

TRAFFIC IMPACT ANALYSIS

**APN 3132-011-01, 02& 03 Portion of 03
ADELANTO, CALIFORNIA**

**PREPARED FOR:
Dukomo Development, LLC**

**PREPARED BY:
HALL & FOREMAN, INC.
14297 CAJON STREET, #101
VICTORVILLE, CA 92392**

FINAL REPORT

August 15, 2012



Engineering ■ Planning ■ Surveying

August 15, 2012

Job No. VV.100272.0000

Daniel Yen
Dukomo Development, LLC
878 Towne Center Dr.
Pomona, CA 91767

**RE: FINAL REPORT - TRAFFIC IMPACT ANALYSIS –APN 3132-011-01, 02 & Portion of 03
–ADELANTO, CALIFORNIA**

Dear Mr. Yen;

Hall & Foreman Inc. is pleased to submit this Updated Draft Traffic Impact Analysis report for a project located in the unincorporated area of the City of Adelanto, in the County of San Bernardino. The project consists of proposed Office/Retail buildings, Restaurant, Carwash, Store, and Retail centers located on the southeast corner of Mojave Drive and Koala Road.

The report examines the traffic impacts specifically for the project and presents recommended traffic improvements. The report also addresses the impacts of overall growth within the area to assure that cumulative traffic mitigations can be addressed. This report should satisfy the approval requirements for Dukomo Development, LLC.

We are pleased to have been of assistance to you in processing and obtaining approval for the project. If you have any questions or comments, please feel free to contact me at 760-524-9115.

Respectfully submitted,

Hall & Foreman Inc.


Robert A. Kilpatrick, P.E., T.E.
Project Director/Associate



TABLE OF CONTENTS

		Page
1.	Introduction	1
2.	Existing Conditions	
	Existing Street System	4-5
	Existing Traffic Volumes.....	5
	Capacity Analysis Methodology.....	5
	Existing Levels of Service.....	8
3.	Background Conditions	
	Area Growth.....	9
	Background Traffic Analysis	9-10
4.	Project Conditions	
	Project Trip Generation	13
	Project Trip Distribution	14
	Project Traffic Analysis.....	20
5.	Future Conditions	
	Area Growth.....	21
	Future Traffic Analysis.....	21
6.	Project Mitigation and Summary	25
7.	Appendix	28
	• Other Area Projects	
	○ Exhibit A – School Development	
	○ Exhibit B – Target Development	
	○ Exhibit C – Wal-Mart Development	
	○ Exhibit D - Residential Projects	
	○ Exhibit E - Hwy 395 and SR 18 Background Traffic	
	○ Exhibit F– Total Projects	
	• VVATS Model, Year 2003 AM/PM Peak Period	
	• VVATS Model, Year 2035 AM/PM Peak Period	
	• Calculation of Future Directional Turn Volumes from Future Directional Link Volumes (NCHRP 255)	
	• Post Process Worksheets	
	• Project Mitigation Cost Calculations	
	• Intersection Capacity Analysis Calculations	

LIST OF TABLES

Table 1	Intersection Capacity Analysis/Existing Conditions	8
Table 2	Intersection Capacity Analysis/Background Conditions.....	9
Table 3	Project Trip Generation.....	13
Table 4	Intersection Capacity Analysis/Project Conditions	20
Table 5	Intersection Capacity Analysis/Year 2035 Conditions/Without Project	21
Table 6	Intersection Capacity Analysis/Year 2035 Conditions/With Project	22
Table 7	Traffic summary fair share	27

LIST OF FIGURES

Figure 1	Vicinity Map	2
Figure 2	Site Plan	3
Figure 3	Existing Traffic Volumes	6
Figure 4	Existing Intersection Geometrics.....	7
Figure 5A	Year 2012 Background Traffic	11
Figure 5B	Year 2012 Background Recommended Geometrics	12
Figure 6	Project Trip Distribution	15
Figure 7	Project Trips	16
Figure 8	Project Conditions Year 2012	17
Figure 9	Recommended Project Intersection Geometrics	18
Figure 10	Year 2035 Traffic Volumes w/o Project	22
Figure 11	Proposed Geometrics Year 2035	23
Figure 12	Year 2035 Traffic Volumes w/ Project	24

1. INTRODUCTION

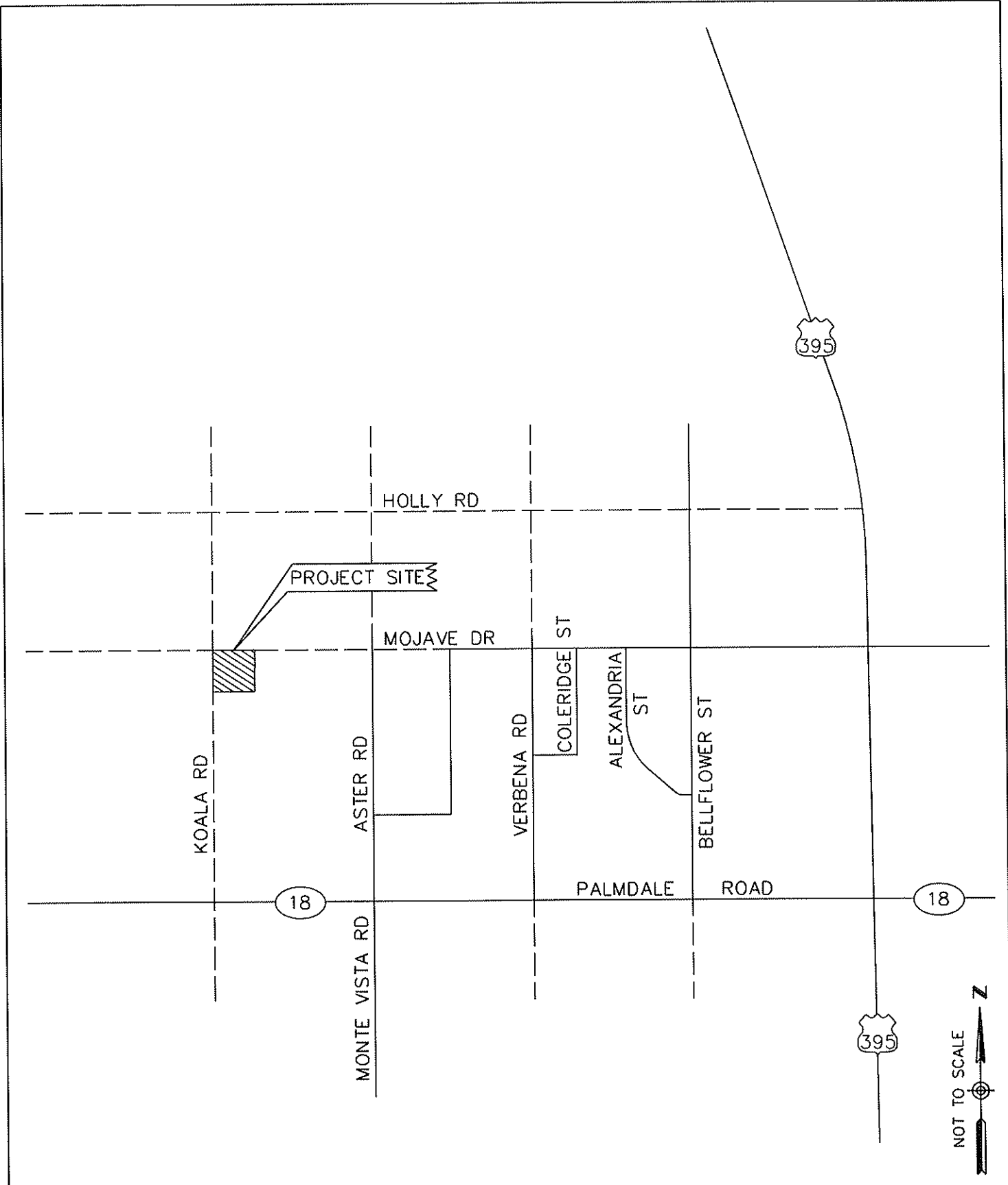
This report identifies the traffic impacts and presents recommendations for access and traffic mitigation for the proposed project located at APN 3132-011-01, 02 and portion of 03 in the unincorporated area of the City of Adelanto, in the County of San Bernardino. The project identified as Dukomo Development, LLC's property consists of a total of 11 acres containing one (1) carwash location, one (1) Restaurant, two (2) Restaurants with drive-thru's, three (3) Office/Retail Buildings, one (1) Store and three (3) retail Buildings. The facility will be accessible from three newly constructed driveways. The driveways are located, one each, on Koala Road, Mojave Drive, and Dunes Drive. The project is generally located at the southeast corner of Mojave Drive and Koala Road. *Figure 1* illustrates the vicinity map and project location and *Figure 2* illustrates the proposed project site plan.

The project is located in the unincorporated area in the City of Adelanto in San Bernardino County. The project is bound by Koala Road to the west, Mojave Drive to the north, Dunes Drive to the east, and an open dirt lot to the south. Access to the project is proposed off of Koala Road, Mojave Drive and Dunes Drive. Mojave Drive will provide direct access to the project site.

To address traffic impacts due to the proposed project, a study area encompassing the streets in the area was developed. The study area is bound by the intersections of Mojave Drive, Koala Road, Palmdale Road, and Highway 395. Palmdale Road provides regional access to the study area due to its full access between City of Victorville and the City of Palmdale and Highway 395 to the east.

In addition to addressing traffic impacts due specifically to development of the project, this study addresses impacts due to development correlating with the development of the project and cumulative projects up to the year 2012 within the study area. The examination of potential development correlating with the development of the project is known as background traffic. Traffic due to other projects is estimated using straight-line growth in the area to create a base for analyzing project traffic impacts.

To assure that recommended improvements for the project fits in with the ultimate needs of the roadway and driveway entry/exit system, traffic estimates for development up to the year 2035 are examined. Identified as future traffic, the traffic generation of the adjoining projects, which is incorporated into the area growth, is included. A Victor Valley Area Traffic Study (VVATS) was supplied by the Southern California Association of Governments in the project vicinity for a base model of Year 2003 and future growth values of Year 2035. Using a County of San Bernardino implemented software (Bturns), the link volumes were adjusted and converted from VVATS link volumes to directional turn volumes for the year 2035.



Hall & Foreman, Inc.

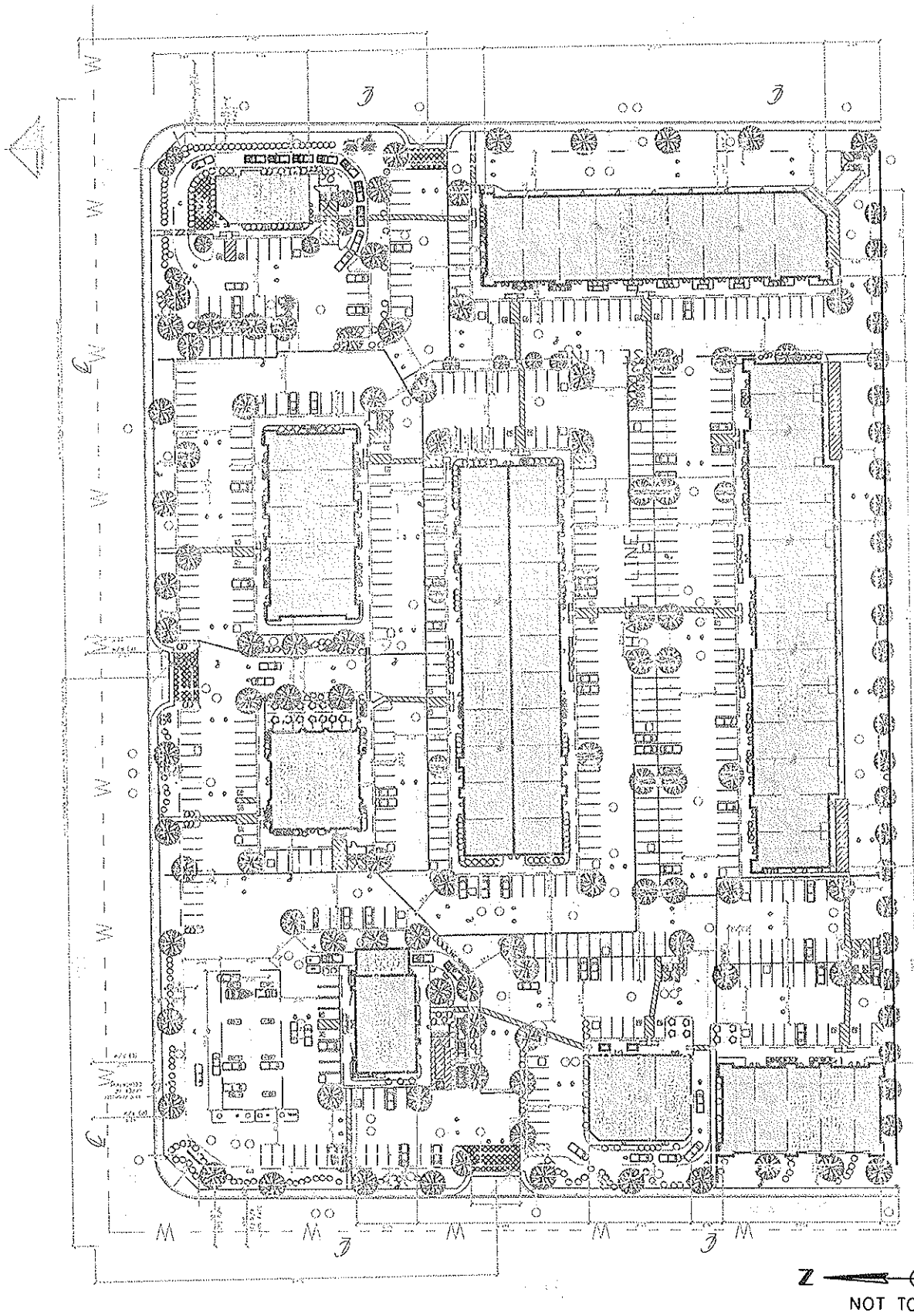
Engineering • Surveying • Planning • Landscape Architecture

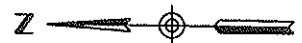
14297 CAJON ST, SUITE 101 • VICTORVILLE, CA 92392 • 760-524-9100

VINCINITY MAP
 DUKOMO DEVELOPMENT
 ADELANTO
 TRAFFIC SYNOPSIS

FIGURE

1





 NOT TO SCALE


Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture
 14297 CAJON ST, SUITE 101 • VICTORVILLE, CA 92392 • 760-524-9100

SITE PLAN
 DUKOMO DEVELOPMENT
 ADELANTO
 TRAFFIC IMPACT ANALYSIS

FIGURE

2

Drawing Name: V:\100272A\Eng\100272-000\Exhibit\02 Traffic Study\Fig-02.dwg

3. EXISTING CONDITIONS

Existing Street System

The project site currently is comprised of an open dirt lot. Land uses around the site consist of single-family dwellings, and two elementary schools south of the project site. Streets fronting the project property are undeveloped dirt roads. In the near vicinity of the project are several developed dirt roads. The roads currently are in range of pavement widths of 20 to 60 feet and are in good to fair condition. The following roadways provide regional access to the project within the study area:

Mojave Drive will provide the primary access to the project site. Mojave Drive is currently a dirt road along the project frontage. The paved road begins just east of Aster Road and continues as a paved road to the east. Mojave Drive runs east west from the project site.

Koala Road will provide secondary access to the project site. Koala Road is currently a dirt road and continues as a dirt road to Palmdale Road. Koala Road is a north to south road.

Aster Road/ Monte Vista Road is currently a dirt road at the intersection with Mojave Drive and is a fully paved road beginning at the intersection with Dawn St. The paved road continues southerly as a paved road past the intersection with Palmdale Road. Aster Road/ Monte Vista Road is for the most part a two-lane road (one lane in each direction) with ample right of way for additional lanes.

Bellflower Street is currently a five-lane road (two lanes in each direction with a central lane for left turn pockets) between Palmdale Road and Mojave Drive. Bellflower Street runs north-south and is east of the project vicinity. Currently, Bellflower consists of a curb and gutter along the east and westerly side of the road.

Palmdale Road will provide regional access to the project site. Palmdale Road (SR 18) is currently a two-lane road (one lane in each direction). The roadway flares out to accommodate a right and left turn and merging lane at several intersections. Palmdale Road runs east-west from the Palmdale area to Victorville. Currently, Palmdale Road consists of a curb and gutter at several intersections of the road.

Verbena Road provides local access within the project area. Verbena is a north-south road from Mojave Dr to Palmdale Rd. The roadway is currently a four-lane road (two lanes in each direction) with left turn pockets at several intersections. The width on Verbena Rd diminishes to a two lane road (one lane in each direction) northerly of Palmdale Rd, for several hundred feet.

Highway 395 provides regional access in the project area. Highway 395 (SR 395) traverses north to south and provides access between Bishop to the north and the Interstate I-15 Freeway to the south. This roadway is primarily a two-lane highway (one lane in each direction) with left turn pockets at key intersections.

The project proposes to construct three entry/exit driveways. The first driveway is located on the easterly side of Koala Road. The second driveway access is located on the southerly side of Mojave Drive and lastly, the third driveway access is located on Dunes Drive, as shown on the Site Plan, *Figure 2*.

The project proposes to obtain its primary access from Mojave Drive and secondary access from Koala Road and Dunes Drive. Eight intersections within the study area have been identified that may potentially be impacted by the project. These intersections are:

- Mojave Drive and Koala Road
- Mojave Drive and Aster Road
- Mojave Drive and Verbena Road
- Mojave Drive and Bellflower Road
- Mojave Drive and Highway 395
- Palmdale Road and Aster Road/ Monte Vista Road
- Palmdale Road and Bellflower Road
- Palmdale Road and Highway 395

Currently the intersections of Mojave Drive and Highway 395, Palmdale Road and Aster Road/ Monte Vista Road, and Palmdale Road and Highway 395 are signalized intersections.

Existing Traffic Volumes

Figure 3 illustrates the existing peak hour traffic volumes in the study area. Newport Traffic Studies' staff conducted AM and PM peak hour (7:00-8:00 AM and 4:00-5:00 PM) turning movement counts at the above-mentioned existing intersections identified for detailed analysis. These counts were conducted in December of 2010. The resulting turning movement volumes are presented in the appendix of this report.

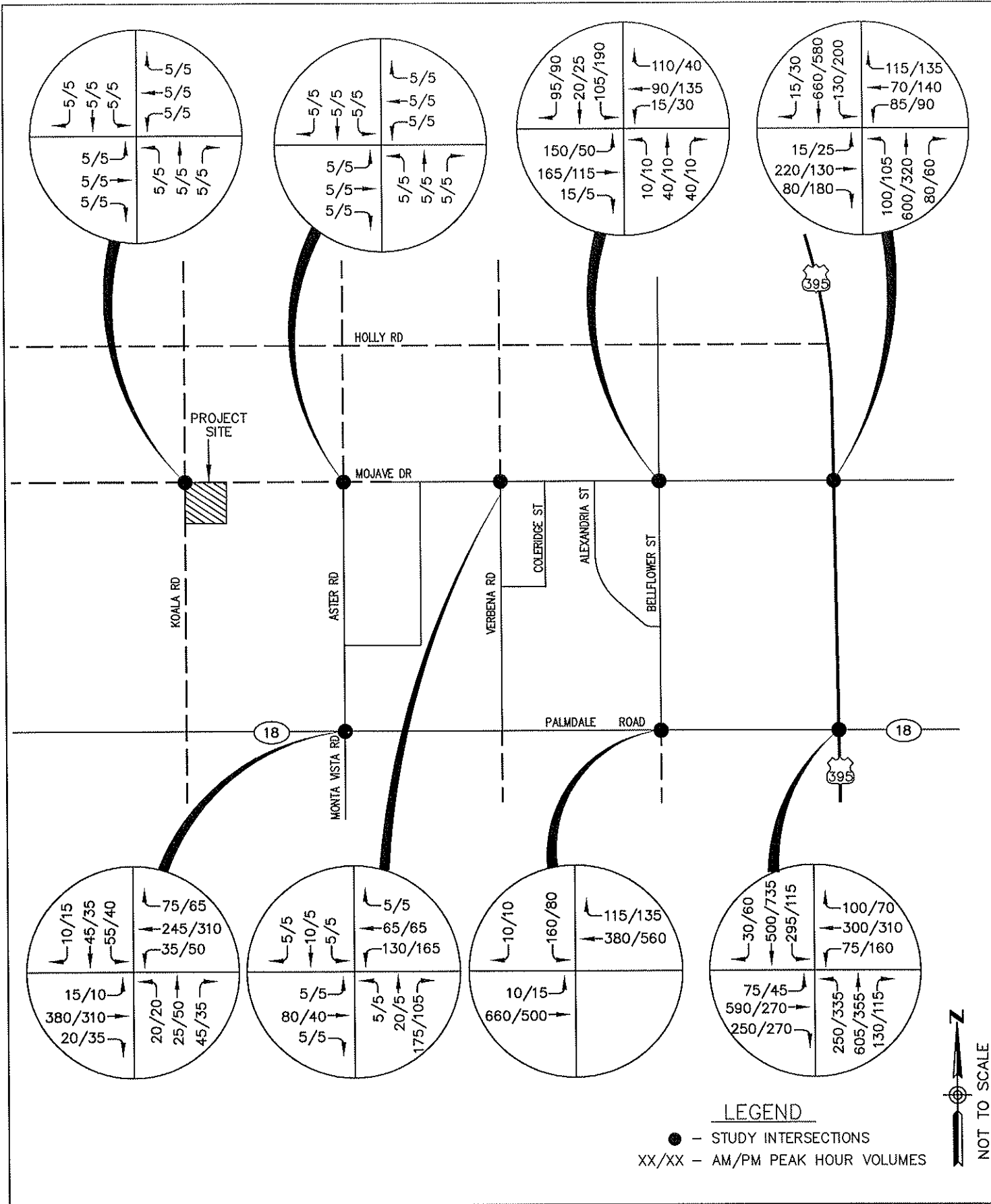
Capacity Analysis Methodologies

Signalized Intersections:

Intersection capacity analyses were conducted for the signalized study intersections to determine a present level-of-service (LOS). Based on the existing intersection geometrics as illustrated in Figure 4 and traffic volumes during the AM peak hour and PM peak hour, the capacity analyses for the signalized intersections were conducted using the WEBSTER (Webster Based Signal Timing Evaluation Routine) methodology (AI Grover and Associates, version 2.0.9). The computerized analysis uses the delay methodology in accordance with the 2000 Highway Capacity Manual. The analysis determines a level-of-service (LOS), which quantitatively describes the operating characteristics of signalized intersections. The LOS ranges from "A" (the best) through "F" (system breakdown).

Un-signalized Intersections:

Intersection capacity analyses were conducted for the seven existing study intersections to determine present conditions and levels-of-service utilizing the existing intersection geometrics as presented in Figure 4. Based on the existing intersection geometrics and traffic volumes during the AM and PM peak hour, intersection capacity analyses were conducted utilizing HCS 2000, which is an un-signalized intersection capacity analysis program, developed by McTrans. This program was developed in accordance with the 2000 Highway Capacity Manual. The analysis determines a level-of-service (LOS), which quantitatively describes the operating characteristics of un-signalized intersections. The LOS ranges from "A" (the best) through "F" (system breakdown). The LOS for the intersection represents the LOS for the critical movement. This is typically the stop controlled left turn from the minor street.



Drawing Name: V:\100272\Eng\00272-000\Exhibit\02 Traffic Study\FIG-03.dwg
 Last Opened: Feb 07, 2012 - 9:23am by: D.Aurez

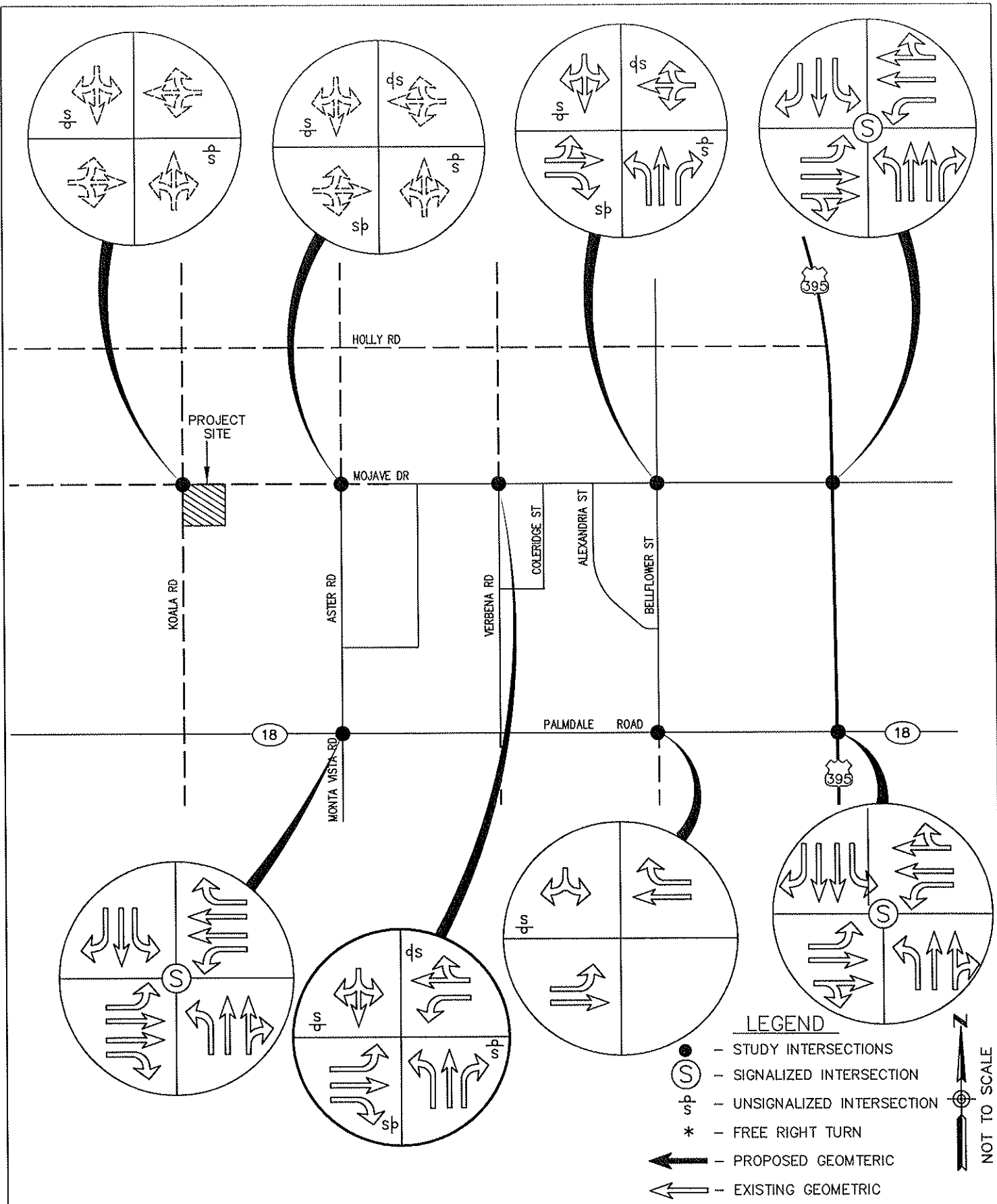


TABLE 1
INTERSECTION CAPACITY ANALYSIS – EXISTING CONDITIONS
Traffic Impact Analysis – Dukomo Development, LLC

Intersection	A.M. Peak		P.M. Peak	
	Delay(1)/ ICU (4)	LOS (2)	Delay (1)/ ICU (4)	LOS (2)
-Mojave Drive and Koala Road (3)	8.8	A	8.8	A
-Mojave Drive and Aster Road (3)	6.9	A	6.9	A
-Mojave Drive and Bellflower Street (3)	26.1	D	13.1	B
-Mojave Drive and Highway 395	0.72	D	0.70	D
-Mojave Drive and Verbena Rd (3)	10.2	B	8.9	A
-Palmdale Road and Aster Road/Monte Vista	0.28	C	0.23	C
-Palmdale Road and Bellflower Street (3)	61.2	F	28.9	D
-Palmdale Road and Highway 395	0.88	D	0.85	D

- (1) Delay – In seconds
(2) LOS – Level of Service
(3) Un-Signalized Intersection
(4) ICU – Intersection Capacity Utilization

Source: **Hall & Foreman Inc.**

As illustrated in Table 1, the existing conditions for intersections of Mojave Drive and Koala Road, Mojave Drive and Aster Road, Mojave Drive and Bellflower Street, Mojave Drive and Highway 395, Palmdale Rd and Aster Road, and Palmdale Road and Highway 395 are currently operating at acceptable LOS "D" or better. The intersections of Palmdale Road and Bellflower Street are operating at LOS "D" or lower.

4. BACKGROUND TRAFFIC

Area Growth

To analyze the project impacts, the inclusion of traffic generated by other projects within the study area is necessary. Other area projects at the intersection were taken into consideration. The estimated traffic volumes are presented on Exhibit A-F in the appendix to this report. This growth with other area project traffic volumes is known as background traffic. The analysis of background traffic allows a comparison of traffic impacts with and without the project applying other area projects to the existing turn movement volumes. *Figure 5A* illustrates year 2012 background traffic volumes.

Background Traffic Analysis

To determine the impacts of the project to the study intersection, existing plus the anticipated background traffic project peak hour volumes were calculated. The analysis was conducted with the existing year 2012 intersection geometrics.

TABLE 2
INTERSECTION CAPACITY ANALYSIS – BACKGROUND CONDITIONS
Traffic Impact Analysis – Dukomo Development, LLC

Intersection	A.M. Peak		P.M. Peak	
	Delay (1)/ ICU (4)	LOS(2)	Delay (1)/ ICU (4)	LOS(2)
-Mojave Drive and Koala Road (3)	8.8	A	8.8	A
-Mojave Drive and Aster Road (3)	12.21	B	9.61	A
w/ Mitigation (High School project) (3)	9.86	A	9.64	A
-Mojave Drive and Bellflower Street (3)	118.24	F	126.13	F
w/ Mitigation (High School project)	0.53	C	0.56	C
-Mojave Drive and Highway 395	0.99	E	1.04	F
w/ Mitigation (Target project)	0.71	D	0.80	D
-Mojave Drive and Verbena Rd (3)	24.9	C	19.1	C
-Palmdale Road and Aster Rd/Monte Vista	0.35	C	0.35	C
-Palmdale Road and Bellflower Street (3)	801.6	F	945.9	F
w/ Mitigation (Caltrans project)	0.79	C	0.76	C
-Palmdale Road and Highway 395	1.17	F	1.13	F
w/ Mitigation (Wal-Mart project)	1.01	F	1.09	F
w/ Additional Mitigation	0.87	D	0.90	D

(1) Delay – In Seconds

(2) LOS – Level of Service

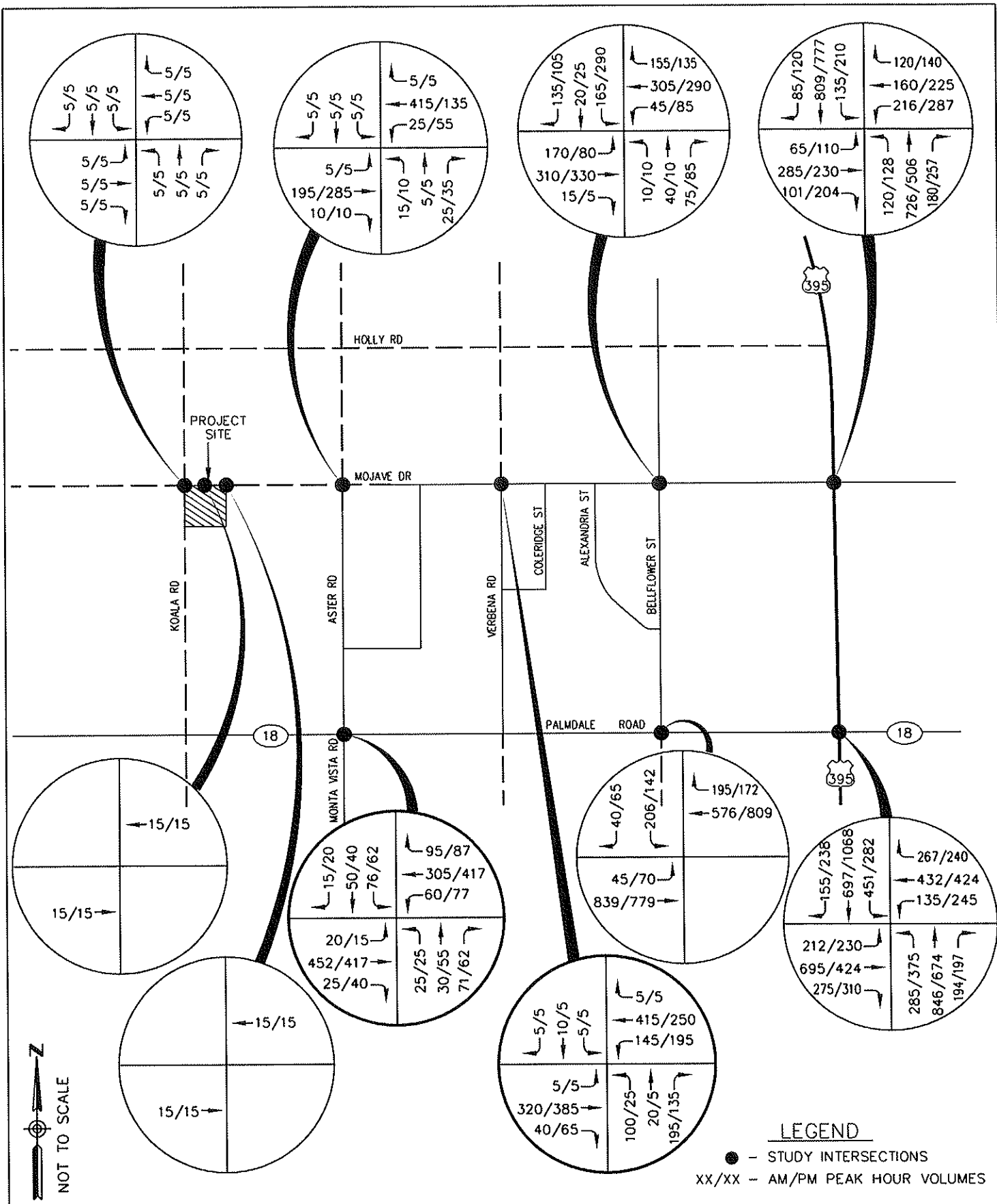
(3) Un-Signalized Intersection

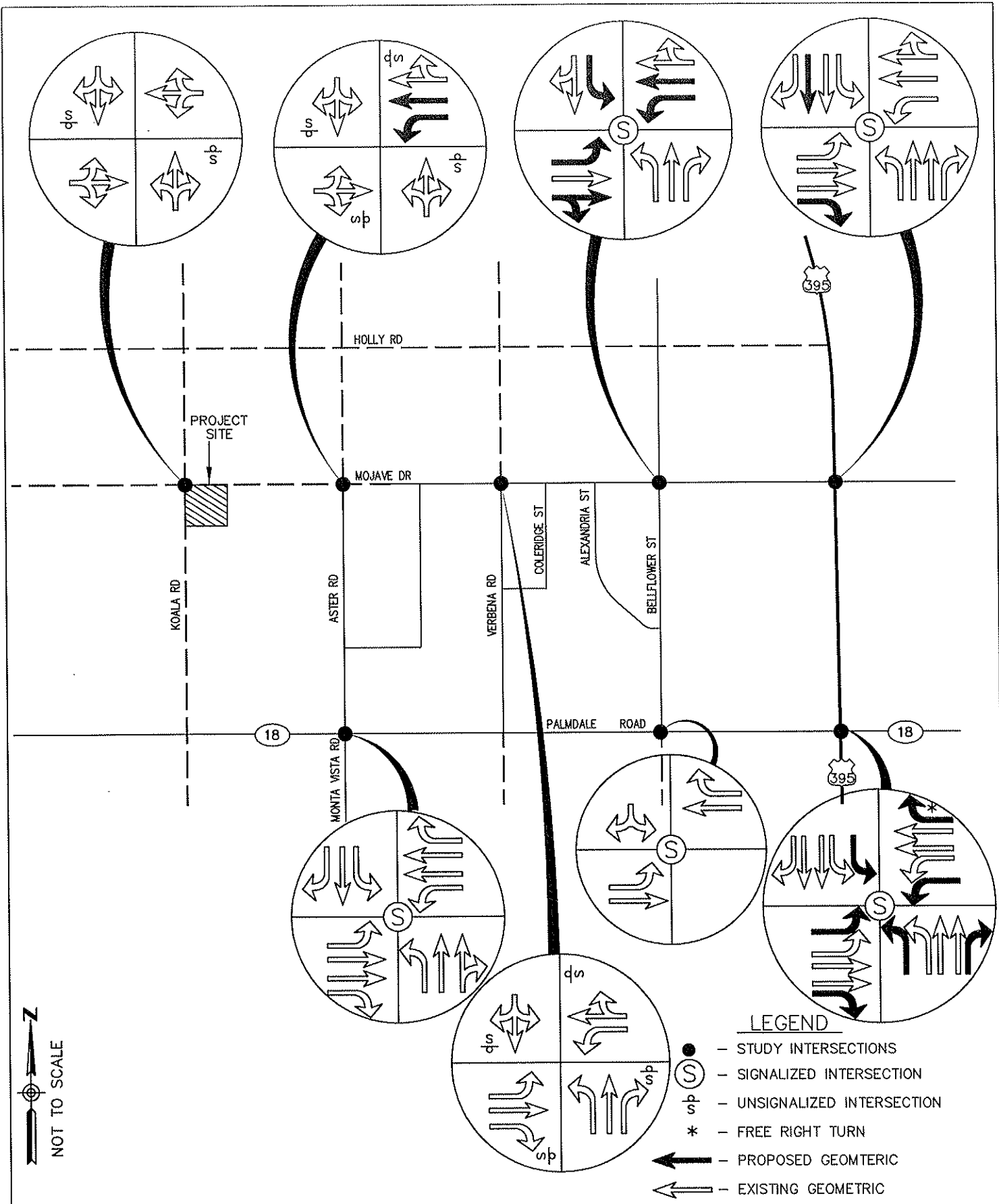
(4) ICU – Intersection Capacity Utilization

Source: **Hall & Foreman Inc.**

As illustrated in Table 2 under background traffic conditions, the intersections of Mojave Drive and Verbena Road, Mojave Drive and Koala Road, Mojave Drive and Aster Road, and Palmdale Road and Aster Road/Monte Vista Road will continue to operate at an acceptable LOS "C" or better, all other intersections are anticipated to operate at LOS "D" or lower.

As shown on Table 2, mitigation is required for all but three intersections to accommodate the anticipated traffic due to other area projects. The proposed mitigation measures addressed for the background traffic conditions are shown on *Figure 5B*. As presented, there are four projects that are proposed in the area that have identified improvements to the area streets. Since it is assumed that these projects are to be developed by the Year 2012, and are included in the Background traffic projections, the proposed improvements are assumed to be constructed under Background conditions. These improvements include the installation of a traffic signal and intersection widening at the intersection of Mojave Drive and Bellflower Street as a part of the new High School project, intersection widening at the intersection of Mojave Drive and Aster Road as a part of the new High School project, intersection widening at the intersection of Mojave Drive and Highway 395 as part of the Target project, and intersection widening at the intersection of Palmdale Drive and Highway 395 as part of the Wal-Mart project. In addition, the City of Adelanto and Caltrans have identified a safety improvement project for the intersection of Palmdale Road and Bellflower Street. To mitigate Background traffic, additional mitigation is needed at the intersection of Palmdale Road at Highway 395. The additional mitigation is needed in addition to the mitigation identified by the Wal-Mart project. The recommended mitigation from the Wal-Mart project consists of adding an exclusive right turn lane in the westbound, eastbound, and northbound directions. The additional mitigation required is the addition of an exclusive left turn lane in the northbound, southbound, westbound, and eastbound directions. The exclusive right turn lane proposed by the Wal-Mart project should be upgraded to a free right turn lane to improve the level of service at the intersection. All recommended mitigations are shown on *Figure 5B*.





Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture
 14297 CAJON ST, SUITE 101 • VICTORVILLE, CA 92392 • 760-524-9100

BACKGROUND YEAR 2012
 RECOMMENDED GEOMETRICS
 DUKOMO DEVELOPMENT
 ADELANTO
 TRAFFIC IMPACT ANALYSIS

FIGURE
 5B

5. PROJECT CONDITIONS

Project Trip Generation

The project was analyzed to determine the amount of traffic that would be generated from the proposed development. To identify potential traffic impacts from the project, trip generation factors were applied to the type of use to generate project traffic estimates. The trip generation rates were obtained from the Institute of Transportation Engineers' trip generation report as presented in Table 3. The square footage for the types of development proposed to be built were obtained from the site plan, *Figure 2*. It is important to note that the total square footage values for the Office/Retail and Specialty Retail buildings listed in Table 3 do not match the site plan because Building "B" labeled as an Office/Retail building in the site plan was divided in half and analyzed as both a Specialty Retail and Office/Retail building since the Specialty Retail is more street oriented.

TABLE 3
PROJECT TRIP GENERATION
Traffic Impact Analysis – Dukomo Development, LLC

	Use	Daily	A.M. Peak Hour			P.M. Peak Hour		
			In	Out	Total	In	Out	Total
1	Gasoline/ Service Station with Convenience Market and Carwash							
	(ITE 946) Per Fueling Positions	152.84	6.08	5.85	11.93	7.11	6.83	13.94
	16 Fueling Positions	2,445	97	94	191	114	109	223
2	Restaurant							
	(ITE 932) Per 1000 SF	127.15	5.99	5.53	11.52	6.58	4.57	11.15
	5,950	757	36	33	69	39	27	66
3	Restaurant w/ Drive-thru							
	(ITE 934) Per 1000 SF	496.12	25.17	24.18	49.35	17.6	16.24	33.84
	5,135	2548	129	124	253	90	83	174
4	Office/ Retail (Business Park)							
	(ITE 770) Per 1000 SF	12.76	1.2	0.23	1.43	0.3	0.99	1.29
	60,528	772	73	14	87	18	60	78
5	Specialty Retail Store							
	(ITE 814) Per 1000 SF	44.32	3.28	3.56	6.84	2.81	2.21	5.02
	37,219	1,650	122	132	255	105	82	187
	Sub-Total	8,171	457	397	854	366	362	728
	Internal Trips (10% Reduction)	-817	-46	-40	-85	-37	-36	-73
	Pass-By Trips (10%)	-817	-46	-40	-85	-37	-36	-73
	Primary Trips	6,537	365	318	683	293	289	582

As presented, the project consists of one Convenient Store with a gas station and carwash facility on a total of 3.8 acres. It is estimated that the project will generate 6,537 daily trips with 683 trips during the AM Peak Hour, and 582 trips during the PM Peak Hour.

Project Trip Distribution

To address the impacts of the estimated project traffic, the trips were distributed and assigned to the surrounding streets and study intersections. The project traffic was distributed based on the anticipated project utilization. Once the distribution pattern was established, project trips were assigned to the area streets that serve the project.

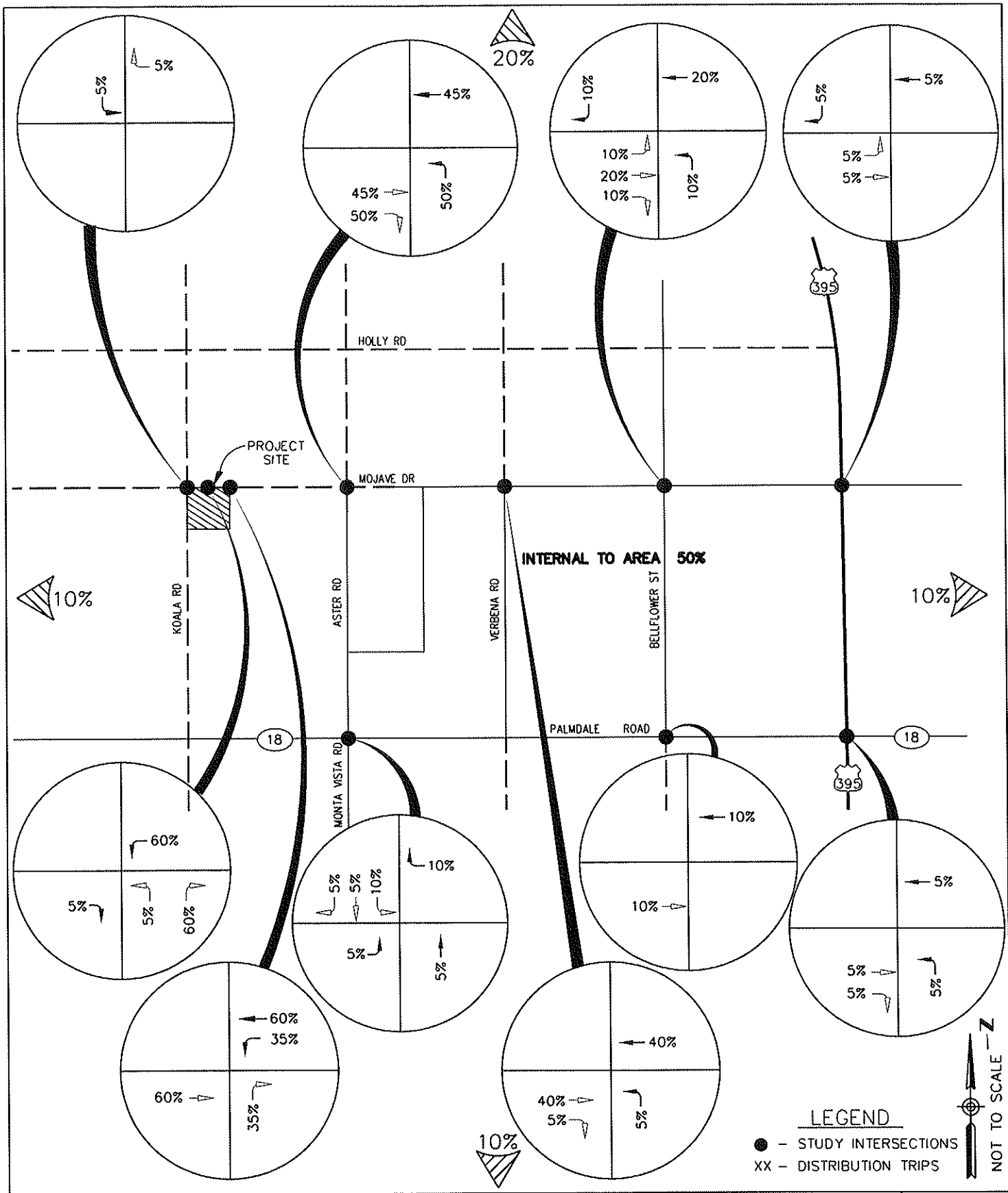
To address the impacts of the estimated entry/exit trips at the project driveways, the trips were distributed and assigned to each driveway. The project was distributed based on the anticipated project traffic flows and surrounding area utilization.

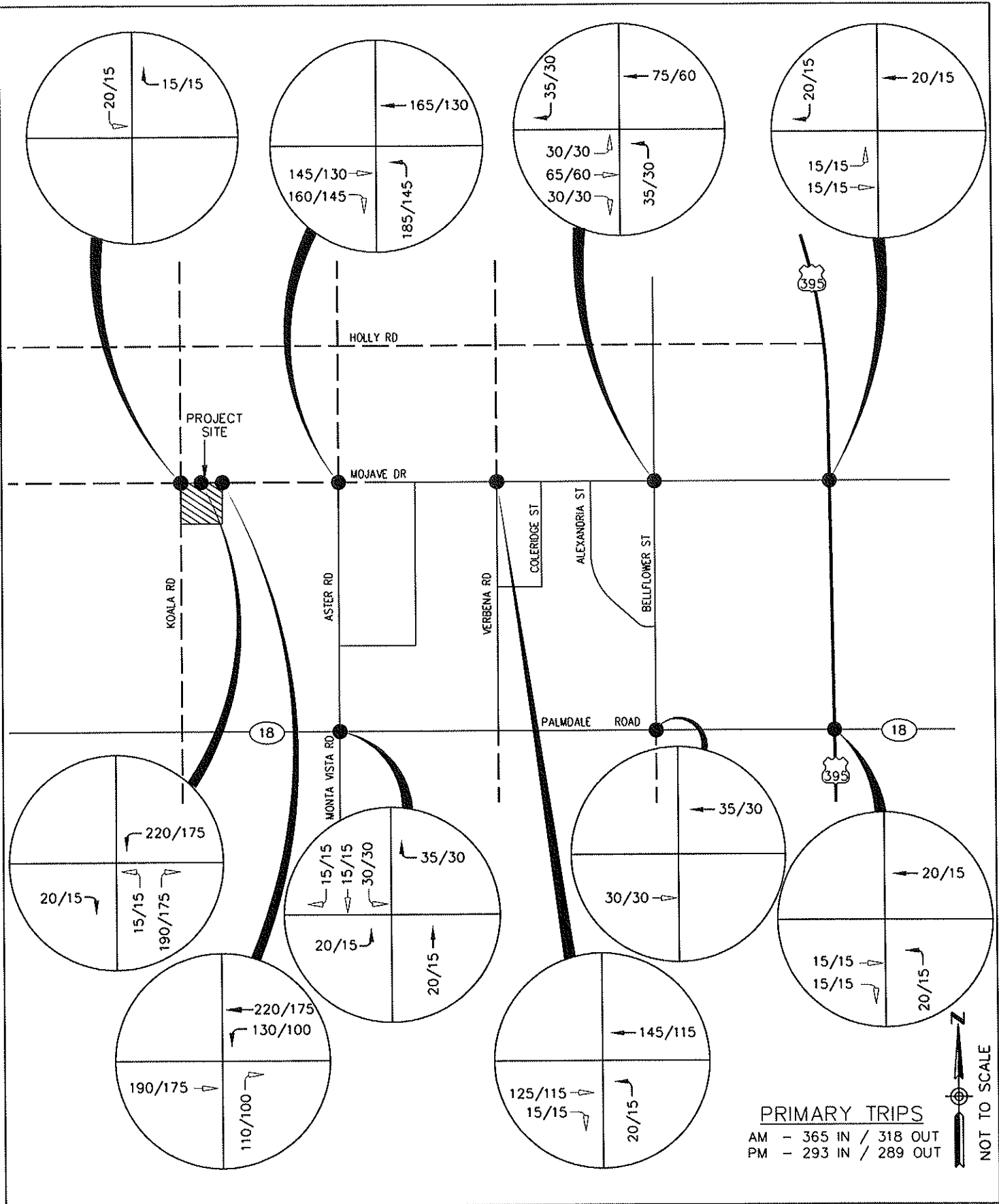
Figure 6 illustrates the general and specific estimated distribution pattern for project traffic. The project traffic was added to the existing traffic volume to assess the impacts generated. *Figure 7* illustrates the estimated AM and PM peak hours for the project traffic volumes.

Project Traffic Analysis

Based on the proposed traffic distribution, assignment patterns, and project trip generation, intersection capacity analyses were conducted to assess the estimated project impacts. To determine the project impacts at the study intersection and driveways, the Background Year 2012 volumes and project trips, known as Project Conditions and as shown on *Figure 8*, were calculated.

Intersection capacity analysis for the proposed unsignalized driveway intersections was conducted utilizing the methodologies described in the Capacity Analysis Methodologies. The recommended intersection geometrics are shown in *Figure 9*. The LOS for the intersection presented in Table 4 represents the LOS for the critical movement. This is typically the stop controlled left turn from the minor street.





Hall & Foreman, Inc.

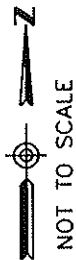
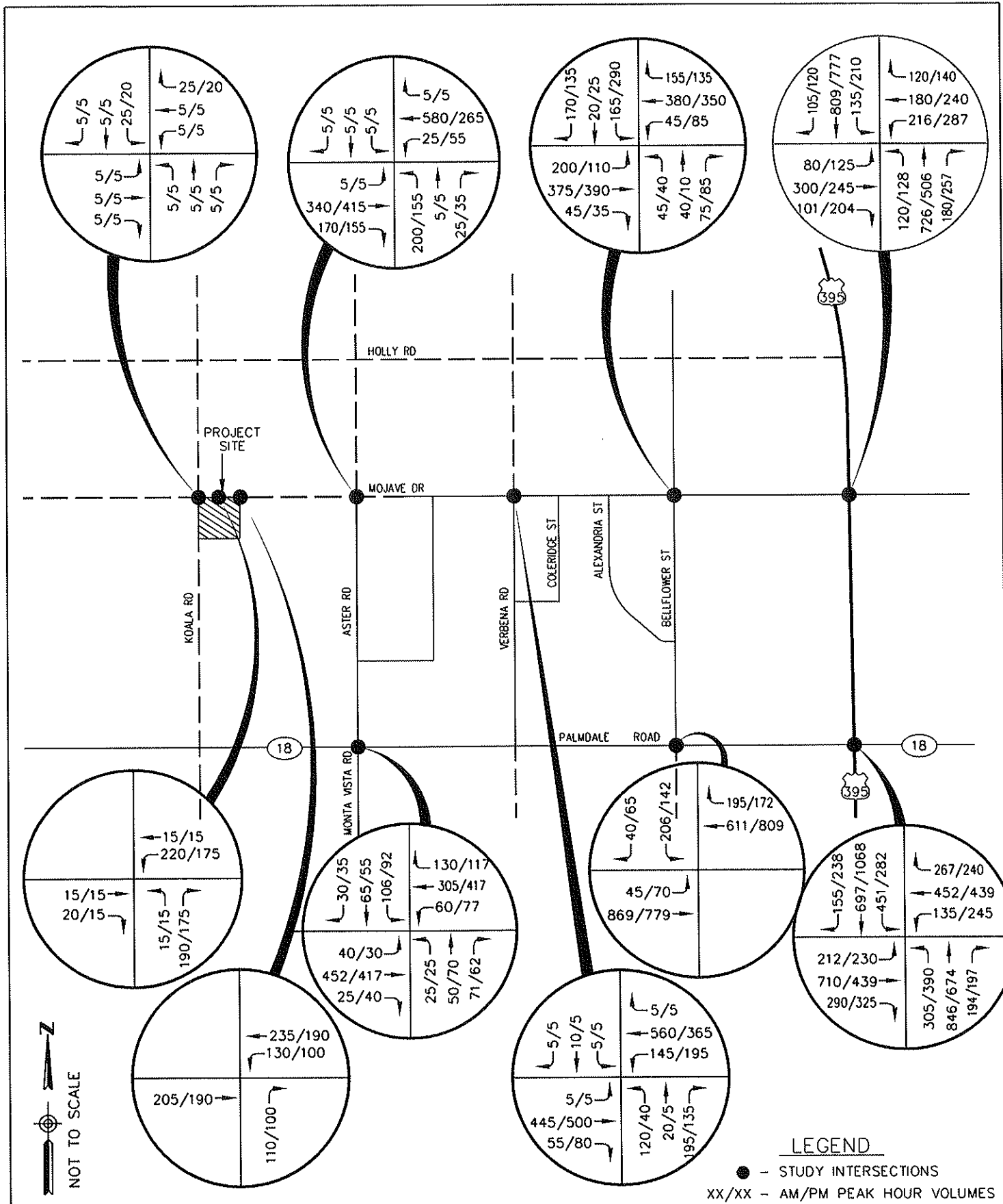
Engineering • Surveying • Planning • Landscape Architecture
 14297 CAJON ST, SUITE 101 • VICTORVILLE, CA 92392 • 760-524-9100

PROJECT TRIPS
 DUKOMO DEVELOPMENT
 ADELANTO
 TRAFFIC IMPACT ANALYSIS

FIGURE

7

Drawing Name: V:\020271\Eng\020271-000\Exhib\Traffic Study\FIG-07.dwg
 Last Opened: Oct. 03, 2011 - 1:28pm by: Daberc



NOT TO SCALE



Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

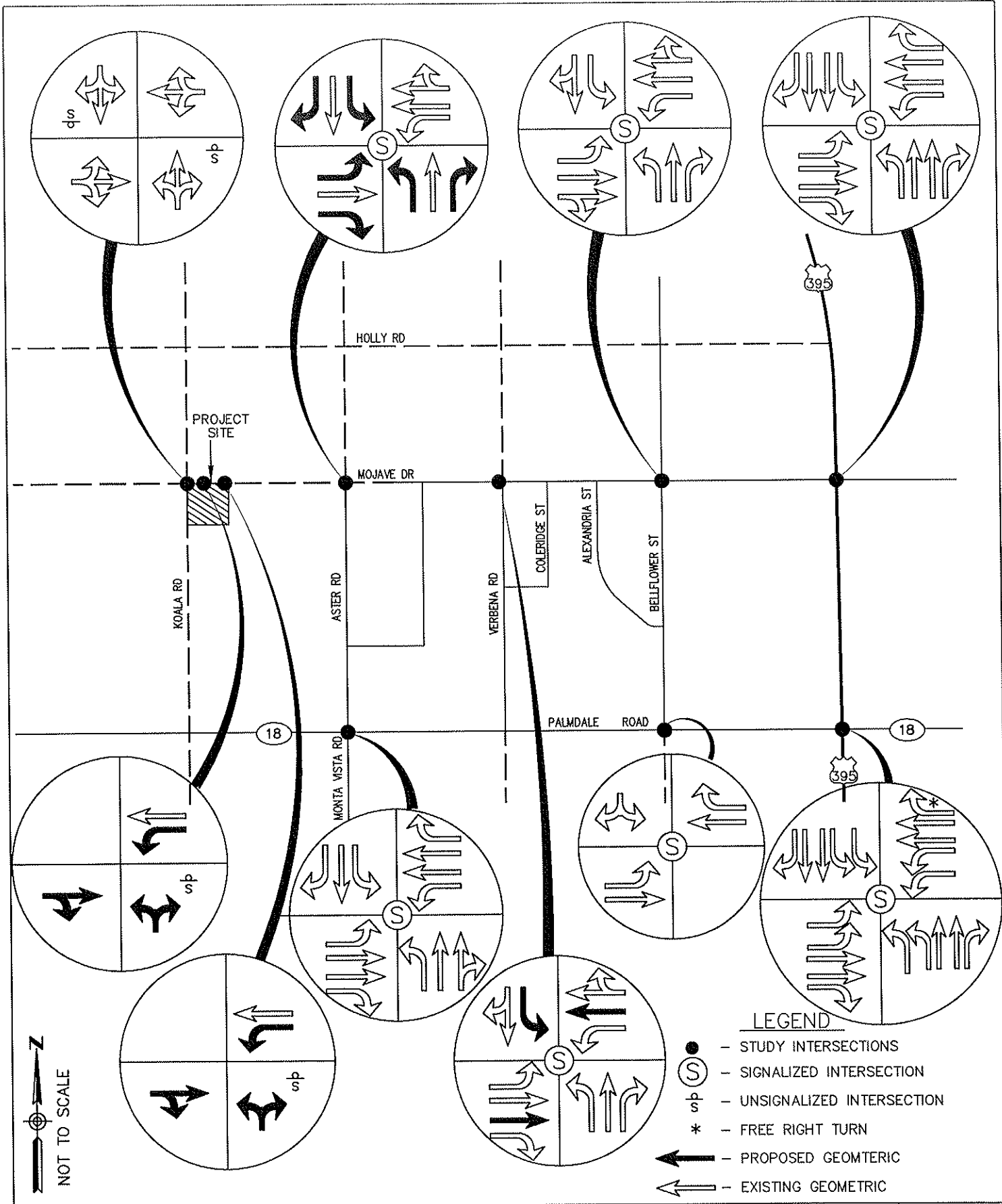
14297 CAJON ST, SUITE 101 • VICTORVILLE, CA 92392 • 760-524-9100

YEAR 2012 BACKGROUND
 PLUS PROJECT TRIPS
 DUKOMO DEVELOPMENT
 ADELANTO
 TRAFFIC IMPACT ANALYSIS

FIGURE

8

Drawing Name: V:\0027X\Eng\10027X-000\Exhibit\Traffic Study\FIG-08.dwg
 Last Opened: Oct 05, 2011 - 8:55am by: Dabertz



NOT TO SCALE

- LEGEND**
- - STUDY INTERSECTIONS
 - ⊙ S - SIGNALIZED INTERSECTION
 - ⊙ sp - UNSIGNALIZED INTERSECTION
 - * - FREE RIGHT TURN
 - - PROPOSED GEOMETRIC
 - ← - EXISTING GEOMETRIC

Hall & Foreman, Inc.
 Engineering • Surveying • Planning • Landscape Architecture
 14297 CAJON ST, SUITE 101 • VICTORVILLE, CA 92392 • 760-524-9100

RECOMMENDED PROJECT
 INTERSECTION GEOMETRICS
 DUKOMO DEVELOPMENT
 ADELANTO
 TRAFFIC IMPACT ANALYSIS

FIGURE
 9

Drawing Name: V:\00272\Eng\00272-000\Exhibit\02 Traffic Study\Fig-09.dwg
 Last Opened: Feb 07, 2012 - 8:46am by: D.Aurez

TABLE 4
INTERSECTION CAPACITY ANALYSIS – PROJECT CONDITIONS
Traffic Impact Analysis – Dukomo Development, LLC

Intersection	A.M. peak		P.M. Peak	
	Delay(1)/ ICU (4)	LOS(2)	Delay(1)/ ICU (4)	LOS(2)
-Mojave Drive and Koala Road (3)	9.0	A	8.9	A
-Mojave Drive and Aster Road (3) w/ Mitigation (Traffic Signal)	28.35 0.38	D C	28.89 0.45	D C
-Mojave Drive and Bellflower Street	0.55	C	0.57	C
-Mojave Drive and Highway 395	0.68	C	0.76	D
-Mojave Drive and Project Driveway (3)	10.0	B	9.7	A
-Mojave Drive and Dune Drive (3)	10.2	B	10.0	B
-Mojave Drive and Verbena Rd (3) w/ Mitigation (Traffic Signal)	84.46 0.42	F C	49.81 0.45	E C
-Palmdale Road and Aster Road/Monte Vista	0.37	C	0.37	C
-Palmdale Road and Bellflower Street	0.81	C	0.78	C
-Palmdale Road and Highway 395	0.86	D	0.90	D

(1) Delay – In Seconds

(2) LOS – Level of Service

(3) Un-Signalized Intersection

(4) ICU – Intersection Capacity Utilization

Source: Hall & Foreman Inc.

As presented in Table 4 under project conditions, the intersection of Mojave Dr and Verbena Rd will operate at an unacceptable LOS “F”, and requires mitigation. The project trips will not have a significant impact on the rest of the intersections, as they will continue to operate at an acceptable LOS “D” or better with the existing and or Background recommended mitigations.

The required mitigations for the intersections of Mojave Dr and Verbena Rd is the installation of new traffic signal. The new traffic signal will improve the critical movement and LOS to an acceptable LOS “C” or better. As discussed previously the recommended geometrics are shown in *Figure 9*. It is also recommended that a traffic signal be installed at the intersection of Mojave Drive and Aster Road to improve the LOS to a LOS “C”.

A traffic signal warrant study was done for the intersections of Mojave Drive and Aster Road and Mojave Drive and Verbena Road. Both intersections satisfied Warrant 3 due to the high peak hour volumes expected at these intersections for the project conditions.

6. FUTURE TRAFFIC CONDITIONS

Area Growth

This report is primarily concerned with traffic impacts created by the proposed project. However, growth within the study area due to development will occur. To analyze the future conditions the VVATS traffic model Year 2035, which includes the High School, Target, and Wal-Mart background projects, was used. The VVATS traffic model Year 2035 data was adjusted based on the existing turn volume movements and the anticipated growth in the near vicinity. This allows the project to be analyzed to its relation of the cumulative traffic.

The results of the year 2035 forecast calculations are illustrated in *Figures 10* and *11*, and presented in the Turn Movement summary worksheets in the appendix to this report.

Future Traffic Analysis

The intersections were analyzed using the capacity analysis methodology described earlier. The analysis was conducted with the anticipated project and Future Year 2035 traffic volumes and the existing intersection geometrics. The results of the analysis are shown in Tables 5 and 6.

TABLE 5
INTERSECTION CAPACITY ANALYSIS – FUTURE YEAR 2035 CONDITIONS – W/O PROJECT

Traffic Impact Analysis – Dukomo Development, LLC

Intersection	A.M. Peak		P.M. Peak	
	Delay (1)/ ICU (4)	LOS (2)	Delay (1)/ ICU (4)	LOS (2)
-Mojave Drive and Koala Road (3)	41.6	E	86.3	F
-Mojave Drive and Aster Road (3)	8.78	A	9.10	A
-Mojave Drive and Bellflower Street	0.68	C	0.59	C
-Mojave Drive and Highway 395	0.77	D	0.84	D
-Mojave Drive and Verbena Rd (3)	17.7	C	277.2	F
-Palmdale Road and Aster Rd/Monte Vista	0.36	C	0.27	C
-Palmdale Road and Bellflower Street	0.80	C	0.78	C
-Palmdale Road and Highway 395	0.96	E	0.98	E

(1) Delay – In Seconds

(2) LOS – Level of Service

(3) Un-Signalized Intersection

(4) ICU – Intersection Capacity Utilization

Source: **Hall & Foreman Inc.**

As illustrated in Table 5 under Year 2035 without project traffic conditions, it is anticipated that two intersections will operate at LOS "F" during the AM/PM Peak hours. As presented, improvements are recommended for the Year 2035, and are shown on *Figure 11*. The recommended improvements will improve the Level-of-Service to a value "D" or better.

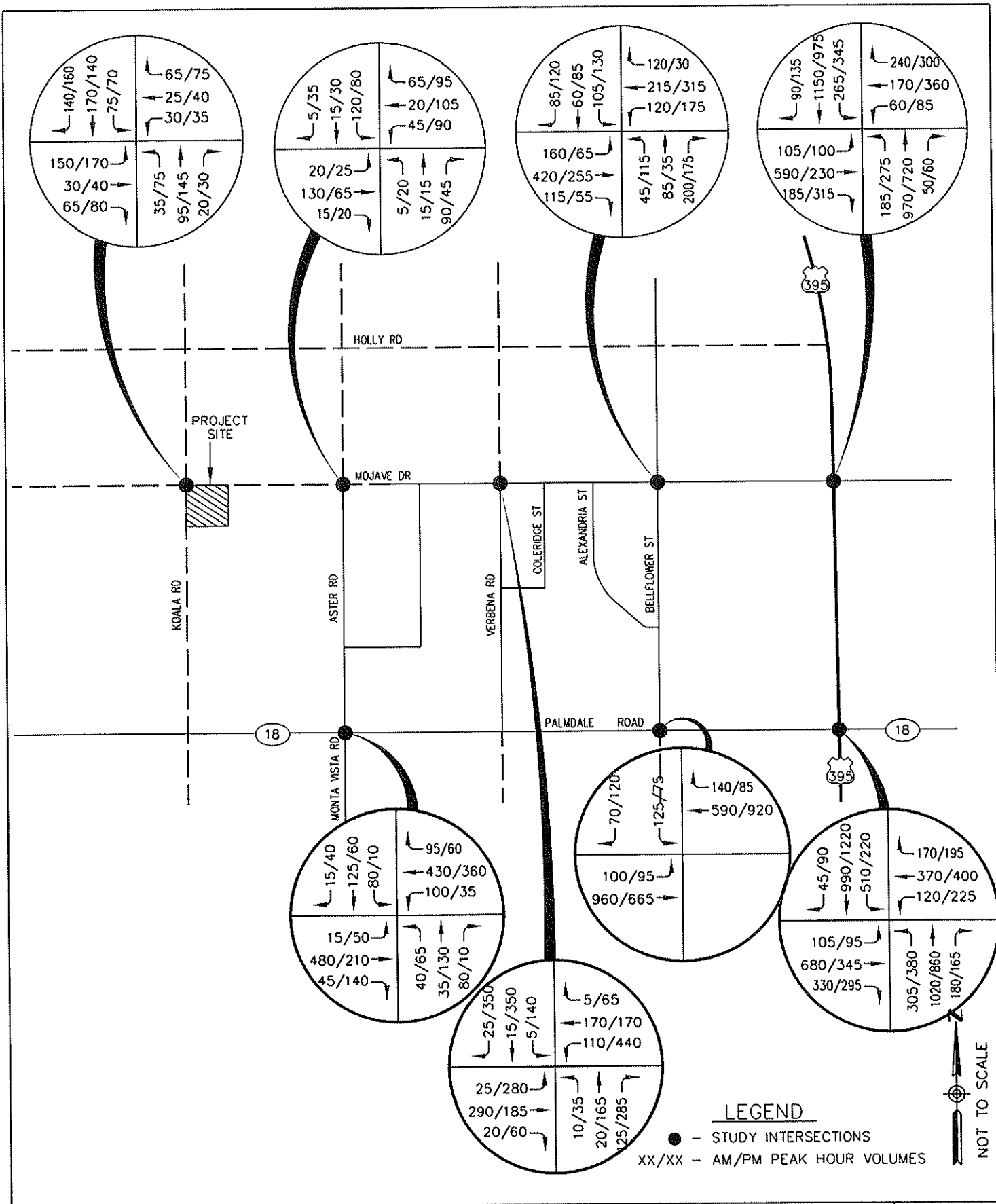
TABLE 6
INTERSECTION CAPACITY ANALYSIS – FUTURE YEAR 2035 CONDITIONS – WITH PROJECT
 Traffic Impact Analysis – Dukomo Development, LLC

Intersection	A.M. Peak		P.M. Peak	
	Delay (1)/ ICU (4)	LOS (2)	Delay (1)/ ICU (4)	LOS (2)
-Mojave Drive and Koala Road (3)	11.6	B	12.6	B
-Mojave Drive and Aster Road	0.37	C	0.32	D
-Mojave Drive and Bellflower Street	0.55	C	0.56	C
-Mojave Dr and Highway 395	0.77	D	0.83	D
-Mojave Drive and Project Driveway (3)	11.0	B	10.9	B
-Mojave Drive and Dunes Drive (3)	11.0	B	10.9	B
-Mojave Drive and Verbena Rd	0.28	C	0.62	D
-Palmdale Road and Aster Road/Monte Vista	0.39	C	0.29	C
-Palmdale Road and Bellflower Street	0.82	C	0.79	C
-Palmdale Road and Highway 395	0.84	D	0.87	D

- (1) Delay – In Seconds
 (2) LOS – Level of Service
 (3) Un-Signalized Intersection
 (4) ICU – Intersection Capacity Utilization

Source: **Hall & Foreman Inc.**

As illustrated in Table 6 under Year 2035 with project traffic conditions, all the intersections will operate at LOS "D" or better with the previously recommended mitigations.



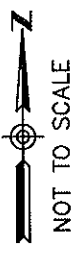
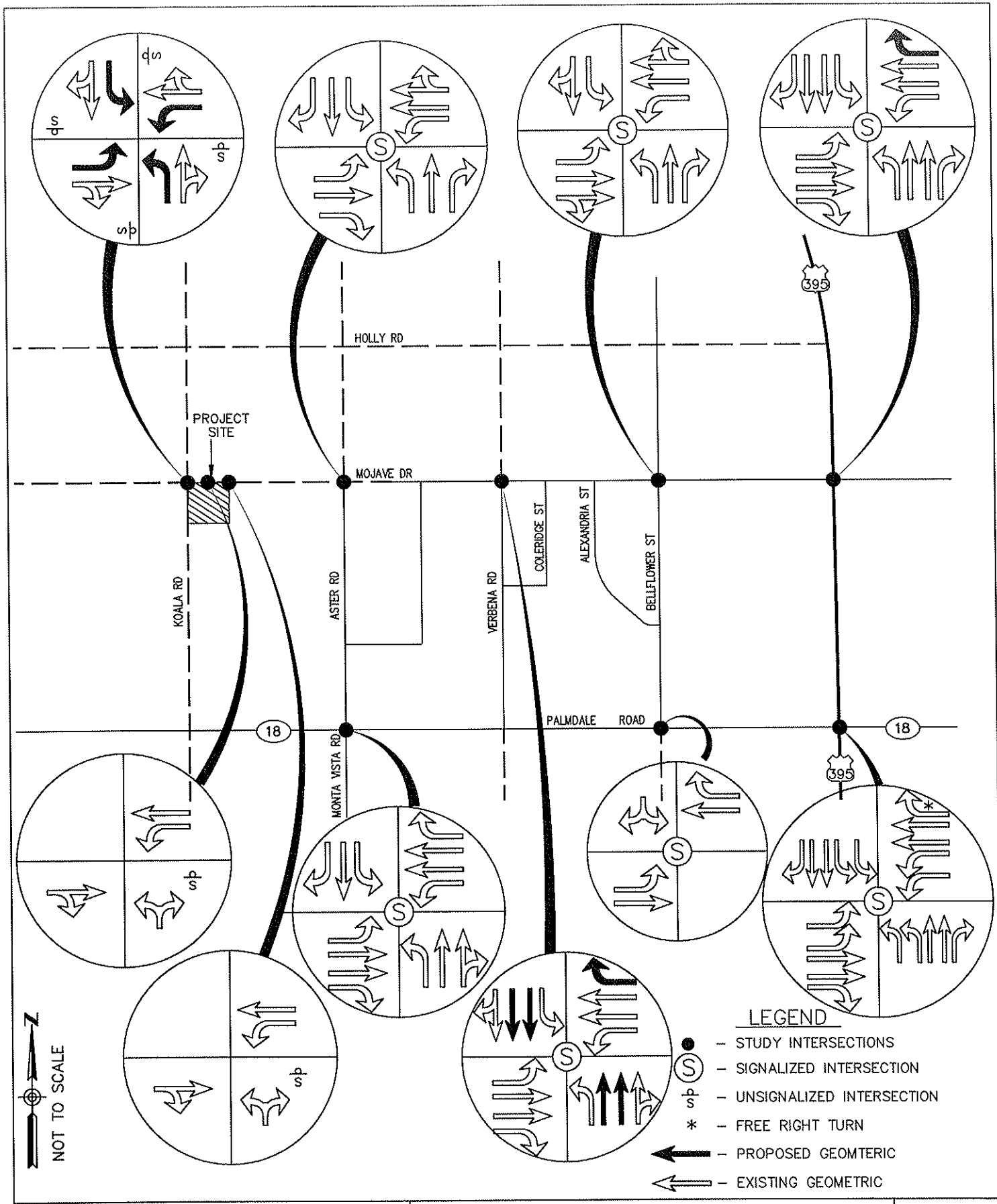
Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture
 14297 CAJON ST, SUITE 101 • VICTORVILLE, CA 92392 • 760-524-9100

YEAR 2035 TRAFFIC VOLUMES
 WITHOUT PROJECT
 DUKOMO DEVELOPMENT
 ADELANTO
 TRAFFIC IMPACT ANALYSIS

FIGURE
 10

Drawing Name: V:\00272\Eng\00272-000\Exhibit\Traffic Study\Fig-10.dwg
 Last Generated: Oct 03, 2011 - 1:39pm by: bbarrett

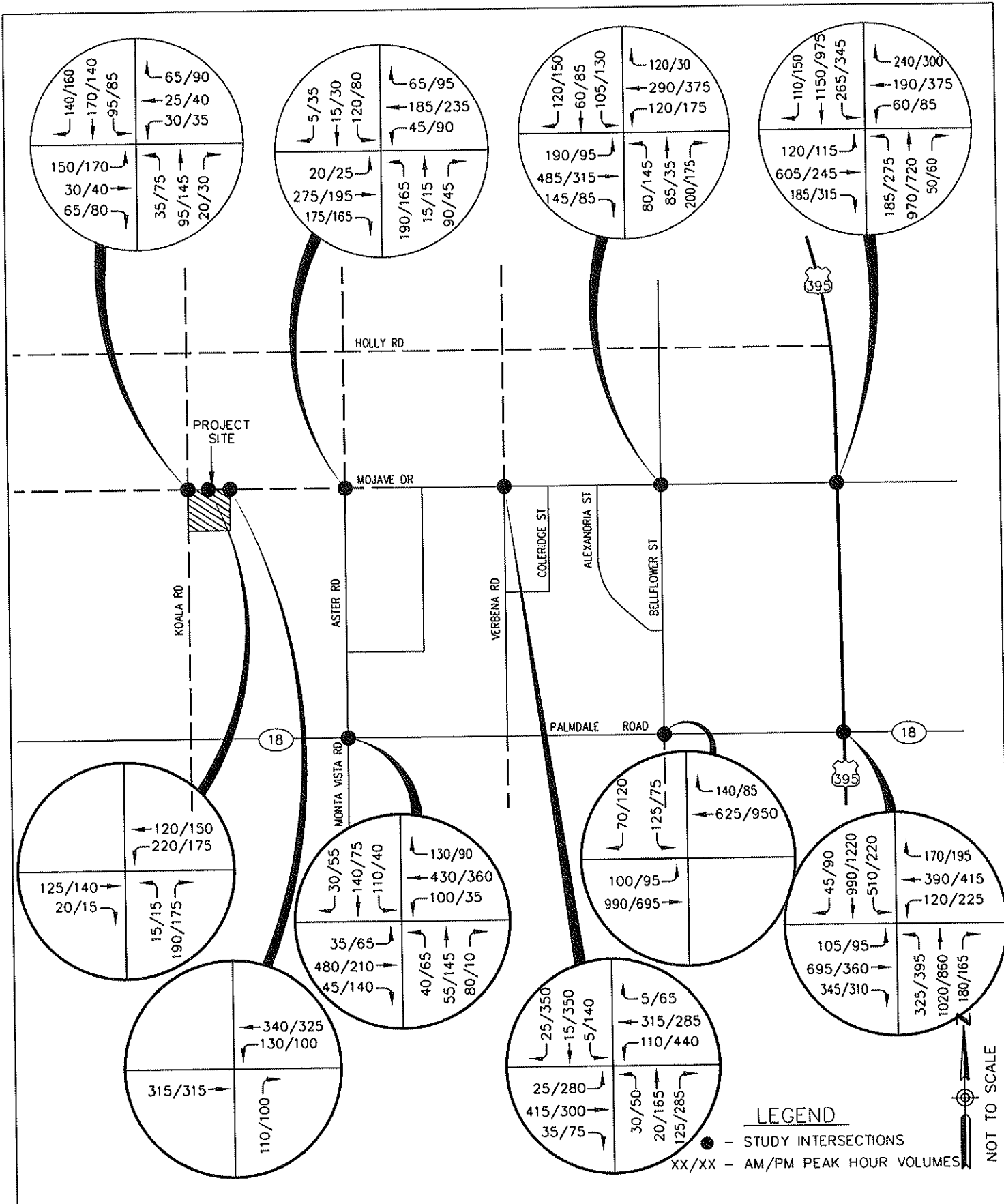


Hall & Foreman, Inc.
 Engineering • Surveying • Planning • Landscape Architecture
 14297 CAJON ST, SUITE 101 • VICTORVILLE, CA 92392 • 760-524-9100

PROPOSED YEAR 2035
 INTERSECTION GEOMETRICS
 DUKOMO DEVELOPMENT
 ADELANTO
 TRAFFIC IMPACT ANALYSIS

FIGURE
 11

Drawing Name: V:\00272\Eng\100272-000\Exhibit\02 Traffic Study\FIG-11.dwg
 Last Opened: Feb 07, 2012 - 8:45am by: dluarez



7. PROJECT MITIGATION AND SUMMARY

In summary, the project as presented will cause impacts to the surrounding street system. The street system will require the installation of new traffic signals and lane improvements at several intersections.

Background Mitigation – Year 2012

As discussed, several intersections are recommended to be mitigated to address other project volume generation. The following intersections are improvements required in addition to those improvements to be constructed by others;

1. Palmdale Road and Highway 395; The Wal-Mart project recommends that an exclusive right turn lane in the westbound, eastbound, and northbound direction be added to the intersection. The additional mitigation identified by this study is the addition of an exclusive left turn lane in the northbound, southbound, westbound, and eastbound directions. The exclusive right turn lane in the westbound direction proposed by the Wal-Mart project should be upgraded to a free right turn lane to improve the level of service at the intersection.

Project Mitigation – Year 2012

As presented, it is recommended that several of the intersection be improved to address the increase traffic produced by the project and nearby other area projects. The following mitigation measures are recommended for the Project Year 2012;

1. Mojave Drive and Aster Road; Install a traffic signal and make lane modifications to accommodate an exclusive left turn lane and right turn lane in the northbound, southbound, and eastbound directions.
2. Mojave Drive and Verbena Road; Install a traffic signal and make lane modifications to accommodate an exclusive left turn lane in the southbound direction and a through lane in both the eastbound and westbound directions.

Year 2035 Mitigation

The following are the additional recommended mitigation measures to address the Year 2035 traffic growth:

1. Mojave Drive and Koala Road; Modify the intersection for an all-way stop and make lane modifications to accommodate an exclusive left turn lane and a shared through and right turn lane in all approaches.
2. Mojave Drive and Verbena Road; Due to the high volumes, the intersection requires that the following lane modifications be made. In the westbound direction add an exclusive right turn lane. In the northbound and southbound directions add two through lanes.
3. Mojave Drive and Highway 395; Provide an exclusive right turn lane in the westbound direction.

Project Specific Mitigation

The following is an outline of the specific mitigation measures recommended for the project;

1. Mojave Drive and Koala Road; Improve the intersection with an all way stop intersection.
2. Mojave Drive and Aster Road; Install a traffic signal and provide a left, through and right turn lane in the eastbound, northbound, and southbound directions. In the westbound direction provide a left turn lane, one through lane, and a shared through and right turn lane.
3. Mojave Drive and Verbena Road; Install a traffic signal and make lane modifications to accommodate an exclusive left turn lane in the southbound direction and a through lane in both the eastbound and westbound directions.
4. Construct half width street improvements along the project frontage.
5. Construct Mojave Drive as a two lane roadway from Koala Road to Racoon Avenue.

TABLE 7
TRAFFIC MITIGATION FAIR SHARE - BACKGROUND YEAR 2012
Traffic Impact Analysis – Dukomo Development, LLC

Location	Improvements	Fair Share	Total Cost (\$)	Project Cost (\$)
Palmdale Road and Highway 395	As discussed in Project Mitigation and Summary	4.1%	\$350,000	\$14,350

Total Background Year 2012 = \$14,350

TRAFFIC MITIGATION FAIR SHARE - FUTURE YEAR 2035

Location	Improvements	Fair Share	Total Cost (\$)	Project Cost (\$)
Mojave Drive and Koala Road	As discussed in Project Mitigation and Summary	4.0%	\$200,000	\$8,000
Mojave Road and Verbena Road	As discussed in Project Mitigation and Summary	49.6%	\$1,208,880	\$599,525
Mojave Road and Highway 395	As discussed in Project Mitigation and Summary	3.6%	\$50,000	\$1,785

Total Project Year 2035 = \$609,310

Grand Total = \$623,660

APPENDIX

- Other Area Projects
 - Exhibit A – School Development
 - Exhibit B – Target Development
 - Exhibit C – Wal-Mart Development
 - Exhibit D - Residential Projects
 - Exhibit E - Hwy 395 and SR 18 Background Traffic
 - Exhibit F– Total Projects

- VVATS Model, Year 2003 AM/PM Peak Period
- VVATS Model, Year 2035 AM/PM Peak Period
- Calculation of Future Directional Turn Volumes from Future Directional Link Volumes (NCHRP 255)
- Post Process Worksheets
- Project Mitigation Cost Calculations
- Intersection Capacity Analysis Calculations