FILE COPY

TRANSPORTATION IMPACT & MITIGATION ANALYSIS FOR

Paseo de las Flores

Southeast Corner of McCormick Parkway and Hayden Road
Scottsdale, Arizona

Prepared for:

LGE Design Build
740 North 52nd Street
Phoenix, AZ 85008

Prepared by:

UCG
United Civil Group

Transportation Impact & Mitigation Analysis
For

Paseo de las Flores

Southeast Corner of McCormick Parkway and Hayden Road
Scottsdale, Arizona

January 27, 2015

UCG Project Number: TR16002

Prepared for:

LGE Design Build
740 North 52nd Street
Phoenix, AZ 85008

Prepared by:

United Civil Group

2803 N. 7th Avenue
Phoenix, Arizona 85007
602-265-6155

Registered Professional Engineer (Civil) CERTIFICATE NO. 32650 SARAH A. SIMPSON Date Signed 1-29-15 ARIZONA, U.S.A.

Conducted by _____
Sarah Simpson, PhD, PE
President

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY 3

A. Purpose of the Report 3
B. Study Objectives 3
C. Conclusions and Recommendations 5

II. PROPOSED DEVELOPMENT 7

A. Site Location 7
B. Land Use and Intensity 7
C. Phasing and Timing 7
D. Site Accessibility 7

III. STUDY AREA CONDITIONS 11

A. Study Area 11
B. Study Area Land Use 11
C. Anticipated Future Development and Planned Improvements 11
D. Observed Off-site Issues 11

IV. EXISTING ROADWAY CONDITIONS 12

A. Physical Characteristics 12
B. Intersection Traffic Volumes 13
C. Intersection Level of Service Analyses 13
C.1 HCM Capacity Analyses and Levels of Service 13
C.2 Existing Intersection Level of Service 14

V. PROJECTED TRAFFIC 18

A. Trip Generation 18
A.1. Trip Generation for the Existing Use- Daycare (R1-7) 18
A.2. Trip Generation for the Proposed Development 20
A.3. Trip Generation Comparison 21
B. Trip Distribution and Assignment 22
C. Projected Non-Site Generated Traffic 24
D. Total Traffic 24

VI. TRAFFIC AND IMPROVEMENT ANALYSIS 29

A. Site Accessibility On-Site Circulation 29
B. On-Site Circulation 30

C. Deceleration Lane Analyses 30
C.1. Right-turn Lanes 30
C.2. Left-turn Lanes 31
D. Sight Triangles 31
E. Intersection Level of Service Analyses 33
E.1 Background traffic – Year 2018 33
E.2 Total traffic – Year 2018 and 2023 34

VII. CONCLUSIONS AND RECOMMENDATIONS 36

VIII. LIMITATIONS 38

IX. SOURCES 39

LIST OF FIGURES

Figure 1: Vicinity Map 8
Figure 2: Aerial View 9
Figure 3: Site Plan 10
Figure 4: Existing Geometry – Year 2016 16
Figure 5: Existing Conditions – Year 2016 17
Figure 6: Existing Daycare – Year 2016 19
Figure 7: Site Generated Traffic and Trip Distribution 23
Figure 8: Background Traffic – Year 2018 25
Figure 9: Background Traffic – Year 2023 26
Figure 10: Total Traffic – Year 2018 27
Figure 11: Total Traffic – Year 2023 28
Figure 12: Recommendations 32

LIST OF TABLES

Table 1: Intersection Levels of Service and Delay 13
Table 2: 2016 Existing Conditions Intersection Levels of Service 15
Table 3: Trip Generation – Existing Daycare 18
Table 4: Trip Generation – Proposed Development (Weekday) 20
Table 5: Trip Generation Comparisons 21
Table 6: Trip Distribution Percentages 22
Table 7: Site Accessibility 29
Table 8: Right-Turn Deceleration Lane Warrants 31
Table 9: Background Traffic Levels of Service 33
Table 10: Total Traffic Levels of Service 34

Appendix A . . . Traffic Counts
Appendix B . . . Capacity Analyses

I. EXECUTIVE SUMMARY

A. Purpose of the Report

United Civil Group (UCG) was retained by LGE Design Build to perform this Transportation Impact & Mitigation Analysis (TIMA) for the proposed development named Paseo de las Flores located on the southeast corner of McCormick Parkway and Hayden Road in Scottsdale, Arizona.

This TIMA is a part of the application to the City of Scottsdale for a request to rezone the property from R1-7 (current) to C-1 with a minor general plan amendment from office to commercial. The Paseo de las Flores development is proposed as 27,242 square feet of mixed use commercial that will include retail, office and restaurant use with 3,709 square feet of additional patio dining. The site will include two building structures. Building A will be constructed as a one story building with approximately 6,735 square feet of retail/restaurant space and 2,600 square feet of patio dining. Building B will be constructed with two stories and include 20,507 square feet of retail, office and restaurant space with 1,109 square feet of additional patio space.

Currently, the parcel of land is developed as ChurchPlace, an approximate 14,600 square foot church, ministry school and daycare. The ChurchPlace facility will be demolished prior to construction of the Paseo de las Flores development.

UCG performed this TIMA in general accordance with the requirements within the City of Scottsdale's *Design Standards & Policies Manual*, locally accepted standards, and industry practice.

B. Study Objectives

This study is intended to investigate the existing roadway conditions and identify any potential roadway and intersection improvements necessary to serve the Paseo de las Flores development and maintain efficient and safe traffic operations on the street system in the vicinity of the site. Major study objectives of this traffic report are as follows:

- Determine the AM and PM peak hour intersection turning movement volumes at the intersections of Hayden Road/McCormick Parkway and McCormick Parkway/Via Paseo Del Sur.

- Estimate the AM and PM peak hour site generated volumes for the planned development.

- Prepare existing and projected capacity analyses for the study area intersections.

- Analyze the proposed site accesses.

- Where applicable, recommend intersection and/or roadway improvements sufficient to meet the needs of the development and surrounding roadway network due to the addition of the site generated traffic volumes.

C. Conclusions and Recommendations

United Civil Group (UCG) was retained by LGE Design Build LLC to perform this Transportation Impact & Mitigation Analysis for the Paseo de las Flores proposed development on the southeast corner of Hayden Road and McCormick Parkway in Scottsdale, Arizona.

This TIMA is a part of the application to the City of Scottsdale for a request to rezone the property from R1-7 (current) to C-1 with a minor general plan amendment from office to commercial. The Paseo de las Flores development is proposed as 27,242 square feet of mixed use commercial that will include retail, office and restaurant use with 3,709 square feet of additional patio dining. The site will include two building structures. Building A will be constructed as a one story building with approximately 6,735 square feet of retail/restaurant space and 2,600 square feet of patio dining. Building B will be constructed with two stories and include 20,507 square feet of retail, office and restaurant space with 1,109 square feet of additional patio space.

The Paseo de las Flores development is forecasted to generate 1,714 daily trips with 141 trips occurring in the morning peak hour 135 trips in the evening peak hour.

For the existing year 2016 traffic conditions, the signalized study area intersection of Hayden Road/McCormick Parkway operates at an acceptable level of service, LOS C, in the morning peak hour. However, during the evening peak hour the intersection operates an unacceptable LOS E. The existing 4-way stop intersection of McCormick Parkway/Via Paseo del Sur currently operates at an acceptable LOS B during the morning and evening peak hours.

For background traffic conditions in the horizon years of 2018 and 2023, the intersection of Hayden Road/McCormick Parkway, is forecasted to operate at an acceptable level of service, LOS C in the morning peak hour and an unacceptable LOS of E and F in the evening peak hour. The existing 4-way stop intersection of McCormick Parkway/Via Paseo del Sur is projected to continue to operate at an acceptable LOS B during the morning and evening peak hours.

For the total traffic conditions in the horizon years of 2018 and 2023, the intersection of Hayden Road/McCormick Parkway, is forecasted to operate at an acceptable level of service, LOS C in the morning peak hour and an unacceptable LOS of E and F in the evening peak hour. The existing 4-way stop intersection of McCormick Parkway/Via Paseo del Sur is projected to continue to operate at an acceptable LOS B during the morning and evening peak hours. The proposed driveways are projected to operate at an acceptable LOS of D or better during the morning and evening peak hours.

Based on City of Scottsdale criteria, a right-turn deceleration lane is warranted for implementation at Driveway A on Hayden Road for northbound traffic. No right turn deceleration lanes are warranted on Driveways B-D.

As a result of this TIMA, the following improvements are recommended:

- Install right-turn deceleration lane at Driveway A.
  - The right-turn deceleration lanes should have the minimum dimensions of: 100 foot storage, 90 foot taper.

- Based on an analysis of the illustrative/conceptual site plan of the proposed development, several recommended improvements should be considered in relation to the site accessibility and on-site circulation of the proposed development. Section VI presents these recommendations.

- Sight triangles should be provided at site access points per City of Scottsdale DS&PM Figure 5.3-26, Appendix 5-3B, and Appendix 5-3C.

II. PROPOSED DEVELOPMENT

A. Site Location

The proposed development, Paseo de las Flores, is located on the southeast corner of McCormick Parkway and Hayden Road in Scottsdale, Arizona, as shown in *Figures 1 and 2: Vicinity Map* and *Aerial View*.

B. Land Use and Intensity

Located on an approximate 2.9-acre parcel, the Paseo de las Flores development is proposed as 27,242 square feet of mixed use commercial that will include retail, office and restaurant use with 3,709 square feet of additional patio dining.

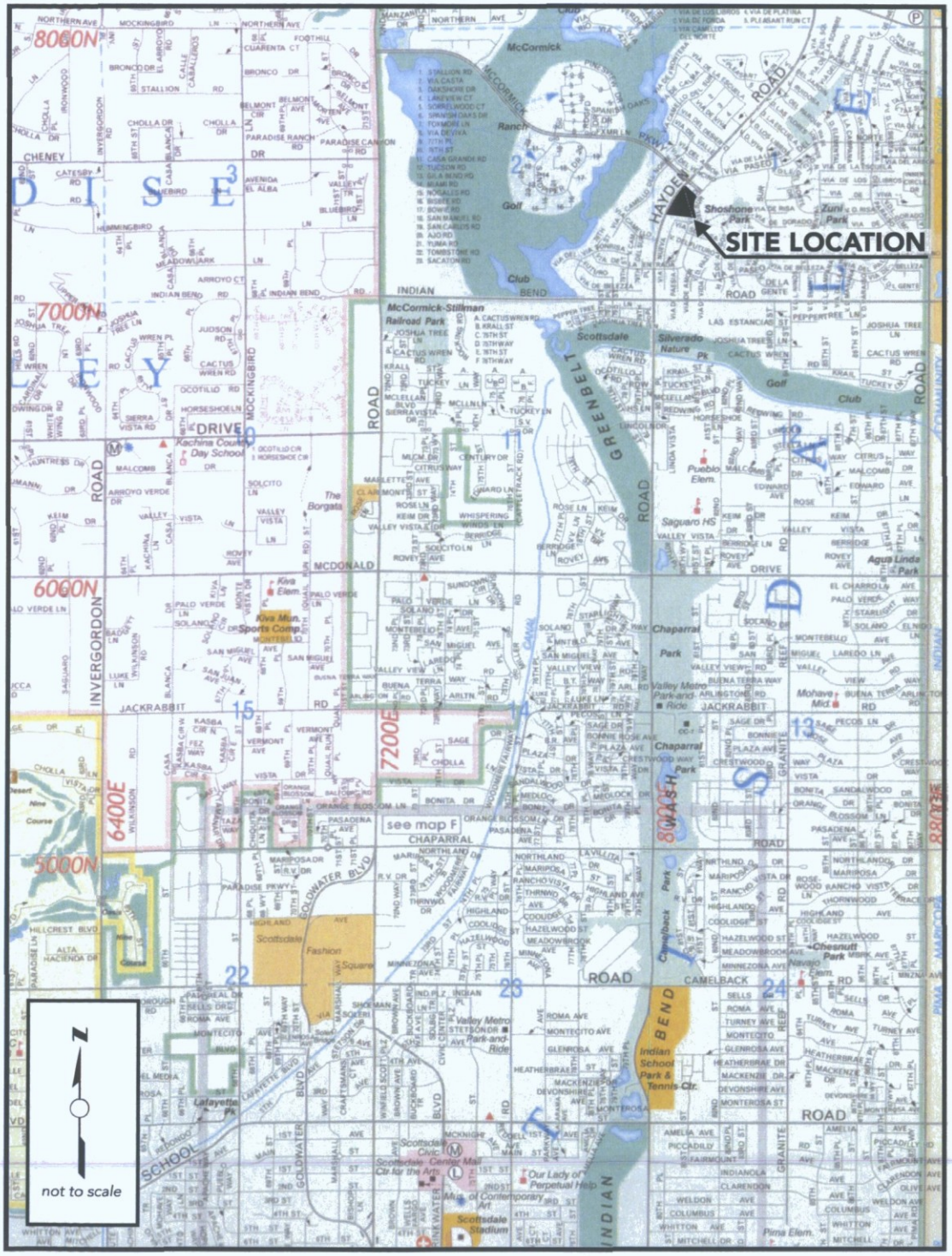
C. Phasing and Timing

The proposed development is planned to be constructed in one phase and is expected to be open and operating in 2018. Regardless if the development is constructed and operational prior to the year 2018, all recommendations remain valid and apply.

D. Site Accessibility

Four site driveways are proposed to serve the development, Driveway A, Driveway B, Driveway C and Driveway D. Driveway A is planned as right-in/right-out only and provides access to Hayden Road. Driveway B, C and D are planned as full access onto Via Paseo del Sur.

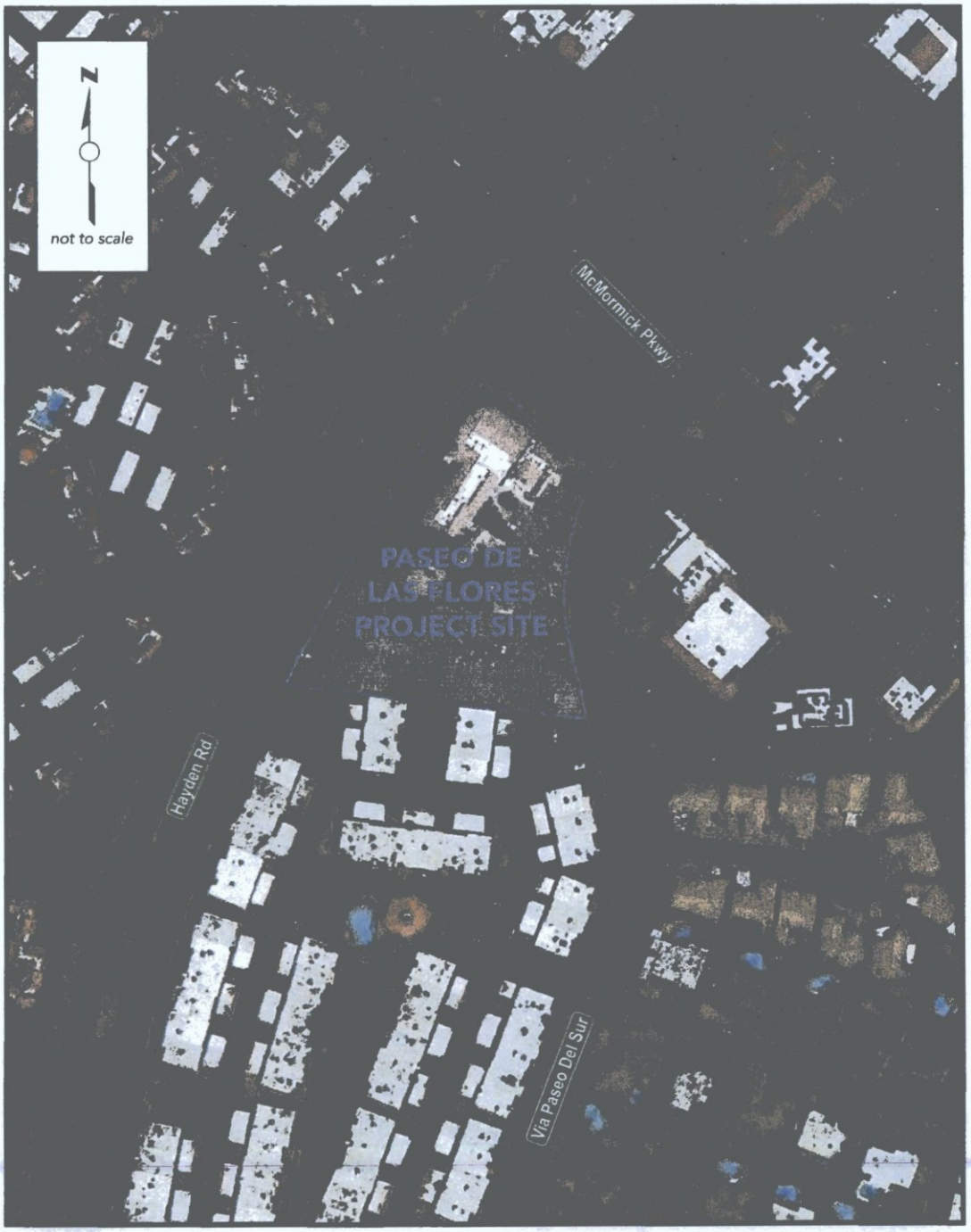
Figure 3: Site Plan conceptualizes the proposed driveways in relation to the proposed Paseo de las Flores building layout. The site driveways are analyzed in further detail in Section VI.A.



Wide World of Maps, Inc copyright notice and reproduced with permission No. 442166

Figure 1: Vicinity Map

UCG
United Civil Group



Permission for commercial use granted by Google Earth

Figure 2: Aerial View

UCG
United Civil Group

Figure 3: Site Plan

III. STUDY AREA CONDITIONS

A. Study Area

Based on TIMA guidelines within the *Design Standards & Policy Manual (DS&PM)* and per discussions with the City of Scottsdale's traffic engineer, this development will require a Category 3 study, and have a study area of:

- Hayden Road/McCormick Parkway
- McCormick Parkway/Via Paseo
- Four proposed driveways

B. Study Area Land Use

The following describes the existing land uses of the subject site and surrounding area:

SUBJECT SITE: Developed as ChurchPlace
NORTH: Developed as Chase Bank and Desert School Credit Union followed by multi-family units
SOUTH: Developed as multi-family units
EAST: Developed as commercial
WEST: Developed as multi-family units

C. Anticipated Future Development and Planned Improvements

There are no known specific planned future developments within the study area requiring inclusion in this study. Any growth or development is accounted for by utilizing an ambient annual growth rate as detailed in Section V.C.

D. Observed Off-site Issues

During the site visit and turning movement count data collection efforts at Hayden Road/McCormick Parkway, no off-site issues were noted.

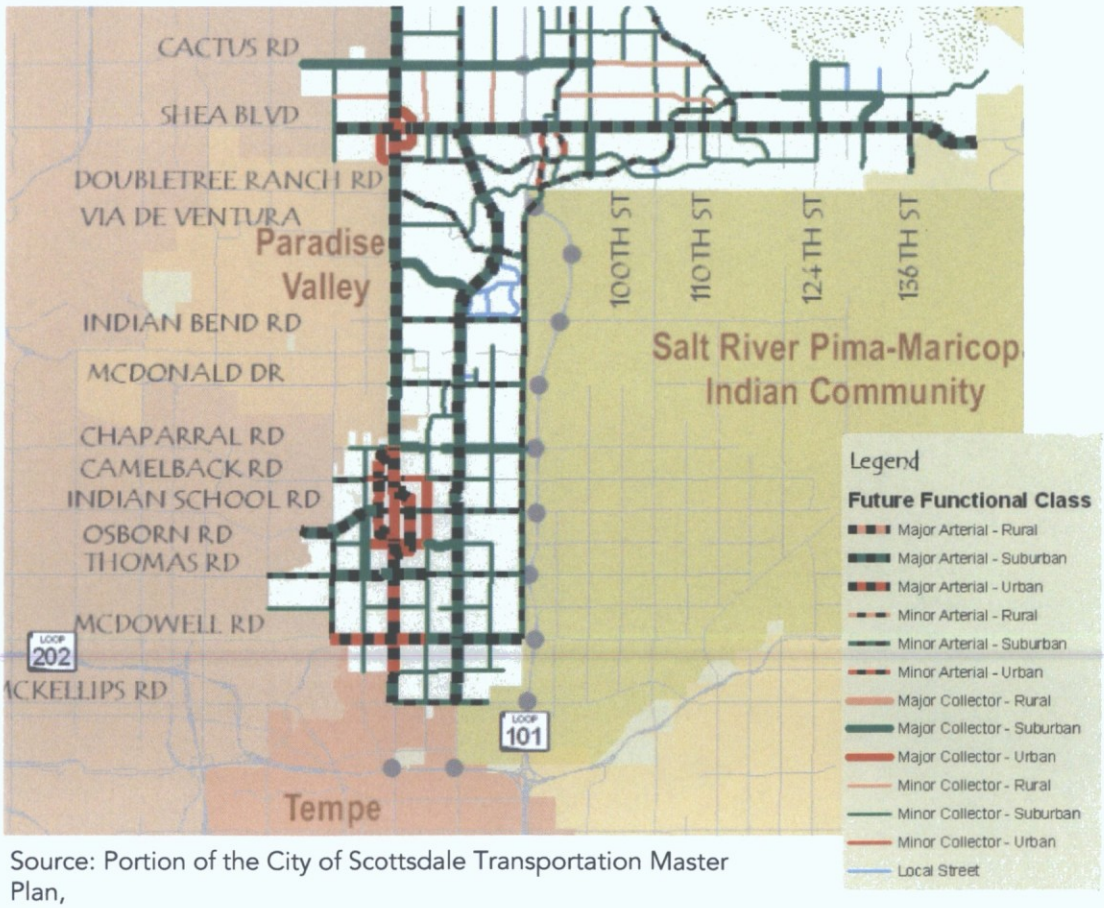
IV. EXISTING ROADWAY CONDITIONS

A. PHYSICAL CHARACTERISTICS

Hayden Road is classified by the City of Scottsdale's Transportation Master Plan as a Major Arterial - Suburban. Hayden Road is a six-lane roadway with a raised median near the proposed site. The posted speed limit adjacent to the development is 45 miles per hour.

McCormick Parkway is classified by the City of Scottsdale's Transportation Master Plan as a Major Collector - Suburban. McCormick Parkway is a four-lane roadway with a raised median west of Hayden Road. McCormick Parkway ends at the Paseo Village Commercial Village east of Hayden Road. The posted speed limit adjacent to the proposed development is 40 miles per hour.

Via Paseo del Sur is classified by the City of Scottsdale's Transportation Master Plan as a Local Road. Via Paseo del Sur is a two-lane roadway that provides local access to residents. The posted speed limit adjacent to the proposed development is 25 miles per hour.



Source: Portion of the City of Scottsdale Transportation Master Plan,

Figure 4: Existing Geometry – 2016 graphically depicts the geometry and traffic control conditions at the existing study area intersections.

B. Intersection Traffic Volumes

Existing turning movement counts were collected at the study area intersections of Hayden Road/McCormick Parkway and McCormick Parkway/Via Paseo del Sur on Tuesday, January 19, 2016, in 15-minute intervals during the morning peak hours (7:00AM – 9:00AM) and evening peak hours (4:00PM – 6:00PM). The resulting morning and evening peak hour traffic volumes at the study area intersections are presented in Figure 5. Complete traffic volume data can be found in *Appendix A: Traffic Counts*.

C. Intersection Level of Service Analyses

C.1 HCM Capacity Analyses and Levels of Service

The roadway system's ability to accommodate traffic demand is typically limited by the capacity of the intersections. Therefore, intersection capacity analysis is a principal tool used in traffic engineering to determine the adequacy of a roadway system.

The level of service (LOS) concept is used in traffic engineering to describe the degree of delay a driver can expect. The concept defines a near-capacity condition as LOS E while a free flow condition under which a driver would experience minimal delay is defined as LOS A. Most jurisdictions strive to obtain a level of service D or better. Intersections having a LOS E or LOS F may warrant improvements.

The intersections level of service was determined using the methodologies presented the Highway Capacity Manual published by the Transportation Research Board. Per the HCM 2010, the signalized and unsignalized intersection delay and associated LOS is presented in *Table 1: Intersection Levels of Service and Delay*. For unsignalized intersections, LOS is reported as the lowest LOS of any movement.

Table 1: Intersection Levels of Service and Delay

Level of Service	Signalized Delay (Sec/Veh)	Unsignalized Delay (Sec/Veh)
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

C.2 Existing Intersection Level of Service

The levels of service (LOS) and average delay at the existing study area intersections of Hayden Road/McCormick Parkway and McCormick Parkway/Via Paseo del Sur were evaluated using the 2016 intersection volumes, lane geometry, and existing traffic control as presented in Figures 4 and 5. PTV Vistro traffic modeling software, employing the methodologies as presented in the Highway Capacity Manual (HCM) 2010, was utilized for the capacity analysis to obtain the existing conditions levels of service. Summaries of the Vistro output calculations are included in *Appendix B: Capacity Analyses.*

The results of the existing levels of service analysis are presented in *Table 2: 2016 Existing Conditions Intersection Levels of Service*, and are shown on Figure 5.

TABLE 2: 2016 EXISTING CONDITIONS INTERSECTION LEVELS OF SERVICE

Intersection Location	NB AvgDel/LOS	SB AvgDel/LOS	EB AvgDel/LOS	WB AvgDel/LOS	Intersection AvgDel, LOS
Hayden Road/McCormick Parkway – Signalized					
AM Peak Hour	37.26 D	20.60 C	34.80 C	35.87 D	**32.10 C**
PM Peak Hour	26.38 C	69.20 E	68.25 E	79.17 E	**56.78 E**
McCormick Parkway/Via Paseo del Sur – 4-Way Stop					
AM Peak Hour	9.15 A	9.71 A	10.72 B	9.64 A	**10.10 B**
PM Peak Hour	9.84 A	11.39 B	12.84 B	10.37 B	**11.79 B**

The existing signalized study area intersection of Hayden Road/McCormick Parkway currently operates at an acceptable level of service during the morning peak hour, LOS C. However, during the evening, the intersection currently operates at an LOS E.

The existing 4-way stop study area intersection of McCormick Parkway/Via Paseo del Sur currently operates at an acceptable LOS B during the morning and evening peak hours.

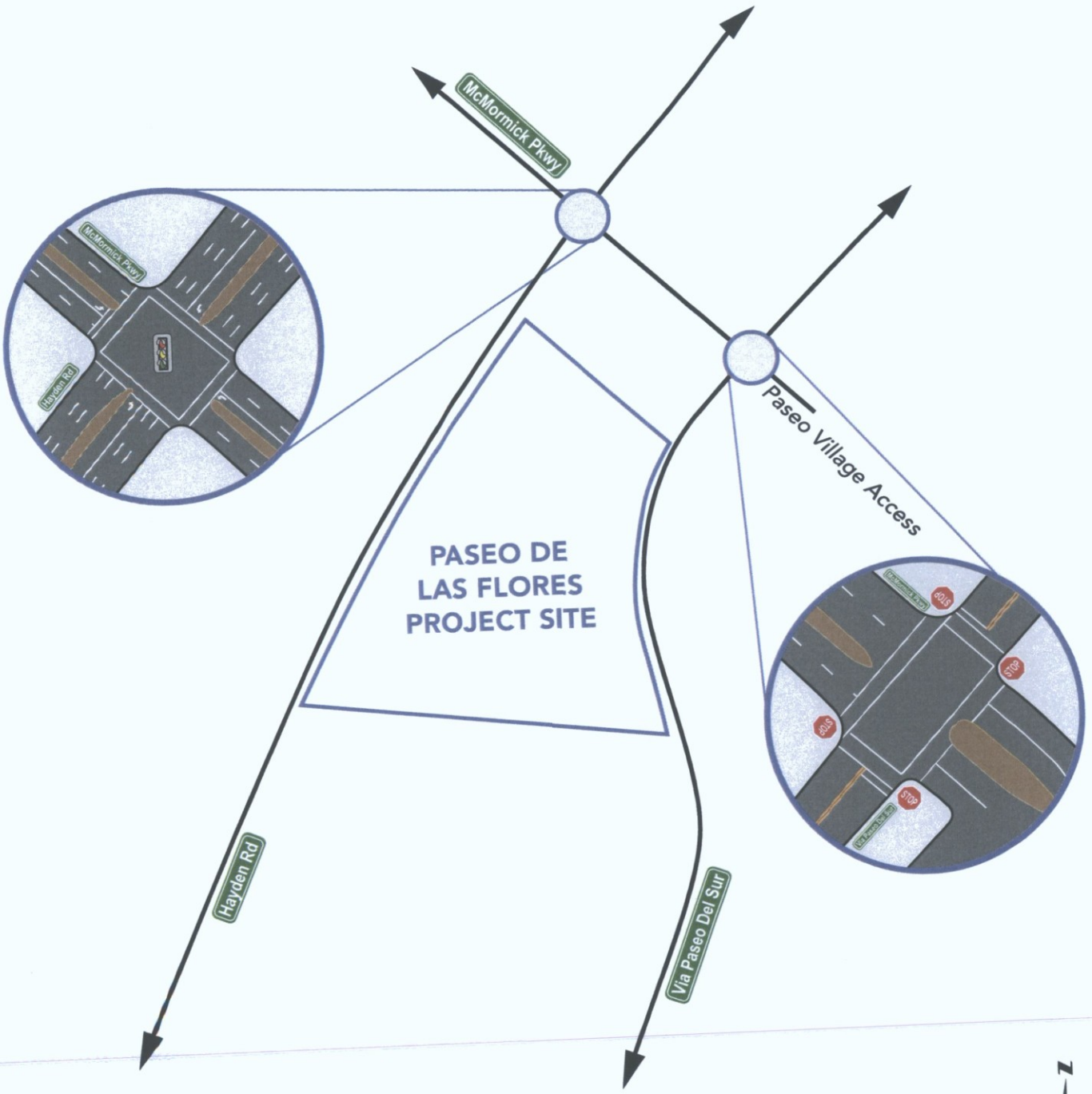


Figure 4: Existing Geometry - Year 2016

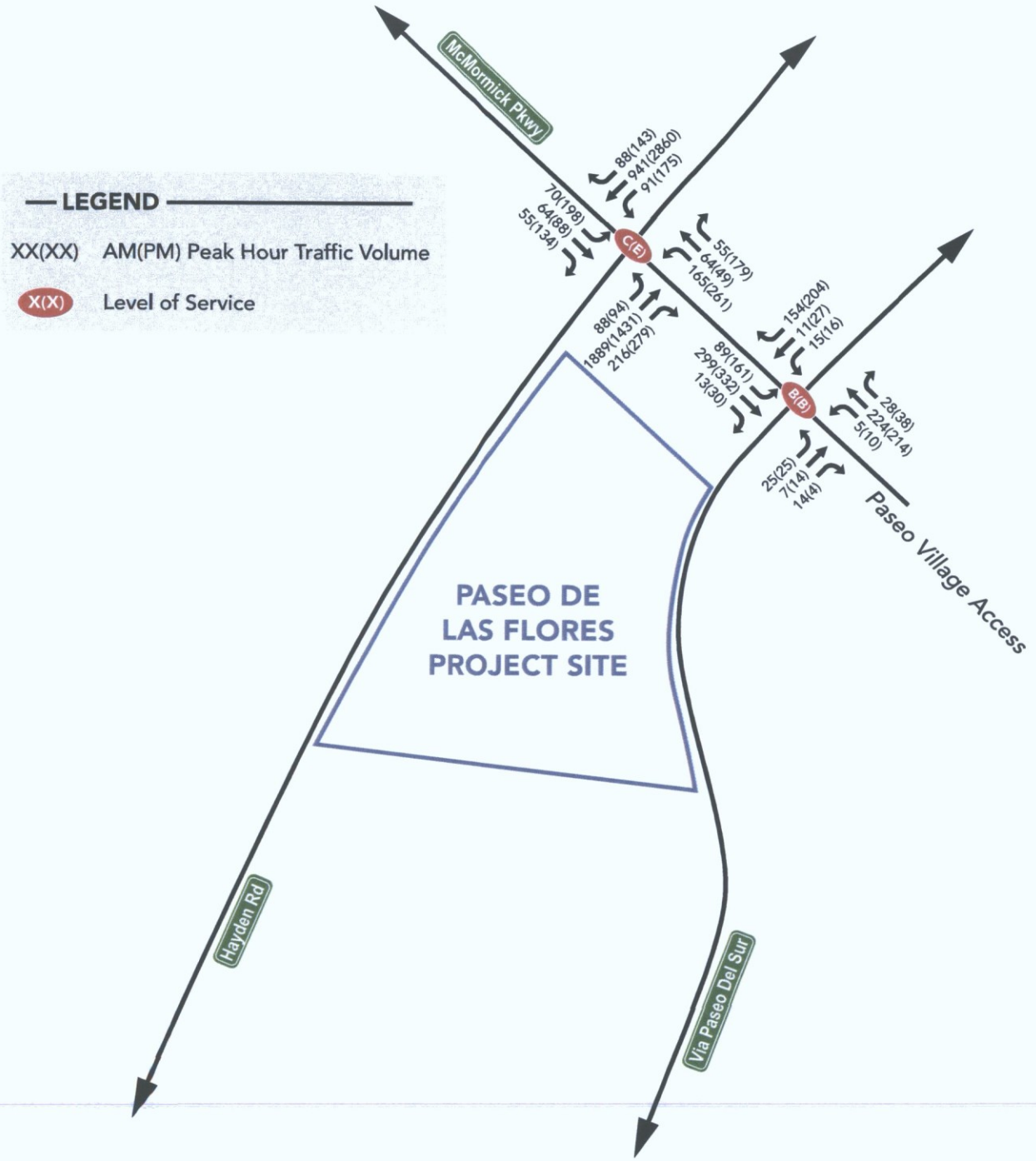


Figure 5: Existing Conditions - Year 2016

United Civil Group

V. PROJECTED TRAFFIC

A. TRIP GENERATION

Estimates of the traffic volumes for the proposed land uses of the subject site were determined from transportation planning data taken from the Institute of Transportation Engineers (ITE) publication titled *Trip Generation*, 9th Edition, 2012. The ITE rates are based on studies that measure the trip generation characteristics for various types of land uses. The rates are expressed in terms of trips per unit of land use type. This publication is considered the standard for the transportation engineering profession.

A.1. TRIP GENERATION FOR THE EXISTING USE- DAYCARE (R1-7)

Currently, ChurchPlace occupies the proposed development land. During the weekdays, Church Place provides day-care services in approximately 5,000 square feet of the church facility. Therefore, the daycare land use was used to determine the existing trips placed on the roadway network due to the current facility.

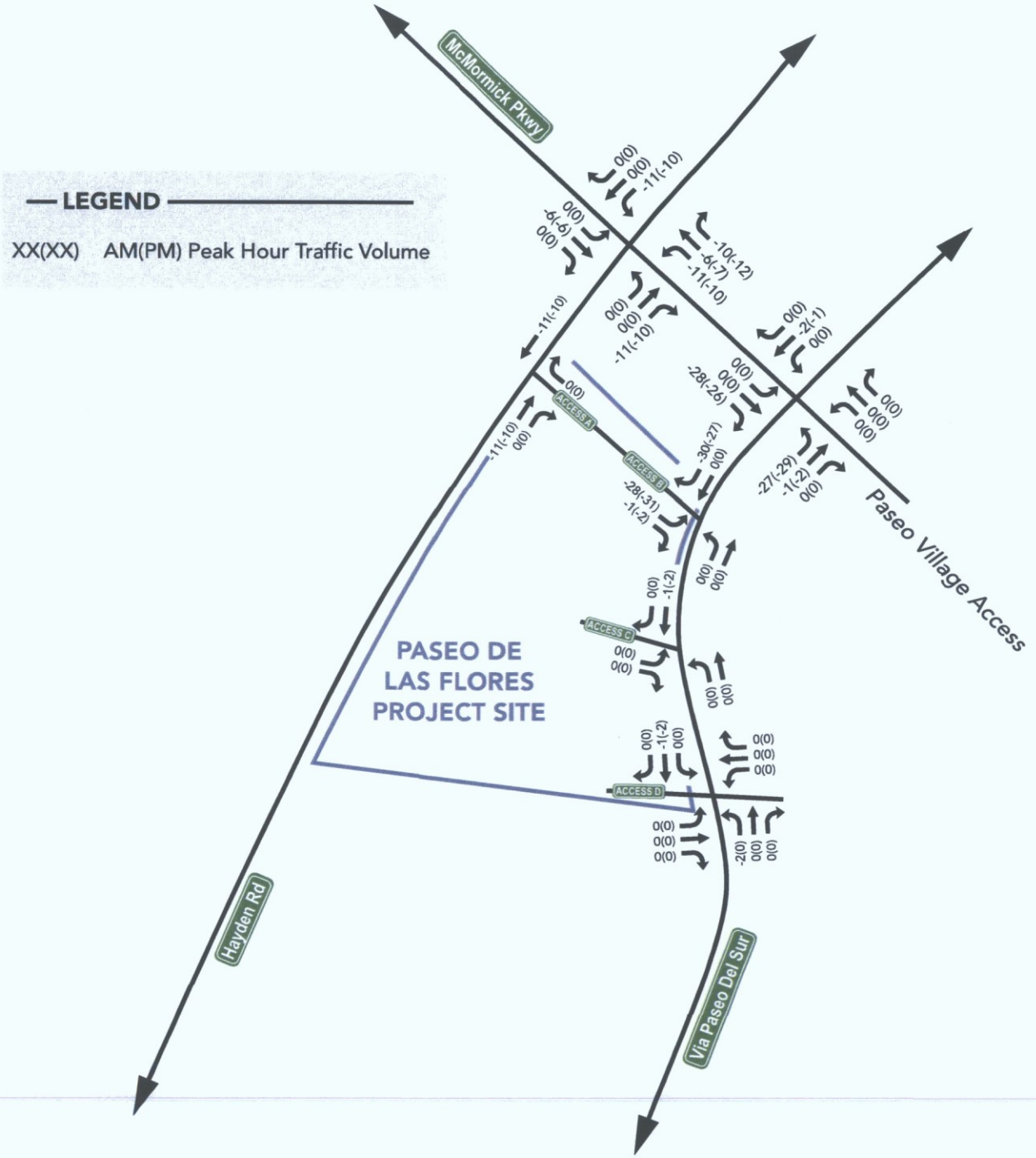
Day Care – Single-family detached housing includes all single-family detached homes on individual lots. A typical site surveyed is a suburban subdivision. City of Scottsdale property development standards under the R1-190 zoning designation require that each lot shall have a minimum area of at least 190,000 square feet.

The estimated trip generation, *Table 3: Trip Generation – Existing Zoning and* a figure showing those trips distributed onto the roadway network for the daycare, under the existing zoning, are presented on the following pages.

TABLE 3: TRIP GENERATION – EXISTING DAYCARE

Land Use	ITE Code	Units	Total Size	Daily	AM Peak			PM Peak		
					In	Out	Total	In	Out	Total
Daycare	565	1,000 sq.ft. GFA	5	370	32	29	61	29	33	62

Daycare (560)		
AM Peak Hour	T = 12.18 x (1000s SF)	53% entering, 47% exiting
PM Peak Hour	T = 12.34 x (1000s SF)	47% entering, 53% exiting
Daily	T = 74.06 x (1000s SF)	50% entering, 50% exiting



N

not to scale

Figure 6: Existing Daycare - Year 2016

UCG
United Civil Group

A.2. Trip Generation for the Proposed Development

Estimates of the traffic volumes that will be generated by Paseo de las Flores were determined from transportation planning data taken from the Institute of Transportation Engineers (ITE) *Trip Generation*, 9th Edition, 2012. For the proposed land uses of Paseo de las Flores, the most similar land use codes were determined to be ITE Land Use Code 945 – Gasoline/Service Station with Convenience Market and ITE Land Use Code 932 – High-Turnover (Sit-Down) Restaurant. Descriptions of the assumed land uses of the development follow.

General Office Building – Houses multiple tenants; it is a location where affairs of businesses, commercial or industrial organizations, or professional persons or firms are conducted. General office may contain a mixture of tenants.

Specialty Retail Center – This land use contains a variety of retail shops and specializes in quality apparel, hard goods and services, such as real estate offices, dance studios, florists and small restaurants.

High-Turnover (Sit-Down) Restaurant – Consists of sit-down, full service eating establishments. Patrons commonly wait to be seated, are served by a server, order from menus and pay for their meal after they eat. This land use may also contain a bar area for serving food and alcoholic drinks.

Table 4: Trip Generation – Proposed Development (Weekday) presents the forecasted weekday vehicle trips generated by Paseo de las Flores as estimated by the *Trip Generation* manual.

Table 4: Trip Generation – Proposed Development (Weekday)

Land Use	ITE Code	Units	Total Size	Daily	AM Peak			PM Peak		
					In	Out	Total	In	Out	Total
High-Turnover (Sit-Down) Restaurant	932	1,000 sq.ft. GFA	10.14	1,289	61	49	110	60	40	100
Specialty Retail Center	826	1,000 sq.ft. GFA	6.81	302	7	7	14	9	9	18
General Office Building	710	1,000 sq.ft. GFA	11.10	123	15	2	17	3	14	17
TOTAL				1,714	83	58	141	72	63	135

High-Turnover (Sit-Down) Restaurant (932)		
AM Peak Hour	T = 10.81 x (1000's SF)	55% entering, 45% exiting
PM Peak Hour	T = 9.85 x (1000's SF)	60% entering, 40% exiting
Daily	T = 127.15 x (1000's SF)	50% entering, 50% exiting
Specialty Retail Center (826)		
AM Peak Hour*	T = 2.00 x (1000's SF)	50% entering, 50% exiting
PM Peak Hour	T = 2.71 x (1000's SF)	48% entering, 52% exiting
Daily	T = 44.32 x (1000's SF)	50% entering, 50% exiting
General Office Building (710)		
AM Peak Hour	T = 1.56 x (1000's SF)	88% entering, 12% exiting
PM Peak Hour	T = 1.49 x (1000's SF)	17% entering, 83% exiting
Daily	T = 11.03 x (1000's SF)	50% entering, 50% exiting

*Because the Trip Generation Manual does not have a rate for AM Peak – UCG assumed 2 trips per 1000 SF

As seen in the above table, the Paseo de las Flores development is forecasted to generate 1,714 daily trips with 141 trips occurring in the morning peak hour 135 trips in the evening peak hour. *Figure 7: Site Generated Traffic and Trip Distribution* presents the site generated traffic, graphically.

A.3. Trip Generation Comparison

Trip generation totals for the existing land use on the existing parcel were compared to the estimated trip generation totals for the proposed development. These comparisons, as depicted in *Table 5: Trip Generation Comparisons*, show the difference in projected traffic volumes between the proposed development and existing land use.

Table 5: Trip Generation Comparisons

Land USE	Daily	AM Peak			PM Peak		
		In	Out	Total	In	Out	Total
Existing Daycare	370	32	29	61	29	33	62
Proposed Development Paseo de las Flores	1,714	83	58	141	72	63	135
Difference	+1344	+51	+29	+80	+43	+30	+73

B. Trip Distribution and Assignment

The trip distribution procedure determines the general pattern of travel for vehicles entering and leaving the development in the study area. The assumed trip distribution percentages for the proposed development are shown in *Table 6: Trip Distribution Percentages*. These percentages are based on the land uses surrounding the site, and the associated street patterns outside the development. Given the relatively unique nature of the proposed development, especially the restaurant portions, it may be likely vehicles will originate from longer distances than a typical development, so the percentages are based on a 10-mile radius from the center of the site and peak hour traffic data collected near the site. The areas surrounding the development within the search radius are largely residential areas, from which the largest percentage of trips to the development will originate. These residential areas are generally evenly distributed to the north, south, east, and west, with a slightly higher proportion of residential areas to the north and to the south on Hayden Road.

Table 6: Trip Distribution Percentages

Direction	Trip Distribution Percentage	
	Arriving From	Departing To
McCormick Parkway west of Hayden Road	20%	20%
Hayden Road north of McCormick Parkway	35%	35%
Hayden Road south of McCormick Parkway	35%	35%
Via Paseo Del Sur north of McCormick Parkway	5%	5%
Via Paseo Del Sur south of McCormick Parkway	5%	5%
TOTAL	*100%*	*100%*

Figure 6: Site Generated Traffic and Trip Distribution presents the forecasted site generated traffic for the Paseo de las Flores development, the assumed departure and arrival percentages, and the distributed site generated traffic from to and from the development.

Figure 7: Site Generated Traffic and Distribution

United Civil Group

C. Projected Non-Site Generated Traffic

Non-site or background traffic volumes representing the amount of traffic estimated to be on the area roadway network without the proposed development within the study area were projected for the horizon years 2018 and five years after opening, year 2023. The yearly ambient growth trends coupled with any known proposed development in the study area are used to forecast the background traffic.

There are no known developments near the study area that should be included in the background traffic. Because the area is built out surrounding the proposed site, an annual ambient growth rate for the area of 1.5% per year, which is a typically appropriate value for the region has been assumed and applied to the existing AM and PM peak hour traffic volumes.

The background traffic volumes are presented in *Figure 8: Background Traffic – Year 2018 and Figure 9: Background Traffic – Year 2023.*

D. Total Traffic

Total traffic projections for the horizon years of the development were determined by adding the proposed development's site generated traffic (Figure 7) to the estimated background traffic (Figure 8 or 9) and subtracting the existing daycare traffic (Figure 6). *Figure 10: Total Traffic – Year 2017* and *Figure 11: Total Traffic – Year 2023* present the total traffic volumes anticipated during the AM and PM peak hours on the roadway system during the horizon years of the development and this study.

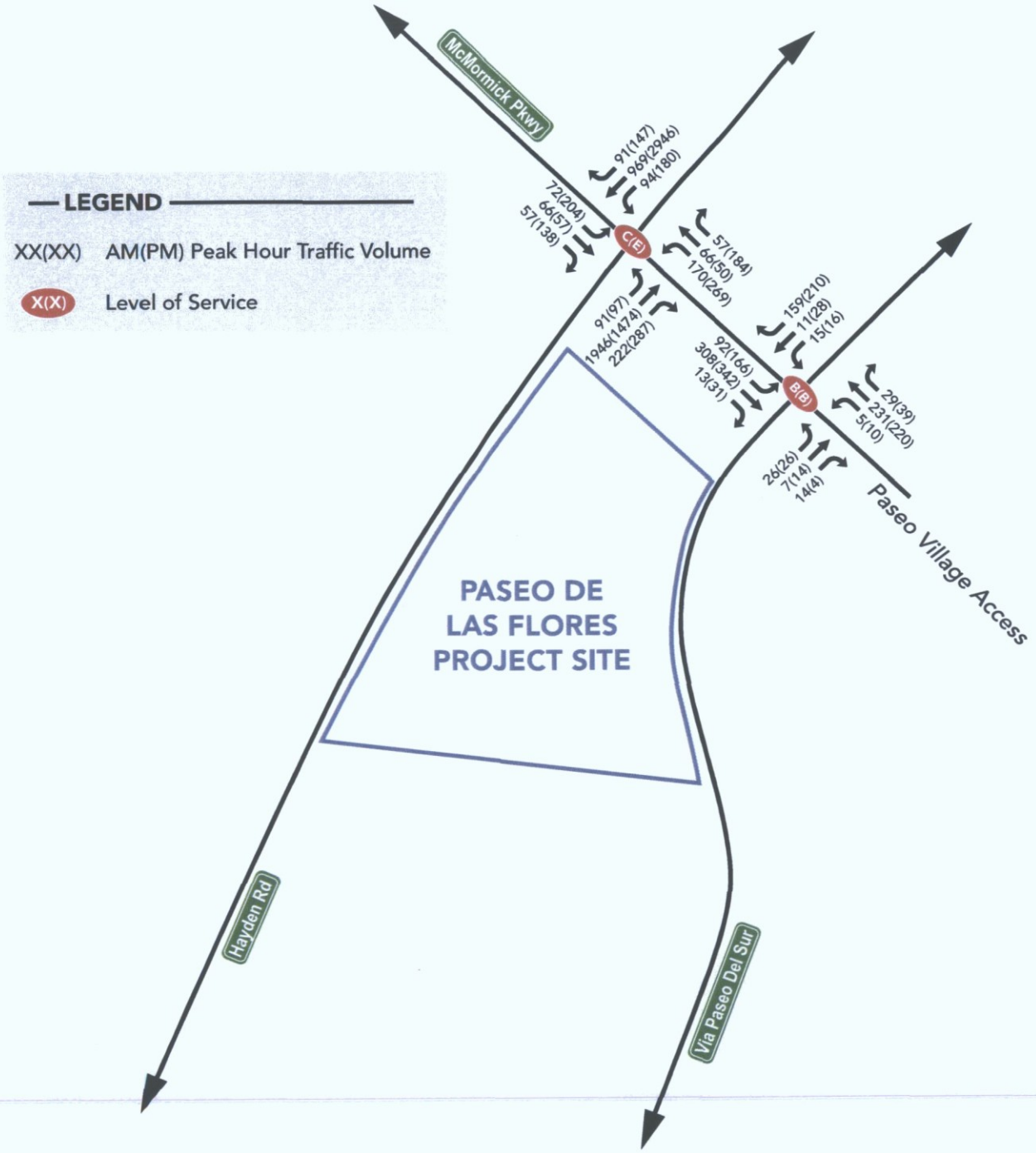
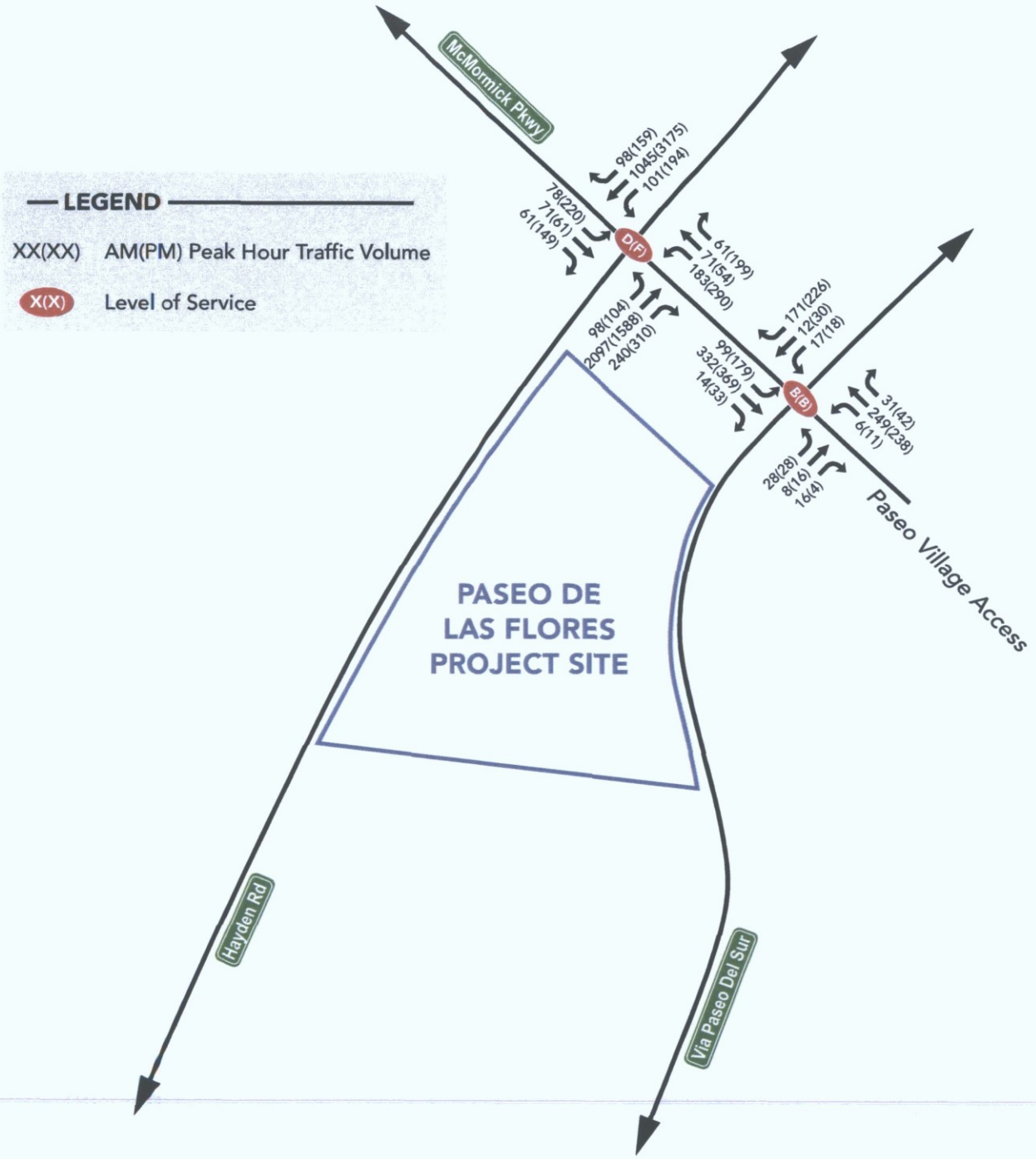


Figure 8: Background Traffic - 2018

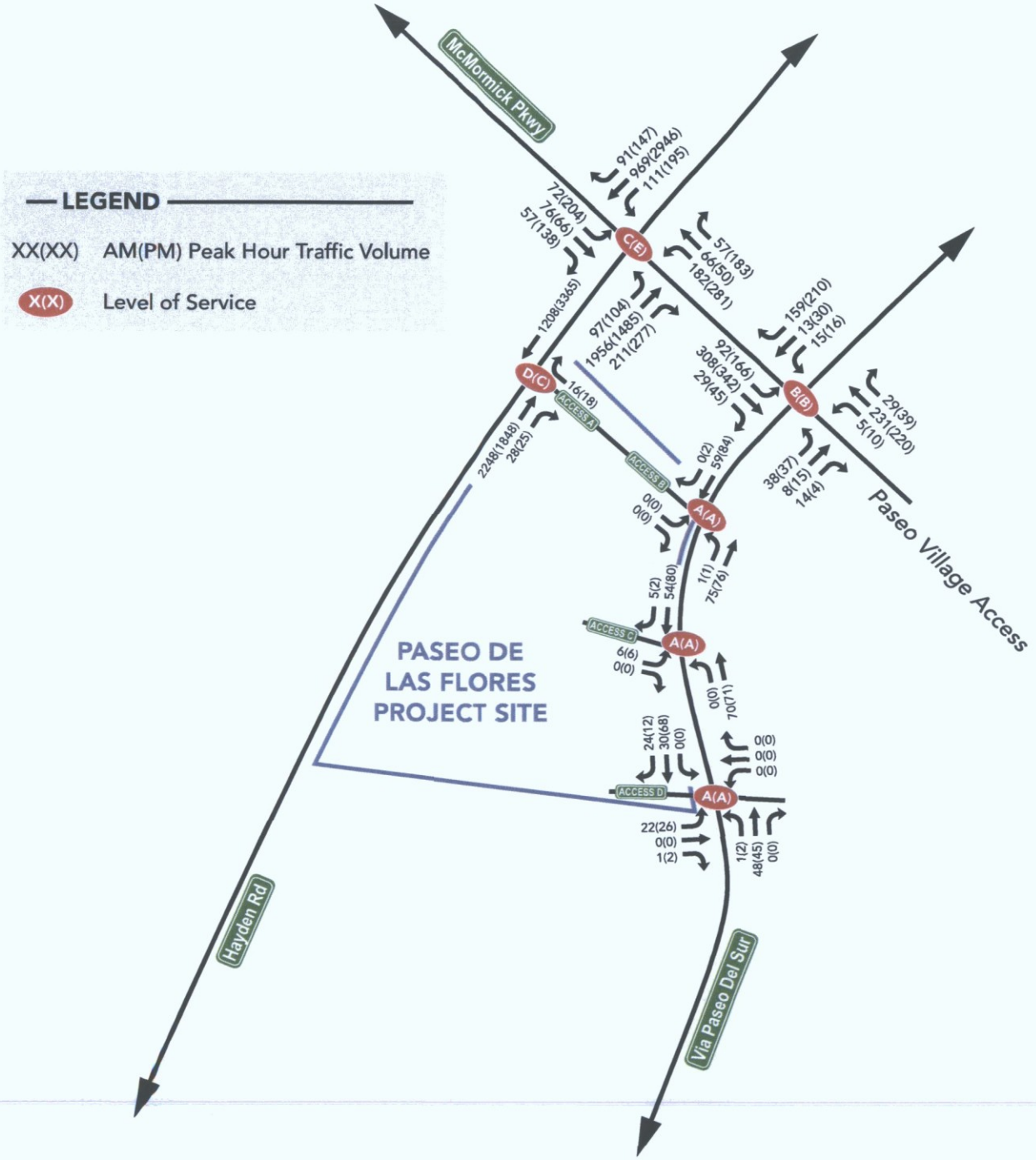
United Civil Group



not to scale

Figure 9: Background Traffic - 2023

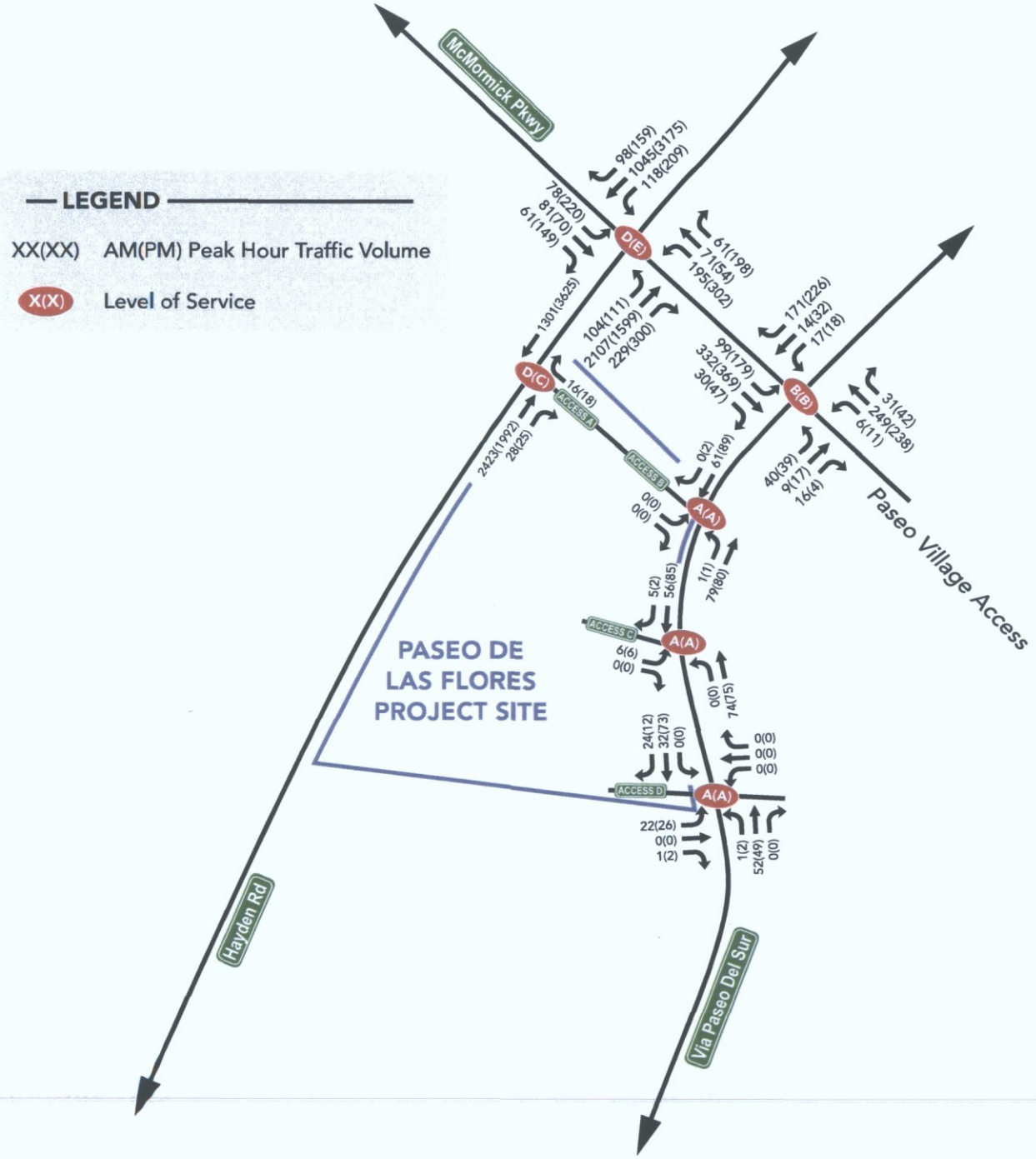
United Civil Group



not to scale

Figure 10: Total Traffic - 2018

United Civil Group



N

not to scale

Figure 11: Total Traffic - 2023

UCG
United Civil Group

VI. TRAFFIC AND IMPROVEMENT ANALYSIS

The purpose of this section is to show the relations between traffic operations and roadway geometrics; identify needs pertaining to progressive traffic flow and safety; and identify alternatives for further consideration, where applicable.

All improvement needs are analyzed and recommended based on horizon year 2023 total traffic conditions.

A. SITE ACCESSIBILITY ON-SITE CIRCULATION

The site accessibility for the proposed development was reviewed based on the provided conceptual site plan in Figure 3. In addition, site accessibility was reviewed considering Hayden Road is classified as *a Major Arterial - Suburban* and Via Paseo del Sur is classified as a *Local Road*. *Table 7: Site Accessibility* provides the recommended site access type for each of the site accesses and information for each access.

TABLE 7: SITE ACCESSIBILITY

Site Access	Access Type	Notes
Driveway A	Right-in, Right-out	Access driveway shall have 1 ingress and 1 egress lane (type CH-1). The raised median on Hayden Road restricts access.
Driveway B	Full	Access driveway shall have 1 ingress and 1 egress lanes (type CL-1 or CH-2).
Driveway C	Full	Access driveway shall have 1 ingress and 1 egress lanes (type CL-1 or CH-2).
Driveway D	Full	Access driveway shall have 1 ingress and 1 egress lanes (type CL-1 or CH-2).

A minimum throat length of 50 feet should be provided for each access driveway.

The number of driveways accessing the development, and the spacing between driveways, existing intersections, and property lines is directed by the Major Arterial classification of Hayden Road, the Local classification of Via Paseo del Sur and the commercial use of the property. Based on these details, the guidelines within the DS&PM, are as follows:

- A maximum of two driveway openings per the abutting streets (Section 5-3.201).
- Minimum distance driveway spacing of 165 feet (Local Commercial) on Via Paseo del Sur (Section 5-3.201).
- A minimum of 30 feet spacing from a commercial property line (Section 5-3.202).
- A minimum of 100 feet from the rights-of-way line of an intersecting arterial (Section 5-3.202).

The property frontage of the subject site on Hayden Road is approximately 490 feet and Driveway A is located approximately 180 feet from McCormick Parkway. Therefore, Driveway A meets the DS&PM Guidelines.

The property frontage of the subject site on Via Paseo del Sur is approximately 360 feet. Driveway B is placed approximately 165 feet from McCormick Parkway. Driveway C and D are placed approximately 315 feet and 445 feet from McCormick Parkway. The spacing between Driveways B-C and C-D are 150 feet and 130 feet, respectively. Therefore, the driveway spacing on Via Paseo del Sur does not meet the minimum driveway spacing per the DS&PM.

B. On-Site Circulation

The on-site circulation for the proposed development was reviewed based on the provided conceptual site plan in Figure 3. The following recommendations have been provided based on this review.

- The through connection between Driveway A and Driveway B may lead to cut through traffic during peak periods.
- Proper pedestrian connectivity should be provided between buildings on site and the surrounding sidewalks or trail system.
- Bicycle parking should be provided near the main entrances of the buildings.

C. Deceleration Lane Analyses

C.1. Right-turn Lanes

According to Section 5-3 of the City of Scottsdale's Design Standards and Policies Manual (DS&PM), deceleration lanes are required at all new driveways on major arterials and at new commercial/retail driveways on minor arterials. Further, to determine the need for a deceleration lane on streets classified as minor arterial or collector, the following criteria are used:

- At least 5,000 vehicles per day are expected to be using the street.
- The 85th percentile traffic speed on the street is at least 35 mph; or 45 mph for a two lane (one lane in each direction) roadway.
- At least 30 vehicles will be making turns into the driveway during a one-hour period.

Table 8: Right-turn Deceleration Lane Warrants on the following page presents the need for right-turn deceleration lanes at the proposed site accesses.

TABLE 8: RIGHT-TURN DECELERATION LANE WARRANTS

Location	Approx Directional ADT	Posted Speed	Peak Hour Right Turning Vehicles	Warrant Satisfied?
NB Hayden Road at Driveway A	19,000	45 mph	29	YES
SB Via Paseo del Sur at Driveway B	300	25 mph	29	NO
SB Via Paseo del Sur at Driveway C	300	25 mph	4	NO
SB Via Paseo del Sur at Driveway D	300	25 mph	24	NO

A right-turn deceleration lane is recommended at Driveway A. Right-turn deceleration lanes on southbound Via Paseo del Sur are not required due to the relatively low forecasted right turn volume coupled with the average daily traffic expected on Via Paseo del Sur.

Based on the fact that right-turning vehicles need not stop as they turn into the driveway, storage lengths for the right-turn deceleration lanes shall be the minimum length according to the DS&PM, 100 feet. For the posted speed limit of 45 miles per hour, the taper length shall be a minimum of 90 feet, which is in accordance with Table 430-1 of Section 430 of the ADOT *Traffic Engineering Guidelines and Processes (TGP)*, June 2015, and City of Scottsdale Standard Detail 2225.

C.2. LEFT-TURN LANES

According to Section 5-3 of the City of Scottsdale's DS&PM, deceleration lanes are required at all new driveways on major arterials and at new commercial/retail driveways on minor arterials. However, because Driveway A is planned as a right in/right out only, a left turn lane is not warranted for this development.

D. SIGHT TRIANGLES

Sight triangles shall be provided and maintained at site access points to give drivers exiting the site a clear view of oncoming traffic on Hayden Road and Via Paseo del Sur. The landscape and hardscape within the sight triangles must not obstruct the driver's view of the adjacent travel lanes. Adequate sight distances and sight distance triangles should be provided as per DS&PM Figure 5.3-26, Appendix 5-3B, and Appendix 5-3C.

Figure 12: Recommendations

E. Intersection Level of Service Analyses

E.1 Background traffic – Year 2018

Capacity analyses at the existing study area intersection was performed for the background traffic and current roadway geometries for the horizon years of the study, year 2018 and 2023, as presented in Figures 8 and 9. *Table 9: Background Traffic Levels of Service* presents the background traffic average delay and levels of service at the study area intersections without Paseo de las Flores development and without any further roadway improvements in the study area.

Table 9: Background Traffic Levels of Service

Intersection Location	NB AvgDel/LOS	SB AvgDel/LOS	EB AvgDel/LOS	WB AvgDel/LOS	Intersection AvgDel, LOS
2018					
Hayden Road/McCormick Parkway – Signalized					
AM Peak Hour	40.95 D	20.83 C	34.93 C	36.19 D	**34.34 C**
PM Peak Hour	28.78 C	80.50 F	65.66 E	80.83 E	**63.62 E**
McCormick Parkway/Via Paseo del Sur – 4-Way Stop					
AM Peak Hour	9.24 A	9.86 A	10.91 B	9.76 A	**10.27 B**
PM Peak Hour	9.95 A	11.66 B	13.22 B	10.53 B	**12.08 B**
2023					
Hayden Road/McCormick Parkway – Signalized					
AM Peak Hour	56.45 E	21.45 C	35.20 C	37.05 D	**32.10 C**
PM Peak Hour	31.29 C	113.98 F	82.05 F	103.33 F	**85.52 F**
McCormick Parkway/Via Paseo del Sur – 4-Way Stop					
AM Peak Hour	9.49 A	10.33 B	11.49 B	10.14 B	**10.76 B**
PM Peak Hour	10.29 B	12.55 B	14.45 B	11.06 B	**13.02 B**

As can be seen in Table 10 for background traffic in the horizon year of the study, the study area intersection of Hayden Road/McCormick Parkway is forecasted to operate at acceptable levels of service during the morning peak hour, LOS C. However, during the evening peak hour the intersection may operate at unacceptable levels of service.

E.2 Total Traffic – Year 2018 and 2023

Capacity analyses at the study area intersections of Hayden Road/McCormick Parkway and McCormick Parkway/Via Paseo del Sur and the site access intersections were performed for the forecasted years 2018 and 2023 total traffic conditions. *Table 10: Total Traffic Levels of Service* presents the total traffic average delay and levels of service utilizing the recommended roadway improvements.

Table 10: Total Traffic Levels of Service

Intersection Location	NB AvgDel/LOS	SB AvgDel/LOS	EB AvgDel/LOS	WB AvgDel/LOS	Intersection AvgDel, LOS
2018					
Hayden Road/McCormick Parkway – Signalized					
AM Peak Hour	40.89 D	20.74 C	35.27 D	36.84 D	**34.31 C**
PM Peak Hour	30.94 C	77.85 F	85.40 E	104.52 F	**66.21 E**
McCormick Parkway/Via Paseo del Sur – 4-Way Stop					
AM Peak Hour	9.51 A	10.03 B	11.14 B	9.90 A	**10.46 B**
PM Peak Hour	10.21 B	11.89 B	13.59 B	10.68 B	**12.08 B**
Hayden Parkway/Driveway A					
AM Peak Hour	*	*	-	28.16 D	**28.16 D**
PM Peak Hour	*	*	-	21.74 C	**21.74 C**
Via Paseo del Sur/Driveway B					
AM Peak Hour	*	*	8.89 A	-	**8.89 A**
PM Peak Hour	*	*	9.02 A	-	**9.02 A**
Via Paseo del Sur/Driveway C					
AM Peak Hour	*	*	9.18 A	-	**9.18 A**
PM Peak Hour	*	*	9.32 A	-	**9.32 A**
Via Paseo del Sur/Driveway D					
AM Peak Hour	*	*	9.12 A	-	**9.12 A**
PM Peak Hour	*	*	9.33 A	-	**9.33 A**

Intersection Location	NB AvgDel/LOS	SB AvgDel/LOS	EB AvgDel/LOS	WB AvgDel/LOS	Intersection AvgDel, LOS
2023					
Hayden Road/McCormick Parkway – Signalized					
AM Peak Hour	43.79 D	21.09 C	41.11 D	44.85 D	**36.99 D**
PM Peak Hour	35.16 D	109.98 F	104.75 F	115.65 F	**87.13 F**
McCormick Parkway/Via Paseo del Sur – 4-Way Stop					
AM Peak Hour	9.78 A	10.52 B	11.76 B	10.30 B	**10.97 B**
PM Peak Hour	10.57 B	12.82 B	14.92 B	11.23 B	**13.35 B**
Hayden Parkway/Driveway A					
AM Peak Hour	*	*	-	31.93 D	**31.93 D**
PM Peak Hour	*	*	-	23.87 C	**23.87 C**
Via Paseo del Sur/Driveway B					
AM Peak Hour	*	*	8.91 A	-	**8.91 A**
PM Peak Hour	*	*	9.06 A	-	**9.06 A**
Via Paseo del Sur/Driveway C					
AM Peak Hour	*	*	9.21 A	-	**9.21 A**
PM Peak Hour	*	*	9.37 A	-	**9.37 A**
Via Paseo del Sur/Driveway D					
AM Peak Hour	*	*	9.16 A	-	**9.16 A**
PM Peak Hour	*	*	9.39 A	-	**9.39 A**

**free movement*

For total traffic conditions in the horizon years 2018 and 2023, the study area intersections are forecasted to operate at acceptable levels of service, LOS D or better, during the AM and PM peak hours, except for the intersection of Hayden Road/McCormick Parkway. During the evening peak hour, the intersection is projected to produce unacceptable levels of service.

Because the intersection is currently built-out, geometric recommendations are not proposed to assist in reducing the delay during the evening peak hour. As traffic congestion increases, signal timing may be adjusted to assist with this delay.

The proposed development does not adversely affect the traffic conditions at the intersection of Hayden Road/McCormick Parkway in the evening peak hour. The proposed development only projected to add an additional three seconds of overall delay to the intersection in the horizon years.

VII. CONCLUSIONS AND RECOMMENDATIONS

United Civil Group (UCG) was retained by LGE Design Build LLC to perform this Transportation Impact & Mitigation Analysis for the Paseo de las Flores proposed development on the southeast corner of Hayden Road and McCormick Parkway in Scottsdale, Arizona.

This TIMA is a part of the application to the City of Scottsdale for a request to rezone the property from R1-7 (current) to C-1 with a minor general plan amendment from office to commercial. The Paseo de las Flores development is proposed as 27,242 square feet of mixed use commercial that will include retail, office and restaurant use with 3,709 square feet of additional patio dining. The site will include two building structures. Building A will be constructed as a one story building with approximately 6,735 square feet of retail/restaurant space and 2,600 square feet of patio dining. Building B will be constructed with two stories and include 20,507 square feet of retail, office and restaurant space with 1,109 square feet of additional patio space.

The Paseo de las Flores development is forecasted to generate 1,714 daily trips with 141 trips occurring in the morning peak hour 135 trips in the evening peak hour.

For the existing year 2016 traffic conditions, the signalized study area intersection of Hayden Road/McCormick Parkway operates at an acceptable level of service, LOS C, in the morning peak hour. However, during the evening peak hour the intersection operates an unacceptable LOS E. The existing 4-way stop intersection of McCormick Parkway/Via Paseo del Sur currently operates at an acceptable LOS B during the morning and evening peak hours.

For background traffic conditions in the horizon years of 2018 and 2023, the intersection of Hayden Road/McCormick Parkway, is forecasted to operate at an acceptable level of service, LOS C in the morning peak hour and an unacceptable LOS of E and F in the evening peak hour. The existing 4-way stop intersection of McCormick Parkway/Via Paseo del Sur is projected to continue to operate at an acceptable LOS B during the morning and evening peak hours.

For the total traffic conditions in the horizon years of 2018 and 2023, the intersection of Hayden Road/McCormick Parkway, is forecasted to operate at an acceptable level of service, LOS C in the morning peak hour and an unacceptable LOS of E and F in the evening peak hour. The existing 4-way stop intersection of McCormick Parkway/Via Paseo del Sur is projected to continue to operate at an acceptable LOS B during the morning and evening peak hours. The proposed driveways are projected to operate at an acceptable LOS of D or better during the morning and evening peak hours.

Based on City of Scottsdale criteria, a right-turn deceleration lane is warranted for implementation at Driveway A on Hayden Road for northbound traffic. No right turn deceleration lanes are warranted on Driveways B-D.

As a result of this TIMA, the following improvements are recommended:

- Install right-turn deceleration lane at Driveway A.
  - The right-turn deceleration lanes should have the minimum dimensions of: 100 foot storage, 90 foot taper.

- Based on an analysis of the illustrative/conceptual site plan of the proposed development, several recommended improvements should be considered in relation to the site accessibility and on-site circulation of the proposed development. Section VI presents these recommendations.

- Sight triangles should be provided at site access points per City of Scottsdale DS&PM Figure 5.3-26, Appendix 5-3B, and Appendix 5-3C.

VIII. LIMITATIONS

Our professional services have been performed using the degree of skill ordinarily exercised, under similar circumstances, by reputable transportation engineering firms practicing in this locality. No other warranty, expressed or implied, is made.

The contents of this report are intended for the sole use of the addressee and his/her designees. In completing this report, data was obtained from a variety of sources (i.e. City, County, State and Federal sources); United Civil Group has assumed these sources to be reliable and accurate. Should deviations from this report be noted, this firm shall be contacted for review of the area of concern.

Every reasonable attempt was made to acquire recent traffic impact studies, traffic projections and/or data that may be helpful in more accurately projecting traffic volumes. United Civil Group is not responsible for incorporating data made available after this document has been finalized.

This report is issued with the understanding that it is the responsibility of the owner to see that its provisions are carried out or brought to the attention of those concerned. In the event that any changes of the proposed project are planned, the conclusions and recommendations contained in this report shall be reviewed and the report shall be modified or supplemented as necessary.

IX. SOURCES

A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials, 2011.

Arizona Department of Transportation Traffic Guidelines and Processes, most recent updates.

City of Scottsdale Design Standards & Policies Manual, January 2010.

City of Scottsdale Transportation Master Plan, 2008.

Highway Capacity Manual, HCM 2010, Transportation Research Board, 2010.

Manual on Uniform Traffic Control Devices, Federal Highway Administration, MUTCD 2009.

Trip Generation, 9th Edition. Institute of Transportation Engineers, 2012.