Ladera Senior Housing Project

(Ladera Rd. South of Bent Tree Dr.)

Traffic Impact Study

June 1, 2007

Terry O. Brown, P.E.

Presented to:

Transportation Development Division
City of Albuquerque

Prepared for:

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Saturday, October 01, 2005

Wilfred Gallegos
City of Albuquerque Transportation Development
600 2nd St. NW
Albuquerque, NM 87102

Re: Ladera Apartments (Ladera Rd. South of Bent Tree Dr.)

Dear Wilfred:

Attached is the required queuing analysis for the proposed south driveway of the proposed Ladera Senior Housing Project located on the east side of Ladera Rd. just south of Bent Tree Dr.

A recent traffic count indicated that the current volumes of traffic on Ladera Rd. are 440 northbound and 500 southbound vehicles during the AM Peak Hour and 290 northbound vehicles and 470 southbound vehicles during the PM Peak Hour.

Included in the Appendix of this study is the trip generation calculation to determine the number of trips generated by this project during the AM and PM Peak Hour Weekday periods as well as the number of trips generated by the future development to the east. This project is described as the implementation of a 114-Unit Senior Housing Development with apartment-like units. The future development will be an approximately 160-unit apartment complex. The trip generation calculations in this study assumed that both developments are classified as apartments (ITE Land Use 220) as defined in the ITE Trip Generation Manual (7th Edition – 2003).

Included in the Appendix of this study are the trip distribution worksheet which forecasts the disbursement of trips generated by this project based on a citywide employment gravity model utilizing a distance inverse relationship. The trip distribution model utilized in this study is based on the Mid-Region Council of Government's Socioeconomic data. Therefore, the trip distribution model utilized in this study is consistent with the Mid-Region Council of Governments model.

The trip distribution analysis indicates that approximately 59% of the traffic generated by this project will be attracted to and from the north on Ladera Rd. and the remaining 41% will be attracted to and from the south on Ladera Rd.

Re: Ladera Apartments (Ladera Rd. South of Bent Tree Dr.)

Based on the above data, an unsignalized intersection analysis was performed for both proposed driveways on the project utilizing HiCAP 2.0 (version 2) software. The HiCAP 2.0 software utilizes methodology established by the Highway Capacity Manual (2000 Edition) to analyze unsignalized intersections and driveways.

The results of the analysis indicated that the average delay that is projected for the 2007 BUILD Conditions at the south driveway of this project will be no more than approximately 21.8 seconds. This is an average value, and it is conceivable and probable that some vehicles will experience more delay and some will experience less delay. However, it becomes unlikely that a significant percentage of exiting vehicles will experience more than twice the average delay. Therefore, it can be reasonably projected that there will not be a significant percentage of vehicles that experience more than a 44 second delay. Utilizing a three-minute queue in this case is not appropriate.

The HiCAP analysis in the Appendix of this study indicates that the queue length for exiting traffic from this project and the future project (sharing Driveway "A") will be 1 vehicle (25 feet) based on 95% probably comfort level. An alternative means of calculating the queue length for exiting traffic at Driveway "A" is to utilize a one-minute, a two-minute, and a three-minute queue length based on the average arrival rate. The following table summarizes the results of those three queuing calculation methods:

Driveway "A"	Volume	Average Arrival Rate (per minute) One-Minute Queue	Two-Minute Queue	Three-Minute Queue
AM Peak	49	0.8	1.6	2.4
PM Peak	25	0.4	0.8	1.2

As stated earlier, a three-minute queue length is not appropriate for this project. Since the projected delays at the driveway are less than 0.5 minutes, it would be more appropriate to utilize a one or two minute. A two-minute queue length would require a 50 feet deep throat in the driveway. The current design is characterized by a 40 feet deep throat. However, by relocating the driveway to the north a short distance, a 50 feet deep throat can be accomplished.

The southbound left turn volume at Driveway "A" is projected to be approximately 14 vehicles per hour during the 2007 AM Peak Hour Conditions and approximately 74 vehicles per hour during the 2007 PM Peak Hour Conditions. Utilizing the maximum projected volume of 74 vehicles per hour, then a three-minute queue length would be 4 vehicles (or 100 feet).

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This study concludes that the two driveways proposed for this project will operate at acceptable levels-of-service with acceptable delays. This study recommends that a 50-feet deep throat be provided for the exiting traffic at the south driveway. Also this study recommends that a southbound left turn lane on Ladera Rd. be constructed at Driveway "A" at a minimum length of 100 feet plus transition to accommodate the projected 3-minute queue. Since the posted speed limit on Ladera Rd. at this location is 35 MPH, then it is consistent with the Development Process Manual to construct a 100 feet long left turn lane.

Please call if you have questions or need additional information.

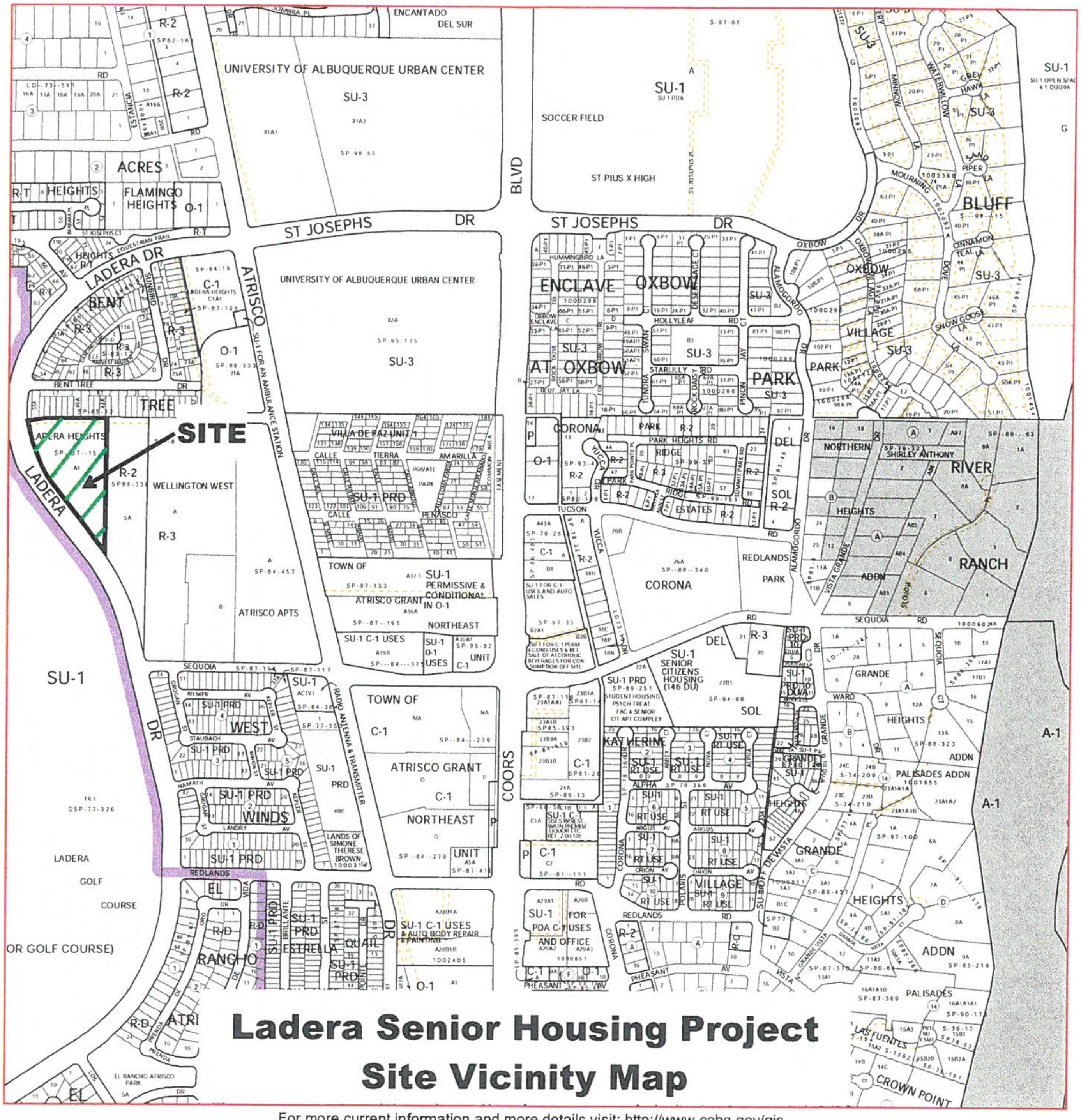
Sincerely Yours,

Terry O. Brown

cc: Scott McGee, Isaacson & Arfman w/attachments

attachments as noted

Appendix:
- Vicinity Map
- Preliminary Site Plan for Ladera Senior Housing Project
- Trip Generation Summary Table and Worksheets
- MRCOG Subarea Map
- Trip Distribution Map
- Trip Assignments Maps (% Entering and % Exiting)
- Turning Movement Volumes Summary and Worksheets
- Turning Movement Volumes Maps
- HiCAP Unsignalized Intersection Analyses

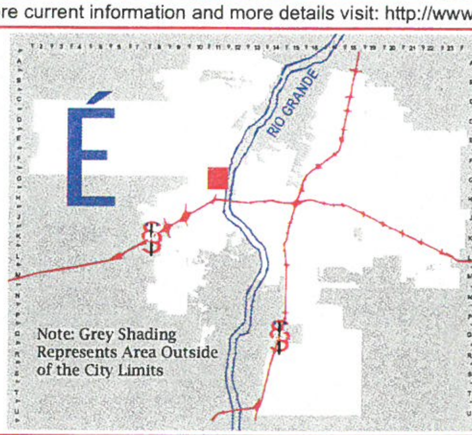


Ladera Senior Housing Project
Site Vicinity Map

For more current information and more details visit: http://www.cabq.gov/gis

AGIS
Albuquerque Geographic Information System

Map amended through: **Apr 22, 2005**



Zone Atlas Page:

G-11-Z

Selected Symbols

- Outside City Limits
- Sector Plans
- Design Overlay Zones
- City Historic Zone
- H-1 Buffer Zone
- Petroglyph Mon.
- Escarpment
- 2 Mile Airport Zone
- Airport Noise Contours
- Wall Overlay Zone

0 750 1,500 Feet

AREA: 3.785 ACRES

BENCHMARK: ACS BRASS CAP "6-G10"
ELEVATION= 5111.87 (NGVD 29)

TBM: CENTER OF EXISTING SANITARY SEWER MH RIM LOCATED WEST OF THE NW PROPERTY CORNER AS SHOWN.
ELEVATION= 5113.00

EXISTING CONDITIONS: THE SITE IS UNDEVELOPED AND SLOPES SLIGHTLY FROM THE CENTER BOTH TO THE NW CORNER AND SOUTHERN TIP. THE SITE IS BOUNDED ON THE WEST BY LADERA DRIVE, BY EXISTING RESIDENTIAL DEVELOPMENT TO THE NORTH, AND BY A VACANT TRACT TO THE EAST.
Q=(3.785Ac)(1.29cfs/Ac) = 4.9cfs

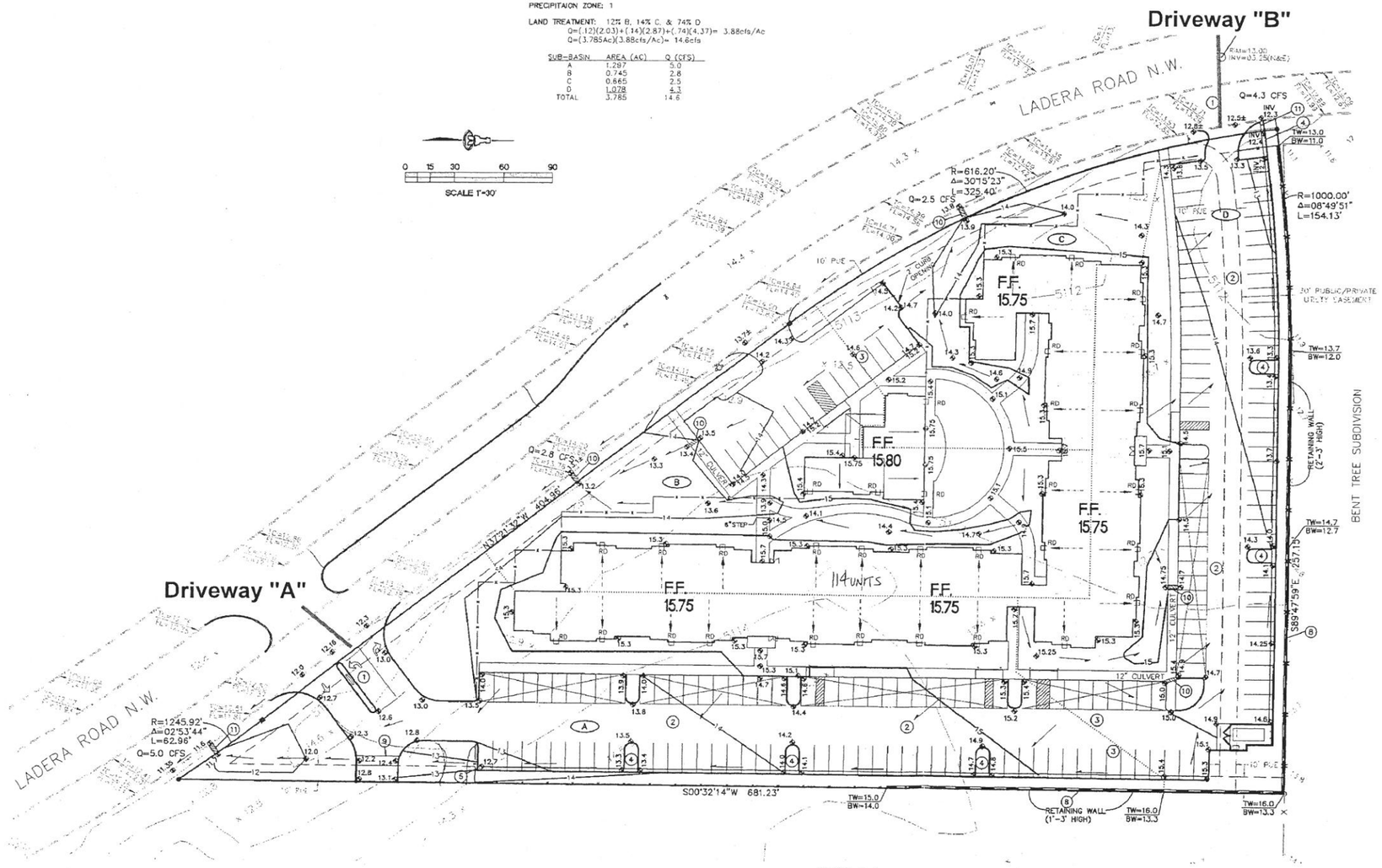
FLOODPLAIN: FEMA FLOOD PANELS 114 & 327 INDICATE THE SITE IS WITHIN ZONE "X" OUTSIDE THE 100-YEAR FLOODPLAIN.

PROPOSED CONDITIONS: 114 APARTMENT UNITS ARE PROPOSED IN A 4-STORY BUILDING, WITH AN OFFICE/COMMONS BUILDING, ASSOCIATED PAVED PARKING, AND LANDSCAPING. DEVELOPED RUNOFF DISCHARGES TO LADERA DRIVE NW AT FOUR LOCATIONS VIA SIDEWALK CULVERTS. TOTAL DISCHARGE TO LADERA DRIVE IS THEN 6.8cfs (NORTH) AND 7.8cfs (SOUTH) WHICH CAN BE CONVEYED BY THE STREET TO THE EXISTING STORM DRAIN SYSTEM.

PRECIPITAION ZONE: 1

LAND TREATMENT: 12% B, 14% C, & 74% D
Q=(.12)(2.03)+(.14)(2.87)+(.74)(4.37)= 3.88cfs/Ac
Q=(3.785Ac)(3.88cfs/Ac)= 14.6cfs

SUB-BASIN	AREA (AC)	Q (CFS)
A	1.297	5.0
B	0.745	2.8
C	0.665	2.5
D	1.078	4.3
TOTAL	3.785	14.6

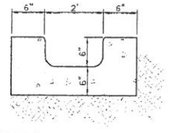


TRACT 5-A
TOWN OF ATRISCO GRANT

5.3 ACRES R-2

30 d.u.'s/acre

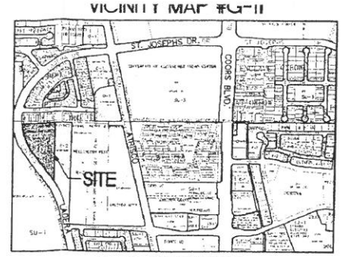
160 units



CURB OPENING DETAIL

MANNING EQUATION:
$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$
2' WIDTH: Q=8.4CFS
1.5' WIDTH: Q=5.9CFS
1' WIDTH: Q=3.5CFS

VICINITY MAP #G-11



KEYED NOTES

1. CONSTRUCT SITE ENTRANCE PER C.O.A. STD. DWG. 2426. SEE ARCHITECTURAL FOR ADD'L INFO. PROVIDE SMOOTH TRANSITION FROM 8" STANDARD CURB AND GUTTER AT STREET TO 6" MEDIAN CURB AND GUTTER ON-SITE.
2. CONSTRUCT ASPHALT PAVING AT ELEVATIONS SHOWN. SEE ARCHITECTURAL FOR PARKING LAYOUT, DIMENSIONS, AND STRIPING.
3. PAVING HIGH POINT.
4. PROVIDE 2' WIDE CURB OPENINGS TO ALLOW DRAINAGE TO PASS THROUGH MEDIAN.
5. DEPRESS CURB FOR 2' TO ALLOW RUNOFF TO ENTER LANDSCAPED AREA.
6. ROOF FLOWS FROM THE PROPOSED BUILDINGS TO BE RELEASED TO. SEE ARCHITECTURAL PLANS.
7. CONTRACTOR TO CONSTRUCT / VERIFY FF ELEVATIONS AND GRADES PER PLAN TO ENSURE DRAINAGE PATTERNS ARE ACHIEVED PER DESIGN.
8. CONSTRUCT RETAINING WALLS AS SHOWN TO ACHIEVE GRADE DIFFERENCES. SEE RETAINING WALL DESIGN BY OTHERS.
9. CONSTRUCT 6' CONCRETE VALLEY GUTTER. PROVIDE 6' CURB OPENING (NORTH & SOUTH ENDS).
10. CONSTRUCT 12" SIDEWALK CULVERT PER COA STD DWG #2236.
11. CONSTRUCT 18" SIDEWALK CULVERT PER COA STD DWG #2236.

LEGEND

	EXISTING CONTOUR
	PROPOSED CONTOUR
14.2	PROPOSED SPOT ELEVATION
	FLOW ARROW
FF - 15.75	FINISH FLOOR ELEVATION
	SIDEWALK CULVERT
TC 31.9 FL 61.4	TOP OF CURB FLOWLINE ELEVATION
TW=16.0 BW=13.3	TOP OF BOTTOM OF WALL ELEVATION
	RETAINING WALL
RD	ROOF DRAIN DOWNSPOUT
	DRAINAGE SUB-BASIN BOUNDARY
D	DRAINAGE SUB-BASIN

NOTICE TO CONTRACTORS

1. AN EXCAVATION/CONSTRUCTION PERMIT WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN CITY RIGHT-OF-WAY.
2. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED, EXCEPT AS OTHERWISE STATED OR PROVIDED HEREON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF ALBUQUERQUE INTERIM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1985.
3. TWO WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATING SERVICE, 765-1234, FOR LOCATION OF EXISTING UTILITIES.
4. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL CONSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
5. BACK FILL COMPACTION SHALL BE ACCORDING TO TRAFFIC/STREET USE.
6. MAINTENANCE OF THESE FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER OF THE PROPERTY SERVED.
7. WORK ON ARTERIAL STREETS SHALL BE PERFORMED ON A 24-HOUR BASIS.

APPROVAL	NAME	DATE
INSPECTOR		

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque, New Mexico 87108
Ph. 505-268-8828 Fax. 505-268-2632
1451GRD DWG thor 06.30.05

Dekker Perich Sabatini
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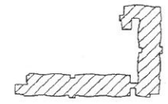
Suite 100
Albuquerque, NM 87109
505 761-9700
fax 761-4222
dps@dpsabq.com
ARCHITECT

ENGINEER
SCOTT M. MAGEE NEW MEXICO 10519 LICENSED PROFESSIONAL ENGINEER

PROJECT

GSL Properties
Ladera Senior Housing
Albuquerque, NM

KEY PLAN



REVISIONS
1.
2.
3.
4.
5.
6.

DRAWN BY	AS
REVIEWED BY	BP
DATE	
PROJECT NO.	
DRAWING NAME	

GRADING AND DRAINAGE PLAN

SHEET NO.
C101
OF

Ladera Senior Housing Project (Ladera Rd. South of Bent Tree Dr.)

Trip Generation Data

COMMENT	USE (ITE CODE) DESCRIPTION		24 HR VOL GROSS	A. M. PEAK HR. ENTER	A. M. PEAK HR. EXIT	P. M. PEAK HR. ENTER	P. M. PEAK HR. EXIT
	Summary Sheet	Units					
Ladera Senior Housing	Apartment, Post-1973 (220)	114.00	817	10	50	54	27
Future Development	Apartment, Post-1973 (220)	160.00	1,093	13	70	71	35
	Subtotal		**1,910**	**23**	**120**	**125**	**62**

Ladera Senior Housing Project (Ladera Rd. South of Bent Tree Dr.)
Trip Generation Data

USE (ITE CODE)		24 HOUR TWO-WAY VOLUME	A. M. PEAK HOUR		P. M. PEAK HOUR	
		GROSS	ENTER	EXIT	ENTER	EXIT
	Units					
Apartment, Post-1973 (220)	***114.00***	817	10	50	54	27
	Dwelling Units					

ITE Trip Generation Equations:

Average Vehicle Trip Ends on a Weekday (24 HOUR TWO-WAY VOLUME)

T = ***5.994*** **(X) +** ***134.114***
50% Enter, ***50%*** Exit

Average Vehicle Trip Ends on a Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7am and 9am (A.M. PEAK HOUR)

T = ***0.497*** **(X) +** ***3.238***
16% Enter, ***84%*** Exit

Average Vehicle Trip Ends on a Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 4pm and 6pm (P.M. PEAK HOUR)

T = ***0.541*** **(X) +** ***18.743***
67% Enter, ***33%*** Exit

Comments:
Ladera Senior Housing

Based on ITE Trip Generation Manual - 7th Edition

Ladera Senior Housing Project (Ladera Rd. South of Bent Tree Dr.)
Trip Generation Data

USE (ITE CODE)		24 HOUR TWO-WAY VOLUME	A. M. PEAK HOUR		P. M. PEAK HOUR	
		GROSS	ENTER	EXIT	ENTER	EXIT
	Units					
Apartment, Post-1973 (220)	***160.00***	1,093	13	70	71	35
	Dwelling Units					

ITE Trip Generation Equations:

Average Vehicle Trip Ends on a Weekday (24 HOUR TWO-WAY VOLUME)

T = ***5.994*** (X) + ***134.114***

50% Enter, ***50%*** Exit

Average Vehicle Trip Ends on a Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7am and 9am (A.M. PEAK HOUR)

T = ***0.497*** (X) + ***3.238***

16% Enter, ***84%*** Exit

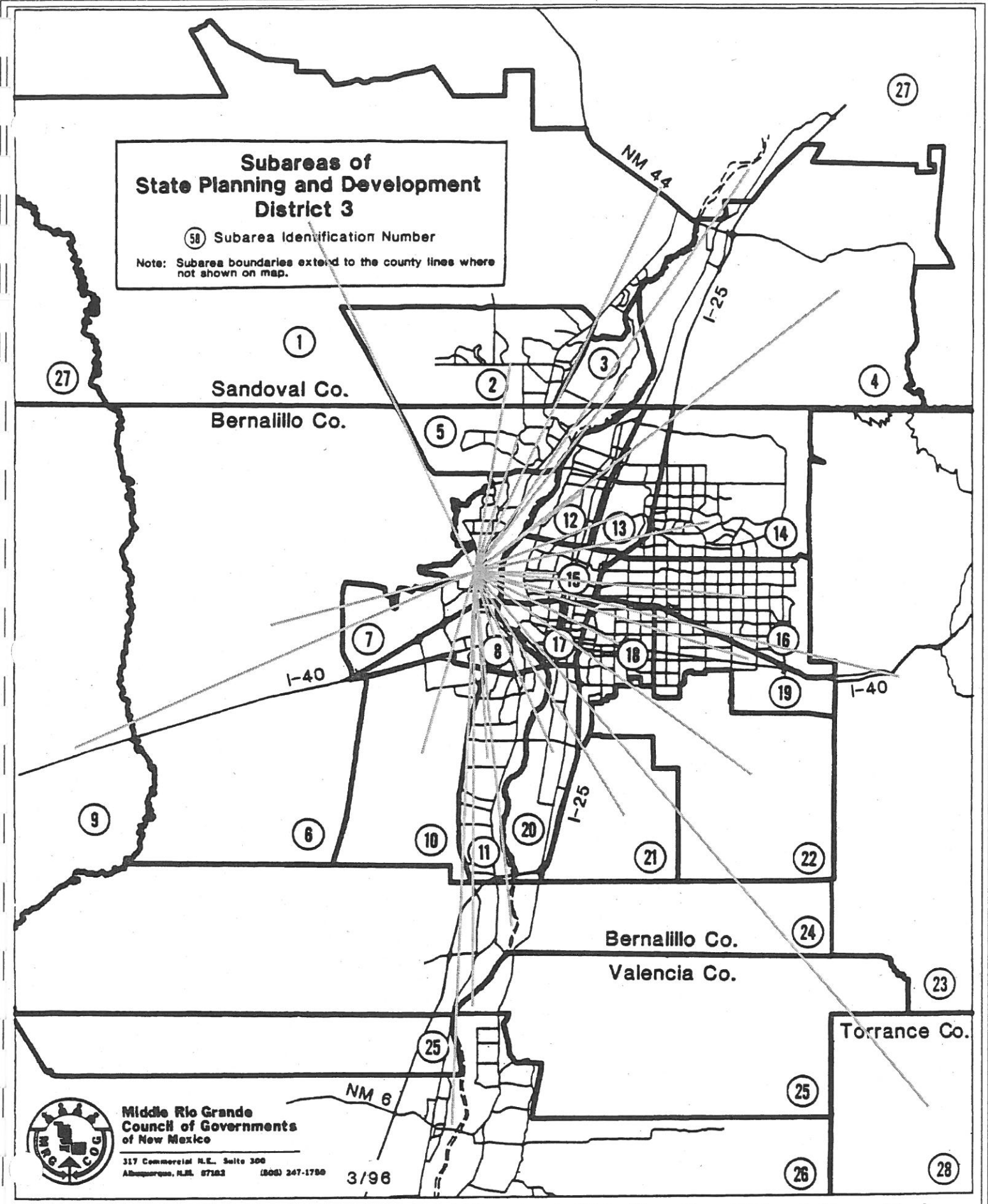
Average Vehicle Trip Ends on a Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 4pm and 6pm (P.M. PEAK HOUR)

T = ***0.541*** (X) + ***18.743***

67% Enter, ***33%*** Exit

Comments:
Future Development

Based on ITE Trip Generation Manual - 7th Edition



Ladera Senior Housing Project (Ladera Rd. South of Bent Tree Dr.)
Trip Distribution - Subarea Map

Figure 4

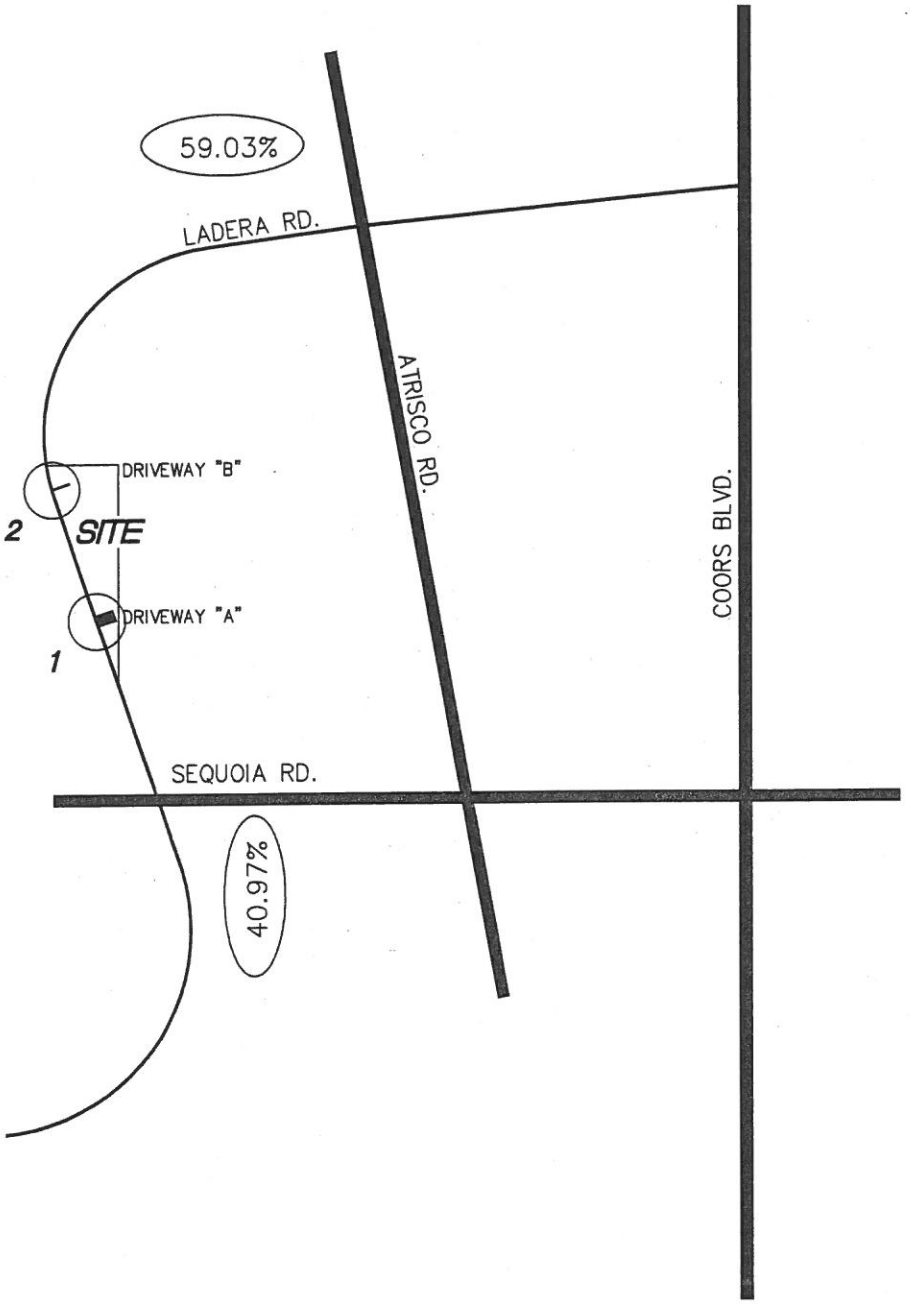
Trip Distribution Table

Ladera Senior Housing Project (Ladera Rd. South of Bent Tree Dr.)

Sub Area Employment Data:
For determination of Trip Distribution for Proposed Residential Development

Data Taken from Middle Rio Grande Council of Governments' 2020 Socioeconomic Forecasts for Data Analysis Subzones in State Planning and Development District 3 (TR-125) - Appendix "B"

									(LN) Ladera North			(LS) Ladera South		
Sub Area I.D.#	% Sub Area in Study	1995 Employment	2005 Employment	Interpolated Employment for the Year	Employment in Study	Dist. (Mi.)	Employment / Distance	% Employment / Distance	% Utilizing	% Employment / Dist. Utilizing	Employment	% Utilizing	% Employment / Dist. Utilizing	Employment
		1995	2005	2007										
1	100%	659	4,763	5,584	5,584	15.5	360	0.48%	100%	0.48%	360	0%	0.00%	0
2	100%	14,925	22,575	24,105	24,105	8	3,013	4.04%	100%	4.04%	3,013	0%	0.00%	0
3	100%	985	1,222	1,269	1,269	10.5	121	0.16%	100%	0.16%	121	0%	0.00%	0
4	100%	2,463	2,694	2,740	2,740	18.5	148	0.20%	100%	0.20%	148	0%	0.00%	0
5	100%	4,784	12,928	14,557	14,557	5.5	2,647	3.55%	100%	3.55%	2,647	0%	0.00%	0
6	100%	114	147	154	154	9	17	0.02%	0%	0.00%	0	100%	0.02%	17
7*	100%	5,845	10,257	11,139	11,139	1	11,139	14.95%	50%	7.47%	5,570	50%	7.47%	5,570
8	100%	5,415	8,137	8,681	8,681	2	4,341	5.82%	0%	0.00%	0	100%	5.82%	4,341
9	100%	62	69	70	70	18.5	4	0.01%	0%	0.00%	0	100%	0.01%	4
10	100%	1,555	2,680	2,905	2,905	8	363	0.49%	0%	0.00%	0	100%	0.49%	363
11	100%	4,680	5,776	5,995	5,995	7.5	799	1.07%	0%	0.00%	0	100%	1.07%	799
12	100%	5,680	6,883	7,124	7,124	5.5	1,295	1.74%	100%	1.74%	1,295	0%	0.00%	0
13	100%	28,380	45,105	48,450	48,450	6.5	7,454	10.00%	100%	10.00%	7,454	0%	0.00%	0
14	100%	29,501	36,361	37,733	37,733	10	3,773	5.06%	100%	5.06%	3,773	0%	0.00%	0
15	100%	15,159	19,266	20,087	20,087	3	6,696	8.98%	50%	4.49%	3,348	50%	4.49%	3,348
16	100%	64,446	78,155	80,897	80,897	11	7,354	9.87%	50%	4.93%	3,677	50%	4.93%	3,677
17	100%	36,775	39,496	40,040	40,040	4	10,010	13.43%	50%	6.72%	5,005	50%	6.72%	5,005
18	100%	40,093	49,531	51,419	51,419	6.5	7,911	10.61%	50%	5.31%	3,955	50%	5.31%	3,955
19	100%	28,365	31,549	32,186	32,186	11.5	2,799	3.76%	50%	1.88%	1,399	50%	1.88%	1,399
20	100%	5,451	7,979	8,485	8,485	8	1,061	1.42%	50%	0.71%	530	50%	0.71%	530
21	100%	23	29	30	30	12	3	0.00%	50%	0.00%	1	50%	0.00%	1
22	100%	23,886	23,679	23,638	23,638	14	1,688	2.27%	50%	1.13%	844	50%	1.13%	844
23	100%	1,547	2,308	2,460	2,460	17.5	141	0.19%	50%	0.09%	70	50%	0.09%	70
24	100%	888	2,351	2,644	2,644	14.5	182	0.24%	50%	0.12%	91	50%	0.12%	91
25	100%	91	128	135	135	18	8	0.01%	50%	0.01%	4	50%	0.01%	4
26	100%	12,362	19,073	20,415	20,415	22.5	907	1.22%	50%	0.61%	454	50%	0.61%	454
27	100%	2,431	3,291	3,463	3,463	20	173	0.23%	100%	0.23%	173	0%	0.00%	0
28	100%	2,581	3,344	3,497	3,497	29	121	0.16%	50%	0.08%	60	50%	0.08%	60
		339,146	439,776	459,902	459,902		74,527	100.00%		59.03%	43,994		40.97%	30,533
											59.03%			40.97%



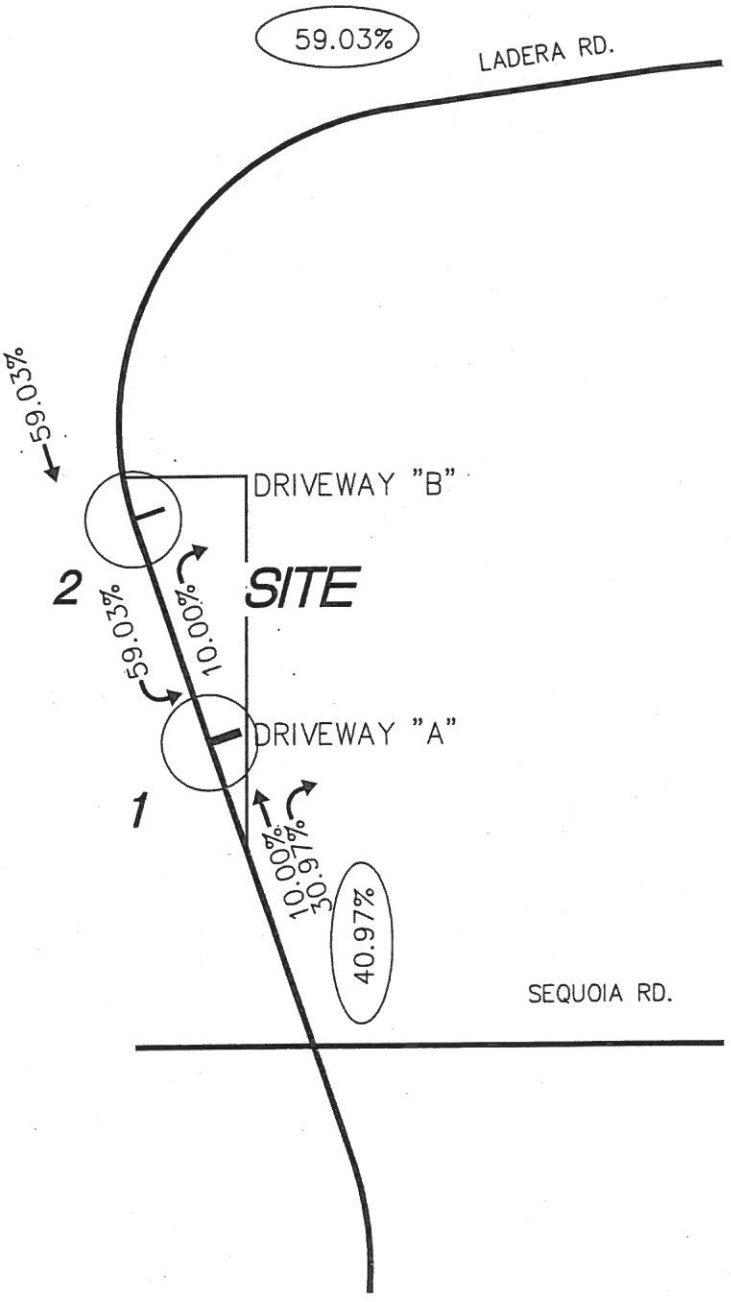
NORTH

NOT TO SCALE

LADERA SENIOR HOUSING PROJECT

LADERA RD. SOUTH OF BENT TREE DR.

TRIP DISTRIBUTION (%)



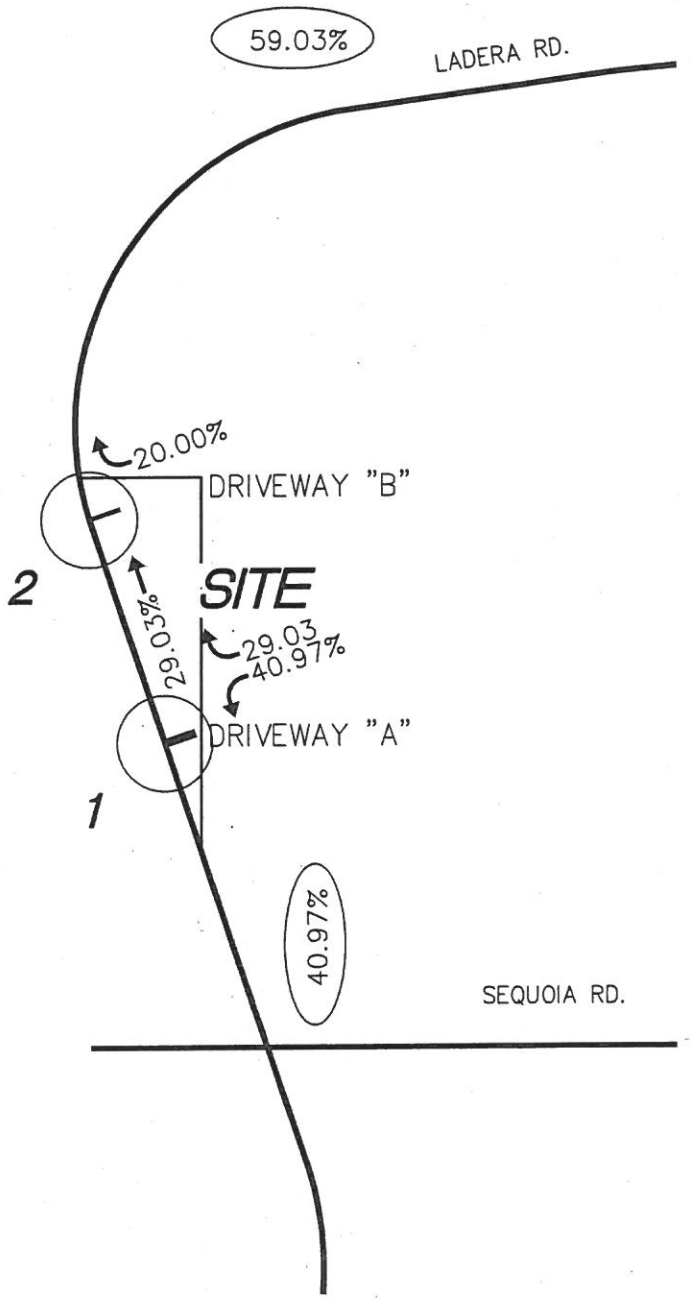
NORTH

NOT TO SCALE

LADERA SENIOR HOUSING PROJECT

LADERA RD. SOUTH OF BENT TREE DR.

TRIP ASSIGNMENTS (% ENTERING)



NORTH

NOT TO SCALE

LADERA SENIOR HOUSING PROJECT

LADERA RD. SOUTH OF BENT TREE DR.

TRIP ASSIGNMENTS (% EXITING)

Ladera Senior Housing Project (Ladera Rd. South of Bent Tree Dr.)

Projected Turning Movements SUMMARY

PROPOSED DEVELOPMENT (2007) - 100% Development

INTERSECTION: **Summary**

Driveway "A" / Ladera Rd.

(1)

3.0% Truck

	0.85			0.85			0.85			0.85			PHF
	Eastbound (Driveway "A")			Westbound (Driveway "A")			Northbound (Ladera Rd.)			Southbound (Ladera Rd.)			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Existing (2005)	0	0	0	0	0	0	0	440	0	0	500	0	
2007 (NO BUILD - A.M.)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*466*	*0*	*0*	*530*	*0*	
2007 (BUILD - A.M.)	***0***	***0***	***0***	***49***	***0***	***35***	***0***	***468***	***7***	***14***	***530***	***0***	

	0.85			0.85			0.85			0.85			PHF
	Eastbound (Driveway "A")			Westbound (Driveway "A")			Northbound (Ladera Rd.)			Southbound (Ladera Rd.)			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Existing (2005)	0	0	0	0	0	0	0	290	0	0	470	0	
2007 (NO BUILD - P.M.)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*307*	*0*	*0*	*498*	*0*	
2007 (BUILD - P.M.)	***0***	***0***	***0***	***25***	***0***	***18***	***0***	***320***	***39***	***74***	***498***	***0***	

Driveway "B" / Ladera Dr.

(2)

3.0% Truck

	0.85			0.85			0.85			0.85			PHF
	Eastbound (Driveway "B")			Westbound (Driveway "B")			Northbound (Ladera Dr.)			Southbound (Ladera Dr.)			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Existing (2005)	0	0	0	0	0	0	0	440	0	0	500	0	
2007 (NO BUILD - A.M.)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*466*	*0*	*0*	*530*	*0*	
2007 (BUILD - A.M.)	***0***	***0***	***0***	***0***	***0***	***24***	***0***	***501***	***2***	***0***	***544***	***0***	

	0.85			0.85			0.85			0.85			PHF
	Eastbound (Driveway "B")			Westbound (Driveway "B")			Northbound (Ladera Dr.)			Southbound (Ladera Dr.)			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Existing (2005)	0	0	0	0	0	0	0	290	0	0	470	0	
2007 (NO BUILD - P.M.)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*307*	*0*	*0*	*498*	*0*	
2007 (BUILD - P.M.)	***0***	***0***	***0***	***0***	***0***	***12***	***0***	***325***	***13***	***0***	***572***	***0***	

Ladera Senior Housing Project (Ladera Rd. South of Bent Tree Dr.)

Projected Turning Movements Worksheet

Driveway "A" / Ladera Rd.

INTERSECTION: E-W Street: **Driveway "A"** (1)

N-S Street: **Ladera Rd.**

Year of Existing Counts 2005

Implementation Year **2007**

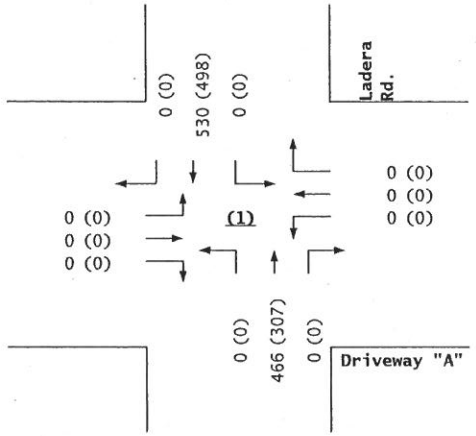
Growth Rates

	3.00%			3.00%			3.00%			3.00%		
	Eastbound (Driveway "A")			Westbound (Driveway "A")			Northbound (Ladera Rd.)			Southbound (Ladera Rd.)		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Existing Volumes	0	0	0	0	0	0	0	440	0	0	500	0
Background Traffic Growth	0	0	0	0	0	0	0	26	0	0	30	0
Subtotal (NO BUILD - A.M.)	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***466***	***0***	***0***	***530***	***0***
Percent Residential Trips Generated(Entering)	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	***10.00%***	***30.97%***	***59.03%***	*0.00%*	*0.00%*
Percent Residential Trips Generated(Exiting)	*0.00%*	*0.00%*	*0.00%*	***40.97%***	*0.00%*	***29.03%***	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Total Trips Generated	0	0	0	49	0	35	0	2	7	14	0	0
Total AM Peak Hour BUILD Volumes	**0**	**0**	**0**	**49**	**0**	**35**	**0**	**468**	**7**	**14**	**530**	**0**

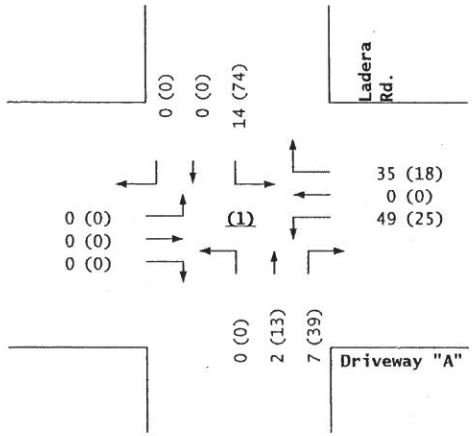
	Eastbound (Driveway "A")			Westbound (Driveway "A")			Northbound (Ladera Rd.)			Southbound (Ladera Rd.)		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Existing Volumes	0	0	0	0	0	0	0	290	0	0	470	0
Background Traffic Growth	0	0	0	0	0	0	0	17	0	0	28	0
Subtotal (NO BUILD - P.M.)	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***307***	***0***	***0***	***498***	***0***
Percent Residential Trips Generated(Entering)	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	***10.00%***	***30.97%***	***59.03%***	*0.00%*	*0.00%*
Percent Residential Trips Generated(Exiting)	*0.00%*	*0.00%*	*0.00%*	***40.97%***	*0.00%*	***29.03%***	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Total Trips Generated	0	0	0	25	0	18	0	13	39	74	0	0
Total PM Peak Hour BUILD Volumes	**0**	**0**	**0**	**25**	**0**	**18**	**0**	**320**	**39**	**74**	**498**	**0**

	Entering	Exiting		
Number of Residential Trips Generated	**23**	**120**	A.M.	100% Residential Development
	125	**62**	P.M.	

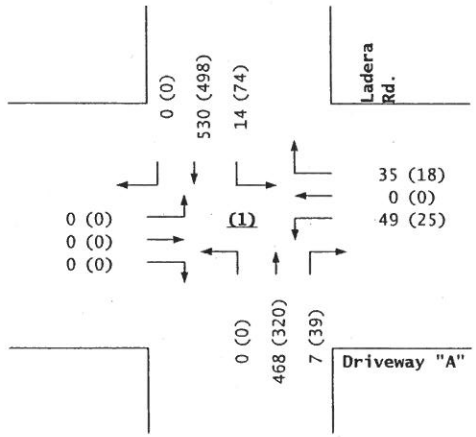
2007
NO BUILD



Trips



2007
BUILD



Driveway "A" / Ladera Rd.

Ladera Senior Housing Project (Ladera Rd. South of Bent Tree Dr.)

Projected Turning Movements Worksheet

Driveway "B" / Ladera Dr.

INTERSECTION: E-W Street: **Driveway "B"** (2)

N-S Street: **Ladera Dr.**

Year of Existing Counts 2005

Implementation Year **2007**

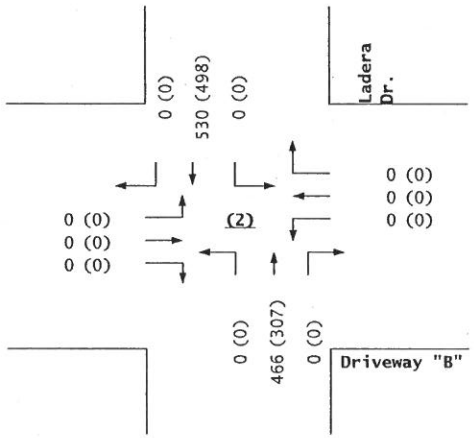
Growth Rates

	3.00%			3.00%			3.00%			3.00%		
	Eastbound (Driveway "B")			Westbound (Driveway "B")			Northbound (Ladera Dr.)			Southbound (Ladera Dr.)		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Existing Volumes	0	0	0	0	0	0	0	440	0	0	500	0
Background Traffic Growth	0	0	0	0	0	0	0	26	0	0	30	0
Subtotal (NO BUILD - A.M.)	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***466***	***0***	***0***	***530***	***0***
Percent Residential Trips Generated(Entering)	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	***10.00%***	*0.00%*	***59.03%***	*0.00%*
Percent Residential Trips Generated(Exiting)	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	***20.00%***	*0.00%*	***29.03%***	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Total Trips Generated	0	0	0	0	0	24	0	35	2	0	14	0
Total AM Peak Hour BUILD Volumes	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**501**	**2**	**0**	**544**	**0**

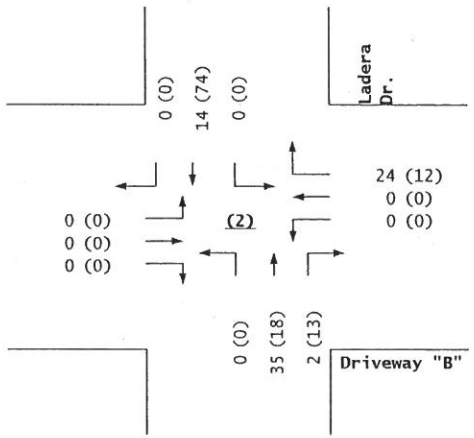
	Eastbound (Driveway "B")			Westbound (Driveway "B")			Northbound (Ladera Dr.)			Southbound (Ladera Dr.)		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Existing Volumes	0	0	0	0	0	0	0	290	0	0	470	0
Background Traffic Growth	0	0	0	0	0	0	0	17	0	0	28	0
Subtotal (NO BUILD - P.M.)	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***307***	***0***	***0***	***498***	***0***
Percent Residential Trips Generated(Entering)	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	***10.00%***	*0.00%*	***59.03%***	*0.00%*
Percent Residential Trips Generated(Exiting)	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	***20.00%***	*0.00%*	***29.03%***	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Total Trips Generated	0	0	0	0	0	12	0	18	13	0	74	0
Total PM Peak Hour BUILD Volumes	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**325**	**13**	**0**	**572**	**0**

	Entering	Exiting		
Number of Residential Trips Generated	**23**	**120**	A.M.	100% Residential Development
	125	**62**	P.M.	

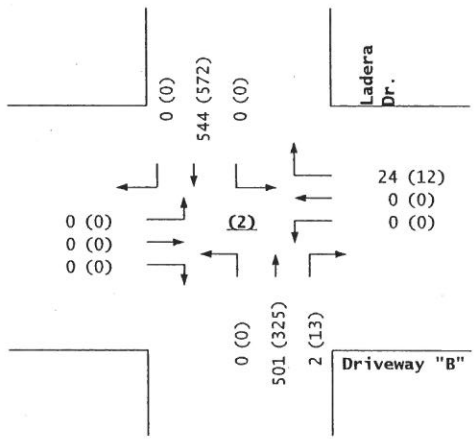
2007
NO BUILD



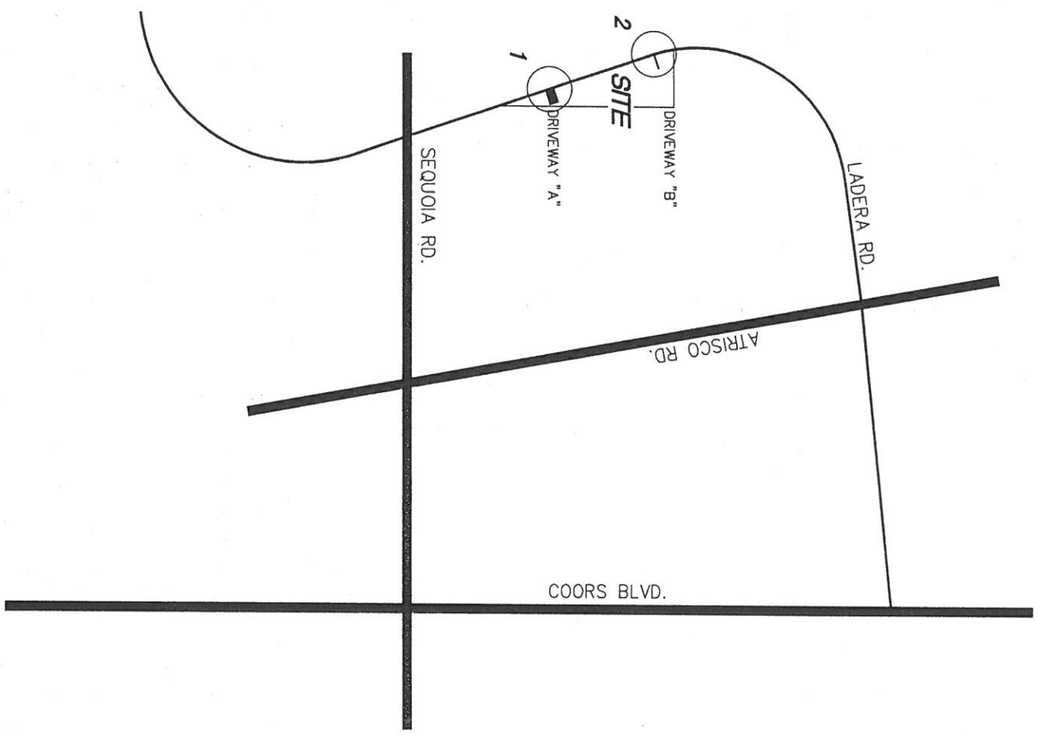
Trips



2007
BUILD

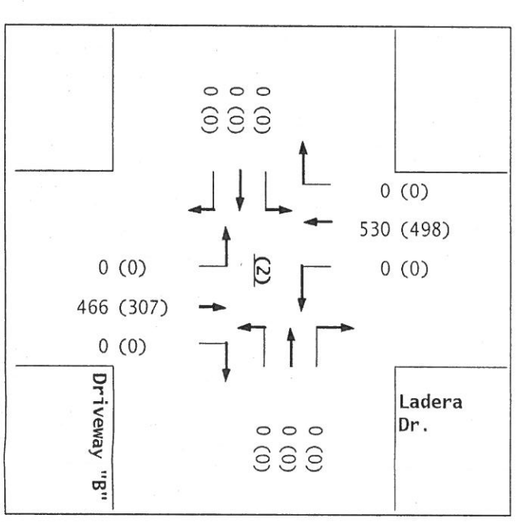


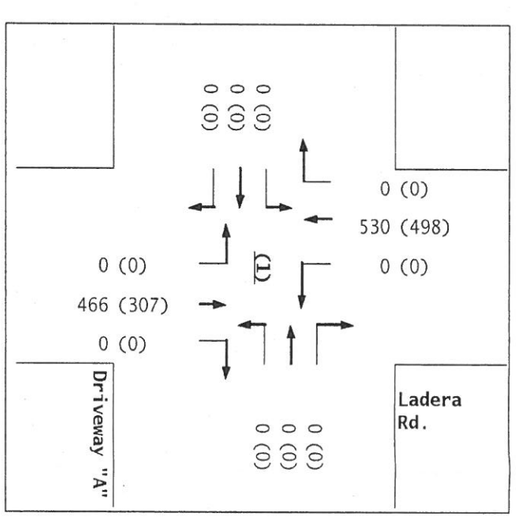
Driveway "B" / Ladera Dr.



NORTH

NOT TO SCALE

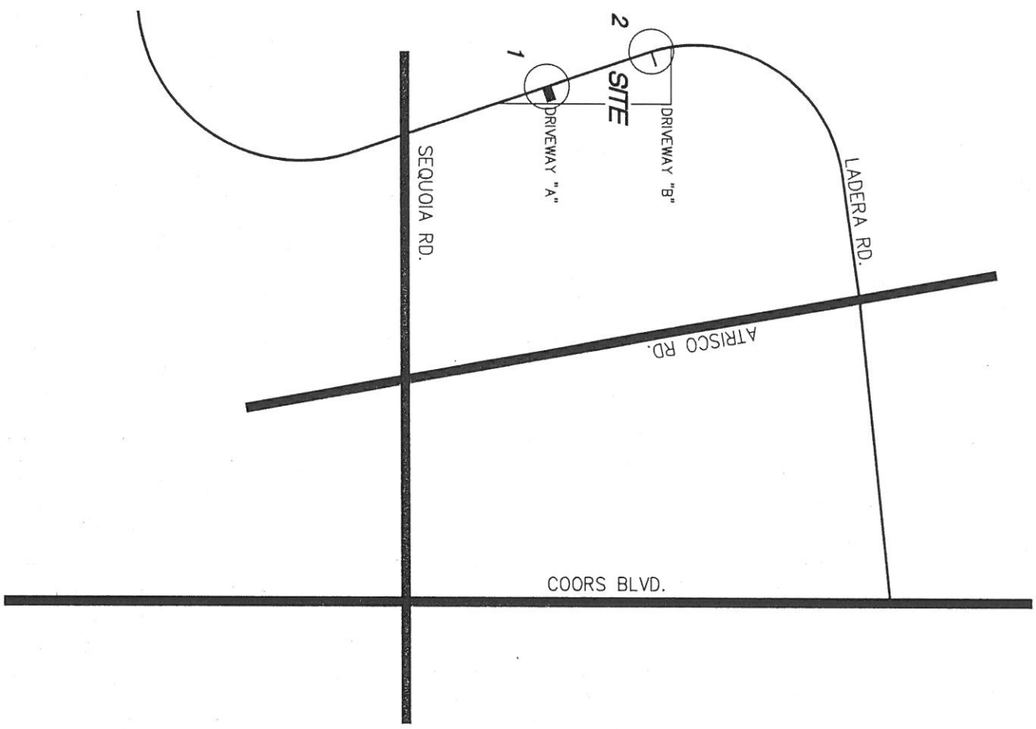




LADERA SENIOR HOUSING PROJECT

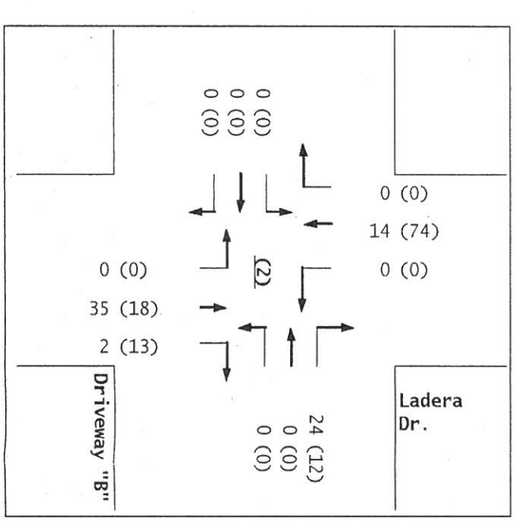
LADERA RD. SOUTH OF BENT TREE DR.

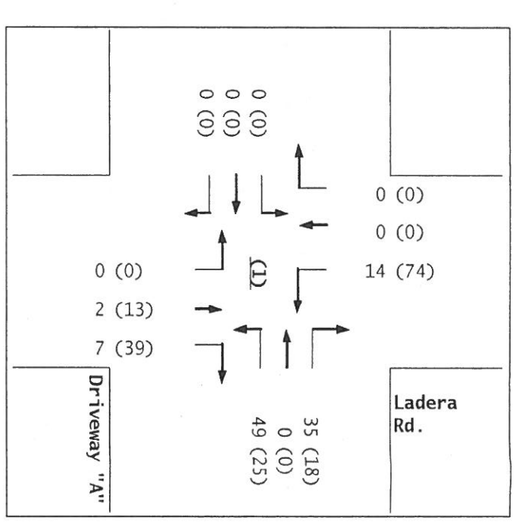
2007 NO BUILD VOLUMES



NORTH

NOT TO SCALE

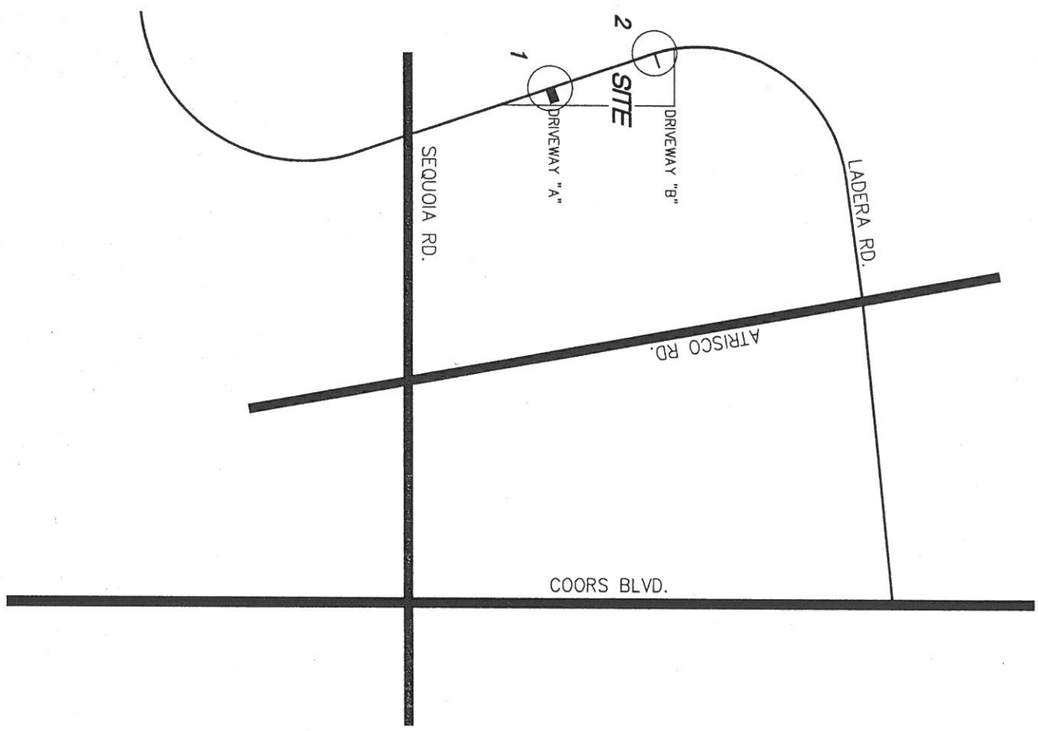




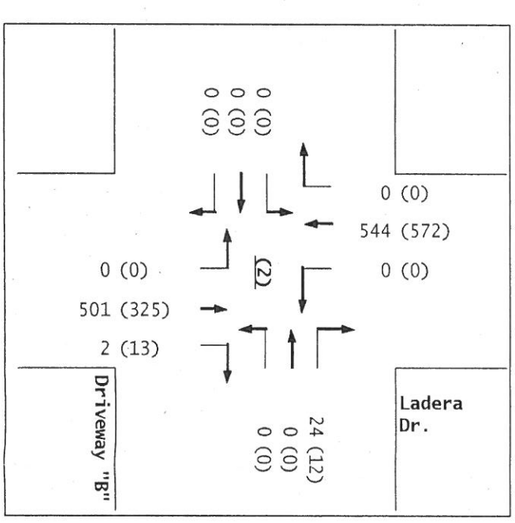
LADERA SENIOR HOUSING PROJECT

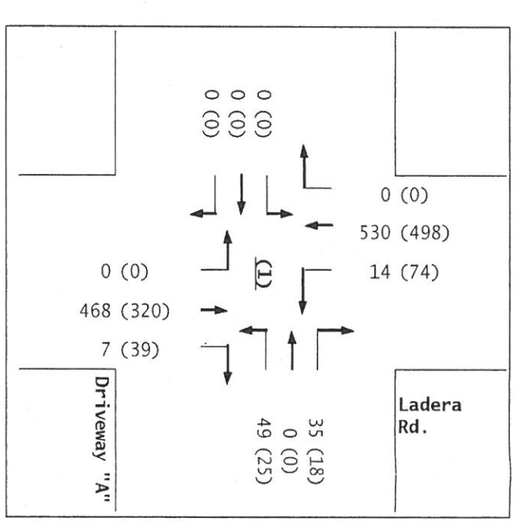
LADERA RD. SOUTH OF BENT TREE DR.

TRIPS GENERATED



NORTH





LADERA SENIOR HOUSING PROJECT

LADERA RD. SOUTH OF BENT TREE DR.

2007 NO BUILD VOLUMES

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information | ***Site Information***

Analyst	tob	Jurisdiction/Date	City of Albuque 10/1/2005
Agency or Company	Terry O. Brown	Major Street	Ladera Rd.
Analysis Period/Year	AM Peak Hour 2007	Minor Street	Driveway "A"
Comment	2007 AM Peak Hour BUILD Conditions		

Input Data

Lane Configuration	NB	SB	WB	EB
Lane 1 (curb)	TR	T	LR	
Lane 2	T	T		
Lane 3		L		
Lane 4				
Lane 5				

	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		467	7	14	530		49		35			
PHF		0.85	0.85	0.85	0.85		0.85		0.85			
Percent of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		549	8	16	624		58		41			
Flare storage (# of vehs)												
Median storage (# of vehs)												

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 0.25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	LR	99	366	0.270	1	18.4	C	18.4
	2								C
	3								
EB	1								
	2								
	3								
NB		(1)							
SB		(4)	16	1002	0.016	0	8.7	A	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	tob
Agency or Company	Terry O. Brown
Analysis Period/Year	PM Peak Hour 2007
Comment	2007 PM Peak Hour BUILD Conditions

Site Information

Jurisdiction/Date	City of Albuque 10/1/2005
Major Street	Ladera Rd.
Minor Street	Driveway "A"

Input Data

Lane Configuration	NB	SB	WB	EB
Lane 1 (curb)	TR	T	LR	
Lane 2	T	T		
Lane 3		L		
Lane 4				
Lane 5				

	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		320	39	74	498		25		18			
PHF		0.85	0.85	0.85	0.85		0.85		0.85			
Percent of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		376	46	87	586		29		21			
Flare storage (# of vehs)												
Median storage (# of vehs)												

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 0.25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	LR	50	371	0.135	0	16.2	C	16.2
	2								
	3								C
EB	1								
	2								
	3								
NB		(1)							
SB		(4)	87	1126	0.077	0	8.5	A	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information | ***Site Information***

Analyst	tob	Jurisdiction/Date	City of Albuque 10/1/2005
Agency or Company	Terry O. Brown	Major Street	Ladera Rd.
Analysis Period/Year	AM Peak Hour 2007	Minor Street	Driveway "A"
Comment	2007 AM Peak Hour BUILD Conditions - Separate L+R Lanes		

Input Data

Lane Configuration	NB	SB	WB	EB
Lane 1 (curb)	TR	T	R	
Lane 2	T	T	L	
Lane 3		L		
Lane 4				
Lane 5				

	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		467	7	14	530		49		35			
PHF		0.85	0.85	0.85	0.85		0.85		0.85			
Percent of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		549	8	16	624		58		41			
Flare storage (# of vehs)												
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 0.25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	R	41	715	0.057	0	10.3	B	17.0
	2	L	58	272	0.213	1	21.8	C	
	3								C
EB	1								
	2								
	3								
NB		(1)							
SB		(4)	16	1002	0.016	0	8.7	A	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information | ***Site Information***

Analyst	tob	Jurisdiction/Date	City of Albuque 10/1/2005
Agency or Company	Terry O. Brown	Major Street	Ladera Rd.
Analysis Period/Year	PM Peak Hour 2007	Minor Street	Driveway "A"
Comment	2007 PM Peak Hour BUILD Conditions - Separate L+R Lanes		

Input Data

Lane Configuration	NB	SB	WB	EB
Lane 1 (curb)	TR	T	R	
Lane 2	T	T	L	
Lane 3		L		
Lane 4				
Lane 5				

	NB			SB			WB			EB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		320	39	74	498		25		18			
PHF		0.85	0.85	0.85	0.85		0.85		0.85			
Percent of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		376	46	87	586		29		21			
Flare storage (# of vehs)												
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 0.25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
WB	1	R	21	791	0.027	0	9.7	A	15.7
	2	L	29	268	0.108	0	20.1	C	
	3								C
EB	1								
	2								
	3								
NB		(1)							
SB		(4)	87	1126	0.077	0	8.5	A	

Daskalos Commercial Development

(Irving Blvd. / Universe Blvd.)

Traffic Impact Study

June 11, 2007

Terry O. Brown, P.E.

Presented to:

Transportation Development Division
City of Albuquerque

Developers:

Pete Daskalos Properties
5321 Menaul Blvd. NE
Albuquerque, NM 87110

TERRY O. BROWN
NEW MEXICO
6407
LICENSED PROFESSIONAL ENGINEER

Terry O. Brown

Terry O. Brown, P.E.
P. O. Box 92051
Albuquerque, NM 87199
(505) 883-8807

Daskalos Commercial Development (Irving/Universe)
TRAFFIC IMPACT STUDY

Daskalos Comm. Dev. (Irving/Universe)
TRAFFIC IMPACT STUDY

STUDY PURPOSE

The study is being conducted in conjunction with a request for approval of a subdivision plan for implementation of the site as shown in the Appendix (Page A-2) of this report. It consists of approximately 38000 SF Shopping Center, 6000 SF High-turnover Sit-down Restaurant, a Drive-in Bank w/ 4 windows and a 55000 SF Supermarket comprising Daskalos Comm. Dev. (Irving/Universe) in the City of Albuquerque. The purpose of this study is to identify the impact of the proposed development on the adjacent transportation system, and to make recommendations to mitigate any significant adverse impact on the adjacent transportation system resulting from the implementation of the subdivision plan. This study is being prepared to meet the requirements of the City of Albuquerque Transportation Development Section.

STUDY PROCEDURES

A scoping meeting was held in August, 2005 with City of Albuquerque staff (Tony Loyd) prior to beginning the study to discuss scope and methodology to be utilized within the report. Tony Loyd summarized the meeting and defined the requirements and procedures for the study his in letter dated September xx, 2005 (See Appendix Page A-96 thru A-98). Specific items included format, intersections to be studied, intersection analysis procedures, existing traffic counts, trip distribution methodology, and implementation year definition. No horizon year analysis was required for this study.

The basic procedure followed is described as follows:

1. Calculate the generated trips for this proposed commercial development consisting of approximately 37,600 SF Shopping Center, 5,700 SF High-turnover Sit-down Restaurant, a Drive-in Bank w/ 4 windows and a 55,000 SF Supermarket. A pass-by trip rate reduction of 30% was utilized for this project. This report will consider the impact of the development as a single phase.
2. Calculate trip distribution for the newly generated trips by this development. The proposed commercial trips shall be distributed based on year 2009 population within a 2-mile radius of the project.
3. Determine Trip Assignments for the newly generated trips based on the results of the Trip Distribution Analysis and logical routing to and from the site.
4. Perform an AM Peak Hour and PM Peak Hour turning movement traffic count at the intersections of Irving Blvd / Unser Blvd, Paradise Blvd / Universe Blvd and for Irving Blvd / Universe Blvd. Existing turning movement counts for the driveways analyzed in this report were derived by extrapolation of the existing counts.
5. Calculate historic growth rate for each of the approaches to the intersections targeted for analysis.
6. Incorporate Trips Generated from the previously approved Seville Subdivision and Milagro Subdivision Traffic Impact Studies into the 2009 NO BUILD Volumes for this analysis.
7. Add in data from Trip Assignments Maps and Tables to the 2009 NO BUILD Volumes to obtain 2009 BUILD Volumes for this project.

8. Provide signalized and unsignalized intersection analyses for the following intersections:

INTERSECTION	TYPE CONTROL	NO BUILD	BUILD
Irving Blvd. / Unser Blvd.	Traffic Signal*	2009	2009
Paradise Blvd. / Universe Blvd	Traffic Signal*	2009	2009
Irving Blvd. / Universe Blvd	Four Way Stop	2009	2009

PREVIOUS RELATED TRAFFIC IMPACT STUDIES

Base data for this Traffic Impact Study were obtained from two previous Traffic Impact Studies:

1) ***Seville Subdivision*** *(performed 2000).*
2) ***Milagro Subdivision*** *(performed in 2005).*

The trips generated (or adjusted trips generated) from the above previously approved traffic impact studies were incorporated into the 2009 NO BUILD Volumes utilized in this report.

GENERAL AREA CHARACTERISTICS

The proposed requested development plan is for a property bounded on the south by Irving Blvd. and on the west by Universe Blvd. as shown on the Vicinity Map on Page A-1 of the Appendix of this report. The total area of the requested development plan is approximately 9 acres. The subject tract of land is in a rapidly developing area of Northwest Albuquerque. Most of the surrounding land use is residential.

AREA STREET NETWORK

Unser Boulevard is classified as a Principal Arterial Roadway on the Long Range Roadway System Map for the Albuquerque Metropolitan Planning Area. Unser Blvd. north of Paradise Blvd. to the McMahon Blvd. extension is generally a two lane rural type roadway with segments of four-lane roadway where adjacent land developments have been constructed. Unser Blvd. in the future is planned to be a four lane urban roadway. "Unser Blvd." is interchangeably used with the former "Lyon Blvd." between Paradise Blvd. and Irving Blvd.

Irving Blvd. is classified as a Minor Arterial Roadway on the Long Range Roadway System Map for the Albuquerque Metropolitan Planning Area. Irving Blvd. from Unser Blvd. east to Coors Blvd. is generally a two lane paved rural type roadway. Irving Blvd. extends west of Unser Blvd. as a two lane roadway.

Paradise Blvd. is classified as a Minor Arterial Roadway on the Long Range Roadway System Map for the Albuquerque Metropolitan Planning Area. Paradise Blvd. from Unser Blvd. (Lyon) east beyond Golf Course Rd. is generally a two lane paved rural type roadway.

Universe Blvd. is classified as a Minor Arterial Roadway on the Long Range Roadway System Map for the Albuquerque Metropolitan Planning Area. Universe Blvd between Paseo del Norte and Irving Blvd is a 4 lane roadway with medians and curb & gutter. Otherwise, it is generally a two lane paved rural type roadway.

EXISTING TRAFFIC VOLUMES

2004 Average Weekday Traffic Volumes (AWDT) for major streets in the site plan area are shown on Appendix A, Page A-4.

Existing AM and PM peak hour turning movement counts for the year 2004 were provided by the consulting engineer for the following intersections:

Paradise Blvd. / Universe Blvd
Irving Blvd. / Unser Blvd

Additionally, 2005 AM and PM peak hour turning movement counts were obtained for this project for the following intersections:

Irving Blvd. / Universe Blvd.

The counts are included at the end of the Appendix.

LEVELS OF SERVICE

The Highway Capacity Manual defines Level of Service (LOS) for signalized intersections in terms of average controlled delay per vehicle as follows:

LOS A	10.0" or less	Most Vehicles do not stop
LOS B	10.1 to 20.0"	Some Vehicles stop
LOS C	20.1 to 35.0"	Significant number of vehicles stop.
LOS D	35.1 to 55.0"	Many vehicles stop.
LOS E	55.1 to 80.0"	Limit of acceptable delay.
LOS F	> 80.0"	Unacceptable delay.

Level of Service D is generally considered acceptable in urban areas and is the desirable base condition for analysis in a traffic study.

Following is a series of tables indicating the current (2005) levels-of-service being experienced by the intersections targeted for operational analysis in this report:

* * * * * * * * * * * * * * *

Existing Geometry (Irving Blvd. / Unser Blvd.)

Approach	Left Turn Lanes	Thru/Lefts	Thru Lanes	Thru/Rights	Right Turn Lanes
EB Irving Blvd.	1	0	0	1	0
WB Irving Blvd.	1	0	1	0	1
NB Unser Blvd.	1	0	0	1	0
SB Unser Blvd.	1	0	0	1	0

Irving Blvd. / Unser Blvd.	Existing Conditions (2005)	
	A.M.	P.M.
Existing Geometry	***E – 66.6***	***E – 65.6***

D - 30.7 - Bold Italicized Level-of-Service indicates that one or more individual turning movements is Level-of-Service E or worse.

* * * * * * * * * * * * * * *

Existing Geometry (Paradise Blvd. / Universe Blvd.)

Approach	Left Turn Lanes	Thru/Lefts	Thru Lanes	Thru/Rights	Right Turn Lanes
EB N/A	0	0	0	0	0
WB Paradise Blvd.	2	0	0	0	1
NB Universe Blvd.	0	0	1	1	0
SB Universe Blvd.	1	0	2	0	0

Paradise Blvd. / Universe Blvd.	Existing Conditions (2005)	
	A.M.	P.M.
Existing Geometry	B - 13.0	B – 16.7

D - 30.7 - Bold Italicized Level-of-Service indicates that one or more individual turning movements is Level-of-Service E or worse.

EXISTING TRANSIT SERVICE

This area is serviced by the Ventana Ranch / Unser Route 162 bus which provides service intermittently from 5:30 a.m. until 7:30 a.m. and from to 4:00 p.m. until 6:00 p.m. weekdays. No weekend service is available at this time.

PROPOSED DEVELOPMENT

The proposed development is for a combination of retail shops & banking. See the conceptual site development plan on Page A-2 in the Appendix of this report to acquire more detailed information about the proposed development. This site plan is conceptual at this point in time and is subject to some changes as progress takes place in the design process. The plan should, however, provide a reliable basis upon which to analyze the impact of the development on the adjacent transportation system and provide guidelines for mitigating the impact and establishing access criteria. The conceptual site plan as it is shown in this report proposes two major access points onto Irving Blvd. from the site. The plan also shows an access point onto Universe Blvd. which is considered to be a secondary access and a service entrance.

TRIP GENERATION

Projected trips were calculated from data in the Institute of Transportation Engineers Trip Generation report (7th Edition, 2003). Trips for the development were determined based on land uses defined on the Conceptual Site Plan on Page A-2 in the Appendix of this report.

The resulting number of trips generated for the proposed development are summarized in the following table:

Daskalos Comm. Dev. (Irving Blvd. / Universe Blvd.)
Trip Generation Data

USE (ITE CODE)		24 HR VOL	A. M. PEAK HR.		P. M. PEAK HR.	
DESCRIPTION		*GROSS*	*ENTER*	*EXIT*	*ENTER*	*EXIT*
Summary Sheet	Units					
Shopping Center (820)	37.60	3,596	53	34	158	171
High Turnover (Sit-Down) Restaurant (932)	5.70	725	34	32	38	24
Drive-In Bank (912)	4.00	1,563	45	33	102	102
Supermarket (850)	55.00	5,074	134	86	297	285
Subtotal		**10,958**	**266**	**185**	**595**	**582**
Pass-by Trip Reduction	30%	**(3,287)**	**(80)**	**(56)**	**(179)**	**(175)**
Net Offsite Trips Generated		**7,671**	**186**	**130**	**417**	**407**

TRIP DISTRIBUTION

Primary and Diverted Linked Trips:

Trips were distributed as follows:

Commercial Land Use

Primary and diverted linked trips for the both the commercial land use development were distributed proportionally to the 2008 projected population of Data Analysis Subzones within an 2-mile radius around the proposed development. Population data for the years 2000 and 2025 were taken from the 2025 Socioeconomic Forecasts by Data Analysis Subzones for the Mid-Region of New Mexico, S-03-01 (April, 2003), supplied by the Mid-Region Council of Governments (MRCOG). Population data from the years 2000 and 2025 was interpolated linearly to obtain 2008 population data to utilize for this analysis. Population Subzones were grouped based on the most likely major streets or route to the subject project. The trip distribution worksheets and associated map of subareas and data analysis subzones are shown on Pages A-11 thru A-14 in the Appendix. The resulting Trip Distribution model is demonstrated by the Trip Distribution Map on Page A-15 in the Appendix.

TRIP ASSIGNMENTS

Trip assignments are first made on a percentage basis derived from data established in the trip distribution determination process and logical routing. Those percentages are then applied to the projected trips to determine individual traffic movements. Percentage trip assignments are shown in the Appendix on Pages A-16 thru A-17.

BACKGROUND TRAFFIC GROWTH

Background historic traffic growth rates for roadway segments were calculated in the following manner:
Background traffic growth rates were considered for each individual approach to an intersection that was targeted for analysis based on data from the 2000, 2001, 2002, 2003 and 2004 Traffic Flow maps prepared by the Mid Regional Council of Governments. Most

of the Traffic Flow Data for the years 2000, 2001, 2002, 2003 and 2004 taken from the MGCOG Traffic Flow Maps were Standard Data. The data from those years for each approach was plotted on a graph and a linear "regression trend line" calculated using the equation format *y=mx+b*. The growth rate was determined by calculating the average volume increase per year during the time period considered and dividing that volume into the most recent (2004) AWDT used in the analysis from which future volumes will be calculated. The rate of growth of that trend line was utilized as the growth rate for each approach if that calculated rate appeared feasible. However, there were some instances where the rate indicated a negative growth trend or an unusually low growth trend. In those cases, an appropriate growth rate from an adjacent segment of the same roadway was used or a generic growth rate of 10% or 12% was used. Due to the potential for growth in the area, it was believed that a zero percent growth rate was inappropriate for this study. Additionally, if the R^2 value of the trend line was low, other means of establishing a probable growth rate from the data accumulated was considered. Historical Growth Rate Graphs with linear regression trendlines are shown in the Appendix on Pages A-18 through A-28. The map on Page A-29 in the Appendix of this report also shows historic growth rates used in this study. Additionally, the growth rate utilized for each approach to an intersection is printed at the top of the Turning Movement sheets for each intersection (Appendix Pages A-30 through A-43).

PROJECTED PEAK HOUR TURNING MOVEMENTS FOR 2009 BUILDOUT

Projected Peak Hour Turning Movement Volumes for the 2009 BUILD Condition was obtained by adding in the new trips generated by the proposed new land use to the calculated NO BUILD Volumes. See Appendix Pages A-30 thru A-46 for further information regarding turning movement counts.

For the intersections analyzed in this study, recent (2004-2005) traffic counts were grown to 2009 using the background traffic historic growth rates established for this project. To the 2009 NO BUILD Volumes, the generated trips from this proposed development were added in to provide the resulting 2009 BUILD Volumes.

INTERSECTION CAPACITY ANALYSIS

Intersection capacity analyses were performed in accordance with the procedures for signalized and unsignalized intersections in the Highway Capacity Manual, Special Report 209, Transportation Research Board, 2000, using TEAPAC Signal 2000 software for signalized intersections and using HiCAP 2000 software for unsignalized intersections. For signalized intersections, the operational method of analysis was used for 2008 conditions (NO BUILD and BUILD). In addition to utilizing the operational analysis for the intersections, the planning method may also be used to provide additional information at the intersection to help define critical lane volumes and to help analyze a solution.

Capacity analyses were performed for the following traffic conditions.

2009 without development of the subject property (NO BUILD)
2009 with development as per the Conceptual Subdivision Development Plan (BUILD)

The results of the 2009 NO BUILD and 2009 BUILD capacity analyses are summarized in the following sections - *Results and Discussion of Intersection Capacity Analyses.*

RESULTS OF SIGNALIZED INTERSECTION CAPACITY ANALYSES

IMPLEMENTATION YEAR (2009)

Irving Blvd. / Unser Blvd. - Pages A-47 thru A-66

The results of the implementation year analysis of the signalized intersection of Irving Blvd. / Unser Blvd. are summarized in the following table:

Existing Geometry (Irving Blvd. / Unser Blvd.)

Approach	Left Turn Lanes	Thru/Lefts	Thru Lanes	Thru/Rights	Right Turn Lanes
EB Irving Blvd.	1	0	0	1	0
WB Irving Blvd.	1	0	1	0	1
NB Unser Blvd.	1	0	0	1	0
SB Unser Blvd.	1	0	0	1	0

Wilson & Co. Geometry (Irving Blvd. / Unser Blvd.)

Approach	Left Turn Lanes	Thru/Lefts	Thru Lanes	Thru/Rights	Right Turn Lanes
EB Irving Blvd.	1	0	0	1	0
WB Irving Blvd.	1	0	1	0	1
NB Unser Blvd.	1	0	1	1	0
SB Unser Blvd.	1	0	1	0	1

Irving Blvd. / Unser Blvd.	2009 No Build		2009 BUILD	
	A.M.	P.M.	A.M.	P.M.
Wilson & Co. Geometry	***F – 115.1***	***F – 122.6***	***F – 120.5***	***F – 144.6***
Wilson Geom Plus SB Thru Lane	***E – 58.1***	***F – 97.5***	***E – 62.2***	***F – 115.4***
Wilson Geom Plus SB/WB Thru Lane	***D – 41.1***	***D – 45.5***	***D – 43.1***	***E – 60.0***

D - 30.7 - Bold Italicized Level-of-Service indicates that one or more individual turning movements is Level-of-Service E or worse.

The intersection of Irving Blvd. / Unser Blvd. is currently being redesigned in conjunction with an AMAFCA storm sewer construction project on Unser Blvd. Since the intersection was being demolished due to the storm sewer construction, the City and AMAFCA cooperated to reconstruct the intersection to a better condition than existed a few months ago before construction began. The new intersection geometry is currently being designed by Wilson & Company. The plans are not final at this time, but a conceptual plan is included at the end of the Appendix of this report on Page A-105. The plan is not intended to be a final configuration for the intersection of Irving Blvd. / Unser Blvd.

A table summarizing the required queue length of each turning lane follows. The queue lane lengths are based on an average vehicle arrival rate during the AM and PM Peak utilizing Poisson's ratio to determine a 95% probable maximum queue length. The lengths of each lane are based on the mitigated geometry (Wilson & Co. Plus SB/WB Thru Lane) analyzed above:

Queueing Analysis Summary Sheet

Project: Daskalos Commercial Development (Irving / Universe)
Intersection: Irving Blvd / Unser Blvd

2009

Eastbound Approach	Left Turns # Lanes	Left Turns Vol.	Left Turns Length (Ft.)	Thru Movements # Lanes	Thru Movements Vol.	Thru Movements Length (Ft.)	Right Turns # Lanes	Right Turns Vol.	Right Turns Length (Ft.)
Existing Lane Length	*1*	*238*	*Not Avail.*	*1*	*175*	*Cont*	*0*	*57*	*0*
AM NO BUILD Queue	1	395	450	1	468	525	0	101	150
AM BUILD Queue	**1**	**421**	**475**	**1**	**475**	**525**	**0**	**103**	**150**
Existing Lane Length	*1*	*214*	*Not Avail.*	*1*	*167*	*Cont*	*0*	*44*	*0*
PM NO BUILD Queue	1	350	**475**	1	371	**500**	0	76	150
PM BUILD Queue	**1**	**431**	**550**	**1**	**394**	**525**	**0**	**83**	**150**

Westbound Approach	# Lanes	Vol.	Length (Ft.)	# Lanes	Vol.	Length (Ft.)	# Lanes	Vol.	Length (Ft.)
Existing Lane Length	*1*	*17*	*Not Avail.*	*2*	*117*	*Cont*	*1*	*47*	*Not Avail.*
AM NO BUILD Queue	1	27	75	2	249	200	1	75	125
AM BUILD Queue	**1**	**27**	**75**	**2**	**260**	**200**	**1**	**75**	**125**
Existing Lane Length	*1*	*43*	*Not Avail.*	*2*	*247*	*Cont*	*1*	*228*	*Not Avail.*
PM NO BUILD Queue	1	69	125	2	578	425	1	365	475
PM BUILD Queue	**1**	**69**	**125**	**2**	**602**	**450**	**1**	**365**	**475**

Northbound Approach	# Lanes	Vol.	Length (Ft.)	# Lanes	Vol.	Length (Ft.)	# Lanes	Vol.	Length (Ft.)
Existing Lane Length	*1*	*16*	*Not Avail.*	*2*	*359*	*Cont*	*0*	*18*	*0*
AM NO BUILD Queue	1	29	75	2	574	375	0	29	75
AM BUILD Queue	**1**	**32**	**75**	**2**	**574**	**375**	**0**	**29**	**75**
Existing Lane Length	*1*	*29*	*Not Avail.*	*2*	*683*	*Cont*	*0*	*19*	*0*
PM NO BUILD Queue	1	56	125	2	1,093	750	0	30	75
PM BUILD Queue	**1**	**63**	**125**	**2**	**1,093**	**750**	**0**	**30**	**75**

Southbound Approach	# Lanes	Vol.	Length (Ft.)	# Lanes	Vol.	Length (Ft.)	# Lanes	Vol.	Length (Ft.)
Existing Lane Length	*1*	*270*	*Not Avail.*	*2*	*735*	*Cont*	*1*	*186*	*Not Avail.*
AM NO BUILD Queue	1	432	475	2	1,176	675	1	303	375
AM BUILD Queue	**1**	**432**	**475**	**2**	**1,176**	**675**	**1**	**340**	**400**
Existing Lane Length	*1*	*80*	*Not Avail.*	*2*	*537*	*Cont*	*1*	*250*	*Not Avail.*
PM NO BUILD Queue	1	128	200	2	859	600	1	413	**550**
PM BUILD Queue	**1**	**128**	**200**	**2**	**859**	**600**	**1**	**496**	**625**

	AM	PM
Cycle Length:	110	130

Paradise Blvd. / Universe Blvd. - Pages A-67 thru A-78

The results of the implementation year analysis of the signalized intersection of Paradise Blvd. / Universe Blvd. are summarized in the following table:

Existing Geometry (Paradise Blvd. / Universe Blvd.)

Approach	Left Turn Lanes	Thru/Lefts	Thru Lanes	Thru/Rights	Right Turn Lanes
EB N/A	0	0	0	0	0
WB Paradise Blvd.	2	0	0	0	1
NB Universe Blvd.	0	0	1	1	0
SB Universe Blvd.	1	0	2	0	0

Paradise Blvd. / Universe Blvd.	2009 No Build		2009 BUILD	
	A.M.	P.M.	A.M.	P.M.
Existing Geometry	B – 13.0	B – 19.0	B – 13.9	***D – 36.4***

D - 30.7 - Bold Italicized Level-of-Service indicates that one or more individual turning movements is Level-of-Service E or worse.

The analysis of the intersection of Paradise Blvd. / Universe Blvd. demonstrates that all of the conditions analyzed will operate at acceptable levels-of-service under its existing geometry.

A table summarizing the required queue length of each turning lane follows. The queue lane lengths are based on an average vehicle arrival rate during the AM and PM Peak utilizing Poisson's ratio to determine a 95% probable maximum queue length. The lengths of each lane are based on the existing geometry analyzed above:

Queueing Analysis Summary Sheet

Project: Daskalos Commercial Development (Irving / Universe)
Intersection: Paradise Blvd / Universe Blvd

2009

Eastbound Approach	Left Turns # Lanes	Left Turns Vol.	Left Turns Length (Ft.)	Thru Movements # Lanes	Thru Movements Vol.	Thru Movements Length (Ft.)	Right Turns # Lanes	Right Turns Vol.	Right Turns Length (Ft.)
Existing Lane Length	*0*	*0*	*0*	*0*	*0*	*Cont*	*0*	*0*	*0*
AM NO BUILD Queue	0	0	0	0	0	0	0	0	0
AM BUILD Queue	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Existing Lane Length	*0*	*0*	*0*	*0*	*0*	*Cont*	*0*	*0*	*0*
PM NO BUILD Queue	0	0	0	0	0	0	0	0	0
PM BUILD Queue	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Westbound Approach	# Lanes	Vol.	Length (Ft.)	# Lanes	Vol.	Length (Ft.)	# Lanes	Vol.	Length (Ft.)
Existing Lane Length	*2*	*278*	*>1,000*	*0*	*0*	*Cont*	*1*	*101*	*>1,000*
AM NO BUILD Queue	2	288	225	0	0	0	1	103	150
AM BUILD Queue	**2**	**288**	**225**	**0**	**0**	**0**	**1**	**131**	**200**
Existing Lane Length	*2*	*226*	*>1,000*	*0*	*0*	*Cont*	*1*	*170*	*>1,000*
PM NO BUILD Queue	2	243	225	0	0	0	1	173	275
PM BUILD Queue	**2**	**243**	**225**	**0**	**0**	**0**	**1**	**237**	**350**

Northbound Approach	# Lanes	Vol.	Length (Ft.)	# Lanes	Vol.	Length (Ft.)	# Lanes	Vol.	Length (Ft.)
Existing Lane Length	*0*	*0*	*0*	*2*	*138*	*Cont*	*0*	*267*	*0*
AM NO BUILD Queue	0	0	0	2	166	150	0	330	400
AM BUILD Queue	**0**	**0**	**0**	**2**	**169**	**150**	**0**	**330**	**400**
Existing Lane Length	*0*	*0*	*0*	*2*	*283*	*Cont*	*0*	*350*	*0*
PM NO BUILD Queue	0	0	0	2	339	275	0	425	550
PM BUILD Queue	**0**	**0**	**0**	**2**	**346**	**275**	**0**	**425**	**550**

Southbound Approach	# Lanes	Vol.	Length (Ft.)	# Lanes	Vol.	Length (Ft.)	# Lanes	Vol.	Length (Ft.)
Existing Lane Length	*1*	*253*	*150*	*2*	*336*	*Cont*	*0*	*0*	*0*
AM NO BUILD Queue	1	316	375	2	420	300	0	0	0
AM BUILD Queue	**1**	**336**	**400**	**2**	**422**	**300**	**0**	**0**	**0**
Existing Lane Length	*1*	*207*	*150*	*2*	*109*	*Cont*	*0*	*0*	*0*
PM NO BUILD Queue	1	259	375	2	137	150	0	0	0
PM BUILD Queue	**1**	**321**	**425**	**2**	**144**	**150**	**0**	**0**	**0**

	AM	PM
Cycle Length:	110	130

RESULTS OF UNSIGNALIZED INTERSECTION CAPACITY ANALYSES

IMPLEMENTATION YEAR (2009)

Irving Blvd. / Universe Blvd. - Pages A-79 thru A-86

The existing unsignalized intersection of Irving Blvd. / Universe Blvd. is controlled by four-way stop signs. The results of the analysis of the unsignalized intersection of Irving Blvd. / Universe Blvd. are summarized in the following table:

	2009 NO BUILD		2009 BUILD	
	AM	PM	AM	PM
Irving Blvd. / Universe Blvd.				
Eastbound Approach	B – 11.0	B – 11.8	B – 13.8	C – 19.7
Westbound Approach	B – 11.9	C – 24.5	B – 13.5	F – 70.2
Northbound Approach	A – 10.0	B – 11.8	B – 11.9	C – 21.4
Southbound Approach	A – 9.3	A – 10.0	B – 10.8	C – 15.8

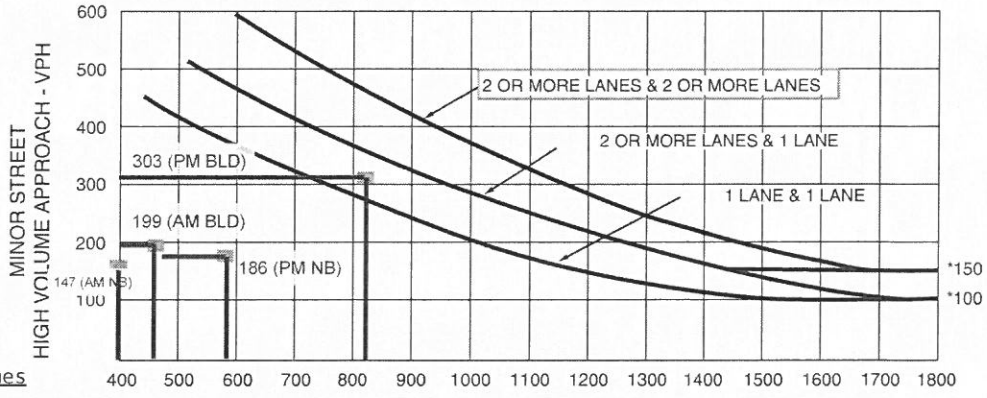
The westbound approach of the existing intersection of Irving Blvd. / Universe Blvd. fails during the 2009 PM Peak Hour BUILD Conditions.

Since one of the approaches to the intersection was analyzed to be level-of-service "F", a Peak Hour Warrant Analysis was conducted to determine if the forecast volumes at the intersection warranted a traffic signal under the Peak Hour Warrant Criteria. The following graph shows the volumes plotted on Figure 4C-3 in the Manual on Uniform Traffic Control Devices, Millennium Edition:

December 2000 Page 4C-9

Figure 4C-3. Warrant 3, Peak Hour

Irving Blvd. / Universe Blvd.



Projected Volumes

2006	Minor	Major
AM Peak		
NO BUILD	147	372
BUILD	199	466
PM Peak		
NO BUILD	186	591
BUILD	303	816

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Traffic Signal is NOT Warranted based on Projected 2009 Volumes

Driveway "A" / Universe Blvd - Pages A-87 thru A-89

The results of the analysis of the unsignalized intersection of Driveway "A" / Universe Blvd are summarized in the following table:

	2009 BUILD	
	AM	PM
Driveway "A" / Universe Blvd		
Minor (Driveway "A")		
WB Left	B – 10.7	C – 22.8
Major Street (Universe Blvd.)		
SB Left	A – 7.7	A – 8.4

Driveway "B" / Universe Blvd - Pages A-90 thru A-92

The results of the analysis of the unsignalized intersection of Driveway "B" / Universe Blvd are summarized in the following table:

	2009 BUILD	
	AM	PM
Driveway "B" / Universe Blvd		
Minor (Driveway "B")		
WB Left	A – 8.8	A – 9.2
Major Street (Universe Blvd.)		
SB Left	A – 7.4	A – 7.6

Irving Blvd / Driveway "C" - Pages A-93 thru A-95

The results of the analysis of the unsignalized intersection of Irving Blvd / Driveway "C" are summarized in the following table:

	2009 BUILD	
	AM	PM
Irving Blvd / Driveway "C"		
Minor (Driveway "C")		
SB Left	C – 15.1	F – 84.3
Major Street (Irving Blvd.)		
EB Left	A – 8.1	A – 9.4

The projected operation of Driveway "C" on Irving Blvd. for the PM Peak Hour is LOS "F". However, this condition will probably improve after a signal is installed at the intersection of Irving Blvd. / Universe Blvd. The signal will create gaps in eastbound traffic, thus improving the available time for southbound left turn traffic to maneuver out onto eastbound Irving Blvd. It is anticipated, though, that delays for southbound left turn traffic at Driveway "C" will be long.

It should be noted that Levels of Service (LOS) for unsignalized intersections cannot be compared directly with Levels of Service for signalized intersections. LOS for unsignalized intersections is based on reserve capacity, which is converted to generalized levels of delay; LOS for signalized intersections is based on actual delay in seconds.

LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Average Delay (secs)	Level-of-Service
≤ 10	A
> 10 and ≤ 15	B
> 15 and ≤ 25	C
> 25 and ≤ 35	D
> 35 and ≤ 50	E
> 50	F

Generally speaking, a Level-of-Service D or better is an acceptable parameter for design purposes.

CONCLUSIONS

This analysis was conducted using the following methodology: Trip Generation was established using the Institute of Transportation Engineers' (ITE's) Trip Generation Manual (7th Edition). Generated Trips were distributed proportionately based on the Population Data Analysis Subzones within a two-mile radius of the project for Commercial Land Use: NO BUILD volumes were established based on current traffic counts grown to the implementation year with adjustments made for trips generated by the Seville Subdivision and Milagro Subdivision; and the intersection analyses were performed in accordance with the 2000 Highway Capacity Manual, Special Report 209. The Traffic Impact Study showed a moderate increase in traffic congestion for the adjacent transportation network based on 100% buildout of the proposed project. This impact can be mitigated to provide acceptable level-of-service of operation of the intersections analyzed in this study.

In summary, the proposed plan for commercial development presents no significant adverse impact to the adjacent transportation system provided that the following recommendations are followed:

RECOMMENDATIONS

FROM IMPLEMENTATION YEAR (2009) ANALYSIS

- All site design and construction including driveways and landscaping shall maintain adequate sight distances at the driveways and the existing intersections.
- Driveways – This site can be properly served with the three proposed driveways as shown on the proposed site development plan on Page A-2 in the Appendix.
  - Driveway "A" – the primary full access driveway located about mid-way along the frontage of the project on Universe Blvd. Driveway "A" should be constructed with two exiting lanes (one for left turns and one for right turns) and one entering lane.
  - Driveway "B" – secondary full access driveway located near the north end of the frontage of the project on Universe Blvd. Driveway "B" should be constructed with two exiting lanes (one for left turns and one for right turns) and one entering lane.
  - Driveway "C" – secondary full access driveway on Irving Blvd. at the east property line of the site. Driveway "C" should be located as far to the east as is possible on this project. Recommended distance at this time is 350 feet east of Universe Blvd.

Due to its close proximity to the intersection of Irving Blvd. / Universe Blvd., Driveway "C" may be restricted to a right-turn-in, right-turn-out driveway in the future when Irving / Unser becomes signalized.

- **Irving Blvd. / Unser Blvd.** – Joint efforts by the City of Albuquerque and AMAFCA related to a storm drainage project on Unser Blvd. will reconstruct the intersection of Irving Blvd. / Unser Blvd. to improve its capacity above that that existed a few months ago. However, this analysis indicated that the following improvements will be needed at the intersection of Irving Blvd. / Unser Blvd.:
  - Construct a second southbound thru lane on Unser Blvd. at Irving Blvd.
  - Construct a second westbound thru lane on Irving Blvd. at Unser Blvd.

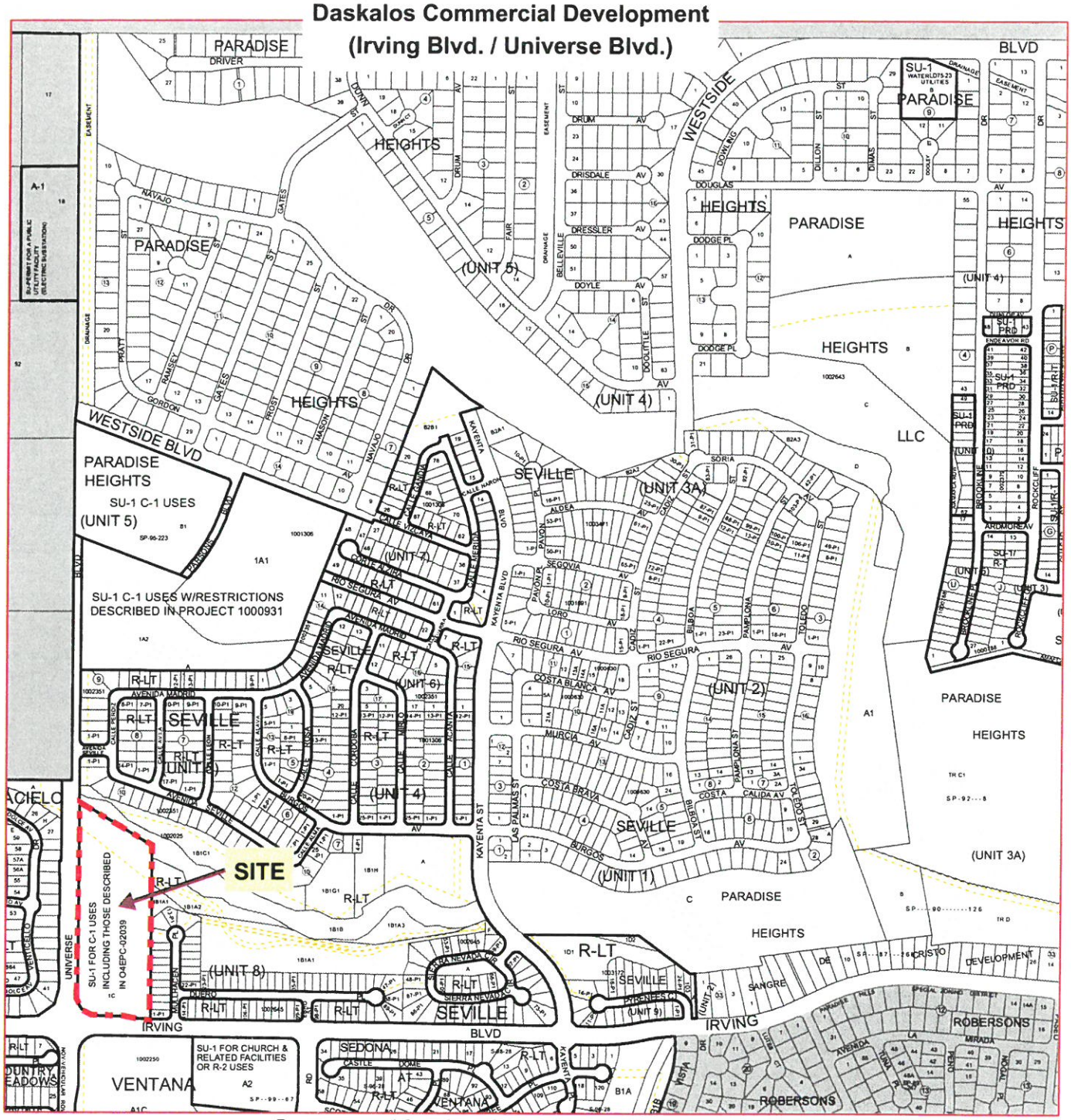
The final configuration of the intersection of Irving Blvd. / Unser Blvd. should conform to the table below:

Recommended Geometry (Irving Blvd. / Unser Blvd.)

Approach	Left Turn Lanes	Thru/Lefts	Thru Lanes	Thru/Rights	Right Turn Lanes
EB Irving Blvd.	1	0	0	1	0
WB Irving Blvd.	1	0	**2**	0	1
NB Unser Blvd.	1	0	1	1	0
SB Unser Blvd.	1	0	**2**	0	1

Appendix

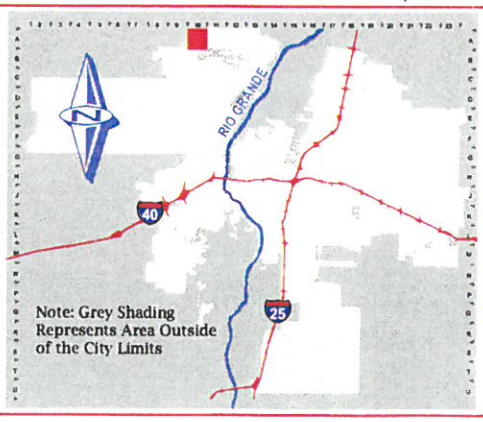
Daskalos Commercial Development
(Irving Blvd. / Universe Blvd.)



For more current information and more details visit: http://www.cabq.gov/gis

AGIS
Albuquerque Geographic Information System

Map amended through: 11/2/2005



Zone Atlas Page:

A-10-Z

Selected Symbols

- SECTOR PLANS
- Design Overlay Zones
- City Historic Zones
- H-1 Buffer Zone
- Petroglyph Mon.
- Escarpment
- 2 Mile Airport Zone
- Airport Noise Contours
- Wall Overlay Zone

0 750 1,500 Feet