous left-turn lanes and some portions where parking is permitted. It has a higher density of roadside development than the typical suburban design and usually has 4 to 10 signals per mile. Speed limits are normally 30 to 40 mph.

7) Arterial Class IV - These are defined as Principal arterials with typical Urban design or Minor Arterials with Intermediate or typical Urban Design. A *Principal* arterial serves major through movements between important centers of activity and a substantial portion of trips entering and leaving the area. Its importance is derived from the service provided to traffic passing through the urban areas. Service to abutting land is subordinate to the function of moving through traffic. A *Minor* arterial is a facility that connects and augments the principal arterial system. Although its main function is still traffic mobility, it performs this function at a somewhat lower level and places more emphasis on land access. A system of minor arterial serves trips of moderate length and distributes travel to geographical areas smaller than those served by the principal arterial. *Intermediate* design represents an arterial with a moderate driveway access-point density. It may have some separate or continuous left-turn lanes and some portions where parking is permitted. It has a higher density of roadside development than the typical suburban design and usually has 4 to 10 signals per mile. Speed limits are normally 30 to 40 mph. *Urban* design represents an arterial with a high driveway access-point density. It frequently is an undivided one-way or two-way facility with two or more lanes. Parking is

usually permitted. There are few separate left-turn lanes, and some pedestrian interference is present. It commonly has 6 to 12 signals per mile. Roadside development is dense with commercial uses. Speed limits range from 25 to 35 mph.

8) Collectors - Collectors are streets providing both land access and traffic circulation within residential, commercial, or industrial areas. The access function is more important that that of arterials, and unlike arterials, the operation is not always dominated by traffic signals.

9) Rural Two-Lane Highways - These are defined as a two-lane roadway having one lane for use by traffic in each direction. Passing of slower vehicles requires the use of the opposing lane where sight distance and gaps in the opposing traffic stream permit. As volumes and or/geometric restrictions increase, the ability to pass decreases, resulting in the formation of platoons in the traffic stream. Efficient mobility is the principal function of major two-lane highways used as primary arteries. These routes may serve long-distance commercial and recreational travelers and may have sections of many miles without traffic control interruptions. Consistent high-speed operations and infrequent passing delays are desirable for these facilities.

10) Zone Centroid Connector - This is for model purposes only and is used to designate connections between the zone centroids and the actual network.

11) Unpaved - These are soft-surfaced (dirt, gravel, base course, or cold millings) facilities, located in non-urban settings. Their principal purpose is to provide links to paved rural highways or arterials that are used by rural residents to access distant urban services. Promotion of traffic mobility is secondary to providing land access to large undeveloped properties, isolated homesteads, ranches, farms, or low density residential subdivisions. These routes have one or two lanes, are often poorly maintained, and may not have posted speeds. Traffic controls at intersections with unpaved connecting roads often do not exist. Driveway access is rare but permitted; driveway spacing typically exceeds 300 feet. Feasible speeds range from 10 to 30 mph, depending on surface conditions and the width of the roadway. Roadside development is virtually non-existent; adjacent development, where it exists, is set back from the roadway by twenty feet or more. Peak-hour lane capacities generally do not exceed 150 vphpl, and may be considerably lower.

Link Area - The link area is used to designate the area within the Los Lunas CBD (Central Business District). Links in this area were given a lower capacity to reflect the width constraints, parking interactions, and other features of roads in this area. Links that are included within this area are designated as Area 1. All other links are designated as Area 0.

Link Type-Link type codes were not used in the Los Lunas model. This field can be used for future purposes.

One- or Two-way Direction-All links were checked for one- or two-way entry. A one-way link is entered in TMODEL by entering a '1' in the one or two-way ("12 Way" in TMODEL Network Graphics Editor/Reporter (NGE)) column. All two-way links receive a '2.' In future updates, it is important that the user have the direction appropriately entered with the proper A (origin) and B (destination) node columns in the Network Graphic Editor.

Number of Lanes-This attribute is used to assign capacities to network links. This field is not used during the TMODEL distribution and assignment simulations, however, it is important for assigning capacities to network links. It is also used for display and in some network calculator functions. All model links were checked for accuracy with this designation.

Capacity-Capacity is entered in terms of vehicles per hour (vph) for each link, directionally. Due to the number of links contained in the Los Lunas model, it wasn't possible to complete individual capacity analyses on each link to find suitable capacities. Therefore, a global link capacity system was adopted. The capacities were based upon Special Report 209 "Highway Capacity Manual," Transportation Research Board, National Research Council, Washington, D.C. 1985, the previous Los Lunas model and TModel Corporation experience with other models.

In the context of model operation, the capacities are used in conjunction with link speeds, link lengths, and speed-delay functions to derive a realistic travel speed to be used in the distribution of travel and the derivation of appropriate travel routes. In the context of network analysis, the capacities are used to identify deficiencies and recommend improvements. In both cases, it is desired that the capacities used in the model be as accurate and realistic as possible. Table IV-2 represents the capacities used for the model.

Table IV-2
Link (Roadway) Class/Capacities
2003 Los Lunas Transportation Planning Model

Class Number	Facility Type	General Capacity (vphpl)	CBD Area Capacity (vphpl)
1	Freeway	2000	2000
2	Ramps	1500	1200
3	Multi-Lane Highway	1800	1500
4	Arterial Class I	1600	1300
5	Arterial Class II	1400	1100
6	Arterial Class III	1200	900
7	Arterial Class IV	1000	800
8	Collector	800	600
9	Rural Two-Lane Highway	1250	1250
10	Centroid Connector	1000	1000
11	Unpaved	150	150

A supplemental file, with the extension of .LDE contains Link Data Equations. This was used to compute the link capacities of all links using the Class and Number of Lanes columns. This feature is found in TMODEL section 1.7.1. If the number of lanes is changed in testing future year alternatives, the modeler should make sure and recompute the link capacities.

Length-In TMODEL, all lengths are automatically calculated using the scale factor. The program will calculate lengths for each link during data entry and any subsequent future modifications. After the link lengths were calculated for the Los Lunas model, link lengths were checked to confirm that the function was working properly. In earlier model implementations, the external link lengths were manually adjusted to reflect appropriate travel distances for internal-external travel in the Los Lunas area. In this update, the travel times are included as terminal times in the Origin/Destination file. The model scale in units of coordinate points per mile is set in section 1.3.2. This assures that whenever a link is added or a node is moved in the Network Graphic Editor, the link length will be recalculated using this scale factor.

Design Speed-Link speeds are entered in TMODEL in miles per hour. Speeds have a direct influence on the computation of travel times during simulation runs. Generally, posted speed limits are entered into the program during the initial data entry phase. However, posted limits do not always accurately depict the free-flow conditions on the roadway. For example, some state highways have speed limits that are ignored. Conversely, some locations may have posted limits greater than what can be achieved (e.g., arterials in fully developed areas with numerous driveways and signalized intersections). During the model update process, a plot of coded speeds was reviewed for consistency with posted speeds. Changes were made to all links noted on the plots to begin the calibration process using the posted speeds.

During the calibration process, roadway operating speeds from the model were reviewed to justify modifications to the posted speed limit coded in the model as well as link and node delay coefficients. These modifications were made to reflect conditions and traveler perceptions that are different from the posted speeds. Very few link speeds were modified during calibration.

Link Delay Coefficients-Travel time on each individual link typically increases as the traffic volume on the link approaches capacity. Current research has shown that the amount of travel time increase depends on the functional classification of the link as well as the region and the behavior of the drivers using that link. TMODEL offers the ability to adjust the travel time increases on the link as the volume-to-capacity (V/C) ratio changes by functional classification of the link. This feature was used during the calibration process.

During calibration analysis, both link operating speeds and total (including both link and node delays) operating speeds can be analyzed. This differential analysis is used to adjust both the link and node delay coefficients. The final values used in the model calibration are shown in Table IV-3. Note that Class 10 (centroid connectors) uses an equation that does not add travel time based upon congestion. This is because the centroid connectors are not representing real streets.

Table IV-3
Link Delay Coefficients
2003 Los Lunas Transportation Planning Model

Link Class	V/C >= UL			UL	V/C > UL		
	K1A	EA	K2A		K1B	EB	K2B
1	0.20	4.0	0.10	0.90	0.20	10.0	0.10
2	0.20	4.0	0.10	0.90	0.20	10.0	0.10
3	0.20	4.0	0.15	0.85	0.20	10.0	0.15
4	0.20	4.0	0.15	0.85	0.20	10.0	0.15
5	0.20	4.0	0.20	0.80	0.20	10.0	0.20
6	0.20	4.0	0.20	0.80	0.20	10.0	0.20
7	0.20	4.0	0.20	0.80	0.20	10.0	0.20
8	0.20	4.0	0.25	0.75	0.20	10.0	0.25
9	0.20	4.0	0.20	0.80	0.20	10.0	0.20
10	0	1	0	0	0	0	0
11	0.20	4.0	0.40	0.60	0.20	10.0	0.40

Link Travel Time = Base Time * (1 + (K1A * ((V/C)+K2A)^{EA})) when V/C >= Upper Limit (UL) otherwise Link Travel Time = Base Time * (1 + (K1B * ((V/C)+K2B)^{EB})). Note: Time in minutes.

Intersection (Node) Data

The beginning and end points of each link are called nodes. A node can be an intersection, a zone centroid, or an intermediate point between intersections. In TMODEL, all nodes are coded with data, which defines the operating characteristics of that node. Data needs for node files in TMODEL include the following:

- Node Classification (user-specifiable)
- Node Area (user-specifiable)
- Node Type (user-specifiable)
- Node Capacity
- Special Delay Links (SDLs)
- Base Delay
- Turn Penalty Files
- Node Delay Coefficients

Node Classification-The node classifications were coded in the model dependent upon the intersection control. Delay equations are defined by node class, so it is important that the node class is properly coded. Table IV-4 lists the node classifications used in the 2003 Los Lunas model. These were refined during the model calibration process.

Table IV-4
Node (Intersection) Classification
2003 Los Lunas Transportation Planning Model

Node Class	Description
1	Node In-Link (Shape Nodes)
2	Zone Connector Intersection
4	Freeway Ramp Terminals – Merges
5	Freeway Ramp Terminals – Diverges
10	Traffic Signal
20	All-Way Stop
30	Partial Way Stop
40	Yield Sign
50	Uncontrolled Intersection

Node Area-Node Area attributes were coded by sequential numbering (1 through 34) to identify locations where existing intersection turning movement counts were collected. Locations 1 through 15 were within the Village and locations 20 through 34 were outside of the Village. These intersection locations were saved for model output turning movements to assist in the model calibration validation.

Node Type-Node type has been used to designate the node capacity equations for computation of the node capacities. The node type system closely follows the link functional classification system. Node types have been grouped to show whether the intersection represents an arterial meeting an arterial, an arterial meeting a collector, etc. Table IV-5 lists the node types.

Because of the mix of classifications, a key was established to assist in determining the node type to be used based upon entering link classifications for most situations. All types needed to be checked for special cases such as at-grade railroad crossings. The node type key is shown in Table IV-6.

Node Capacity-Capacities at all nodes are required in TMODEL to compute delays based upon traffic congestion at the intersections. The program has the ability to model delay at intersections. This feature has been incorporated into the Los Lunas model so that delays at these critical points on the network can be modeled to reflect the impacts upon traffic flow patterns.

For the Los Lunas model, TMODEL calculates preliminary node capacities using the following node equation:

$$Cap. = K_1 + K_2(No.\ of\ Lanes) + K_3(No.\ of\ Lanes)^{E3} + K_4(Entr.\ Cap.) + K_5(Entr.\ Cap.)^{E5}$$

where:

Cap.	=	Intersection Capacity
K_i	=	Constant
E_i	=	Exponent
No. of Lanes	=	Number of Entering Lanes from all links entering the node
Entr. Cap.	=	Sum of Entering Capacities from all links entering the node

Node capacities for the Los Lunas model used the K_4 constant. K_4 was used to simulate the effect that a green time-to-cycle length (G/C) ratio has at an intersection. For modeling purposes, it was assumed that when like classes meet, the G/C ratio is fairly even, and as the roadway meets lesser class roadways, the green time, or G/C ratio, increases on the major facility.

For intersections that are 3-legged, the capacities were increased due to the reduced number of conflicting turns and increased G/C ratio as compared to 4-legged intersections. The K_4 values on the 3-legged intersections were increased by 0.05 from the equivalent classified 4-legged intersection. Table IV-5 lists the constants for the TMODEL node capacity equations.

Table IV-5
Node Type and Capacities
2003 Los Lunas Transportation Planning Model

Node Type	Description	Node Capacity Equation (vph) $C = K^1 + K^4 * (\text{Ent. Capacity})$	
		K^1	K^4
1	Node In-Link (Shape Nodes)		1.0
2	Zone Centroid connector with network		1.0
4	Freeway Ramp Terminals – Merges	-1500	1.0
5	Freeway Ramp Terminals – Diverges		1.0
20	Equal Link Class Facilities		0.45
21	Intersection with 1 link class lower		0.50
22	Intersection with 2 link classes lower		0.55
23	Intersection with 3 link classes lower		0.60
24	Intersection with 4 link classes lower		0.65
25	Intersection with 5 link classes lower		0.70
26	Intersection with 6 link classes lower		0.75
30	Equal Link Class Facilities - 3 Legs		0.50
31	Intersection with 1 link class lower – 3 Legs		0.55
32	Intersection with 2 link classes lower - 3 Legs		0.60
33	Intersection with 3 link classes lower - 3 Legs		0.65
34	Intersection with 4 link classes lower - 3 Legs		0.70
35	Intersection with 5 link classes lower - 3 Legs		0.75
36	Intersection with 6 link classes lower - 3 Legs		0.80
40	Signal not at an intersection		0.75

Table IV-6
Node Type (specific)
2003 Los Lunas Transportation Planning Model

Link Class	1	2	3	4	5	6	7	8	9	10	11
1	1	5	2 0	2 1	2 2	2 3	2 4	2 5	2 6	2	2 6
2	4	4	2 0	2 1	2 2	2 3	2 4	2 5	2 6	2	2 6
3	3 0	3 0	2 0	2 1	2 2	2 3	2 4	2 5	2 6	2	2 6
4	3 1	3 1	3 1	2 0	2 1	2 2	2 3	2 4	2 5	2	2 6
5	3 2	3 2	3 2	3 1	2 0	2 1	2 2	2 3	2 4	2	2 5
6	3 3	3 3	3 3	3 2	3 1	2 0	2 1	2 2	2 3	2	2 4
7	3 4	3 4	3 4	3 3	3 2	3 1	2 0	2 1	2 2	2	2 3
8	3 5	3 5	3 5	3 4	3 3	3 2	3 1	2 0	2 1	2	2 2
9	3 6	3 6	3 6	3 5	3 4	3 3	3 2	3 1	2 0	2	2 1
10	2	2	2	2	2	2	2	2	2	1	2
11	3 6	3 6	3 6	3 6	3 5	3 4	3 3	3 2	3 1	2	2 0

Note: Use node types 30-36 for 3-leg intersections.

Special Delay Links (SDLs)-Another feature in TMODEL is the ability to model intersections under STOP or YIELD control. SDLs at a node denote which link(s) are under two- or three-way STOP or YIELD control. If an intersection is a four-way STOP, then no SDLs are entered, because node delay is applied equally to all approaches.

SDLs are applied during the assignment phase in TMODEL simulation modules. As traffic is loaded onto the network, the program calculates Volume-to-Capacity (V/C) ratios at each node. Intersection delay is calculated using the V/C ratio (more on how the program calculates the delay is presented in later sections of this report). If SDLs are specified at the nodes, then any delay calculated during the simulation run is assigned to the special delay link(s) approaching the node to simulate a STOP or YIELD condition. Under a four-way STOP condition, delay is experienced on all four legs and no SDLs are entered for this condition. SDLs were placed at all partial way stop signs. SDLs were also used on centroid connector links at the intersection with the model network.

Base Delay-Additional delay can be added to an intersection if a known condition exists. These conditions could include an all red condition at a signal, pedestrian phases, or a node representing significant delays at railroad crossings. In the Los Lunas model, no additional node delays were used.

Turn Penalty Files-At some locations on a network it may not be possible to execute a certain turn movement, there can be a capacity constraint due to the drivers' perceptions of potential safety concerns, or it is desired to restrict movements through a zone centroid. A supplementary file, the Turn Penalty File (.TNP), is available to TMODEL users to simulate these conditions. Within the Los Lunas model, turn penalties were used to restrict travel through zone centroids that were not on the roadway network, and to penalize left turns through the network. Additional delays were assigned at left turn movements at all signalized and stop control intersections. These additional delays improved model operation to eliminate any excessive "stair-stepping" movements. The turn penalty types are shown in Table IV-7.

Table IV-7
Turn Penalty Types
2003 Los Lunas Transportation Planning Model

Type Number	Penalty Description	Penalty (Minutes)
1	Zone Centroid	30
2	Left Turns at Signals (Node Class 10)	0.05
3	Left Turn at Partial Stop Signs (Node Class 30)	0.10

It is important to place these turn penalty delays at any locations in the forecast network that have changed conditions. After all new zone centroid and other turn penalties have been added; it is recommended that turns be recomputed for all nodes of class 10 and 30. The Turn Penalty module sort/check routine can automatically remove redundant penalties. However, one should check and make sure that penalties are appropriately constructed at intersections that have odd angles.

Node Delay Coefficients-The delay caused by different classifications of intersection control must be defined to reproduce the delays that drivers perceive. The resultant extra travel time is dependent upon the volume-to-capacity ratio (V/C) and varies by class of the nodes. The final values used are shown in Table IV-8.

Table IV-8
Node Delay Coefficients
2003 Los Lunas Transportation Planning Model

	V/C >= UL					V/C > UL			
Node Class	K1A	EA	K2A	BD A	UL	K1B	EB	K2B	BD B
1	0	0.01	0	0	0	0	0	0	0
2	0	0.01	0	0	0	0	0	0	0
4	0.50	3.8	0.05	0	0.95	0.50	5.8	0.05	0
5	0	0.01	0	0	0	0	0	0	0
10	0.50	5.0	0.15	0.01	0.85	0.50	5.0	0.15	0.01
20	0.50	3.6	0.10	0.02	0.90	0.45	4.6	0.10	0.05
30	0.50	3.6	0.10	0.02	0.90	0.45	4.6	0.10	0.05

Upstream Queuing Propagation (UQP) version 4 was used for these model runs. This permits the model to reflect the impacts of queues or backed up traffic on links and intersections that are affected by these queues. UQP allows the setting of various parameters. These parameters where set to initiate the use of UQP when the V/C ratio of the node was 100% or greater, to analyze the length of the queue using 100% of the capacity, to use an average vehicle length of 25 feet, to iterate 5 nodes back from the node with the exceeding V/C ratio, to use a minimum approach speed of 5 mph when affected by a queue, and to apply the UQP algorithms for node classes 4 through 40.

LAND USE AND TRAVEL CHARACTERISTICS

The central point of each traffic analysis zone (TAZ), where trips begin and end on a transportation planning model network, is called a zone centroid. In TMODEL, these centroids are also nodes in the model network. Zone centroids are at the center of a zone, which consist of a variety of land uses bounded by either the roadway network or other geographic or municipal boundaries. Plots of the TAZ boundaries are shown in Appendix IV.

The Los Lunas model consists of two zone types: internal and external. Internal zones were those zones within the model area. Internal zones have associated land use data that is used to generate origins and destinations. External zones were placed along roadways entering and leaving the Los Lunas model area. Land use is not associated with external zones, rather the traffic volumes coming in and out of the area are used to describe the origins and destinations for these zones.

TMODEL requires that the beginning node numbers correspond to zone centroids and that the numbering be consecutive. Zone numbering for the Los Lunas model is:

1 to 99	Internal Zones - representing the model area.
100 to 115	External Zones - representing the entry/exit points from the model area.

Zones numbered 90 through 99 were held in reserve for future use perhaps to study impacts of specific future developments. These additional zone centroid numbers were placed in the southern area of the network model.

Internal Zone Data-Land use data was collected and collated by Molzen-Corbin with assistance from TModel Corporation. Land use data questions that arose during the calibration stage of model development were reviewed and adjusted as necessary. Land use categories were similar to those used in other similar models, but adjusted to match data availability in the Los Lunas area from the MRCOG. All land use data was summarized into the following categories with associated units of measure:

LU1	Population	Persons
LU2	Single-family	Dwelling Units
LU3	Multi-Family	Dwelling Units
LU4	Basic Employment	Employees
LU5	Retail Employment	Employees
LU6	Service Employment	Employees
LU7	Elementary Education	Students
LU8	Middle School Education	Students
LU9	High School Education	Students
LU10	University of New Mexico	Students
LU11	Correctional Facilities	Employees
LU12	Walmart	Employees

The Correctional Facilities (Prison) and Walmart categories were derived from the more standard categories to better explain the trip generation in these two special areas.

All inputs were reviewed using the land use viewer capabilities of TMODEL by TModel and Molzen-Corbin staff in conjunction with the model calibration. These categories are also to be used for the model forecasts.

A printed spreadsheet listing of the land use is provided in Appendix IV.

Trip Generation-After the collected land use data was distributed to the model zone system, the number of trips generated by each zone was calculated. This procedure, called trip generation, is a compilation of several mathematical formulas that determine the number of trips produced and attracted to each model zone.

Many transportation engineering projects use the Institute of Transportation Engineer's (ITE) *Trip Generation* report to determine trip generation for proposed projects. Research by ITE has established a series of trip generation rates that, when multiplied by amount of proposed development (e.g., number of dwelling units, employees of commercial or industrial, etc.), produce an estimate of the total number of vehicle trips entering or exiting the development.

While the above application is suitable for many traffic engineering projects, modeling uses a more disaggregate trip generation approach. When a trip distribution model (such as the one used in TMODEL) is applied to origins and destinations, different trip *purposes* exhibit different travel *characteristics*. For example, the characteristics of a home-to-work trip are different from a home-to-shopping trip. If trip generation estimates were made simply following just the ITE rates, no distinction could be made. Therefore, it is important that the model generate different trip productions (origins) and attractions (destinations) for different trip purposes so that different travel characteristics can be accounted for in the gravity model.

In its NCHRP report 187, the Transportation Research Board (TRB) describes a methodology for trip generation that includes the following trip purposes:

- Home-Based Work (HBW) trips,
- Home-Based Other (HBO) trips, and
- Non-Home-Based (NHB) trips.

These three trip purposes are typically used with most daily transportation models. To better model the Los Lunas area, it was decided to disaggregate the trip purposes. The Home-Based Work trips were divided into trips between Home-to-Work and Work-to-Home. The Home-Based Other trips were divided into trips between Home-to-Other and Other-to-Home. By splitting the HBW and HBO trip purposes into their components, this eliminated the possibility of a problem of excessive trips between households. Therefore five trip types were used:

- Home to Work (HW) trips,
- Work to Home (WH) trips,
- Home to Other (HO) trips,
- Other to Home (OH) trips, and
- Non-Home-Based (NHB) trips.

TModel Corporation developed the following trip generation factors for use in the model. The base trip generation rates were taken from ITE's *Trip Generation Report*. Factors used to separate the trips into the five purposes and origins-destinations were from NCHRP reports 187 and 365 and experience by TModel Corporation.

Trip generation rates are set at values during the beginning calibration simulations. As the calibration process is conducted, adjustments are made to the rates to better reflect the known (or base-year) travel conditions. Generated trips are compared with traffic count volumes and modified to match these volumes as closely as possible. Table IV-9 presents the final calibrated trip generation rates used for the weekday afternoon peak hour model.

Table IV-9
Trip Generation Rates
2003 Los Lunas Transportation Planning Model

	Land Uses		HW		WH		HO		OH		NHB		Total		
		Units	Orig	Dest	Orig	Dest	Orig	Dest	Orig	Dest	Orig	Dest	Orig	Dest	Total
1	Population	Pop	0.000	0.000	0.000	0.003	0.002	0.000	0.000	0.003	0.001	0.001	0.004	0.007	0.010
2	Single-Family	DU	0.035	0.000	0.000	0.254	0.203	0.000	0.000	0.227	0.052	0.059	0.291	0.540	0.830
3	Multi-Family	DU	0.019	0.000	0.000	0.151	0.111	0.000	0.000	0.135	0.029	0.035	0.158	0.322	0.480
4	Basic Emp.	Empl	0.000	0.014	0.113	0.000	0.000	0.051	0.068	0.000	0.045	0.079	0.226	0.144	0.370
5	Retail Emp.	Empl	0.000	0.060	0.187	0.000	0.000	0.475	0.393	0.000	0.356	0.328	0.936	0.864	1.800
6	Service Emp.	Empl	0.000	0.027	0.259	0.000	0.000	0.136	0.132	0.000	0.137	0.109	0.528	0.272	0.800
7	Elementary	Stdnts	0.000	0.004	0.024	0.000	0.000	0.018	0.015	0.000	0.021	0.018	0.060	0.040	0.100
8	Middle School	Stdnts	0.000	0.008	0.034	0.000	0.000	0.034	0.021	0.000	0.030	0.034	0.085	0.075	0.160
9	High School	Stdnts	0.000	0.006	0.036	0.000	0.000	0.027	0.023	0.000	0.032	0.027	0.090	0.060	0.150
10	UNM	Stdnts	0.000	0.006	0.044	0.000	0.000	0.028	0.037	0.000	0.066	0.028	0.147	0.063	0.210
11	Prison	Empl	0.000	0.032	0.083	0.000	0.000	0.016	0.041	0.000	0.041	0.016	0.166	0.064	0.230
12	Walmart	Empl	0.000	0.041	0.110	0.000	0.000	0.243	0.226	0.000	0.215	0.167	0.550	0.450	1.000

In Table IV-10, a comparison is made between the generation rates used in the Los Lunas model and ITE *Trip Generation Report.* The retail employees were compared to shopping center floor space. Other employment designations are often hard to match with descriptions from the more detailed ITE classification system. The closest available description was used for other classes of employment.

Model rates are comparable but slightly different than ITE rates. Reasons for these differences can be occupancy or, conversely, vacancy, the aggregation of distinct land use types into more general categories, and local variations. Retail rates are based upon a medium size shopping center and the assumption of one employee per 1000 square feet of floor space. Typically a smaller retail establishment will have a higher trip generation to floor space ratio than a larger mall.

In addition, the ITE national average, or NCHRP 187 rates, assumes the same trip generation rates at each development. During the actual system peak hour, this is not necessarily the case. For example, one industrial development or office may dismiss their employees during the peak hour, while another, located elsewhere in the model area, will have a slightly earlier (or later) discharge time.

The factors were applied to the collected land use information and stored in the origin-destination files in TMODEL. These files contain the origins and destination values for all trips generated by all land uses and external zones.

External Zones-Origin and destination totals for external zones were set at the base-year peak-hour traffic volumes. As with internal zones, traffic generated externally is also apportioned among different trip purposes. Trips generated by external zones fall into two categories. Traffic that travels from external zone to external zone, or through the network, is called a through trip. These movements are designated as X-X trips in TMODEL, which stands for eXternal to eXternal travel. The primary characteristic of these trips is that they travel through the network but do not stop or start within an internal or perimeter zone. In the Los Lunas model the best illustration for this movement is the trip that starts at NM6 west of the Village limits and ends east of the Manzano Expressway without making a stop in the Los Lunas model area.

The second trip type generated by an external zone is the one that begins at an internal zone and ends in an external zone, or vice versa. These trips, often designated as I-X and X-I trips (for Internal to eXternal, eXternal to Internal) can be illustrated by the movement from Belen to Los Lunas.

Trip distribution is typically only performed for I-I (Internal-Internal), I-X, and X-I trips. The remaining X-X trips are placed in a trip table. This trip table, listing the number of direct movements between zones, is a manual distribution of the X-X traffic based upon some known parameters. External-external traffic is difficult to simulate (or in this case, distribute) with the gravity model. Therefore, the modeling process with TMODEL includes a step for "manually" distributing X-X traffic to the external stations.

The External-External traffic for the model was derived from analysis of the traffic volumes. This was an iterative process which was updated during the model calibration.

Table IV-10
Trip Generation Rate Comparison
2003 Los Lunas Transportation Planning Model

Village of Los Lunas Trip Generation Rates				Comparable ITE Trip Generation Rates					
Land Uses	Units	Trip Rate	%Origin	Category	Description	Ave	LOW	HIGH	%Origin
Population	Pop	0.01	35	NA	Population	NA			
Single-Family	DU	0.83	35	210	Single-Family Detached	1.01	0.42	2.98	36
Multi-Family	DU	0.48	33	220	Apartment	0.62	0.10	1.64	33
Basic Emp.	Empl	0.37	61	140	Manufacturing	0.37	0.14	0.90	55
Retail Emp.	Empl	1.80	52	820	Shopping Center	3.74	0.68	29.27	52
Service Emp.	Empl	0.80	66	720	Medical-Dental Office	1.06	0.58	1.75	66
Elementary	Stdnts	0.10	60	520	Elementary School	NA			
Middle School	Stdnts	0.16	53	522	Middle School	0.16	0.12	0.30	53
High School	Stdnts	0.15	60	530	High School	0.15	0.03	0.38	60
UNM	Stdnts	0.21	70	550	University/College	0.21	0.20	0.43	70
Prison	Empl	0.23	72	571	Prison	0.23	0.19	0.48	72
Big Box (Walmart)	Empl	1.00	55	820	Shopping Center	3.74	0.68	29.27	52

The X-X trips were placed in a through trip table for use in the model. The remaining trips associated with the external zone's I-X and X-I movements were combined with the model's origin-destination file for the simulation runs. The simulation run module used in TMODEL automatically adds the manually distributed X-X trips to the trip table created from the origin-destination file during the gravity model distribution process. This is part of the TMODEL auto-external zone calibration process for simulation runs.

Combine Origin-Destination File and Balance-Data from the external traffic zones were combined with the internal zone trips to form a complete origin-destination file for the Los Lunas model. After the I-X and X-I trips were added, origin and destination sums by trip purpose were checked for equivalency with the Check Sum utility in TMODEL's origin-destination editor. The primary purpose for checking equivalencies was to ensure that for each origin generated by the model there was a destination. (Transportation planning models are closed systems, meaning that every trip on the network must have an origin and a destination.)

A trip generation rates strategy such as the one used to develop the Los Lunas model internal zone traffic does not always produce balanced origins and destinations. For example, trip generation assumes that every business within the same retail category has the same trip generating characteristic. Retail land uses include different types of development ranging from department stores to restaurants. Furthermore, had a single land use been assumed, such as grocery stores, the departure rates during the PM peak hour would vary from development to development. Therefore, with the methodology there is some difficulty in producing equal numbers of origins and destinations in the transportation model.

A process must be followed before the first simulation run can be performed to balance the origins and destinations. In the Los Lunas model, the assumption was made that the external zone traffic volumes were correct and did not need to be included in the balancing operations. Any balancing adjustments would be done to the trip origins for the internal zones. First, the total differences by trip types were found. Then, the trip generation rates were reevaluated and appropriate changes were made to the trip rates. After this process was completed, the sums were checked for both internal and external zones, all trips were balanced by averaging the internal trips, and the origin-destination file was ready for initial TMODEL simulation runs.

CALIBRATION

Approach

Calibration is an iterative process and includes upgrading or adjusting entered data, program coefficients, or parameters and assumptions on successive simulation runs until the volumes and traffic patterns produced by the model approximate known volumes within an "acceptable level of error." The acceptable level of error for calibrated model data has been recommended in National Cooperative Highway Research Program Report No. 255 entitled *Highway Traffic Data for Urbanized Area Project Planning and Design.* The primary premise behind these guidelines is that simulated model data should not significantly differ from actual count data thereby causing inappropriate under- or over-design of roadway facilities. Differences between modeled volumes and actual counts may look significant; however, in everyday practice, these differences should not cause unsuitable roadway facility planning.

There are three significant points to consider. The first is "acceptable level of error" and "How good are the counts?" Given that this is the basis for calibration, are these counts good enough for the process? If some count data is questionable, can the model be asked to simulate a condition better than the condition is known?

Considering these questions, it has been found through experience in modeling that an "acceptable level of error" is directly related to the existing traffic volumes on a certain link. Through the course of calibration, higher volume streets can be expected to have better results. Acceptable limits may be that a 20% error can be expected on heavily used arterials, 40% on primary collectors, and perhaps as high as 200% on little-used rural collectors. Although the latter level of error may seem high, a variation of 200% on little-used roadways may mean a difference of 25 to 100 vehicles, insufficient to cause inappropriate facility planning when the model results are used. The model volumes are compared with count volumes and even in the same week, the count volumes can vary by plus and minus 20% or more from the average.

The second point to consider is the adjustment of entered data, program parameters, and model assumptions. After entering all the data and making the initial model assumptions, the simulation distribution and assignment run is made. The desired outcome is that the results will perfectly match all the counts and the model will be calibrated. Usually, though, some data or assumptions (the "rules" of the model) are incorrect. On locating the errors from the distribution and assignment, causes are identified. The rules are reconsidered and adjusted.

Each change in data, parameters, or assumptions represents a refinement or upgrade of the rules. Each refinement **must be backed** by a reason. No changes are made to simply get better volumes. To apply the model to alternative scenarios, especially future year forecasts, each justification must be questioned for its continued application. If the rule still holds for the scenario, then it can be applied. If the rule is not applicable, then adjustments must be made in rules for that scenario.

Finally, it must be emphasized that the simulation being run with the model is one of human interaction with the transportation system. To do this, the program uses the gravity model to simulate the distribution of trips between zones and selects "shortest paths" for the assignment of trips. Human behavior is equated to a series of mathematical formulas that assume that all humans behave logically. While people do not always behave in a logical and rational manner, under most situations these assumptions are valid. Keeping this in mind, the calibration process is carried out.

Model Calibration Process

Essentially, calibration is comprised of three stages. First, working from outside to inside and large to small, all volumes that lead to the outside world through external zones are calibrated. After this is completed, the procedure progresses, analyzing the model for general trends of trips. The third step is to evaluate the individual count locations and individual routes. Changes at any level may affect operations at another stage in calibration. That is, a proper allocation of trips to the right route may affect the general trends. Therefore, the calibration process is one of always looking back and continually monitoring each step until the procedure is complete.

External Zones-In TMODEL, zones are differentiated between "internal" and "external." Internal zones are those in which all the land use is known and all generated trips will go to and

arrive from other zones in the modeled system. An external zone interacts with other zones in the modeled system and with the external world that surrounds the network. (Traffic count data, collected on the roadway leading in or out of an external zone, is used.) It is impossible to describe fully the land uses outside the modeled area that interact with the internal zones. Therefore, an external zone is described in the model as having origins and destinations to produce the appropriate volume of traffic on the roadways that connect it with the rest of the network.

TMODEL automatically adjusts the distribution to match the I-X and X-I origins and destinations at the external zones. It also automatically distributes the proper number of destinations to each zone based upon the values derived during the trip generation process. Count data was not available for all of the externals because some were added during the model calibration stage. The volumes at the externals were estimated based upon known counts and then adjusted in subsequent calibration runs.

At the conclusion of a simulation run, assigned model volumes from the simulation run are compared against the known count data. A scattergram report is printed listing the error from that run and the "acceptable level of error" as outlined in National Cooperative Highway Research Program Report #255, *Highway Traffic Data for Urbanized Area Project Planning and Design.* In this report, a methodology is presented that lists the "acceptable level of error" for roadways based upon their existing ADT volumes. It is "based upon the assumption that the maximum traffic assignment deviation should not result in a design deviation of more than one highway travel lane."[1]

From these results, analyses are performed and potential changes or upgrades to the entered data are made for the following simulation run. Overall high or low trends can suggest that information needs to be upgraded concerning dwelling units, employment, trip generation rates, and/or gravity model-spatial behavior coefficients. Throughout the calibration of overall trends, each segment of entered data is questioned and necessary changes are made. In addition, ground count data is also scrutinized.

Initial model run volumes were compared on a statistical basis with traffic count volumes. Once the model was close statistically, individual routes were examined more closely.

[1] National Cooperative Highway Research Program Report No. 255, *Highway Traffic Data for Urbanized Area Project Planning and Design*, Transportation Research Board, December, 1982, page 41.

Allocation to Individual Routes-Figure IV-2 was developed to aid in determining the acceptability of the base-year model assignment compared to base year model volumes. As can be seen, the "acceptable" deviation is higher on low volume roads where a large percentage deviation will not have major design implications. The converse is true on higher volume facilities. Federal Highway Administration (FHWA) standards recommend that 75% of links classified as principal arterial or higher should be within these acceptable limits.

From these results, analyses are performed and potential changes or upgrades to the entered data are made for the following simulation run. Overall high or low statistical comparisons can suggest that information needs to be upgraded concerning housing, employment, trip generation rates, and/or gravity model-spatial behavior exponents. Throughout the calibration of screenlines and the analysis of the scattergrams, each segment of entered data is questioned and necessary changes are made. In addition, ground count data is also scrutinized. Simultaneously, care is taken to ensure that the calibration of external zones is not significantly altered through ensuing runs.

After it has been determined that the overall trends are acceptable, the individual routes are examined. In TMODEL, this process is usually performed by examining the desirability of certain routes by examining the free flow speeds, node capacity values, the link and node delay coefficients, land use quantities, trip generation rates, and/or multi-point assignment loading percentages. The primary premise for assigning trips to a network is based upon the shortest path which in turn is based upon travel times.

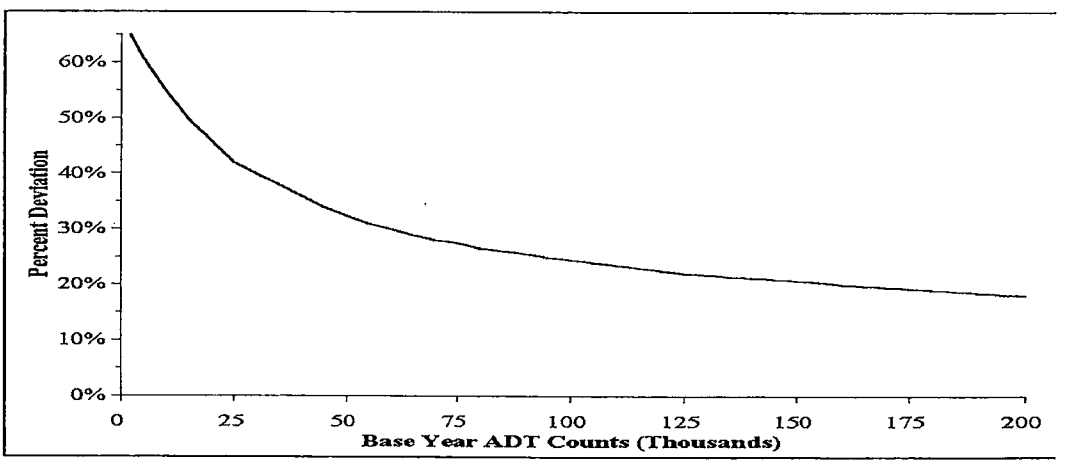


Figure IV-2 - Relative Allowable Errors

Within TMODEL, travel time is controlled by the operating speed of the link. Therefore, the link speed may be raised or lowered to adjust the desirability of a certain route. There are limits to raising or lowering speeds, typically +/-10 mph on primary roadways. If a link's speed is altered beyond this range, there may be significant deviations from the known travel patterns of the model area. Should this occur, the previous steps to calibration must be scrutinized and changes made to earlier simulation assumptions.

Very few link speeds were changed for this model and the maximum change made was 5 mph. Speeds that were changed were based upon review of the data plots and aerial photography. The model was calibrated through carefully checking and verifying the input data and equation parameters. When the traffic volume trends were close, each link that showed a significant deviation between model volume and traffic counts was scrutinized to find the source of that deviation. Placement of the land use in the traffic analysis zones was checked and updated as necessary. Trip generation values where adjusted to account for local variations.

The Los Lunas model also used a feature unique in TMODEL called Multi-Point Assignment (MPA). In the typical transportation planning model, all trips begin and end at one point, called the centroid, within a traffic analysis zone. Depending on the spatial structure of the model, this can cause significant errors in the assignment of trips. The MPA allows the modeler to designate percentages of trips to and from the zone that will use specified access points. During calibration the MPA percentage allocations were analyzed and adjusted as necessary and appropriate to reflect the land use access to the network. These were reviewed with the assistance of the aerial photography.

Model Verification

Finally, the "calibrated" model is verified against the base-year traffic counts. The verification process is a series of post-simulation run analyses that are designed to analyze the accuracy and degree of confidence presented in the calibrated results. Included in these analyses are tests of the screenlines, verification of the trip distribution characteristics, and comparisons of the traffic count data vs. Modeled link volumes.

Figure IV-3 shows link ground counts on the X-axis and assigned volumes on the Y-axis. On the 'goal' line the assignment volume is equal to the ground count. The linear 'regression' line shows the best straight line estimate of the assignment volume for any count. The 'allowable' curves show the maximum allowable errors according to the graph discussed from NCHRP 255. As can be seen, all errors fall between the curves. Also, the aggregation of land use types may cause slightly higher or lower traffic generations for a specific zone due to the global land use designation. Other statistics calculated are:

- AvgVol is the average assignment volume for all analyzed links.
- %RMSE, the percent root mean square error, a summary statistic representing the average assignment error, disregarding sign, in percent.

$$\% \text{ RMSE} = 100 \times \frac{\sqrt{\frac{\Sigma(\text{Assignment Errors})^2}{\text{Number of Links}}}}{\text{Average Count}}$$

- % In shows the percent of assigned volumes exceeding the allowable errors.
- R^2, the coefficient of determination or 'goodness of fit' statistic, shows how well the regression line represents the assignment data.

Tic marks are shown at each 1000 on the X-axis. Each point in the graph that was near or out of the allowable limits was evaluated. All of the points that were near the allowable limits were felt to be caused by traffic count variations or due to other sampling errors.

There are no national standards for R^2 or RMSE. However, there are guidelines that have been established by Caltrans for data used in air quality analysis. The guidelines recommend an R^2 of 0.88, a maximum RMSE of 35%, and a minimum %In of 75% for links classified as Principal Arterials and above.

Analysis shows an R^2 of 0.93, which is much better than the guideline of 0.88. The 2003 Los Lunas model shows a %RMSE of 24%, which is again better than the guideline of 35% or less.

Analyzing all link classes shows the 2003 Los Lunas model with 96% of the count locations within acceptable bounds. Five of the link classes have 100% of count locations within acceptable bounds and the worst one, which is Ramps, has 83% within acceptable bounds. These are all better than the recommended standard of 75%.

Figure IV-3 - **Allowable Directional Errors Analysis**
2003 Los Lunas Transportation Planning Model

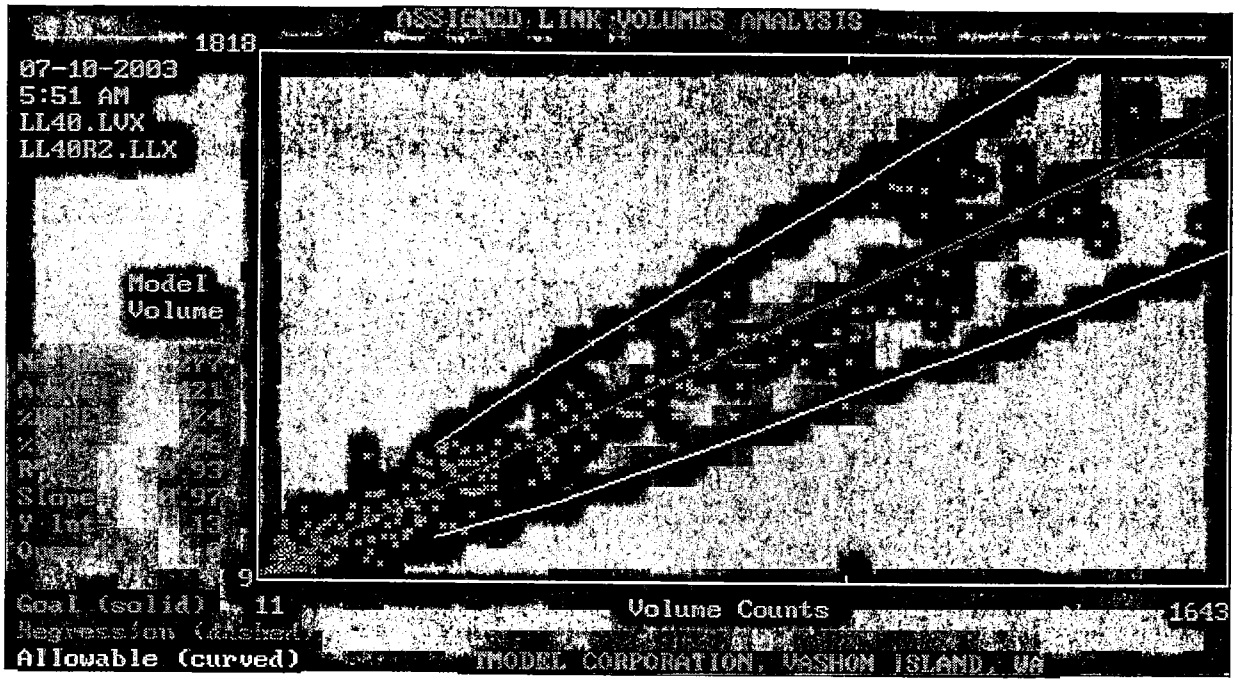


Table IV-11 presents the percent errors by functional class. As mentioned earlier, a variation of 100% on a little used lower volume road may mean a difference of up to 100 vehicles, which is insignificant for facility planning. The recommended standard is that 75% of the roads classified as Principal Arterials or above are within limits. These standards are exceeded for all functional classifications. All deviations are within limits. Class 9 shows the highest deviation and shows volumes to be 22% low. This class has only 10 count observations of the 277 counts with an average volume of 182 vehicles per hour. This deviation may appear high but it represents only about 40 vehicles per hour.

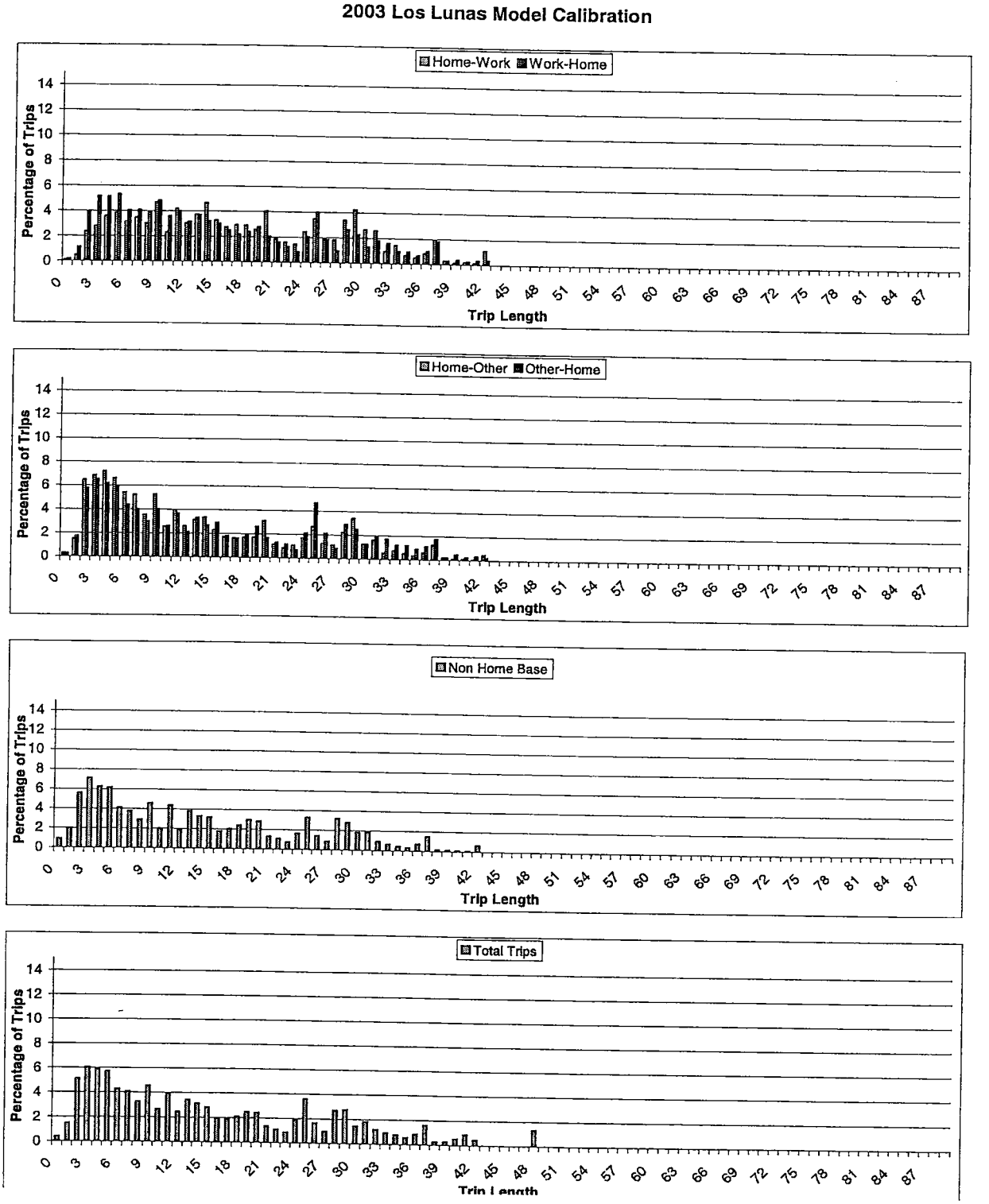


Figure IV-4 – Trip Length Frequency Distribution

Calibration History

Calibration of the Los Lunas model was conducted in June and July 2003. Sixteen TMODEL simulation runs were necessary to calibrate the model. It was the goal of the model's calibration

to represent existing traffic volumes for the base period of spring 2003. All land use and travel characteristics data supplied was for this year.

Simulation Runs-Previously, external zone traffic volumes were the most difficult trips on the network to calibrate, and this took time. Now, since TMODEL has incorporated a "self-calibrating" module, the user may always duplicate the base-year traffic entered in the program that represents external zone volumes. Although the self-calibrating module accelerated the process, the assumptions made to develop the external zone volumes were continually challenged to determine that effective results were being produced by the simulation process. Not all external count volumes were available, although they were available close to these locations within the model area. Adjustments were made in the assumed counts at several of the external zone locations during the calibration process. These adjustments were to help the model correspond with known counts at locations internal to the model.

The next task was to consider the general trends as shown in the scattergrams for overall traffic flow patterns. The scattergrams are used to validate the gravity (distribution) model's exponents and the general overall mass movement of traffic across the network. In these initial simulations, close attention is paid to the gravity model exponents and constants as well as to the overall amount of traffic generated for the model. If the overall travel was too high, it was an indicator that the friction of distance was too low and the exponents needed to be raised to shorten travel length and decrease volumes on major roadways. If overall travel is too low, the converse is true.

In the comparison of scattergrams for the peak hour model, it was found that the overall count comparisons were too low in some areas and too high in others. When this occurred, it signified that the trip generation assumptions were probably incorrect. Land use locations and trip generation values were re-evaluated and adjusted. These rates were modified to more accurately reflect local conditions. The land use refinements to more accurately represent activity locations resulted in model improvements.

The slope of the regression line was improved by increasing the Beta exponent in the gravity model. This reflected the tendency seen in urban and suburban areas to be more sensitive to the travel costs of time. These adjustments resulted in an improvement in calibration statistics.

Once the overall trend analysis was considered acceptable, other adjustments were made to the model to produce better link volumes at known count locations. In transportation modeling, it is important to describe as accurately as possible how the driver perceives the traffic operations on the network. Speeds were adjusted slightly to reflect the drivers' perception.

One of the parameters in a transportation planning model is link speeds. Known speed limits are entered as a starting place for the model. The simulated volumes are compared to known ground counts. If individual routes had too high or low simulated volumes, the posted speeds were adjusted so that estimated volumes could match known counts. All speed limit changes were within a +/-5 mph range.

To ensure proper distribution of traffic throughout the model, travel time matrices were saved as part of the calibration process. These matrices were then displayed in the travel/land use graphic viewer to analyze the travel times to/from selected zones in the Los Lunas area. This in turn would not only visually illustrate the travel times but aid in reviewing improper network

coding such as capacity constraints, network connectivity, and link lengths. In addition, the trip distribution, or trip table, was graphically examined at selected zones for reasonableness.

The model was considered calibrated when the scattergram analysis met or exceeded the NCHRP 255 limits, simulated volumes were close to known counts, and recognized travel patterns modeled.

Final Calibration Values-Changes were made to the parameters in an iterative fashion based upon judgment. The final values used in the calibration are the following:

- Time and distance weights of 0.9 and 0.1, respectively.
- Incremental distribution and assignment assumed. Selection of this option meant that the gravity model distributions are based upon recalculated travel times in subsequent assignments.
- Table IV-12 illustrates the gravity model exponents set at the following (refer to page 5 for the form of the gravity model used in TMODEL):

Table IV-12
Gravity Model Parameters
2003 Los Lunas Transportation Planning Model

Trip Purpose	Beta Exponent	Alpha Exponent	Constant
HW	1.95	-.5	5
WH	1.95	-.5	5
HO	2.95	-.5	10
OH	2.95	-.5	10
NHB	2.90	-.5	10

- A total of 10 gravity model iterations. To calibrate the external zone volumes effectively, a high number of gravity model iterations are used. TMODEL allows up to 10 iterations. But as the destinations are factored up or down, the user can specify a maximum destination error that can stop the process. A 0.01% error was assumed sufficient to calibrate the zone destinations. Factors were not changed during the calibration process.
- The incremental loading process. The incremental process computes the current travel times on links and nodes at the beginning of each increment.
- Ten loading increments of 20%, 10%, 10%, 10%, 10%, 10%, 10%, 10%, 5%, and 5% were used for the assignment process.

LOS LUNAS
TRANSPORTATION STUDY

PHASE 1 REPORT

V
INITIAL FINDINGS AND PHASE 2 EFFORTS

V
INITIAL FINDINGS AND PHASE 2 EFFORTS

Initial Findings

Although the primary purpose of Phase 1 of this study is to gather information which will then be analyzed in detail in Phase 2, there are several general areas of concern under existing volumes that have already manifested themselves. They are:

- Los Lentes Road and Main Street Intersection
- Los Cerritos Road and Main Street Intersection
- NM314 and Main Street Intersection
- NM47 and NM6 Intersection
- Signal Progression
- East-West Corridors

Los Lentes Road and Main Street Intersection

This intersection experiences a high number of accidents as well as very low levels of service. The primary level of service failure at this intersection is the north-bound through and left movements. These two movements are currently occurring from the same lane. This causes significant delay for north bound vehicles that must wait for left turn vehicles ahead of them. Several of the other turning movements at this intersection also show very low levels of service. These low levels of service will only get worse as the traffic projections for the future are applied to the existing configuration of this intersection.

Los Cerritos Road and Main Street Intersection

This intersection showed so poorly under existing conditions that the software used to develop the queues could not fully assess the length of the queue. This intersection is the one of the two primary exit points for traffic from Los Lunas High School. A large number of vehicles (128 peak hour volume) are trying to turn left onto Main Street to go east without a signal. It was our understanding when doing the traffic counts and creating the model that a signal at this location was already in the planning stages at the New Mexico Department of Transportation. This understanding became a reality when a signal was installed at this location in the fall of 2003. Therefore, the primary solution to the traffic flow from Los Cerritos Road has already been provided.

NM314 and Main Street Intersection

The analysis of this intersection combined with first hand experience in the afternoon peak hours show that this intersection fails in the east-bound direction in addition to the other low levels of service shown in the traffic report. One of the primary culprits for this east-bound failure is the Main Street signal at Luna Avenue. The Luna Avenue signal is approximately 800 feet from the

NM314. These two signals are not synchronized to provide good progression through this area. It was observed on several occasions that the signal will change at just the wrong time, causing vehicles with a green on NM314 to stop at Luna Avenue. This sometimes causes vehicles to string through the NM314 intersection and significantly artificially reduces the green time for the NM314 intersection.

NM47 and NM6 Intersection

This intersection has the highest number of accidents and shows levels of service of at C and D for many of the intersection movements. The level of service will only continue to decrease as the traffic volumes increase. This intersection will be investigated further in Phase 2.

Signal Progression

As was discussed in Section III of this document and above on the NM314 and Main Street intersection, signal progression synchronization on Main Street (NM6) does not presently exist. This causes a significant reduction in capacity at the NM314 intersection as well as several of the other intersections in this area. This topic will be further addressed in Phase 2.

East-West Corridors

One of the concerns that comes to the forefront for the future transportation system in the Village and the surrounding area is the discontinuity of east-west routes. There are several north-south routes including NM47, NM314, and the Manzano Expressway. However, there is no continuous east-west route from I-25 to the areas on the east mesa. There are some that may argue that this topic should not concern the Village because the Village currently has the east-west routes it needs and traffic outside of the Village is not its concern. However, the current primary east-west route for the entire area, Main Street, passes through the heart of the Village. The intersection of NM47 and NM6 is also within the Village. Therefore, as this area continues to grow, this issue will become an issue for the Village if it is not already. We will look further at this issue in Phase 2 of this study. We currently believe that one of the outcomes of this study will be recommendations concerning cooperation with surrounding communities and governmental agencies regarding improved east-west transportation corridors.

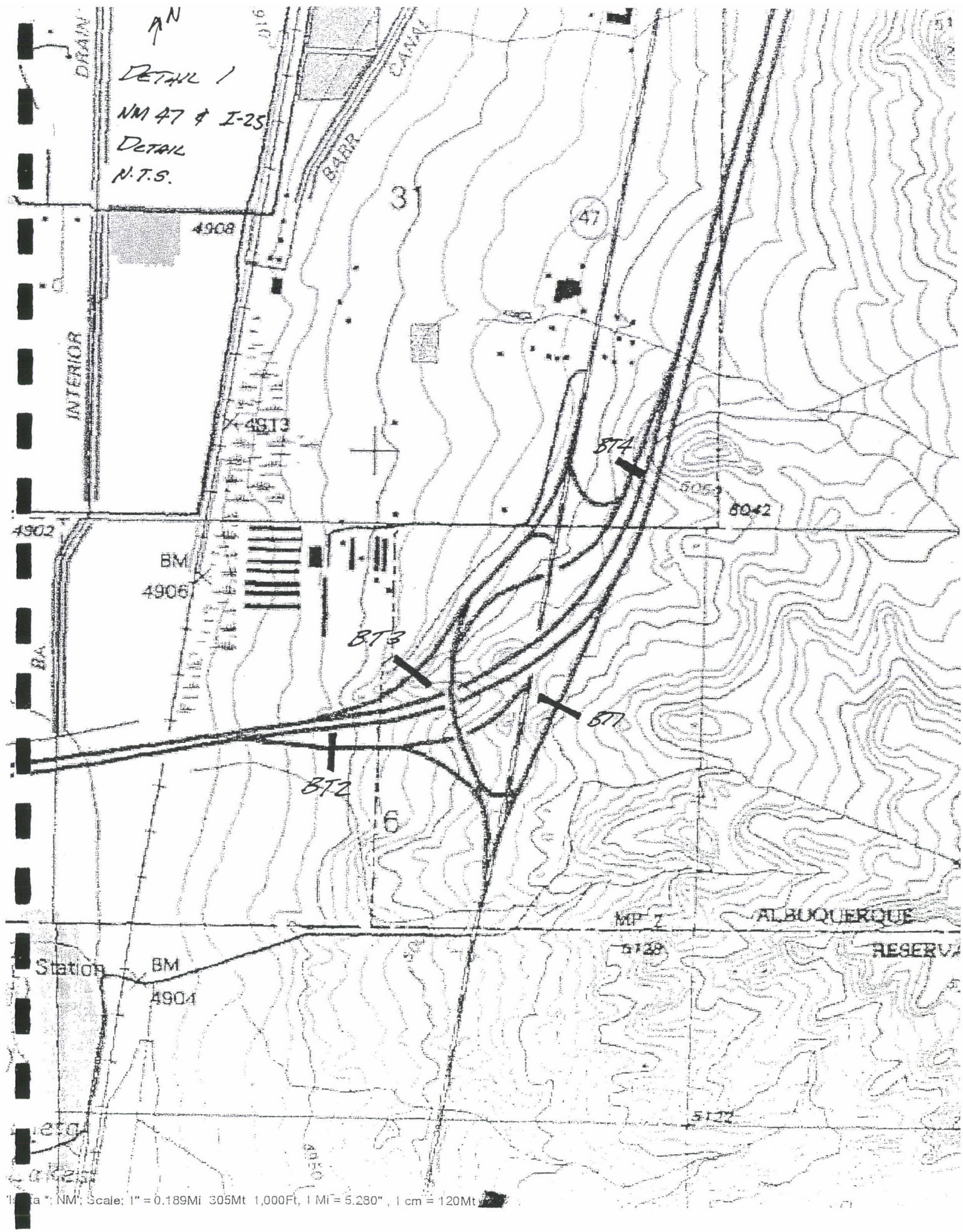
Phase 2

Phase 2 of this study, as detailed in Section 1 of this document, will take the data that has been gathered, develop traffic volume projections for the future, and develop planning level solutions to be able to handle those traffic volumes. The initial findings stated above are just the start of the analysis and are provided purely as a starting point for the deeper analysis of Phase 2.

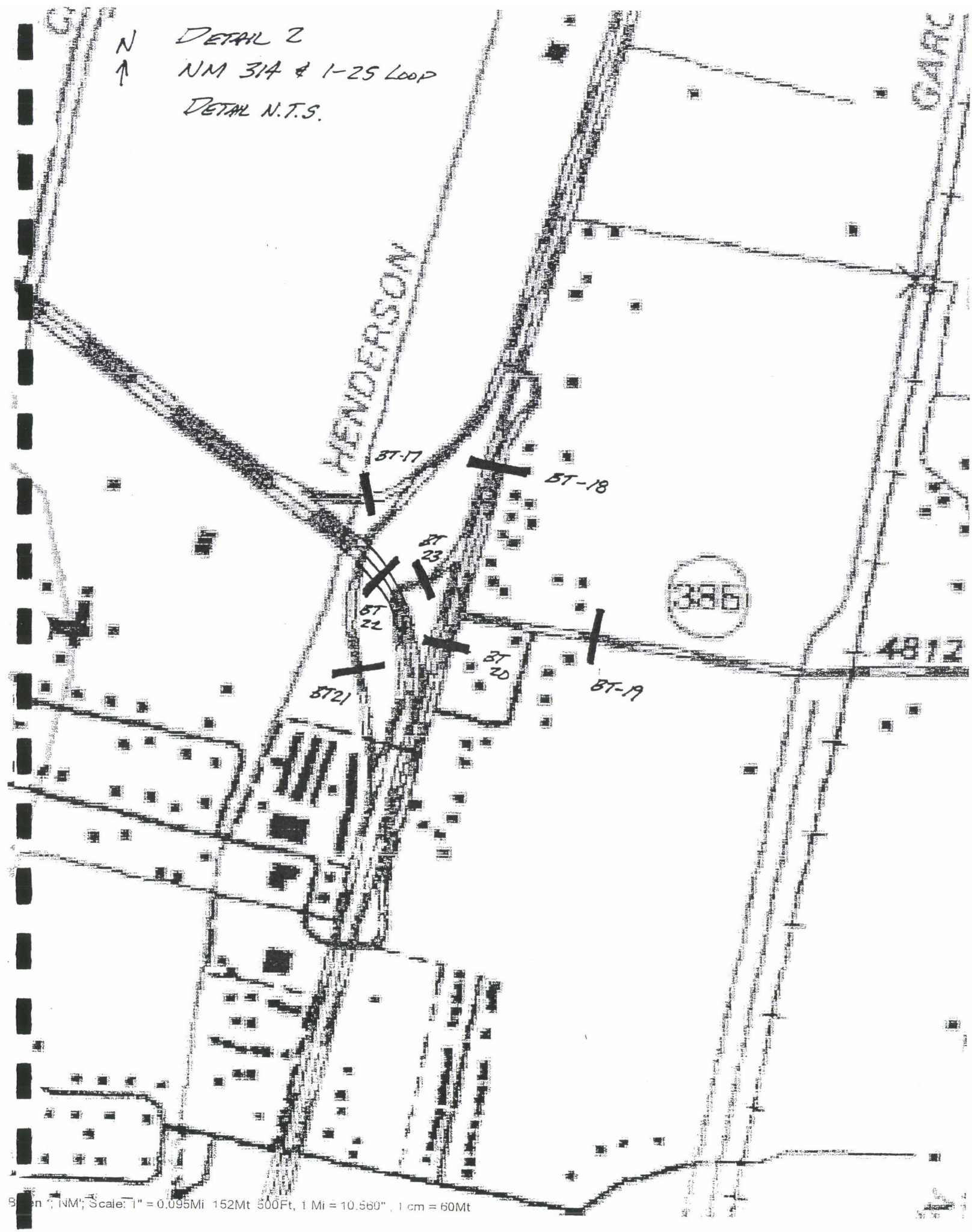
The insight of the Village of Los Lunas in authorizing this study is to be commended as now is the time to plan for the problems of the future. So many communities wait until the problems arise when many of the options for solutions have been taken by unplanned development or have become unreasonably expensive. This Village has shown that this is not the case for this community and the efforts of its officials should be commended.

APPENDIX II

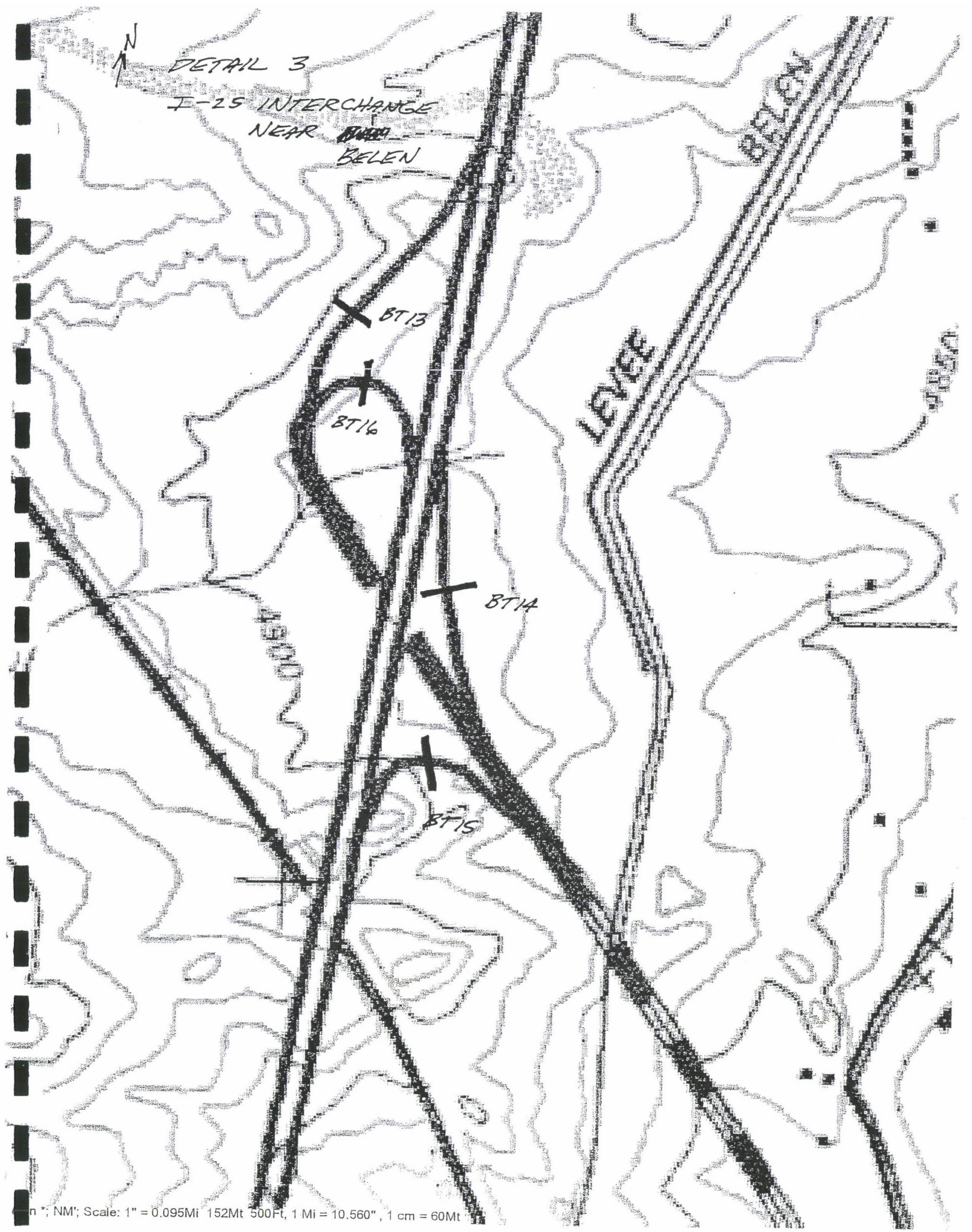
Tube Count Locations Detail 1
Tube Count Locations Detail 2
Tube Count Locations Detail 3



"Isleta", NM", Scale: 1" = 0.189Mi 305Mt 1,000Ft, 1 Mi = 5.280" , 1 cm = 120Mt



Scale: 1" = 0.095Mi 152Mt 500Ft, 1 Mi = 10.560", 1 cm = 60Mt



n *; NM'; Scale: 1" = 0.095Mi 152Mt 500Ft, 1 Mi = 10.560" , 1 cm = 60Mt

APPENDIX III-A

AM and PM Peak Hour
Unsignalized and Signalized
Intersection Capacity Analysis Reports

INTERSECTION TRAFFIC OPERATIONS ANALYSIS SUMMARY - AM PEAK HOUR

INTERSECTION	CYCLE LENGTH (secs)	Level of Service by Approach Movement												Average Delay (sec/veh)	Intersection LOS	Max v/c
		EB			WB			NB			SB					
		L	T	R	L	T	R	L	T	R	L	T	R			
Signalized																
NM 6 (Main St.) & Desert Willow Road	45	B	A	-	-	A	A	-	-	-	B	-	A	7.9	A	0.45
NM 6 (Main St.) & I-25 Southbound Ramps	65	-	A	A	B	A	-	-	-	-	B	B	A	8.3	A	0.31
NM 6 (Main St.) & Emilio Lopez Rd. / Camelot Blvd.	90	D	B	B	C	C	A	D	B	B	C	A	A	18.6	B	0.77
NM 6 (Main St.) & Don Pasqual Road	80	C	A	-	-	A	A	-	-	-	C	-	A	8.5	A	0.68
NM 6 (Main St.) & NM 314	120	D	C	C	D	C	C	D	C	C	D	C	C	27.4	C	0.79
NM 6 (Main St.) & Luna Avenue	80	C	A	A	C	A	A	B	B	B	A	A	A	9.5	A	0.57
NM 6 (Main St.) & Los Lentes Road	80	C	C	B	E	D	D	F	F	A	E	A	A	54.4	D	(1)
NM 6 (Main St.) & Carson Drive	75	A	A	A	C	A	A	B	A	A	A	A	A	7.6	A	0.54
NM 314 & Courthouse Road / Gensen Drive	50	A	A	A	A	A	A	A	A	A	A	A	A	5.9	A	0.42
NM 6 (Main St.) & NM 263 / Lake View Drive	90	D	C	C	D	C	C	D	D	A	B	B	A	29.4	C	0.91
NM 6 (Main St.) & NM 47 / commercial access	75	B	B	B	B	B	A	B	A	A	B	A	A	4.7	A	0.55
NM 47 & Valencia Road	70	-	-	-	B	-	B	-	B	B	C	A	-	10.7	B	0.77
Unsignalized (Stop Controlled)																
NM 6 (Main St.) & Los Cerritos Road	TWSC	C	A	-	-	A	A	-	-	-	(2)	-	C	-	-	-
Courthouse Road & Luna Avenue	TWSC	A	A	-	-	A	A	-	-	-	B	-	B	-	-	-

Notes: 1: Synchro shows max v/c=11.73; HCM-Synchro shows v/c=0.77

2: Neither HCS nor Synchro produces a valid LOS for this movement; assume LOS E or F

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	350			150	200	200
Storage Lanes	1			1	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	3539	3539	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				30		14
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	45		30	
Link Distance (ft)		800	1254		916	
Travel Time (s)		18.2	19.0		20.8	
Volume (vph)	5	60	116	24	87	8
Peak Hour Factor	0.77	0.77	0.81	0.81	0.59	0.59
Adj. Flow (vph)	6	78	143	30	147	14
Lane Group Flow (vph)	6	78	143	30	147	14
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Detector Phases	5	2	6	6	4	4
Minimum Initial (s)	7.0	15.0	15.0	15.0	7.0	7.0
Minimum Split (s)	12.0	20.5	20.5	20.5	12.0	12.0
Total Split (s)	12.0	33.0	21.0	21.0	12.0	12.0
Total Split (%)	27%	73%	47%	47%	27%	27%
Maximum Green (s)	7.0	27.5	15.5	15.5	7.0	7.0
Yellow Time (s)	3.5	4.0	4.0	4.0	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min	Min	Min	None	None
Walk Time (s)			7.0	7.0	7.0	7.0
Flash Dont Walk (s)			18.0	18.0	27.0	27.0
Pedestrian Calls (#/hr)			0	0	0	0
Act Effct Green (s)	9.6	35.1	32.2	32.2	10.5	10.5
Actuated g/C Ratio	0.15	0.65	0.60	0.60	0.19	0.19
v/c Ratio	0.02	0.03	0.07	0.03	0.45	0.05
Uniform Delay, d1	25.0	2.7	5.4	0.0	20.9	0.0
Delay	15.2	3.4	5.7	3.8	12.9	8.1
LOS	B	A	A	A	B	A
Approach Delay		4.2	5.4			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A			
Queue Length 50th (ft)	1	3	5	0	21	0
Queue Length 95th (ft)	7	6	22	10	46	6
Internal Link Dist (ft)		720	1174		836	
50th Up Block Time (%)						
95th Up Block Time (%)						
Turn Bay Length (ft)	350			150	200	200
50th Bay Block Time %						
95th Bay Block Time %						
Queuing Penalty (veh)						

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 53.9

Natural Cycle: 45

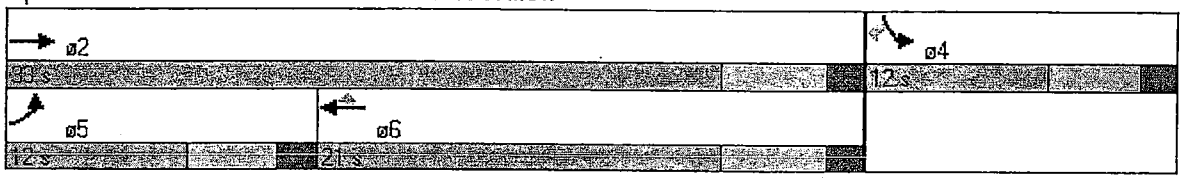
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 7.9 Intersection LOS: A

Intersection Capacity Utilization 27.3% ICU Level of Service A

Splits and Phases: 1: NM 6 & Desert Willow



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50		50	50					50	50	50
Trailing Detector (ft)		0		0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.976										0.850
Flt Protected				0.950						0.950	0.950	
Satd. Flow (prot)	0	3454	0	1770	3539	0	0	0	0	1681	1681	1583
Flt Permitted				0.950						0.950	0.950	
Satd. Flow (perm)	0	3454	0	1770	3539	0	0	0	0	1681	1681	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33										61
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		1254			1775			1225			909	
Travel Time (s)		28.5			26.9			27.8			20.7	
Volume (vph)	0	188	36	90	212	0	0	0	0	183	0	55
Peak Hour Factor	0.85	0.85	0.85	0.93	0.93	0.93	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	221	42	97	228	0	0	0	0	203	0	61
Lane Group Flow (vph)	0	263	0	97	228	0	0	0	0	102	101	61
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Detector Phases		2		1	6					4	4	4
Minimum Initial (s)		10.0		7.0	10.0					7.0	7.0	7.0
Minimum Split (s)		20.0		20.0	20.0					24.0	24.0	24.0
Total Split (s)	0.0	21.0	0.0	20.0	41.0	0.0	0.0	0.0	0.0	24.0	24.0	24.0
Total Split (%)	0%	32%	0%	31%	63%	0%	0%	0%	0%	37%	37%	37%
Maximum Green (s)		17.0		16.0	37.0					20.0	20.0	20.0
Yellow Time (s)		3.0		3.0	3.0					3.0	3.0	3.0
All-Red Time (s)		1.0		1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Recall Mode		Min		None	Min					None	None	None
Walk Time (s)		5.0			5.0					7.0	7.0	7.0
Flash Dont Walk (s)		9.0			9.0					13.0	13.0	13.0
Pedestrian Calls (#/hr)		0			0					0	0	0
Act Effct Green (s)		28.5		10.6	38.3					10.9	10.9	10.9
Actuated g/C Ratio		0.55		0.19	0.75					0.20	0.20	0.20
v/c Ratio		0.14		0.29	0.09					0.31	0.31	0.17
Uniform Delay, d1		6.0		20.5	2.3					20.4	20.4	0.0
Delay		8.7		12.6	3.2					12.4	12.4	4.8
LOS		A		B	A					B	B	A
Approach Delay		8.7			6.0						10.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A						B	
Queue Length 50th (ft)		18		17	8					18	17	0
Queue Length 95th (ft)		44		48	21					51	51	20
Internal Link Dist (ft)		1174			1695			1145			829	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)				150								
50th Bay Block Time %												
95th Bay Block Time %												
Queuing Penalty (veh)												

Intersection Summary

Area Type: Other

Cycle Length: 65

Actuated Cycle Length: 51.4

Natural Cycle: 65

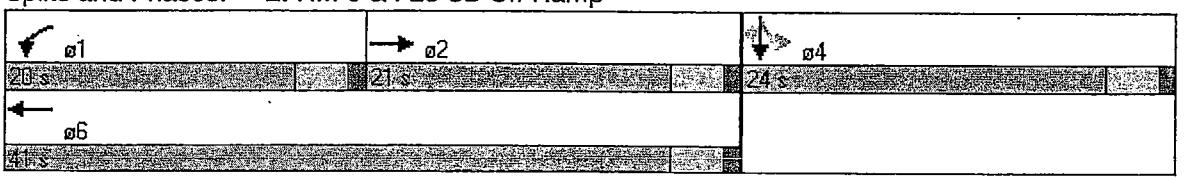
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.31

Intersection Signal Delay: 8.3 Intersection LOS: A

Intersection Capacity Utilization 30.0% ICU Level of Service A

Splits and Phases: 2: NM 6 & I-25 SB Off Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	0		0	0		0
Storage Lanes	1		0	1		1	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979				0.850		0.902			0.862	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3465	0	1770	3539	1583	1770	1680	0	1770	1606	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3465	0	1770	3539	1583	1770	1680	0	1770	1606	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				560		110			163	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		1775			5083			1222			902	
Travel Time (s)		40.3			77.0			27.8			20.5	
Volume (vph)	126	278	44	64	663	448	187	45	83	121	10	116
Peak Hour Factor	0.79	0.79	0.79	0.80	0.80	0.80	0.70	0.70	0.70	0.71	0.71	0.71
Adj. Flow (vph)	159	352	56	80	829	560	267	64	119	170	14	163
Lane Group Flow (vph)	159	408	0	80	829	560	267	183	0	170	177	0
Turn Type	Prot			Prot		Free	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						Free						
Detector Phases	5	2		1	6		3	8		7	4	
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	11.0	22.0		11.0	22.0		11.0	31.0		11.0	31.0	
Total Split (s)	13.0	28.0	0.0	13.0	28.0	0.0	18.0	33.0	0.0	16.0	31.0	0.0
Total Split (%)	14%	31%	0%	14%	31%	0%	20%	37%	0%	18%	34%	0%
Maximum Green (s)	9.0	24.0		9.0	24.0		14.0	29.0		12.0	27.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		10.0			10.0			20.0			20.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	9.0	24.8		8.2	21.5	71.1	14.0	11.0		13.5	10.5	
Actuated g/C Ratio	0.13	0.35		0.11	0.30	1.00	0.20	0.15		0.19	0.15	
v/c Ratio	0.71	0.33		0.41	0.77	0.35	0.76	0.52		0.51	0.47	
Uniform Delay, d1	30.3	16.6		31.1	22.3	0.0	27.5	10.8		26.3	2.1	
Delay	40.0	17.5		30.5	22.8	0.0	35.9	12.8		28.0	6.8	
LOS	D	B		C	C	A	D	B		C	A	
Approach Delay		23.8			14.5			26.5			17.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			C			B	
Queue Length 50th (ft)	70	68		34	170	0	114	30		68	6	
Queue Length 95th (ft)	#132	93		67	207	0	149	52		103	29	
Internal Link Dist (ft)		1695			5003			1142			822	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	200			200								
50th Bay Block Time %												
95th Bay Block Time %					7%							
Queuing Penalty (veh)					3							

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 71.1

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.77

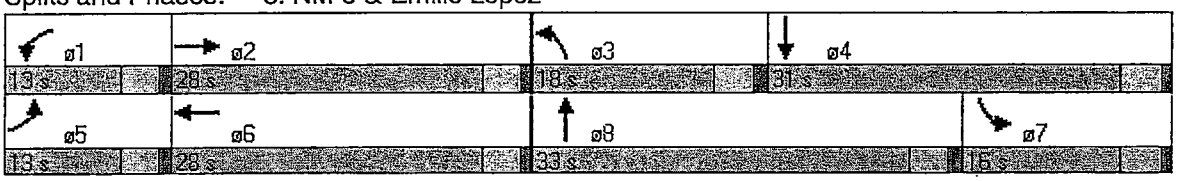
Intersection Signal Delay: 18.6 Intersection LOS: B

Intersection Capacity Utilization 70.7% ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: NM 6 & Emilio Lopez



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.968			0.979			0.947			0.929	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3426	0	1770	3465	0	1770	3352	0	1770	3288	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3426	0	1770	3465	0	1770	3352	0	1770	3288	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			18			90			68	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		1903			808			1500			920	
Travel Time (s)		43.3			12.2			34.1			20.9	
Volume (vph)	31	534	143	108	854	142	334	172	95	88	60	54
Peak Hour Factor	0.91	0.91	0.91	0.81	0.81	0.81	0.87	0.87	0.87	0.79	0.79	0.79
Adj. Flow (vph)	34	587	157	133	1054	175	384	198	109	111	76	68
Lane Group Flow (vph)	34	744	0	133	1229	0	384	307	0	111	144	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Detector Phases	1	6		5	2		7	4		3	8	
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.5	31.5		12.0	31.5		11.5	31.0		11.5	30.5	
Total Split (s)	11.5	43.5	0.0	16.0	48.0	0.0	30.0	41.5	0.0	19.0	30.5	0.0
Total Split (%)	10%	36%	0%	13%	40%	0%	25%	35%	0%	16%	25%	0%
Maximum Green (s)	7.0	38.0		11.0	42.5		25.5	36.5		14.5	26.0	
Yellow Time (s)	3.0	3.5		3.5	3.5		3.0	3.5		3.0	3.0	
All-Red Time (s)	1.5	2.0		1.5	2.0		1.5	1.5		1.5	1.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		16.0			16.0			16.0			16.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	7.7	31.0		11.3	40.4		26.4	23.8		11.4	8.8	
Actuated g/C Ratio	0.08	0.34		0.12	0.44		0.29	0.26		0.12	0.09	
v/c Ratio	0.24	0.63		0.61	0.79		0.75	0.32		0.51	0.39	
Uniform Delay, d1	43.6	23.7		39.3	23.2		30.9	19.7		40.5	21.8	
Delay	45.6	24.1		44.6	23.5		40.4	22.5		40.9	24.1	
LOS	D	C		D	C		D	C		D	C	
Approach Delay		25.1			25.5			32.4			31.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	21	186		84	355		238	62		69	24	
Queue Length 95th (ft)	54	256		134	394		#391	101		108	45	
Internal Link Dist (ft)		1823			728			1420			840	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	150			150			150			150		
50th Bay Block Time %		14%			34%		31%					
95th Bay Block Time %		27%			37%		50%					
Queuing Penalty (veh)		7			47		62					

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 90.9

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

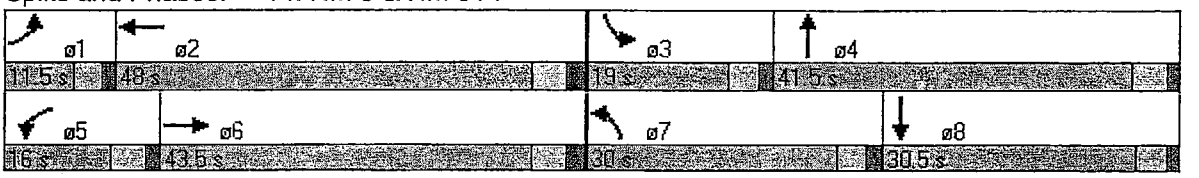
Intersection Signal Delay: 27.4 Intersection LOS: C

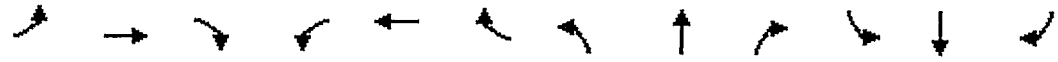
Intersection Capacity Utilization 81.0% ICU Level of Service D

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 14: NM 6 & NM 314



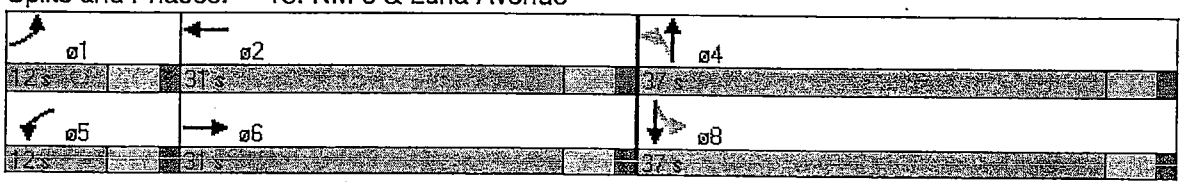


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	300		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.999			0.943			0.894	
Flt Protected	0.950			0.950				0.981			0.995	
Satd. Flow (prot)	1770	3497	0	1770	3536	0	0	1723	0	0	1657	0
Flt Permitted	0.950			0.950				0.877			0.975	
Satd. Flow (perm)	1770	3497	0	1770	3536	0	0	1541	0	0	1624	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			1			38			122	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		808			1714			1396			956	
Travel Time (s)		18.4			26.0			31.7			21.7	
Volume (vph)	74	605	53	38	996	8	28	15	31	13	14	100
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	90	738	65	46	1215	10	34	18	38	16	17	122
Lane Group Flow (vph)	90	803	0	46	1225	0	0	90	0	0	155	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Detector Phases	1	6		5	2		4	4		8	8	
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	12.0	23.0		12.0	23.0		32.0	32.0		37.0	37.0	
Total Split (s)	12.0	31.0	0.0	12.0	31.0	0.0	37.0	37.0	0.0	37.0	37.0	0.0
Total Split (%)	15%	39%	0%	15%	39%	0%	46%	46%	0%	46%	46%	0%
Maximum Green (s)	7.0	26.0		7.0	26.0		32.0	32.0		32.0	32.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		10.0			10.0		20.0	20.0		25.0	25.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	8.9	42.4		8.8	39.6			10.7			10.7	
Actuated g/C Ratio	0.13	0.65		0.12	0.61			0.16			0.16	
v/c Ratio	0.40	0.35		0.21	0.57			0.33			0.43	
Uniform Delay, d1	29.7	6.2		30.4	8.4			14.9			5.4	
Delay	22.4	6.9		23.4	9.8			12.8			7.1	
LOS	C	A		C	A			B			A	
Approach Delay		8.5			10.3			12.8			7.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			B			A	
Queue Length 50th (ft)	27	38		14	152			15			10	
Queue Length 95th (ft)	61	125		37	216			42			42	
Internal Link Dist (ft)		728			1634			1316			876	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	300			300								
50th Bay Block Time %												
95th Bay Block Time %												
Queuing Penalty (veh)												

Intersection Summary
Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 65.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 9.5 Intersection LOS: A
Intersection Capacity Utilization 61.2% ICU Level of Service B

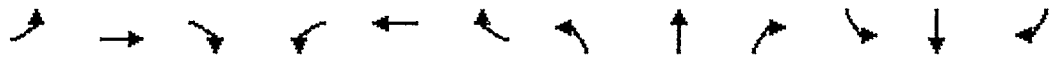
Splits and Phases: 13: NM 6 & Luna Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	300		0	0		0	0		0
Storage Lanes	1		1	1		0	0		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.984				0.850		0.920	
Flt Protected	0.950			0.950				0.985		0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3483	0	0	1835	1583	1770	1714	0
Flt Permitted	0.950			0.950				0.899		0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3483	0	0	1675	1583	1770	1714	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			19		16				242		77	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1714			1397			1340			945	
Travel Time (s)		39.0			31.8			30.5			21.5	
Volume (vph)	70	550	18	154	730	86	34	81	215	137	63	72
Peak Hour Factor	0.97	0.97	0.97	0.90	0.90	0.90	0.89	0.89	0.89	0.67	0.67	0.67
Adj. Flow (vph)	72	567	19	171	811	96	38	91	242	204	94	107
Lane Group Flow (vph)	72	567	19	171	907	0	0	129	242	204	201	0
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6						4			
Detector Phases	1	6	6	5	2		7	4	4	3	8	
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0		7.0	10.0	10.0	7.0	10.0	
Minimum Split (s)	11.5	24.0	24.0	11.5	24.0		11.5	28.0	28.0	11.5	28.0	
Total Split (s)	11.5	25.1	25.1	12.7	26.3	0.0	11.5	28.0	28.0	14.2	30.7	0.0
Total Split (%)	14%	31%	31%	16%	33%	0%	14%	35%	35%	18%	38%	0%
Maximum Green (s)	7.0	20.1	20.1	8.2	21.3		7.0	23.0	23.0	9.7	25.7	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0		3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min		None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		12.0	12.0		12.0			16.0	16.0		16.0	
Pedestrian Calls (#/hr)		0	0		0			0	0		0	
Act Effct Green (s)	7.5	19.4	19.4	8.7	23.1			24.0	24.0	10.2	38.3	
Actuated g/C Ratio	0.09	0.25	0.25	0.11	0.29			0.31	0.31	0.13	0.49	
v/c Ratio	0.44	0.65	0.05	0.87	0.87			11.73	0.37	0.88	0.23	
Uniform Delay, d1	35.4	26.1	0.0	34.8	26.4			28.1	0.0	34.1	7.1	
Delay	34.9	26.5	10.2	65.5	35.4			468.5	3.4	63.1	7.6	
LOS	C	C	B	E	D			F	A	E	A	
Approach Delay		26.9			40.2			165.1			35.6	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3483			1836	1583	1770	1714	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.88	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3483			1633	1583	1770	1714	
Volume (vph)	70	550	18	154	730	86	34	81	215	137	63	72
Peak-hour factor, PHF	0.97	0.97	0.97	0.90	0.90	0.90	0.89	0.89	0.89	0.67	0.67	0.67
Adj. Flow (vph)	72	567	19	171	811	96	38	91	242	204	94	107
Lane Group Flow (vph)	72	567	19	171	907	0	0	129	242	204	201	0
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6						4			
Actuated Green, G (s)	5.5	19.4	19.4	8.2	22.1			23.1	23.1	9.7	37.3	
Effective Green, g (s)	6.0	20.4	20.4	8.7	23.1			24.1	24.1	10.2	38.3	
Actuated g/C Ratio	0.08	0.26	0.26	0.11	0.29			0.30	0.30	0.13	0.48	
Clearance Time (s)	4.5	5.0	5.0	4.5	5.0			5.0	5.0	4.5	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	134	909	407	194	1013			496	480	227	827	
v/s Ratio Prot	0.04	0.16		c0.10	c0.26					c0.12	0.12	
v/s Ratio Perm			0.01					0.08	c0.15			
v/c Ratio	0.54	0.62	0.05	0.88	0.90			0.26	0.50	0.90	0.24	
Uniform Delay, d1	35.4	26.1	22.2	34.8	27.0			20.9	22.7	34.1	12.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.1	1.3	0.0	34.0	10.3			0.3	0.8	33.4	0.2	
Delay (s)	39.5	27.4	22.2	68.9	37.3			21.2	23.6	67.5	12.2	
Level of Service	D	C	C	E	D			C	C	E	B	
Approach Delay (s)		28.6			42.3			22.7			40.1	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	35.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	79.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	A
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	200		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987						0.850				
Flt Protected				0.950			0.950					
Satd. Flow (prot)	1863	3493	0	1770	3539	0	1770	1583	0	1863	1863	0
Flt Permitted				0.950			0.757					
Satd. Flow (perm)	1863	3493	0	1770	3539	0	1410	1583	0	1863	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15						259				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			35			20			20	
Link Distance (ft)		1397			4457			1305			800	
Travel Time (s)		27.2			86.8			44.5			27.3	
Volume (vph)	0	702	64	61	1092	0	85	0	91	0	0	0
Peak Hour Factor	0.78	0.78	0.78	0.79	0.79	0.79	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	900	82	77	1382	0	92	0	99	0	0	0
Lane Group Flow (vph)	0	982	0	77	1382	0	92	99	0	0	0	0
Turn Type	Perm			Prot			Perm			Perm		
Protected Phases		6		5	2			4			8	
Permitted Phases	6						4			8		
Detector Phases	6	6		5	2		4	4		8	8	
Minimum Initial (s)	10.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	29.5	29.5		12.5	21.5		29.0	29.0		29.0	29.0	
Total Split (s)	33.5	33.5	0.0	12.5	46.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0
Total Split (%)	45%	45%	0%	17%	61%	0%	39%	39%	0%	39%	39%	0%
Maximum Green (s)	28.0	28.0		7.0	40.5		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Walk Time (s)	8.0	8.0					8.0	8.0		8.0	8.0	
Flash Dont Walk (s)	16.0	16.0					16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	0	0					0	0		0	0	
Act Effct Green (s)		39.6		9.6	48.3		12.0	12.0				
Actuated g/C Ratio		0.59		0.13	0.72		0.17	0.17				
v/c Ratio		0.48		0.33	0.54		0.38	0.20				
Uniform Delay, d1		8.5		29.3	4.2		25.8	0.0				
Delay		9.6		22.8	5.0		19.7	0.0				
LOS		A		C	A		B	A				
Approach Delay		9.6			5.9			9.5			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			A			A			A	
Queue Length 50th (ft)		118		21	97		25	0				
Queue Length 95th (ft)		160		55	148		67	0				
Internal Link Dist (ft)		1317			4377			1225			720	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)				200								
50th Bay Block Time %												
95th Bay Block Time %												
Queuing Penalty (veh)												

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 67.3

Natural Cycle: 75

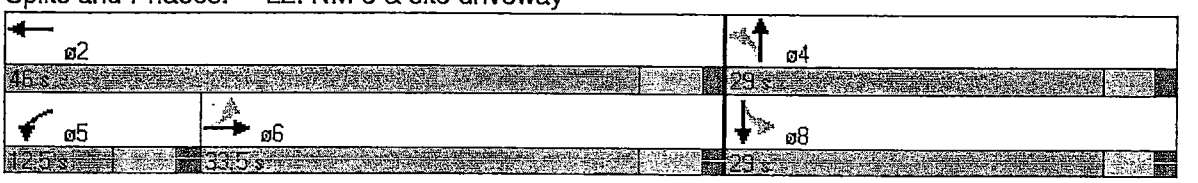
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 7.6 Intersection LOS: A

Intersection Capacity Utilization 62.7% ICU Level of Service B

Splits and Phases: 22: NM 6 & site driveway



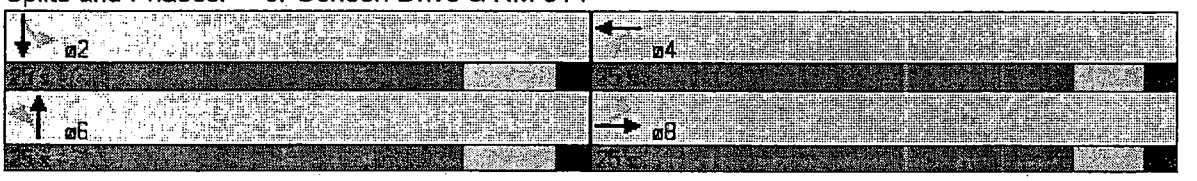
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	150		0	150		0
Storage Lanes	0		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.932			0.850			0.953			0.999	
Flt Protected		0.984		0.950			0.950			0.950		
Satd. Flow (prot)	0	1708	0	1770	1583	0	1770	3373	0	1770	3536	0
Flt Permitted		0.945		0.750			0.545			0.333		
Satd. Flow (perm)	0	1641	0	1397	1583	0	1017	3373	0	620	3536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			255			178			2	
Headway Factor	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		20			30			35			35	
Link Distance (ft)		4112			4320			3672			3016	
Travel Time (s)		140.2			98.2			71.5			58.8	
Volume (vph)	2	1	3	155	0	112	1	441	198	46	244	2
Peak Hour Factor	0.50	0.50	0.50	0.89	0.89	0.89	0.94	0.94	0.94	0.72	0.72	0.72
Adj. Flow (vph)	4	2	6	174	0	126	1	469	211	64	339	3
Lane Group Flow (vph)	0	12	0	174	126	0	1	680	0	64	342	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Detector Phases	8	8		4	4		6	6		2	2	
Minimum Initial (s)	10.0	10.0		12.0	12.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	20.5	20.5		22.0	22.0		21.5	21.5		24.0	24.0	
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	25.0	25.0	0.0	25.0	25.0	0.0
Total Split (%)	50%	50%	0%	50%	50%	0%	50%	50%	0%	50%	50%	0%
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Act Effct Green (s)		13.0		13.0	13.0		16.9	16.9		16.9	16.9	
Actuated g/C Ratio		0.34		0.34	0.34		0.45	0.45		0.45	0.45	
v/c Ratio		0.02		0.36	0.18		0.00	0.42		0.23	0.22	
Uniform Delay, d1		4.1		9.3	0.0		6.0	5.1		6.5	6.4	
Delay		6.8		10.0	0.1		6.0	5.4		7.5	6.7	
LOS		A		A	A		A	A		A	A	
Approach Delay		6.8			5.8			5.4			6.8	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)		1		26	0		0	31		7	20	
Queue Length 95th (ft)		4		62	1		2	64		21	32	
Internal Link Dist (ft)		4032			4240			3592			2936	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)							150			150		
50th Bay Block Time %												
95th Bay Block Time %												
Queuing Penalty (veh)												

Intersection Summary

Area Type: Other
Cycle Length: 50
Actuated Cycle Length: 37.9
Natural Cycle: 50
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.42
Intersection Signal Delay: 5.9 Intersection LOS: A
Intersection Capacity Utilization 58.5% ICU Level of Service A

Splits and Phases: 3: Gensen Drive & NM 314



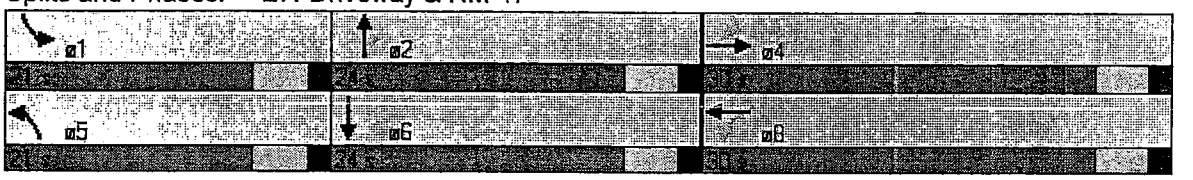
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	12	14	12	12	12	12	12	12
Storage Length (ft)	150		0	150		0	150		150	150		0
Storage Lanes	1		0	1		1	1		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.929				0.850			0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1846	0	1770	1863	1689	1770	3539	1583	1770	3522	0
Flt Permitted	0.746			0.744			0.950			0.950		
Satd. Flow (perm)	1390	1846	0	1386	1863	1689	1770	3539	1583	1770	3522	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				772			11		4	
Headway Factor	1.00	0.92	1.00	1.00	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			45			45			40	
Link Distance (ft)		300			1410			2440			3845	
Travel Time (s)		6.8			21.4			37.0			65.5	
Volume (vph)	9	8	7	27	16	845	20	320	9	138	397	12
Peak Hour Factor	0.70	0.70	0.70	0.91	0.91	0.91	0.79	0.79	0.79	0.88	0.88	0.88
Adj. Flow (vph)	13	11	10	30	18	929	25	405	11	157	451	14
Lane Group Flow (vph)	13	21	0	30	18	929	25	405	11	157	465	0
Turn Type	Perm			Perm		Free	Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		Free			2			
Detector Phases	4	4		8	8		5	2	2	1	6	
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	15.0	15.0	7.0	15.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		21.0	23.0	23.0	21.0	23.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	21.0	24.0	24.0	21.0	24.0	0.0
Total Split (%)	40%	40%	0%	40%	40%	0%	28%	32%	32%	28%	32%	0%
Maximum Green (s)	25.0	25.0		25.0	25.0		16.0	19.0	19.0	16.0	19.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	
Flash Dont Walk (s)	18.0	18.0		18.0	18.0			10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	
Act Effct Green (s)	9.6	9.6		9.6	9.6	46.6	11.5	29.1	29.1	11.2	37.5	
Actuated g/C Ratio	0.18	0.18		0.18	0.18	1.00	0.20	0.62	0.62	0.22	0.80	
v/c Ratio	0.05	0.06		0.12	0.05	0.55	0.07	0.18	0.01	0.41	0.16	
Uniform Delay, d1	22.9	12.0		23.2	22.9	0.0	24.3	6.0	0.0	21.4	3.8	
Delay	17.2	13.3		17.3	17.1	0.0	18.1	8.7	7.4	13.6	4.6	
LOS	B	B		B	B	A	B	A	A	B	A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		14.8			0.8			9.2			6.8	
Approach LOS		B			A			A			A	
Queue Length 50th (ft)	2	1		4	2	0	3	18	0	22	0	
Queue Length 95th (ft)	11	13		26	18	0	19	70	7	76	79	
Internal Link Dist (ft)		220			1330			2360			3765	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	150			150			150		150	150		
50th Bay Block Time %												
95th Bay Block Time %												
Queuing Penalty (veh)												

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 46.6
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 4.7 Intersection LOS: A
Intersection Capacity Utilization 37.9% ICU Level of Service A

Splits and Phases: 27: Driveway & NM 47



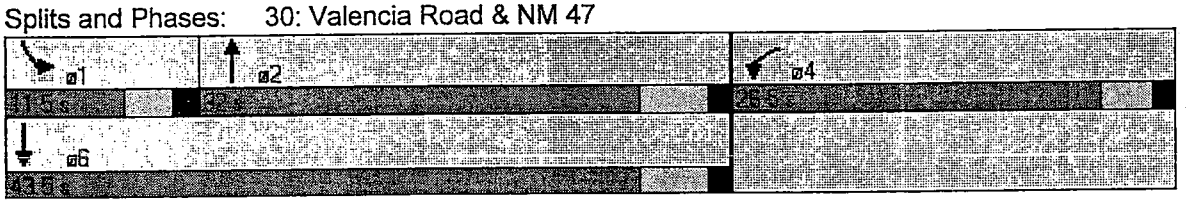
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50		50		50	50
Trailing Detector (ft)	0		0		0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.911		0.997			
Flt Protected	0.983				0.950	
Satd. Flow (prot)	1668	0	3529	0	1770	3539
Flt Permitted	0.983				0.950	
Satd. Flow (perm)	1668	0	3529	0	1770	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	147		3			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		45			40
Link Distance (ft)	1490		3845			1324
Travel Time (s)	33.9		58.3			22.6
Volume (vph)	76	146	1104	21	31	505
Peak Hour Factor	0.84	0.84	0.92	0.92	0.75	0.75
Adj. Flow (vph)	90	174	1200	23	41	673
Lane Group Flow (vph)	264	0	1223	0	41	673
Turn Type					Prot	
Protected Phases	4		2		1	6
Permitted Phases						
Detector Phases	4		2		1	6
Minimum Initial (s)	7.0		15.0		7.0	15.0
Minimum Split (s)	26.5		26.5		11.5	21.5
Total Split (s)	26.5	0.0	32.0	0.0	11.5	43.5
Total Split (%)	38%	0%	46%	0%	16%	62%
Maximum Green (s)	22.0		26.5		7.0	38.0
Yellow Time (s)	3.0		4.0		3.0	4.0
All-Red Time (s)	1.5		1.5		1.5	1.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		Min		Min	Min
Walk Time (s)	10.0		10.0			
Flash Dont Walk (s)	12.0		10.0			
Pedestrian Calls (#/hr)	0		0			
Act Effct Green (s)	10.8		25.0		7.6	36.7
Actuated g/C Ratio	0.19		0.45		0.14	0.66
v/c Ratio	0.60		0.77		0.17	0.29
Uniform Delay, d1	8.6		12.7		21.1	3.9
Delay	10.1		13.8		24.6	4.4
LOS	B		B		C	A
Approach Delay	10.1		13.8			5.6

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		B			A
Queue Length 50th (ft)	36		162		13	36
Queue Length 95th (ft)	84		285		34	65
Internal Link Dist (ft)	1410		3765			1244
50th Up Block Time (%)						
95th Up Block Time (%)						
Turn Bay Length (ft)					100	
50th Bay Block Time %						
95th Bay Block Time %						
Queuing Penalty (veh)						

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 55.6
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 10.7 Intersection LOS: B
Intersection Capacity Utilization 56.3% ICU Level of Service A

Splits and Phases: 30: Valencia Road & NM 47



TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Bressler*
Agency/Co.	*HDR for MC / Los Lunas*
Date Performed	*06/25/2003*
Analysis Time Period	*Exst AM Peak Hour 6:45 - 7:45*

Site Information

Intersection	*NM 6 & Los Cerritos*
Jurisdiction	
Analysis Year	
Project ID	

East/West Street: *NM 6* | North/South Street: *Los Cerritos*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*66*	*501*	*0*	*0*	*1031*	*276*
Peak-Hour Factor, PHF	*0.86*	*0.86*	*1.00*	*1.00*	*0.76*	*0.76*
Hourly Flow Rate, HFR	*76*	*582*	*0*	*0*	*1356*	*363*
Percent Heavy Vehicles	*2*	–	–	*0*	–	–
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*0*	*2*	*1*
Configuration	*L*	*T*			*T*	*R*
Upstream Signal		*1*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*138*	*0*	*171*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.79*	*1.00*	*0.79*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*174*	*0*	*216*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*6*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (vph)	*76*					*174*		*216*
C (m) (vph)	*364*							*395*
v/c	*0.21*							*0.55*
95% queue length	*0.77*							*3.17*
Control Delay	*17.5*							*24.6*
LOS	C							C
Approach Delay	–	–						
Approach LOS	–	–						

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			100	150	150
Storage Lanes	1			1	2	1
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3539	1583	3433	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	3539	3539	1583	3433	1583
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		938	1002		1088	
Travel Time (s)		21.3	22.8		24.7	
Volume (vph)	66	501	1031	276	138	171
Peak Hour Factor	0.86	0.86	0.76	0.76	0.79	0.79
Adj. Flow (vph)	77	583	1357	363	175	216
Lane Group Flow (vph)	77	583	1357	363	175	216
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 57.6%		ICU Level of Service A	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Bressler*
Agency/Co.	*HDR for MC / Los Lunas*
Date Performed	*06/25/2003*
Analysis Time Period	*Exst AM Pk Hr 7:45 - 8:45 AM*

Site Information

Intersection	*Courthouse Road & Luna Avenue*
Jurisdiction	
Analysis Year	
Project ID	

East/West Street: *Courthouse Road* | North/South Street: *LUNA AVENUE*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*62*	*241*	*0*	*0*	*157*	*28*
Peak-Hour Factor, PHF	*0.84*	*0.84*	*1.00*	*1.00*	*0.76*	*0.76*
Hourly Flow Rate, HFR	*73*	*286*	*0*	*0*	*206*	*36*
Percent Heavy Vehicles	*2*	–	–	*0*	–	–
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*1*
Configuration	*L*	*T*			*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*11*	*0*	*30*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.57*	*1.00*	*0.57*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*19*	*0*	*52*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*						*LR*	
v (vph)	*73*						*71*	
C (m) (vph)	*1324*						*658*	
v/c	*0.06*						*0.11*	
95% queue length	*0.17*						*0.36*	
Control Delay	*7.9*						*11.1*	
LOS	*A*						*B*	
Approach Delay	–	–					*11.1*	
Approach LOS	–	–					*B*	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	0	0
Storage Lanes	1			1	1	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850	0.901	
Flt Protected	0.950				0.987	
Satd. Flow (prot)	1770	1863	1863	1583	1657	0
Flt Permitted	0.950				0.987	
Satd. Flow (perm)	1770	1863	1863	1583	1657	0
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		938	1002		1088	
Travel Time (s)		21.3	22.8		24.7	
Volume (vph)	62	241	157	28	11	30
Peak Hour Factor	0.84	0.84	0.76	0.76	0.57	0.57
Adj. Flow (vph)	74	287	207	37	19	53
Lane Group Flow (vph)	74	287	207	37	72	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.3%		ICU Level of Service A	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	62	241	157	28	11	30
Peak Hour Factor	0.84	0.84	0.76	0.76	0.57	0.57
Hourly flow rate (veh/h)	74	287	207	37	19	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	207				641	207
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	207				641	207
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				95	94
cM capacity (veh/h)	1365				415	834

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	74	287	207	37	72
Volume Left	74	0	0	0	19
Volume Right	0	0	0	37	53
cSH	1365	1700	1700	1700	656
Volume to Capacity	0.05	0.17	0.12	0.02	0.11
Queue Length (ft)	4	0	0	0	9
Control Delay (s)	7.8	0.0	0.0	0.0	11.2
Lane LOS	A				B
Approach Delay (s)	1.6		0.0		11.2
Approach LOS					B

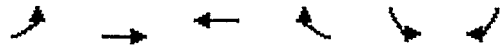
Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	29.3%	ICU Level of Service	A

INTERSECTION TRAFFIC OPERATIONS ANALYSIS SUMMARY - PM PEAK HOUR

INTERSECTION	CYCLE LENGTH (secs)	Level of Service by Approach Movement												Average Delay (sec/veh)	Intersection LOS	Max v/c
		EB			WB			NB			SB					
		L	T	R	L	T	R	L	T	R	L	T	R			
Signalized																
NM 6 (Main St.) & Desert Willow Road	50	B	A	-	-	A	A	-	-	-	B	-	A	9.1	A	0.57
NM 6 (Main St.) & I-25 Southbound Ramps	65	-	B	B	C	A	-	-	-	-	B	B	A	14.1	B	0.68
NM 6 (Main St.) & Emilio Lopez Rd. / Camelot Blvd.	90	C	B	B	D	B	A	C	A	A	D	B	B	19.9	B	0.74
NM 6 (Main St.) & Don Pasqual Road	60	C	A	-	-	B	B	-	-	-	B	-	A	13.2	B	0.62
NM 6 (Main St.) & NM 314	120	D	C	C	E	B	B	E	C	C	D	D	D	33.0	C	0.90
NM 6 (Main St.) & Luna Avenue	80	C	B	B	C	A	A	B	B	B	B	B	B	9.9	A	0.57
NM 6 (Main St.) & Los Lentes Road	90	D	D	A	E	C	C	F	F	A	E	B	B	55.6	E	(1)
NM 6 (Main St.) & Carson Drive	75	A	B	B	D	A	A	C	A	A	A	A	A	14.5	B	0.83
NM 314 & Courthouse Road / Gensen Drive	50	A	A	A	B	A	A	A	A	A	A	A	A	7.0	A	0.55
NM 6 (Main St.) & NM 263 / Lake View Drive	90	D	C	C	D	B	B	D	D	A	B	B	A	25.1	C	0.90
NM 6 (Main St.) & NM 47 / commercial access	90	C	C	C	C	C	A	C	C	A	D	B	B	23.1	C	0.91
NM 47 & Valencia Road	65	-	-	-	B	-	B	-	B	B	C	A	-	9.2	A	0.57
Unsignalized (Stop Controlled)																
NM 6 (Main St.) & Los Cerritos Road	TWSC	B	A	-	-	A	A	-	-	-	(2)	-	C	-	-	-
Courthouse Road & Luna Avenue	TWSC	A	A	-	-	A	A	-	-	-	B	-	B	-	-	-

Notes: 1: Synchro shows max v/c=18.86; HCM-Synchro shows v/c=0.85

2: Neither HCS nor Synchro produces a valid LOS for this movement; assume LOS E or F



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	350			150	200	200
Storage Lanes	1			1	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	3539	3539	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				47		18
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	45		30	
Link Distance (ft)		800	1254		916	
Travel Time (s)		18.2	19.0		20.8	
Volume (vph)	9	146	148	36	234	15
Peak Hour Factor	0.72	0.72	0.77	0.77	0.82	0.82
Adj. Flow (vph)	12	203	192	47	285	18
Lane Group Flow (vph)	12	203	192	47	285	18
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Detector Phases	5	2	6	6	4	4
Minimum Initial (s)	7.0	15.0	15.0	15.0	7.0	7.0
Minimum Split (s)	12.0	20.5	20.5	20.5	12.0	12.0
Total Split (s)	12.0	33.0	21.0	21.0	17.0	17.0
Total Split (%)	24%	66%	42%	42%	34%	34%
Maximum Green (s)	7.0	27.5	15.5	15.5	12.0	12.0
Yellow Time (s)	3.5	4.0	4.0	4.0	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min	Min	Min	None	None
Walk Time (s)			7.0	7.0	7.0	7.0
Flash Dont Walk (s)			18.0	18.0	27.0	27.0
Pedestrian Calls (#/hr)			0	0	0	0
Act Effct Green (s)	8.0	20.6	18.7	18.7	11.4	11.4
Actuated g/C Ratio	0.16	0.51	0.47	0.47	0.28	0.28
v/c Ratio	0.04	0.11	0.12	0.06	0.57	0.04
Uniform Delay, d1	20.1	4.5	7.7	0.0	14.5	0.0
Delay	17.7	5.4	8.0	4.1	13.0	6.7
LOS	B	A	A	A	B	A
Approach Delay		6.1	7.3			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	A			
Queue Length 50th (ft)	2	11	10	0	44	0
Queue Length 95th (ft)	11	17	32	12	120	10
Internal Link Dist (ft)		720	1174		836	
50th Up Block Time (%)						
95th Up Block Time (%)						
Turn Bay Length (ft)	350			150	200	200
50th Bay Block Time %						
95th Bay Block Time %						
Queuing Penalty (veh)						

Intersection Summary

Area Type: Other

Cycle Length: 50

Actuated Cycle Length: 40.1

Natural Cycle: 50

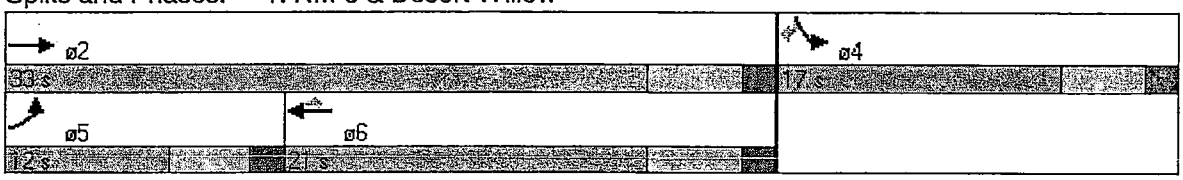
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 9.1 Intersection LOS: A

Intersection Capacity Utilization 35.0% ICU Level of Service A

Splits and Phases: 1: NM 6 & Desert Willow



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50		50	50					50	50	50
Trailing Detector (ft)		0		0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.977										0.850
Flt Protected				0.950						0.950	0.953	
Satd. Flow (prot)	0	3458	0	1770	3539	0	0	0	0	1681	1686	1583
Flt Permitted				0.950						0.950	0.953	
Satd. Flow (perm)	0	3458	0	1770	3539	0	0	0	0	1681	1686	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30										162
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		1254			1775			1225			909	
Travel Time (s)		28.5			26.9			27.8			20.7	
Volume (vph)	0	483	86	123	361	0	0	0	0	651	1	146
Peak Hour Factor	0.93	0.93	0.93	0.97	0.97	0.97	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	519	92	127	372	0	0	0	0	723	1	162
Lane Group Flow (vph)	0	611	0	127	372	0	0	0	0	362	362	162
Turn Type				Prot						Perm		Perm
Protected Phases		2		1	6						4	
Permitted Phases										4		4
Detector Phases		2		1	6					4	4	4
Minimum Initial (s)		10.0		7.0	10.0					7.0	7.0	7.0
Minimum Split (s)		20.0		20.0	20.0					24.0	24.0	24.0
Total Split (s)	0.0	21.0	0.0	20.0	41.0	0.0	0.0	0.0	0.0	24.0	24.0	24.0
Total Split (%)	0%	32%	0%	31%	63%	0%	0%	0%	0%	37%	37%	37%
Maximum Green (s)		17.0		16.0	37.0					20.0	20.0	20.0
Yellow Time (s)		3.0		3.0	3.0					3.0	3.0	3.0
All-Red Time (s)		1.0		1.0	1.0					1.0	1.0	1.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Recall Mode		Min		None	Min					None	None	None
Walk Time (s)		5.0			5.0					7.0	7.0	7.0
Flash Dont Walk (s)		9.0			9.0					13.0	13.0	13.0
Pedestrian Calls (#/hr)		0			0					0	0	0
Act Effct Green (s)		14.5		9.5	24.6					15.6	15.6	15.6
Actuated g/C Ratio		0.29		0.18	0.50					0.32	0.32	0.32
v/c Ratio		0.59		0.39	0.21					0.68	0.68	0.26
Uniform Delay, d1		14.1		19.3	6.3					14.7	14.7	0.0
Delay		16.4		21.1	6.9					17.1	17.0	3.5
LOS		B		C	A					B	B	A
Approach Delay		16.4			10.5						14.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B						B	
Queue Length 50th (ft)		86		38	31					102	102	0
Queue Length 95th (ft)		150		83	52					#212	211	35
Internal Link Dist (ft)		1174			1695			1145			829	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)				150								
50th Bay Block Time %												
95th Bay Block Time %												
Queuing Penalty (veh)												

Intersection Summary

Area Type: Other

Cycle Length: 65

Actuated Cycle Length: 49.2

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.68

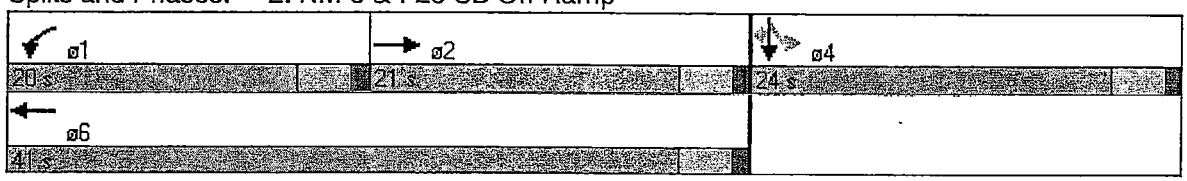
Intersection Signal Delay: 14.1 Intersection LOS: B

Intersection Capacity Utilization 54.4% ICU Level of Service A

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: NM 6 & I-25 SB Off Ramp

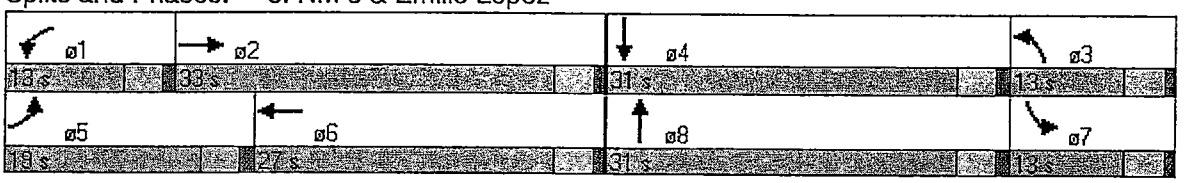


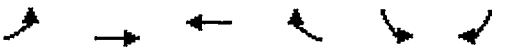
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	0		0	0		0
Storage Lanes	1		0	1		1	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978				0.850		0.876			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3461	0	1770	3539	1583	1770	1632	0	1770	1641	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3461	0	1770	3539	1583	1770	1632	0	1770	1641	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24				90		125			78	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		1775			5083			1222			902	
Travel Time (s)		40.3			77.0			27.8			20.5	
Volume (vph)	141	844	149	125	426	79	63	19	91	143	18	72
Peak Hour Factor	0.96	0.96	0.96	0.88	0.88	0.88	0.73	0.73	0.73	0.92	0.92	0.92
Adj. Flow (vph)	147	879	155	142	484	90	86	26	125	155	20	78
Lane Group Flow (vph)	147	1034	0	142	484	90	86	151	0	155	98	0
Turn Type	Prot			Prot		Free	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						Free						
Detector Phases	5	2		1	6		3	8		7	4	
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	11.0	22.0		11.0	22.0		11.0	31.0		11.0	31.0	
Total Split (s)	19.0	33.0	0.0	13.0	27.0	0.0	13.0	31.0	0.0	13.0	31.0	0.0
Total Split (%)	21%	37%	0%	14%	30%	0%	14%	34%	0%	14%	34%	0%
Maximum Green (s)	15.0	29.0		9.0	23.0		9.0	27.0		9.0	27.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lead		Lag	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		10.0			10.0			20.0			20.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	10.9	27.2		8.6	27.8	68.4	8.9	10.4		9.4	10.3	
Actuated g/C Ratio	0.15	0.40		0.13	0.41	1.00	0.13	0.15		0.14	0.15	
v/c Ratio	0.53	0.74		0.63	0.34	0.06	0.39	0.44		0.64	0.31	
Uniform Delay, d1	29.0	17.3		29.4	14.9	0.0	29.8	4.8		28.8	5.3	
Delay	27.7	18.4		35.7	17.3	0.0	29.8	8.9		38.7	11.2	
LOS	C	B		D	B	A	C	A		D	B	
Approach Delay		19.5			18.8			16.5			28.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B			C	
Queue Length 50th (ft)	62	199		62	82	0	36	11		68	8	
Queue Length 95th (ft)	113	283		#137	133	0	62	36		#158	49	
Internal Link Dist (ft)		1695			5003			1142			822	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	200			200								
50th Bay Block Time %		5%										
95th Bay Block Time %		21%										
Queuing Penalty (veh)		19										

Intersection Summary
Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 68.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 19.9 Intersection LOS: B
Intersection Capacity Utilization 68.1% ICU Level of Service B
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: NM 6 & Emilio Lopez



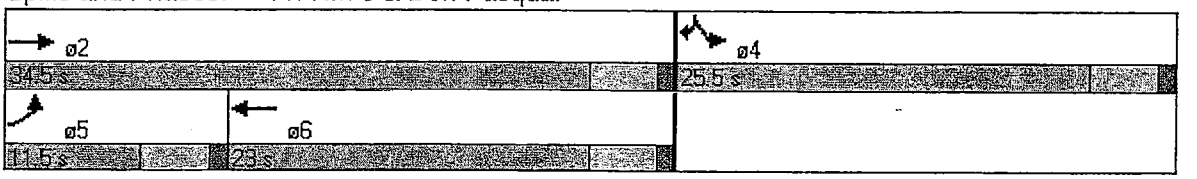


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			0	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50		50	50
Trailing Detector (ft)	0	0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.981			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3472	0	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	3539	3472	0	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			27			146
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	45		30	
Link Distance (ft)		5083	1903		902	
Travel Time (s)		115.5	28.8		20.5	
Volume (vph)	105	1123	884	125	172	98
Peak Hour Factor	0.91	0.91	0.95	0.95	0.67	0.67
Adj. Flow (vph)	115	1234	931	132	257	146
Lane Group Flow (vph)	115	1234	1063	0	257	146
Turn Type	Prot					Prot
Protected Phases	5	2	6		4	4
Permitted Phases						
Detector Phases	5	2	6		4	4
Minimum Initial (s)	7.0	10.0	10.0		7.0	7.0
Minimum Split (s)	11.5	20.5	22.5		25.5	25.5
Total Split (s)	11.5	34.5	23.0	0.0	25.5	25.5
Total Split (%)	19%	58%	38%	0%	43%	43%
Maximum Green (s)	7.0	30.0	18.5		21.0	21.0
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Min	Min		None	None
Walk Time (s)			7.0		10.0	10.0
Flash Dont Walk (s)			10.0		10.0	10.0
Pedestrian Calls (#/hr)			0		0	0
Act Effct Green (s)	7.5	34.4	25.4		13.3	13.3
Actuated g/C Ratio	0.14	0.66	0.49		0.24	0.24
v/c Ratio	0.47	0.53	0.62		0.59	0.29
Uniform Delay, d1	22.8	5.4	11.2		19.6	0.0
Delay	22.3	7.2	19.8		16.2	3.3
LOS	C	A	B		B	A
Approach Delay		8.5	19.8		11.5	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Approach LOS		A	B		B	
Queue Length 50th (ft)	32	104	143		68	0
Queue Length 95th (ft)	#82	212	#301		85	13
Internal Link Dist (ft)		5003	1823		822	
50th Up Block Time (%)						
95th Up Block Time (%)						
Turn Bay Length (ft)	150					
50th Bay Block Time %						
95th Bay Block Time %		20%				
Queuing Penalty (veh)		11				

Intersection Summary
Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 52.1
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 13.2 Intersection LOS: B
Intersection Capacity Utilization 60.5% ICU Level of Service B
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: NM 6 & Don Pasqual



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.955			0.979			0.916			0.967	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3380	0	1770	3465	0	1770	3242	0	1770	3422	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3380	0	1770	3465	0	1770	3242	0	1770	3422	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65			19			127			28	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		1903			808			1500			920	
Travel Time (s)		43.3			12.2			34.1			20.9	
Volume (vph)	38	809	351	197	629	101	206	78	100	153	165	47
Peak Hour Factor	0.88	0.88	0.88	0.90	0.90	0.90	0.79	0.79	0.79	0.89	0.89	0.89
Adj. Flow (vph)	43	919	399	219	699	112	261	99	127	172	185	53
Lane Group Flow (vph)	43	1318	0	219	811	0	261	226	0	172	238	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Detector Phases	1	6		5	2		7	4		3	8	
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.5	31.5		12.0	31.5		11.5	31.0		11.5	30.5	
Total Split (s)	11.5	48.7	0.0	19.0	56.2	0.0	21.8	32.7	0.0	19.6	30.5	0.0
Total Split (%)	10%	41%	0%	16%	47%	0%	18%	27%	0%	16%	25%	0%
Maximum Green (s)	7.0	43.2		14.0	50.7		17.3	27.7		15.1	26.0	
Yellow Time (s)	3.0	3.5		3.5	3.5		3.0	3.5		3.0	3.0	
All-Red Time (s)	1.5	2.0		1.5	2.0		1.5	1.5		1.5	1.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		16.0			16.0			16.0			16.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	7.5	44.7		15.0	57.0		17.8	10.1		20.0	12.3	
Actuated g/C Ratio	0.07	0.42		0.14	0.54		0.17	0.10		0.19	0.12	
v/c Ratio	0.36	0.90		0.87	0.43		0.88	0.53		0.51	0.56	
Uniform Delay, d1	50.5	26.5		45.4	15.1		43.9	20.0		39.5	39.7	
Delay	49.0	32.0		66.2	15.8		62.0	20.2		39.6	38.8	
LOS	D	C		E	B		E	C		D	D	
Approach Delay		32.6			26.5			42.6			39.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			D			D	
Queue Length 50th (ft)	28	411		147	179		174	33		105	71	
Queue Length 95th (ft)	65	#566		#296	248		#268	56		179	110	
Internal Link Dist (ft)		1823			728			1420			840	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	150			150			150			150		
50th Bay Block Time %		37%		4%	11%		16%					
95th Bay Block Time %		44%		49%	22%		41%			18%		
Queuing Penalty (veh)		17		107	36		32			10		

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 105.9

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

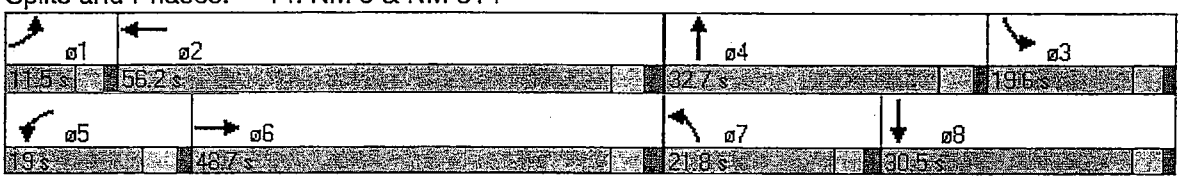
Intersection Signal Delay: 33.0 Intersection LOS: C

Intersection Capacity Utilization 84.9% ICU Level of Service D

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 14: NM 6 & NM 314



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	300		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.999			0.946			0.901	
Flt Protected	0.950			0.950				0.975			0.993	
Satd. Flow (prot)	1770	3518	0	1770	3536	0	0	1718	0	0	1667	0
Flt Permitted	0.950			0.950				0.858			0.976	
Satd. Flow (perm)	1770	3518	0	1770	3536	0	0	1512	0	0	1638	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			1			50			27	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		808			1714			1396			956	
Travel Time (s)		18.4			26.0			31.7			21.7	
Volume (vph)	30	1092	49	49	921	4	60	11	47	5	5	25
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.92	0.92
Adj. Flow (vph)	32	1162	52	52	980	4	64	12	50	5	5	27
Lane Group Flow (vph)	32	1214	0	52	984	0	0	126	0	0	37	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Detector Phases	1	6		5	2		4	4		8	8	
Minimum Initial (s)	7.0	15.0		7.0	15.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	12.0	23.0		12.0	23.0		32.0	32.0		37.0	37.0	
Total Split (s)	12.0	31.0	0.0	12.0	31.0	0.0	37.0	37.0	0.0	37.0	37.0	0.0
Total Split (%)	15%	39%	0%	15%	39%	0%	46%	46%	0%	46%	46%	0%
Maximum Green (s)	7.0	26.0		7.0	26.0		32.0	32.0		32.0	32.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		10.0			10.0		20.0	20.0		25.0	25.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	8.5	39.1		8.6	41.8			11.0			11.0	
Actuated g/C Ratio	0.12	0.61		0.12	0.65			0.16			0.16	
v/c Ratio	0.15	0.57		0.24	0.43			0.43			0.13	
Uniform Delay, d1	30.2	8.5		29.0	6.9			15.6			6.6	
Delay	23.9	10.2		23.0	7.9			12.7			10.7	
LOS	C	B		C	A			B			B	
Approach Delay		10.6			8.7			12.7			10.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			B			B	
Queue Length 50th (ft)	10	156		16	55			23			3	
Queue Length 95th (ft)	32	262		45	195			62			23	
Internal Link Dist (ft)		728			1634			1316			876	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	300			300								
50th Bay Block Time %												
95th Bay Block Time %		1%										
Queuing Penalty (veh)												

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 64.3

Natural Cycle: 80

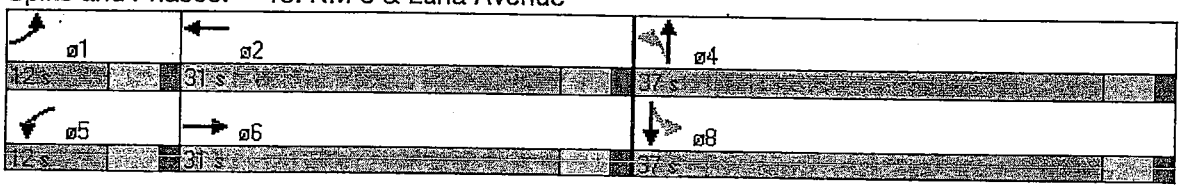
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 9.9 Intersection LOS: A

Intersection Capacity Utilization 54.3% ICU Level of Service A

Splits and Phases: 13: NM 6 & Luna Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	300		0	0		0	0		0
Storage Lanes	1		1	1		0	0		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.981				0.850		0.923	
Flt Protected	0.950			0.950				0.979		0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3472	0	0	1824	1583	1770	1719	0
Flt Permitted	0.950			0.950				0.821		0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3472	0	0	1529	1583	1770	1719	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			32		19				298		62	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1714			1397			1340			945	
Travel Time (s)		39.0			31.8			30.5			21.5	
Volume (vph)	90	920	30	202	860	125	52	66	265	148	80	85
Peak Hour Factor	0.95	0.95	0.95	0.90	0.90	0.90	0.89	0.89	0.89	0.77	0.77	0.77
Adj. Flow (vph)	95	968	32	224	956	139	58	74	298	192	104	110
Lane Group Flow (vph)	95	968	32	224	1095	0	0	132	298	192	214	0
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6						4			
Detector Phases	1	6	6	5	2		7	4	4	3	8	
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0		7.0	10.0	10.0	7.0	10.0	
Minimum Split (s)	11.5	24.0	24.0	11.5	24.0		11.5	28.0	28.0	11.5	28.0	
Total Split (s)	11.5	29.8	29.8	16.4	34.7	0.0	11.5	29.0	29.0	14.8	32.3	0.0
Total Split (%)	13%	33%	33%	18%	39%	0%	13%	32%	32%	16%	36%	0%
Maximum Green (s)	7.0	24.8	24.8	11.9	29.7		7.0	24.0	24.0	10.3	27.3	
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0		3.5	4.0	4.0	3.5	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Min	Min	None	Min		None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		12.0	12.0		12.0			16.0	16.0		16.0	
Pedestrian Calls (#/hr)		0	0		0			0	0		0	
Act Effct Green (s)	7.5	25.8	25.8	12.4	33.0			25.0	25.0	10.8	39.8	
Actuated g/C Ratio	0.08	0.29	0.29	0.14	0.37			0.28	0.28	0.12	0.44	
v/c Ratio	0.66	0.95	0.07	0.92	0.85			18.86	0.45	0.91	0.27	
Uniform Delay, d1	41.8	31.2	0.0	38.8	26.8			33.7	0.0	39.6	11.2	
Delay	49.0	45.3	8.8	68.9	33.3			477.5	3.4	70.6	11.3	
LOS	D	D	A	E	C			F	A	E	B	
Approach Delay		44.5			39.3			148.9			39.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			F			D	
Queue Length 50th (ft)	53	283	0	128	305			~154	0	110	51	
Queue Length 95th (ft)	#122	#412	21	#263	#435			#266	57	#183	78	
Internal Link Dist (ft)		1634			1317			1260			865	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	300			300								
50th Bay Block Time %					5%							
95th Bay Block Time %		25%			26%							
Queuing Penalty (veh)		12			34							

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 18.86

Intersection Signal Delay: 55.6 Intersection LOS: E

Intersection Capacity Utilization 73.1% ICU Level of Service C

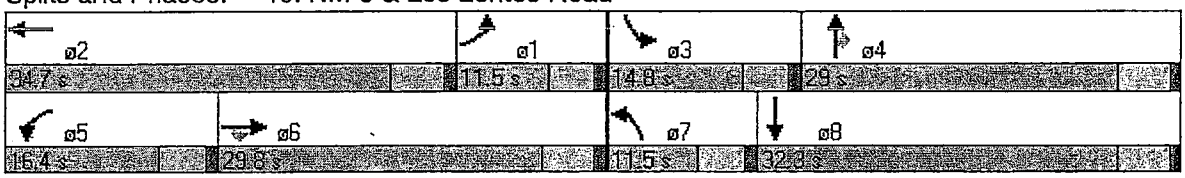
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 19: NM 6 & Los Lentes Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B			A	
Queue Length 50th (ft)		236		74	80		56	4				
Queue Length 95th (ft)		#440		#190	157		107	55				
Internal Link Dist (ft)		1317			4377			1225			720	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)				200								
50th Bay Block Time %												
95th Bay Block Time %				3%								
Queuing Penalty (veh)												

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 66.9

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.83

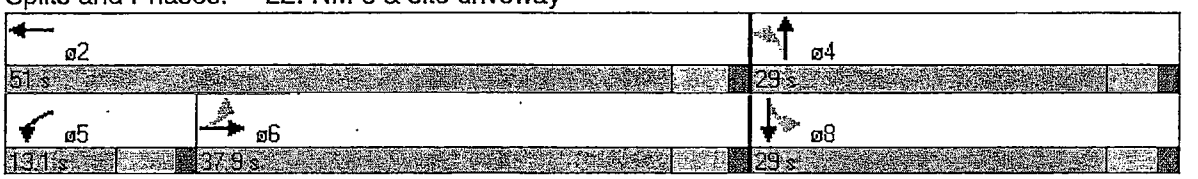
Intersection Signal Delay: 14.5 Intersection LOS: B

Intersection Capacity Utilization 73.9% ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 22: NM 6 & site driveway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	150		0	150		0
Storage Lanes	0		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.966			0.852			0.933			0.998	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	1799	0	1770	1587	0	1863	3302	0	1770	3532	0
Flt Permitted				0.755						0.359		
Satd. Flow (perm)	0	1799	0	1406	1587	0	1863	3302	0	669	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			120			282			3	
Headway Factor	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		20			30			35			35	
Link Distance (ft)		4112			4320			3672			3016	
Travel Time (s)		140.2			98.2			71.5			58.8	
Volume (vph)	0	3	1	242	2	103	0	297	237	86	518	1
Peak Hour Factor	1.00	1.00	1.00	0.86	0.86	0.86	0.84	0.84	0.84	0.91	0.91	0.91
Adj. Flow (vph)	0	3	1	281	2	120	0	354	282	95	569	8
Lane Group Flow (vph)	0	4	0	281	122	0	0	636	0	95	577	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Detector Phases	8	8		4	4		6	6		2	2	
Minimum Initial (s)	10.0	10.0		12.0	12.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	20.5	20.5		22.0	22.0		21.5	21.5		24.0	24.0	
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	25.0	25.0	0.0	25.0	25.0	0.0
Total Split (%)	50%	50%	0%	50%	50%	0%	50%	50%	0%	50%	50%	0%
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Act Effct Green (s)		14.7		14.7	14.7			17.4		17.4	17.4	
Actuated g/C Ratio		0.36		0.36	0.36			0.43		0.43	0.43	
v/c Ratio		0.01		0.55	0.19			0.40		0.33	0.38	
Uniform Delay, d1		6.0		10.0	0.1			4.0		7.5	7.6	
Delay		7.5		10.7	2.6			4.6		9.5	8.3	
LOS		A		B	A			A		A	A	
Approach Delay		7.5			8.3			4.6			8.5	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)		1		45	0			21		11	36	
Queue Length 95th (ft)		5		104	20			55		48	89	
Internal Link Dist (ft)		4032			4240			3592			2936	

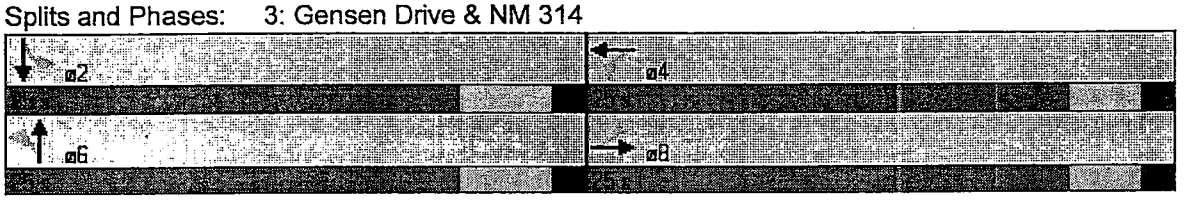
HDRENGLVL7-FF51

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)										150		
50th Bay Block Time %												
95th Bay Block Time %												
Queuing Penalty (veh)												

Intersection Summary

Area Type: Other
Cycle Length: 50
Actuated Cycle Length: 40.3
Natural Cycle: 50
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 7.0 Intersection LOS: A
Intersection Capacity Utilization 63.6% ICU Level of Service B

Splits and Phases: 3: Gensen Drive & NM 314



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	0		0	0		0
Storage Lanes	1		0	1		0	0		1	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.941			0.997				0.850			0.850
Flt Protected	0.950			0.950				0.953			0.967	
Satd. Flow (prot)	1770	3330	0	1770	3529	0	0	1775	1583	0	1801	1583
Flt Permitted	0.950			0.950				0.697			0.661	
Satd. Flow (perm)	1770	3330	0	1770	3529	0	0	1298	1583	0	1231	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		198			3				21			14
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		35			45			35			25	
Link Distance (ft)		4457			809			1600			1230	
Travel Time (s)		86.8			12.3			31.2			33.5	
Volume (vph)	31	774	500	25	762	17	375	8	18	25	12	11
Peak Hour Factor	0.94	0.94	0.94	0.95	0.95	0.95	0.86	0.86	0.86	0.80	0.80	0.80
Adj. Flow (vph)	33	823	532	26	802	18	436	9	21	31	15	14
Lane Group Flow (vph)	33	1355	0	26	820	0	0	445	21	0	46	14
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	1	2		1	2			4			4	
Permitted Phases							4		4	4		4
Detector Phases	1	2		1	2		4	4	4	4	4	4
Minimum Initial (s)	8.0	10.0		8.0	10.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.5	27.5		12.5	27.5		27.5	27.5	27.5	27.5	27.5	27.5
Total Split (s)	12.5	40.5	0.0	12.5	40.5	0.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	14%	45%	0%	14%	45%	0%	41%	41%	41%	41%	41%	41%
Maximum Green (s)	8.0	36.0		8.0	36.0		32.5	32.5	32.5	32.5	32.5	32.5
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		8.0			8.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		15.0			15.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	8.6	34.5		8.6	34.5			30.2	30.2		30.2	30.2
Actuated g/C Ratio	0.10	0.43		0.10	0.43			0.38	0.38		0.38	0.38
v/c Ratio	0.18	0.87		0.14	0.54			0.90	0.03		0.10	0.02
Uniform Delay, d1	36.8	18.3		36.6	17.6			24.5	0.0		16.7	0.0
Delay	38.1	24.0		37.9	18.4			41.0	7.9		18.7	9.1
LOS	D	C		D	B			D	A		B	A
Approach Delay		24.3			19.0			39.6			16.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			D			B	
Queue Length 50th (ft)	18	331		14	184			240	0		17	0
Queue Length 95th (ft)	46	#484		39	243			#398	14		86	10
Internal Link Dist (ft)		4377			729			1520			1150	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	150			150								
50th Bay Block Time %		32%			14%							
95th Bay Block Time %		42%			25%							
Queuing Penalty (veh)		12			5							

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 79.7

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

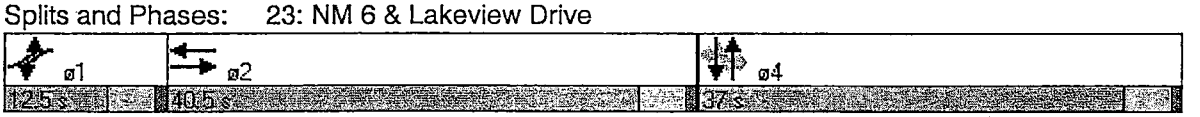
Intersection Signal Delay: 25.1 Intersection LOS: C

Intersection Capacity Utilization 77.8% ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 23: NM 6 & Lakeview Drive

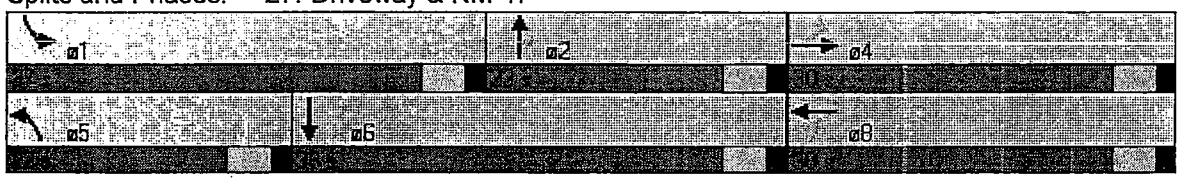


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	12	14	12	12	12	12	12	12
Storage Length (ft)	150		0	150		0	150		150	150		0
Storage Lanes	1		0	1		1	1		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.954				0.850			0.850		0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1896	0	1770	1863	1689	1770	3539	1583	1770	3507	0
Flt Permitted	0.711			0.565			0.950			0.950		
Satd. Flow (perm)	1324	1896	0	1052	1863	1689	1770	3539	1583	1770	3507	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25				316			34		8	
Headway Factor	1.00	0.92	1.00	1.00	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			45			45			40	
Link Distance (ft)		300			1410			2440			3845	
Travel Time (s)		6.8			21.4			37.0			65.5	
Volume (vph)	63	110	49	54	63	281	172	527	29	654	603	38
Peak Hour Factor	0.88	0.88	0.88	0.89	0.89	0.89	0.86	0.86	0.86	0.93	0.93	0.93
Adj. Flow (vph)	72	125	56	61	71	316	200	613	34	703	648	41
Lane Group Flow (vph)	72	181	0	61	71	316	200	613	34	703	689	0
Turn Type	Perm			Perm		Free	Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		Free			2			
Detector Phases	4	4		8	8		5	2	2	1	6	
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	15.0	15.0	7.0	15.0	
Minimum Split (s)	30.0	30.0		30.0	30.0		21.0	23.0	23.0	21.0	23.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	22.0	23.0	23.0	37.0	38.0	0.0
Total Split (%)	33%	33%	0%	33%	33%	0%	24%	26%	26%	41%	42%	0%
Maximum Green (s)	25.0	25.0		25.0	25.0		17.0	18.0	18.0	32.0	33.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	
Flash Dont Walk (s)	18.0	18.0		18.0	18.0			10.0	10.0		10.0	
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	
Act Effct Green (s)	12.8	12.8		12.8	12.8	76.0	14.5	18.0	18.0	33.1	36.7	
Actuated g/C Ratio	0.17	0.17		0.17	0.17	1.00	0.19	0.24	0.24	0.44	0.48	
v/c Ratio	0.32	0.53		0.34	0.23	0.19	0.59	0.73	0.08	0.91	0.41	
Uniform Delay, d1	27.8	24.7		27.9	27.3	0.0	28.0	26.7	0.0	20.1	12.4	
Delay	28.1	24.9		28.3	27.3	0.0	28.6	27.5	9.3	35.9	13.7	
LOS	C	C		C	C	A	C	C	A	D	B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		25.8			8.2			27.0			24.9	
Approach LOS		C			A			C			C	
Queue Length 50th (ft)	31	69		26	30	0	88	140	0	305	102	
Queue Length 95th (ft)	66	124		60	63	0	148	201	20	#581	177	
Internal Link Dist (ft)		220			1330			2360			3765	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	150			150			150		150	150		
50th Bay Block Time %										33%		
95th Bay Block Time %							6%	22%		50%	13%	
Queuing Penalty (veh)							9	22		142	45	

Intersection Summary
Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 76
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 23.1 Intersection LOS: C
Intersection Capacity Utilization 85.9% ICU Level of Service D
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 27: Driveway & NM 47



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50		50		50	50
Trailing Detector (ft)	0		0		0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.945		0.988			
Flt Protected	0.971				0.950	
Satd. Flow (prot)	1709	0	3497	0	1770	3539
Flt Permitted	0.971				0.950	
Satd. Flow (perm)	1709	0	3497	0	1770	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	58		15			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		45			40
Link Distance (ft)	1490		3845			1324
Travel Time (s)	33.9		58.3			22.6
Volume (vph)	86	59	674	58	162	1281
Peak Hour Factor	0.86	0.86	0.88	0.88	0.96	0.96
Adj. Flow (vph)	100	69	766	66	169	1334
Lane Group Flow (vph)	169	0	832	0	169	1334
Turn Type					Prot	
Protected Phases	4		2		1	6
Permitted Phases						
Detector Phases	4		2		1	6
Minimum Initial (s)	7.0		15.0		7.0	15.0
Minimum Split (s)	26.5		26.5		11.5	21.5
Total Split (s)	26.5	0.0	26.5	0.0	12.0	38.5
Total Split (%)	41%	0%	41%	0%	18%	59%
Maximum Green (s)	22.0		21.0		7.5	33.0
Yellow Time (s)	3.0		4.0		3.0	4.0
All-Red Time (s)	1.5		1.5		1.5	1.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		Min		Min	Min
Walk Time (s)	10.0		10.0			
Flash Dont Walk (s)	12.0		10.0			
Pedestrian Calls (#/hr)	0		0			
Act Effct Green (s)	9.6		19.4		8.2	32.9
Actuated g/C Ratio	0.20		0.42		0.18	0.71
v/c Ratio	0.44		0.57		0.54	0.53
Uniform Delay, d1	11.7		10.5		17.9	4.2
Delay	12.5		11.5		26.0	5.2
LOS	B		B		C	A
Approach Delay	12.5		11.5			7.5

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Approach LOS	B		B			A
Queue Length 50th (ft)	26		89		43	85
Queue Length 95th (ft)	69		153		#132	176
Internal Link Dist (ft)	1410		3765			1244
50th Up Block Time (%)						
95th Up Block Time (%)						
Turn Bay Length (ft)					100	
50th Bay Block Time %						7%
95th Bay Block Time %					33%	22%
Queuing Penalty (veh)					109	24

Intersection Summary

Area Type: Other

Cycle Length: 65

Actuated Cycle Length: 46.5

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

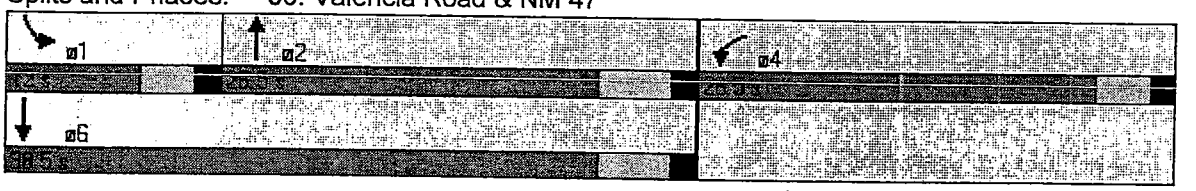
Intersection Signal Delay: 9.2 Intersection LOS: A

Intersection Capacity Utilization 53.3% ICU Level of Service A

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 30: Valencia Road & NM 47



TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Bressler*
Agency/Co.	
Date Performed	*06/25/2003*
Analysis Time Period	*Exst PM Pk Hr 14:15 - 15:15*

Site Information

Intersection	*NM 6 & Los Cerritos*
Jurisdiction	
Analysis Year	
Project ID	

East/West Street: *NM 6* | North/South Street: *Los Cerritos*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*68*	*978*	*0*	*0*	*689*	*134*
Peak-Hour Factor, PHF	*0.80*	*0.80*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR	*84*	*1219*	*0*	*0*	*725*	*141*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*0*	*2*	*1*
Configuration	*L*	*T*			*T*	*R*
Upstream Signal		*1*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*128*	*0*	*128*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.44*	*1.00*	*0.44*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*290*	*0*	*290*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (vph)	*84*					*290*		*290*
C (m) (vph)	*773*							*635*
v/c	*0.11*							*0.46*
95% queue length	*0.36*							*2.39*
Control Delay	*10.2*							*15.3*
LOS	*B*							*C*
Approach Delay	--	--						
Approach LOS	--	--						

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			100	150	150
Storage Lanes	1			1	2	1
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	3539	3539	1583	3433	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	3539	3539	1583	3433	1583
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		938	1002		1088	
Travel Time (s)		21.3	22.8		24.7	
Volume (vph)	68	978	689	134	128	128
Peak Hour Factor	0.80	0.80	0.95	0.95	0.44	0.44
Adj. Flow (vph)	85	1223	725	141	291	291
Lane Group Flow (vph)	85	1222	725	141	291	291
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	48.8%	ICU Level of Service	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	68	978	689	134	128	128
Peak Hour Factor	0.80	0.80	0.95	0.95	0.44	0.44
Hourly flow rate (veh/h)	85	1222	725	141	291	291
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						6
Median type					Raised	
Median storage veh)					0	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	725				1507	363
vC1, stage 1 conf vol	0				725	
vC2, stage 2 conf vol	0				781	
vCu, unblocked vol	725				1507	363
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)	3.1				5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	86				0	54
cM capacity (veh/h)	594				65	634

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	85	611	611	363	363	141	194	388
Volume Left	85	0	0	0	0	0	194	97
Volume Right	0	0	0	0	0	141	0	291
cSH	594	1700	1700	1700	1700	1700	65	230
Volume to Capacity	0.14	0.36	0.36	0.21	0.21	0.08	2.98	1.69
Queue Length (ft)	12	0	0	0	0	0	495	637
Control Delay (s)	12.1	0.0	0.0	0.0	0.0	0.0	1028.3	365.3
Lane LOS	B						F	F
Approach Delay (s)	0.8			0.0			586.3	
Approach LOS							F	

Intersection Summary			
Average Delay	124.2		
Intersection Capacity Utilization	48.8%	ICU Level of Service	A

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Bressler*
Agency/Co.	*HDR for MC / Los Lunas*
Date Performed	*06/25/2003*
Analysis Time Period	*Exst PM Pk Hr 16:30 - 17:30*

Site Information

Intersection	*Courthouse Road & Luna Avenue*
Jurisdiction	
Analysis Year	
Project ID	

East/West Street: *Courthouse Rd* | North/South Street: *Luna Avenue*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*19*	*258*	*0*	*0*	*262*	*12*
Peak-Hour Factor, PHF	*0.84*	*0.84*	*1.00*	*1.00*	*0.93*	*0.93*
Hourly Flow Rate, HFR	*22*	*307*	*0*	*0*	*281*	*12*
Percent Heavy Vehicles	*2*	–	–	*0*	–	–
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*1*
Configuration	*L*	*T*			*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*26*	*0*	*52*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.70*	*1.00*	*0.70*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*37*	*0*	*74*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*						*LR*	
v (vph)	*22*						*111*	
C (m) (vph)	*1269*						*608*	
v/c	*0.02*						*0.18*	
95% queue length	*0.05*						*0.66*	
Control Delay	*7.9*						*12.2*	
LOS	*A*						*B*	
Approach Delay	–	–					*12.2*	
Approach LOS	–	–					*B*	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	0	0
Storage Lanes	1			1	1	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850	0.910	
Flt Protected	0.950				0.984	
Satd. Flow (prot)	1770	1863	1863	1583	1668	0
Flt Permitted	0.950				0.984	
Satd. Flow (perm)	1770	1863	1863	1583	1668	0
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		938	1002		1088	
Travel Time (s)		21.3	22.8		24.7	
Volume (vph)	19	258	262	12	26	52
Peak Hour Factor	0.84	0.84	0.93	0.93	0.70	0.70
Adj. Flow (vph)	23	307	282	13	37	74
Lane Group Flow (vph)	23	307	282	13	111	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.5%		ICU Level of Service A	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	19	258	262	12	26	52
Peak Hour Factor	0.84	0.84	0.93	0.93	0.70	0.70
Hourly flow rate (veh/h)	23	307	282	13	37	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	282				634	282
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	282				634	282
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				91	90
cM capacity (veh/h)	1281				435	757

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	23	307	282	13	111
Volume Left	23	0	0	0	37
Volume Right	0	0	0	13	74
cSH	1281	1700	1700	1700	607
Volume to Capacity	0.02	0.18	0.17	0.01	0.18
Queue Length (ft)	1	0	0	0	17
Control Delay (s)	7.9	0.0	0.0	0.0	12.3
Lane LOS	A				B
Approach Delay (s)	0.5		0.0		12.3
Approach LOS					B

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	29.5%	ICU Level of Service	A

APPENDIX III-B

Traffic Signal Timing Data

Los Lunas Intersection timing requested by HDR (Eric Hatton)

NM 6 & Desert Willow

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
2 E.B.	15			2.5	30	40	4.0	1.5	Min rec
4 S.B.	7	7	27	2.5	20	30	3.5	1.5	
5 E to N	7			2.5	20	30	3.5	1.5	
6 W. B.	15	7	18	2.5	30	40	4.0	1.5	Min rec

NM 6 & I-25Ramp

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
1 N to S	7			2.5	35	40	3.0	1.0	
2 E.B.	10	5	9	2.5	35	40	3.0	1.0	Min rec
4 S.B.	7	7	13	2.5	35	40	3.0	1.0	
6 W.B.	10	5	9	2.5	35	40	3.0	1.0	Min rec

NM 6 & Emilio Lopez

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
1 W to S	7			3.0	20	20	3.0	1.0	
2 E. B.	15	7	10	3.0	40	45	3.0	1.0	Min rec
3 N to W	7			3.0	25	30	3.0	1.0	
4 .S. B.	10	7	20	3.0	30	35	3.0	1.0	
5 E to N	7			3.0	20	25	3.0	1.0	
6 W. B.	15	7	10	3.0	40	45	3.0	1.0	Min rec
7 S to E	7			3.0	30	35	3.0	1.0	
8 N. B.	10	7	20	3.0	30	35	3.0	1.0	

NM 6 & Don Pasqual

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
2 E. B.	10			2.5	30	40	3.5	1.0	Min rec
4 S. B.	7	10	10	1.5	45	40	3.5	1.0	
5 E to N	7			1.5	15	20	3.5	1.0	
6 W. B.	10	7	10	3.0	30	40	3.5	1.0	Min rec

NM 6 & NM 314

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
1 E to N	7			2.0	25	30	3.0	1.5	
2 W. B.	15	10	16	3.5	70	45	3.5	2.0	Min rec
3 S to E	7			2.5	15	20	3.0	1.5	
4 N. B.	7	10	16	2.5	25	20	3.5	1.5	
5 W to S	7			2.5	25	30	3.5	1.5	
6 E. B.	15	10	16	3.5	70	45	3.5	2.0	Min rec
7 N to W	7			2.5	25	20	3.0	1.5	
8 S. B.	7	10	16	2.5	25	30	3.0	1.5	

NM 314 & Courthouse

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
2 S. B.	15			4.0	35	40	4.0	1.5	Min rec
4 W. B.	12			2.5	25	30	3.0	1.5	Min rec
6 N. B.	15			4.0	35	40	4.0	1.5	Min rec
8 E. B.	10			2.5	10	40	3.0	1.5	Min rec

NM 6 & Luna

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
1 E to N	7			2.5	20	25	3.5	1.5	
2 W. B.	15	7	10	3.5	60	35	3.5	1.5	Min rec
4 N. B.	7	7	20	2.5	30	35	3.5	1.5	
5 W to S	7			2.5	20	25	3.5	1.5	
6 E. B.	15	7	10	3.5	60	60	3.5	1.5	Min rec
8 S. B.	7	7	25	2.5	30	35	3.5	1.5	

NM 6 & Los Lentes

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
1 E to N	7			2.5	15	20	3.5	1.0	
2 W. B.	10	7	12	4.0	55	40	4.0	1.0	Min rec
3 S to E	7			2.5	20	20	3.5	1.0	
4 N. B.	10	7	16	3.5	15	30	4.0	1.0	
5 W to S	7			2.5	15	20	3.5	1.0	
6 E. B.	10	7	12	4.0	55	40	4.0	1.0	Min rec
7 N to W	7			2.5	10	20	3.5	1.0	
8 S. B.	10	7	16	3.5	35	30	4.0	1.0	

NM 6 & Carson

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
2 W. B.	10			3.5	45	40	4.0	1.5	Min rec
4 N. B.	7	8	16	3.0	20	40	3.5	1.5	
5 W to S	7			3.5	25	40	4.0	1.5	
6 E. B.	10	8	16	3.5	45	40	4.0	1.5	Min rec
8 S. B.	7	8	16	3.0	15	25	3.5	1.5	

NM 6 & NM 263 Lakeview

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
1 E to N & W to S	8			2.5	20	40	3.5	1.0	
2 EB & WB	10	8	15	4.0	30	55	3.5	1.0	Min rec
4 SB & NB	7	8	15	3.5	40	25	3.5	1.0	

NM 6 & NM 47

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
1 N to W	7			3.0	20	30	3.5	1.5	
2 S. B.	15	7	10	4.0	55	40	3.5	1.5	Min rec
4 E. B.	8	7	18	4.0	40	40	3.5	1.5	
5 S to E	10			4.0	30	30	3.5	1.5	
6 N. B.	15	7	10	4.0	55	40	3.5	1.5	Min rec
8 W. B.	8	7	18	4.0	40	40	3.5	1.5	

NM 47 & Valencia

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
1 S to E	7			2.5	20	40	3.0	1.5	Min rec
2 N. B.	15	10	10	3.5	40	40	4.0	1.5	Min rec
4 W. B.	7	10	12	2.5	25	40	3.0	1.5	
6 S. B.	15			3.5	40	40	4.0	1.5	Min rec

NM 47 & NM 263 (El Cerro)

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
1 S to E	7			2.0	20	30	3.5	2.0	
2 N. B.	10	10	16	3.0	40	40	3.5	2.0	Min rec
4 E. B.	7	10	16	2.5	45	45	3.5	2.0	
5 N to W	7			2.0	20	30	3.5	2.0	
6 S. B.	10	10	16	3.0	30	40	3.5	2.0	Min rec
8 W. B.	7	10	16	2.0	30	40	3.5	2.0	

NM 263 & Ladera

Phase	Int/green	Walk	Don't walk	Passage	Max1	Max2	Yellow	Red	Mode
1 E to N	7			2.5	15	20	3.5	1.0	
2 W. B.	10	5	8	4.0	25	40	3.5	1.0	Min rec
4 N. B.	7	5	16	4.0	30	35	3.5	2.0	
5 W to S	7			2.5	15	20	3.5	1.0	
6 E. B.	10	5	8	4.0	25	40	3.5	1.0	Min rec
8 S. B.	7	5	16	4.0	30	35	3.5	1.0	

APPENDIX IV

Land Use Speadsheet Data
Land Use Graphs
TMODEL Output Maps of:

- Model Volumes Peak Hourly PM*
- PM Peak Hour Traffic Counts*
- Link Class*
- Link Speed*
- Node Class*
- Link Lanes*
- Traffic Analysis Zones*

*The computer traffic model will be further refined during Phase 2.

	2000 Mid-Region Council of Governments SOCIOECONOMIC DATA--Revised September 24, 2002--Valencia County											Split to Los Lunas TAZ structure - updated 05/30/2003									
LLTAZ	DASZ	Housing%	EMP%	acres	pop	hhpop	nonhhpop	hhlds	Sing Fam	Multi Fam	Housing U	income	basic	retail	service	emplymt	elEnroll	msEnroll	hsEnroll	unmEnr
83	4111			1078.22	18	18	0	7	7	0	7	1	6	0	0	6	0	0	0	0
84	4112			1204	593	593	0	198	206	4	210	1	40	2	10	52	0	0	0	0
85	4113			1007.83	163	163	0	54	58	4	62	1	17	4	4	25	0	0	0	0
86	4121			1219.4	561	561	0	155	157	0	157	1	2	2	34	38	0	0	0	0
87	4122			1099.53	823	823	0	311	406	4	410	1	8	5	110	123	200	0	0	0
	4132			***2219.2***	***46***	***46***	***0***	***20***	***22***	***0***	***22***	***3***	***14***	***0***	***0***	***14***	***0***	***0***	***0***	***0***
1	4132	**0%**	**0%**		0	0	0	0	0	0	0		0	0	0	**0**	0	0	0	0
2	4132	**80%**	**80%**		37	37	0	16	18	0	18		11	0	0	**11**	0	0	0	0
3	4132	**20%**	**20%**		9	9	0	4	4	0	4		3	0	0	**3**	0	0	0	0
0.185279	***4141***			***1057.13***	***788***	***778***	***10***	***287***	***305***	***0***	***305***	***4***	***14***	***102***	***1073***	***1189***	***0***	***0***	***2289***	***0***
4	4141	**62%**	**0%**		489	482	6	178	189	0	189		0	0	0	0	0	0	**0**	0
5	4141	**14%**	**2%**		110	109	1	40	43	0	43		0	2	21	24	0	0	**0**	0
6	4141	**18%**	**45%**		142	140	2	52	55	0	55		6	**161**	483	**650**	0	0	**1853**	0
7	4141	**6%**	**53%**		47	47	1	17	18	0	18		7	54	**509**	**570**	0	0	**0**	0
8	4142			214.58	103	103	0	39	42	0	42	1	9	0	1	10	0	0	0	0
9	4143			222.99	323	323	0	120	120	0	120	3	3	1	4	8	0	0	0	0
0.227711	***4144***			***842.05***	***830***	***830***	***0***	***267***	***265***	***13***	***278***	***3***	***21***	***3***	***124***	***148***	***484***	***0***	***0***	***0***
10	4144	**30%**	**5%**		249	249	0	80	80	4	83		1	0	6	7	**0**	0	0	0
11	4144	**23%**	**5%**		191	191	0	61	61	3	64		1	0	6	7	**0**	0	0	0
12	4144	**47%**	**90%**		390	390	0	125	125	6	131		19	3	**62**	**83**	**0**	0	0	0
	4145			***322.81***	***923***	***923***	***0***	***349***	***336***	***37***	***373***	***3***	***10***	***107***	***115***	***232***	***0***	***482***	***0***	***0***
13	4145	**76%**	**20%**		701	701	0	265	255	28	283		2	21	23	46		0	0	0
14	4145	**24%**	**80%**		222	222	0	84	81	9	90		8	86	**142**	**236**	**482**	**510**	0	0
15	4146			181.24	372	372	0	151	95	66	161	1	26	58	**238**	**322**	**491**	0	0	0
16	4152			2074.06	8	8	0	3	6	0	6	4	0	0	0	0	0	0	0	0
17	4153			837.16	0	0	0	0	0	0	0	0	250	**814**	65	**1129**	0	0	0	0
18	4154			3144.16	215	215	0	76	80	0	80	3	3	18	23	44	0	0	0	0
19	4156			6005.47	159	159	0	60	68	0	68	3	37	0	1	38	0	0	0	0
	4161			***935.4***	***2624***	***2624***	***0***	***1009***	***881***	***182***	***1063***	***3***	***45***	***38***	***77***	***160***	***0***	***0***	***0***	***0***
20	4161	**50%**	**49%**		1312	1312	0	505	441	91	532		22	19	**41**	**81**	**23**	0	0	0
21	4161	**44%**	**49%**		1155	1155	0	444	388	80	468		22	19	38	78	0	0	0	0
22	4161	**6%**	**2%**		157	157	0	61	53	11	64		1	1	2	3	0	0	0	0
	4162			***829.86***	***1540***	***1329***	***211***	***474***	***427***	***97***	***524***	***3***	***34***	***104***	***332***	***470***	***0***	***0***	***0***	***0***
23	4162	**21%**	**6%**		323	279	44	100	90	20	110		2	6	20	28	0	0	0	0
24	4162	**14%**	**0%**		216	186	30	66	60	14	73		0	0	0	0	0	0	0	0
25	4162	**61%**	**41%**		939	811	129	289	260	59	320		14	43	136	193	0	0	0	0
26	4162	**4%**	**53%**		62	53	8	19	17	4	21		18	55	176	249	0	0	0	0
	4163			***106.36***	***262***	***148***	***114***	***52***	***40***	***16***	***56***	***2***	***35***	***26***	***659***	***720***	***0***	***688***	***0***	***0***
27	4163	**14%**	**15%**		37	21	16	7	6	2	8		5	4	99	108	0	**0**	0	0
28	4163	**86%**	**85%**		225	127	98	45	34	14	48		30	22	560	612	0	**717**	**107**	0

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LLTAZ	DASZ	Housing%	EMP%	acres	pop	hhpop	nonhhpop	hhlds	Sing Fam	Multi Fam	Housing U	income	basic	retail	service	emplymt	elEnroll	msEnroll	hsEnroll	unmEnr
	4164			***641.15***	***1960***	***1960***	***0***	***645***	***661***	***30***	***691***	***2***	***13***	***144***	***119***	***276***	***0***	***0***	***0***	***0***
29	4164	**5%**	**40%**		98	98	0	32	33	2	35		5	58	48	110	**0**			
30	4164	**63%**	**50%**		1235	1235	0	406	416	19	435		7	72	60	138	0	0	0	0
31	4164	**32%**	**10%**		627	627	0	206	212	10	221		1	14	12	28	0	0	0	0
32	4164	**0%**	**0%**		0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
33	4165			192.12	1042	1042	0	358	349	35	384	2	2	1	10	13	0	0	0	0
	4166			***3359.24***	***2660***	***1863***	***797***	***655***	***706***	***2***	***708***	***3***	***58***	***6***	***477***	***541***	***0***	***0***	***0***	***0***
34	4166	**15%**	**44%**		399	279	120	98	106	0	106		26	3	210	**238**	0	0	0	0
35	4166	**16%**	**45%**		426	298	128	105	113	0	113		26	3	215	**243**	0	0	0	0
36	4166	**42%**	**1%**		1117	782	335	275	297	1	297		1	0	5	5	0	0	0	0
37	4166	**27%**	**10%**		718	503	215	177	191	1	191		6	1	48	54	0	0	0	0
	4167	**100%**	**100%**	***811.31***	***206***	***206***	***0***	***84***	***90***	***0***	***90***	***3***	***9***	***0***	***1***	***10***	***0***	***0***	***0***	***0***
38	4167	**47%**	**40%**		97	97	0	39	42	0	42		4	0	0	4	0	0	0	0
39	4167	**53%**	**60%**		109	109	0	45	48	0	48		5	0	1	6	0	0	0	0
	4171			***4241.5***	***2399***	***2399***	***0***	***803***	***851***	***7***	***858***	***3***	***301***	***580***	***141***	***1022***	***525***	***0***	***0***	***0***
40	4171	**46%**	**25%**		1104	1104	0	369	391	3	395		75	145	95	316	**525**	0	0	0
41	4171	**54%**	**75%**		1295	1295	0	434	460	4	463		226	435	106	767	**0**	0	0	0
42	4172			1759.15	595	595	0	229	241	0	241	3	90	21	11	122	**0**	0	0	0
	4211			***23055.97***	***43***	***43***	***0***	***15***	***17***	***0***	***17***	***1***	***21***	***5***	***1089***	***1115***	***0***	***0***	***0***	***0***
88	4211	**14%**	**10%**		6	6	0	2	2	0	2		2	1	109	112	0	0	0	0
89	4211	**86%**	**90%**		37	37	0	13	15	0	15		19	5	980	1004	0	0	0	0
	4311			***56339.56***	***919***	***919***	***0***	***293***	***319***	***0***	***319***	***3***	***133***	***1***	***30***	***164***	***0***	***0***	***0***	***0***
43	4311	**23%**	**20%**		211	211	0	67	73	0	73		27	0	6	33	0	0	0	0
44	4311	**35%**	**40%**		322	322	0	103	112	0	112		53	0	12	66	0	0	0	0
45	4311	**42%**	**40%**		386	386	0	123	134	0	134		53	0	12	66	0	0	0	0
	4415			***3048.87***	***1022***	***1022***	***0***	***351***	***380***	***0***	***380***	***2***	***2***	***1***	***98***	***101***	***600***	***700***	***0***	***0***
46	4415	**41%**	**80%**		419	419	0	144	156	0	156		2	1	78	81	**524**	**0**	0	0
47	4415	**59%**	**20%**		603	603	0	207	224	0	224		0	0	20	20	**0**	**0**	0	0
48	4415	**0%**	**0%**		0	0	0	0	0	0	0		0	0	0	0	**0**	**0**	0	0
49	4421			2322.36	353	353	0	131	140	0	140	3	6	3	366	375	**534**	**650**	0	1574
50	4422			2822.91	15	15	0	5	5	0	5	3	0	0	0	0	0	**0**	0	0
	4511			***2698.12***	***3743***	***3743***	***0***	***1343***	***1393***	***0***	***1393***	***4***	***248***	***175***	***149***	***572***	***289***	***0***	***0***	***0***
51	4511	**50%**	**40%**		1872	1872	0	672	697	0	697		99	70	60	229	**293**	0	0	0
52	4511	**50%**	**60%**		1872	1872	0	672	697	0	697		149	105	89	343	**0**	0	0	0
53	4512			397.78	615	615	0	237	247	0	247	2	103	43	105	251	**0**	0	0	0

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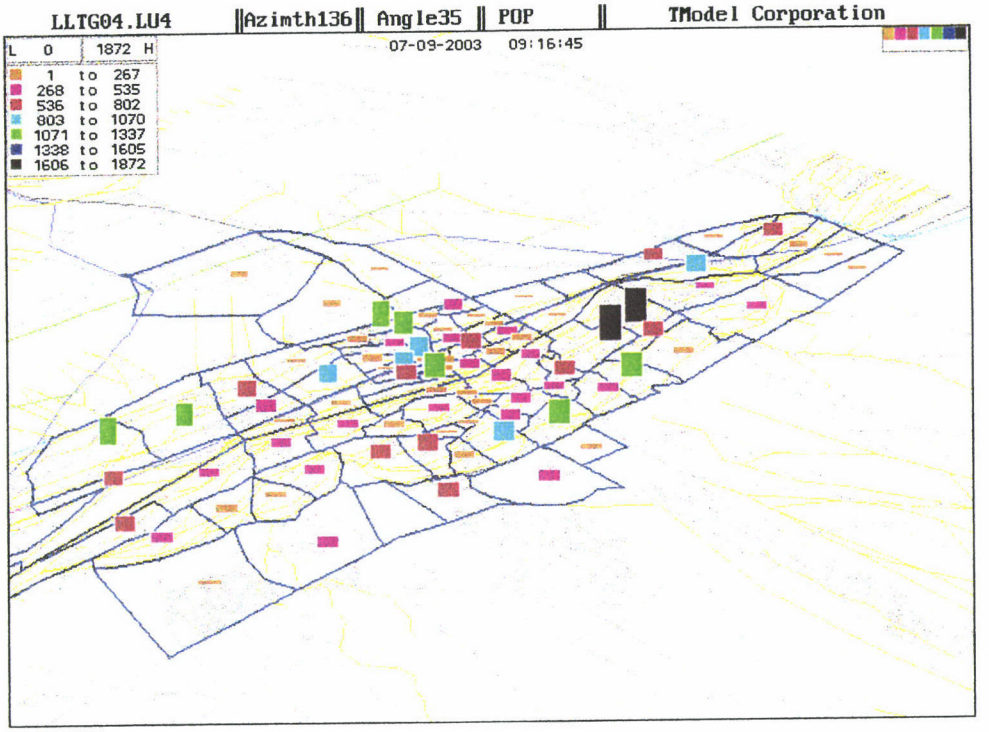
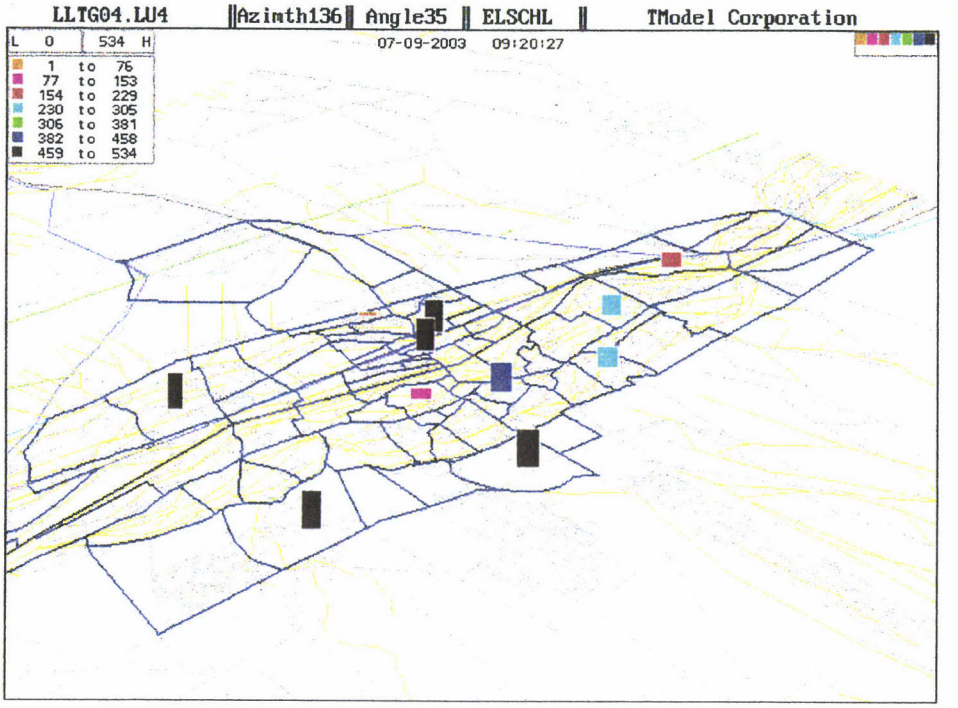
LLTAZ	DASZ	Housing%	EMP%	acres	pop	hhpop	nonhhpop	hhlds	Sing Fam	Multi Fam	Housing U	income	basic	retail	service	emplymt	elEnroll	msEnroll	hsEnroll	unmEnr
	4513			***1613.38***	***1986***	***1986***	***0***	***687***	***706***	***26***	***732***	***4***	***161***	***11***	***167***	***339***	***323***	***0***	***0***	***0***
54	4513	**64%**	**35%**		1271	1271	0	440	452	17	468		56	4	58	119	**297**	0	0	0
55	4513	**22%**	**22%**		437	437	0	151	155	6	161		35	2	37	75	**0**	0	0	0
56	4513	**14%**	**43%**		278	278	0	96	99	4	102		69	5	72	146	**0**	0	0	0
	4514			***1342.97***	***1422***	***1422***	***0***	***504***	***542***	***14***	***556***	***3***	***71***	***335***	***189***	***595***	***0***	***0***	***0***	***0***
57	4514	**27%**	**15%**		384	384	0	136	146	4	150		11	50	28	89	0	0	0	0
58	4514	**39%**	**20%**		555	555	0	197	211	5	217		14	67	38	119	0	0	0	0
59	4514	**34%**	**65%**		483	483	0	171	184	5	189		46	218	123	387	0	0	0	0
	4521			***1890.01***	***2183***	***2183***	***0***	***771***	***822***	***9***	***831***	***2***	***107***	***92***	***158***	***357***	***450***	***0***	***0***	***0***
60	4521	**23%**	**60%**		502	502	0	177	189	2	191		64	55	95	214	**435**	0	0	0
61	4521	**20%**	**12%**		437	437	0	154	164	2	166		13	11	19	43	**0**	0	0	0
62	4521	**52%**	**27%**		1135	1135	0	401	427	5	432		29	25	43	96	**0**	0	0	0
63	4521	**5%**	**1%**		109	109	0	39	41	0	42		1	1	2	4	**0**	0	0	0
	4522			***198.93***	***271***	***271***	***0***	***106***	***106***	***10***	***116***	***2***	***20***	***199***	***63***	***282***	***0***	***0***	***0***	***0***
64	4522	**69%**	**20%**		187	187	0	73	73	7	80		4	40	13	56	0	0	0	0
65	4522	**31%**	**80%**		84	84	0	33	33	3	36		16	159	50	226	0	0	0	0
	4523			***3014.85***	***2765***	***2754***	***11***	***949***	***984***	***0***	***984***	***4***	***120***	***17***	***28***	***165***	***0***	***0***	***0***	***0***
66	4523	**1%**	**25%**		28	28	0	9	10	0	10		30	4	7	41	0	0	0	0
67	4523	**36%**	**10%**		995	991	4	342	354	0	354		12	2	3	17	0	0	0	0
68	4523	**1%**	**20%**		28	28	0	9	10	0	10		24	3	6	33	0	0	0	0
69	4523	**9%**	**5%**		249	248	1	85	89	0	89		6	1	1	8	0	0	0	0
70	4523	**29%**	**20%**		802	799	3	275	285	0	285		24	3	6	33	0	0	0	0
71	4523	**24%**	**20%**		664	661	3	228	236	0	236		24	3	6	33	0	0	0	0
	4524			***2145.97***	***1000***	***951***	***49***	***340***	***365***	***0***	***365***	***2***	***114***	***2***	***106***	***222***	***0***	***600***	***0***	***0***
72	4524	**19%**	**10%**		190	181	9	65	69	0	69		11	0	11	22	0	**0**	0	0
73	4524	**28%**	**40%**		280	266	14	95	102	0	102		46	1	**70**	**117**	**128**	**524**	0	0
74	4524	**23%**	**30%**		230	219	11	78	84	0	84		34	1	32	67	0	**0**	0	0
75	4524	**30%**	**20%**		300	285	15	102	110	0	110		23	0	21	44	0	**0**	0	0
	4531			***3357.41***	***1303***	***1303***	***0***	***467***	***490***	***9***	***499***	***2***	***111***	***6***	***10***	***127***	***0***	***0***	***0***	***0***
76	4531	**28%**	**15%**		365	365	0	131	137	3	140		17	1	2	19	0	0	0	0
77	4531	**22%**	**30%**		287	287	0	103	108	2	110		33	2	3	38	0	0	0	0
78	4531	**50%**	**55%**		652	652	0	234	245	5	250		61	3	6	70	0	0	0	0
	4532			***2891.91***	***1249***	***1249***	***0***	***451***	***465***	***9***	***474***	***3***	***75***	***2***	***5***	***82***	***0***	***0***	***0***	***0***
79	4532	**32%**	**30%**		400	400	0	144	149	3	152		23	1	2	25	0	0	0	0
80	4532	**13%**	**10%**		162	162	0	59	60	1	62		8	0	1	8	0	0	0	0
81	4532	**21%**	**25%**		262	262	0	95	98	2	100		19	1	1	21	0	0	0	0
82	4532	**34%**	**35%**		425	425	0	153	158	3	161		26	1	2	29	0	0	0	0

LAND USE GRAPHS

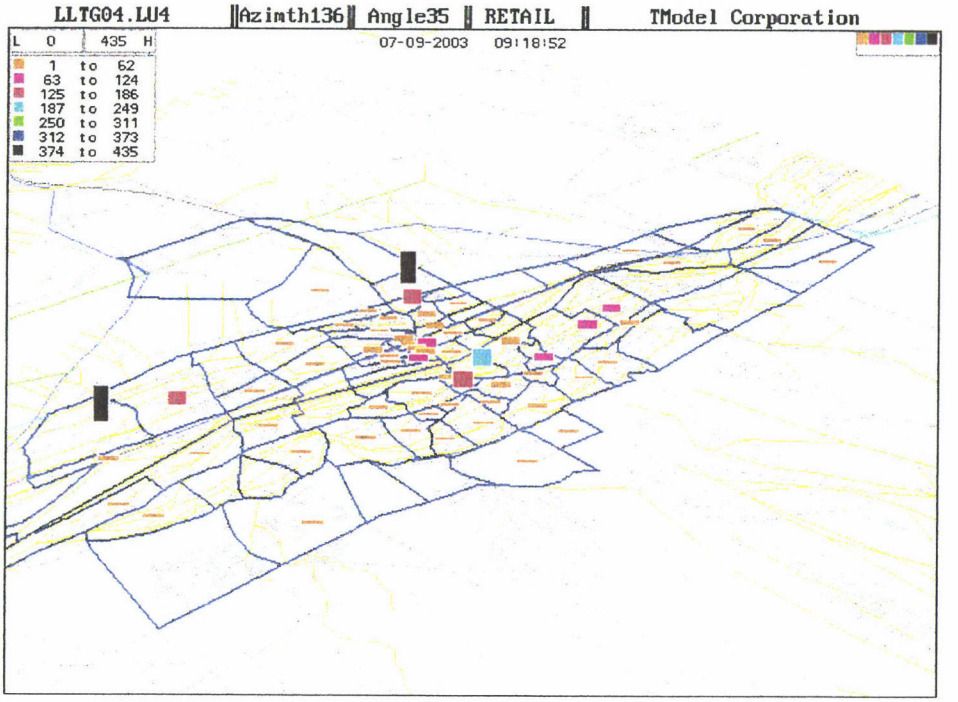
The following sample information is based on the totals for the Traffic Analysis Zones shown. Also, the following graphs do not include employment at the Correctional Facilities or at the new Wal-Mart facility. Those categories were addressed individually and are not shown. Also, employment numbers, in order to arrive at the impact on traffic, were broken into approximate numbers in the day shift. For example, the Wal-Mart Distribution Center employs more than those shown in total but the total for the shift was approximated by the existing impact on traffic derived from the traffic counts taken. These graphs will be refined as part of Phase 2 of this study.



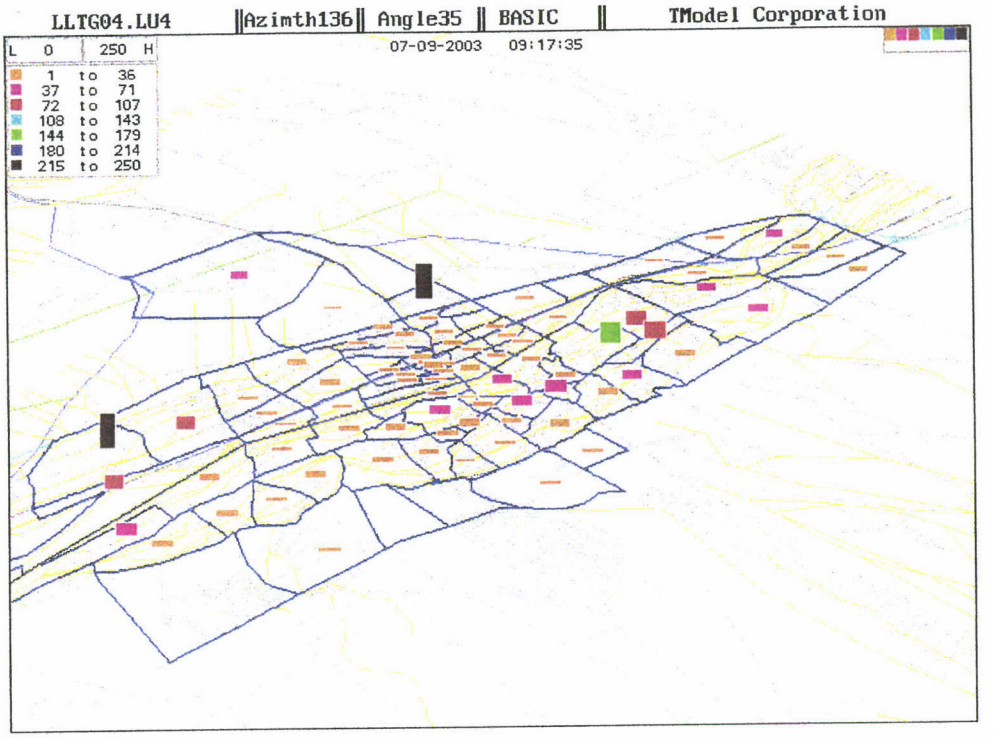
Appendix IV Graph 1-Population



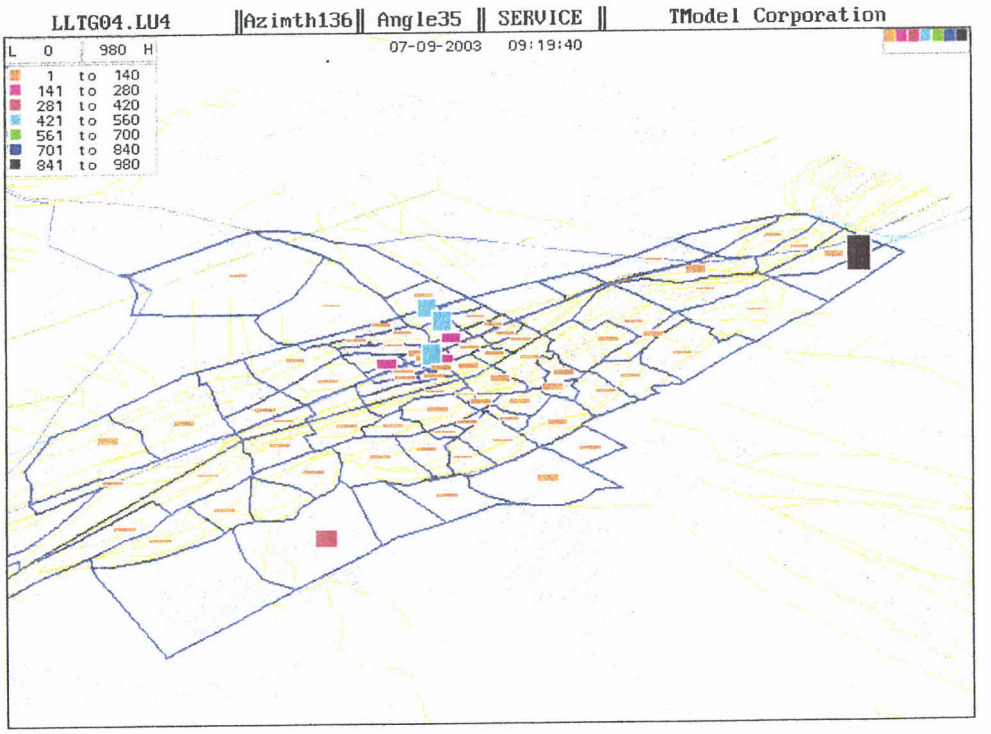
Appendix IV Graph 2-Elementary School Enrollment



Appendix IV Graph 3-Retail Employment



Appendix IV Graph 4-Basic Employment



Appendix IV Graph 5-Service Employment