

CHECK LIST FOR TRAFFIC IMPACT ANALYSIS (TIS) SUBMITTED FOR REVIEW	
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PROJECT NAME	Hualapai Commons Phase II
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PROJECT LOCATION	South of Charleston Boulevard east of Hualapai Way
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TRAFFIC/CONSULTING ENGINEER Kimley-Horn and Associates, Inc.
Curtis D. Rowe, P.E.

DATE SUBMITTED FOR REVIEW 3/11/99

ADDENDUM 1 SUBMITTAL DATE _____

ADDENDUM 2 SUBMITTAL DATE

ADDENDUM 3 SUBMITTAL DATE _____

APPROVED BY: _____

CURRENT STATUS: Approved AS OF 4/14/99

REMARKS: ITE Land use codes used are: 862, 820, and 834. They provided contributions amounts in the study, please advise that this is up to City Traffic Engineering to determine contributions. Site consist of 131,856 square foot home improvement center; 56,441 square feet of retail space; and a 5,000 square foot pad. Full buildout is expected in 2000. Maximum of three driveways allowed on Charleston Boulevard, two shall align w/existing median openings. \$13,940 traffic mitigation contribution required from developer.

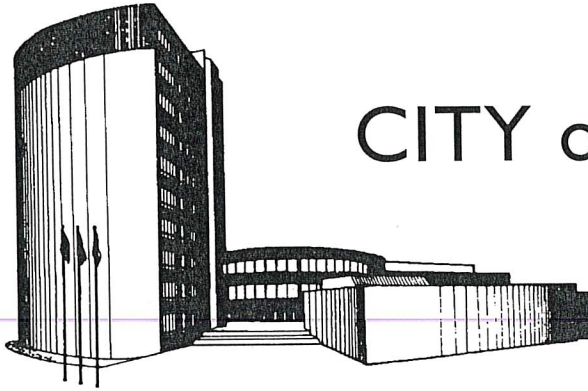
ZONING ACTION: Z-17-90(22); PM-48-98

PARCEL NUMBER(S): 163-06-111-001

MAYOR
JAN LAVERTY JONES

COUNCILMEN
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CITY of LAS VEGAS

DEPARTMENT OF PUBLIC WORKS
RICHARD D. GOECKE
DIRECTOR

April 14, 1999

Curtis D. Rowe, P.E.
Kimley-Horn and Associates, Inc.
1050 East Flamingo Road
Las Vegas, Nevada 89119

**RE: Traffic Impact Analysis and Addendum for the Commercial Site on the Southeast Corner of
Charleston Boulevard and Hualapai Way (Hualapai Commons Phase II)
Z-17-90(29)**

Dear Mr. Rowe:

The Traffic Engineering Division of the City of Las Vegas Department of Public Works has reviewed the traffic impact analysis for the commercial site, to be located on the south side of Charleston Boulevard, east of Hualapai Way. This project is essentially an expansion of the previously approved commercial center on the corner of Charleston Boulevard and Hualapai Way. The study has been approved, with the following conditions:

1. The developer will be required to contribute \$13,940 for area traffic mitigation, as required by Z-17-90(29).
2. The site will be allowed a maximum of three driveways on Charleston Boulevard, of which the two which align with the existing median openings on Charleston Boulevard will be allowed all movements at this time.



April 14, 1999

Page 2

Hualapai Commons, Phase II Z-17-90(29)

3. Your addendum projects a level of service of "F" for the proposed all movement driveways on Charleston Boulevard during the PM peak hour. If the City of Las Vegas finds three or more accidents in a one year period involve left turns out of the driveway in question, left turns out of the driveway will be prohibited.
4. Your addendum projects the required left turn storage from westbound Charleston Boulevard to southbound Hualapai Way to be 497 feet, while only 225 feet exist. The developer will be required to modify the existing median on Charleston Boulevard to provide a minimum of 500 feet of storage for this movement, subject to NDOT approval. This will reduce the left turn storage for the corresponding eastbound to northbound movement at the median opening to the east, but as the north side of Charleston Boulevard is developed without a driveway at this location, this should be acceptable.
5. Your addendum projects the required left turn storage from westbound Charleston Boulevard to the development's center driveway to be 120 feet, while 125 feet exist. This satisfies the projected demand, however it seems prudent to allow for more storage if it does not harm other movements. Therefore, the developer will be required to modify the existing median on Charleston Boulevard to provide a minimum of 175 feet of storage for this movement, subject to NDOT approval. This will reduce the left turn storage for the corresponding eastbound to northbound movement at the median opening to the east, but as the north side of Charleston Boulevard is developed without a driveway at this location, this should be acceptable.

This analysis was also reviewed by Kent Sears, the District Traffic Engineer for the Nevada Department of Transportation (NDOT), with the following comment: "The study identifies a significant impact for storage at the east leg of Charleston Blvd. And Hualapai. One third of this impact is derived from this development. The study should therefor recommend mitigation to be implemented as part of this project." Note that this is NOT an approval, and will require a response before an approval is forthcoming from NDOT.

April 14, 1999

Page 3

Hualapai Commons, Phase II Z-17-90(29)

These conditions of approval do not supersede or eliminate conditions of approval imposed by the Planning Commission and/or the City Council. An addendum to this traffic study is required if the development of the site occurs in a manner not in keeping with the land use assumptions contained in the report. No barriers (e.g., curbs, wall, ect.) shall be erected within the boundaries of this commercial subdivision which would prohibit any vehicle on this site from utilizing any driveway connecting this commercial development site to the abutting public streets. Please contact me at 229-2452 if you have any questions.

Sincerely,



Rick Schroder
Transportation Planning

RES:res

cc: O. C. White, P.E.

Wayne Dowdey, P. E.

Cheri Edelman, P.E.

Gary Phillips

Kent Sears, P. E., NDOT

John Toth, P.E., CCTMD

file



KENNY C. GUINN, *Governor*

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

DISTRICT I
123 E. Washington Avenue
P.O. Box 170
Las Vegas, Nevada 89125

TOM STEPHENS, P.E., *Director*

March 17, 1999

Mr. Rick Schroder
City of Las Vegas
731 S. 4th St.
Las Vegas, NV 89101

Re: Traffic Study - Hualapai Commons Phase II, Charleston Blvd. and Hualapai
Prepared By Kimley-Horn

Dear Mr. Schroder,

The Nevada Department of Transportation has reviewed the traffic impact study for the project referenced above. The study identifies a significant impact for storage at the east leg of Charleston Blvd. and Hualapai. One third of this impact is derived from this development. The study should therefor recommend mitigation to be implemented as part of this project.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kent Sears".

Kent Sears
District I Traffic Engineer

c: Scott Thorson
Curtis Rowe, Kimley-Horn

A:\TISDOCS\LV1399.LTR



Kimley-Horn
and Associates, Inc.

Suite S210
1050 East Flamingo Road
Las Vegas, Nevada
89119

To: City of Las Vegas
Transportation Planning
731 S. 4th Street, 2nd Floor
Las Vegas, NV 89101

Date: March 11, 1999

Attn: Rick Schroder, P.E.

Re: Traffic Impact Analysis Update
Hualapai Commons Phase II
KHA Project No. 092191.09

HAND DELIVER

We are sending you the following items:

— 2 copies of the above subject

These items are submitted:

— At your request
X For your review and approval
— For your review and comments

— For your action
— For your files
— For your information

Remarks:

By:

Curtis D. Rowe, P.E.
Transportation Engineer

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Copies to:
Kent Sears, NDOT (2)
Joe Peck, Pentacore Engineering, Inc. (3)
KHA file(2)

■
Traffic Impact Analysis Update

*Hualapai Commons
Phase II*

*Prepared for:
Pentacore Engineering*

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092191.09



Kimley-Horn
and Associates, Inc.

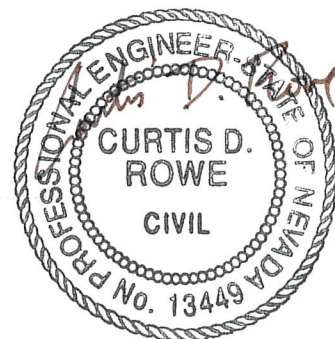
TRAFFIC IMPACT STUDY UPDATE
FOR
HUALAPAI COMMONS PHASE II

Prepared for:

Pentacore Engineering, Inc.
6763 West Charleston Boulevard
Las Vegas, Nevada 89102

Prepared by:

Kimley-Horn and Associates, Inc.
1050 East Flamingo Road
Suite S210
Las Vegas, NV 89119
(702) 734-5666



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092191.09

March 11, 1999

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1.0 EXECUTIVE SUMMARY

The Hualapai Commons - Phase II is to be constructed along the south side of Charleston Boulevard between Hualapai Way and Fort Apache Road in the City of Las Vegas, Nevada. The project, consisting of a 131,856 square foot home improvement center (Home Depot), 56,441 square feet of retail space and a 5,000 square foot pad.

Regional access to the project will be provided by US 95 and Summerlin Parkway. Primary access to the project will be provided by Town Center Drive, Hualapai Way, Fort Apache Road, Rampart Boulevard and Charleston Boulevard. Direct access to the commercial center is planned from four driveways located along Charleston Boulevard.

The purpose of this study is to provide an update to the previously approved traffic studies for the Peccole Ranch Development. The original study (July 1993, Kimley-Horn and Associates) and Addendum One (January 1995, Kimley-Horn and Associates) identified traffic mitigation measures required for the entire Peccole Ranch Development. The traffic study for Phase I of this project was prepared by Kimley-Horn and Associates, May 22, 1998, with Addendum I to this study dated June 24, 1998. City acceptance of this study was obtained on July 1, 1998. This project incorporates project trips expected from Phase I as detailed in this traffic study. This update for Phase II is to address project impact on the adjacent street system with specific evaluations for study area intersections as identified by the City of Las Vegas. These intersections are as follows:

- Charleston Boulevard/Town Center Drive
- Charleston Boulevard/Hualapai Way
- Charleston Boulevard/Rampart Boulevard (Fort Apache Road)

At buildout in 2000, the Hualapai Commons - Phase II is expected to generate 558 AM peak hour, 975 PM peak hour and 11,902 daily driveway trips. Of these trips, accounting for pass-by, 401 AM and 662 PM peak hour trips, with a total of 9,006 daily trips are expected to be added to the surrounding street system as a result of this project.

Distribution of site traffic on the street system was based on the distribution provided in the Traffic Study for Phase I of this project: Traffic Study Update for the Commercial Site on SE Corner of Charleston and Hualapai.

The findings of this traffic study recommends mitigation measures in addition to those recommended in the original Peccole Ranch Traffic Studies. Since Phase I of this project site is required to contribute \$11,800 for area traffic mitigation, as required by Z-17-90(22), Phase II will be required to contribute the remainder fee for the site. As determined in Addendum One of the Peccole Ranch Traffic Impact Study this site was determined to have a participation amount of \$25,740 for both phases. Therefore, Phase II of the project is recommended to contribute \$13,940 for area traffic mitigation.

Other site specific improvements to facilitate the movement of project traffic to and from the site and reduce its impact on the adjacent street network are as follows:

- The developer is to discourage on-street parking along project frontage on Charleston Boulevard by posting R8-3A and R7-1AP "No Parking" signs to prohibit on-street parking.
- Any signing and striping improvements should be incorporated into the civil drawings for the project and should conform to the standards of the City of Las Vegas and the Manual on Uniform Traffic Control Devices.
- An Encroachment Permit from the Nevada Department of Transportation (NDOT) will be required for any work performed within the State right-of-way of Charleston Boulevard.

2.0 INTRODUCTION

Kimley-Horn and Associates has been retained by Pentacore Engineering to provide a traffic impact study for the Hualapai Commons - Phase II in Las Vegas, Nevada. The project is to consist of a 131,856 square foot home improvement center (Home Depot), 56,441 square feet of retail space and a 5,000 square foot pad. The project is scheduled for completion in the year 2000. The project is proposed to be located along the south side of Charleston Boulevard, between Hualapai Way and Fort Apache Road - Rampart Boulevard in the City of Las Vegas. The area to be developed is currently vacant land. The assessor's parcel number for the site is 163-06-111-001. **Appendix F** includes a site plan of the project.

The purpose of this study is to provide an update to the previously approved studies for the Peccole Ranch Development. The original study (July 1993, Kimley-Horn and Associates) and Addendum One (January 1995, Kimley-Horn and Associates) identified traffic mitigation measures required for the entire Peccole Ranch Development. The traffic study for Phase I of this project was prepared by Kimley-Horn and Associates, May 22, 1998, with Addendum I to this study dated June 24, 1998. City acceptance of this study was obtained on July 1, 1998. This project incorporates project trips expected from Phase I as detailed in this traffic study. This update is to address potential project impacts on the adjacent street system with specific evaluations for study area intersections as identified by the City of Las Vegas.

3.0 EXISTING CONDITIONS

3.1 Existing Lane Configuration

Regional access to the project will be provided by US 95 and Summerlin Parkway. Primary access to the project will be provided by Town Center Drive, Hualapai Way, Fort Apache Road, Rampart Boulevard and Charleston Boulevard. Direct access to the commercial center is planned from four access driveway locations on Charleston Boulevard. Based upon the direct access to the commercial center, three intersections were identified by the City of Las Vegas for study. These intersections are as follows:

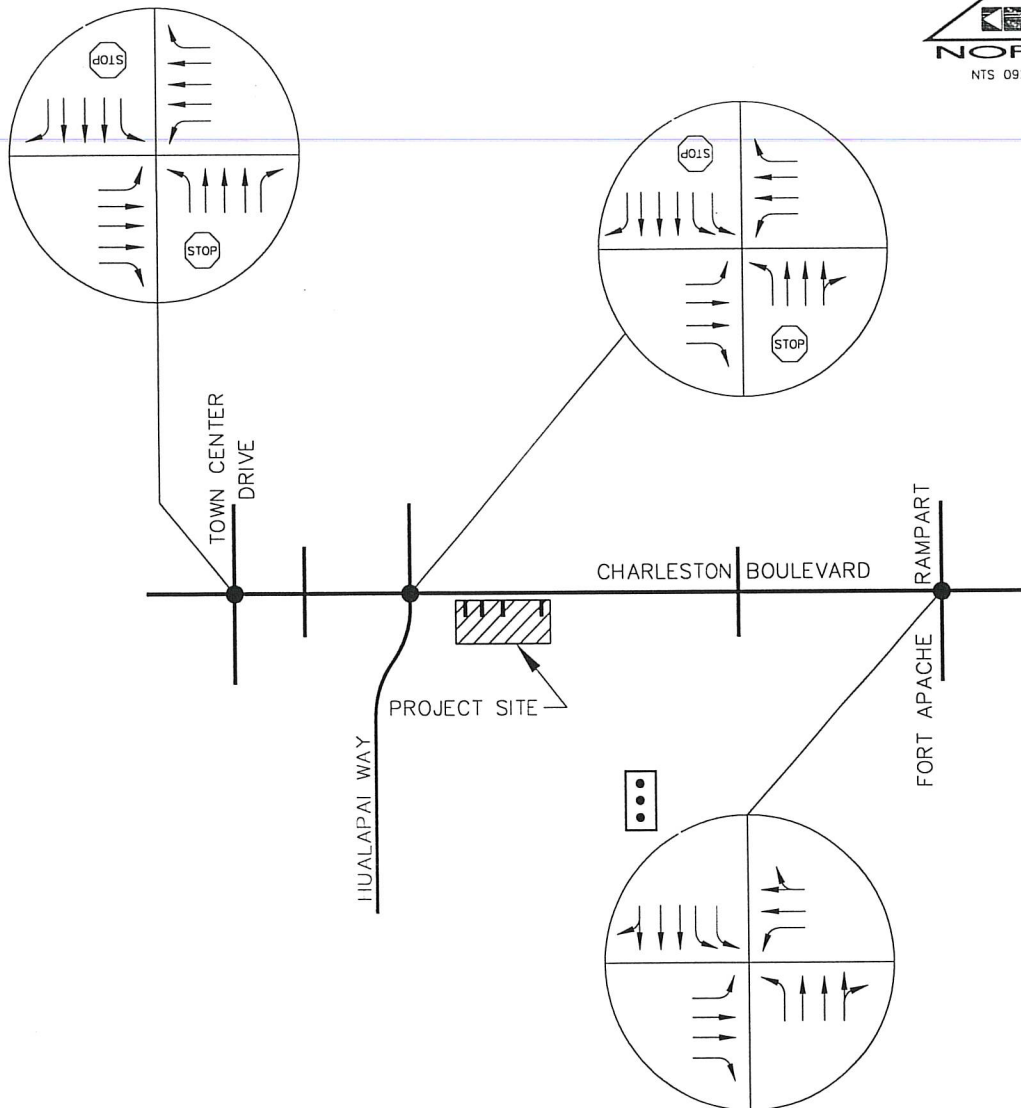
- Charleston Boulevard/Town Center Drive
- Charleston Boulevard/Hualapai Way
- Charleston Boulevard/Rampart Boulevard (Fort Apache Road)

For clarification purposes, the north leg of the Charleston Boulevard/Rampart Boulevard - Fort Apache Road intersection is named Rampart Boulevard, while the south leg is name Fort Apache Road.

Figure 1 shows existing lane configurations at key project intersections.

3.2 Existing Turning Movements

Existing intersection AM and PM peak hour traffic turning movement data was field counted on Wednesday, March 3, 1999. A summary of these counts is shown in **Figure 2** with the count data sheets provided in **Appendix A**.

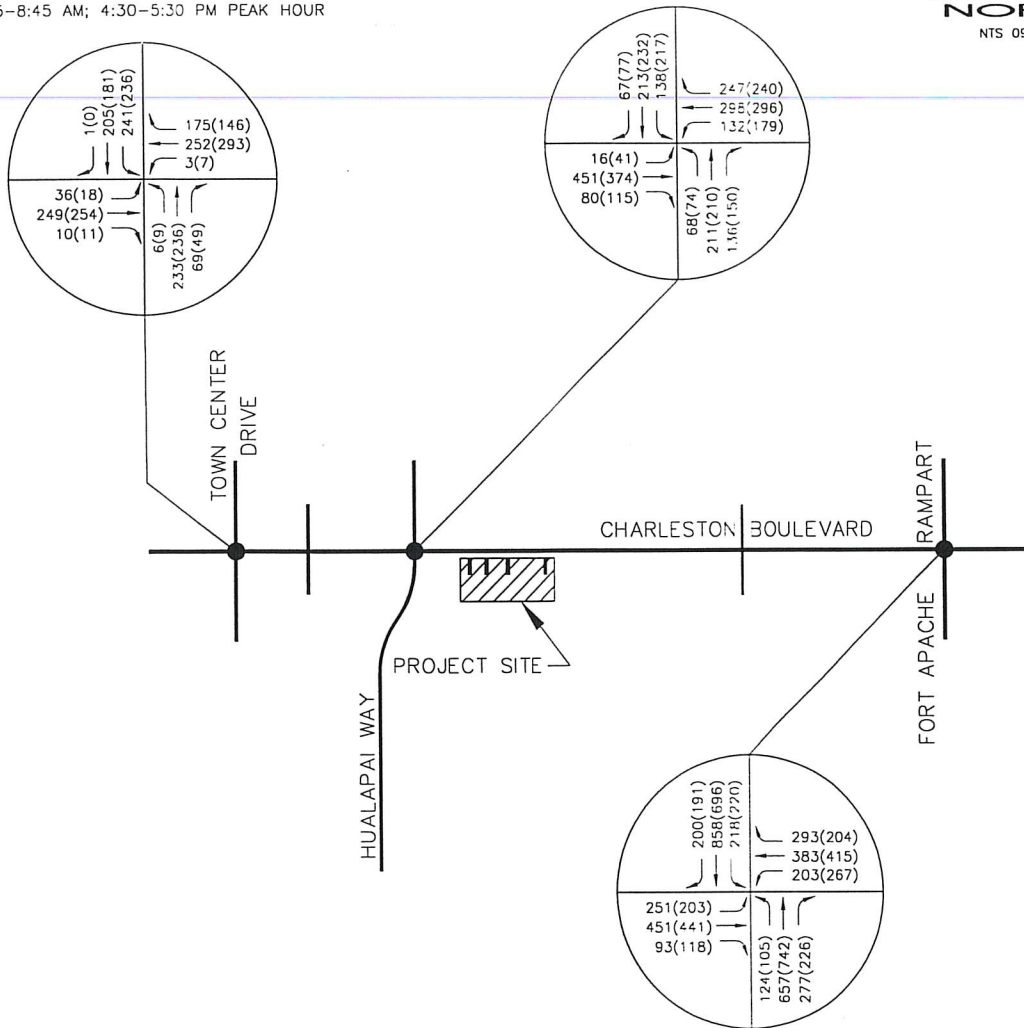


**CHARLESTON/HUALAPAI
COMMERCIAL (PHASE 2)
EXISTING LANE CONFIGURATIONS**

FIGURE 1

WEDNESDAY, MARCH 3, 1999
7:45-8:45 AM; 4:30-5:30 PM PEAK HOUR

WEDNESDAY, MARCH 3, 1999
7:15-8:15 AM; 4:15-5:15 PM PEAK HOUR



WEDNESDAY, MARCH 3, 1999
7:15-8:15 AM; 4:30-5:30 PM PEAK HOUR

LEGEND

- STUDY AREA KEY INTERSECTION
- PROJECT ACCESS DRIVE
- XX(X) AM(PM) PEAK HOUR TRAFFIC VOLUMES

CHARLESTON/HUALAPAI COMMERCIAL (PHASE 2) 1999 EXISTING TRAFFIC VOLUMES

FIGURE 2

4.0 FUTURE CONDITIONS

This section of the report details conditions that are expected in the future as the project and other projects near the site are constructed.

4.1 Buildout Background Traffic

Background traffic volumes at the anticipated time of project buildout (2000) were determined from growth rate adjustments. To determine the background traffic volumes, the existing traffic volumes were increased to reflect growth expected over the next year. The recent annual rate of growth on Charleston Boulevard west of Durango Road (NDOT Count Station 03-356) has been 15 percent (as provided in the Phase I study). Likewise the project traffic expected with the opening of Phase I of the Hualapai Commons was added to the key intersections. The projected background traffic volumes for 2000 are shown in **Figure 3**.

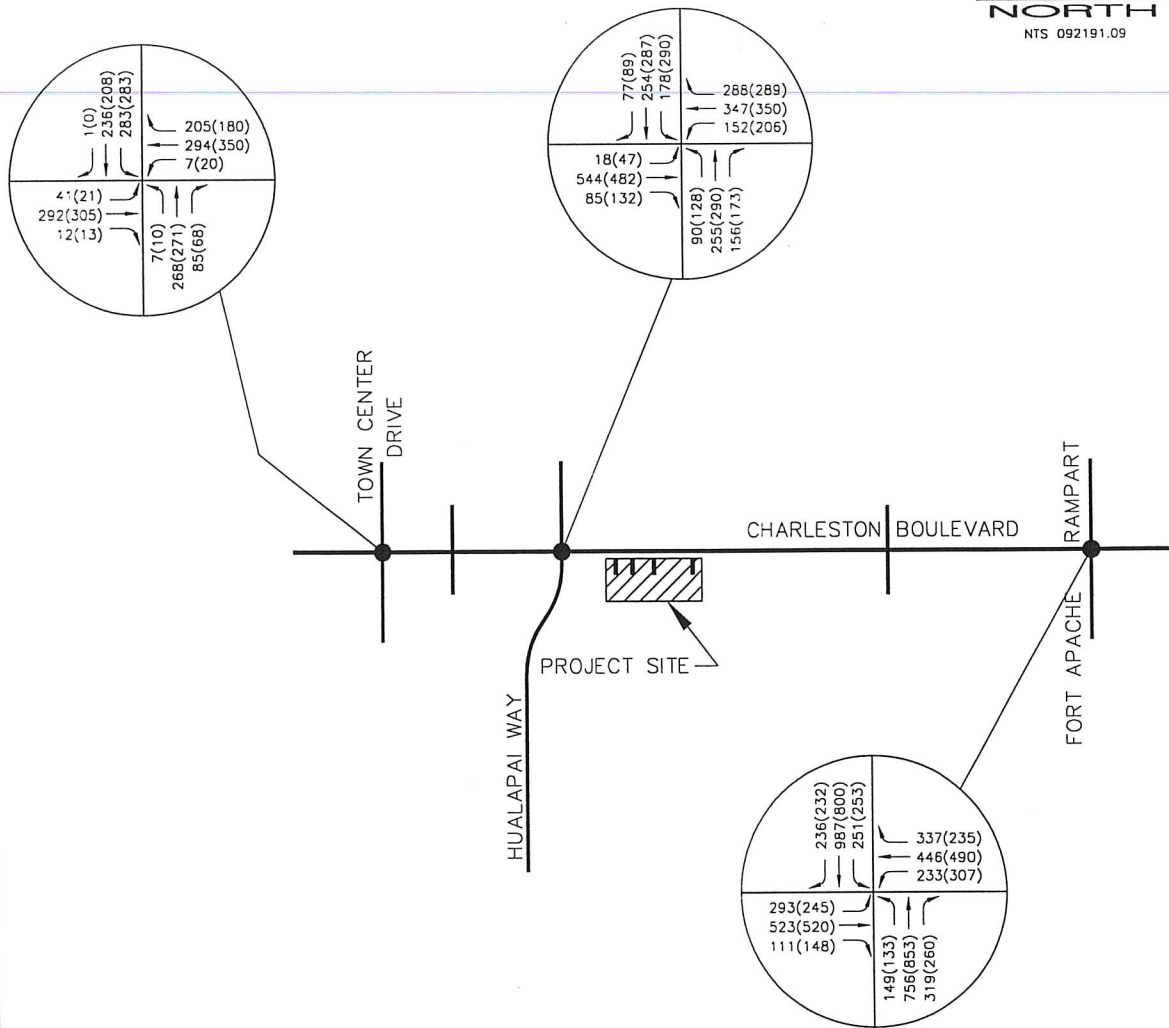
4.2 Project Description

A copy of the site plan for the project is included as **Appendix F** to this study. The plan shows that the project is proposed to include a 131,856 square foot home improvement center (Home Depot), 56,441 square feet of retail space and a 5,000 square foot pad. Full buildout of the project is expected to occur in 2000.

4.3 Project Trip Generation

For purposes of estimating the number of new trips which would be generated by the Hualapai Commons - Phase II, the Institute of Transportation Engineers Trip Generation Manual, 6th Edition, was used. This manual is a standard reference used by jurisdictions throughout the country and is based on actual trip generation studies performed at numerous locations in areas of various populations.

Project trip generation was based on Home Improvement Center (I.T.E. Land Use Code 862), Shopping Center (I.T.E. Land Use Code 820) and Fast Food Restaurant with Drive Through Window (I.T.E. Land Use Code 834) land uses. Pass-by traffic percentages were estimated from the I.T.E. Trip Generation Manual, February 1995 update to the 5th Edition. **Table 1** summarizes estimated non pass-by, pass-by and total project daily and peak hour trips (Calculations are shown in **Appendix B**).



LEGEND

- STUDY AREA KEY INTERSECTION
- PROJECT ACCESS DRIVE
- XX(XX) AM(PM) PEAK HOUR TRAFFIC VOLUMES

CHARLESTON/HUALAPAI COMMERCIAL (PHASE 2) 2000 BACKGROUND TRAFFIC VOLUMES

FIGURE 3

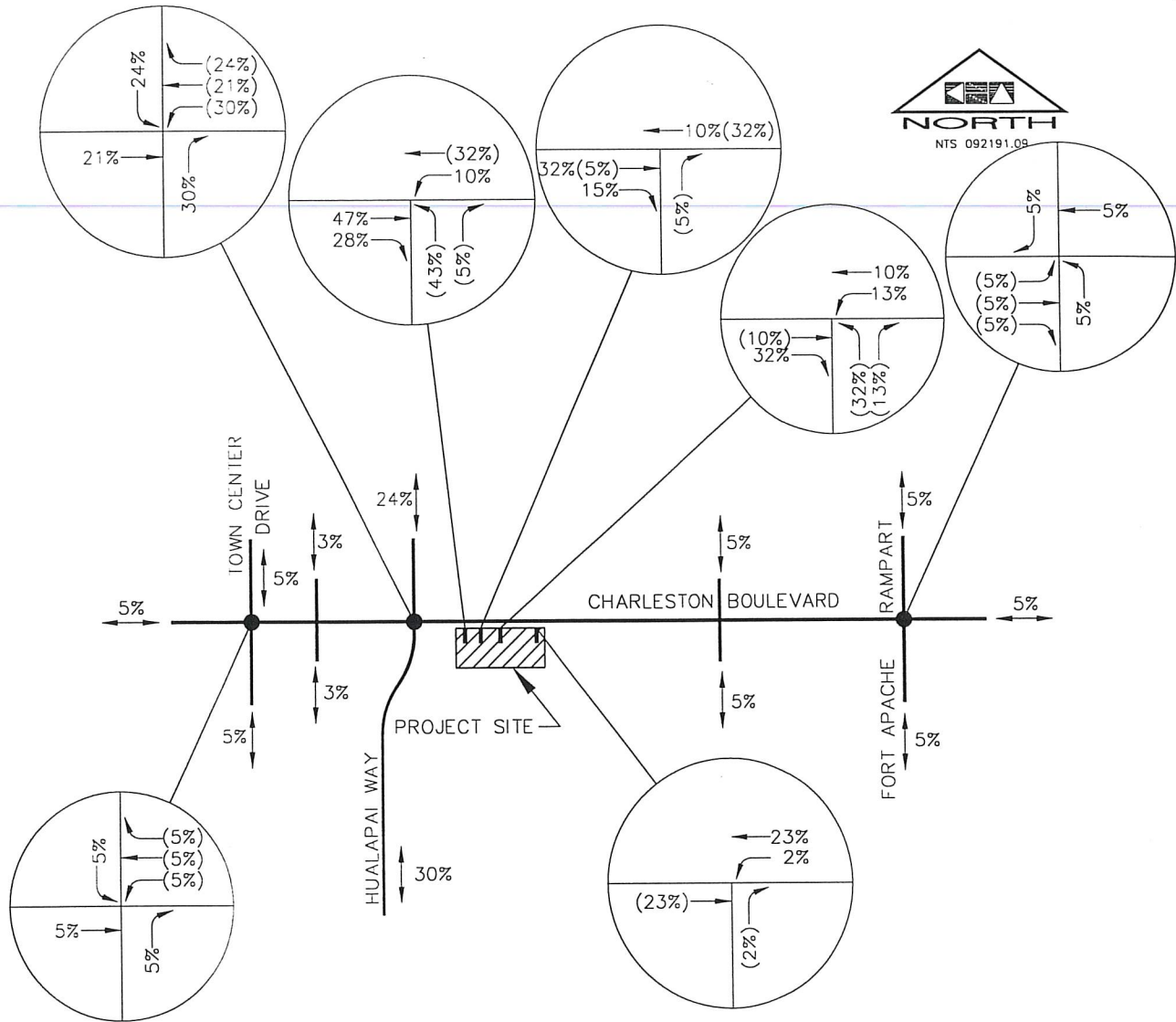
TABLE 1
Project Generated Traffic

	Daily Trips	Trips					
		AM Peak Hour			PM Peak Hour		
		Entering	Exiting	Total	Entering	Exiting	Total
Non Pass-by	9,006	218	184	402	317	345	662
Pass-by	2,896	84	72	156	154	159	313
Total	11,902	302	256	558	471	504	975

Note: * Trip Generation Manual, 6th Edition, Institute of Transportation Engineers.

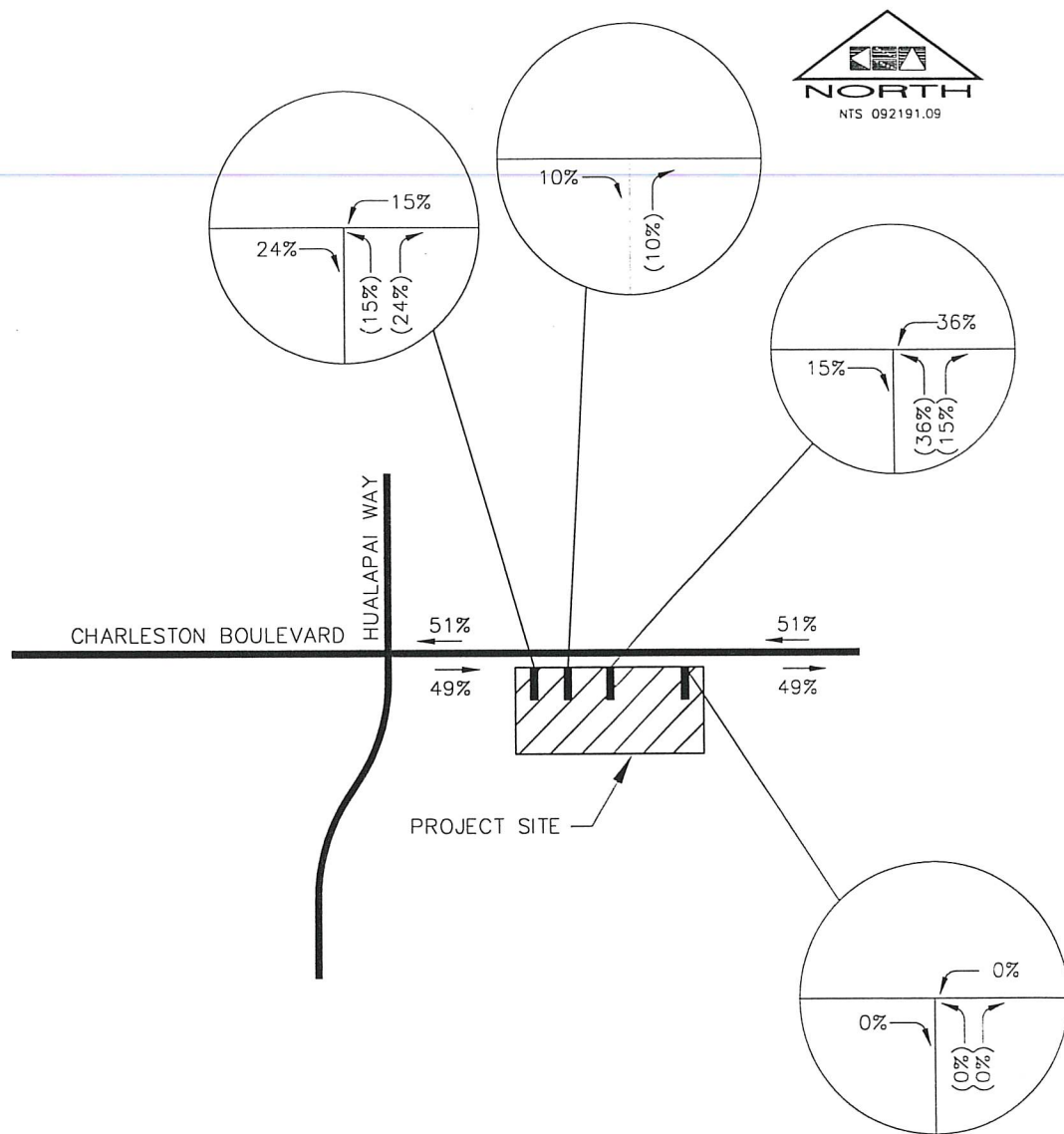
4.4 Trip Distribution and Assignment

Current land use patterns, existing traffic volumes and the existing street system were used to determine the distribution of site generated traffic. The directional distribution of traffic is a means to quantify the percentage of site generated traffic which approaches the site from a given direction and departs the site in the same direction (equal and opposite). The trip distribution for this project site is expected to be similar to the distribution for Phase I of the Hualapai Commons development. Therefore, **Figure 4** illustrates the anticipated non pass-by project trip distribution of the Hualapai Commons - Phase II traffic utilizing the same distribution as Phase I. Pass-by traffic is defined as traffic already on the roadway accessing the site. A certain percentage of patrons of the retail shopping center and restaurant are believed to be pass-by traffic and already on the street system. For a conservative analysis, no pass-by trip reductions were applied for the home improvement store since published data does not exist, however pass-by trips are expected. Pass-by directional distribution of traffic is a means to quantify the percentage of pass-by traffic which approaches the site from a given direction and departs by continuing the trip in the same direction as previous travel. **Figure 5** illustrates the anticipated pass-by project trip distribution of the Hualapai Commons - Phase II. The assignment of the project traffic at the key intersections and project driveways based upon these distributions is illustrated on **Figure 6**. Background plus total project peak hour traffic volumes at key intersections are shown in **Figure 7**.



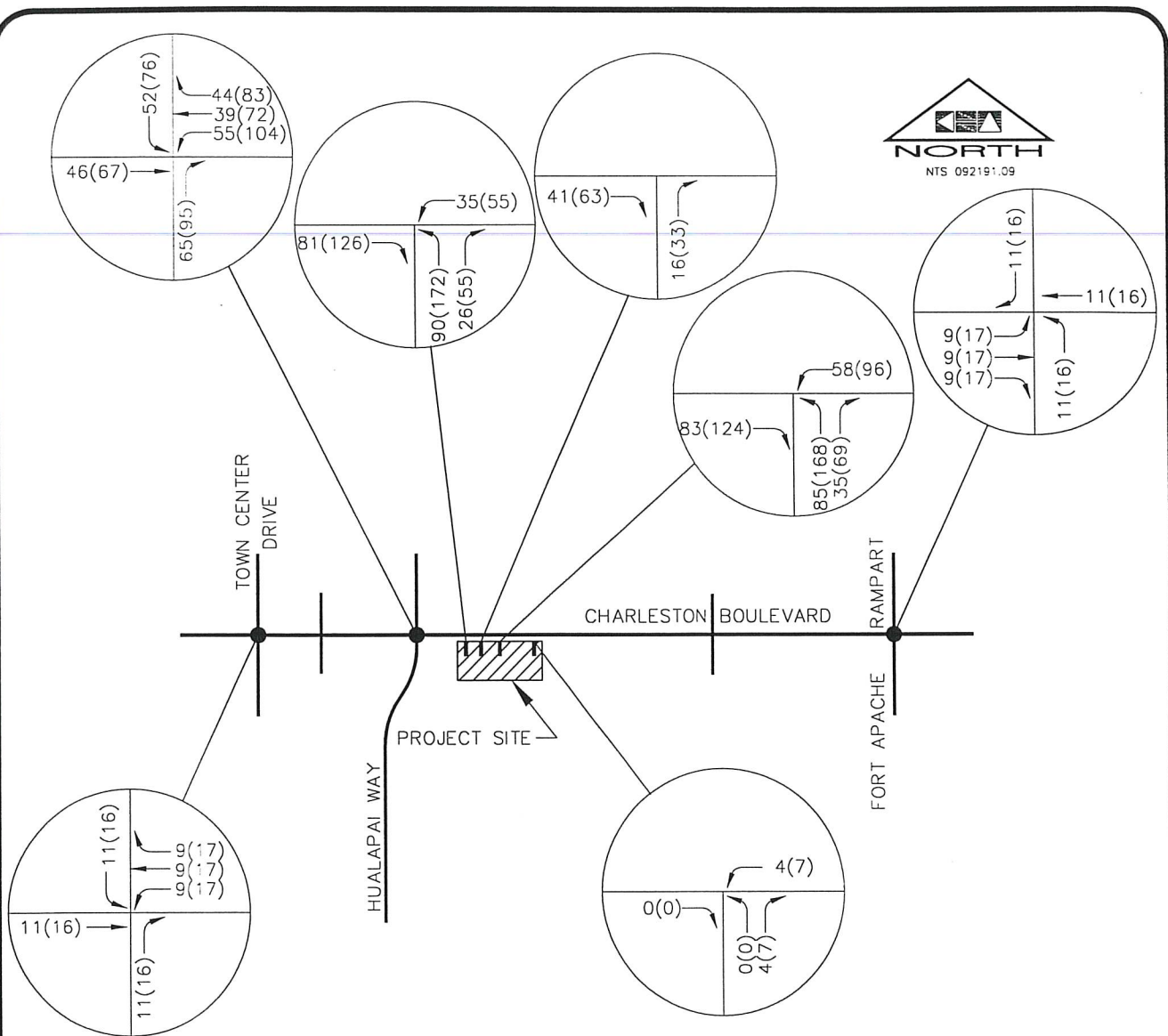
CHARLESTON/HUALAPAI
COMMERCIAL (PHASE 2)
NON PASS-BY TRIP DISTRIBUTION

FIGURE 4



CHARLESTON/HUALAPAI COMMERCIAL (PHASE 2) PASS-BY TRIP DISTRIBUTION

FIGURE 5

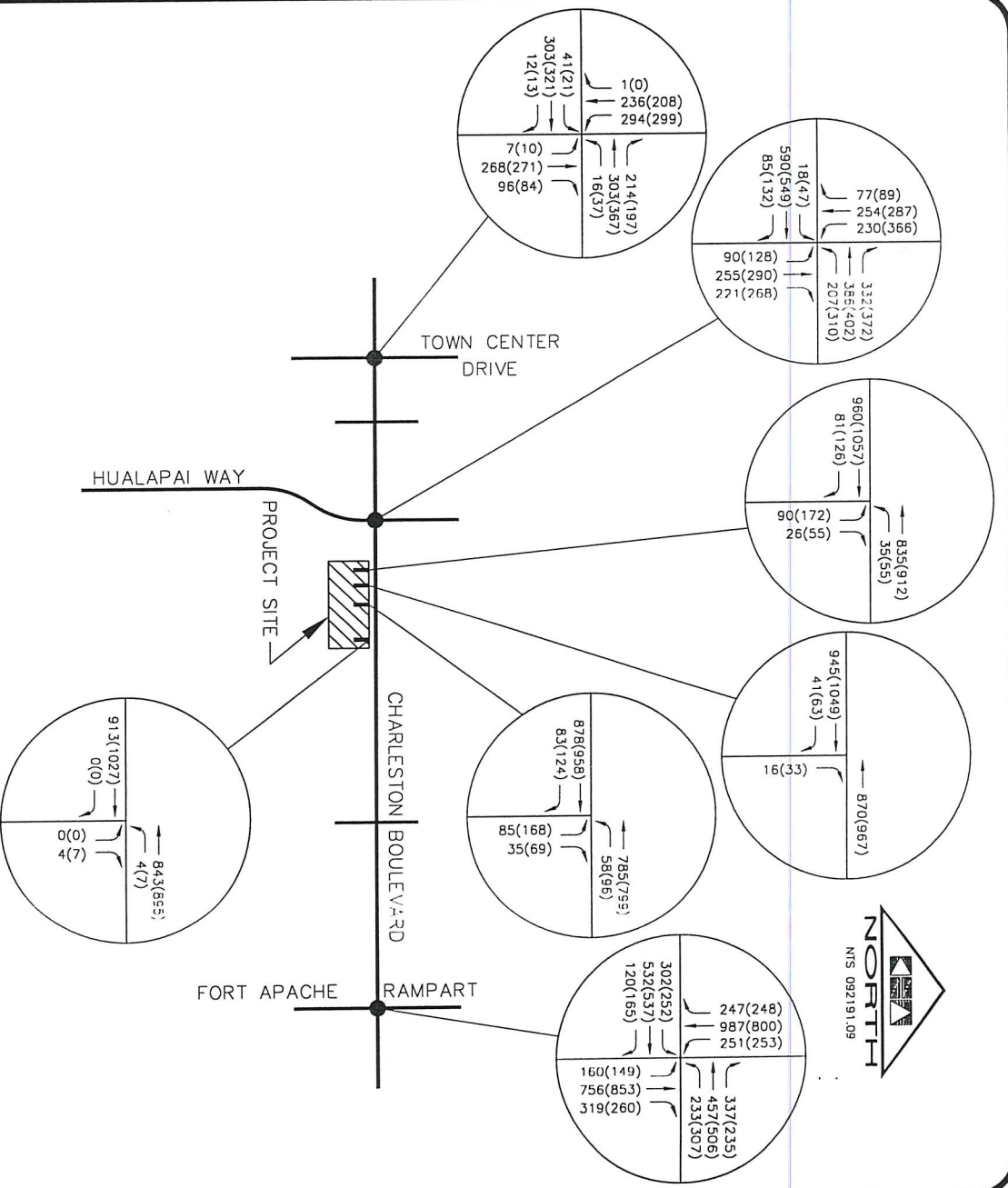


LEGEND

- STUDY AREA KEY INTERSECTION
- PROJECT ACCESS DRIVE
- XX(X) AM(PM) PEAK HOUR TRAFFIC VOLUMES

CHARLESTON/HUALAPAI COMMERCIAL (PHASE 2) PROJECT TRAFFIC ASSIGNMENT

FIGURE 6



CHARLESTON/HUALAPAI COMMERCIAL (PHASE 2) 2000 BACKGROUND PLUS PROJECT TRAFFIC VOLUMES

FIGURE 7

4.5 Accident Data

Vehicle accident information has been obtained from the Nevada Department of Transportation for the signalized key intersection of Charleston Boulevard with Fort Apache Road - Rampart Boulevard (accident data provided in **Appendix C**). This intersection was chosen for accident analysis, since it has the greatest history of traffic volumes. Also, signalized improvements are expected at the other two key intersections which will change the character of these intersections. From reviewing the intersection accident history indicates that a large percentage of the accidents at the signalized intersection is the result of aggressive driving as demonstrated by the majority of the accidents being contributed to failure to yield and failure to reduce speed. It is anticipated that the construction of the project may increase the number of accidents at the surrounding key intersections simply because the overall traffic volumes will increase.

4.6 On-site Circulation

The site plan, included in **Appendix F**, illustrates adequate maneuvering area is available for the normal site generated traffic of passenger vehicles and delivery truck operations along the service drive.

4.7 Additional Right-of-Way

The City of Las Vegas may require the developer to dedicate additional right-of-way along the project frontage to provide for a Citizen Area Transit (CAT) bus turnout. The Regional Transportation Commission (RTC) should be contacted upon buildout of the project to determine if a bus turnout is required at this location. If a bus turnout is required, the additional right-of-way required will be based on RTC Clark County Area Standard Drawings #234.1 and #234.2. However, no bus service is currently provided along the segments of either Charleston or Hualapai adjacent to the site. Therefore, no bus turnout is required to be provided at this time. Since RTC prefers far side bus stops, a bus stop may be provided on eastbound Charleston Boulevard, just east of Hualapai Way in the future. However, due to the expected large volumes of traffic on Charleston Boulevard, it is doubtful that RTC will desire a turnout. If a turnout is desired, adequate existing right-of-way is believed to exist to accommodate a turnout. Likewise, the location of the bus stop for this commercial development would likely be adjacent to the Phase I portion of the project frontage.

5.0 ANALYSIS

Analyses were conducted to determine the adequacy of the street sections that will exist at the key intersections of Charleston Boulevard with Town Center Drive, Hualapai Way and Fort Apache Road - Rampart Boulevard including project access drives.

5.1 Analysis Methodology

Study area intersections were analyzed based on average total delay analysis for signalized and unsignalized intersections presented in the Transportation Research Board's 1994 "Highway Capacity Manual" (Special Report 209). Under the unsignalized analysis, a level of service is calculated for all critical movements of the four legs of the intersection along with a level of service for the entire intersection. **Table 2** shows the definition of level of service for signalized and unsignalized intersections.

TABLE 2
Level of Service Definitions

Level of Service	Signalized Intersection Average Total Delay (sec/veh)	Unsignalized Intersection Average Total Delay (sec/veh)
A	≤ 5	≤ 5
B	> 5 and ≤ 15	> 5 and ≤ 10
C	> 15 and ≤ 25	> 10 and ≤ 20
D	> 25 and ≤ 40	> 20 and ≤ 30
E	> 40 and ≤ 60	> 30 and ≤ 45
F	> 60	> 45

* Definitions provided from the Highway Capacity Manual, Special Report 209, Transportation Research Board, 1994.

5.2 Key Intersection Analyses

Level of service analyses were conducted for all key intersections under existing conditions. These intersections were analyzed for existing and year 2000 traffic volumes with and without project traffic. Existing intersection analysis assumes the lane geometrics shown in **Figure 3**. Results of the analyses are provided in **Appendix D**.

Town Center Drive/Charleston Boulevard

This existing unsignalized intersection operates at Level of Service (LOS) F during both the AM and PM peak hours. Therefore, signalization of this intersection is recommended to be considered as soon as a warrant analysis demonstrates this need. For analysis purposes, this intersection was analyzed as signalized for future traffic conditions. With signalized improvements, this intersection is expected to operate at LOS C during the AM and PM peak hours with or without project traffic in 2000. **Table 3** shows the LOS summary for this intersection.

TABLE 3
Town Center Drive/Charleston Boulevard
Level of Service Analysis

Time Period	1999 Existing (u)		2000 Without Project		2000 With Project	
	Delay#	LOS	Delay#	LOS	Delay#	LOS
AM Peak Hour	105.9	F	18.4	C	18.5	C
PM Peak Hour	102.9	F	18.3	C	18.5	C

Delay in seconds per vehicle

* Delay exceeds maximum

(u) Unsignalized Analysis

Hualapai Way/Charleston Boulevard

This unsignalized intersection currently operates with a LOS F during both of the AM and PM peak hours. Likewise, signalization of this intersection is recommended as soon as a warrant analysis demonstrates this need. With signalization improvements, this intersection is expected to operate with LOS C and D during the AM and PM peak hours, respectively, with or without project traffic in 2000. **Table 4** shows the LOS summary for this intersection.

TABLE 4
Hualapai Way/Charleston Boulevard
Level of Service Analysis

Time Period	1999 Existing (u)		2000 Without Project		2000 With Project	
	Delay#	LOS	Delay#	LOS	Delay#	LOS
AM Hour	*	F	21.9	C	22.4	C
PM Hour	*	F	28.6	D	30.1	D

Delay in seconds per vehicle
 * Delay exceeds maximum
 (u) Unsignalized Analysis

Fort Apache Road - Rampart Boulevard/Charleston Boulevard

This key signalized intersection currently operates with a LOS D during both of the AM and PM peak hours. This intersection is expected to continue to operate with LOS D during both of the AM and PM peak hours with or without project traffic in 2000. **Table 5** shows the LOS summary for this intersection.

TABLE 5
Fort Apache Road - Rampart Boulevard/Charleston Boulevard
Level of Service Analysis

Time Period	1999 Existing (u)		2000 Without Project		2000 With Project	
	Delay#	LOS	Delay#	LOS	Delay#	LOS
AM Hour	32.3	D	38.1	D	39.4	D
PM Hour	30.2	D	34.3	D	34.8	D

Delay in seconds per vehicle

As demonstrated by the analysis, all three key intersections are expected to operate with acceptable levels of service as signalized intersections during the peak hours. Since the unsignalized key intersections currently operate with poor levels of service during the peak hours under existing traffic conditions, no intersection improvements are recommended to be required by the Hualapai Commons Phase II project. Rather signalization of these two key intersections should be explored by the City of Las Vegas. This development has participated in the cost of these signals with the area traffic mitigation fee as determined in the original Peccole Ranch Traffic Impact Study Addendum.

Project Access

Project access to this site is expected to be gained by four driveway locations along Charleston Boulevard. The furthest west driveway is expected to be shared with Phase I traffic. The analysis shows poor level of service at the main two full access driveways, however these driveway intersections are expected to operate better than predicted due to the Highway Capacity Software failing to recognize the platooning effect created by nearby traffic signals. During the poor level of service times (PM peak hour) it is expected that traffic will either turn right at the driveway and do a U-turn further down Charleston Boulevard, or traffic will use the center median area of the street as a refuge area awaiting a gap from each direction separately as can be observed at numerous driveways along principal arterials in the Las Vegas Valley. Results of the level of service analysis is provided in **Table 6** with calculations provided in **Appendix D**.

TABLE 6
Project Driveway
Level of Service Analysis

Driveway Location	AM Peak Hour		PM Peak Hour	
	Delay#	LOS	Delay#	LOS
West Driveway	27.7	D	169.9	F
NB Left	619.3	F	*	F
NB Right	5.1	B	5.9	B
WB Left	9.0	B	11.9	C
West Middle Driveway	0.0	A	0.1	A
NB Right	4.9	A	5.4	B
East Middle Driveway	27.8	D	208.6	F
NB Left/Right	441.0	F	*	F
WB Left	8.5	B	11.7	C
East Driveway	0.0	A	0.0	A
NB Left/Right	4.6	A	4.9	A
WB Left	6.9	B	8.1	B

Delay in seconds per vehicle

* Delay exceeds maximum

All access driveways do not conflict with any proposed driveways or roadways across the street. Across Charleston Boulevard, north of this project site, is the existing Queensridge Master Plan Community. This residential development is served with a gated entrance of Palace Court Drive and gains no access along the project's Charleston Boulevard frontage.

5.3 Left Turn Storage Analysis

Existing key intersections with defined storage bay lengths were analyzed for left turning capacity (calculations shown in **Appendix E**). Results of the left turn analysis are provided in **Table 7**.

Table 7
Left Turn Storage Analysis Results

Intersection	Desirable Storage Length Per Lane	Existing Storage Length
Town Center Dr./Charleston Blvd. <i>North Leg</i> East Leg South Leg West Leg	<i>482 Feet</i> 94 Feet 39 Feet 92 Feet	<i>250 Feet</i> 300 Feet 300 Feet Under Construction
Hualapai Way/Charleston Blvd. North Leg <i>East Leg</i> South Leg West Leg	286 Feet <i>497 Feet</i> 240 Feet 112 Feet	300 Feet <i>225 Feet</i> Continuous Left 300 Feet
Fort Apache Rd/Charleston Blvd. <i>North Leg</i> <i>East Leg</i> South Leg West Leg	<i>210 Feet</i> <i>493 Feet</i> 271 Feet 271 Feet	<i>175 Feet</i> <i>175 Feet</i> Continuous Left Continuous Left
Left Turn into West Project Driveway	69 Feet	125 Feet
Left Turn into East Middle Project Driveway	120 Feet	125 Feet
Left Turn into East Project Driveway	9 Feet	120 Feet

As demonstrated in this table, there are several locations at the key intersections that an analysis has shown inadequate storage exists during the peak hours. It is recommended the City of Las Vegas, study these locations for possible dual left turn lanes or lengthening of existing turn lanes. Also it was found that the existing left turn storage bays serving project traffic are believed to be adequate to accommodate project traffic.

5.4 Participation Analysis

As determined from Z-17-90(22), Phase I of this project site is required to contribute \$11,800 for area traffic mitigation. Phase II will be required to contribute the remainder fee for the entire project site development. As determined in Addendum One of the Peccole Ranch Traffic Impact Study this site was determined to have a participation amount of \$25,740 for both phases. Therefore, Phase II of the project is recommended to contribute \$13,940 for area traffic mitigation.

6.0 RECOMMENDATIONS

This traffic study recommends mitigation measures in addition to those recommended in the original Peccole Ranch Traffic Studies. Since Phase I of this project site is required to contribute \$11,800 for area traffic mitigation, as required by Z-17-90(22), Phase II will be required to contribute the remainder fee for the site. As determined in Addendum One of the Peccole Ranch Traffic Impact Study this site was determined to have a participation amount of \$25,740 for both phases. Therefore, Phase II of the project is recommended to contribute \$13,940 for area traffic mitigation.

Other site specific improvements to facilitate the movement of project traffic to and from the site and reduce its impact on the adjacent street network are as follows:

- The developer is to discourage on-street parking along project frontage on Charleston Boulevard by posting R8-3A and R7-1AP "No Parking" signs to prohibit on-street parking.
- Any signing and striping improvements should be incorporated into the civil drawings for the project and should conform to the standards of the City of Las Vegas and the Manual on Uniform Traffic Control Devices.
- An Encroachment Permit from the Nevada Department of Transportation (NDOT) will be required for any work performed within State right-of-way.

APPENDIX A

INTERSECTION COUNT SHEETS

TRAFFIC TECHS

PEAK HOUR COUNT

COMPANY: Kimley Horn

COUNT DATE: 3/03/99

ENGINEER: Curtis Rowe

COUNT DAY: Wednesday

INTERSECTION: Town Center Dr. / Charleston Blvd.

PROJECT#: TCC303

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES	0.5	0.5	1	1	1	1	0.33	0.33	0.33	0.5	0.5	1	
7:00 AM	3	50	15	56	48	>	>	49	1	1	69	41	333
:15	2	49	22	52	58	>	7	56	>	>	71	42	359
:30	>	45	19	61	53	>	9	56	2	>	63	39	347
:45	>	51	17	60	49	>	12	60	3	1	62	47	362
8:00 AM	1	66	20	56	45	1	10	62	>	2	61	45	369
:15	2	61	15	64	52	>	9	59	4	>	66	46	378
:30	3	55	17	61	59	>	5	68	3	>	63	37	371
:45	>	51	19	50	53	>	>	61	1	1	61	44	341
VOLUME:	11	428	144	460	417	1	52	471	14	5	516	341	2860
PEAK:	6	233	69	241	205	1	36	249	10	3	252	175	1480

START PEAK HOUR: 7:45 AM

INTERSECTION CONTROL: 2 way STOP (N/S)

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES	0.5	0.5	1	1	1	1	0.33	0.33	0.33	0.5	0.5	1	
4:00 PM	2	53	10	49	51	>	5	60	3	>	70	35	338
:15	>	55	9	52	43	1	7	62	2	1	79	31	342
:30	3	52	14	58	50	>	9	64	3	2	71	39	365
:45	3	60	13	57	39	>	4	62	5	3	72	36	354
5:00 PM	>	61	12	62	42	>	5	65	>	2	77	34	360
:15	3	63	10	59	50	>	>	63	3	>	73	37	361
:30	4	57	12	55	41	>	6	59	>	>	75	32	341
:45	>	49	9	53	49	1	1	47	1	1	69	31	311
VOLUME :	15	450	89	445	365	2	37	482	17	9	586	275	2772
PEAK:	9	236	49	236	181	0	18	254	11	7	293	146	1440

START PEAK HOUR: 4:30 PM

INTERSECTION CONTROL: 2 way STOP (N/S)

TRAFFIC TECHS

PEAK HOUR COUNT

COMPANY: Kimley Horn

COUNT DATE: 3/03/99

ENGINEER: Curtis Rowe

COUNT DAY: Wednesday

INTERSECTION: Hualaphi Way / Charleston Blvd.

PROJECT#: HC303

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTALS
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
LANES	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	
7:00 AM	19	49	33	39	50	14	2	102	19	23	78	65	493
:15	19	46	37	32	54	20	5	103	23	31	74	62	506
:30	21	61	35	35	48	15	3	105	25	44	66	65	523
:45	15	55	34	32	53	19	4	121	17	24	76	59	509
8:00 AM	13	49	30	39	58	13	4	122	15	33	82	61	519
:15	15	58	25	29	42	17	2	117	21	28	80	48	482
:30	17	46	21	34	38	19	5	119	25	39	74	49	486
:45	13	44	23	35	41	13	5	99	26	28	70	53	450
VOLUME :	132	408	238	275	384	130	30	888	171	250	600	462	3968
PEAK:	68	211	136	138	213	67	16	451	80	132	298	247	2057

START PEAK HOUR: 7:15 AM

INTERSECTION CONTROL: 2 way STOP (N/S)

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	
4:00 PM	13	58	36	53	56	17	7	91	23	32	75	53	514
:15	17	48	34	55	63	21	10	84	25	46	73	68	544
:30	19	55	39	61	60	19	10	99	30	41	74	51	558
:45	16	55	42	53	56	20	9	100	25	47	75	62	560
5:00 PM	22	52	35	48	53	17	12	91	35	45	74	59	543
:15	20	50	33	54	48	15	10	97	25	52	75	56	535
:30	17	44	26	53	46	17	9	106	15	48	73	57	511
:45	20	37	30	55	41	12	10	74	25	40	69	50	463
VOLUME :	144	399	275	432	423	138	77	742	203	351	588	456	4228
PEAK:	74	210	150	217	232	77	41	374	115	179	296	240	2205

START PEAK HOUR: 4:15 PM

INTERSECTION CONTROL: 2 way STOP (N/S)

TRAFFIC TECHS

PEAK HOUR COUNT

COMPANY: Kimley Horn

COUNT DATE: 3/03/99

ENGINEER: Curtis Rowe

COUNT DAY: Wednesday

INTERSECTION: Fort Apache Rd. / Charleston Blvd.

PROJECT#: FAC303

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES	1	2.5	0.5	2	2.5	0.5	1	1.5	0.5	1	1.5	0.5	
7:00 AM	30	153	81	45	217	41	59	101	21	64	95	87	994
:15	31	157	77	56	202	44	56	117	19	56	92	67	974
:30	33	165	60	57	220	53	65	100	30	48	109	72	1012
:45	27	163	71	49	227	47	69	119	19	50	85	74	1000
8:00 AM	33	172	69	56	209	56	61	115	25	49	97	80	1022
:15	25	174	52	55	193	42	52	109	20	51	89	79	941
:30	29	169	55	57	204	41	56	97	21	50	92	75	946
:45	21	151	53	52	196	39	55	85	17	46	91	61	867
VOLUME:	229	1304	518	427	1668	363	473	843	172	414	750	595	7756
PEAK:	124	657	277	218	858	200	251	451	93	203	383	293	4008

START PEAK HOUR: 7:15 AM

INTERSECTION CONTROL: SIGNAL

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES	1	2.5	0.5	2	2.5	0.5	1	1.5	0.5	1	1.5	0.5	
4:00 PM	35	172	57	60	182	31	50	119	21	62	94	51	934
:15	32	167	63	52	196	49	39	105	29	51	106	49	938
:30	27	186	54	51	178	36	57	122	30	69	103	46	959
:45	25	191	59	59	165	47	59	115	31	72	112	42	977
5:00 PM	31	188	61	63	170	52	43	99	32	61	95	57	952
:15	22	177	52	47	183	56	44	105	25	65	105	59	940
:30	19	168	47	56	156	59	49	107	29	59	100	53	902
:45	21	159	53	59	163	45	41	92	26	61	93	61	874
VOLUME:	212	1408	446	447	1393	375	382	864	223	500	808	418	7476
PEAK:	105	742	226	220	696	191	203	441	118	267	415	204	3828

START PEAK HOUR: 4:30 PM

INTERSECTION CONTROL: SIGNAL

APPENDIX B

TRIP GENERATION CALCULATIONS



Project Hualapai Commons - Phase 2
Subject Trip Generation
Designed by JK Date February 23, 1999 Job No. 092191.09
Checked by _____ Date _____ Sheet No. 1 of 1

TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 6th Edition, Average Rate Equations

Land Use Code - Home Improvement Center (862)

Independant Variable - 1000 Square Feet Gross Floor Area (X)

Gross Floor Area = 131,856 Square Feet

X = 131.856

T = Average Vehicle Trip Ends

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m. (Page 1594)

Daily Weekday	Directional Distribution:	54% ent.	46% exit.
T = 1.48 (X)	T = 195	Average Vehicle Trip Ends	
T = 1.48 * 131.856	105 entering	90	exiting
	105 + 90 =	195	

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (page 1595)

Daily Weekday	Directional Distribution:	47% ent.	53% exit.
T = 2.87 (X)	T = 378	Average Vehicle Trip Ends	
T = 2.87 * 131.856	178 entering	200	exiting
	178 (*)+ 200 =	378	

Weekday (page 1401)

Daily Weekday	Directional Distribution:	50% entering, 50% exiting	
T = 37.403 (X) - 235.069	T = 4698	Average Vehicle Trip Ends	
T = 37.403* 131.856 - 235.069	2349 entering	2349	exiting
	2349 + 2349 =	4698	



Project Hualapai Commons - Phase 2
Subject Trip Generation
Designed by JK Date February 23, 1999 Job No. 092191.09
Checked by _____ Date _____ Sheet No. 1 of 1

TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 6th Edition, Fitted Curve Equations

Land Use Code - Shopping Center (820)

Independant Variable - 1000 Square Feet Gross Leasable Area (X)

Gross Leasable Area = 56,441 Square Feet

X = 56.441

T = Average Vehicle Trip Ends

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m. (Page 1338)

Daily Weekday Directional Distribution: 61% ent. 39% exit.
 $\ln(T) = 0.596 \ln(X) + 2.329$ T = 114 Average Vehicle Trip Ends
 $\ln(T) = 0.596 * \ln(56.441) + 2.329$ 70 entering 44 exiting
70 + 44 = 114

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (page 1339)

Daily Weekday Directional Distribution: 48% ent. 52% exit.
 $\ln(T) = 0.660 \ln(X) + 3.403$ T = 430 Average Vehicle Trip Ends
 $\ln(T) = 0.660 * \ln(56.441) + 3.403$ 206 entering 224 exiting
206 + 224 = 430

Weekday (page 1337)

Daily Weekday Directional Distribution: 50% entering, 50% exiting
 $\ln(T) = 0.643 \ln(X) + 5.866$ T = 4718 Average Vehicle Trip Ends
 $\ln(T) = 0.643 * \ln(56.441) + 5.866$ 2359 entering 2359 exiting
2359 + 2359 = 4718

Non-Pass-by Trip Volumes (page I-30 and I-32, 5th Edition)

PM Peak Hour = 55% Pass By Remaining Hours = 35% Pass By

	IN	Out	Total
AM Peak	46	29	74
PM Peak	93	102	195
Daily	1495	1495	2990



Project Hualapai Commons - Phase 2
Subject Trip Generation
Designed by JK Date February 23, 1999 Job No. 092191.09
Checked by _____ Date _____ Sheet No. 1 of 1

TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 6th Edition, Average Rate Equations

Land Use Code - Fast Food Restaurant With Drive-Through Window (834)

Independant Variable - 1000 Square Feet Gross Floor Area (X)

Gross Floor Area = 5,000 Square Feet

X = 5.000

T = Average Vehicle Trip Ends

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m. (Page 1402)

Daily Weekday Directional Distribution: 51% ent. 49% exit.
T = 49.86 (X) T = 249 Average Vehicle Trip Ends
T = 49.86 * 5.000 127 entering 122 exiting
127 + 122 = 249

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (page 1403)

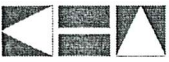
Daily Weekday Directional Distribution: 52% ent. 48% exit.
T = 33.48 (X) T = 167 Average Vehicle Trip Ends
T = 33.48 * 5.000 87 entering 80 exiting
87 + 80 = 167

Weekday (page 1401)

Daily Weekday Directional Distribution: 50% entering, 50% exiting
T = 496.12 (X) T = 2486 Average Vehicle Trip Ends
T = 496.12 * 5.000 1243 entering 1243 exiting
1243 + 1243 = 2486

Average Pass-By Trip Percentage = 47% As obtained from Table VII-3, Page I-20 of ITE Trip Generation Manual
5th Edition Update, Feb. 1995

	Non Pass-By Trips		
	In	Out	Total
AM	67	65	132
PM	46	43	89



Project Hualapai Commons - Phase 2
Subject Trip Generation
Designed by JK Date February 23, 1999 Job No. 92191.09
Checked by _____ Date _____ Sheet No. 1 of 1

TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 6th Edition, Average Rate Equations

Land Use Code - Specialty Retail Center (814)

Independant Variable - 1000 Sq. Feet Gross Leasable Area (X)

$$X = 56.441$$

T = Average Vehicle Trip Ends

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (page 1225)

Daily Weekday

$$(T) = 2.59 (X)$$

$$(T) = 2.59 * (56.4)$$

Directional Distribution: 43% ent. 57% exit.

$$T = 146 \text{ Average Vehicle Trip Ends}$$

$$63 \text{ entering} \quad 83 \text{ exiting}$$

$$63 + 83 = 146$$

Weekday (page 1224)

Daily Weekday

$$(T) = 40.67 (X)$$

$$(T) = 40.67 * (56.4)$$

Directional Distribution: 50% entering, 50% exiting

$$T = 2296 \text{ Average Vehicle Trip Ends}$$

$$1148 \text{ entering} \quad 1148 \text{ exiting}$$

$$1148 + 1148 = 2296$$

APPENDIX C

ACCIDENT DATA

This intersection has been identified by the Nevada Department of Transportation as a High Crash Location. Please call Jerry Pierretti or Jay Van Sickle with NDOT to discuss potential countermeasures for this intersection. If contact is not made with the aforementioned person(s), your crash analysis for this intersection may be considered as incomplete. They may be reached at 702-888-7333.

Prepared by the Transportation Research Center at
the University of Nevada, Las Vegas with permission
from the Nevada Department of Transportation.

| THIS INFORMATION IS PROTECTED BY |
| FEDERAL MANDATE |
| TITLE 23 USC SECTION 409 |
CANNOT BE USED FOR LITIGATION

FORT APACHE ROAD AT CHARLESTON BOULEVARD
JANUARY 1995 THROUGH DECEMBER 1997
CONTRIBUTING FACTOR BY SEVERITY

Contributing Factor	Property Dmg Crashes	Injury Crashes	Fatal Crashes	Total Crashes	No. of Inj.	No. of Fat.
Failure to Yield	9	8	0	17	17	0
Failure To Reduce Speed	4	4	0	8	7	0
Inattentive Driving	2	1	0	3	1	0
D.U.I. Citation Issued	0	2	0	2	3	0
Improper Turn	1	0	0	1	0	0
Unsafe Load	1	0	0	1	0	0
Improper Lane Change	1	0	0	1	0	0
TOTALS	18	15	0	33	28	0

This intersection has been identified by the Nevada Department of Transportation as a High Crash Location. Please call Jerry Pierretti or Jay Van Sickle with NDOT to discuss potential countermeasures for this intersection. If contact is not made with the aforementioned person(s), your crash analysis for this intersection may be considered as incomplete. They may be reached at 702-888-7333.

Prepared by the Transportation Research Center at the University of Nevada, Las Vegas with permission from the Nevada Department of Transportation.

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 | FEDERAL MANDATE |
 | TITLE 23 USC SECTION 409 |
CANNOT BE USED FOR LITIGATION

FORT APACHE ROAD AT CHARLESTON BOULEVARD
 JANUARY 1995 THROUGH DECEMBER 1997
 CRASH TYPE BY SEVERITY

Type of Crash	Property Dmg Crashes	Injury Crashes	Fatal Crashes	Total Crashes	No. of Inj.	No. of Fat.
Left-Turn Collision	5	8	0	13	18	0
Rear-End Collision	5	5	0	10	8	0
Angle Collision	3	2	0	5	2	0
Right-Turn Collision	2	0	0	2	0	0
SideSwipe Collision Same Dir.	2	0	0	2	0	0
NMV Object Thrown From Veh	1	0	0	1	0	0
TOTALS	18	15	0	33	28	0

Definition of Acronyms (Where applicable for Type of Crash):

AAV: Avoiding Another Vehicle
 NCA: Non Collision Accident
 NMV: Non Motor Vehicle
 ROR: Ran Off Roadway

APPENDIX D

INTERSECTION ANALYSIS SHEETS

Kimley-Horn And Associates
1050 East Flamingo Road Suite
Suite S210
Las Vegas, NV 89119-
Ph: (702) 734-5666

Streets: (N-S) Town Center Drive (E-W) Charleston Boulevard
Major Street Direction.... EW
Length of Time Analyzed... 15 (min)
Analyst..... CDR
Date of Analysis..... 3/2/99
Other Information..... 1998 Existing Traffic AM Peak
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	3	1	1	3	1	1	3	1	1	3	1
Stop/Yield			N			N						
Volumes	36	249	10	3	252	175	6	233	69	241	205	1
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	87	88
Potential Capacity: (pcph)	1251	1250
Movement Capacity: (pcph)	1251	1250
Prob. of Queue-Free State:	0.94	1.00
Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	273	449
Potential Capacity: (pcph)	1223	984
Movement Capacity: (pcph)	1223	984
Prob. of Queue-Free State:	1.00	0.96
Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	752	579
Potential Capacity: (pcph)	396	500
Capacity Adjustment Factor due to Impeding Movements	0.95	0.95
Movement Capacity: (pcph)	378	477
Prob. of Queue-Free State:	0.29	0.50
Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	676	782
Potential Capacity: (pcph)	391	335
Major LT, Minor TH Impedance Factor:	0.48	0.27
Adjusted Impedance Factor:	0.59	0.41
Capacity Adjustment Factor due to Impeding Movements	0.59	0.38
Movement Capacity: (pcph)	230	128

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB L	7	230		16.1	0.0	C	
NB T	270	378		30.1	5.0	E	23.7
NB R	80	1251		3.1	0.1	A	
SB L	279	128		606.7	20.9	F	
SB T	238	477		14.8	2.8	C	333.9
SB R	1	1250		2.9	0.0	A	
EB L	42	984		3.8	0.0	A	0.5
WB L	3	1223		3.0	0.0	A	0.0

Intersection Delay = 105.9 sec/veh

Kimley-Horn And Associates
 1050 East Flamingo Road Suite
 Suite S210
 Las Vegas, NV 89119-
 Ph: (702) 734-5666

Streets: (N-S) Town Center Drive (E-W) Charleston Boulevard
 Major Street Direction.... EW
 Length of Time Analyzed... 15 (min)
 Analyst..... CDR
 Date of Analysis..... 3/2/99
 Other Information.....1998 Existing Traffic PM Peak
 Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	3	1	1	3	1	1	3	1	1	3	1
Stop/Yield			N			N						
Volumes	18	254	11	7	293	146	9	236	49	236	181	0
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	89	103
Potential Capacity: (pcph)	1248	1228
Movement Capacity: (pcph)	1248	1228
Prob. of Queue-Free State:	0.95	1.00
Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	279	462
Potential Capacity: (pcph)	1214	968
Movement Capacity: (pcph)	1214	968
Prob. of Queue-Free State:	0.99	0.98
Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	755	613
Potential Capacity: (pcph)	394	478
Capacity Adjustment Factor due to Impeding Movements	0.97	0.97
Movement Capacity: (pcph)	383	465
Prob. of Queue-Free State:	0.29	0.55
Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	697	802
Potential Capacity: (pcph)	379	325
Major LT, Minor TH Impedance Factor:	0.53	0.28
Adjusted Impedance Factor:	0.63	0.41
Capacity Adjustment Factor due to Impeding Movements	0.63	0.39
Movement Capacity: (pcph)	240	128

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB L	10	240		15.7	0.0	C	
NB T	273	383		29.6	5.0	D	24.7
NB R	57	1248		3.0	0.0	A	
SB L	273	128		586.3	20.2	F	
SB T	210	465		14.0	2.4	C	337.8
SB R	0	1228		2.9	0.0	A	
EB L	21	968		3.8	0.0	A	0.2
WB L	8	1214		3.0	0.0	A	0.0

Intersection Delay = 102.9 sec/veh

Streets: (E-W) Charleston Boulevard (N-S) Town Center Drive
Analyst: CDR File Name: TCDAMB.HC9
Area Type: Other 3-2-99 AM Peak
Comment: 2000 Background Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	3	1	1	3	1	1	3	1	1	3	1
Volumes	41	292	12	7	294	205	7	268	85	283	236	1
Lane W (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations												
Phase Combination	1	2	3	4	5	6	7	8				
EB Left	*	*			NB Left	*		*				
Thru		*			Thru			*				
Right		*			Right			*				
Peds		*			Peds			*				
WB Left	*	*			SB Left	*	*	*				
Thru		*			Thru		*	*				
Right		*			Right		*	*				
Peds		*			Peds			*				
NB Right					EB Right							
SB Right					WB Right							
Green	5.0P	72.0P			Green	5.0P	15.0P	55.0P				
Yellow/AR	0.0	4.0			Yellow/AR	0.0	0.0	4.0				
Cycle Length: 160 secs Phase combination order: #1 #2 #5 #6 #7												

Intersection Performance Summary									
Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:	Delay	LOS
Mvmts	Cap	Flow	Ratio	Ratio					
EB	L	403	1770	0.107	0.487	12.9	B	15.5	C
	T	2550	5588	0.133	0.456	15.9	C		
	R	722	1583	0.018	0.456	15.0	B		
WB	L	404	1770	0.017	0.487	12.6	B	16.4	C
	T	2550	5588	0.133	0.456	15.9	C		
	R	722	1583	0.299	0.456	17.3	C		
NB	L	374	1770	0.019	0.381	22.7	C	26.0	D
	T	1956	5588	0.159	0.350	25.7	D		
	R	554	1583	0.161	0.350	27.2	D		
SB	L	488	1770	0.611	0.475	17.5	C	17.1	C
	T	2480	5588	0.110	0.444	16.7	C		
	R	702	1583	0.001	0.444	15.9	C		

Intersection Delay = 18.4 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.414

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d
Kimley-Horn And Associates

03-08-1999

Streets: (E-W) Charleston Boulevard (N-S) Town Center Drive
Analyst: CDR File Name: TCDPMB.HC9
Area Type: Other 3-2-99 PM Peak
Comment: 2000 Background Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	3	1	1	3	1	1	3	1	1	3	1
Volumes	21	305	13	20	350	180	10	271	68	283	208	5
Lane W (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*	*			NB Left	*	*	
Thru		*			Thru		*	
Right		*			Right		*	
Peds		*			Peds		*	
WB Left	*	*			SB Left	*	*	*
Thru		*			Thru	*	*	*
Right		*			Right	*	*	*
Peds		*			Peds		*	*
NB Right					EB Right			
SB Right					WB Right			
Green	5.0P	72.0P			Green	5.0P	15.0P	55.0P
Yellow/AR	0.0	4.0			Yellow/AR	0.0	0.0	4.0
Cycle Length: 160 secs Phase combination order: #1 #2 #5 #6 #7								

Intersection Performance Summary

	Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:	
	Mvmts	Cap	Flow	Ratio	Ratio			Delay	LOS
EB	L	362	1770	0.061	0.487	12.8	B	15.7	C
	T	2550	5588	0.138	0.456	15.9	C		
	R	722	1583	0.019	0.456	15.0	B		
WB	L	395	1770	0.053	0.487	12.7	B	16.2	C
	T	2550	5588	0.159	0.456	16.1	C		
	R	722	1583	0.262	0.456	17.0	C		
NB	L	395	1770	0.028	0.381	22.7	C	25.8	D
	T	1956	5588	0.161	0.350	25.7	D		
	R	554	1583	0.130	0.350	26.9	D		
SB	L	485	1770	0.614	0.475	17.5	C	17.1	C
	T	2480	5588	0.097	0.444	16.6	C		
	R	702	1583	0.007	0.444	15.9	C		

Intersection Delay = 18.3 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.397

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d
Kimley-Horn And Associates

03-08-1999

Streets: (E-W) Charleston Boulevard (N-S) Town Center Drive
Analyst: CDR File Name: TCDAMP.HC9
Area Type: Other 3-2-99 AM Peak
Comment: 2000 Background Plus Project Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	3	1	1	3	1	1	3	1	1	3	1
Volumes	41	303	12	16	303	214	7	268	96	294	236	1
Lane W (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations												
Phase Combination		1	2	3	4			5	6	7	8	
EB	Left	*	*			NB	Left	*		*		
	Thru		*				Thru			*		
	Right		*				Right			*		
	Peds		*				Peds			*		
WB	Left	*	*			SB	Left	*	*	*		
	Thru		*				Thru		*	*		
	Right		*				Right		*	*		
	Peds		*				Peds			*		
NB	Right					EB	Right					
SB	Right					WB	Right					
Green		5.0P	72.0P			Green		5.0P	15.0P	55.0P		
Yellow/AR		0.0	4.0			Yellow/AR		0.0	0.0	4.0		
Cycle Length: 160 secs Phase combination order: #1 #2 #5 #6 #7												

Intersection Performance Summary									
	Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:	
	Mvmts	Cap	Flow	Ratio	Ratio			Delay	LOS
EB	L	396	1770	0.109	0.487	12.9	B	15.6	C
	T	2550	5588	0.138	0.456	15.9	C		
	R	722	1583	0.018	0.456	15.0	B		
WB	L	396	1770	0.043	0.487	12.7	B	16.4	C
	T	2550	5588	0.138	0.456	15.9	C		
	R	722	1583	0.312	0.456	17.4	C		
NB	L	374	1770	0.019	0.381	22.7	C	26.1	D
	T	1956	5588	0.159	0.350	25.7	D		
	R	554	1583	0.182	0.350	27.5	D		
SB	L	488	1770	0.633	0.475	17.9	C	17.4	C
	T	2480	5588	0.110	0.444	16.7	C		
	R	702	1583	0.001	0.444	15.9	C		

Intersection Delay = 18.5 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.434

Streets: (E-W) Charleston Boulevard (N-S) Town Center Drive
Analyst: CDR File Name: TCDPMP.HC9
Area Type: Other 3-2-99 PM Peak
Comment: 2000 Background Plus Project Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	3	1	1	3	1	1	3	1	1	3	1
Volumes	21	321	13	37	367	197	10	271	84	299	208	5
Lane W (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations												
Phase Combination	1	2	3	4	5	6	7	8				
EB Left	*	*			*		*					
Thru		*					*					
Right		*					*					
Peds		*					*					
WB Left	*	*			*	*	*					
Thru		*				*	*					
Right		*				*	*					
Peds		*					*					
NB Right					EB Right							
SB Right					WB Right							
Green	5.0P	72.0P			Green	5.0P	15.0P	55.0P				
Yellow/AR	0.0	4.0			Yellow/AR	0.0	0.0	4.0				
Cycle Length: 160 secs Phase combination order: #1 #2 #5 #6 #7												

Intersection Performance Summary									
Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:	Delay	LOS
Mvmts	Cap	Flow	Ratio	Ratio					
EB L	348	1770	0.063	0.487	12.8	B	15.8	C	
T	2550	5588	0.146	0.456	16.0	C			
R	722	1583	0.019	0.456	15.0	B			
WB L	382	1770	0.102	0.487	12.9	B	16.3	C	
T	2550	5588	0.167	0.456	16.1	C			
R	722	1583	0.287	0.456	17.2	C			
NB L	395	1770	0.028	0.381	22.7	C	25.9	D	
T	1956	5588	0.161	0.350	25.7	D			
R	554	1583	0.159	0.350	27.2	D			
SB L	485	1770	0.649	0.475	18.3	C	17.5	C	
T	2480	5588	0.097	0.444	16.6	C			
R	702	1583	0.007	0.444	15.9	C			

Intersection Delay = 18.5 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.431

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Streets: (N-S) Hualapai Way (E-W) Charleston Boulevard

Major Street Direction.... EW

Length of Time Analyzed... 15 (min)

Analyst..... CDR

Date of Analysis..... 3/2/99

Other Information..... 1998 Existing Traffic AM Peak

Two-way Stop-controlled Intersection

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	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	1	1	3	< 0	1	3	1
Stop/Yield			N			N						
Volumes	16	451	80	132	298	247	68	211	136	138	213	67
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB

Conflicting Flows: (vph)	238	157
Potential Capacity: (pcph)	1049	1153
Movement Capacity: (pcph)	1049	1153
Prob. of Queue-Free State:	0.85	0.93

Step 2: LT from Major Street	WB	EB

Conflicting Flows: (vph)	559	574
Potential Capacity: (pcph)	859	843
Movement Capacity: (pcph)	859	843
Prob. of Queue-Free State:	0.82	0.98

Step 3: TH from Minor Street	NB	SB

Conflicting Flows: (vph)	1205	1029
Potential Capacity: (pcph)	215	273
Capacity Adjustment Factor due to Impeding Movements	0.80	0.80
Movement Capacity: (pcph)	173	219
Prob. of Queue-Free State:	0.00	0.00

Step 4: LT from Minor Street	NB	SB

Conflicting Flows: (vph)	1056	1186
Potential Capacity: (pcph)	224	185
Major LT, Minor TH Impedance Factor:	0.00	0.00
Adjusted Impedance Factor:	0.00	0.00
Capacity Adjustment Factor due to Impeding Movements	0.00	0.00
Movement Capacity: (pcph)	0	0

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
-----		-----	-----	-----	-----	-----	-----	-----
NB	L	79	0		*	*	F	
NB	T	244	173	>				*
NB	R	157	1049	> 257	300.5	21.9	F	
SB	L	160	0		*	*	F	
SB	T	246	219		139.5	9.9	F	*
SB	R	78	1153		3.3	0.1	A	
EB	L	19	843		4.4	0.0	A	0.1
WB	L	153	859		5.1	0.7	B	1.0

Intersection Delay = *

* The calculated value was greater than 999.9.

=====

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=====

Streets: (N-S) Hualapai Way (E-W) Charleston Boulevard

Major Street Direction.... EW

Length of Time Analyzed... 15 (min)

Analyst..... CDR

Date of Analysis..... 3/2/99

Other Information.....1998 Existing Traffic PM Peak

Two-way Stop-controlled Intersection

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	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	1	1	3	< 0	1	3	1
Stop/Yield			N			N						
Volumes	41	374	115	179	296	240	74	210	150	217	232	77
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street			NB	SB
Conflicting Flows: (vph)			197	156
Potential Capacity: (pcph)			1100	1154
Movement Capacity: (pcph)			1100	1154
Prob. of Queue-Free State:			0.84	0.92
Step 2: LT from Major Street			WB	EB
Conflicting Flows: (vph)			515	565
Potential Capacity: (pcph)			907	853
Movement Capacity: (pcph)			907	853
Prob. of Queue-Free State:			0.77	0.94
Step 3: TH from Minor Street			NB	SB
Conflicting Flows: (vph)			1190	1058
Potential Capacity: (pcph)			220	262
Capacity Adjustment Factor due to Impeding Movements			0.73	0.73
Movement Capacity: (pcph)			160	191
Prob. of Queue-Free State:			0.00	0.00
Step 4: LT from Minor Street			NB	SB
Conflicting Flows: (vph)			1060	1175
Potential Capacity: (pcph)			222	188
Major LT, Minor TH Impedance Factor:			0.00	0.00
Adjusted Impedance Factor:			0.00	0.00
Capacity Adjustment Factor due to Impeding Movements			0.00	0.00
Movement Capacity: (pcph)			0	0

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB	L	86	0		*	*	F	
NB	T	243	160	>				*
NB	R	174	1100	> 249	350.5	24.5	F	
SB	L	251	0		*	*	F	
SB	T	268	191		251.4	14.0	F	*
SB	R	89	1154		3.4	0.2	A	
EB	L	47	853		4.5	0.0	A	0.3
WB	L	207	907		5.1	1.0	B	1.3

Intersection Delay = *

* The calculated value was greater than 999.9.

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d
Kimley-Horn And Associates

03-08-1999

Streets: (E-W) Charleston Boulevard (N-S) Hualapai Way
Analyst: CDR File Name: HWAMB.HC9
Area Type: Other 3-2-99 AM Peak
Comment: 2000 Background Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	1	1	3	<	2	3	1
Volumes	18	544	85	152	347	288	90	255	156	178	254	77
Lane W (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations												
Phase Combination		1	2	3	4		5	6	7	8		
EB	Left	*		*		NB	Left	*		*		
	Thru			*			Thru			*		
	Right			*			Right			*		
	Peds			*			Peds					
WB	Left	*	*	*		SB	Left	*	*			
	Thru		*	*			Thru		*	*		
	Right		*	*			Right		*	*		
	Peds			*			Peds					
NB	Right					EB	Right					
SB	Right					WB	Right					
Green		7.0P	18.0P	61.0P		Green	15.0P	4.0P	27.0P			
Yellow/AR		0.0	0.0	4.0		Yellow/AR	0.0	0.0	4.0			
Cycle Length: 140 secs Phase combination order: #1 #2 #3 #5 #6 #7												

Intersection Performance Summary									
	Lane	Group:	Adj Sat	v/c	g/C			Approach:	
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
EB	L	420	1770	0.045	0.493	11.7	B	16.3	C
	T	1650	3725	0.365	0.443	16.7	C		
	R	701	1583	0.127	0.443	14.8	B		
WB	L	471	1770	0.340	0.621	4.8	A	6.9	B
	T	2129	3725	0.180	0.571	7.0	B		
	R	905	1583	0.335	0.571	7.8	B		
NB	L	355	1770	0.268	0.307	28.2	D	36.0	D
	TR	1054	5270	0.451	0.200	37.6	D		
SB	L	404	3539	0.477	0.114	44.7	E	37.2	D
	T	1277	5588	0.230	0.229	33.4	D		
	R	362	1583	0.224	0.229	33.4	D		

Intersection Delay = 21.9 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 12.0 sec Critical v/c(x) = 0.434

Streets: (E-W) Charleston Boulevard (N-S) Hualapai Way
Analyst: CDR File Name: HWPMB.HC9
Area Type: Other 3-2-99 PM Peak
Comment: 2000 Background Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	1	1	3	<	2	3	1
Volumes	47	482	132	206	350	289	128	290	173	290	287	89
Lane W (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations																
Phase Combination				1	2	3	4					5	6	7	8	
EB	Left		*			*		NB	Left		*		*			
	Thru					*			Thru				*			
	Right					*			Right				*			
	Peds					*			Peds				*			
WB	Left		*		*	*		SB	Left		*					
	Thru				*	*			Thru				*			
	Right				*	*			Right				*			
	Peds					*			Peds				*			
NB	Right							EB	Right							
SB	Right							WB	Right							
Green		15.0P	14.0P	57.0P				Green		25.0P	45.0P					
Yellow/AR		0.0	0.0	4.0				Yellow/AR		0.0	0.0					
Cycle Length: 160 secs													Phase combination order: #1 #2 #3 #5 #6			

Intersection Performance Summary									
Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:	Delay	LOS
Mvmts	Cap	Flow	Ratio	Ratio					
EB	L	435	1770	0.113	0.456	16.4	C	25.9	D
	T	1350	3725	0.394	0.363	27.0	D		
	R	574	1583	0.242	0.363	25.3	D		
WB	L	455	1770	0.477	0.544	11.1	B	16.4	C
	T	1676	3725	0.230	0.450	17.2	C		
	R	712	1583	0.427	0.450	19.2	C		
NB	L	448	1770	0.301	0.419	19.6	C	33.4	D
	TR	1385	5275	0.387	0.262	36.9	D		
SB	L	487	3539	0.645	0.138	51.2	E	42.0	E
	T	1467	5588	0.226	0.262	35.2	D		
	R	416	1583	0.226	0.262	35.2	D		

Intersection Delay = 28.6 sec/veh Intersection LOS = D

Lost Time/Cycle, L = 12.0 sec Critical v/c(x) = 0.493

=====
 Streets: (E-W) Charleston Boulevard (N-S) Hualapai Way
 Analyst: CDR File Name: HWAMP.HC9
 Area Type: Other 3-2-99 AM Peak
 Comment: 2000 Background Plus Project Traffic
 =====

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	1	1	3	<	2	3	1
Volumes	18	590	85	207	386	332	90	255	221	230	254	77
Lane W (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*		*				*	
Thru			*				*	
Right			*				*	
Peds			*					
WB Left		*	*	*		*		
Thru			*	*		*	*	
Right			*	*		*	*	
Peds			*					
NB Right								
SB Right								
Green	7.0P	18.0P	61.0P		15.0P	4.0P	27.0P	
Yellow/AR	0.0	0.0	4.0		0.0	0.0	4.0	
Cycle Length: 140 secs Phase combination order: #1 #2 #3 #5 #6 #7								

Intersection Performance Summary

Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:	Delay	LOS
Mvmts	Cap	Flow	Ratio	Ratio					
EB L	389	1770	0.049	0.493	11.7	B		16.6	C
T	1650	3725	0.395	0.443	17.0	C			
R	701	1583	0.127	0.443	14.8	B			
WB L	441	1770	0.494	0.621	5.6	B		7.1	B
T	2129	3725	0.200	0.571	7.1	B			
R	905	1583	0.386	0.571	8.1	B			
NB L	355	1770	0.268	0.307	28.2	D		36.9	D
TR	1040	5198	0.530	0.200	38.4	D			
SB L	404	3539	0.616	0.114	46.4	E		38.6	D
T	1277	5588	0.230	0.229	33.4	D			
R	362	1583	0.224	0.229	33.4	D			

Intersection Delay = 22.4 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 12.0 sec Critical v/c(x) = 0.519

Streets: (E-W) Charleston Boulevard

(N-S) Hualapai Way

Analyst: CDR

File Name: HWPMP.HC9

Area Type: Other

3-2-99 PM Peak

Comment: 2000 Background Plus Project Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	1	1	3	<	2	3	1
Volumes	47	549	132	310	402	372	128	290	268	366	287	89
Lane W (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*		*			*		
Thru			*			*		
Right			*			*		
Peds			*			*		
WB Left		*	*	*				
Thru			*	*			*	
Right		*	*	*			*	
Peds			*	*			*	
NB Right								
SB Right								
Green	15.0P	14.0P	57.0P		25.0P	45.0P		
Yellow/AR	0.0	0.0	4.0		0.0	0.0		
Cycle Length: 160 secs Phase combination order: #1 #2 #3 #5 #6								

Intersection Performance Summary

Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:	Delay	LOS
Mvmts	Cap	Flow	Ratio	Ratio					
EB L	399	1770	0.123	0.456	16.4	C		26.5	D
T	1350	3725	0.450	0.363	27.6	D			
R	574	1583	0.242	0.363	25.3	D			
WB L	424	1770	0.769	0.544	16.7	C	18.4		C
T	1676	3725	0.265	0.450	17.5	C			
R	712	1583	0.550	0.450	21.0	C			
NB L	448	1770	0.301	0.419	19.6	C	34.8		D
TR	1361	5186	0.475	0.262	37.9	D			
SB L	487	3539	0.816	0.138	56.5	E	45.5		E
T	1467	5588	0.226	0.262	35.2	D			
R	416	1583	0.226	0.262	35.2	D			

Intersection Delay = 30.1 sec/veh Intersection LOS = D

Lost Time/Cycle, L = 12.0 sec Critical v/c(x) = 0.608

Kimley-Horn And Associates

Streets: (E-W) Charleston Boulevard (N-S) Fort Apache/Rampart

Analyst: CDR

File Name: FAAME.HC9

Area Type: Other

3-2-99 AM Peak

Comment: 1999 Existing Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	<	1	3	<	2	3	<
Volumes	251	451	93	203	383	293	124	657	277	218	858	200
Lane W (ft)	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*	*	*				*	
Thru		*	*				*	
Right		*	*				*	
Peds								
WB Left		*	*			*		
Thru			*			*	*	
Right			*			*	*	
Peds								
NB Right								
SB Right								
Green	16.0P	25.0P	34.0P		11.0P	11.0P	35.0P	
Yellow/AR	0.0	0.0	4.0		0.0	0.0	4.0	
Cycle Length: 140 secs Phase combination order: #1 #2 #3 #5 #6 #7								

Intersection Performance Summary

Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:	Delay	LOS
Mvmts	Cap	Flow	Ratio	Ratio					
EB L	534	1770	0.494	0.543	14.5	B	16.3	C	
T	1596	3725	0.313	0.429	17.3	C			
R	678	1583	0.144	0.429	16.0	C			
WB L	333	1770	0.643	0.364	26.5	D	39.2	D	
TR	871	3483	0.858	0.250	42.8	E			
NB L	159	1770	0.824	0.336	41.6	E	38.8	D	
TR	1373	5339	0.788	0.257	38.5	D			
SB L	480	3539	0.491	0.136	43.1	E	31.7	D	
TR	1823	5429	0.672	0.336	29.5	D			

Intersection Delay = 32.3 sec/veh Intersection LOS = D

Lost Time/Cycle, L = 15.0 sec Critical v/c(x) = 0.724

Streets: (E-W) Charleston Boulevard

(N-S) Fort Apache/Rampart

Analyst: CDR

File Name: FAPME.HC9

Area Type: Other

3-2-99 PM Peak

Comment: 1999 Existing Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	<	1	3	<	2	3	<
Volumes	203	441	118	267	415	204	105	742	226	220	696	191
Lane W (ft)	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*	*			*	*		
Thru		*				*		
Right		*				*		
Peds		*				*		
WB Left	*	*			*			
Thru		*				*		
Right		*				*		
Peds		*				*		
NB Right								
SB Right								
Green	28.0P	49.0P			15.0P	60.0P		
Yellow/AR	0.0	4.0			0.0	4.0		
Cycle Length: 160 secs Phase combination order: #1 #2 #5 #6								

Intersection Performance Summary

Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:	Delay	LOS
Mvmnts	Cap	Flow	Ratio	Ratio					
EB L	351	1770	0.610	0.488	18.2	C	28.4	D	
T	1164	3725	0.418	0.313	32.4	D			
R	495	1583	0.251	0.313	30.5	D			
WB L	426	1770	0.660	0.488	17.7	C	30.2	D	
TR	1107	3541	0.619	0.313	35.4	D			
NB L	206	1770	0.539	0.475	17.3	C	26.2	D	
TR	2056	5392	0.545	0.381	27.0	D			
SB L	265	3539	0.900	0.075	73.4	F	35.3	D	
TR	2062	5408	0.498	0.381	26.4	D			

Intersection Delay = 30.2 sec/veh Intersection LOS = D

Lost Time/Cycle, L = 12.0 sec Critical v/c(x) = 0.676

Streets: (E-W) Charleston Boulevard (N-S) Fort Apache/Rampart

Analyst: CDR

File Name: FAAMB.HC9

Area Type: Other

3-2-99 AM Peak

Comment: 2000 Background Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	<	1	3	<	2	3	<
Volumes	293	523	111	233	446	337	149	756	319	251	987	236
Lane W (ft)	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination		1	2	3	4	5	6	7	8
EB	Left	*	*	*				*	
	Thru		*	*				*	
	Right		*	*				*	
	Peds								
WB	Left	*		*			*		
	Thru			*			*	*	
	Right			*			*	*	
	Peds								
NB	Right								
SB	Right								
Green		16.0P	25.0P	34.0P		Green	11.0P	11.0P	35.0P
Yellow/AR		0.0	0.0	4.0		Yellow/AR	0.0	0.0	4.0
Cycle Length: 140 secs Phase combination order: #1 #2 #3 #5 #6 #7									

Intersection Performance Summary

Summary									
	Lane	Group:	Adj Sat	v/c	g/C			Approach:	
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
	-----	-----	-----	-----	-----	-----	---	-----	---
EB	L	534	1770	0.577	0.543	16.8	C	17.3	C
	T	1596	3725	0.363	0.429	17.8	C		
	R	678	1583	0.172	0.429	16.2	C		
WB	L	310	1770	0.790	0.364	31.9	D	52.7	E
	TR	871	3485	0.993	0.250	58.6	E		
NB	L	159	1770	0.987	0.336	73.8	F	46.8	E
	TR	1373	5339	0.907	0.257	43.4	E		
SB	L	480	3539	0.566	0.136	43.9	E	33.5	D
	TR	1822	5427	0.777	0.336	31.6	D		

Intersection Delay = 38.1 sec/veh Intersection LOS = D

Lost Time/Cycle, L = 12.0 sec Critical v/c(x) = 0.842

Streets: (E-W) Charleston Boulevard (N-S) Fort Apache/Rampart
Analyst: CDR File Name: FAPMB.HC9
Area Type: Other 3-2-99 PM Peak
Comment: 2000 Background Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	<	1	3	<	2	3	<
Volumes	245	520	148	307	490	235	133	853	260	253	800	232
Lane W (ft)	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations												
Phase Combination		1	2	3	4	5	6	7	8			
EB	Left	*	*			NB	Left	*	*			
	Thru		*				Thru		*			
	Right		*				Right		*			
	Peds		*				Peds		*			
WB	Left	*	*			SB	Left	*				
	Thru		*				Thru		*			
	Right		*				Right		*			
	Peds		*				Peds		*			
NB	Right					EB	Right					
SB	Right					WB	Right					
Green		28.0P	49.0P			Green	15.0P	60.0P				
Yellow/AR		0.0	4.0			Yellow/AR	0.0	4.0				
Cycle Length: 160 secs Phase combination order: #1 #2 #5 #6												

Intersection Performance Summary									
Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:	Delay	LOS
Mvmts	Cap	Flow	Ratio	Ratio					
EB	L	323	1770	0.799	0.488	34.5	D	33.3	D
	T	1164	3725	0.493	0.313	33.4	D		
	R	495	1583	0.315	0.313	31.2	D		
WB	L	392	1770	0.824	0.488	24.2	C	33.7	D
	TR	1108	3545	0.723	0.313	37.5	D		
NB	L	189	1770	0.741	0.475	25.1	D	28.0	D
	TR	2056	5392	0.627	0.381	28.3	D		
SB	L	265	3539	1.032	0.075	102.5	F	41.5	E
	TR	2059	5400	0.580	0.381	27.6	D		

Intersection Delay = 34.3 sec/veh Intersection LOS = D
Lost Time/Cycle, L = 12.0 sec Critical v/c(x) = 0.756

Kimley-Horn And Associates

Streets: (E-W) Charleston Boulevard (N-S) Fort Apache/Rampart

Analyst: CDR

File Name: FAAMP.HC9

Area Type: Other

3-2-99 AM Peak

Comment: 2000 Background Plus Project Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	<	1	3	<	2	3	<
Volumes	302	532	120	233	457	337	160	756	319	251	987	247
Lane W (ft)	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*	*	*				*	
Thru		*	*				*	
Right		*	*				*	
Peds								
WB Left		*	*			*		
Thru			*			*	*	
Right			*			*	*	
Peds								
NB Right								
SB Right								
Green	16.0P	25.0P	34.0P		12.0P	11.0P	34.0P	
Yellow/AR	0.0	0.0	4.0		0.0	0.0	4.0	
Cycle Length: 140 secs Phase combination order: #1 #2 #3 #5 #6 #7								

Intersection Performance Summary

Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:	Delay	LOS
Mvmnts	Cap	Flow	Ratio	Ratio					
EB L	534	1770	0.596	0.543	17.3	C		17.5	C
T	1596	3725	0.368	0.429	17.8	C			
R	678	1583	0.186	0.429	16.3	C			
WB L	308	1770	0.795	0.364	32.2	D		55.3	E
TR	872	3488	1.007	0.250	61.8	F			
NB L	172	1770	0.977	0.336	68.9	F		48.7	E
TR	1335	5339	0.933	0.250	46.0	E			
SB L	506	3539	0.538	0.143	43.0	E		34.5	D
TR	1781	5420	0.802	0.329	32.8	D			

Intersection Delay = 39.4 sec/veh Intersection LOS = D

Lost Time/Cycle, L = 12.0 sec Critical v/c(x) = 0.833

Streets: (E-W) Charleston Boulevard (N-S) Fort Apache/Rampart

Analyst: CDR File Name: FAPMP.HC9

Area Type: Other 3-2-99 PM Peak

Comment: 2000 Background Plus Project Traffic

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	<	1	3	<	2	3	<
Volumes	252	537	165	307	506	235	149	853	260	253	800	248
Lane W (ft)	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*	*			*	*		
Thru		*				*		
Right		*				*		
Peds		*				*		
WB Left		*	*		*			
Thru			*			*		
Right			*			*		
Peds			*			*		
NB Right								
SB Right								
Green	28.0P	49.0P			15.0P	60.0P		
Yellow/AR	0.0	4.0			0.0	4.0		
Cycle Length: 160 secs Phase combination order: #1 #2 #5 #6								

Intersection Performance Summary

Lane	Group:	Adj Sat	v/c	g/C	Delay	LOS	Approach:
Mvmts	Cap	Flow	Ratio	Ratio			Delay LOS
EB	L	323	1770	0.820	0.488	36.2	D 33.9 D
	T	1164	3725	0.509	0.313	33.6	D
	R	495	1583	0.352	0.313	31.6	D
WB	L	386	1770	0.837	0.488	25.3	D 34.3 D
	TR	1109	3549	0.738	0.313	37.9	D
NB	L	188	1770	0.835	0.475	35.7	D 29.1 D
	TR	2056	5392	0.627	0.381	28.3	D
SB	L	265	3539	1.032	0.075	102.5	F 41.5 E
	TR	2055	5390	0.590	0.381	27.7	D

Intersection Delay = 34.8 sec/veh Intersection LOS = D

Lost Time/Cycle, L = 12.0 sec Critical v/c(x) = 0.761

=====

Kimley-Horn And Associates
 1050 East Flamingo Road Suite
 Suite S210
 Las Vegas, NV 89119-
 Ph: (702) 734-5666

=====

Streets: (N-S) West Driveway (E-W) Charleston Boulevard
 Major Street Direction.... EW
 Length of Time Analyzed... 15 (min)
 Analyst..... CDR
 Date of Analysis..... 3/2/99
 Other Information..... 2000 Background Plus Project Traffic AM
 Peak

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	< 0	1	2	0	1	0	1	0	0	0
Stop/Yield			N			N						
Volumes		960	81	35	835		90		26			
PHF		.95	.95	.95	.95		.95		.95			
Grade		0			0			0				
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10			1.10		1.10			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

SB

548

731

731

0.96

EB

1096

442

442

0.91

SB

1970

58

Major LT, Minor TH

0.91

0.91

Capacity Adjustment Factor

0.91

53

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB	L	105	53		619.3	8.3	F	481.6
NB	R	30	731		5.1	0.0	B	
WB	L	41	442		9.0	0.2	B	0.4

Intersection Delay = 27.7 sec/veh

=====

Kimley-Horn And Associates
 1050 East Flamingo Road Suite
 Suite S210
 Las Vegas, NV 89119-
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=====

Streets: (N-S) West Driveway (E-W) Charleston Boulevard
 Major Street Direction.... EW
 Length of Time Analyzed... 15 (min)
 Analyst..... CDR
 Date of Analysis..... 3/2/99
 Other Information..... 2000 Background Plus Project Traffic PM
 Peak

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	< 0	1	2	0	1	0	1	0	0	0
Stop/Yield			N			N						
Volumes		1057	126	55	912		172		55			
PHF		.95	.95	.95	.95		.95		.95			
Grade		0			0			0				
MC's (%)												
BU/RV's (%)												
CV's (%)												
PCE's				1.10			1.10		1.10			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street			NB	SB
Conflicting Flows: (vph)			623	
Potential Capacity: (pcph)			669	
Movement Capacity: (pcph)			669	
Prob. of Queue-Free State:			0.90	
Step 2: LT from Major Street			WB	EB
Conflicting Flows: (vph)			1246	
Potential Capacity: (pcph)			367	
Movement Capacity: (pcph)			367	
Prob. of Queue-Free State:			0.83	
Step 4: LT from Minor Street			NB	SB
Conflicting Flows: (vph)			2198	
Potential Capacity: (pcph)			42	
Major LT, Minor TH				
Impedance Factor:			0.83	
Adjusted Impedance Factor:			0.83	
Capacity Adjustment Factor				
due to Impeding Movements			0.83	
Movement Capacity: (pcph)			35	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB	L	199	35		*	21.1	F	*
NB	R	64	669		5.9	0.3	B	
WB	L	64	367		11.9	0.6	C	0.7

Intersection Delay = 169.0 sec/veh

* The calculated value was greater than 999.9.

=====
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 Ph: (702) 734-5666
 =====

Streets: (N-S) West Middle Driveway (E-W) Charleston Boulevard
 Major Street Direction.... EW
 Length of Time Analyzed... 15 (min)
 Analyst..... CDR
 Date of Analysis..... 3/2/99
 Other Information..... 2000 Background Plus Project Traffic AM
 Peak

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	< 0	0	2	0	0	0	1	0	0	0
Stop/Yield			N			N						
Volumes		945	41		870				16			
PHF		.95	.95		.95				.95			
Grade		0			0			0				
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's									1.10			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	519	
Potential Capacity: (pcph)	756	
Movement Capacity: (pcph)	756	
Prob. of Queue-Free State:	0.97	

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB R	19	756		4.9	0.0	A	4.9

Intersection Delay = 0.0 sec/veh

=====

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 Analyst..... CDR
 Date of Analysis..... 3/2/99
 Other Information..... 2000 Background Plus Project Traffic PM
 Peak

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	< 0	0	2	0	0	0	1	0	0	0
Stop/Yield			N			N						
Volumes		1049	63		967				33			
PHF		.95	.95		.95				.95			
Grade		0			0			0				
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's									1.10			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

```

-----
Step 1: RT from Minor Street          NB          SB
-----
Conflicting Flows: (vph)              585
Potential Capacity: (pcph)            700
Movement Capacity: (pcph)             700
Prob. of Queue-Free State:            0.94
-----
  
```

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB R	39	700		5.4	0.0	B	5.4

Intersection Delay = 0.1 sec/veh

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 Length of Time Analyzed... 15 (min)
 Analyst..... CDR
 Date of Analysis..... 3/2/99
 Other Information..... 2000 Background Plus Project Traffic AM
 Peak

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	< 0	1	2	0	1	> 0	< 0	0	0	0
Stop/Yield			N			N						
Volumes		878	83	58	785		85		35			
PHF		.95	.95	.95	.95		.95		.95			
Grade		0			0			0				
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10			1.10		1.10			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street NB SB

Conflicting Flows: (vph) 506

Potential Capacity: (pcph) 767

Movement Capacity: (pcph) 767

Prob. of Queue-Free State: 0.95

Step 2: LT from Major Street WB EB

Conflicting Flows: (vph) 1011

Potential Capacity: (pcph) 491

Movement Capacity: (pcph) 491

Prob. of Queue-Free State: 0.86

Step 4: LT from Minor Street NB SB

Conflicting Flows: (vph) 1854

Potential Capacity: (pcph) 69

Major LT, Minor TH

Impedance Factor: 0.86

Adjusted Impedance Factor: 0.86

Capacity Adjustment Factor

due to Impeding Movements 0.86

Movement Capacity: (pcph) 60

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB L	98	60 >					
NB R	41	767 >	82	441.0	9.6	F	441.0
WB L	67	491		8.5	0.5	B	0.6

Intersection Delay = 27.8 sec/veh

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 Length of Time Analyzed... 15 (min)
 Analyst..... CDR
 Date of Analysis..... 3/2/99
 Other Information..... 2000 Background Plus Project Traffic PM
 Peak

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	< 0	1	2	0	1	> 0	< 0	0	0	0
Stop/Yield			N			N						
Volumes		958	124	96	799		168		69			
PHF		.95	.95	.95	.95		.95		.95			
Grade		0			0			0				
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10			1.10		1.10			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street NB SB

Conflicting Flows: (vph) 570
 Potential Capacity: (pcph) 712
 Movement Capacity: (pcph) 712
 Prob. of Queue-Free State: 0.89

Step 2: LT from Major Street WB EB

Conflicting Flows: (vph) 1139
 Potential Capacity: (pcph) 419
 Movement Capacity: (pcph) 419
 Prob. of Queue-Free State: 0.74

Step 4: LT from Minor Street NB SB

Conflicting Flows: (vph) 2016
 Potential Capacity: (pcph) 54
 Major LT, Minor TH
 Impedance Factor: 0.74
 Adjusted Impedance Factor: 0.74
 Capacity Adjustment Factor
 due to Impeding Movements 0.74
 Movement Capacity: (pcph) 40

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB L	195	40 >					
NB R	80	712 >	55	*	28.2	F	*
WB L	111	419		11.7	1.1	C	1.3

Intersection Delay = 208.6 sec/veh.

* The calculated value was greater than 999.9.

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 Analyst..... CDR
 Date of Analysis..... 3/2/99
 Other Information..... 2000 Background Plus Project Traffic AM
 Peak

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	< 0	1	2	0	1	> 0	< 0	0	0	0
Stop/Yield			N			N						
Volumes		913	0	4	843		0		4			
PHF		.95	.95	.95	.95		.95		.95			
Grade		0			0			0				
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10			1.10		1.10			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street NB SB

Conflicting Flows: (vph) 480
 Potential Capacity: (pcph) 791
 Movement Capacity: (pcph) 791
 Prob. of Queue-Free State: 0.99

Step 2: LT from Major Street WB EB

Conflicting Flows: (vph) 961
 Potential Capacity: (pcph) 523
 Movement Capacity: (pcph) 523
 Prob. of Queue-Free State: 0.99

Step 4: LT from Minor Street NB SB

Conflicting Flows: (vph) 1852
 Potential Capacity: (pcph) 69
 Major LT, Minor TH
 Impedance Factor: 0.99
 Adjusted Impedance Factor: 0.99
 Capacity Adjustment Factor
 due to Impeding Movements 0.99
 Movement Capacity: (pcph) 68

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB L	0	68	>				
NB R	4	791	>	791	4.6	0.0	A 4.6
WB L	4	523		6.9	0.0	B	0.0

Intersection Delay = 0.0 sec/veh

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 Other Information..... 2000 Background Plus Project Traffic PM
 Peak

Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	< 0	1	2	0	1	> 0	< 0	0	0	0
Stop/Yield			N			N						
Volumes		1027	0	7	895		0		7			
PHF		.95	.95	.95	.95		.95		.95			
Grade		0			0			0				
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10			1.10		1.10			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB

Conflicting Flows: (vph)	540	
Potential Capacity: (pcph)	737	
Movement Capacity: (pcph)	737	
Prob. of Queue-Free State:	0.99	

Step 2: LT from Major Street	WB	EB

Conflicting Flows: (vph)	1081	
Potential Capacity: (pcph)	451	
Movement Capacity: (pcph)	451	
Prob. of Queue-Free State:	0.98	

Step 4: LT from Minor Street	NB	SB

Conflicting Flows: (vph)	2030	
Potential Capacity: (pcph)	53	
Major LT, Minor TH		
Impedance Factor:	0.98	
Adjusted Impedance Factor:	0.98	
Capacity Adjustment Factor		
due to Impeding Movements	0.98	
Movement Capacity: (pcph)	52	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)

NB	L	0	52 >					
				737	4.9	0.0	A	4.9
NB	R	8	737 >					
WB	L	8	451		8.1	0.0	B	0.1

Intersection Delay = 0.0 sec/veh

APPENDIX E

LEFT TURN STORAGE ANALYSIS

STORAGE BAY LENGTH WORKSHEET

Poisson Method

Location Charleston Boulevard/Town Center Drive - North Leg

$$\text{Storage} = [(veh/\text{interval}) + z(\sqrt{veh/\text{interval}})] \times 25 \text{ ft/veh}$$

$$N = (veh/\text{interval})$$

$$N = [(V) \times (C/3600)]$$

Where:

$z=1.282$ for 90% confidence level

$z=1.645$ for 95% confidence level

Where:

V = vehicles per hour

C = cycle length in seconds

25 ft/veh = Average Length of Vehicle

$$V = \underline{\quad 299 \quad} \text{ vehicles per hour}$$

$$C = \underline{\quad 160 \quad} \text{ seconds}$$

$$z = \underline{\quad 1.645 \quad}$$

$$N = \underline{\quad 13.29 \quad}$$

$$S = \text{Desirable Storage} = \{N + (z \times [\sqrt{N}])\} \times 25 \text{ ft/veh}$$

$$S = \text{Desirable Storage} = \{ \underline{\quad 13.29 \quad} + \underline{\quad 1.645 \quad} \times [\sqrt{ \underline{\quad 13.29 \quad} }] \} \times 25$$

$$S = \text{Desirable Storage} = \underline{\quad 482 \quad} \text{ Ft}$$

$$\text{or } SL = \text{Desirable Storage Per Lane} = S/L$$

Where:

$$L = \text{Number of Lanes} = \underline{\quad 1 \quad}$$

$$SL = \text{Desirable Storage Per Lane} = \underline{\quad 482 \quad} \text{ Ft}$$

$$\text{Existing or Available Storage} = \underline{\quad 250 \quad} \text{ Ft.}$$

STORAGE BAY LENGTH WORKSHEET

Poisson Method

Location Charleston Boulevard/Town Center Drive - East Leg

$$\text{Storage} = [(veh/\text{interval}) + z(\text{sqrt}(veh/\text{interval}))] \times 25 \text{ ft/veh}$$

$$N = (veh/\text{interval})$$

$$N = [(V) \times (C/3600)]$$

Where:

$z=1.282$ for 90% confidence level

$z=1.645$ for 95% confidence level

Where:

V = vehicles per hour

C = cycle length in seconds

25 ft/veh = Average Length of Vehicle

$$V = \underline{\quad 37 \quad} \text{ vehicles per hour}$$

$$C = \underline{\quad 160 \quad} \text{ seconds}$$

$$z = \underline{\quad 1.645 \quad}$$

$$N = \underline{\quad 1.64 \quad}$$

$$S = \text{Desirable Storage} = \{N + (z \times [\text{sqrt } N])\} \times 25 \text{ ft/veh}$$

$$S = \text{Desirable Storage} = \{ \underline{\quad 1.64 \quad} + \underline{\quad 1.645 \quad} \times [\text{sqrt}(\underline{\quad 1.64 \quad})] \} \times 25$$

$$S = \text{Desirable Storage} = \underline{\quad 94 \quad} \text{ Ft}$$

$$\text{or } SL = \text{Desirable Storage Per Lane} = S/L$$

Where:

$$L = \text{Number of Lanes} = \underline{\quad 1 \quad}$$

$$SL = \text{Desirable Storage Per Lane} = \underline{\quad 94 \quad} \text{ Ft}$$

$$\text{Existing or Available Storage} = \underline{\quad 300 \quad} \text{ Ft.}$$

STORAGE BAY LENGTH WORKSHEET

Poisson Method

Location Charleston Boulevard/Town Center Drive - South Leg

$$\text{Storage} = [(\text{veh/interval}) + z(\text{sqrt}(\text{veh/interval}))] \times 25 \text{ ft/veh}$$

$$N = (\text{veh/interval})$$

$$N = [(V) \times (C/3600)]$$

Where:

$z=1.282$ for 90% confidence level

$z=1.645$ for 95% confidence level

Where:

V = vehicles per hour

C = cycle length in seconds

25 ft/veh = Average Length of Vehicle

$$V = \underline{\quad 10 \quad} \text{ vehicles per hour}$$

$$C = \underline{\quad 160 \quad} \text{ seconds}$$

$$z = \underline{\quad 1.645 \quad}$$

$$N = \underline{\quad 0.44 \quad}$$

$$S = \text{Desirable Storage} = \{N + (z \times [\text{sqrt } N])\} \times 25 \text{ ft/veh}$$

$$S = \text{Desirable Storage} = \{ \underline{\quad 0.44 \quad} + \underline{\quad 1.645 \quad} \times [\text{sqrt}(\underline{\quad 0.44 \quad})] \} \times 25$$

$$S = \text{Desirable Storage} = \underline{\quad 39 \quad} \text{ Ft}$$

$$\text{or SL} = \text{Desirable Storage Per Lane} = S/L$$

Where:

$$L = \text{Number of Lanes} = \underline{\quad 1 \quad}$$

$$\text{SL} = \text{Desirable Storage Per Lane} = \underline{\quad 39 \quad} \text{ Ft}$$

$$\text{Existing or Available Storage} = \underline{\quad 300 \quad} \text{ Ft}$$

STORAGE BAY LENGTH WORKSHEET

Poisson Method

Location Charleston Boulevard/Town Center Drive - West Leg

$$\text{Storage} = [(veh/\text{interval}) + z(\text{sqrt}(veh/\text{interval}))] \times 25 \text{ ft/veh}$$

$$N = (veh/\text{interval})$$

$$N = [(V) \times (C/3600)]$$

Where:

$z=1.282$ for 90% confidence level

$z=1.645$ for 95% confidence level

Where:

V = vehicles per hour

C = cycle length in seconds

25 ft/veh = Average Length of Vehicle

$$V = \underline{\quad 41 \quad} \text{ vehicles per hour}$$

$$C = \underline{\quad 140 \quad} \text{ seconds}$$

$$z = \underline{\quad 1.645 \quad}$$

$$N = \underline{\quad 1.59 \quad}$$

$$S = \text{Desirable Storage} = \{N + (z \times [\text{sqrt } N])\} \times 25 \text{ ft/veh}$$

$$S = \text{Desirable Storage} = \{ \underline{\quad 1.59 \quad} + \underline{\quad 1.645 \quad} \times [\text{sqrt}(\underline{\quad 1.59 \quad})] \} \times 25$$

$$S = \text{Desirable Storage} = \underline{\quad 92 \quad} \text{ Ft}$$

$$\text{or } SL = \text{Desirable Storage Per Lane} = S/L$$

Where:

$$L = \text{Number of Lanes} = \underline{\quad 1 \quad}$$

$$SL = \text{Desirable Storage Per Lane} = \underline{\quad 92 \quad} \text{ Ft}$$

$$\text{Existing or Available Storage} = \underline{\quad \quad \quad}$$

STORAGE BAY LENGTH WORKSHEET

Poisson Method

Location Charleston Boulevard/Hualapai Way - North Leg

$$\text{Storage} = [(veh/\text{interval}) + z(\sqrt{veh/\text{interval}})] \times 25 \text{ ft/veh}$$

$$N = (veh/\text{interval})$$

$$N = [(V) \times (C/3600)]$$

Where:

$z=1.282$ for 90% confidence level

$z=1.645$ for 95% confidence level

Where:

V = vehicles per hour

C = cycle length in seconds

25 ft/veh = Average Length of Vehicle

$$V = \frac{366}{\text{ }} \text{ vehicles per hour}$$

$$C = \frac{160}{\text{ }} \text{ seconds}$$

$$z = \frac{1.645}{\text{ }}$$

$$N = \frac{16.27}{\text{ }}$$

$$S = \text{Desirable Storage} = \{N + (z \times [\sqrt{N}])\} \times 25 \text{ ft/veh}$$

$$S = \text{Desirable Storage} = \{ \frac{16.27}{\text{ }} + \frac{1.645}{\text{ }} \times [\sqrt{ \frac{16.27}{\text{ }}}]\} \times 25$$

$$S = \text{Desirable Storage} = \frac{573}{\text{ }} \text{ Ft}$$

$$\text{or } SL = \text{Desirable Storage Per Lane} = S/L$$

Where:

$$L = \text{Number of Lanes} = \frac{2}{\text{ }}$$

$$SL = \text{Desirable Storage Per Lane} = \frac{286}{\text{ }} \text{ Ft}$$

$$\text{Existing or Available Storage} = \frac{300}{\text{ }} \text{ Ft.}$$

STORAGE BAY LENGTH WORKSHEET

Poisson Method

Location Charleston Boulevard/Hualapai Way - East Leg

$$\text{Storage} = [(veh/\text{interval}) + z(\sqrt{veh/\text{interval}})] \times 25 \text{ ft/veh}$$

$$N = (veh/\text{interval})$$

$$N = [(V) \times (C/3600)]$$

Where:

$z=1.282$ for 90% confidence level

$z=1.645$ for 95% confidence level

Where:

V = vehicles per hour

C = cycle length in seconds

25 ft/veh = Average Length of Vehicle

$$V = \underline{\quad 310 \quad} \text{ vehicles per hour}$$

$$C = \underline{\quad 160 \quad} \text{ seconds}$$

$$z = \underline{\quad 1.645 \quad}$$

$$N = \underline{\quad 13.78 \quad}$$

$$S = \text{Desirable Storage} = \{N + (z \times [\sqrt{N}])\} \times 25 \text{ ft/veh}$$

$$S = \text{Desirable Storage} = \{ \underline{\quad 13.78 \quad} + \underline{\quad 1.645 \quad} \times [\sqrt{ \underline{\quad 13.78 \quad} }] \} \times 25$$

$$S = \text{Desirable Storage} = \underline{\quad 497 \quad} \text{ Ft}$$

$$\text{or } SL = \text{Desirable Storage Per Lane} = S/L$$

Where:

$$L = \text{Number of Lanes} = \underline{\quad 1 \quad}$$

$$SL = \text{Desirable Storage Per Lane} = \underline{\quad 497 \quad} \text{ Ft}$$

$$\text{Existing or Available Storage} = \underline{\quad 225 \quad} \text{ Ft.}$$

STORAGE BAY LENGTH WORKSHEET

Poisson Method

Location Charleston Boulevard/Hualapai Way - South Leg

$$\text{Storage} = [(\text{veh/interval}) + z(\text{sqrt}(\text{veh/interval}))] \times 25 \text{ ft/veh}$$

$$N = (\text{veh/interval})$$

$$N = [(V) \times (C/3600)]$$

Where:

$z=1.282$ for 90% confidence level

$z=1.645$ for 95% confidence level

Where:

V = vehicles per hour

C = cycle length in seconds

25 ft/veh = Average Length of Vehicle

$$V = \underline{\quad 128 \quad} \text{ vehicles per hour}$$

$$C = \underline{\quad 160 \quad} \text{ seconds}$$

$$z = \underline{\quad 1.645 \quad}$$

$$N = \underline{\quad 5.69 \quad}$$

$$S = \text{Desirable Storage} = \{N + (z \times [\text{sqrt } N])\} \times 25 \text{ ft/veh}$$

$$S = \text{Desirable Storage} = \{ \underline{\quad 5.69 \quad} + \underline{\quad 1.645 \quad} \times [\text{sqrt}(\underline{\quad 5.69 \quad})] \} \times 25$$

$$S = \text{Desirable Storage} = \underline{\quad 240 \quad} \text{ Ft}$$

$$\text{or } SL = \text{Desirable Storage Per Lane} = S/L$$

Where:

$$L = \text{Number of Lanes} = \underline{\quad 1 \quad}$$

$$SL = \text{Desirable Storage Per Lane} = \underline{\quad 240 \quad} \text{ Ft}$$

$$\text{Existing or Available Storage} = \underline{\text{Continuous Left}}$$

STORAGE BAY LENGTH WORKSHEET

Poisson Method

Location Charleston Boulevard/Hualapai Way - West Leg

$$\text{Storage} = [(veh/\text{interval}) + z(\sqrt{veh/\text{interval}})] \times 25 \text{ ft/veh}$$

$$N = (veh/\text{interval})$$

$$N = [(V) \times (C/3600)]$$

Where:

$z=1.282$ for 90% confidence level

$z=1.645$ for 95% confidence level

Where:

V = vehicles per hour

C = cycle length in seconds

25 ft/veh = Average Length of Vehicle

$$V = \underline{\quad 47 \quad} \text{ vehicles per hour}$$

$$C = \underline{\quad 160 \quad} \text{ seconds}$$

$$z = \underline{\quad 1.645 \quad}$$

$$N = \underline{\quad 2.09 \quad}$$

$$S = \text{Desirable Storage} = \{N + (z \times [\sqrt{N}])\} \times 25 \text{ ft/veh}$$

$$S = \text{Desirable Storage} = \{ \underline{\quad 2.09 \quad} + \underline{\quad 1.645 \quad} \times [\sqrt{ \underline{\quad 2.09 \quad} }] \} \times 25$$

$$S = \text{Desirable Storage} = \underline{\quad 112 \quad} \text{ Ft}$$

$$\text{or } SL = \text{Desirable Storage Per Lane} = S/L$$

Where:

$$L = \text{Number of Lanes} = \underline{\quad 1 \quad}$$

$$SL = \text{Desirable Storage Per Lane} = \underline{\quad 112 \quad} \text{ Ft}$$

$$\text{Existing or Available Storage} = \underline{\quad 300 \quad} \text{ Ft.}$$

STORAGE BAY LENGTH WORKSHEET

Poisson Method

Location Charleston Boulevard/Fort Apache - North Leg

$$\text{Storage} = [(veh/\text{interval}) + z(\sqrt{veh/\text{interval}})] \times 25 \text{ ft/veh}$$

$$N = (veh/\text{interval})$$

$$N = [(V) \times (C/3600)]$$

Where:

$z=1.282$ for 90% confidence level

$z=1.645$ for 95% confidence level

Where:

V = vehicles per hour

C = cycle length in seconds

25 ft/veh = Average Length of Vehicle

$$V = \frac{253}{1} \text{ vehicles per hour}$$

$$C = \frac{160}{1} \text{ seconds}$$

$$z = \frac{1.645}{1}$$

$$N = \frac{11.24}{1}$$

$$S = \text{Desirable Storage} = \{N + (z \times [\sqrt{N}])\} \times 25 \text{ ft/veh}$$

$$S = \text{Desirable Storage} = \{ \underline{11.24} + \underline{1.645} \times [\sqrt{ \underline{11.24} }] \} \times 25$$

$$S = \text{Desirable Storage} = \underline{419} \text{ Ft}$$

$$\text{or } SL = \text{Desirable Storage Per Lane} = S/L$$

Where:

$$L = \text{Number of Lanes} = \underline{2}$$

$$SL = \text{Desirable Storage Per Lane} = \underline{210} \text{ Ft}$$

$$\text{Existing or Available Storage} = \underline{175} \text{ Ft.}$$

STORAGE BAY LENGTH WORKSHEET

Poisson Method

Location Charleston Boulevard/Fort Apache - East Leg

$$\text{Storage} = [(veh/\text{interval}) + z(\text{sqrt}(veh/\text{interval}))] \times 25 \text{ ft/veh}$$

$$N = (veh/\text{interval})$$

$$N = [(V) \times (C/3600)]$$

Where:

$z=1.282$ for 90% confidence level

$z=1.645$ for 95% confidence level

Where:

V = vehicles per hour

C = cycle length in seconds

25 ft/veh = Average Length of Vehicle

$$V = \underline{\quad 307 \quad} \text{ vehicles per hour}$$

$$C = \underline{\quad 160 \quad} \text{ seconds}$$

$$z = \underline{\quad 1.645 \quad}$$

$$N = \underline{\quad 13.64 \quad}$$

$$S = \text{Desirable Storage} = \{N + (z \times [\text{sqrt } N])\} \times 25 \text{ ft/veh}$$

$$S = \text{Desirable Storage} = \{ \underline{\quad 13.64 \quad} + \underline{\quad 1.645 \quad} \times [\text{sqrt}(\underline{\quad 13.64 \quad})] \} \times 25$$

$$S = \text{Desirable Storage} = \underline{\quad 493 \quad} \text{ Ft}$$

$$\text{or } SL = \text{Desirable Storage Per Lane} = S/L$$

Where:

$$L = \text{Number of Lanes} = \underline{\quad 1 \quad}$$

$$SL = \text{Desirable Storage Per Lane} = \underline{\quad 493 \quad} \text{ Ft}$$

$$\text{Existing or Available Storage} = \underline{\quad 175 \quad} \text{ Ft.}$$

STORAGE BAY LENGTH WORKSHEET

Poisson Method

Location Charleston Boulevard/Fort Apache - South Leg

$$\text{Storage} = [(veh/\text{interval}) + z(\sqrt{veh/\text{interval}})] \times 25 \text{ ft/veh}$$

$$N = (veh/\text{interval})$$

$$N = [(V) \times (C/3600)]$$

Where:

$z=1.282$ for 90% confidence level

$z=1.645$ for 95% confidence level

Where:

V = vehicles per hour

C = cycle length in seconds

25 ft/veh = Average Length of Vehicle

$$V = \underline{\quad 149 \quad} \text{ vehicles per hour}$$

$$C = \underline{\quad 160 \quad} \text{ seconds}$$

$$z = \underline{\quad 1.645 \quad}$$

$$N = \underline{\quad 6.62 \quad}$$

$$S = \text{Desirable Storage} = \{N + (z \times [\sqrt{N}])\} \times 25 \text{ ft/veh}$$

$$S = \text{Desirable Storage} = \{ \underline{\quad 6.62 \quad} + \underline{\quad 1.645 \quad} \times [\sqrt{ \underline{\quad 6.62 \quad} }] \} \times 25$$

$$S = \text{Desirable Storage} = \underline{\quad 271 \quad} \text{ Ft}$$

$$\text{or } SL = \text{Desirable Storage Per Lane} = S/L$$

Where:

$$L = \text{Number of Lanes} = \underline{\quad 1 \quad}$$

$$SL = \text{Desirable Storage Per Lane} = \underline{\quad 271 \quad} \text{ Ft}$$

$$\text{Existing or Available Storage} = \underline{\text{Continuous Left}}$$

STORAGE BAY LENGTH WORKSHEET

Poisson Method

Location Charleston Boulevard/Fort Apache - West Leg

$$\text{Storage} = [(\text{veh}/\text{interval}) + z(\text{sqrt}(\text{veh}/\text{interval}))] \times 25 \text{ ft/veh}$$

$$N = (\text{veh}/\text{interval})$$

$$N = [(V) \times (C/3600)]$$

Where:

$z=1.282$ for 90% confidence level

$z=1.645$ for 95% confidence level

Where:

V = vehicles per hour

C = cycle length in seconds

25 ft/veh = Average Length of Vehicle

$$V = \underline{\quad 149 \quad} \text{ vehicles per hour}$$

$$C = \underline{\quad 160 \quad} \text{ seconds}$$

$$z = \underline{\quad 1.645 \quad}$$

$$N = \underline{\quad 6.62 \quad}$$

$$S = \text{Desirable Storage} = \{N + (z \times [\text{sqrt } N])\} \times 25 \text{ ft/veh}$$

$$S = \text{Desirable Storage} = \{ \underline{\quad 6.62 \quad} + \underline{\quad 1.645 \quad} \times [\text{sqrt}(\underline{\quad 6.62 \quad})] \} \times 25$$

$$S = \text{Desirable Storage} = \underline{\quad 271 \quad} \text{ Ft}$$

$$\text{or } SL = \text{Desirable Storage Per Lane} = S/L$$

Where:

$$L = \text{Number of Lanes} = \underline{\quad 1 \quad}$$

$$SL = \text{Desirable Storage Per Lane} = \underline{\quad 271 \quad} \text{ Ft}$$

$$\text{Existing or Available Storage} = \underline{\text{Continuous Left}}$$

UNSIGNALIZED LEFT-TURN BAY STORAGE LENGTH

Location: Charleston Boulevard Westbound Left into West Driveway

Equation = $[(\text{number of vehicles}/60 \text{ minutes}) * 3 \text{ minutes}] * 25 \text{ feet per vehicle}$

N= Number of vehicles

N= 55 Vehicles Per Hour

Storage Length = $(55 / 60) * 3 * 25$

Storage Length = 69 Feet

Existing Length= 125 Feet

UNSIGNALIZED LEFT-TURN BAY STORAGE LENGTH

Location: Charleston Boulevard Westbound Left into East Middle Driveway

Equation = $[(\text{number of vehicles}/60 \text{ minutes}) * 3 \text{ minutes}] * 25 \text{ feet per vehicle}$

N= Number of vehicles

N= 96 Vehicles Per Hour

Storage Length = $(96 / 60) * 3 * 25$

Storage Length = 120 Feet

Existing Length= 125 Feet

UNSIGNALIZED LEFT-TURN BAY STORAGE LENGTH

Location: Charleston Boulevard Westbound Left into East Driveway

Equation = $[(\text{number of vehicles}/60 \text{ minutes}) * 3 \text{ minutes}] * 25 \text{ feet per vehicle}$

N= Number of vehicles

N= 7 Vehicles Per Hour

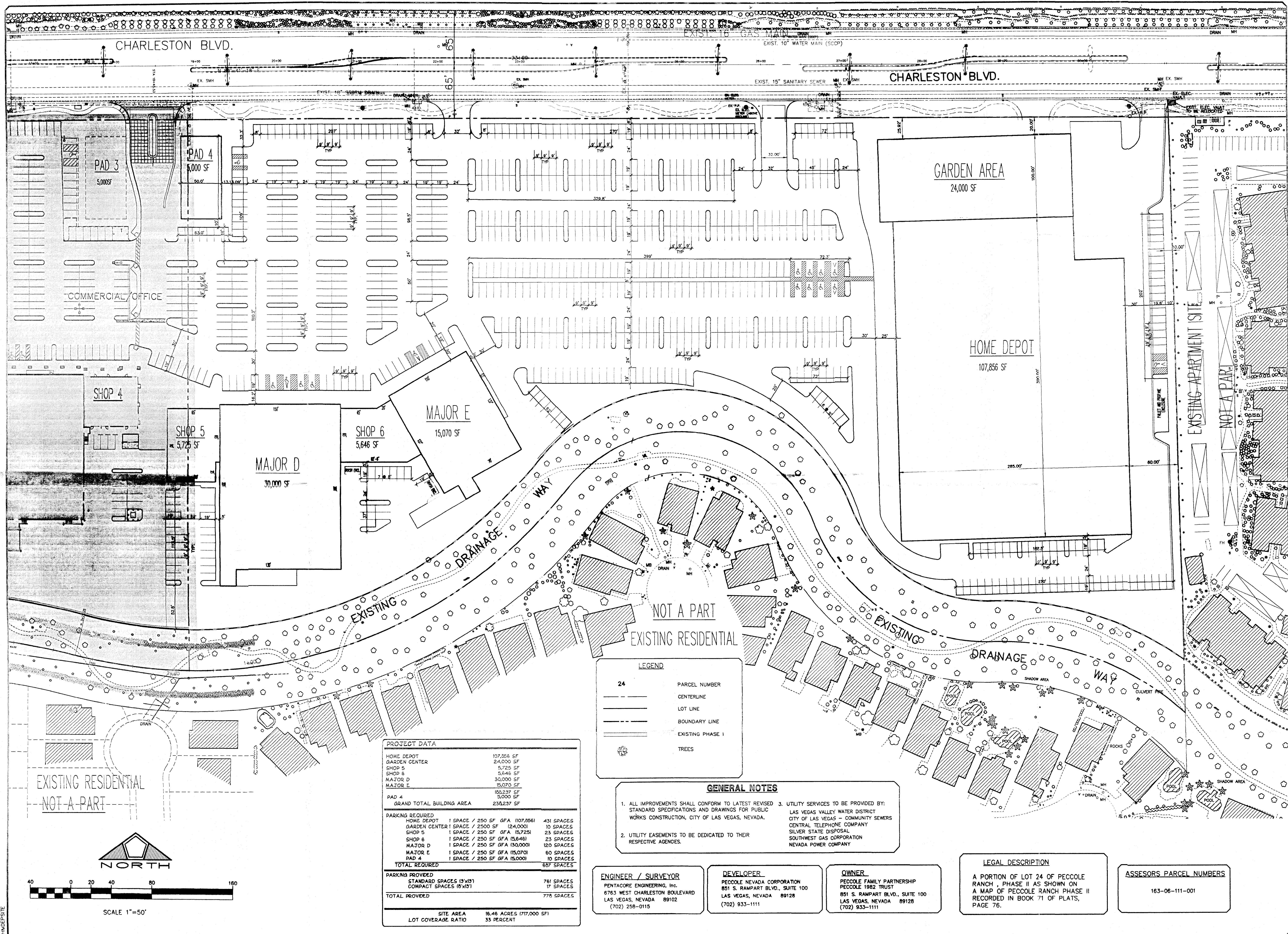
Storage Length = $(7 / 60) * 3 * 25$

Storage Length = 9 Feet

Existing Length= 125 Feet

APPENDIX F

SITE PLAN



DATE: 12/9/98
BY: CS
DRAWN BY: CS
CHECKED BY: CS
DESIGNED BY: CS
JOB NO.: 0145.0039
SCALE: 1"=50'

PECCOLE NEVADA CORP.
851 S. RAMPART BLVD., SUITE 100
LAS VEGAS, NV 89128
(702) 933-1111

PECCOLE RANCH II
HUALAPAI COMMONS - PHASE II
SITE PLAN

PECCOLE NEVADA CORP.
851 S. RAMPART BLVD., SUITE 100
LAS VEGAS, NV 89128
(702) 933-1111

PECCOLE RANCH II
HUALAPAI COMMONS - PHASE II
SITE PLAN

DATE: 12/9/98
BY: CS
DRAWN BY: CS
CHECKED BY: CS
DESIGNED BY: CS
JOB NO.: 0145.0039
SCALE: 1"=50'

PROJECT DATA		
HOME DEPOT	107,856 SF	
GARDEN CENTER	24,000 SF	
SHOP 5	5,725 SF	
SHOP 6	5,646 SF	
MAJOR D	30,000 SF	
MAJOR E	15,070 SF	
PAD 4	5,000 SF	
GRAND TOTAL BUILDING AREA	233,237 SF	
PARKING REQUIRED		
HOME DEPOT	1 SPACE / 250 SF GFA (107,856)	431 SPACES
GARDEN CENTER	1 SPACE / 250 SF GFA (24,000)	10 SPACES
SHOP 5	1 SPACE / 250 SF GFA (5,725)	23 SPACES
SHOP 6	1 SPACE / 250 SF GFA (5,646)	23 SPACES
MAJOR D	1 SPACE / 250 SF GFA (30,000)	120 SPACES
MAJOR E	1 SPACE / 250 SF GFA (15,070)	60 SPACES
PAD 4	1 SPACE / 250 SF GFA (5,000)	10 SPACES
TOTAL REQUIRED		687 SPACES
PARKING PROVIDED		
STANDARD SPACES (12'x12')	761 SPACES	
COMPACT SPACES (8'x12')	17 SPACES	
TOTAL PROVIDED		776 SPACES
SITE AREA		
16.46 ACRES (717,000 SF)		
LOT COVERAGE RATIO	33 PERCENT	

LEGEND	
24	PARCEL NUMBER
---	CENTERLINE
---	LOT LINE
---	BOUNDARY LINE
---	EXISTING PHASE I
---	TREES

- GENERAL NOTES**
 - ALL IMPROVEMENTS SHALL CONFORM TO LATEST REVISED STANDARD SPECIFICATIONS AND DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CITY OF LAS VEGAS, NEVADA.
 - UTILITY EASEMENTS TO BE DEDICATED TO THEIR RESPECTIVE AGENCIES.
 - UTILITY SERVICES TO BE PROVIDED BY:
 - LAS VEGAS VALLEY WATER DISTRICT
 - CITY OF LAS VEGAS - COMMUNITY SEWERS
 - CENTRAL TELEPHONE COMPANY
 - SILVER STATE DISPOSAL
 - SOUTHWEST GAS CORPORATION
 - NEVADA POWER COMPANY

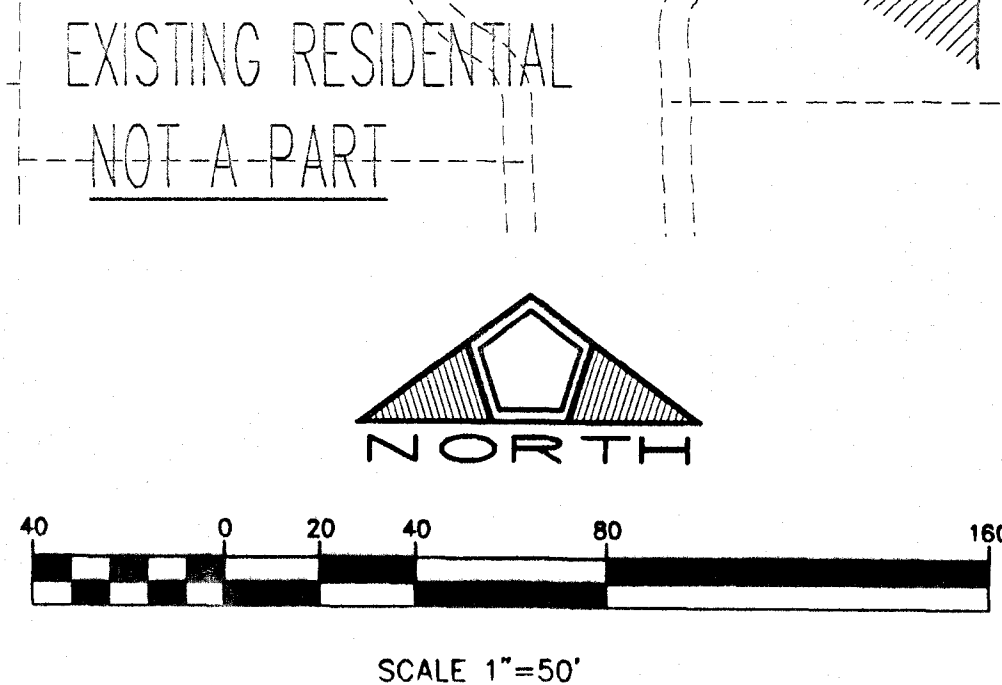
ENGINEER / SURVEYOR
PENTACORE ENGINEERING, INC.
6763 WEST CHARLESTON BOULEVARD
LAS VEGAS, NEVADA 89102
(702) 258-0115

DEVELOPER
PECCOLE NEVADA CORPORATION
851 S. RAMPART BLVD., SUITE 100
LAS VEGAS, NEVADA 89128
(702) 933-1111

OWNER
PECCOLE FAMILY PARTNERSHIP
PECCOLE 1982 TRUST
851 S. RAMPART BLVD., SUITE 100
LAS VEGAS, NEVADA 89128
(702) 933-1111

LEGAL DESCRIPTION
A PORTION OF LOT 24 OF PECCOLE RANCH, PHASE II AS SHOWN ON A MAP OF PECCOLE RANCH PHASE II RECORDED IN BOOK 71 OF PLATS, PAGE 76.

ASSESSORS PARCEL NUMBERS
163-06-111-001





Kimley-Horn
and Associates, Inc.

October 21, 1998

Suite S210
1050 East Flamingo Road
Las Vegas, Nevada
89119

Rick Schroder
Transportation Planner
City of Las Vegas
400 East Stewart Avenue
Las Vegas, Nevada 89101-2986

Re: Traffic Study – Addendum No. 1
Commercial Site: Southeast Quadrant of Charleston/Hualapai
Z – 17 – 90 (22)

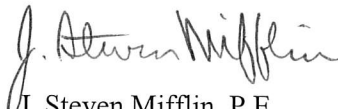
Dear Mr. Schroder:

Attached to this letter is the analysis for traffic accidents at the Charleston Boulevard/Fort Apache Road intersection. The accident history covers the period from January 1995 through December 1997.

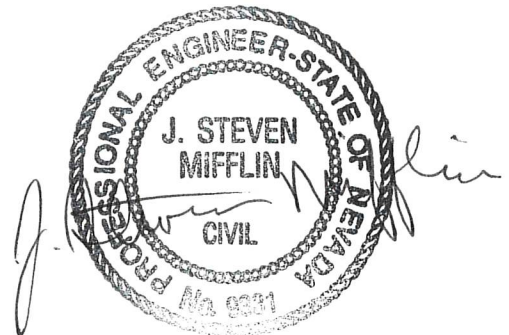
If you have any questions regarding this analysis, please call me at 734-5666.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.


J. Steven Mifflin, P.E.
Senior Vice President

JSM/il
\\ELVIS\VOL1\ADMIN\MSWORD\JSM\SCHRODR2.doc



10/21/98



Traffic Accident Analysis

Traffic accident data collected by the Nevada Department of Transportation (see attached) indicates that the Charleston/Fort Apache intersection suffers approximately one accident per month. Twenty-eight injuries were reported from the thirty-three accidents recorded at this location between January 1995 and December 1997. No fatalities were reported during this time period.

Of the eighteen accidents involving property damage only, half were caused by failure to yield, nearly one-fourth involved speeding, and one-tenth included inattentive driving as a contributing factor.

Fifteen accidents (five per year) involved injuries. Nearly all of these accidents were left-turn collisions or rear end collisions.

Dual turn lanes are expected to be construction on each approach to this intersection in the future. When this improvement is completed, protected-only traffic signal phases will be used to control left turn movements. This change in intersection operation from protected/permissive to protected-only should reduce the number of left-turn collision accidents and may reduce the number of rear-end collisions in left turn lanes.

Overall, anticipated traffic volumes will increase in the future, in part because of this project. However, construction of dual left turn lanes is expected to reduce the reduce the historical rate of accidents at this location.

This intersection has been identified by the Nevada Department of Transportation as a High Crash Location. Please call Jerry Pierretti or Jay Van Sickie with NDOT to discuss potential countermeasures for this intersection. If contact is not made with the aforementioned person(s), your crash analysis for this intersection may be considered as incomplete. They may be reached at 702-888-7333.

Prepared by the Transportation Research Center at the University of Nevada, Las Vegas with permission from the Nevada Department of Transportation.

 | THIS INFORMATION IS PROTECTED BY |
 | FEDERAL MANDATE |
 | TITLE 23 USC SECTION 409 |
CANNOT BE USED FOR LITIGATION

FORT APACHE ROAD AT CHARLESTON BOULEVARD
 JANUARY 1995 THROUGH DECEMBER 1997
 CONTRIBUTING FACTOR BY SEVERITY

Contributing Factor	Property Dmg Crashes	Injury Crashes	Fatal Crashes	Total Crashes	No. of Inj.	No. of Fat.
Failure to Yield	9	8	0	17	17	0
Failure To Reduce Speed	4	4	0	8	7	0
Inattentive Driving	2	1	0	3	1	0
D.U.I. Citation Issued	0	2	0	2	3	0
Improper Turn	1	0	0	1	0	0
Unsafe Load	1	0	0	1	0	0
Improper Lane Change	1	0	0	1	0	0
TOTALS	18	15	0	33	28	0

This intersection has been identified by the Nevada Department of Transportation as a High Crash Location. Please call Jerry Pierretti or Jay Van Sickle with NDOT to discuss potential countermeasures for this intersection. If contact is not made with the aforementioned person(s), your crash analysis for this intersection may be considered as incomplete. They may be reached at 702-888-7333.

Prepared by the Transportation Research Center at
the University of Nevada, Las Vegas with permission
from the Nevada Department of Transportation.

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|   THIS INFORMATION IS PROTECTED BY   |
|   FEDERAL MANDATE                     |
|   TITLE 23 USC SECTION 409           |
|   CANNOT BE USED FOR LITIGATION      |
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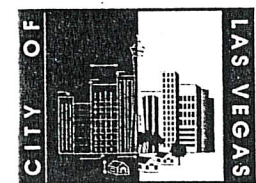
FORT APACHE ROAD AT CHARLESTON BOULEVARD
JANUARY 1995 THROUGH DECEMBER 1997
CRASH TYPE BY SEVERITY

Type of Crash	Property Dmg Crashes	Injury Crashes	Fatal Crashes	Total Crashes	No. of Inj.	No. of Fat.
Left-Turn Collision	5	8	0	13	18	0
Rear-End Collision	5	5	0	10	8	0
Angle Collision	3	2	0	5	2	0
Right-Turn Collision	2	0	0	2	0	0
SideSwipe Collision Same Dir.	2	0	0	2	0	0
NMV Object Thrown From Veh	1	0	0	1	0	0
TOTALS	18	15	0	33	28	0

Definition of Acronyms (Where applicable for Type of Crash):

AAV: Avoiding Another Vehicle
NCA: Non Collision Accident
NMV: Non Motor Vehicle
ROR: Ran Off Roadway

DEVELOPMENT
SERVICES
CENTER



Public Works Department
Land Development

731 S. Fourth Street
Las Vegas, NV 89101

Voice 702-229-6371
FAX 702-383-9767
TDD 702-386-9108

July 1, 1998

J. Steven Mifflin, P.E.
Kimley-Horn and Associates, Inc.
1050 East Flamingo Road
Las Vegas, Nevada 89119

**RE: Traffic Impact Analysis and Addendum for the Commercial Site on the
Southeast Corner of Charleston Boulevard and Hualapai Way
Z-17-90(22)**

Dear Mr. Mifflin:

The Traffic Engineering Division of the City of Las Vegas Department of Public Works has reviewed the traffic impact analysis and addendum for the commercial site, to be located on the southeast corner of Charleston Boulevard and Hualapai Way. The study has been approved, with the following conditions:

1. An additional ten feet of right-of-way will be required Hualapai Way for a right turn lane in accordance with the intent of Clark County Area Standard Drawing #201.1. Contact the Traffic Engineering Representative in Land Development for exact dimensions. This turn lane will not be required to be constructed at this time.
2. The developer will be required to contribute \$11,880 for area traffic mitigation, as required by Z-17-90(22).
3. An accident analysis must be submitted for review, as stated in your study.
4. The site will be allowed a maximum of two driveways on Charleston Boulevard and two driveways on Hualapai Way.
5. Your addendum projects a level of service of "F" for the proposed all movement driveway on Charleston Boulevard during the PM peak hour. If the City of Las Vegas finds three or more accidents in a one year period involve left turns out of the driveway in question, left turns out of the driveway will be prohibited.
6. Your addendum projects the required left turn storage into the site from Charleston Boulevard to be 160 feet, while only 105 feet exist. The developer will be required to modify the existing median on Charleston Boulevard to a minimum of 160 feet, subject to NDOT approval.

Mayor
Jan Lavery Jones

Councilmen
Arnie Adamsen
Michael J. McDonald
Gary Reese
Larry Brown

City Manager
Larry K. Barton



This analysis was also reviewed by Kent Sears, the L. Traffic Engineer for the Nevada Department Transportation (NDOT). The analysis has been accepted by NDOT, with the following comments:

1. The two driveways depicted on the site plan on Charleston Blvd. are acceptable. All driveways on Charleston must be constructed per Clark County Regional Drawing No. 222A.
2. If RTC identifies the east leg of the intersection of Hualapai and Charleston as a location for a future bus stop, a bus turnout should be constructed as part of this project.
3. An Encroachment Permit from NDOT will be required for any work performed within State right-of-way. Final review and approval of the plans will be done at that time.

These conditions of approval do not supersede or eliminate conditions of approval imposed by the Planning Commission and/or the City Council. An addendum to this traffic study is required if the development of the site occurs in a manner not in keeping with the land use assumptions contained in the report. No barriers (e.g., curbs, wall, ect.) shall be erected within the boundaries of this commercial subdivision which would prohibit any vehicle on this site from utilizing any driveway connecting this commercial development site to the abutting public streets. Please contact me at 229-2452 if you have any questions.

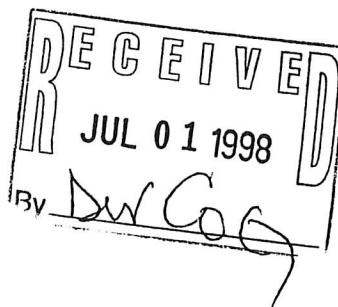
Sincerely,



Rick Schroder
Transportation Planning

RES:res

cc: O. C. White, P.E.
W. Gordon Derr, P. E.
Cheri Edelman, P.E.
Gary Phillips
Kent Sears, P. E., NDOT
Joe Peck, Pentacore
file

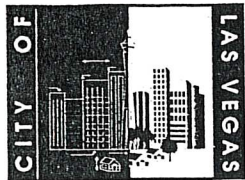


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DEVELOPMENT
SERVICES
CENTER



Public Works Department
Engineering Planning

731 S. Fourth Street
Las Vegas, NV 89101

Voice 702-229-6541
FAX 702-382-8551
TDD 702-386-9108

June 19, 1998

J. Steven Mifflin, P.E.
Kimley-Horn and Associates, Inc.
1050 East Flamingo Road
Las Vegas, Nevada 89119

RE: Traffic Impact Analysis for the Commercial Site on the Southeast Corner of
Charleston Boulevard and Hualapai Way
Z-17-90(22)

Dear Mr. Mifflin:

The Transportation Planning Section of the Engineering Planning Division of the City of Las Vegas Department of Public Works has reviewed the traffic impact analysis for the commercial site, to be located on the southeast corner of Charleston Boulevard and Hualapai Way. Before the study can be approved, the following issues must be addressed:

1. A site plan rendered on a standard scale must be provided.
2. Provide the reference from which the pass-by reduction was calculated.
3. Please provide the trip generation of the site as separate uses. If this trip generation is higher than the Shopping Center use, please use the new rate for all calculations and assignments.
4. When calculating the required left turn storage at designated intersections, calculate storage at all legs of the intersection.

This analysis was also reviewed by Kent Sears, the District Traffic Engineer for the Nevada Department of Transportation (NDOT). The analysis has been accepted by NDOT, with the following comments:

1. The two driveways depicted on the site plan on Charleston Blvd. are acceptable. All driveways on Charleston must be constructed per Clark County Regional Drawing No. 222A.
2. If RTC identifies the east leg of the intersection of Hualapai and Charleston as a location for a future bus stop, a bus turnout should be constructed as part of this project.

Mayor
Jan Lavery Jones

Councilmen
Arnie Adamsen
Michael J. McDonald
Gary Reese
Larry Brown

City Manager
Larry K. Barton



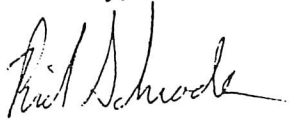
June 19, 1998

Page 2

3. An Encroachment Permit from NDOT will be required for any work performed within State right-of-way. Final review and approval of the plans will be done at that time.

Please contact me at 229-2452 if you have any questions.

Sincerely,



Rick Schroder
Transportation Planning

RES:res

cc: Charles Kajkowski, P.E.
O. C. White, P.E.
Cheri Edelman, P.E.
Kent Sears, P. E., NDOT
file