Griffin Lake Estates Specific Plan 2168
Tentative Tract Map 36744
Draft Traffic Impact Study

Prepared By: Endo Engineering

August 2014

August 20, 2014

Mr. Mark Majer
Griffin Ranch Investors, LP
23 Corporate Plaza - Suite 150
Newport Beach, California 92660

SUBJECT: Griffin Lake Estates Specific Plan 2168 and Tentative Tract Map No. 36744 Draft Traffic Impact Study

Dear Mr. Majer;

Endo Engineering is pleased to submit this analysis of the transportation consequences associated with implementation of the proposed Griffin Lake Estates Specific Plan 2168 and Tentative Tract Map No. 36744 in the City of La Quinta, California. This Specific Plan and Tentative Tract Map would coordinate the planning and future development of 39.79 gross acres located within APN 767-320-013, south of The Madison Club and Avenue 54, between Madison Street and Monroe Street. The project site is bounded on the south, west, and east, by the Griffin Ranch Specific Plan 2004-074 and the associated Tract 32879.

The project site currently has entitlements for one single-family detached residential dwelling unit and is developed as the Merv Griffin estate. The existing residence on-site has 5,400 square feet and is scaled for entertaining and hosting social events. It includes two guest quarters as well as four separate one-bedroom poolside guest casitas, none of which have kitchen facilities. Over the past year, the Merv Griffin estate has been renovated and rented as a gated luxury residential retreat for family vacations and reunions that include overnight stays.

The proposed project would restore and preserve the Merv Griffin estate by retaining and upgrading the existing estate facilities on 5.15 acres within the northwest corner of the site (Lot 79) for continued use as a gated luxury residential rental and private event grounds. The remaining area within the site would be developed as a gated high-end residential enclave surrounding a private 5.97-acre recreational lake with boat docks for residents.

A total of 78 single-family residential dwelling units are proposed along the northeast and south side of the Griffin Lake. A portion of the existing Merv Griffin estate stables located adjacent to the lake would be converted into a community recreation center. The project could be completed by the year 2017 and complement the surrounding equestrian-oriented residential land uses. The site is being planned within the context of the Griffin Lake Estates Specific Plan to ensure land use compatibility and coordinate the infrastructure.

Cohesive design elements would protect unique viewsheds and introduce streetscapes with coordinated landscaping to reinforce and enhance community aesthetics. The project would create a safe environment within which the use of alternative transportation modes for short trips would continue to be a viable option.

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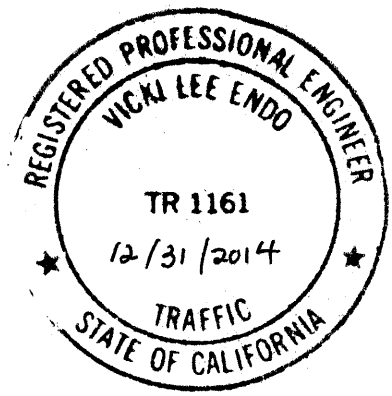
The traffic study analyzes the following scenarios: (1) existing circulation conditions; (2) existing+project buildout conditions; (3) future year 2017 conditions with and without project buildout; and (4) horizon year 2035 conditions at the two site access intersections on Avenue 54. Mitigation measures are identified, as required, to meet the relevant circulation system performance standards.

We trust that the information provided herein will be of value to you and the City of La Quinta in their review of the impacts and conditions of approval associated with the project. Should questions or comments develop regarding the findings and recommendations within this report, please do not hesitate to contact me.

Cordially,
ENDO ENGINEERING
Vicki Lee Endo

Vicki Lee Endo
Registered Professional
Traffic Engineer TR 1161



DRAFT TRAFFIC IMPACT STUDY

GRIFFIN LAKE ESTATES SPECIFIC PLAN 2168
TENTATIVE TRACT MAP 36744

SOUTH OF AVENUE 54
BETWEEN MADISON STREET AND MONROE STREET

CITY OF LA QUINTA

Prepared
AUGUST 20, 2014

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

Purpose and Objectives

This traffic impact study was developed for use in the preparation of the environmental documentation required to process the Griffin Lake Estates Specific Plan 2168 and Tentative Tract Map 36744 (the proposed project). The project site is located within the City of La Quinta, California.

This traffic impact study was conducted to provide an objective and factually supported full-disclosure analysis of the potentially significant transportation consequences associated with implementation of the proposed project. In the process, potential cumulative transportation impacts associated with other future developments in the area were evaluated. To achieve the objective, information was obtained from field observations in the study area, discussions with representatives of affected agencies and the project design team. Adopted plans and policies were analyzed. Available studies, reports, data, literature, and relevant local and regional transportation models were also reviewed.

The analyses summarized herein were designed to achieve the following objectives.

- Describe the thresholds used to determine if a significant impact would occur.
- Collect and analyze the data necessary to identify, disclose, and focus on those impacts determined to be potentially significant.
- Identify improvements that would avoid significant effects, where feasible.
- Reduce adverse effects through the project design process or the incorporation of appropriate mitigation.
- Foster coordination during the development review process.
- Clearly document the study methodology, assumptions, findings, and recommendations to support informed decision making.

Site Location

The 39.79-acre project site is located within the City of La Quinta, south of The Madison Club and Avenue 54, between Madison Street and Monroe Street. Figure 2-1 depicts the project site in its regional context. The property is currently developed as the Merv Griffin estate and surrounded on the west, south and east by the Griffin Ranch Specific Plan. As shown in the Figure 2-2, the Merv Griffin estate has two existing access connections on Avenue 54, the western Primary Site Access and the eastern Secondary Site Access.

The proposed project includes: the Griffin Lake Estates Specific Plan 2168 and Tentative Tract Map 36744 for the 39.79-acre parcel (APN 767-320-013) surrounded on three sides by the Griffin Ranch Specific Plan. The proposed project is not part of the approved Griffin Ranch Specific Plan 2004-074 or the associated Tentative Tract Map 32879.

Figure 2-2, the Vicinity Map, depicts the project site in relation to the study area and the adjacent intersections. As shown therein, the northern site boundary is Avenue 54. The western site boundary is located approximately one-quarter mile east of Madison Street. The eastern site boundary is located approximately one-half mile west of Monroe Street.

1.2 Description of Proposed Project

Existing and Approved On-Site Land Uses

Although the project site currently has entitlements for one single-family detached residential dwelling unit, the Merv Griffin estate is unique. The main house has 5,400 square feet and is scaled for entertaining and hosting social events. It includes two guest quarters as well as four separate one-bedroom poolside guest casitas (none of which have kitchen facilities).

Project Description

As shown in Figure 2-3, the proposed project would restore and preserve the Merv Griffin estate by retaining and upgrading the existing estate facilities on 5.15 acres within the northwest corner of the site (Lot 79) for continued use as a gated luxury residential rental and private event grounds. The remaining area would be developed as a gated high-end residential enclave surrounding a private 5.97-acre recreational lake (Lot "A") with boat docks for residents.

A total of 78 single-family residential dwelling units are proposed surrounding the recreational lake. A portion of the existing Merv Griffin estate stables located adjacent to the lake would be converted into a community recreation center. The project could be completed by the year 2017.

Overnight Rentals/Social Events

Appendix A includes a summary of the proposed future overnight rental and private event guidelines for the Merv Griffin estate facilities located in the northwest portion of the project site (Lot 79 in Figure 2-3). With the proposed project, the Merv Griffin estate facilities may be rented by families for overnight rentals up to four times per month. The estate facilities may also be used for minor and moderate private short-term social events (such as desert retreats, political functions, corporate events, executive dinner parties, etc.) that do not include overnight stays.

In addition to the minor and moderate events, major events may occur up to two times per year in the future. These major events would be consistent with the provisions identified in Temporary Use Permit 2014-1252, which was issued prior to the 2014 Coachella Valley Music and Arts Festival. Up to 450 guests would be allowed on-site over a three-day period during a major event. The sponsor of the event will contract with the Riverside County Sheriff's Department for traffic and crowd control as well as internal/external security.

Proposed Site Access

Two existing gated driveways on the south side of Avenue 54 (see Figure 2-2) are currently being used at the property. The Primary gated driveway is located near the middle of the project site, approximately 0.37 miles east of Madison Street. A Secondary gated access is currently located near the eastern property boundary. With the proposed project, the main gated driveway would be retained at its current location (Street "A" in Figure 2-3). However, the Secondary gated driveway would be relocated approximately 125 feet west of its current location, closer to the main gate. As shown in Figure 2-3, this would align the future Residential Access (Street "D") with the internal street to better serve the future residential component of the development.

1.3 Study Area and Scenarios Analyzed

The study area and two existing key intersections were identified per Engineering Bulletin #06-13 (EB 06-13). The key intersections evaluated included: (1) Madison Street at Avenue 54, and (2) Monroe Street at Avenue 54.

Scenarios Evaluated

Peak season weekday morning and evening peak hour conditions were evaluated at the key intersections. The following scenarios were evaluated in conjunction with this traffic study:

- Existing Conditions (Year 2014 Peak Season);
- Existing+Project Buildout Conditions;
- Year 2017 Ambient Conditions (with background traffic growth);
- Year 2017+Project Buildout Conditions; and
- Year 2035+Project Buildout Conditions (at the two proposed site access intersections only).

Since the proposed project is consistent with the land use assumptions in the *La Quinta General Plan Update Traffic Study* (Iteris, May 14, 2012), the traffic analyses herein address the project buildout year 2017. An evaluation of General Plan buildout conditions was not required except at the two proposed site access intersections on Avenue 54.

1.4 Performance Standards and Significance Threshold Criteria

City of La Quinta Required Intersection LOS

The City of La Quinta has established LOS D as the minimum level of service for intersections and street segments. Engineering Bulletin #06-13 states that "*Intersections with all-way stop control (AWSC) shall have a LOS 'D' or better for all critical movements."* A single level of service is defined in the *Highway Capacity Manual* (HCM) for unsignalized intersections with AWSC. Therefore, the LOS D performance standard for intersections with AWSC was applied to the weighted average control delay associated with the intersection as a whole.

A single level of service is not defined by the HCM for unsignalized two-way stop-controlled (TWSC) intersections as a whole, but rather for the minor-street approaches and the conflicting left-turn moves from the major street. Engineering Bulletin #06-13 states that *"The side street at intersections with two-way stop control shall have a LOS 'E' based on the latest HCM delay methodology."* Each TWSC intersection was evaluated on an individual basis to determine the appropriate mitigation for any minor street approach projected to operate at LOS F.

City of La Quinta Required Roadway Segment LOS

A maximum acceptable daily volume-to-capacity (V/C) ratio of 0.90 (the upper limit of LOS D) is used by the City of La Quinta for all road segments, based on daily capacities that are established by functional classification. Any master planned roadway segments projected to have a daily V/C ratio exceeding 0.90 were identified as potentially significant impacts and the widening required to mitigate the potential impact was identified.

Significance Threshold Criteria

The City of La Quinta has adopted potential thresholds of significance in Engineering Bulletin #06-13 for both intersections and roadway segments. The key intersections and the adjacent roadway links were evaluated for existing+project and future+project buildout conditions in the year 2017 to identify potentially significant project-specific impacts. A potentially significant project-specific impact occurs at an unsignalized intersection when: (1) project-related traffic results in a projected LOS F on a side street at an intersection with TWSC; or (2) LOS E or worse is projected for an AWSC intersection and the project-related traffic results in the addition of 3 seconds or more of delay for any movement.

1.5 Principal Findings

No potentially significant project-specific impacts were identified at either of the key intersections evaluated within the study area with any of the scenarios evaluated. No potentially significant project-specific impacts were identified on any of the roadway links evaluated within the study area with any of the scenarios evaluated.

Existing Conditions

Both of the existing key intersections are all-way stop controlled and currently provide LOS B operation during the morning and evening peak hours in the peak season. All of the roadway links in the study area are currently operating at LOS A with a maximum volume-to-capacity ratio of 0.321.

The current peak hour traffic volumes at the key intersection of Madison Street with Avenue 54 appear to meet the rural traffic signal volume warrants. However, 62 percent of the volume on the minor-street approach (eastbound Avenue 54) represent vehicles turning right onto Madison Street with minimal conflicting volumes. This intersection provides acceptable levels of service with all-way stop control during the peak hours in the peak season. Therefore, signalization is not justified at this intersection by existing traffic volumes.

Existing+Project Buildout Conditions

With existing+project buildout traffic volumes, both of the key intersections are projected to provide LOS B operation during the morning and evening peak hours. All of the roadway links in the study area are projected to operate at LOS A with a maximum volume-to-capacity ratio of 0.329. Since the intersection of Madison Street with Avenue 54 is projected to operate at LOS B with existing+project buildout traffic volumes, signalization is not justified at this intersection with these volumes.

Future Year 2017 Ambient Conditions (Without Project)

Both of the key intersections will provide LOS C operation during the morning and evening peak hours with year 2017 ambient traffic volumes. All of the roadway links evaluated in the study area will continue to operate at LOS A with a maximum volume-to-capacity ratio of 0.444. Since the intersection of Madison Street with Avenue 54 is projected to operate at LOS C with year 2017 ambient traffic volumes, signalization is not justified at this intersection.

Future Year 2017+Project Buildout Conditions

Both of the key intersections will operate at LOS C during the morning and evening peak hours with year 2017+project buildout traffic volumes. All of the roadway links evaluated in the study area will continue to operate at LOS A with a maximum volume-to-capacity ratio of 0.451. Since the intersection of Madison Street with Avenue 54 is projected to operate at LOS C with year 2017+project buildout traffic volumes, signalization is not justified at this intersection.

Site Access Upon General Plan Buildout

Acceptable levels of service would be maintained with two-way STOP control during the peak hours at both of the proposed site access intersections on Avenue 54 with General Plan buildout traffic volumes. No potentially significant project-specific impacts were identified at the site access connections proposed on Avenue 54 upon project completion in the year 2017 or with General Plan buildout traffic volumes.

Traffic signal warrants would not be met at either of the two proposed site access intersections on Avenue 54 upon project completion in the year 2017 or with General Plan buildout traffic volumes. The maximum peak hour

northbound approach volume at either intersection would be 47 vehicles per hour, less than one-half of the 100 vehicles per hour required to meet signal warrants with a two-lane approach.

1.6 Recommendations

Section 7 provides a detailed discussion of standard mitigation for all development projects, and additional recommendations associated with site access. The following site specific measures are recommended to minimize the potential for impacts associated with site access.

1. The developer shall provide the lane geometrics shown in Figure 6-1 at the site access points in conjunction with the development of the proposed project.

2. A "STOP" sign shall be installed facing northbound vehicles at both of the site access connections on Avenue 54 and a westbound left-turn bay shall be provided in the median on Avenue 54 at both of the proposed site access connections (Street "A" and Street "D").

3. Two northbound exit lanes shall be provided, including a dedicated right-turn lane and a dedicated left-turn lane. Two southbound entry lanes shall be provided at each site access.

4. Adequate stacking distance shall be provided on-site for entering vehicles on the approach to each of the gated entries to store the 95th-percentile back-of-queue length during the peak hours on weekdays. The pavement in advance of the gate shall be wide enough to allow non-accepted vehicles to turn around in advance of the gate. Any gated entry that allows visitor access should provide two entry lanes to allow residents to bypass the vehicles of visitors awaiting entry authorization.

5. The gated access points proposed to serve the site development may be required to include provisions to facilitate access by emergency vehicles. If required, all power-operated controlled access devices shall have a radio-controlled override system capable of opening the gate or barrier when activated by a special transmitter located in emergency vehicles and be equipped to facilitate opening in the event of a power failure.

2.0 PROPOSED DEVELOPMENT

With its unique natural beauty and resources as well as its history as a retirement destination with seasonal tourism, the Coachella Valley has become a world-class resort destination. As many as 100,000 seasonal residents spend the winter months in the Coachella Valley. Another 3.5 million conventioneers and tourists visit the Coachella Valley each year. The year-round agricultural industry in the Coachella Valley has been augmented by a leisure, hospitality, and retail economy that has developed to accommodate tourists and the influx of seasonal residents.

The Griffin Lake Estates Specific Plan 2168 and Tentative Tract Map 36744 are proposed for the 39.79-acre parcel (APN 767-320-013) located south of The Madison Club and Avenue 54, between Madison Street and Monroe Street. The proposed project would create a gated residential enclave that is supportive of alternative transportation modes. The development would be pedestrian-friendly and located within an area where the use of golf carts and NEVs is commonplace and multi-use paths exist and are being expanded to accommodate cycling, pedestrians, and golf carts. The development would promote walking and cycling as healthy alternatives to travel by automobile. The project would create a safe environment within which the use of alternative transportation modes for short trips would grow over time and continue to be a viable option in the future.

2.1 Project Location

Figure 2-1 illustrates the project site in its regional context within the Coachella Valley region of eastern Riverside County, California. The Coachella Valley is approximately 45 miles long and 15 miles wide. The Coachella Valley is separated from the Greater Los Angeles Area to the northwest by the San Gorgonio Pass, through which Interstate 10 (I-10) and the Union Pacific Railroad are the major transportation corridors.

The 39.79-acre project site is located within the City of La Quinta, south of The Madison Club and Avenue 54, between Madison Street and Monroe Street. The property is currently developed as the Merv Griffin estate and surrounded on the west, south and east by the Griffin Ranch Specific Plan. As shown in the Figure 2-2, the Merv Griffin estate has two existing access connections on Avenue 54.

Figure 2-2, depicts the project site in relation to the adjacent intersections. As shown therein, the northern site boundary is Avenue 54. The western site boundary is located approximately one-quarter mile east of Madison Street. The eastern site boundary is located approximately one-half mile west of Monroe Street.

2.2 Existing General Plan and Zoning Designations

Existing and Approved On-Site Land Uses

Although the project site currently has entitlements for one single-family detached residential dwelling unit, the Merv Griffin estate is unique. The main house has 5,400 square feet and is scaled for entertaining and hosting social events. It includes two guest quarters as well as four separate one-bedroom poolside guest casitas (none of which have kitchen facilities).

Over the past year, the Merv Griffin estate has been renovated and rented as a gated luxury residential retreat for family vacations and reunions that include overnight stays. On average, two multi-night family vacations occurred on-site per month during the peak season for a total of four to ten days per month. On most weekdays the existing the Merv Griffin estate facilities are not rented and generate relatively little traffic.

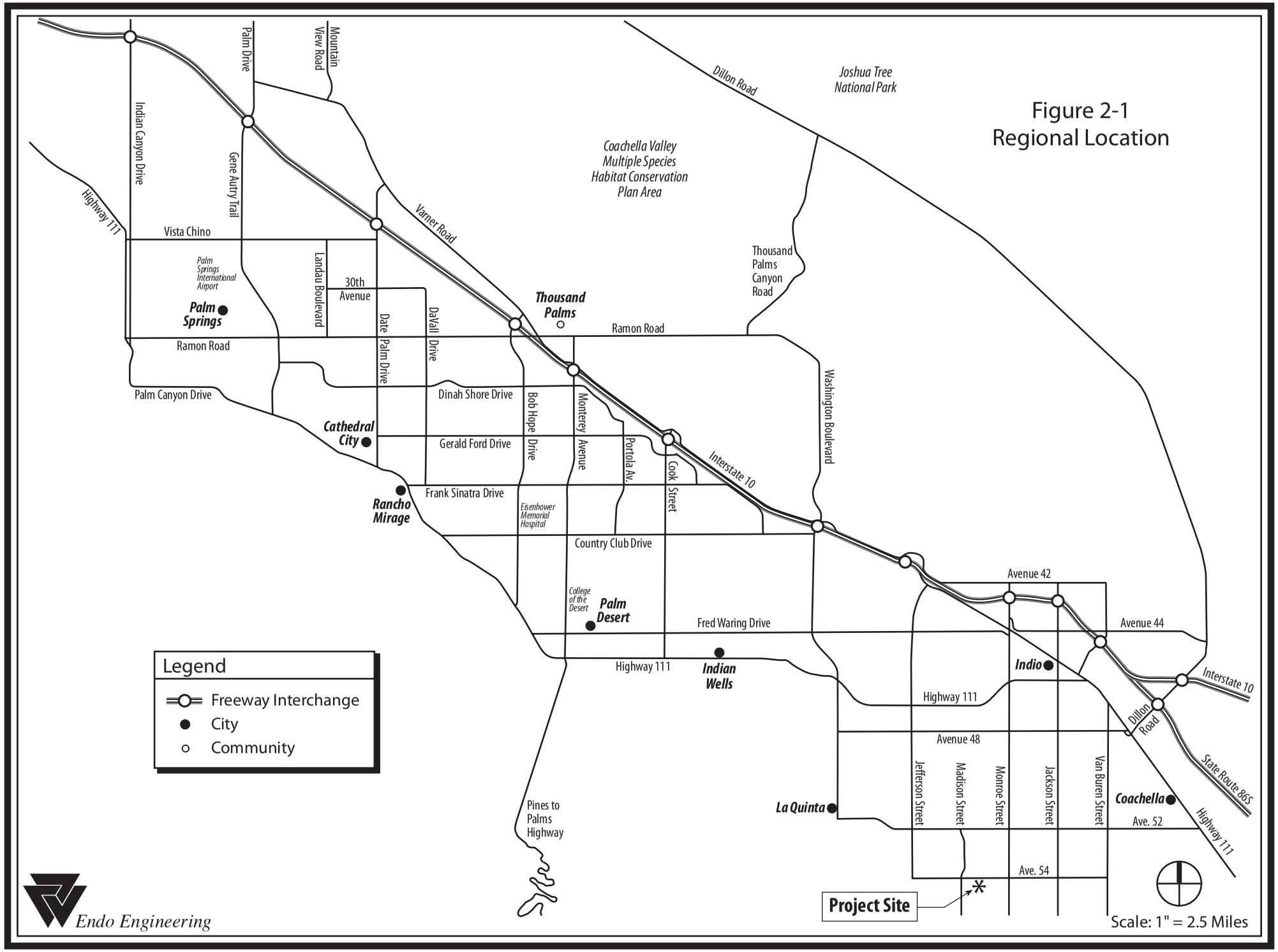
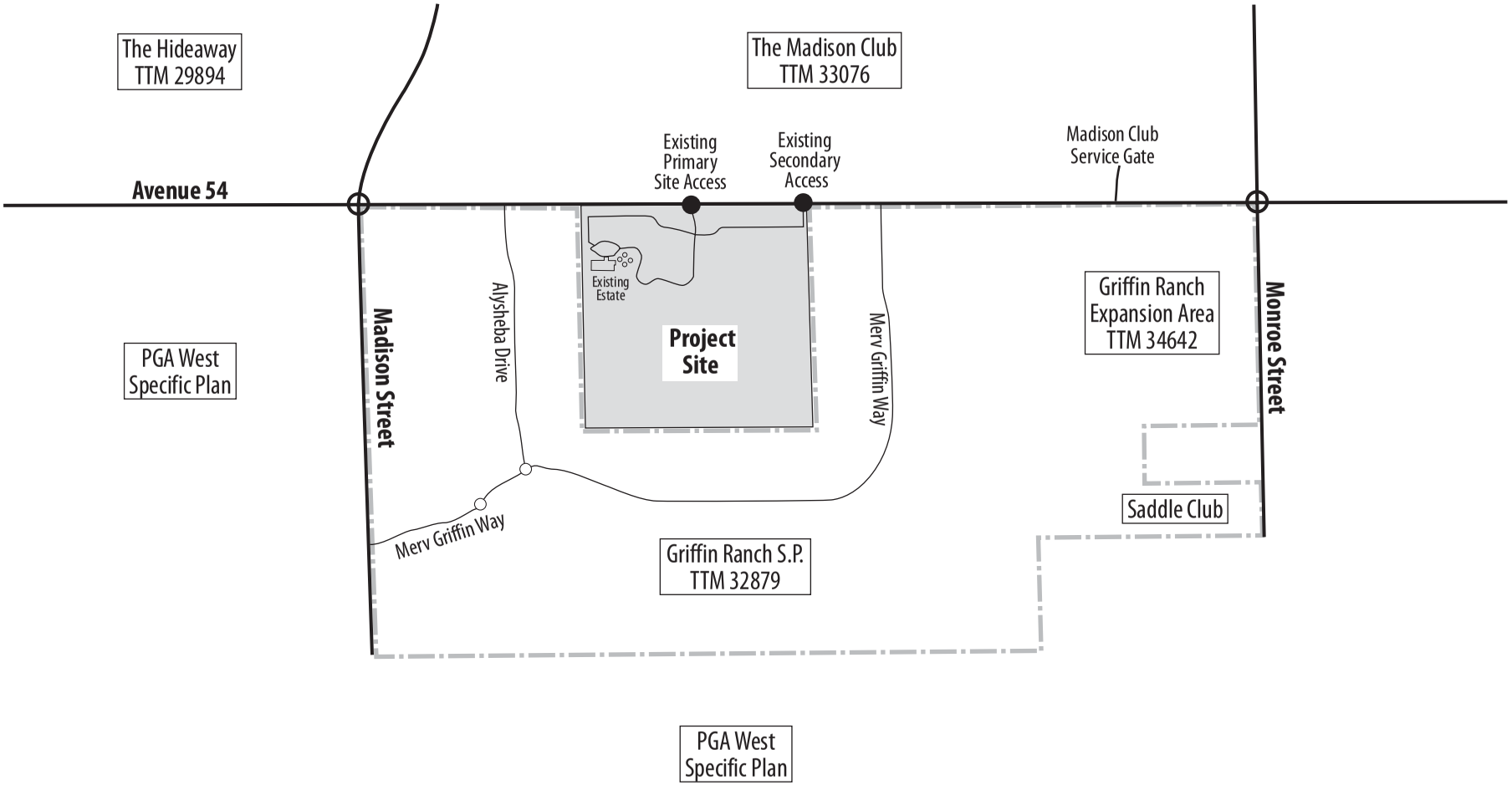


Figure 2-1
Regional Location
Palm Drive
Mountain View Road
Dillon Road
Joshua Tree National Park
Indian Canyon Drive
Gene Autry Trail
Coachella Valley Multiple Species Habitat Conservation Plan Area
Highway 111
Varner Road
Vista Chino
Thousand Palms Canyon Road
Palm Springs International Airport
Landau Boulevard
30th Avenue
Palm Springs
Thousand Palms
Ramon Road
Date
Palm Drive
DaVall Drive
Palm Canyon Drive
Dinah Shore Drive
Bob Hope Drive
Monterey Avenue
Portola Av.
Cook Street
Interstate 10
Washington Boulevard
Cathedral City
Gerald Ford Drive
Frank Sinatra Drive
Rancho Mirage
Eisenhower Memorial Hospital
Country Club Drive
Avenue 42
College of the Desert
Palm Desert
Fred Waring Drive
Avenue 44
Highway 111
Indian Wells
Indio
Interstate 10
Highway 111
Dillon Road
Avenue 48
Jefferson Street
Madison Street
Monroe Street
Jackson Street
Van Buren Street
State Route 865
La Quinta
Coachella
Ave. 52
Highway 111
Pines to Palms Highway
Ave. 54
Project Site
Legend
Freeway Interchange
City
Community
Endo Engineering
Scale: 1" = 2.5 Miles

Figure 2-2
Vicinity Map



Endo Engineering

Scale: 1" = 945'

The estate has also been booked as a private event grounds for upscale social gatherings, corporate dinner parties, fund raisers, and other social activities. When the existing facilities on-site have been rented for short-term social activities (dinners, fund raisers, etc.) the events typically lasted a few hours and occurred on weekends or on weekdays, after the evening peak hour on the adjacent streets. Weekday events have typically started between 7:00 p.m. and 8:00 p.m.

During the peak season, the Merv Griffin estate was booked for an average of two dinner/parties per month. No bookings occurred during the summer months. Eight dinner parties were scheduled for the first ten months of the year 2014. This year, two dinners were held during January and four were booked during April.

Temporary Use Permit 2014-1252 was issued for a major event held in March at the Merv Griffin estate in connection with the 2014 Coachella Valley Music and Arts Festival. During that major event, up to 375 of the music festival patrons gathered to socialize at the Merv Griffin estate.

2.3 Project Description

The currently proposed project includes: the Griffin Lake Estates Specific Plan 2168, and Tentative Tract Map 36744 for the 39.79 gross acre parcel (APN 767-320-013) surrounded on three sides by the Griffin Ranch Specific Plan. The proposed project is not part of the previously approved Griffin Ranch Specific Plan 2004-074 or the associated Tentative Tract Map 32879.

As shown in Figure 2-3, the proposed project would restore and preserve the Merv Griffin estate by retaining and upgrading the existing estate facilities on 5.15 acres within the northwest corner of the site (Lot 79 in Figure 2-3) for continued use as a gated luxury residential rental and private event grounds. The remaining area within the site would be developed as a gated high-end residential enclave surrounding a private 5.97-acre recreational lake (Lot "A" in Figure 2-3) with boat docks for residents.

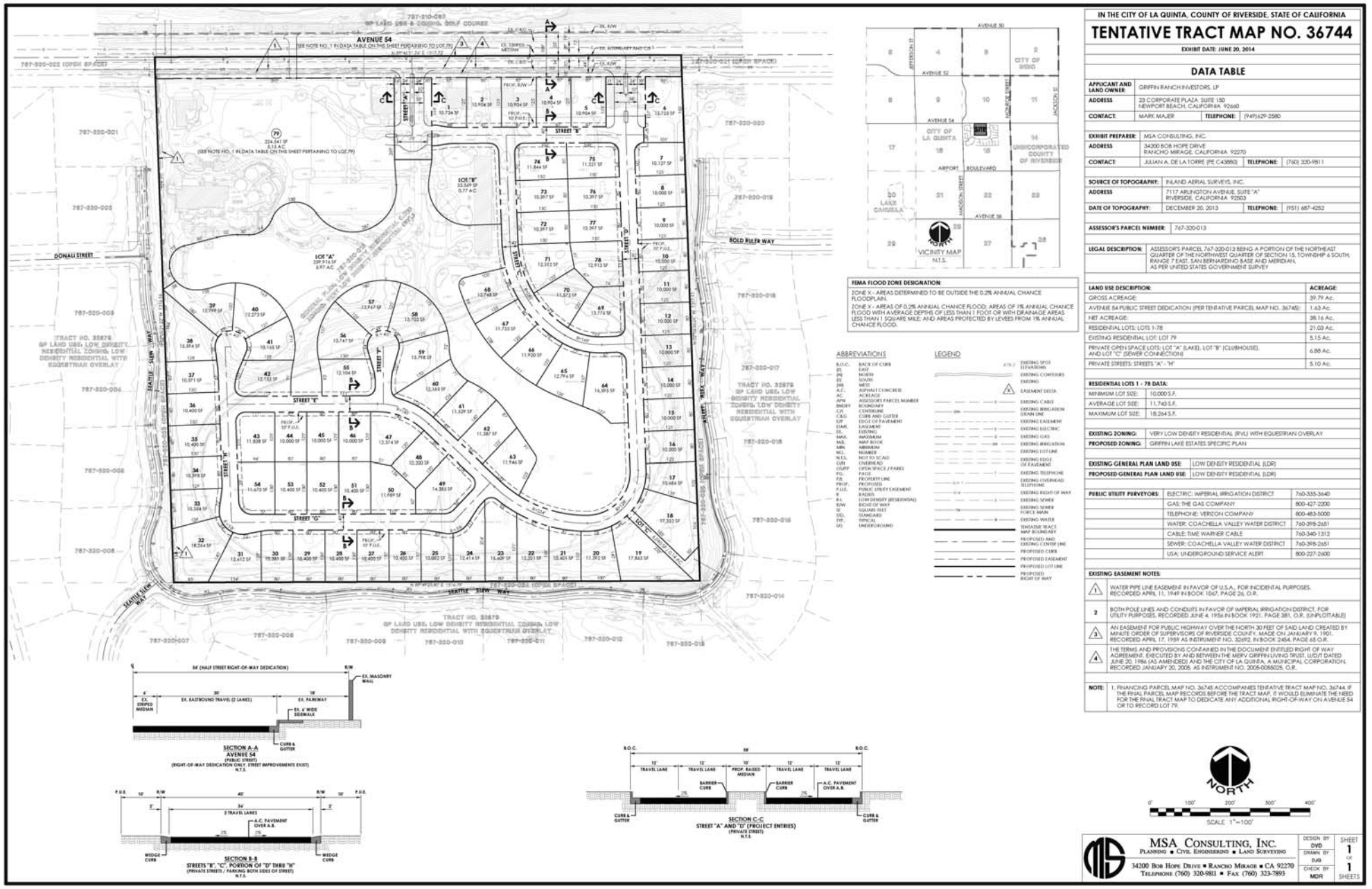
A total of 78 single-family residential dwelling units are proposed along the north, east, and south side of the recreational lake. A portion of the existing Merv Griffin estate stables located adjacent to the lake would be converted into a community recreation center. The project could be completed by the year 2017.

Two existing gated driveways on Avenue 54 are currently being used at the property. The Primary Site Access is located near the middle of the project site, approximately 0.37 miles east of Madison Street. The Secondary Site Access is currently located at the eastern property boundary. With the proposed project, the main gated driveway would be retained at its current location (Street "A" in Figure 2-3). However, the existing Secondary Access would be relocated closer to the Primary Access, approximately 125 feet west of its current location. As shown in Figure 2-3, this would align the future gated Residential Access opposite internal Street "D" to better serve the future residential component of the development.

Separate and controlled access to each component of the on-site development would be provided, as shown in Figure 2-3. The gated entrance to the luxury estate rental facilities (Lot 79 in Figure 2-3) would be located on the west side of the southern terminus of Street "A". A separate gated entrance to the residential enclave would be located on the east side of the main entry. The bulb at the southern terminus of Street "A" would be designed to accommodate non-accepted vehicles by providing space for them to turn around and exit the site without entering either gate.

The Residential Access (Street "D" in Figure 2-3) would be constructed with a transponder-controlled gate. Since the eastern access would provide the most convenient and direct access for most of the residential development, approximately 85 percent of the residential traffic was assumed to use Street "D" for access. Adequate queue storage space and a turn-around area for non-accepted vehicles would be provided on Street "D" outside of the access gate. The remaining fifteen percent of the future residential trips were assumed to use the Estate Access (Street "A") except during major events.

Figure 2-3
Site Development Plan (TTM 36744)



The project appears to be consistent with the *La Quinta 2012 General Plan* land use designation of the project site, which is Low Density Residential (LDR). The project site was included in the *La Quinta 2012 General Plan* Preferred Alternative year 2035 traffic model projections of peak season average weekday trips. Since the proposed project appears to be consistent with the General Plan land use, a General Plan buildout traffic impact analysis is not required. The existing zoning designation of the site is RVL (Very Low Density Residential) with an equestrian overlay. The 78 residential lots would occupy 21.03 acres.

Overnight Rentals/Social Events

Attachment B in Appendix A summarizes the proposed future overnight rental and private event guidelines for the Merv Griffin estate facilities located in the northwest portion of the project site (Lot 79 in Figure 2-3). With the proposed project, the Merv Griffin estate facilities may be rented by families with up to 24 guests and 12 vehicles vacationing for periods ranging from two nights to a week. The Merv Griffin estate facilities may be used for overnight rentals up to four times per month.

In addition to overnight rentals, the estate facilities may be used for minor and moderate private short-term social events (such as desert retreats, political functions, corporate events, executive dinner parties, etc.) that do not include overnight stays. These bookings may occur up to five times per month (four minor events and one moderate event) during the peak season. Minor events may include up to 50 guests with up to 26 vehicles in the future. Moderate events may accommodate up to 100 guests and up to 50 vehicles in the future. Minor and moderate events may include on-site valet service.

In addition to the minor and moderate events, major events may occur up to two times per year in the future. These major events would be consistent with the provisions identified in Temporary Use Permit 2014-1252, which was issued prior to the 2014 Coachella Valley Music and Arts Festival. Up to 450 guests would be allowed on-site over a three-day period during a major event. The sponsor of the event will contract with the Riverside County Sheriff's Department for traffic and crowd control as well as internal/external security.

Proposed Site Access and Internal Circulation

Figure 2-3 shows the site access and internal circulation system planned to support the proposed land uses within the Griffin Lake Estates Specific Plan area. The letter designations assigned to the internal streets (Street "A" through Street "H") are shown in Figure 2-3**.** The two full-turn site access intersections would be located at Street "A" and at Street "D".

The site access plan proposed to support the ultimate development of the project site would include two unsignalized T-type intersections along Avenue 54. The Residential Access (at Street "D") would serve only traffic associated with the proposed residential development. The Secondary Site Access shown in Figure 2-2 would be relocated 125 feet to the west of its existing location and improved as the Residential Access (approximately 545 feet east of the proposed Estate Access). The Estate Access (at Street "A") would serve the Merv Griffin estate facilities located in Lot 79 and also provide a gated access for the residential component of the project.

Project Phasing

The proposed development would be constructed in a single phase. Consequently, the opening year and the project buildout year are expected to be the same. Full development and occupancy of the proposed development is expected to occur in the year 2017.

3.0 METHODOLOGY

The pages that follow document the City of La Quinta specifications for the traffic impact study evaluating the proposed development. A letter formalizing the agreements made between Endo Engineering and City staff, regarding the scope of the analysis and the key parameters and assumptions utilized in the development of the traffic impact study is included in Appendix A. This letter was submitted to the City of La Quinta on June 20, 2014 for review and approval. The City's e-mail response to the letter (dated July 21, 2014) is also included in Appendix A.

3.1 Scenarios Evaluated

Peak season weekday morning and evening peak hour conditions were evaluated at the key intersections. The following scenarios were evaluated in conjunction with this traffic study:

- Existing Conditions (Year 2014 Peak Season);
- Existing+Project Buildout Conditions;
- Year 2017 Ambient Conditions (with background traffic growth calculated by interpolating between existing and year 2035 General Plan Buildout Conditions);
- Year 2017+Project Buildout Conditions; and
- Year 2035+Project Buildout Conditions (at the two site access intersections only).

Since the proposed project is consistent with the land use assumptions in the *La Quinta General Plan Update Traffic Study* (Iteris, May 14, 2012), the traffic analyses herein address the project buildout year of 2017. An evaluation of General Plan buildout conditions was not required except at the two proposed site access intersections.

As described in EB 06-13, the future traffic volumes were calculated by interpolating between existing (year 2014) traffic volumes and the City's General Plan buildout (year 2035) traffic projections. The existing peak hour traffic volumes for the two key intersections were counted during the morning and evening peak hours and seasonally adjusted with a 7.5 percent expansion factor. The City's General Plan buildout morning and evening peak hour traffic volumes were obtained from Figure 11 (Intersections 30 and 34) in the *City of La Quinta General Plan Circulation Element Update Traffic Impact Analysis,* (May 14, 2012; Iteris, Inc.).

Year 2017 ambient background traffic volumes were obtained by interpolating between the year 2014 existing traffic volumes and peak hour General Plan buildout volumes for both key intersections. Since the existing westbound right-turn morning peak hour count at the intersection of Monroe Street and Avenue 54 exceeded the year 2035 General Plan traffic model projection, the year 2035 westbound right-turn morning peak hour volume was assumed to be the existing peak season turning volume, after it was expanded by ten percent.

3.2 Seasonal Traffic Variations

An analysis of the peak-season weekday morning and evening peak hour of the adjacent streets is required. The morning peak hour has been identified by the City of La Quinta as occurring between 6:00 a.m. and 8:30 a.m. and the evening peak hour has been identified as being between 2:30 p.m. and 5:30 p.m.[1]

New peak hour traffic counts were made by Counts Unlimited, Inc. at the two key intersections on Wednesday, April 30, 2014. The traffic counts were made from 5:30 a.m. until 9:00 a.m. and from 2:30 p.m. until 5:30 p.m., consistent with the City of La Quinta in Bulletin #06-13. The new peak hour traffic count data is included in Appendix B.

[1] Mr. Timothy R. Jonasson, Public Works Director/City Engineer, City of La Quinta, *Engineering Bulletin #06-13,* April 7, 2014.

Seasonal fluctuations in traffic demand reflect trip purposes and the activity in the area served by the roadways. The Coachella Valley is relatively isolated from neighboring urbanized regions and is home to hundreds of resort facilities and retirement communities. In the Coachella Valley, a large tourist and retired population, supported by large service sector employment, generates travel patterns that are, in many ways, atypical of Southern California. Approximately 3.5 million people visit the Coachella Valley each year. The tourist season extends from October to May, with the tourist population peak beginning in January and ending in March. Traffic volumes in the study area are subject to significant seasonal fluctuations, as the population swells in the winter and spring with tourists and "snow birds," then decreases as they leave to avoid the heat during the summer months.

Engineering Bulletin #06-13 specifies that a five percent seasonal expansion be applied to counts completed in April, and a ten percent seasonal expansion be applied to counts completed in May. Since the counts were made on the last day of April, a 7.5 percent seasonal expansion factor was applied to increase the peak hour traffic counts to reflect year 2014 peak season conditions.

3.3 Highest-Volume Hours

Based upon a 24-hour traffic count made on November 5, 2009 on Madison Street, south of Avenue 56, 8.7 percent of the daily traffic occurs during the highest hour (3:00 p.m. - 4:00 p.m.). This 8.7 percent expansion factor was used to estimate the daily traffic volumes throughout the study area from the peak season evening peak hour traffic volumes.

3.4 Level of Service Definitions

Levels of service (LOS) are commonly used to describe how well a transportation facility operates from the traveler's perspective. Levels of service use a familiar scale ranging from LOS A (best) to LOS F (worst). Levels of service can be used to describe the performance of a highway segment or intersection with LOS A used to characterize essentially free flow operation and LOS F used to reflect substantial congestion, long delays and stop-and-go operation. LOS has been widely adopted as a standard or criterion on which decisions are based regarding the approval of land development, upgrading traffic control systems, and allocating costs for mitigating traffic impacts.

Intersection Level of Service

A change in average control delay from 20 to 30 seconds per vehicle (i.e., LOS C to LOS D) indicates that the roadway performance has transitioned from one range to another and that change would be perceived by drivers. An increase in average delay with no change in LOS should not be perceived as significant by drivers.

Levels of service are defined by one or more measures of effectiveness such as: speed and travel time, traffic volume, geometric features, traffic interruptions, delays, the ability to move freely, driver comfort and convenience, and vehicle operating costs. For peak hour traffic operations at intersections, the six levels of service are based on relative levels of driver acceptability of delay. Since drivers are willing to accept more delay at signalized than unsignalized intersections, separate ranges of delay have been identified for LOS based on the intersection control type, as shown in Table 3-1. The unsignalized values apply to intersections with either TWSC or AWSC as well as roundabouts.

Roadway Link Vehicular Level of Service

The *City of La Quinta 2012 General Plan* (Table II-6) describes the LOS for mid-block roadway links as follows. LOS A corresponds to a V/C ratio of 0.60 or less. LOS B corresponds to a V/C ratio of 0.61 to 0.70. LOS C corresponds to a V/C ratio of 0.71 to 0.80. LOS D corresponds to a V/C ratio of 0.81 to 0.90. LOS E corresponds to a V/C ratio of 0.91 to 1.00. LOS F corresponds to a V/C ratio greater than 1.00.

Table 3-1
Intersection Level of Service Criteria

Level of Service (LOS)	Average Control Delay (Seconds/Vehicle)		Traffic Flow Characteristics
	Signalized	Unsignalized	
A	≤ 10	≤ 10	Good progression, few stops, and short cycle lengths. Most vehicles arrive during the green phase and many do not stop. Little or no delay at unsignalized intersections.
B	> 10 and ≤ 20	> 10 and ≤ 15	Good progression, short cycle lengths or both. More vehicles stop than with LOS A, causing higher levels of average delay. Short delays at unsignalized intersections.
C	> 20 and ≤ 35	> 15 and ≤ 25	Satisfactory operation with fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear. Cycle failure occurs when a given green phase does not serve queued vehicles and overflow occurs. A significant number of vehicles stop but many pass through without stopping. Average delays at unsignalized intersections.
D	> 35 and ≤ 55	> 25 and ≤ 35	Tolerable delay, where congestion becomes more noticeable and many vehicles stop. Individual cycle failures are noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Long traffic delays at unsignalized intersections.
E	> 55 and ≤ 80	> 35 and ≤ 50	Unstable flow with poor progression, frequent cycle failures, long cycle lengths and high V/C ratios. Individual cycle failures and long queues are frequent occurrences. This is considered the limit of acceptable delay by many agencies. Very long traffic delays at unsignalized intersections.
F	> 80	> 50	Considered unacceptable to most drivers. Arrival flow rates exceed the discharge capacity of intersection with many individual cycle failures. Poor progression and long cycle lengths as well as high V/C ratios and high delay. Unacceptable traffic delays at unsignalized intersections.

Source: *Highway Capacity Manual,* Special Report 209, Transportation Research Board, Fourth Edition, 2000; pp. 10-16.

The HCM 2000 (Exhibit 15-2) defines the LOS for urban street links as a function of the average travel speed by urban street class. Each class reflects a different range of free-flow speeds. Class I reflects free-flow speeds of 45 mph to 55 mph. Class II reflects free-flow speeds of 35 mph to 45 mph. Class III reflects free-flow speeds of 30 mph to 35 mph. Class IV reflects free-flow speeds of 25 mph to 35 mph. A series of LOS criteria are provided for each urban street class, based upon the average travel speed on the facility being evaluated. The lower the average travel speed, the worse the LOS. LOS D is characterized by an average travel speed of 21-27 mph on a Class I street, 17-22 mph on a Class II street, 14-18 mph on a class III street and 9-13 mph on a Class IV street.

The HCM 2010 defines a "link" as a length of roadway between two points and a "segment" as a link and its boundary points, which may be intersections or ramp terminals.[2] The HCM 2010 defines vehicular levels of service for urban and suburban street links and segments with interrupted flow (i.e., those with fixed causes of periodic delay such as traffic signals and STOP signs spaced less than two miles apart) as shown in Table 3-2.

In the 2010 HCM, LOS A reflects primarily free-flow operation with a travel speed that exceeds 85 percent of the base free-flow speed. LOS B is characterized by: travel speeds between 67 and 85 percent of the base free-flow speed, reasonably unimpeded operation, insignificant control delay, and only slightly restricted maneuverability. LOS C represents stable operation with longer queues at the boundary intersection, lower travel speeds (between 50 and

[2] Transportation Research Board of the National Academies. *Highway Capacity Manual* (HCM 2010) Volume 3: Interrupted Flow. Washington, D.C. (page V3-i).

67 percent of the base free-flow speed). LOS D indicates a less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed (i.e., travel speeds between 40 percent and 50 percent of the base free-flow speed). LOS E is characterized by unstable operation and significant delay, with travel times 30 percent to 40 percent of the base free-flow speed. LOS F reflects extremely low speed flow with high levels of delay and extensive queuing and travel speeds 30 percent or less of the base free-flow speed.[3]

Table 3-2
Levels of Service on Roadway Links

Level of Service	Travel Speed as a Percentage of Base Free-Flow Speed[a]	Traffic Flow Characteristics[b]
A	>85%	Primarily free-flow operations at average travel speeds at or near the free-flow speed for the arterial classification. Vehicles maneuvering within the traffic stream are completely unimpeded. Control delay at the boundary intersection is minimal.
B	67%-85%	Reasonably unimpeded operations. Ability to maneuver within the traffic stream is only slightly restricted. Stopped delays are short and not bothersome.
C	50%-67%	Stable operation. Ability to maneuver and change lanes in mid-block locations may be more restricted. Lower average travel speeds and longer queues. Motorists will experience appreciable tension while driving. Adverse signal coordination may contribute. Average delays at unsignalized intersections.
D	40%-50%	Small increases in flow may cause substantial increases in approach delay and decreases in arterial travel speed. Adverse signal progression, inappropriate signal timing, and/or high volumes may be contributing factors. Lowest LOS considered acceptable.
E	30%-40%	Significant approach delays caused by a combination of inappropriate signal timing, adverse signal progression, high traffic signal density (>two signals/mile), high traffic volumes, extensive queuing and delay at critical intersections. V/C ratio ≤ 1.0.
F	< 30%	Arterial flow at extremely low speeds. Intersection congestion at critical boundary intersection is likely with high approach delays and extensive queuing. Poor progression and long cycle lengths are frequently a factor. V/C ratio >1.0.

a. Travel speed for through vehicles in one travel direction (i.e., the average running speed along the link) including the delay incurred by through vehicles at the boundary intersection. LOS criteria for a given direction of travel by automobile mode along an urban or suburban street segment (per the 2010 *Highway Capacity Manual*, Exhibit 17-2, pp17-7). The V/C ratio reflects the through movement at the downstream boundary intersection.
b. *Highway Capacity Manual,* Special Report 209, Transportation Research Board, Fourth Edition, 2000; pp. 10-16.

Roadway Capacity

A given lane or roadway may provide a wide range of service levels, depending upon traffic volumes and speeds. Roadway capacity has been defined as the maximum number of vehicles that can pass over a given roadway during a given time period under prevailing roadway and traffic conditions. The capacity of a roadway that is used for design purposes (which is the upper limit of LOS D in La Quinta) is the level at which the facility is handling the maximum traffic volume that it can accommodate while maintaining an acceptable level of driver satisfaction.

The maximum capacity of a roadway is generally defined at the upper limit of LOS E and reflects the maximum traffic volume that a roadway can theoretically handle. It is usually given as the hourly service volume at the upper limit of LOS E, because the volume of traffic that can be served under the stop-and-go conditions associated with LOS F

[3] Transportation Research Board of the National Academies. *Highway Capacity Manual* (HCM 2010) Volume 3: Interrupted Flow. Washington, D.C. (page 17-6 and 17-7).

is lower than that possible at LOS E. Therefore, the upper limit of LOS E corresponds to the maximum flow rate or "physical" capacity of the facility. The maximum capacity is determined from roadway factors (such as lane widths, lateral clearance, shoulders, surface conditions, alignment and grades) as well as traffic factors (such as vehicle composition i.e. truck and bus mixture, distribution by lane, peaking characteristics, traffic control devices, intersections, etc.).

Street geometric design features that may be less than ideal and adversely affect operating conditions include: narrow lanes and/or shoulders, street grades, constrained design speeds (sharp horizontal and vertical curves), excessive or poorly spaced intersections, private driveways for adjacent development, and a lack of turn lanes. The *Highway Capacity Manual* can be used to identify these features and determine the traffic volumes that can be served by streets with less than ideal design features.

The upper limit of LOS E represents the absolute maximum capacity under ideal conditions on typical master planned roadways. Ideal conditions assume good weather, good pavement conditions, users familiar with the facility, level terrain, only passenger cars in the traffic stream, no pedestrians or curb parking, and no incidents impeding traffic flow. The LOS E maximum capacity values reflect the absolute maximum volume under ideal conditions (assuming improvement to full standards under optimum operating conditions). This level of service is characterized by unstable flows, extremely high volumes, limited operating speeds, and intermittent vehicle queuing.

The maximum capacity values shown in Table 3-3 have been applied at the General Plan level as guidelines relating the daily traffic volume to the number of lanes needed mid-block to serve that volume. The roadway capacity estimates in Table 3-3 are "rule-of-thumb" estimates affected by site specific factors such as the number and configuration of intersections, the degree of access control, roadway grades, substandard design geometrics (horizontal and vertical alignment), sight distance, the level of truck and bus traffic, the percentage of turning movements, and the level of pedestrian and bicycle traffic.

Table 3-3
Maximum Daily Capacity By Roadway Classification

Classification	Typical Lane Configuration[a]	Daily Capacity[b]
Major Arterial	6-Lane Divided Roadway	61,100 Vehicles/Day
Primary Arterial	4-Lane Divided Roadway	42,600 Vehicles/Day
Secondary Arterial	4-Lane Undivided Roadway	28,000 Vehicles/Day
Modified Secondary	2-Lane Divided Roadway	19,000 Vehicles/Day
Collector Street	2-Lane Undivided Roadway	14,000 Vehicles/Day
Local Street	2-Lane Undivided Roadway	9,000 Vehicles/Day

a. The number of mid-block through lanes is shown as well as whether each roadway is a divided or undivided facility. Divided roadways can typically accommodate left-turn lanes at intersections.

b. The daily capacity values shown reflect the upper limit of LOS 'E'. These daily capacity estimates have been used by the City of La Quinta in General Plan level analyses as a guidelines relating the daily traffic volume to the number of mid-block lanes needed to serve that volume. Where it is not feasible to add additional mid-block through lanes, localized mitigation may be utilized (e.g. additional turn lanes at intersections, access restrictions, signal synchronization, etc.) to ensure that acceptable peak hour levels of service are maintained.

For planning purposes, "design" capacities at the upper limit of LOS D are used to ensure a more acceptable quality of service to facility users than the "physical" carrying capacity of the roadway and because of the expense required to achieve a better level of service. LOS D is characterized high density but stable flows, with tolerable operating speeds being maintained, albeit significantly affected by changes in operating conditions. With LOS D operation, fluctuations in volume and temporary restrictions to flow may cause substantial drops in operating speeds.

A "segment" includes a "link" and its boundary "points". A "point" is an intersection or ramp terminal that represents the boundary between roadway "links". A roadway "link" is the roadway between two points. A roadway link and its boundary points (intersections) must be evaluated together to provide an accurate indication of overall street "segment" performance. For a given direction of travel along a roadway "segment", the link and the downstream point performance measures are combined to determine overall segment performance. Consequently, to evaluate a two-way street "segment", both travel directions must be evaluated as well as the signal at each end.[4]

3.5 Applicable Performance Standards

The City of La Quinta has established LOS D as the peak hour and daily system performance standard or design guideline for traffic volumes on the roadway system.

Peak Hour LOS Standard

The City of La Quinta has established LOS D as the minimum level of service for intersections and street segments. Engineering Bulletin #06-13 (EB 06-13) states: "*Intersections with all-way stop control (AWSC) shall have a LOS 'D' or better for all critical movements."* A single level of service is defined in the HCM for unsignalized intersections with AWSC. Therefore, the LOS D performance standard for intersections with AWSC was assumed to apply to the weighted average control delay associated with the intersection as a whole.

Engineering Bulletin #06-13 states: *"The side street at intersections with two-way stop control (TWSC) shall have a LOS 'E' based on the latest HCM delay methodology."* A single level of service is not defined by the HCM for unsignalized two-way stop-controlled (TWSC) intersections as a whole, but rather for the minor-street approaches and the conflicting left-turn moves from the major street. Therefore, each TWSC intersection where LOS E was projected to be exceeded on the approach with the most delay was identified and evaluated on an individual basis, to determine the appropriate mitigation. One factor that can influence the mitigation decision is the number of vehicles that are expected to be making the movement with the most delay. Since the installation of a traffic signal is often considered as mitigation in these cases, another factor to be considered is the appropriate spacing of signalized intersections. A third consideration is whether or not alternative routes are available to accommodate motorists during peak hours if a site access intersection has approaches or movements that would not provide LOS D or better levels of service.

Daily LOS Standard

A maximum acceptable daily volume-to-capacity (V/C) ratio of 0.90 (the upper limit of LOS D) is used by the City of La Quinta for all road segments, based on their functional classification. Any master planned roadway segments projected to have a daily V/C ratio exceeding 0.90 were identified as potentially significant impacts. The widening required to mitigate the potential impact was also identified.

For each scenario, daily traffic volumes throughout the study area were projected and a daily V/C ratio segment analysis was performed. The V/C analysis assumed the daily capacities at the upper limit of LOS E shown in EB 06-13. Although no daily capacity was identified in EB 06-13 for a three-lane divided roadway, it would be between 19,000 VPD (the capacity associated with a two-lane divided roadway) and 28,000 VPD (the capacity associated with a four-lane undivided roadway).

The *City of La Quinta 2035 General Plan* identifies the upper limit of LOS E as corresponding to a daily volume-to-capacity ratio of 1.00. A daily volume-to-capacity ratio that exceeds 1.00 reflects operation at LOS F. The upper limit of LOS D corresponds to a daily V/C ratio of 0.90. The upper limit of LOS C corresponds to a V/C of 0.80. The upper limit of LOS B corresponds to a V/C of 0.70. and the upper limit of LOS A corresponds to a V/C of 0.60.

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[4] *Highway Capacity Manual (HCM 2010),* Fifth Edition, Transportation Research Board, Washington, D.C., December 2010., page 17-5.

3.6 Thresholds of Significance

The City of La Quinta has adopted potential thresholds of significance in Engineering Bulletin #06-13 for both intersections and roadway segments. These thresholds of significance refer to project-related changes in LOS and and control delay are used to identify potential mitigation measures. Subject to the City Council's final determination and findings, a potentially significant project-specific traffic impact may become a traffic impact that requires mitigation.[5]

Both intersections and street segments must be evaluated for existing-plus-project and future-plus-project buildout conditions (in the year 2017) to identify potentially significant project-specific impacts. A potentially significant project-specific impact occurs at an unsignalized intersection when: (1) project-related traffic results in a projected LOS F on a side street at an intersection with TWSC; or (2) LOS E or worse is projected for an AWSC intersection and the project-related traffic results in the addition of 3 seconds or more of delay for any movement.

3.6 Intersection Operational Analysis Methodology

The *Highway Capacity Manual* (HCM) presents the best available techniques for determining capacity, delay and LOS for transportation facilities.[6] The peak hour control delay and levels of service were determined for the key intersections with the methodologies outlined in the HCM. The Highway Capacity Software (HCS 2010 Version 6.3; Copyright: May 3, 2012) was utilized to evaluate the key intersections. The HCS 2010 software is a direct computerized implementation of the HCM 2010 procedures, prepared under FHWA sponsorship and maintained by the McTrans Center at the University of Florida Transportation Research Center. This version of the HCS 2010 software uses HCS+ Version 5.6, (Copyright 2010) to evaluate STOP controlled intersections. The evaluation of intersections with all-way STOP control is restricted to a maximum of two approach lanes in each direction. Since the intersection of Madison Street with Avenue 54 has more than two lanes on all approaches, the HCS model results represent a conservative analysis.

At two-way STOP-controlled (TWSC) intersections, the major street is uncontrolled while the minor street is controlled by STOP signs. The HCM 2010 procedures for TWSC intersections described in Chapter 19 are applicable to major streets with up to three through lanes (either shared or exclusive) in each direction and up to three lanes on the minor-street approaches (with no more than one exclusive lane for each movement on the minor-street approach). The vehicular LOS is determined as a function of the control delay for each minor-street movement (or shared movement) as well as the major-street left turns. LOS is not defined for the intersection as a whole or for the major-street approaches. LOS F is assigned to a movement if the volume-to-capacity (V/C) ratio for the movement exceeds 1.0, regardless of the control delay. Special circumstances that may exist at TWSC intersections and can be evaluated include: (1) two-stage gap acceptance; (2) approaches with shared lanes; (3) upstream traffic signals; and (4) flared approaches for vehicles turning right from the minor street. The HCM 2010 methodology in Chapter 21 was used to evaluate the operational performance of two-lane roundabouts.

Peak Hour Factor

For both the existing and near-term (year 2017) scenarios, the peak hour factor (PHF) assumed was that determined from the peak hour traffic counts at the existing key intersections. A PHF of 1.0 was assumed for General Plan buildout conditions at the two site access intersections.

Heavy Vehicle Mix

A five percent heavy vehicle mix was assumed for the baseline and future scenarios. This assumption for roadways south of Avenue 52, is consistent with the direction provided by City staff for the approved *Isle of Travertine Specific Plan Amendment No. 1 Traffic Impact Study* (Endo Engineering; November 2008).

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[5] Mr. Timothy R. Jonasson, Public Works Director/City Engineer, City of La Quinta, *Engineering Bulletin #06-13,* April 7, 2014.

[6] *Highway Capacity Manual,* Fourth Edition, TRB Report 209, Transportation Research Board, National Research Council, Washington, D.C., 2000.

4.0 AREA CONDITIONS

Figure 4-1 depicts the study area and the two key intersections as well as the two proposed site access connections on Avenue 54. Regional access is currently available from Madison Street, Monroe Street, and Avenue 54. As shown in Figure 2-2, direct site access is currently provided by Avenue 54 via two existing gated full-turn access connections: (1) the Primary Site Access for the Merv Griffin estate, and (2) the Secondary Access for the Merv Griffin estate. The proposed Estate Access (see Figure 4-1) would be constructed at the same location as the existing Primary Site Access for the Merv Griffin estate. However, the Residential Access proposed to serve the Griffin Lake Estates Specific Plan would be located 125 feet west of the existing Secondary Access for the Merv Griffin estate (which would be eliminated).

The existing traffic control devices, posted speed limits, and number of mid-block travel lanes are shown in Figure 4-2, based upon field reconnaissance in the project vicinity. Divided facilities typically provide sufficient pavement width for left-turn pockets at intersections and at mid-block median openings. Undivided facilities require left-turning motorists to queue in the through lane, requiring through traffic to wait until they complete their turn and reducing the carrying capacity of the roadway.

4.1 Study Area and Key Intersections

The analysis herein is consistent with the "Traffic Impact Memo and Traffic Impact Study Guidelines" established by the City of La Quinta in Engineering Bulletin #06-13 (dated April 7, 2014), as modified through coordination with City staff. The City of La Quinta has identified the study area and key intersections, as shown in Figure 4-1. Two existing key intersections were evaluated within the study area, including: (1) Madison Street at Avenue 54 and (2) Monroe Street at Avenue 54. In addition, the two proposed site access intersections were evaluated: (1) Street "A" at Avenue 54 (the Estate Access), and (2) Street "D" at Avenue 54 (the Residential Access).

The Circulation Element roadway segments adjacent to each of the key intersections were evaluated. A daily volume-to-capacity ratio was calculated for each roadway segment to determine whether or not the daily volume-to-capacity ratio would exceed the City of La Quinta minimum performance standard of 0.90. The analysis of the daily volumes on these roadway segments also allowed the project-specific impacts and the cumulative impacts to be evaluated.

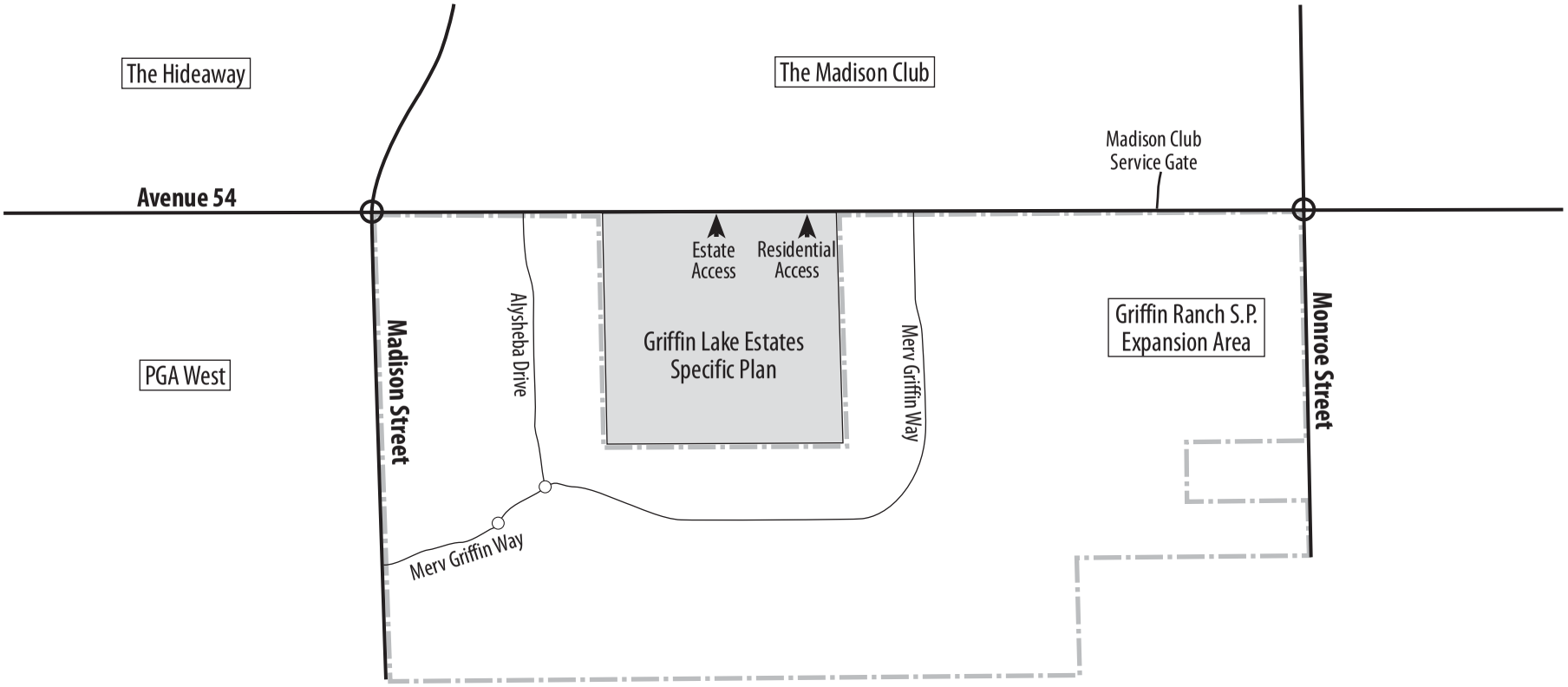
4.2 Study Area Land Use

The project site is currently developed as the Merv Griffin estate. It is surrounded on the west, south and east by the partially constructed Griffin Ranch Specific Plan. The Madison Club is under construction north of Avenue 54, opposite the project site. The area east of Monroe Street within the study area is in unincorporated Riverside County and within the Sphere of Influence of the City of La Quinta.

The Griffin Ranch Specific Plan 2004-074 (TTM 32879) included 199 acres located south of Avenue 54 and east of Madison Street where an equestrian oriented single-family residential development was approved with 303 dwelling units. The subsequent Griffin Ranch Specific Plan 2004-074 Amendment No. 1 added the Griffin Ranch Expansion Area **(**TTM 34642). The Specific Plan area currently includes 245 acres south of Avenue 54, between Madison Street and Monroe Street. This equestrian-oriented community will ultimately include 393 single-family detached residential dwelling units. The *Residential Case Activity Report* indicates that as of April, 2013, a total of 67 homes were constructed within the Griffin Ranch development.

The Griffin Ranch Expansion Area (TTM 34642) 45.04 acres located on the southwest corner of the intersection of Madison Street with Avenue 54. This site was adjacent to the eastern boundary of the Griffin Ranch Specific Plan and north of the Saddle Club at Griffin Ranch. The Griffin Ranch Specific Plan Amendment No.1 was processed for this site and approved for the development of 90 single-family equestrian-oriented residential lots with an internal

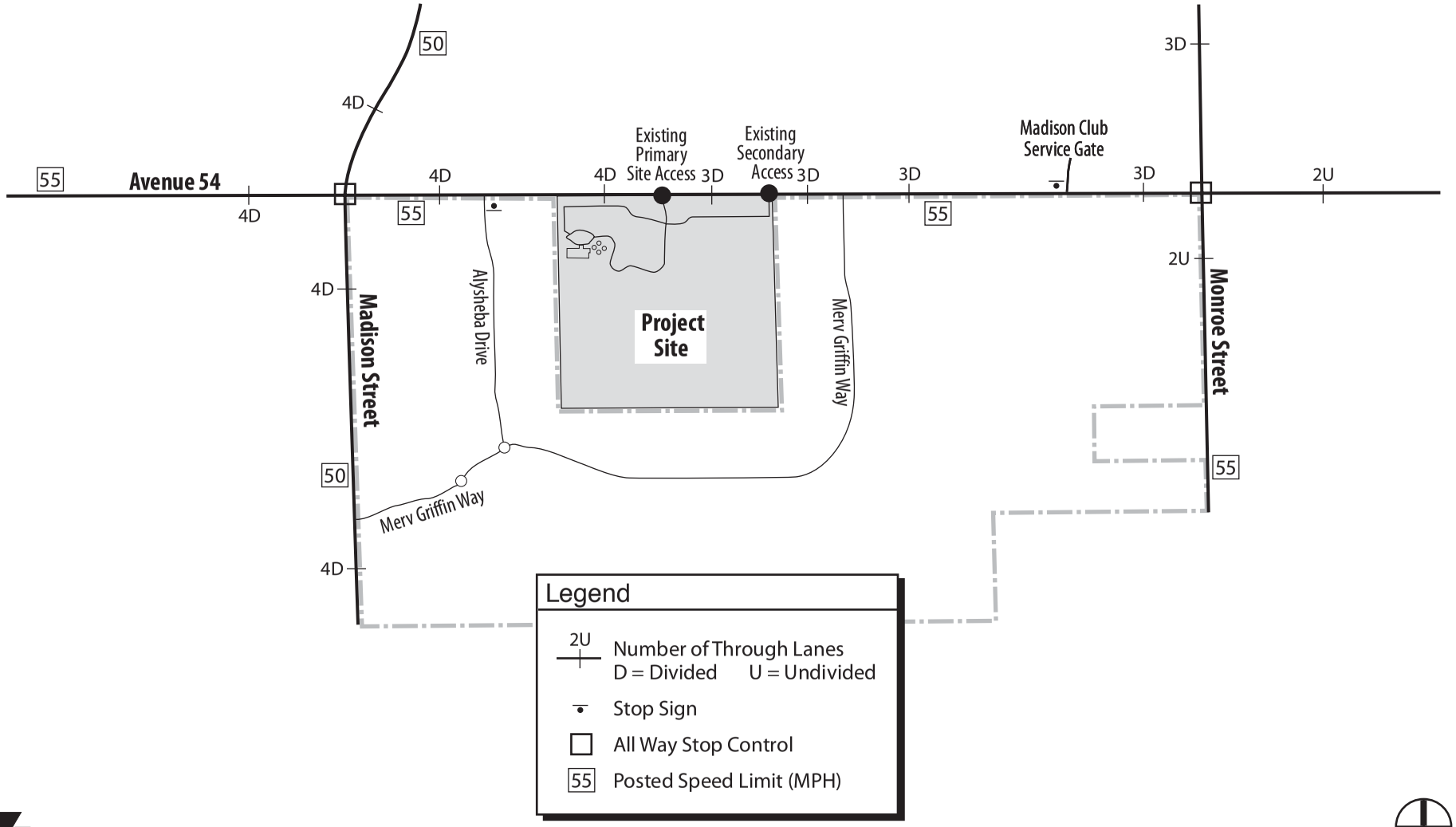
Figure 4-1
Study Area and Key Intersections



Endo Engineering

Scale: 1" = 945'

Figure 4-2
Surrounding Street System



Endo Engineering

Scale: 1" = 945'

connection to Merv Griffin Way and the Saddle Club at Griffin Ranch. A right-in/right-out access was also proposed on Monroe Street, approximately 1,120 feet south of Avenue 54 to serve approximately 23 percent of the trips generated by the development.

The Saddle Club at Griffin Ranch is a 15-acre private equestrian riding and boarding center for up to 90 horses located southeast of the project site and west of Monroe Street. The equestrian facilities are available to tenants and lot owners of the Griffin Ranch. Twenty-five percent of the horse stalls are limited to non-homeowners. Private equestrian trails are being developed as part of the Griffin Ranch Specific Plan that connect to public multi-purpose trails being required on Madison Street, Avenue 54, and Monroe Street by the City of La Quinta.

The Madison Club (TTM 33076) is a private 18-hole golf course with 193 estate-sized custom home sites being developed on 470 acres located north of Avenue 54, between Madison Street and Monroe Street. As of April, 2013, a total of 55 homes had been constructed within this development.

The Hideaway Golf Club (TTM 29894) is a 36-hole golf course and custom home residential development being constructed on a 530-acre site located west of Madison Street, between Avenue 52 and Avenue 54. The City of La Quinta Planning Department *Residential Case Activity Report* (April, 2013) indicates that 308 of the 467 single-family residential dwelling units approved for this development have been completed.

The PGA West Specific Plan area occupies 2,200 acres located between Avenue 54 and Avenue 58, on both sides of Madison Street. With approximately 3,000 residential dwelling units, six golf courses, and the Residence Club constructed, the PGA West community is nearing completion. The development is expected to ultimately include 3,278 residential dwelling units (1,724 single-family and 1,554 multi-family units). The 42-acre Pointe Larson (TTM 36537) portion of the development is currently under construction and includes 230 lots approved for the development of single-family residences and townhomes.

4.3 Existing Transportation System

Avenue 54 is an east-west four-lane divided roadway between Jefferson Street and the Primary Site Access. Avenue 54 has a raised landscape median west of Madison Street and a painted flush median east of Madison Street to Monroe Street. The north side of Avenue 54 is fully improved to its Primary Arterial half-section, between Monroe Street and Jefferson Street (adjacent to The Madison Club and The Hideaway Golf Club). The south side of Avenue 54 has been fully widened with curbs and gutters adjacent to the proposed project and TTM 32879 (the Griffin Ranch Specific Plan). A landscaped multi-use path with a meandering sidewalk exists west of the project site. A six-foot wide sidewalk has been constructed along the project frontage, adjacent to the curb within an 18-foot parkway (between the perimeter wall and the curb face).

Pavement markings on Avenue 54 narrow the eastbound travel lanes from two to one through lane, opposite the existing Primary Site Access to the Merv Griffin estate. The roadway is fully improved opposite the project site and TTM 32879. However, there is currently only one eastbound travel lane marked for approximately 1,900 feet along Avenue 54 where the roadway is fully widened west of Monroe Street. The south side of Avenue 54 has not been fully improved for a distance of 1,320 feet west of Monroe Street (opposite TTM 34642 in the Griffin Ranch Expansion Area). East of Monroe Street, Avenue 54 is a two-lane undivided roadway with approximately 26 feet of pavement and graded shoulders. There are no curbs, gutters, sidewalks, or streetlights along Avenue 54 east of Monroe Street. The prima facie speed

Madison Street is a north/south four-lane divided roadway with a raised median within the study area. The posted speed limit on Madison Street is 50 MPH north and south of Avenue 54. On-street Class II bike lanes are provided on both sides of Madison Street, both north and south of Avenue 54. In addition, an off-street multi-purpose path has been constructed on the east side of Madison Street, south of Avenue 54. There are equestrian crossings at the intersection of Madison Street with Avenue 54, which is all-way STOP controlled. Madison Street was extended from Avenue 52 south to Avenue 54 as a four-lane divided Primary Arterial in conjunction with the construction of The Madison Club and The Hideaway Golf Club developments.

Monroe Street is a north-south roadway with two travel lanes and graded shoulders south of Avenue 54. North of Avenue 54, Monroe Street has a three-lane cross-section. The southbound side of Monroe Street has been improved to its Primary Arterial half-width adjacent to The Madison Club including the provision of a Class II (on-street) bike lane. The intersection of Monroe Street with Avenue 54 is all-way STOP-controlled. Although there are no posted speed limits in the study area, the prima facie speed on Monroe Street is 55 mph. Existing traffic volumes on Monroe Street within the study area are low (less than 4,500 ADT) and consistent with excellent free-flow conditions on a daily basis. The *La Quinta 2035 General Plan* evaluated the peak hour levels of service at the key intersection of Monroe Street with Avenue 54 based upon 2009 traffic volumes and found them to be LOS B.

Merv Griffin Way is a private two-lane residential street providing access for the Griffin Ranch Specific Plan. Merv Griffin Way currently intersects Madison Street opposite the Winged Foot gate for the PGA West community and is projected to serve the traffic generated by 30 percent (870 VPD) of the original Griffin Ranch Specific Plan development. When fully constructed, Merv Griffin Way will intersect Avenue 54 approximately 440 feet east of the eastern boundary of the proposed Griffin Lake Estates Specific Plan and accommodate 1,305 VPD generated by the original Griffin Ranch Specific Plan as well as 730 VPD generated by the Griffin Ranch Expansion Area.

The gated full-turn access on Avenue 54 at Merv Griffin Way will be constructed approximately 3,075 feet east of Madison Street and 2,200 feet west of Monroe Street. It will serve the eastern portion of the Griffin Ranch Specific Plan development, including the Griffin Ranch Expansion Area. Merv Griffin Way will be constructed approximately 440 feet east of the eastern boundary of the Griffin Lake Estates Specific Plan. This location will be 565 feet (centerline to centerline) east of the proposed relocated Griffin Lake Estates Specific Plan Residential Access.

Alysheba Drive is a private two-lane residential street providing access to TTM 32879 within the Griffin Ranch Specific Plan. This gated full-turn access intersects Avenue 54 approximately 460 feet west of the western boundary of the proposed Griffin Lake Estates Specific Plan and 1,095 feet (centerline to centerline) west of the existing Primary Site Access for the Merv Griffin Estate. was projected to *Traffic Impact Study for the Griffin Ranch Specific Plan* (Endo Engineering) projected that Alysheba Drive would ultimately accommodate 725 VPD (25 percent of the 2,900 average daily trips generated by the Griffin Ranch Specific Plan).

4.4 Existing Traffic Volumes

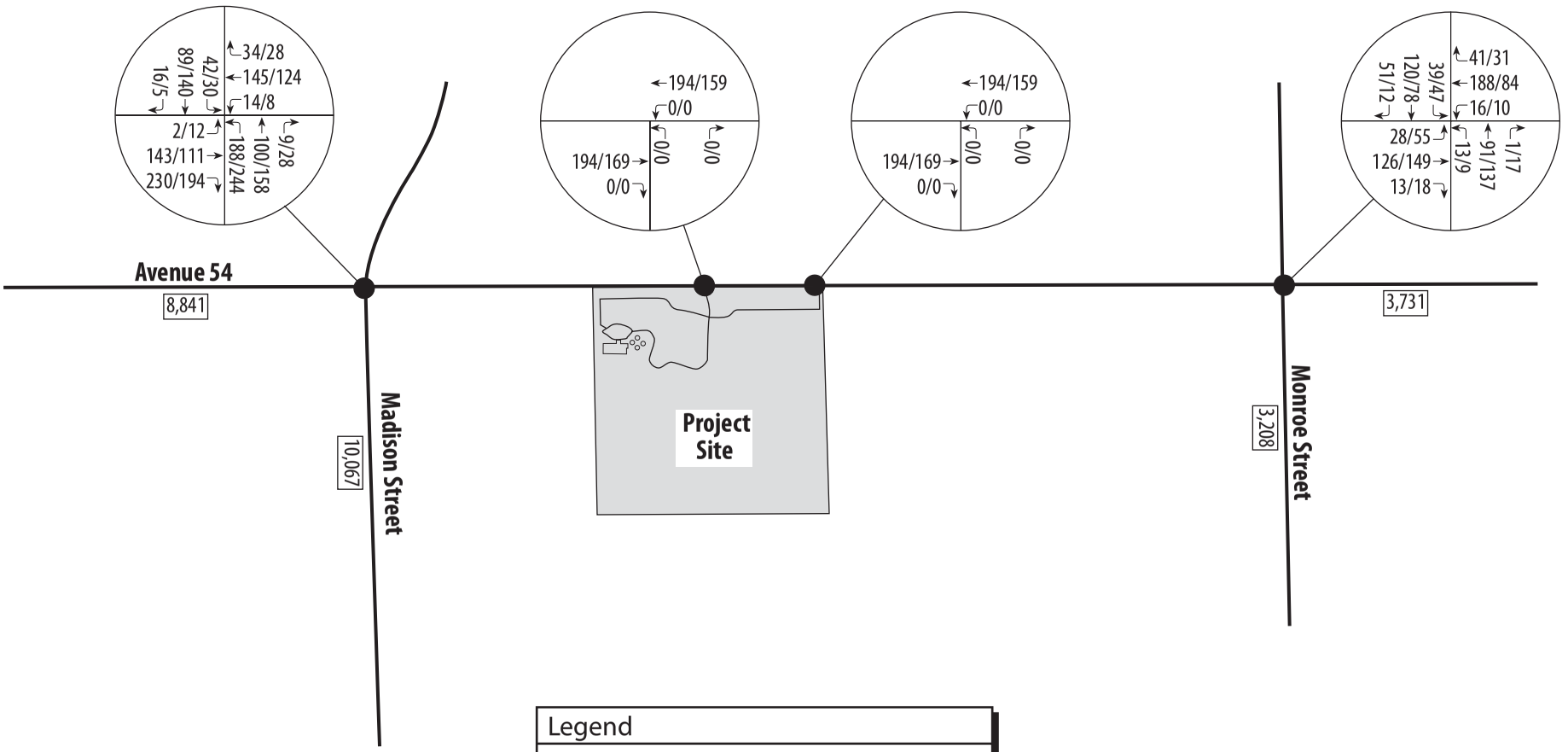
Traffic analyses focus on the peak hour traffic volume because it has the highest capacity requirements and represents the most critical period for operations. Typically, morning and evening peak hours are evident on urban commuter routes on weekdays, with the evening peak being generally more intense than the morning peak. However, commuter travel patterns can vary in response to local travel habits and environments.

The selection of an appropriate hour for planning, design, and operational purposes is critical in providing an adequate level of service for every (or nearly every) hour of the year. For urban roadways, a design hour for the repetitive weekday peak periods is common. However, to avoid substantial congestion during the highest-volume hours, local data is required on which to base informed judgments. The *Highway Capacity Manual* (HCM) states that as a general guide, the most repetitive peak volumes may be used for the design of new or upgraded facilities.

Peak Hour Volumes

New peak hour traffic count data was collected at the key intersections and is included in Appendix B. The highest hourly volume during each count period was identified for analysis. Since the traffic counts were completed at the end the peak traffic season, a seasonal expansion factor was applied to the traffic count data to more closely reflect peak season conditions. Figure 4-3 provides the year 2014 peak season weekday morning and evening peak hour turning movement traffic volumes at the key intersections as well as the year 2013 peak season 24-hour traffic counts published by CVAG for the roadway segments adjacent to the key intersections.

Figure 4-3
Existing Traffic Volumes
(Peak Season)



Legend

- 5/8 Year 2014 Weekday Morning/Evening Peak Hour Turning Volume
- 3,770 CVAG Year 2013 Weekday Volume

Endo Engineering

Scale: 1" = 945'

Daily Volume Estimates

Peak season (winter) weekday traffic volumes have historically been determined with 24-hour machine counters placed at various locations throughout the Coachella Valley. The Coachella Valley Association of Governments (CVAG) compiles the 24-hour traffic count data and publishes traffic census reports biennially. The most recent CVAG traffic count data was collected in the peak season (winter) of 2013. Table 4-1 provides the daily traffic volumes identified by CVAG in the *2013 Traffic Census Report* that were determined from 24-hour traffic counts made in the winter of the year 2013.

Table 4-1 provides the year 2014 peak season daily traffic volume estimates and the peak season year 2013 CVAG 24-hour traffic count data for the roadway segments adjacent to the key intersections. Current daily traffic volume estimates for the roadway segments adjacent to the key intersections were estimated from the peak season evening peak hour traffic volumes shown in Figure 4-3 by assuming that 8.7 percent of the daily volume occurs during the evening peak hour on these roadways. This factor was determined from a 24-hour traffic count made on November 5, 2009 on Madison Street, south of Avenue 56.

Table 4-1
Existing Peak Season Weekday Traffic Volumes

Roadway Link	CVAG 2013 Traffic Count[a]	2014 Weekday Volume Estimate[b]
Avenue 54		
- West of Madison Street	8,841	7,920
- East of Madison Street	NA	3,770
- West of Monroe Street	NA	4,090
- East of Monroe Street	3,731	4,230
Madison Street		
- North of Avenue 54	3,696[c]	4,290
- South of Avenue 54	10,067	8,860
Monroe Street		
- North of Avenue 54	3,867[c]	4,500
- South of Avenue 54	3,208	3,360

a. Source: CVAG, *2013 Traffic Census Report.*
b. The daily volumes shown are estimates of the current peak season weekday volume, derived from the 2014 peak hour volumes shown in Figure 4-3. The daily volumes shown were estimated by assuming that 8.7 percent of the daily volume occurs during the evening peak hour.
c. This 24-hour traffic count was made south of Avenue 52, rather than north of Avenue 54. No CVAG 24-hour traffic count is available for this roadway north of Avenue 54.

The 2014 peak season daily traffic volumes estimated from the peak hour traffic volumes in Figure 4-3 appear to be generally consistent with the year 2013 CVAG 24-hour counts for the roadway segments in the study area. The daily volume estimate for Madison Street, south of Avenue 54, is 88 percent of the CVAG 24-hour count. The daily volume estimate for Avenue 54, west of Madison Street, represents 90 percent of the CVAG 24-hour count. However, the sum of the six daily volume estimates represents 99 percent of the sum of the CVAG traffic counts for those same six roadway segments in Table 4-1. Therefore, the traffic counts with the seasonal expansion factor are considered reasonable.

4.5 Existing Traffic Conditions

The degree of mobility provided by a roadway segment can be determined from the daily demand-volume-to-capacity ratio, which can be used to characterize the vehicular level of service for a given direction of travel along

an urban street segment. The preferred method of gauging congestion is to evaluate intersection operations during the peak hours, since the approach lane configuration at intersections represents the limiting factor in the capacity of the transportation system. A peak hour intersection analysis requires more data but can more clearly define the circulation system performance characteristics. Once these characteristics are known, the intersection approach lanes and traffic control required to accommodate the travel demands and meet the applicable intersection performance standards can be determined.

Peak Hour Levels of Service at the Key Intersections

All of the key intersections and site access points are currently unsignalized. Unsignalized intersections are typically categorized as either two-way stop-controlled (TWSC) or all-way stop-controlled (AWSC) intersections. The two key intersections are currently all-way stop-controlled. The two existing site access points are two-way stop controlled.

The performance measures for TWSC and AWSC intersections are: control delay, delay to major street through vehicles, queue length, and volume-to-capacity ratio. However, the level of service is primarily related to the average control delay, which is given in terms of seconds of delay per vehicle by minor movement and intersection approach. The average control delay for any particular minor movement is a function of the capacity of the approach and the degree of saturation. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

All-Way Stop-Controlled Intersections

The HCM procedures for all-way stop-controlled (AWSC) intersections provide the overall average intersection control delay and LOS, as well as the control delay and LOS for each intersection approach and lane group. The approach delay is the weighted average of the lane delays. The overall intersection control delay and LOS as well as the delay and LOS for the approach with the most delay are provided in Table 4-2 for both of the existing key intersections with all-way stop control. A brief discussion of the HCM 2000 operational analysis is provided in Appendix C with the intersection worksheets.

The control delay and LOS analysis assumes the existing approach lane geometrics at the intersections and a five percent heavy vehicle mix. The existing intersection approach lanes and type of traffic control at the key intersections are shown in Figure 4-4. The analysis utilized the peak hour factor determined from the traffic counts (as shown in Table 4-2) to determine the impact of traffic volumes occurring over the peak 15 minutes, as directed by the City of La Quinta.

A heavy vehicle will exhibit a longer departure headway than a passenger car and the analysis assumed a five percent heavy truck mix. Furthermore, the departure headway for a left-turning vehicle will be longer than for a through vehicle, which in turn will be longer than that for a right-turning vehicle. Therefore, even AWSC intersections with large left-turn volumes or heavy through volumes which exhibit a poor level of service during the peak commute period, may operate considerably better during the remaining hours of the day.

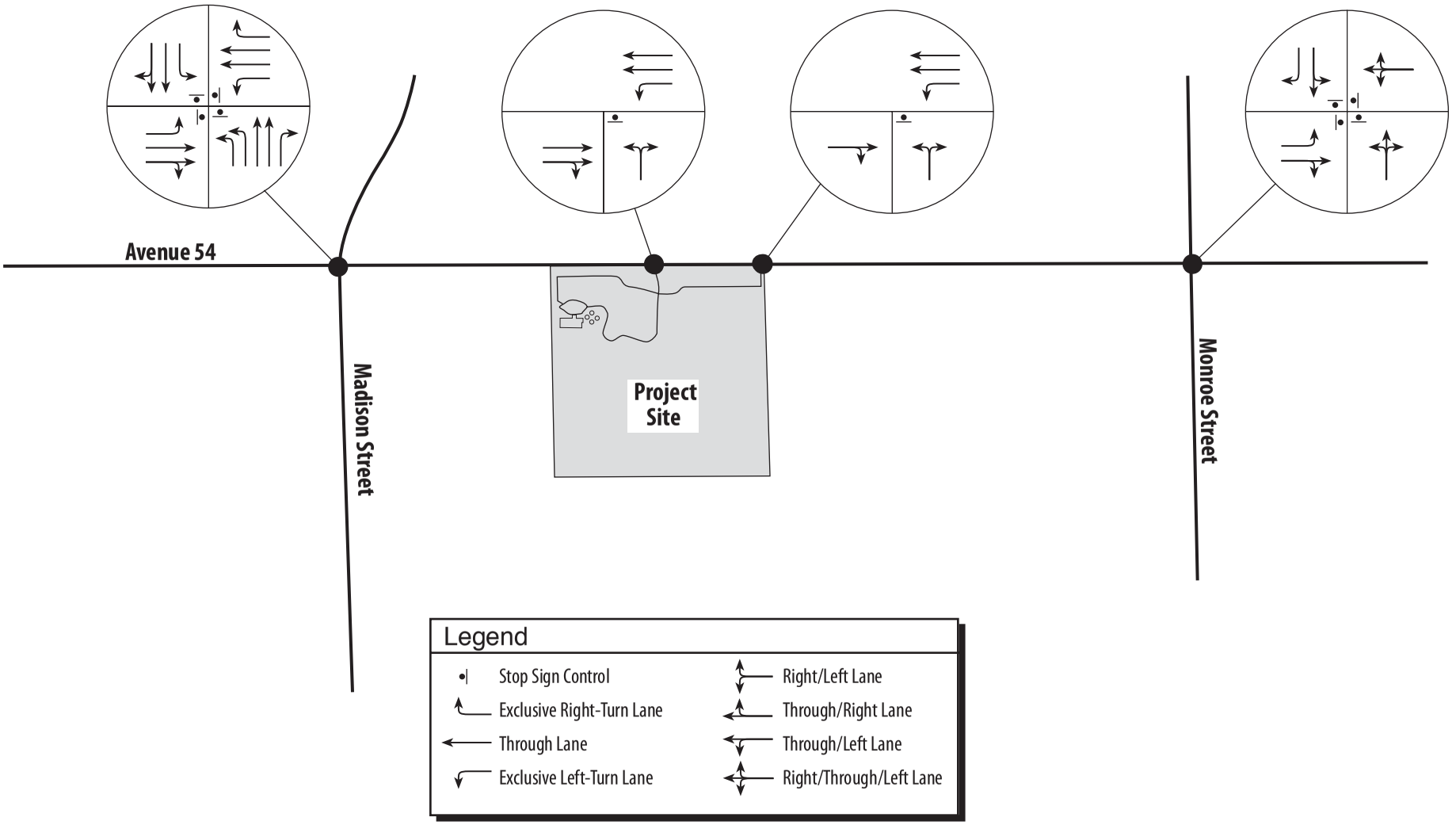
Both of the AWSC key intersections currently exhibit relatively moderate traffic volumes and operate at LOS B during the morning and evening peak hours. The overall average intersection control delay in the peak hours currently ranges from a low of 12.64 seconds per vehicle to a high of 13.86 seconds per vehicle. The approaches that currently exhibit the most control delay at these two intersections operate at LOS C or better during the peak hours. During the evening peak hours, the approach with the most delay at the intersection of Madison Street with Avenue 54 operates at LOS C. During the morning peak hours, the approach with the most delay at the intersection of Monroe Street with Avenue 54 operates at LOS C. These levels of service are considered acceptable and meet the City of La Quinta performance standards.

Table 4-2
Existing Weekday Peak Hour Delay and Levels of Service
At the All-Way Stop-Controlled Key Intersections[a]

Unsignalized Intersection	Existing Condition (Year 2014 Peak Season)				
	Overall Intersection		Approach With The Most Delay		
	Control Delay	Level of Service	Approach	Control Delay	Level of Service
Madison St. @ Avenue 54					
- Morning Peak Hour (PHF=0.920)	12.64	LOS B	Eastbound	13.98	LOS B
- Evening Peak Hour (PHF=0.878)	13.86	LOS B	Northbound	15.60	LOS C
Monroe St. @ Avenue 54					
- Morning Peak Hour (PHF=0.797)	12.81	LOS B	Westbound	15.12	LOS C
- Evening Peak Hour (PHF=0.768)	11.71	LOS B	Northbound	12.38	LOS B

a. Assumes intersection geometrics shown in Figure 4-4, and a 5 percent heavy vehicle mix. Appendix C includes the HCS unsignalized intersection worksheets. LOS was determined from the delay (0-10 sec./veh.=LOS A; 10-15 sec./veh.=LOS B; 15-25 sec./veh.=LOS C; 25-35 sec./veh.=LOS D; 35-50 sec./veh.=LOS E; 50+ sec./veh. = LOS F) per HCM 2000 page 17-2 and 17-32.

Figure 4-4
Existing Lane Geometrics



Endo Engineering

Scale: 1" = 945'

Roadway Link Levels of Service

A comparison of existing daily traffic volumes to the current daily capacity of each roadway link provides the proportion of the roadway capacity being utilized by the traffic volume, as shown in Table 4-3. Daily volume-to-capacity ratios reflect mid-block operations, based upon daily traffic volumes and mid-block capacities derived from the number of through lanes available on each roadway and whether or not the roadway is a divided facility. A volume-to-capacity (V/C) ratio of 1.0 indicates that the facility is handling the maximum traffic volume that it can accommodate at the maximum capacity of the facility (the upper limit of LOS 'E'). Smaller volume-to-capacity ratios imply better operational characteristics.

Table 4-3
Existing Daily Volume-to-Capacity Ratios and
Levels of Service for Area Roadways

Roadway Segment	Daily Volume[a] (Vehicles/Day)	Daily Capacity[b] (Vehicles/Day)	V/C Ratio	Level of Service
Avenue 54				
- West of Madison Street	7,920	14,000	0.186	A
- East of Madison Street	3,770	42,600	0.088	A
- West of Primary Access	3,770	42,600	0.088	A
- West of Secondary Access	3,770	19,000+	0.088	A
- West of Monroe Street	4,090	19,000+	0.215	A
- East of Monroe Street	4,230	14,000	0.302	A
Madison Street				
- North of Avenue 54	4,290	42,600	0.101	A
- South of Avenue 54	8,860	42,600	0.208	A
Monroe Street				
- North of Avenue 54	4,500	19,000+	0.321	A
- South of Avenue 54	3,360	14,000	0.240	A

a. These peak season 2014 weekday volumes were estimated from the current peak season evening peak hour traffic volumes (shown in Figure 4-3) by assuming that 8.7 percent of the daily volume occurs during the evening peak hour.
b. The capacity of a three-lane divided roadway has not been established by the City of La Quinta in EB 06-13. From Table 3-2, it would be greater than 19,000 vehicles per day but less than 28,000 vehicles per day and is shown as 19,000+.

Daily traffic volumes on the roadway segments adjacent to the key intersections in the project vicinity were evaluated to determine if existing traffic volumes approach or exceed the daily capacity of these roadway links. Table 4-3 provides the current daily traffic volumes, the current mid-block daily roadway capacity, and the volume-to-capacity ratios for the roadway links adjacent to the key intersections and site access intersections. As shown therein, all of the mid-block roadway segments in the study area are currently operating at LOS A on a daily basis. Area roadways are currently handling peak season weekday traffic volumes that comprise between 8 and 32 percent of their existing daily capacity.

Localized widening has occurred along portions of some of the roadways within the study area as adjacent parcels have been developed. Although the resulting three-lane portions of the partially improved roadways are capable of carrying higher traffic volumes than a two-lane divided roadway, the narrow sections provide a two-lane divided capacity in one direction and a four-lane divided capacity in the other direction. Applying the capacity of a two-lane divided roadway for a three-lane divided cross-sections assumes that the two-lane capacity is the limiting condition on the following links: Monroe Street, north of Avenue 54 (southbound side has two lanes) Avenue 54, east of the project site (eastbound side).

Traffic Signal Warrants

The need for signalization is typically recognized through periodic traffic counts made to determine if traffic volumes are approaching the applicable traffic signal warrant thresholds identified in the *California Manual on Uniform Traffic Control Devices* (CA MUTCD), which was revised on January 13, 2012. The nine warrants established by the State of California in the CA MUTCD identify the minimum conditions under which unsignalized intersections may be considered potentially viable candidates for signalization. Further investigation of an intersection should be initiated if one or more of the warrants are met to determine if signalization is justified based on an established traffic need.

A traffic control signal should not be installed unless the minimum threshold criteria are met or exceeded for one or more of the warrants described in the CA MUTCD. Improper or unwarranted signal installations may cause: (1) excessive delay; (2) disobedience of the signal indications; (3) circuitous travel on alternate routes; and (4) increased accident frequency. Justification for the installation of a traffic signal at an intersection is based on the warrants adopted by Caltrans in the CA MUTCD. However, the satisfaction of a warrant is not necessarily sufficient justification for the installation of signals. Delay, congestion, approach conditions, driver confusion, future land use or other evidence of the need for right-of-way assignment beyond that which could be provided by stop signs must be demonstrated. The actual design and installation of signals should be based upon detailed studies that include extensive traffic counts.

Since the installation of traffic signals typically increases the accident rate and the total vehicular delay, a traffic signal should not be installed, even though the traffic volume thresholds for signalization are reached, unless there is evidence of the need for right-of-way assignment beyond that which could be provided by a STOP sign. Where traffic signals are not warranted, but increases in future traffic will cause an unsignalized intersection to fail to meet the applicable minimum intersection performance standard in the City of La Quinta, less restrictive forms of mitigation should be identified to address the operational deficiency. Traffic signals should be installed only when: (1) one or more signal warrants is met, (2) lesser measures have failed to remedy the deficiency, and (3) no other solution or form of control would be effective in assuring traffic safety and efficiency. Traffic signals should be installed only where the net effect expected to occur would be an improvement in the overall safety and/or operations at an intersection.

There are nine different types of traffic signal warrants including warrants based on: eight-hour vehicular volumes, four-hour vehicle volumes, peak hour vehicle volumes and delay, pedestrian volumes, school crossings, coordinated signal system warrant, crash experience, a roadway network warrant, and intersections near a railroad grade crossing. Caltrans has adopted future average daily traffic warrants (including minimum vehicular traffic, interruption of continuous traffic and a combination warrant) to be used for new intersections or other locations where it is not feasible to count actual traffic volumes.

Rural volume warrants (70 percent of the urban warrants) apply when the 85th percentile speed of traffic on the major street exceeds 40 mph in either an urban or a rural area, or when the intersection lies within the built-up area of an isolated community with a population under 10,000. Avenue 54 has a 55 MPH posted speed limit and Madison Street has a 50 MPH posted speed limit. Therefore, rural traffic signal warrants were applied to the intersections of Madison Street with Avenue 54 and Monroe Street with Avenue 54.

Peak hour signal warrants (see Appendix D for the peak hour signal warrant worksheets) were used as a preliminary indicator of the need for traffic signals. These signal warrants should be considered in conjunction with the unsignalized peak hour intersection analysis for a more complete understanding of the need for signalization.

Based upon existing peak hour traffic volumes in the peak season, the unsignalized key intersection of Madison Street and Avenue 54 appears to currently meet traffic signal warrants. However, this intersection is currently operating at LOS B during the peak hours (see Table 4-2). Therefore, signalization is not currently justified at this intersection based upon an established need.

4.6 Relevant Circulation Plans

City of La Quinta Circulation Element

The *2012 City of La Quinta General Plan* Circulation Element details the location and extent of the circulation system required to serve future traffic demands upon buildout of the Land Use Element of the General Plan. Each Circulation Element roadway has been assigned a specific design classification based upon existing and projected traffic demands generated by buildout of the General Plan. The need for each classification has been based upon modeled future volumes and overall community design goals in the General Plan. Within the study area, Madison Street, Monroe Street, and Avenue 54 are classified as four-lane divided Primary Arterials.

Primary Arterials have a 45 MPH roadway design speed and a minimum intersection spacing design standard of 1,060 feet (or as approved by the City Engineer).[1] Left-turn median openings may be authorized if they do not interfere with other existing or planned left-turn pockets. A three-foot minimum median width is required adjacent to turn lanes and no trees or fixed objects are allowed within 50 feet of any median nose. All access configurations proposed along Primary Arterials require review and approval by the City Engineer.

The City of La Quinta Primary Arterial classification typically requires a 108-foot mid-block right-of-way. A typical cross-section provides a 16-foot median, 12-foot wide inner travel lanes, 11-foot wide outer travel lanes, and 8-foot shoulders for a curb-to-curb width of 78 feet. The shoulders can accommodate an 8-foot Class II bike/golf cart/NEV lane. A parkway on both sides of the roadbed, which is 14-feet in width, can accommodate sidewalks a minimum of 6-feet in width and/or multi-use paths on both sides of Primary Arterials. City policy requires that sidewalks be provided on both sides of all arterial and collector streets, except where there is a multi-use trail on one side. The General Plan includes a multi-purpose trail along Avenue 54, where it abuts the project site, as well as along Monroe Street and Madison Street. Class II bicycle lanes exist along both sides of Avenue 54 within the study area, except east of Monroe Street. The *2012 City of La Quinta Comprehensive General Plan* shows Class II bicycle lanes along Madison Street and Monroe Street. The Madison Club has provided Class II bikeways along the west side of Monroe Street and along both sides of Madison Street, north of Avenue 54.

Refinements may be required when securing right-of-way and constructing improvements at specific locations, particularly along designated Image Corridors. For example, a 116-foot right-of-way may be required at intersections, to provide dual left-turn lanes by eliminating on-street parking. The minimum landscape setback required for Primary Arterials is typically 20 feet.

Golf Cart/NEV/Route System

The *City of La Quinta 2035 General Plan* identifies a system of pathways that can accommodate golf carts and neighborhood electric vehicles (NEVs) to reduce the need for travel by traditional automobile and encourage the use of alternative travel modes. These pathways connect residential areas to commercial developments as well as recreational and other community amenities along existing and future roadways. The system of golf cart/NEV pathways includes Class I, Class II, and Class III paths as well as multi-use paths.

Class II golf cart/NEV paths are shown in the *City of La Quinta 2035 General Plan* along Avenue 54 (adjacent to the project site) and along Madison Street and Monroe Street, both north and south of Avenue 54. These on-street Class II golf cart paths are 8 feet in width and should be appropriately signed and marked. These striped on-street lanes accommodate one-way golf cart travel and are shared with bicyclists.

Golf carts may not be operated on roads with posted speed limits above 35 MPH, except by ordinance or local resolution. NEVs operate at top speeds of 20 to 25 MPH and cannot travel on streets with posted speed limits in excess of 35 MPH unless an NEV lane is provided. The City of La Quinta has established minimum design criteria and signage for directional guidance for these routes, by classification.

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[1] Source: Program CIR-1.10.C of the *City of La Quinta 2035 General Plan* (page II-121).

Multi-Use Paths

Off-street multi-use paths are shown in the Circulation Element of the *City of La Quinta 2035 General Plan* along Avenue 54, between Madison Street and Van Buren Street (adjacent to the project site). Off-street multi-use paths are also shown along Madison Street and Monroe Street, north and south of Avenue 54. These paths provide pedestrian, bicycle, and NEV travelways that are separated from automobile traffic. They typically include a meandering sidewalk and multi-use path within a landscaped setback (to provide shade) as well as convenient connections to the City street network. Trail crossings should include design features that warn people using the path as well as motorists of the crossing. To enhance sight distance and safety, on-street parking should be restricted near multi-use path crossings.

Equestrian Paths

Although no explicit provision has been made in the *City of La Quinta 2035 General Plan* for equestrians, the standards applied to the development of multi-use paths will accommodate equestrians.

Bike Lanes and Facilities

The *City of La Quinta 2035 General Plan* identifies a system of existing and planned bikeways designed to serve the resort residential community. Cyclists can use on-street bikeways as well as off-street multi-use trails. Bike routes should be clearly marked and striped as one-way routes flowing in the same direction as the adjacent automobile traffic. The construction of bikeways should conform to Caltrans specifications and design criteria. Bikeways should be a minimum of six feet in width.

General Plan Goals Policies and Programs

Specific Plans shall be required for projects proposing the integration of recreation, tourist commercial and residential uses; and for all projects proposing flexible development standards that differ from the Zoning Ordinance. [Policy LU-2.2] The Planning Director will determine substantial conformance with General Plan land use policies in approved Specific Plans. [Program LU-2.2b] Density transfers may occur in Specific Plans when common area amenities and open space are provided. [Policy LU-3.2] Maintain residential development standards including setbacks, height, pad elevations and other design and performance standards that assure a high quality of development in the Zoning Ordinance. [Policy LU-3.3] Provide incentives in the Zoning Ordinance for creative and high quality development; projects that reduce the dependence on automobiles; projects that incorporate trails and paths for pedestrians and bicycles; and projects that incorporate transit and alternative transportation facilities into their designs. [Program LU-3.3.a]

The General Plan designated street classifications set forth in the Circulation Element and serving as the Master Plan of Roads shall be as follows: …Primary Arterial: four lanes, divided, Class II bike/NEV lane, multi-use paths…[Policy CIR-1.2] The General Plan recognizes the need for flexibility in applying and adapting roadway design standards and specifications, and authorizes the Public Works Director to make consistency findings to permit modifications that do not compromise the operational capacity of the subject roadway or intersection. [Policy CIR-1.4] Where the construction of multi-use paths is called for but is determined to be infeasible, sidewalks shall be constructed along at least one side of these roadways. [Policy CIR-1.5]

Maintain LOS 'D' operating conditions for all corridors and intersections unless this LOS would, in the City's judgment, be infeasible and/or conflict with the achievement of other goals. [Policy CIR-1.6] Allow flexible LOS standards in recognition of constraints on roadway expansions and as a means of creating streets that balance all modes of travel. [Policy CIR-1.7]

Establish and maintain minimum standards for roadway geometrics, points of access and other improvements that facilitate movement of traffic onto and off of the roadway network. [Policy CIR-1.10] Review new and redeveloping

projects along all major roadways with the intent of limiting access and aligning and/or consolidating access drives in a manner which minimizes conflicting turning movements and maximizes the use of existing and planned signalized intersections. [Program CIR-1.10.a]

On Primary Arterials the minimum intersection spacing shall be 1,060 feet. The design speed shall be 45 mph. Left-turn median cuts may be authorized if the proposed left-turn pocket does not interfere with other existing or planned left-turn pockets….All access configurations shall require City Engineer review and approval. [Program CIR-1.10.c] On Local streets, the minimum intersection spacing shall be 250 feet. The design speed shall be 25 mph. [Program CIR-1.10.g]

Within subdivisions, private streets may be designed to provide a reduced minimum paved width of 28 feet with no on-street or restricted on-street parking, subject to City Engineer and Fire Department approval, and in consideration of other improvements that encourage pedestrian and bicycle use. [Program CIR-1.10.h] New development shall provide pedestrian and bicycle connections to adjacent streets, and assure that infrastructure and amenities accommodate pedestrian and bicycle use. [Program CIR-1.12.d] Private streets shall be developed in accordance with development standards set forth in the Municipal Code, relevant Public Works Bulletins and other applicable standards and guidelines. [Policy CIR-1.14] Private streets will be designed to meet the standards of the City's public street system at the point where they connect with it, in order to safely integrate into public and private streets. [Program CIR-1.14]

Continue to implement the Image Corridor treatments throughout the City and identify new image corridors for streets brought into the City through annexation. [Policy CIR-1.16] Standards for all Image Corridors shall be maintained in the City Municipal Code. [Program CIR-1.16.a] Secure easements adjacent to public road right-of-way along Image Corridors to enhance view protection and corridor accessibility. [Program CIR-1.16.c]

In order to preserve the aesthetic values on the City's streets, optimum landscape setbacks shall be maintained along all designated General Plan Image Corridors and shall be identified in the City Municipal Code. [Policy CIR-1.17] Building height limits along City Image Corridors shall be identified in the City Municipal Code. [Policy CIR-1.20]

General Plan goal CIR-2 is a circulation system that promotes and enhances transit, alternative vehicle, bicycle, and pedestrian networks. To achieve this goal, when reviewing development proposals, the City shall consult and coordinate with SunLine Transit and solicit comments and suggestions on how bus stops and other public transit facilities and design concepts, including enhanced handicapped access, should be integrated into project designs. [Program CIR-2.1C] Reduce greenhouse gas emissions by reducing vehicle miles traveled and vehicle hours of delay. Increase or encourage the use of alternative modes and transportation technologies. Implement and manage a hierarchy of Complete Street multi-modal transportation infrastructure and programs to deliver improved mobility. [Policy CIR-2.2]

Expand golf cart/NEV routes, and bicycle routes to connect residential and activity centers with transportation centers. [Program-2.2.a] Develop and encourage the use of continuous and convenient pedestrian and bicycle routes and multi-use paths to places of employment, recreation, shopping, schools, and other high activity areas with potential for increased pedestrian, bicycle, golf cart/NEV modes of travel. [Policy CIR-2.3] The construction of bikeways shall conform to the CalTrans manual *Planning and Design Criteria for Bikeways in California*. Bikeways shall be a minimum of 6 feet in width. Alternative designs required by constraints may be acceptable, as approved by the Public Works Director. [Program CIR-2.3.b] Sidewalks shall be provided on both sides of all arterial, secondary and collector streets, except where there is a multi-use path on one side. [Program CIR-2.3.c] Golf carts shall be permitted on designated routes and on all public local streets. [Program CIR-2.3.d]

City Design Standards

Standards for all City streets are provided in the *City of La Quinta 2035 General Plan*, the Development Code, the City Municipal Code, and relevant Public Works Bulletins. Engineering Bulletin #06-13 details auxiliary lane policies and standards that are relevant to the proposed project.

City of La Quinta Auxiliary Lane Policies

Engineering Bulletin #06-13 details adopted City of La Quinta requirements regarding auxiliary lanes.[2] Dual left-turn lanes should be considered when 250 or more vehicles are turning left in the peak hour. An exclusive right-turn lane should be considered when 200 or more vehicles turn right in the peak hour. Subject to approval by the City Engineer, auxiliary lanes shall be installed on all Secondary Arterial, Primary Arterial, and higher classification streets when specific criteria are met including:

- A left-turn deceleration lane with taper and storage length is required for any driveway with a projected peak hour left-turn ingress volume $\geq$ 25 vehicles per hour. The taper length shall be included as part of the required deceleration lane length.
- A left-turn deceleration lane should be considered for locations where vehicles turning left would be required to queue in a high-speed through lane (e.g. $\geq$ 40 MPH).
- A right-turn deceleration lane with taper and storage length is required for any driveway with a projected peak hour right-turn ingress volume $\geq$ 50 vehicles per hour. The taper length shall be included as part of the required deceleration lane length.
- A right-turn deceleration lane should be considered for lower turning volumes on high-volume streets (e.g. Washington Avenue, Highway 111).

The minimum lane length for auxiliary lanes shall be 100 feet plus taper length. The right-of-way (with a bike lane) must be widened 8 or 10 feet to accommodate a 12-foot wide auxiliary lane. The right-of-way (without a bike lane) must be widened 12 feet to accommodate a 12-foot wide auxiliary lane. No reductions in the width of the landscape buffer will be permitted to construct the auxiliary lane. All auxiliary lanes must be contained within the development project limits.

Congestion Management Program (CMP)

The Congestion Management Program (CMP) is intended to link land use, transportation, and air quality with reasonable growth management methods, strategies and programs that effectively utilize new transportation funds to alleviate traffic congestion and related impacts. The Riverside County Transportation Commission (RCTC) is the designated Congestion Management Agency (CMA) that prepares the Riverside County Congestion Management Program updates in consultation with local agencies, the County of Riverside, transit agencies and sub-regional agencies like the Coachella Valley Association of Governments (CVAG).

The CMA provides a uniform database of traffic impacts for use in countywide transportation computer models. To analyze traffic impacts associated with development proposals or land use plans, the RCTC has recognized use of the Riverside County Traffic Analysis Model (RIVTAM) and other models. The methodology for measuring levels of service (LOS) must be that contained in the *Highway Capacity Manual*. Traffic standards must be set no lower than LOS E for any segment or intersection on the CMP system unless the current LOS is lower (i.e., LOS F).

The RCTC has designated a system of highways and roadways to include (at a minimum) all State Highway facilities within Riverside County and a system of principal arterials as the Congestion Management System (CMS). All State Highways within Riverside County have been designated as part of the CMP System of Highways and Roadways. It is the responsibility of local agencies, when reviewing and approving development proposals to consider the traffic impacts on the CMS.

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[2] Mr. Timothy R. Jonasson. Engineering Bulletin #06-13, *Traffic Impact Memo and Traffic Impact Study Guidelines.* April 7, 2014.

To include additional arterials on the CMP System, consideration is given to: (1) routes identified by Caltrans as "principal arterials" on their "Functional Classification System" maps; (2) designated expressways; and (3) facilities linking cities/communities (inter-regional facilities) and major activity centers (shopping malls, major industrial/ business parks, stadiums). Local agencies may nominate arterials for inclusion on the CMP System.[3] Monroe Street, north of Avenue 52 was nominated and included in the CMP System. None of the roadways within the study area are part of the regional arterial system.

Per the adopted Level of Service standard of "E", when a Congestion Management System (CMS) segment falls to LOS F, a deficiency plan must be prepared by the local agency where the deficiency is located, following coordination with other agencies identified as contributors to the deficiency. The deficiency plan must contain mitigation measures (including Transportation Demand Management strategies and transit alternatives) and a schedule for mitigating the deficiency. RCTC will prepare deficiency plans when deficiencies are identified by local jurisdictions on the State Highway System.

Transportation Uniform Mitigation Fee Program

The Coachella Valley Association of Governments (CVAG) has developed a Transportation Uniform Mitigation Fee (TUMF) program that compliments the objectives of the Congestion Management Program (CMP). The member agencies of CVAG collect a uniform development impact fee to help fund construction of the regional system of roads, streets, and highways (excluding state or federal highways) needed to accommodate growth in the region. The City of La Quinta began participation in the collection of TUMF from new developments in April 2013. Prior to this time, the City of La Quinta forfeited its Local Measure "A" to the Regional Arterial Program on a monthly basis.

The TUMF program is a component of the Measure "A" sales tax approved by Riverside County voters in 1988 and effective through the year 2039. Measure A and the TUMF program help fund the construction of the regional system of roads, streets, and highways to accommodate growth in the region. Transportation-related improvement projects partially funded by the TUMF program include: arterial street construction, street widening, intersection enhancements, and freeway interchange improvements. Regional transportation funds are meant to supplement, not replace local revenues and/or developer contributions required for approved regional road construction projects. CVAG members that participate in the TUMF and the Multiple Species program pay 25 percent of the cost of eligible regional transportation projects while CVAG pays 75 percent.

CVAG follows the protocol outlined in the *Coachella Valley Regional Arterial Program Policy and Procedures Manual* (Updated January 27, 2014), which details the process to be followed by Lead Agencies seeking Measure "A" and TUMF revenues for eligible transportation-related improvement projects. The revenues distributed by CVAG include the Measure "A" sales tax, TUMF collected by CVAG member agencies, and state and federal funding. Lead agencies submitting projects for review and funding through the CVAG Regional Arterial Program must document the project limits, the need for the improvement, and the cost of project design and construction (including right-of-way acquisition, preliminary engineering, alignment and traffic studies, administration, and project management). The CVAG *Regional Arterial Cost Estimate* (RACE) is updated periodically for use in estimating improvement costs.

CVAG uses the ranking identified in the latest version of the *Transportation Project Prioritization Study* (TPPS) to allocate the available funding to eligible projects within the Coachella Valley that would meet demonstrated transportation needs. The four primary criteria applied to determine funding priorities include: surface road conditions, system continuity considerations, the level of service, and the accident rate. Additional criteria that may increase the priority of an improvement project include: (1) an improvement cost of less than $1 million; (2) an improvement involving a roadway segment crossing the Whitewater River or a major tributary; (3) project readiness (i.e., right-of-way available, environmental document approved, agency funds reserved, plans and specifications complete); and (4) an improvement that represents a backbone level project (i.e., it is integral to the continued and future development of an area). A lower ranked project in the TPPS receiving "outside funds" may be moved up the priority list, provided it would be of sufficient benefit to the region.

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[3] VRPA Technologies, Inc. *2011 Riverside County Congestion Management Program,* December 14, 2011.

Regional Transportation Improvement Plans

SCAG is responsible for preparing the 2012 Regional Transportation Plan to address requirements set forth in SB 375. The Regional Transportation Plan (RTP) is a multi-modal long-range planning document prepared by SCAG. It involves coordination with federal, state and other regional, sub-regional, and local agencies in southern California. The RTP is prepared every three years and reflects the current future horizon based on a 20-year projection of future needs. It includes programs and policies for congestion management, transit, bicycles, pedestrians, roadways, freight, and finances. It is used as a long-range plan for federally funded transportation projects.

The Capital Improvement Program (CIP) is a 7-year program including all regional and local capital improvement projects that maintain or improve the LOS for traffic and transit and conform to transportation-related emission air quality mitigation measures. Currently, regional projects are programmed in the Riverside County Transportation Improvement Plan (TIP), while locally funded projects (off the State Highway System) are identified in local agency CIPs. To comply with CMP Statutes, CIP requirements shall be the same as and accomplished through the RCTC TIP development process. Projects in the CIP may be incorporated into the Regional Transportation Improvement Program (RTIP) for the programming of Flexible Congestion Relief (FCR) and Urban and Commuter Rail funds. The *2010 Update CVAG Transportation Project Prioritization Study*[4] includes no buildable projects within the study area.

Existing TSM Programs

There are no Transportation System Management plans in effect in the study area at present. No transit stations or park-and-ride facilities currently exist in the vicinity.

4.7 Public Transportation

The Sunline Transit Agency provides fixed-schedule bus service (SunBus) between local communities and on-demand transportation (SunDial) for individuals with disabilities. The SunLine Transit Agency provides public transportation for 3.5 million passengers annually. A fleet of low-emission buses operate on seven days per week (excluding Thanksgiving and Christmas) along the fourteen fixed-schedule SunBus transit routes to provide public transportation service to nine cities and five communities within the Coachella Valley.

SunBus transit lines provide public bus service with a fleet of buses throughout the Coachella Valley seven days a week (excluding Thanksgiving and Christmas). SunLine Transit Agency buses are wheelchair accessible and have bicycle racks that can accommodate either two or three bicycles and are convenient for cyclists to use. Bike racks are proposed by SunLine Transit at select bus stop locations.

The SunLine Transit Agency contracts with a private provider for SunDial, a door-to-door dial-a-ride next day service that is ADA compliant and wheelchair accessible. SunDial is a demand response service designed to serve seniors and those with disabilities on an appointment basis between 8:30 A.M. and 9:00 P.M. on weekdays, and between 8:30 A.M. and 4:00 P.M. on weekends. In addition to SunDial, a subscription-based transit service is available through agencies serving people with disabilities who need regular repetitive trips.

Line 111 is the major trunk line, which is interconnected with smaller community feeder routes that provide access to every community in the Valley. Line 111 extends north of the study area along Highway 111, from Palms Springs to Indio. Line 70 also extends north of the study area from the La Quinta Cove along Avenue 47, where it turns north along Adams Street and then west on Washington Street. No transit stations or park-and-ride facilities currently exist or are planned in the City of La Quinta.

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[4] KOA Corporation. *2010 Update CVAG Transportation Project Prioritization Study;* November 2010.

There is no transit service currently available within the study area. A higher development density than that in the study area is needed to achieve the critical levels of transit ridership necessary to justify the investment in transit facilities required to provide adequate levels of infrastructure and service. Low-density residential development generates an insufficient number of riders per route mile and requires longer transit trips than mixed-use developments with higher densities.

5.0 PROJECTED FUTURE TRAFFIC VOLUMES

The Institute of Transportation Engineers (ITE) report *Trip Generation* is the principal source of data related to trip-generation rates used in most site traffic analyses. These rates are commonly used to estimate future traffic volumes upon which off-site transportation improvements are based and to determine site access requirements for proposed developments. The trip-generation rates provided by the ITE reflect isolated single-use stand-alone developments. The data compiled by the ITE identifies traffic peaking characteristics by land use type for a range of days of the week (i.e., average weekday, Saturday, Sunday) and for different time periods during those days (i.e., the peak hour of the generator and the weekday morning and evening peak hours on the adjacent street system).

The ITE weighted average trip-generation rates and regression equations can be used to determine the traffic volumes generated by future development for use in identifying appropriate design requirements. The time period that should be analyzed is that interval during which the combination of site generated traffic and adjacent street traffic is at its maximum. In nearly all cases this occurs on weekdays during the morning and evening peak hours of adjacent street traffic. The ITE defines these periods as the highest volume hour between 7:00 A.M. and 9:00 A.M. and between 4:00 P.M. and 6:00 P.M. The City of La Quinta experiences heavy construction-related and golf course maintenance trips which result in slightly earlier peak hour intervals, as specified in EB #06-13.

The ITE provides guidelines for accurately estimating trip generation in *Trip Generation Handbook* (March, 2001). The guiding principles and recommended procedures outlined therein are sensitive to the quality of the trip-generation data documented in *Trip Generation*. The ITE protocol for interpreting the trip generation data specifies the conditions under which the weighted average trip-generation rates should be used and when regression equations should be used. The weighted average trip generation rates provided by the ITE assume a linear relationship between the number of trip ends generated and the value of the independent variable (i.e., the number of dwelling units proposed).

The ITE uses a regression analysis to develop an equation that defines the line that "best fits" the trip generation data. The use of the regression equation is recommended by the ITE when the data plot contains more than twenty data points and a regression curve and equation are provided. A regression equation with a coefficient of determination of at least 0.75 is preferred because it indicates the desired level of correlation between the number of trips generated by a land use and the value used as the independent variable to estimate the number of trips (such as the number of dwelling units being proposed).

Engineering Bulletin #06-13 (EB 06-13) specifies that the regression equation be used to estimate the trip generation if the coefficient of determination exceeds 0.7.[1] Since the proposed development includes existing and future residential land uses, a worst-case sensitivity analysis was not required.

5.1 Site Traffic

The ITE does not publish trip-generation rates for luxury residential rentals with private event grounds. However, it does publish trip-generation data for single-family dwellings and a variety of lodging, resort, and hotel units. The ITE weighted average trip-generation rates are appropriate for use in estimating the trips that would be generated by a single residence or a few hotel rooms. The ITE regression equations are appropriate for use in estimating the trip generation associated with a proposed residential development with 78 single-family homes.

For single-family detached housing on individual lots (ITE land use code 210) a total of 314 trip-generation studies of subdivisions with an average of 208 dwelling units were used by the ITE to develop the weekday evening peak hour data plot. The 78 single-family detached dwelling units proposed are within the cluster of the ITE data points, which was associated with developments containing fewer than 400 dwelling units. The coefficients of determination for the regression equations (0.89 and 0.91) indicate a very good fit between the number of dwelling units and the number

[1] Timothy R. Jonasson, Public Works Director/City Engineer, City of La Quinta, *Engineering Bulletin #06-13*, April 7, 2014.

of trips generated during the morning and evening peak hour on a weekday. As a result, the ITE protocol specifies that the regression equations be utilized to estimate the trip generation associated with the 78 proposed single-family dwelling units.

Existing Residential Entitlement Trips

The project site has entitlements for one single-family detached residential dwelling unit. The ITE weighted average trip-generation rates for the weekday peak hours were used to estimate the trip generation associated with the existing estate entitlement. A single dwelling is not within the data cluster used by the ITE to develop the regression equations, therefore the use of the regression equations to estimate the trips generated by a single dwelling unit is not appropriate. As shown in Table 5-1, the existing estate entitlement (a single-family residence) would generate approximately 10 weekday trips. During the morning peak hour, one outbound trip would be generated. During the evening peak hour, one inbound trip would be generated by a single residence.

Table 5-1
Weekday Site Trip-Generation Forecast[a]

Land Use Category	Land Use Quantity[b]	Morning Peak Hour In	Out	Total	Evening Peak Hour In	Out	Total	Daily 2-Way
Existing Estate Entitlements								
Residential - SFD (210)	1 DU	0	1	1	1	0	1	10
Future Residential Uses								
Residential - SFD (210)	78 DU	16	48	64	53	31	84	830
Luxury Residential Rental (310)	6 Rooms	2	1	3	2	2	4	50
Existing Subtotal		18	49	67	55	33	88	880
Total (Existing Plus Future Uses)		18	50	68	56	33	89	890

a. Based upon trip-generation data published by the ITE in *Trip Generation* (8th Edition, December, 2008). The ITE Land Use Codes (LUC) assumed include: LUC 210 for single-family detached residential dwellings and LUC 310 (hotel) for the luxury residential rental use. The rental of the existing estate house is currently ongoing and not a part of the proposed project. The trips generated by upscale dinner parties and other short-term social events were not included because they only occur a few hours per month and typically do not involve guest arrivals during the peak hours. The ITE weighted average trip-generation rates were used to estimate the trips associated with the existing entitlement and the luxury residential rental. The ITE regression equations were used to estimate the trip-generation associated with the 78 single-family residential dwelling units.

b. DU=Dwelling Units.

Future Residential Trips

Table 5-1 shows the number of inbound and outbound trips generated by the proposed 78 single-family detached dwellings. During the morning peak hour on a weekday, approximately 64 trip-ends (inbound plus outbound) would be generated by 78 single-family detached dwelling units. The ITE identifies the inbound versus outbound distribution of single-family detached residential trips during the morning peak hour as 25 percent entering and 75 percent exiting. The 78 proposed dwellings would generate 16 inbound trips and 48 outbound trips during the morning peak hour on a weekday.

During the evening peak hour on a weekday, approximately 84 trip-ends would be generated by the 78 single-family dwelling units proposed. During the evening peak hour, 63 percent of those trips would be entering and 37 percent exiting the proposed future residential development. The 78 proposed single-family detached dwellings would generate 53 inbound trips and 31 outbound trips during the evening peak hour on a weekday.

Future Merv Griffin Estate Rental Trips

The number of entering trips that will be generated in the future by the Merv Griffin estate will vary from day to day and month to month. The future trip generation will be affected by the private events that are held at the estate and the number of people on-site at any given time, as well as the number of vehicles used to transport guests to and from the site.

Attachment B within Appendix A provides a summary of the proposed future Merv Griffin estate event guidelines including: the on-site guest limits, the maximum frequency of the events by type, and the hours during which the various events will be permitted. The traffic control by event type is also shown therein. Although the traffic volume generated by the rental of the Merv Griffin estate facilities will often be relatively low, it may affect whether or not an eastbound right-turn deceleration lane will be required in the future at the Estate Access connection (Street "A") on Avenue 54.

Overnight Luxury Residential Rental

When the main house and casitas are rented for large family gatherings involving overnight stays, the Merv Griffin estate functions, from a trip-generation perspective, like a single-family home and six hotel rooms. When visiting couples stay overnight in the guest quarters, the estate functions like a residence and a series of hotel rooms.

Although the luxury residential rental units may be occupied only a fraction of the time each year, the potential trip generation of the Merv Griffin estate was estimated by assuming, as a worst-case analysis, that the visitors during overnight rentals generate trips like both a single-family residence and six hotel rooms. The trip generation associated with the main house at the Merv Griffin estate was estimated from the ITE weighted average trip-generation rates because a single residence was not within the cluster of the data points. Since the six hotel rooms assumed for the luxury rental were fewer than the number of rooms at the hotels studied by the ITE to develop the trip-generation rates, the weighted average trip-generation rate per hotel room was used to estimate the trip generation.

The peak hour and daily trip generation associated with both the existing and the future land uses (excluding short-term social events) on a typical weekday during the peak season are shown in Table 5-1. As shown therein, the existing Merv Griffin estate, the proposed future luxury residential rentals, and the proposed future residential development are projected to generate approximately 890 weekday trip-ends. During the morning peak hour, approximately 68 trip-ends are expected to be generated including 18 inbound and 50 outbound trips. During the evening peak hour, approximately 89 trip-ends are expected to be generated including 56 inbound and 33 outbound trips.

Short-Term Social Event Rental

Short-term social events are expected to occur approximately ten to twenty hours per month during the peak season and generally occur at times other than the morning and evening peak traffic hours. The number of attendees at major events will comply with the requirements of Temporary Use Permit 2014-1252. Since these short-term events are expected to occur for only a few hours per month, which are typically outside of the peak travel hours, the trips generated by short-term events were not included in Table 5-1.

Trip Distribution and Assignment

Traffic distribution is the determination of the directional orientation of traffic. It is based upon the geographical location of the site and land uses that will serve as trip origins and destinations. Traffic assignment is the determination of which specific routes project-related traffic will use, once the generalized traffic distribution is determined. The basic factors affecting route selection are minimizing time and distance. Other considerations might be the aesthetic quality of alternate routes, the number of turning maneuvers, and avoidance of congestion. Site access locations and turn restrictions at site access points can directly affect the traffic assignment.

The site traffic distribution throughout the study area assumed for the proposed residential uses is shown in Figure 5-1. the proposed Residential Access (Street "D") is expected to accommodate approximately 85 percent of the future site traffic on weekdays. The Estate Access (Street "A") is expected to serve the remaining 15 percent of the site traffic on weekdays.

The primary travel demand for site traffic will be to the northwest, where commercial development and employment opportunities are located along Highway 111 in the City of La Quinta. The overall traffic distribution would be similar to the approved traffic distribution associated with the Griffin Ranch Specific Plan. Seventy-five percent of the site traffic at each of the proposed site access connections was assigned to the west toward the City of La Quinta and the remaining twenty-five percent was assigned to the east. This distribution is similar to the ratio of the year 2013 CVAG 24-hour traffic counts south of Avenue 54 on Madison Street (10,067 ADT) and on Monroe Street (3,208 ADT).

Since there are few trip attractions located south of the site, only ten percent of the site traffic was assigned to the south, including eight percent on Madison Street and two percent on Monroe Street. A total of 47 percent of the site traffic was assigned to Avenue 54, west of Madison Street. Another 20 percent was assigned to Madison Street, north of Avenue 54. This distribution was based upon the year 2013 CVAG 24-hour traffic counts of 3,696 ADT for Madison Street (south of Avenue 52) and 8,841 ADT for Avenue 54 (west of Madison Street).

The site traffic assigned east of the proposed project on Avenue 54 included: 11 percent assigned to Avenue 54 (east of Monroe Street), 12 percent assigned to Monroe Street (north of Avenue 54), and 2 percent assigned to Monroe Street (south of Avenue 54). This distribution was based upon the year 2013 daily CVAG counts of 3,867 ADT (Monroe Street, south of Avenue 52) and 3,731 ADT (Avenue 54, east of Monroe Street).

Site Traffic Volumes

Figure 5-2 illustrates the site traffic volumes that would be expected upon completion of the proposed development. The project-related morning and evening peak hour turning volumes are shown in Figure 5-2 at the key intersections within the study area as well as the proposed site access connections on Avenue 54. Table 5-2 shows the weekday site traffic volumes assigned to the roadway segments adjacent to the key intersections.

5.2 Existing+Project Buildout Traffic Volumes

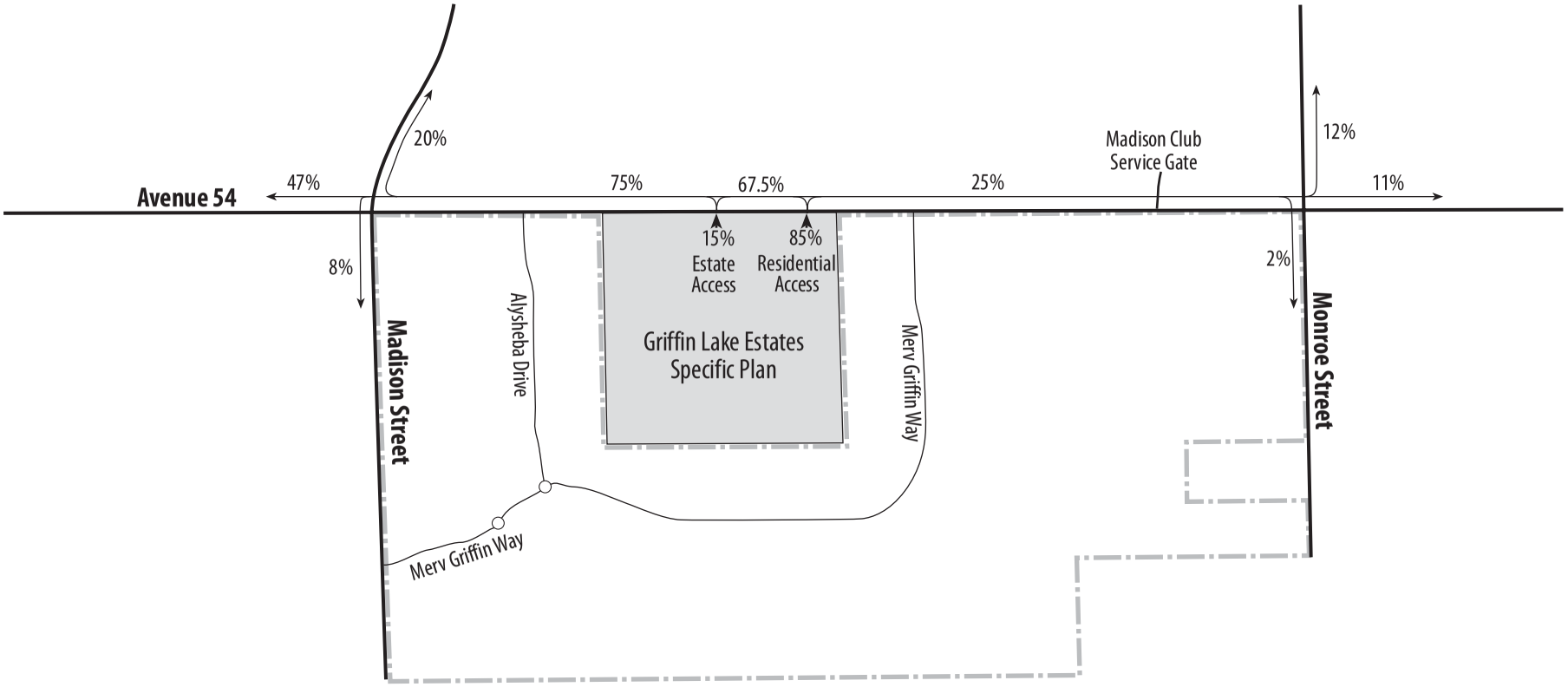
Figure 5-3 shows the existing+project buildout traffic volumes during the peak hours on weekdays in the peak season. The traffic volumes shown in Figure 5-3 were determined by adding the existing turning volumes at the key intersections and site access points (shown in Figure 4-3) to the site traffic volumes (shown in Figure 5-2).

5.3 Future Ambient Traffic Volumes (No Site Traffic)

The proposed project is projected to be completed in the future year 2017. During the three intervening years, traffic volumes will increase in the study area as development occurs throughout the region. As specified in EB #06-13, the future ambient traffic volumes in the year 2017 were calculated by interpolating between the existing (year 2014) traffic volumes and the City's year 2035 General Plan buildout traffic projections for the key intersections. The existing peak hour traffic volumes are shown in Figure 4-3. The City's General Plan buildout morning and evening peak hour traffic volumes for the two key intersections were taken from Figure 11 (Intersections 30 and 34) of the *City of La Quinta 2035 General Plan Circulation Element Update Traffic Impact Analysis,* (May 14, 2012; Iteris, Inc.).

The year 2017 peak season ambient or "through" traffic volume projections for the weekday peak hours (including the growth in cumulative traffic) are shown in Figure 5-4 for the two key intersections and the two proposed site access intersections. The year 2035 ambient peak hour turning movement volumes upon General Plan buildout that were used to determine the year 2017 ambient traffic volumes are shown in Figure 5-5.

Figure 5-1
Site Traffic Distribution



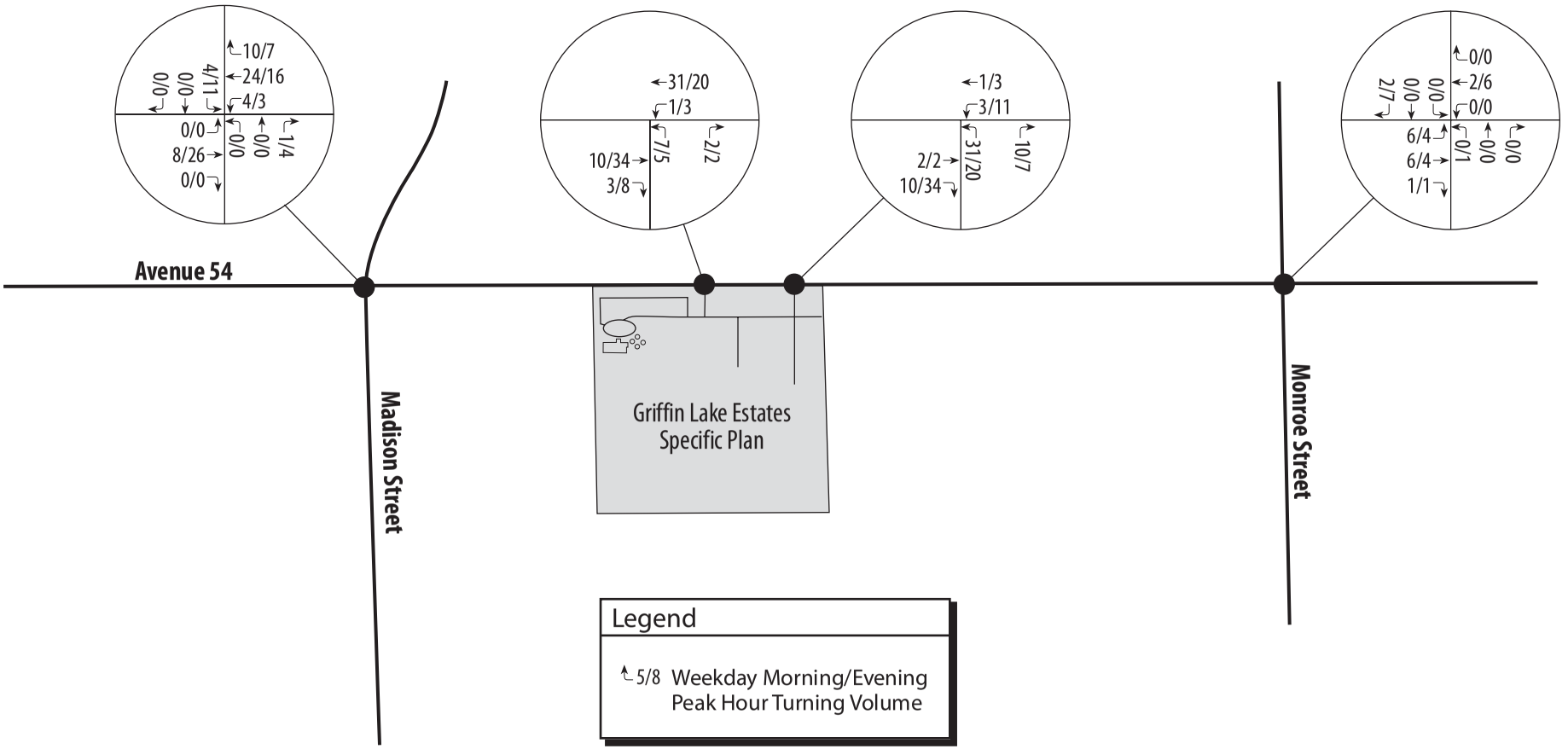
Legend

- Project Site
- Griffin Ranch Specific Plan
- 100% Percentage of Outbound Site Traffic

Endo Engineering

Scale: 1" = 945'

Figure 5-2
Site Traffic Volumes
(Project Buildout)



Endo Engineering

Scale: 1" = 945'

At the key intersection of Monroe Street and Avenue 54, the existing westbound right-turn volume during the morning peak hour is higher than the year 2035 General Plan traffic model projection. Consequently, the year 2035 westbound right-turn volume assumed for the morning peak hour was the existing peak season turning volume plus ten percent.

Table 5-2
Weekday Traffic Projections on Area Roadways
During the Peak Season With and Without Site Traffic

Roadway Segment	Existing (2014)	Project Buildout	Year 2017 Ambient	Year 2017+ Project Buildout	Existing+Project Buildout
Avenue 54					
- West of Madison Street	7,920	420	9,820	10,240	8,340
- East of Madison Street	3,770	670	4,890	5,560	4,440
- West of Primary Access	3,770	670	3,820	4,490	4,440
- West of Secondary Access	3,770	580	3,820	4,400	4,350
- West of Monroe Street	4,090	220	5,310	5,530	4,310
- East of Monroe Street	4,230	100	5,440	5,540	4,330
Madison Street					
- North of Avenue 54	4,290	180	5,890	6,070	4,470
- South of Avenue 54	8,860	70	11,550	11,620	8,930
Monroe Street					
- North of Avenue 54	4,500	110	6,210	6,320	4,610
- South of Avenue 54	3,360	20	4,800	4,820	3,380

a. The 2017 ambient weekday projections were developed by interpolating between the year 2014 existing peak hour traffic volumes and the year 2035 peak hour volumes upon General Plan buildout for both key intersections to reflect the total traffic increase associated with local and regional cumulative developments by the year 2017. The 2017 ambient peak hour volumes were expanded to estimate daily traffic volumes by assuming that 8.7 percent of the daily volume will occur during the evening peak hour.

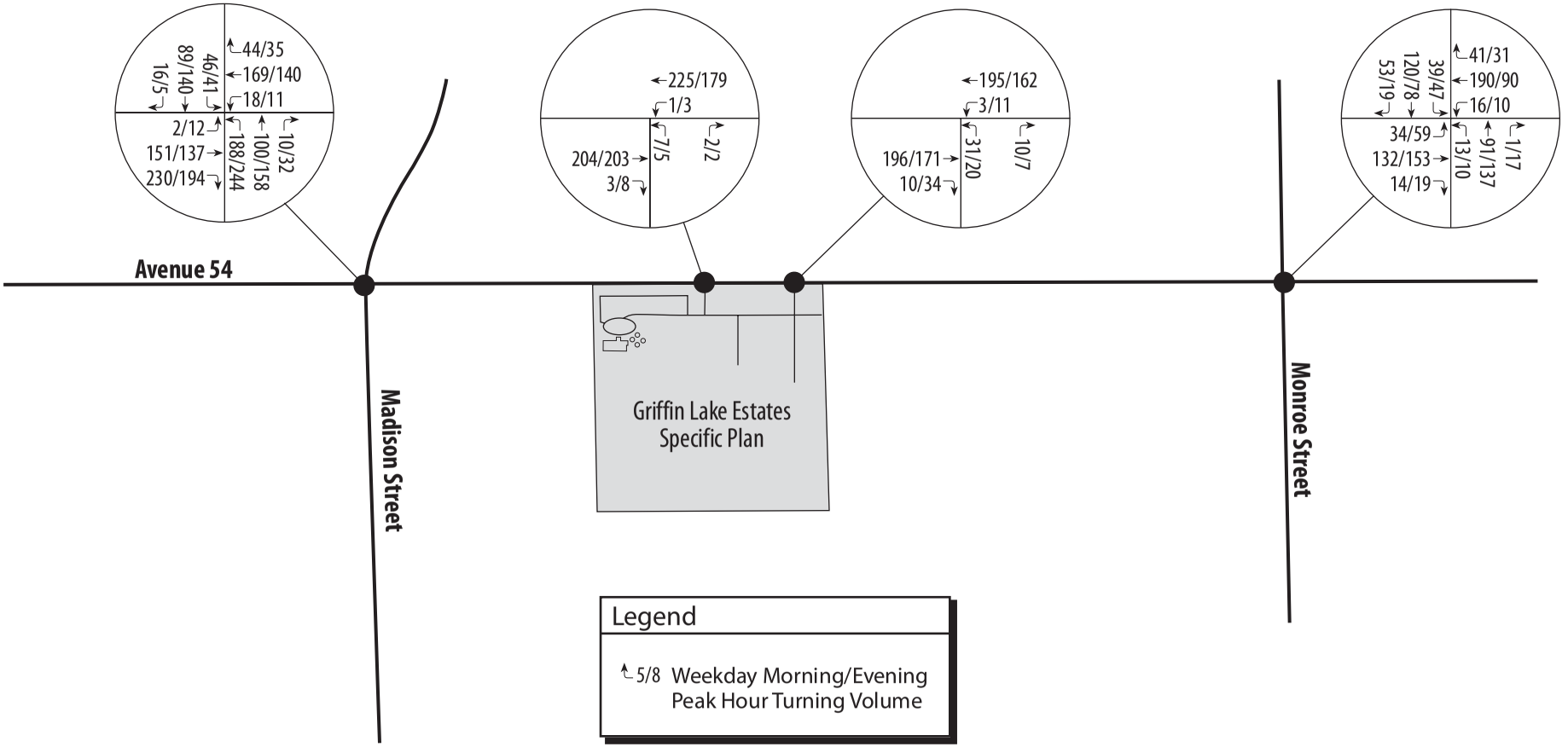
To develop future ambient daily traffic projections in the year 2017 from the ambient peak hour volumes for the year 2017, it was assumed than 8.7 percent of the daily volume will occur during the evening peak hour. Table 5-2 shows the future year 2017 ambient weekday traffic volumes on area roadways.

5.3 Future Total Traffic Volumes (With Site Traffic)

Future total traffic volume projections were determined by adding the site traffic volumes upon project buildout to the future ambient traffic volumes. The site traffic volumes shown in Figure 5-2 were added to the year 2017 ambient peak hour traffic projections shown in Figure 5-4 to determine and future traffic volumes upon project buildout. Figure 5-6 shows the future year 2017+project buildout peak hour traffic volumes at the key intersections and the two proposed site access intersections. The future year 2017+project weekday traffic volumes are provided in Table 5-2.

No operational analysis of General Plan buildout conditions was required for the two key intersections. However, future year 2035 peak hour traffic volumes were required to evaluate future conditions at the two proposed site access intersections. The year 2035 traffic projections upon General Plan buildout at the intersection of Madison Street and Avenue 54 (shown in Figure 5-5) were used to develop the year 2035 ambient traffic volumes at the two site access intersections.

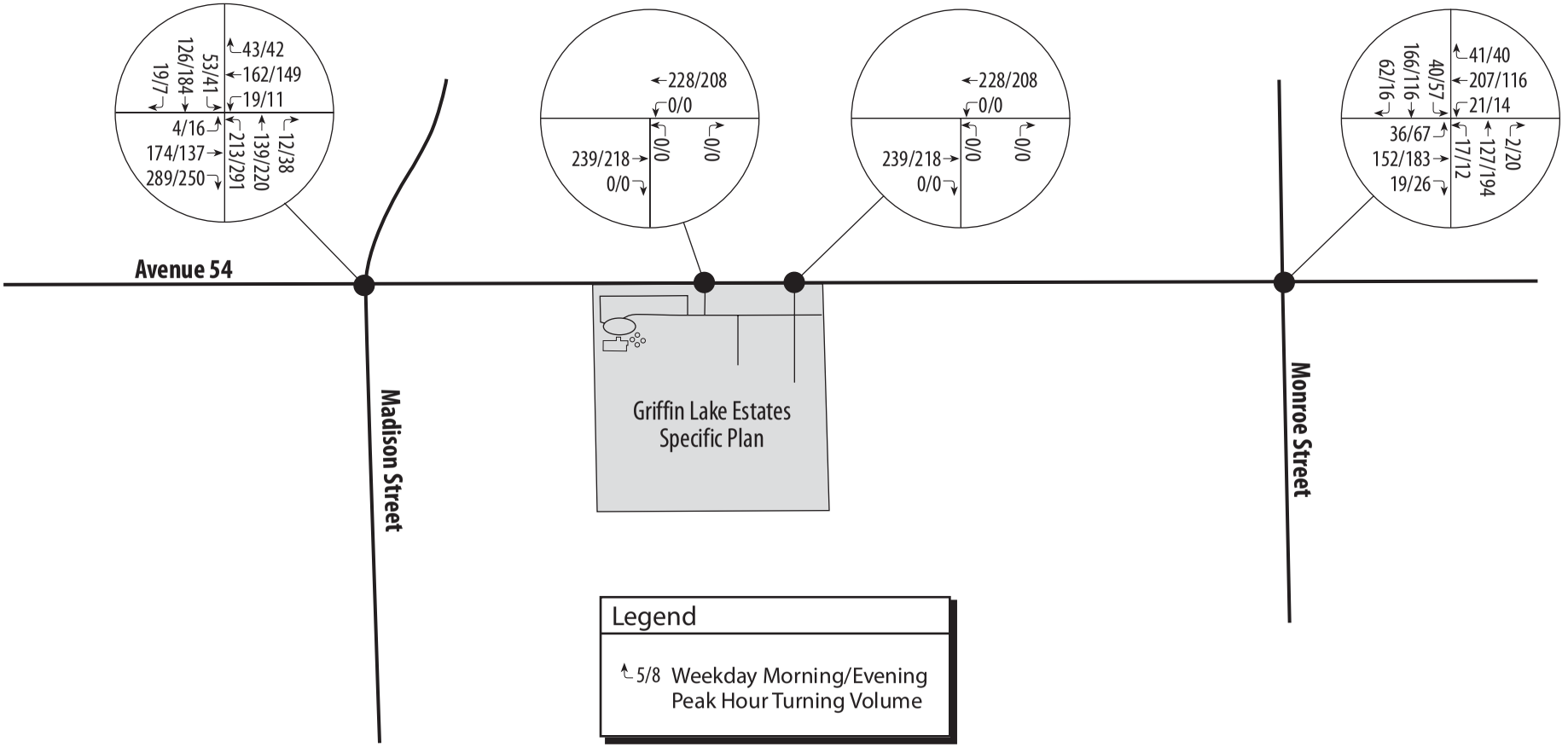
Figure 5-3
Existing+Project Traffic Volumes
(Year 2014 - Peak Season)



Endo Engineering

Scale: 1" = 945'

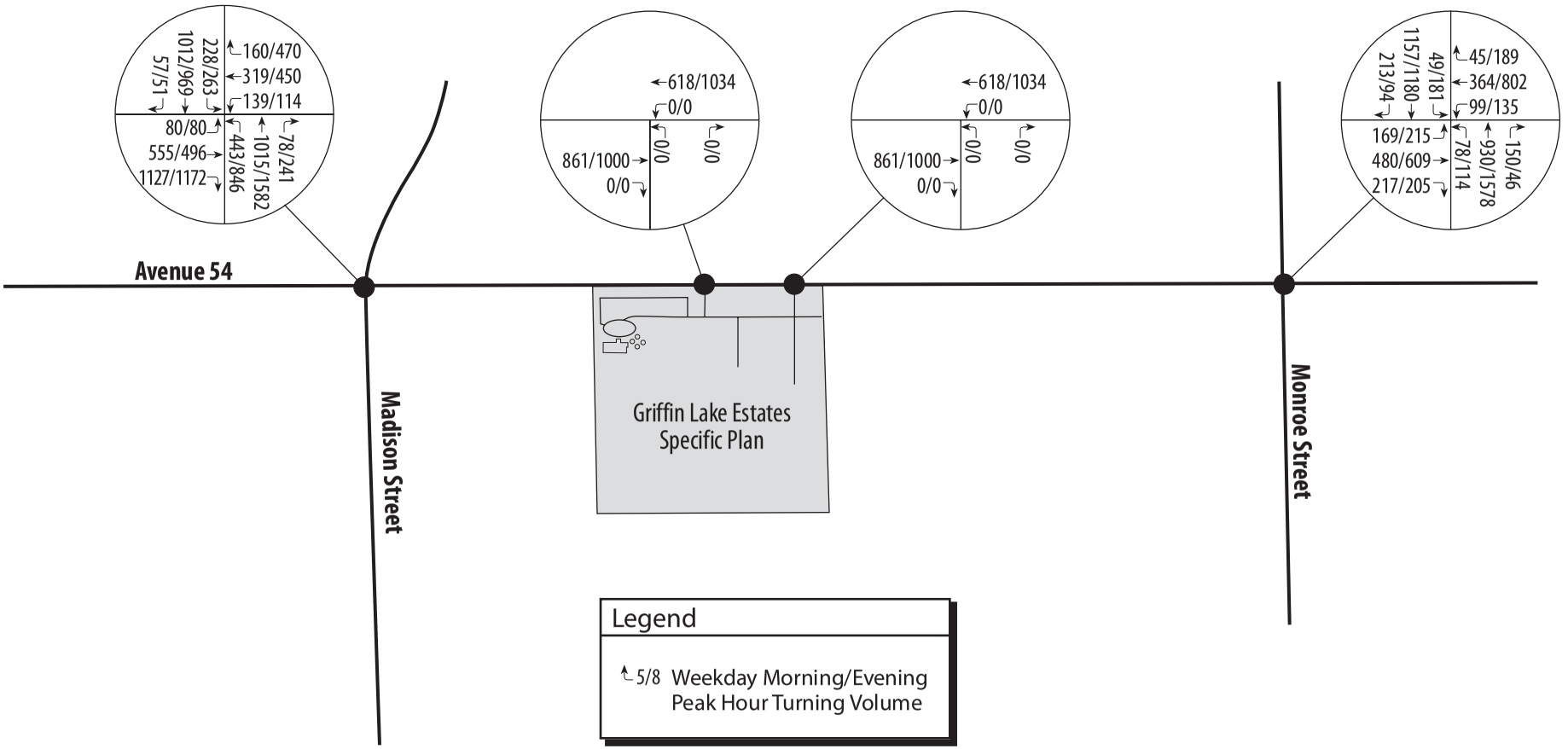
Figure 5-4
Future Year 2017 Ambient
Traffic Volumes



Endo Engineering

Scale: 1" = 945'

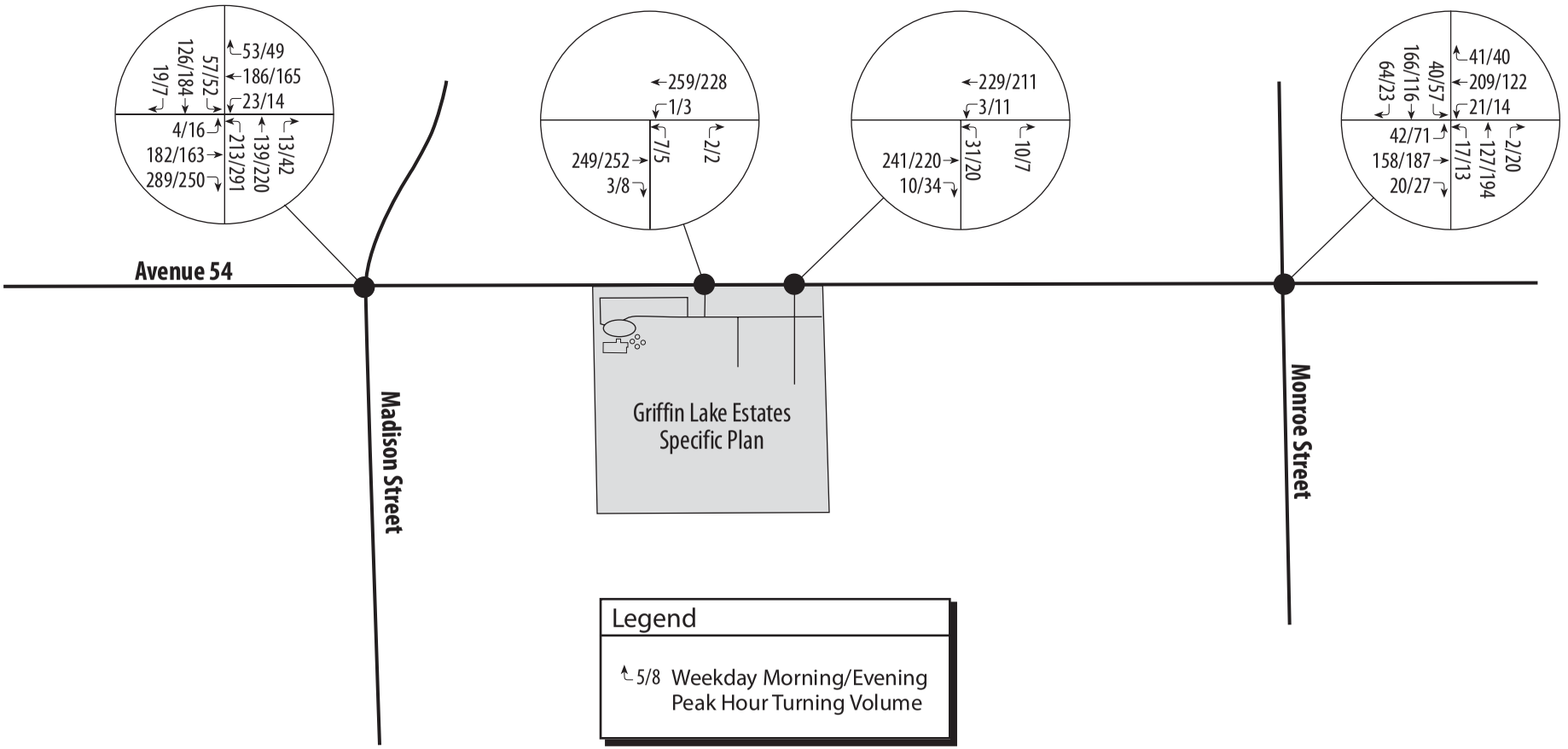
Figure 5-5
Future Year 2035 Ambient
Traffic Volumes



Endo Engineering

Scale: 1" = 945'

Figure 5-6
Year 2017+Project Traffic Volumes



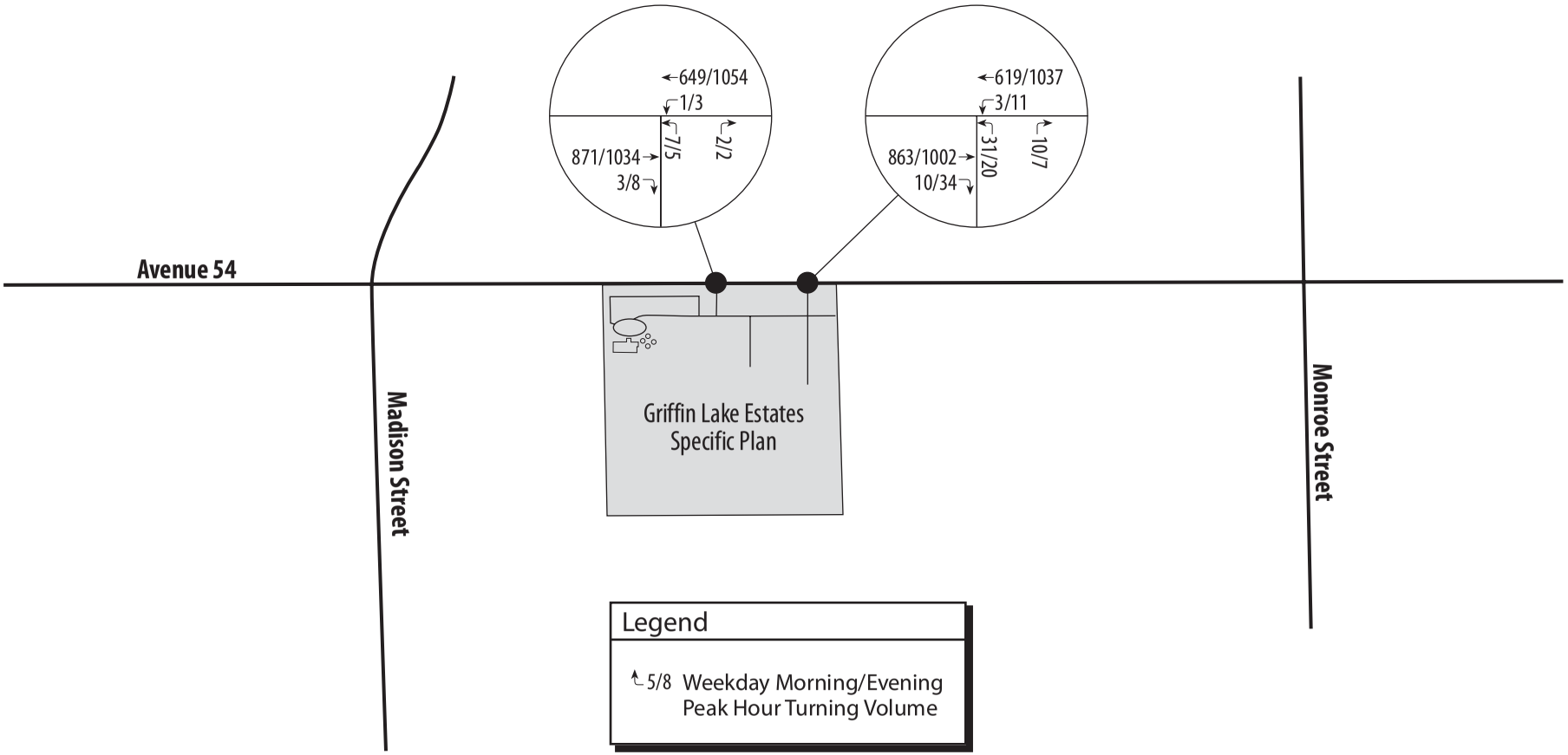
Endo Engineering

Scale: 1" = 945'

No adjustments to the traffic projections shown in Figure 5-5 were made to reflect any minor turning volumes at the intervening intersection of Alysheba Drive with Avenue 54. Most of the custom residential development within the Griffin Ranch Specific Plan has not been completed to date and very little traffic is currently using Alysheba Drive during the peak hours to access the existing residential development within the Griffin Ranch Specific Plan area.

Figure 5-7 illustrates the future year 2035 +project traffic volumes during the peak hours on weekdays at the two proposed site access intersections. The turning movement volumes shown in Figure 5-7 represent the sum of the General Plan buildout traffic volumes shown in Figure 5-5 and project buildout traffic volumes shown in Figure 5-2.

Figure 5-7
Total Year 2035 Traffic Volumes
at the Site Access Points



Endo Engineering

Scale: 1" = 945'

6.0 TRAFFIC ANALYSIS

The evaluation of the change in roadway operating conditions resulting from traffic generated by the Griffin Lake Estates Specific Plan is summarized below. The analysis addressed: (1) existing+project conditions; (2) near-term year 2017 ambient conditions; and (3) year 2017+project conditions. Both near-term (year 2017) and General Plan buildout (year 2035) conditions at the two proposed site access intersections were evaluated. These analyses were conducted to identify the transportation-related implications of the project and any improvements necessary to ensure acceptable traffic operating conditions in the future. Peak hour capacity and level of service analyses were performed for both of the unsignalized key intersections as well as the full-turn site access intersections proposed to serve the project.

Existing+project conditions are evaluated below. With only 78 single-family detached dwelling units, the proposed project could be constructed relatively quickly and is not expected to be implemented in phases. Therefore, a near-term analysis of an initial phase of development was not required. The year 2017 was assumed to be both the project opening year and the project buildout year.

Since the proposed project appears to be consistent with the Low Density Residential land use designation in the *City of La Quinta 2035 General Plan*, a General Plan buildout analysis was not required. The two site access intersections proposed (Street "A" at Avenue 54 and Street "D" at Avenue 54) were evaluated with future year 2035 General Plan buildout traffic volumes to demonstrate the adequacy of the proposed access design with two-way STOP control.

The *City of La Quinta 2035 General Plan* identified the potential for two-lane roundabouts to be constructed at the two key intersections as an alternative to installing traffic control signals. The operation of roundabouts at these two intersections with future year 2035 traffic volumes was evaluated and is discussed in Section 6.4 "Other Considerations."

6.1 Capacity and Level of Service Analysis

Daily volume-to-capacity ratios (V/C) and levels of service are useful planning tools that provide an indication of whether or not additional mid-block through lanes will be needed to accommodate future traffic volumes. Daily V/C ratios and levels of service focus attention on mid-block and network operation, providing a more regional perspective of unsatisfied demand for north/south and east/west travel corridors in an area. A daily V/C ratio analysis can be particularly useful when many cumulative developments are occurring. Daily analyses also permit decisions to be made regarding when a particular roadway requires widening to its master planned cross-section or upgrading to a higher capacity classification in the Circulation Element of the General Plan.

Site-specific mitigation is generally not developed from daily V/C and LOS analyses, since most projects are not large enough to fund major roadway widening that extends a significant distance from the project site. However, daily V/C ratio analyses can be useful in developing conditions of approval, as they provide a mechanism to identify locations where a project's fair-share contribution to the cost of transportation improvements of regional benefit could be significant.

The preferred method of gauging congestion is to evaluate intersection operations during the peak hours, since the approach lane configuration at intersections represents the limiting factor in the capacity of the transportation system. A peak hour intersection analysis requires more data than a daily roadway link V/C analysis but can more clearly define the circulation system performance characteristics. Once these characteristics are known, the intersection approach lanes and traffic control required to accommodate the travel demands and meet the applicable intersection performance standards can be determined.

Significance Thresholds

Any changes in roadway segment LOS were identified. Any changes from one peak hour LOS to another at an unsignalized intersection were identified. All potentially significant project impacts were identified based upon the following City of La Quinta thresholds of significance[1]:

- Any roadway segment where the existing+project level of service is LOS E or LOS F and the project-related traffic causes the peak hour V/C in the peak direction to be increased by 0.02 or more.
- Any roadway segment where the addition of project traffic to existing+cumulative traffic causes the level of service to fall below LOS D.
- Any roadway segment that would operate at LOS E or F with existing+cumulative traffic volumes where the project traffic would increase the peak hour V/C in the peak direction by 0.02.
- An intersection with AWSC where the addition of project-related traffic results in LOS E or worse and project-related traffic adds 3 seconds or more of delay for any movement.
- An intersection with TWSC where the minor-street approach operates at LOS F with project-related traffic and the project-related traffic adds 3 seconds or more of delay for any movement.

Existing+Project Buildout Conditions

Existing+Project Daily V/C and LOS

As shown in Table 6-1, the existing weekday traffic volumes in the peak season utilize up to 32.1 percent of the daily mid-block roadway capacity of area roadways. The existing roadways in the study area currently operate at LOS A on a daily basis. This LOS is characterized by primarily free-flow operation with a travel speed that exceeds 85 percent of the free-flow speed on these roadways. When a facility operates at LOS A, vehicles are completely unimpeded in their ability to maneuver within the traffic stream.[2]

If the proposed project were constructed and fully occupied today, the existing+project buildout weekday traffic volumes would utilize up to 32.9 percent of the existing daily capacity of the roadway links within the study area. Site traffic would utilize between 0.7 percent and 1.6 percent of the daily capacity of Avenue 54. As shown in Table 6-1, the traffic generated by the proposed project within the study area would utilize less than one percent of the daily capacity of Madison Street and Monroe Street. The project-related change in the daily V/C ratios is not projected to be significant.

With existing+project buildout traffic volumes, all of the roadway links evaluated would be accommodating peak season weekday traffic volumes that represent less than one-third of of their daily mid-block capacities. The addition of site traffic to existing traffic volumes would not change the daily level of service on any roadway link in the study area. With the existing+project buildout scenario, no potentially significant project-specific impacts were identified on the roadway segments evaluated within the study area.

Existing+Project Peak Hour Intersection Delay and LOS

The evaluation of peak hour traffic operations at the two key intersections in terms of control delay and levels of service (LOS) is summarized in Table 6-2 for existing conditions with and without project-related traffic. With the existing traffic volumes, intersection approach lane configurations, and all-way STOP control, both of the key intersections currently provide LOS B operation during the peak hours in the peak season. The approach lane geometrics at the two key intersections assumed for the existing+project scenario are shown in Figure 6-1.

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1 Mr. Timothy R. Jonasson, Public Works Director/City Engineer, City of La Quinta, *Engineering Bulletin #06-13,* April 7, 2014.

2 *Highway Capacity Manual,* Special Report 209, Transportation Research Board, 1994; pp. 11-4.

Table 6-1
Existing+Project Daily V/C Ratios and Levels of Service for Area Roadways[a]

Roadway Link	Without Project		With Project Buildout		Project-Related Change		
	ADT	V/C-LOS	ADT	V/C-LOS	ADT	Change	LOS
Avenue 54							
- West of Madison Street	7,920	0.186-A	8,340	0.196-A	420	0.010	No
- East of Madison Street	3,770	0.088-A	4,440	0.104-A	670	0.016	No
- West of Primary Access	3,770	0.088-A	4,440	0.104-A	670	0.016	No
- West of Secondary Access	3,770	0.088-A	4,350	0.102-A	580	0.014	No
- West of Monroe Street	4,090	0.215-A	4,310	0.227-A	220	0.012	No
- East of Monroe Street	4,230	0.302-A	4,330	0.309-A	100	0.007	No
Madison Street							
- North of Avenue 54	4,290	0.101-A	4,470	0.105-A	180	0.004	No
- South of Avenue 54	8,860	0.208-A	8,930	0.210-A	70	0.002	No
Monroe Street							
- North of Avenue 54	4,500	0.321-A	4,610	0.329-A	110	0.008	No
- South of Avenue 54	3,360	0.240-A	3,380	0.241-A	20	0.001	No

Following the addition of project-related traffic to the existing traffic volumes, the peak hour LOS at both of the key intersections would remain unchanged (LOS B). With the existing+project buildout scenario, no potentially significant project-specific impacts were identified on the peak hour operations at the key intersections evaluated within the study area.

If the project were constructed and fully occupied today, an increase in the weighted average overall intersection control delay of 0.19 seconds per vehicle during the peak hours is projected to occur at the intersection of Monroe Street and Avenue 54. The intersection approach with the most delay during the morning peak hour (westbound) would operate at LOS C with and without site traffic. During the evening peak hour, all approaches would operate at LOS B or better with and without site traffic.

The addition of project-related traffic to the existing traffic volumes at the intersection of Madison Street with Avenue 54 would result in an increase in the weighted average overall intersection control delay of 0.39 seconds per vehicle during the morning peak hour and 0.76 seconds per vehicle during the evening peak hour. During the morning peak hour, all approaches would operate at LOS B or better with and without site traffic. The intersection approach with the most delay during the evening peak hour (northbound) would operate at LOS C with site traffic and LOS B without site traffic.

Near-Term Conditions (Year 2017)

Year 2017 (Existing+Ambient Growth) Daily V/C and LOS

As shown in Table 6-3, the year 2017 ambient daily traffic volumes (without site traffic) are projected to utilize up to 44.4 percent of the daily capacity of the roadway segments evaluated within the study area. Prior to the addition of site traffic, all of the roadway segments evaluated are projected to be accommodating daily traffic volumes in the year 2017 at level of service A.

Table 6-2
Existing+Project Peak Hour Delay and Levels of Service
At The All-Way Stop-Controlled Key Intersections[a]

All-Way Stop-Controlled Intersection	Existing Condition			Existing+Project Condition			Change	
	Intersection Delay/LOS	Worst Approach Move	Worst Approach Delay/LOS	Intersection Delay/LOS	Worst Approach Move	Worst Approach Delay/LOS	Intersection Delay	Intersection LOS
Madison Street @ Avenue 54								
- Morning Peak Hour (PHF=0.920)	12.64/B	EB	13.98/B	13.03/B	EB	14.56/B	0.39	No
- Evening Peak Hour (PHF=0.878)	13.86/B	NB	15.60/C	14.62/B	NB	16.45/C	0.76	No
Monroe Street @ Avenue 54								
- Morning Peak Hour (PHF=0.797)	12.81/B	WB	15.12/C	13.00/B	WB	15.45/C	0.19	No
- Evening Peak Hour (PHF=0.768)	11.71/B	NB	12.38/B	11.90/B	NB	12.60/B	0.19	No

a. The overall average intersection control delay and LOS are shown for the all-way stop-controlled intersections as well as the delay and LOS for the approach with the most delay (shown under the heading "Worst Approach"). Delay=Average Control Delay (seconds/vehicle). LOS was determined from the delay (0-10 sec./veh.=LOS A; 10-15 sec./veh.=LOS B; 15-25 sec./veh.=LOS C; 25-35 sec./veh.=LOS D; 35-50 sec./veh.=LOS E; 50+ sec./veh.= LOS F) per HCM 2000 page 17-2. Appendix C includes all of the HCS+ unsignalized intersection peak hour worksheets. Assumes the lane geometrics shown in Figure 3-2 and a 5 percent heavy vehicle mix.

Table 6-3
Year 2017 Daily V/C Ratios and Levels of Service for Area Roadways[a]

Roadway Link	Without Project		With Project Buildout		Project-Related Change		
	ADT	V/C-LOS	ADT	V/C-LOS	ADT	Change	LOS
Avenue 54							
- West of Madison Street	9,820	0.231-A	10,240	0.240-A	420	0.009	No
- East of Madison Street	4,890	0.115-A	5,560	0.131-A	670	0.016	No
- West of Estate Access	3,820	0.090-A	4,490	0.105-A	670	0.015	No
- West of Residential Access	3,820	0.090-A	4,400	0.103-A	580	0.013	No
- West of Monroe Street	5,310	0.279-A	5,530	0.291-A	220	0.012	No
- East of Monroe Street	5,440	0.389-A	5,540	0.396-A	100	0.007	No
Madison Street							
- North of Avenue 54	5,890	0.138-A	6,070	0.142A	180	0.004	No
- South of Avenue 54	11,550	0.271-A	11,620	0.273A	70	0.002	No
Monroe Street							
- North of Avenue 54	6,210	0.444-A	6,320	0.451-A	110	0.007	No
- South of Avenue 54	4,800	0.343-A	4,820	0.344-A	20	0.001	No

a. The values shown assume that the existing capacity of all roadway segments in the study area remains unchanged.

Year 2017 (Existing+Ambient Growth) Peak Hour Intersection Delay and LOS

The evaluation of peak hour traffic operations at the two key intersections in the year 2017 is summarized in Table 6-4 for conditions in the year 2017 with and without project-related traffic. The approach lane geometrics at the two key intersections assumed for the year 2017 scenarios are shown in Figure 6-1.

With all-way STOP control, both of the key intersections are expected to operate at LOS C during the peak hours in the year 2017, prior to the addition of project-related traffic. The approaches with the most control delay at these intersections are projected to operate at LOS C during the peak hours in the year 2017. These levels of service are considered acceptable in the City of La Quinta.

Year 2017+Project Buildout Daily V/C and LOS

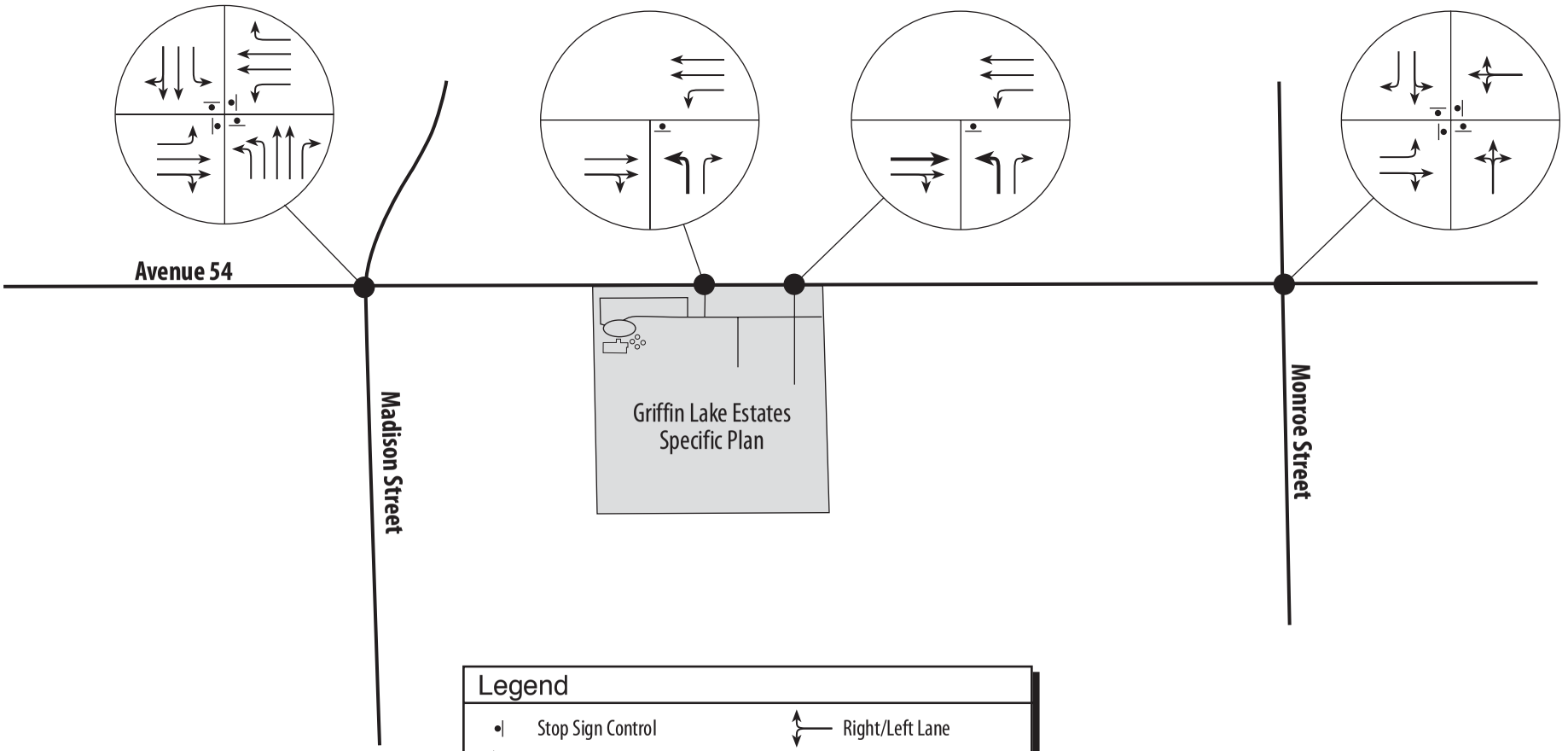
As shown in Table 6-3, the year 2017+project daily traffic volumes are projected to utilize up to 45.1 percent of the daily capacity of the roadway segments evaluated within the study area. Following the addition of site traffic in the year 2017, all of the roadway segments evaluated are projected continue to operate at LOS A on a daily basis.

Upon project completion in the year 2017, site traffic is projected to utilize between 0.9 percent to 1.6 percent of the daily capacity of Avenue 54. Site traffic is expected to utilize between 0.1 percent and 0.7 percent of the daily capacity of Monroe Street in the year 2017. Site traffic is projected to utilize 0.2 to 0.4 percent of the daily capacity of Madison Street upon project completion. With the year 2017+project buildout scenario, no potentially significant project-specific impacts were identified on the roadway segments evaluated within the study area.

Year 2017+Project Buildout Peak Hour Intersection Delay and LOS

As shown in Table 6-4, the peak hour LOS at both of the unsignalized key intersections with AWSC is projected to remain unchanged (LOS C) following the addition of project-related traffic to the year 2017 ambient traffic volumes. This is considered an acceptable level of service.

Figure 6-1
Lane Geometrics Assumed for Existing+Project Buildout



Note: Bold arrows represent new or modified traffic lanes.

Endo Engineering

Scale: 1" = 945'

Table 6-4
Project Buildout Peak Hour Delay and Levels of Service
At The All-Way Stop-Controlled Key Intersections[a]

All-Way Stop-Controlled Intersection	Year 2017 Without Project			Year 2017 + Project Buildout			Change	
	Intersection Delay/LOS	Worst Approach Move	Worst Approach Delay/LOS	Intersection Delay/LOS	Worst Approach Move	Worst Approach Delay/LOS	Intersection Delay	Intersection LOS
Madison Street @ Avenue 54								
- Morning Peak Hour (PHF=0.920)	16.80/C	EB	21.64/C	17.59/C	EB	23.21/C	0.79	No
- Evening Peak Hour (PHF=0.878)	20.22/C	NB	23.75/C	22.00/C	NB	25.68/D	1.78	No
Monroe Street @ Avenue 54								
- Morning Peak Hour (PHF=0.797)	16.50/C	WB	20.70/C	16.88/C	WB	21.41/C	0.38	No
- Evening Peak Hour (PHF=0.768)	16.46/C	NB	18.85/C	16.95/C	NB	19.51/C	0.49	No

a. Overall intersection delay and intersection LOS are shown for the all-way stop-controlled intersections as well as the delay and LOS for the approach with the most delay (shown under the heading "Worst Approach"). Delay=Average Control Delay (seconds/vehicle). LOS was determined from the delay (0-10 sec./veh.=LOS A; 10-15 sec./veh.=LOS B; 15-25 sec./veh.=LOS C; 25-35 sec./veh.=LOS D; 35-50 sec./veh.=LOS E; 50+ sec./veh.= LOS F) per HCM 2000 page 17-2. Appendix C includes all of the HCS+ unsignalized intersection peak hour worksheets. Assumes the lane geometrics shown in Figure 6-1 and a 5 percent heavy vehicle mix.

Project-related traffic is projected to increase the overall intersection control delay at these key intersections by less than 1.8 seconds per vehicle during the peak hours. This increase in the overall intersection control delay would not result in a change in the peak hour LOS and therefore would most likely not be perceived by motorists. During the peak hours in the year 2017, all of the approaches at the key intersections with AWSC would operate at acceptable levels of service (LOS D or better with and without site traffic. With the year 2017+project buildout scenario, no potentially significant project-specific impacts were identified on the peak hour operations at the key intersections evaluated within the study area.

Table 6-5 summarizes the future peak hour operational analysis for the two site access intersections proposed on Avenue 54. Upon project completion in the year 2017, the intersection of the western Estate Access with Avenue 54 would be two-way STOP controlled and provide two entry lanes and two exit lanes. The northbound (minor-street) approach is projected to operate at LOS B during the peak hours upon project completion in the year 2017. The intersection of the eastern Residential Site Access with Avenue 54 would also be two-way STOP controlled and provide two entry lanes and two exit lanes. The northbound (minor-street) approach at the eastern site access is projected to operate at LOS B during the peak hours upon project completion in the year 2017. At both of the proposed site access intersections, westbound vehicles turning left from Avenue 54 into the project site are projected to experience an average delay of less than 8 seconds per vehicle (LOS A).

General Plan Buildout Conditions

A General Plan buildout analysis was not required for the proposed project. The City of La Quinta requested a peak hour analysis of the two proposed site access intersections on Avenue 54 with General Plan buildout traffic volumes to ensure that acceptable levels of service would be maintained with two-way STOP control. The site access improvements shown in Figure 6-1 were assumed to determine the control delay and LOS on Street "A" at Avenue 54 (the western estate access) and on Street "D" at Avenue 54 (the eastern residential access).

Site Access Intersections

As shown in Table 6-5, upon General Plan buildout, the intersection of the western Estate Access with Avenue 54 is projected to provide acceptable levels of service with two-way STOP control. The northbound (minor-street) approach at this intersection is projected to operate at LOS C during the morning peak hour and LOS D during the evening peak hour upon General Plan buildout.

The intersection of the Residential Site Access with Avenue 54 is projected to provide acceptable levels of service with two-way STOP control. The northbound (minor-street) approach at this intersection is projected to operate at LOS D during the morning peak hour and LOS E during the evening peak hour upon General Plan buildout. Westbound vehicles turning left from Avenue 54 into the project site at the Residential Site Access are projected to experience an average delay of less than 11 seconds per vehicle (LOS B) during the evening peak hour. The 95th-percentile back-of-queue length in the westbound left-turn pocket on Avenue 54 would be one vehicle during the weekday peak hours. The 95th-percentile back-of-queue length in the northbound left-turn lane at the Residential Access on Avenue 54 would be one vehicle during the weekday peak hours.

At the western Estate Access intersection on Avenue 54, westbound vehicles turning left from Avenue 54 into the project site are projected to experience an average delay of less than 11 seconds per vehicle (LOS B) during the evening peak hour. The 95th-percentile back-of-queue length in the westbound left-turn pocket on Avenue 54 is projected by the HCS to be one vehicle during the weekday peak hours. The 95th-percentile back-of-queue length in the northbound left-turn lane at the Estate Access on Avenue 54 would be one vehicle during the weekday peak hours. Therefore, the existing left-turn pocket length on Avenue 54 should be adequate to serve project-related traffic upon General Plan buildout.

Table 6-5
Future Delay and LOS at Site Access Intersections on Avenue 54

Unsignalized Intersection	Future Condition With Project Buildout and Two-Way STOP Control				
	Left-Turn Entry From Avenue 54		Northbound Approach to Avenue 54		
	Control Delay[a]	Level of Service[b]	Move	Control Delay[c]	Level of Service[b]
YEAR 2017 + PROJECT					
Estate Access (St. "A") @ Avenue 54					
- Morning Peak Hour (PHF=0.920)	7.8	LOS A	Northbound	11.0	LOS B
- Evening Peak Hour (PHF=0.878)	7.9	LOS A	Northbound	10.9	LOS B
Residential Access (St. "D") @ Avenue 54					
- Morning Peak Hour (PHF=0.920)	7.8	LOS A	Northbound	11.1	LOS B
- Evening Peak Hour (PHF=0.878)	7.9	LOS A	Northbound	11.1	LOS B
GENERAL PLAN BUILDOUT + PROJECT					
Estate Access (St. "A") @ Avenue 54					
- Morning Peak Hour (PHF=1.0)	9.8	LOS A	Northbound	23.1	LOS C
- Evening Peak Hour (PHF=1.0)	10.6	LOS B	Northbound	34.5	LOS D
Residential Access (St. "D") @ Avenue 54					
- Morning Peak Hour (PHF=1.0)	9.8	LOS A	Northbound	25.1	LOS D
- Evening Peak Hour (PHF=1.0)	10.6	LOS B	Northbound	40.7	LOS E

a. Average control delay (seconds/vehicle) for the left-turn move from the major street onto the minor street. Assumes intersection geometrics shown in Figure 6-1, a 5 percent heavy vehicle mix, and the peak hour factors shown. Appendix C includes the HCS unsignalized intersection worksheets.

b. LOS was determined from the delay (0-10 sec./veh.=LOS A; 10-15 sec./veh.=LOS B; 15-25 sec./veh.=LOS C; 25-35 sec./veh.=LOS D; 35-50 sec./veh.=LOS E; 50+ sec./veh. = LOS F) per HCM 2000 page 17-2 and 17-32. LOS is not defined for the overall intersection but rather for individual movements and approaches at TWSC intersections.

c. Delay=average approach control delay (seconds/vehicle) for the minor-street approach at each TWSC site access intersection.

The peak hour analysis of the two proposed site access intersections on Avenue 54 with General Plan buildout traffic volumes determined that acceptable levels of service would be maintained with two-way STOP control. No potentially significant project-specific impacts were identified at the site access connections proposed on Avenue 54 upon project completion in the year 2017 or with General Plan buildout traffic volumes.

6.2 Traffic Signal Warrant Analysis

Madison Street at Avenue 54

Future year 2017 peak hour traffic projections for the two key intersections and the two proposed site access intersections were checked against the rural peak hour traffic signal volume warrants, (see Appendix D). In the year 2017 the intersection of Madison Street and Avenue 54 will meet the peak hour signal warrant for both the morning and evening peak hours with and without site traffic volumes. However, with all-way stop control, this intersection is projected to operate at LOS C with or without project traffic volumes. Therefore, signalization is not justified at this intersection upon project buildout.

Monroe Street at Avenue 54

The existing volumes at the intersection of Monroe Street with Avenue 54 do not currently meet the rural peak hour traffic signal volume warrants. This intersection is currently operating at LOS B in both the morning and evening peak hours. In the year 2017 the intersection of Monroe Street and Avenue 54 is not projected to meet the rural peak hour traffic signal volume warrants. This is projected to operate at LOS C with or without site traffic volumes and all-way stop control. Signalization is not justified at this intersection with year 2017+project traffic volumes.

Neither of the two site access intersections on Avenue 54 are projected to meet the rural peak hour traffic signal volume warrants. The northbound approach volume at the Residential Access intersection is projected to be ≤ 48 vehicles per hour (per Table 4-1 in the morning peak hour including both left and right turning vehicles). Since the minimum minor-street approach volume thresholds associated with the rural peak hour traffic signal warrants is 75 vehicles per hour for a one-lane approach and 100 vehicles per hour for a two-lane approach, site traffic volumes will be insufficient to require signalization at either site access intersection.

6.3 Site Access and Internal Circulation

The existing gated Secondary Access to the Merv Griffin Estate is located approximately 460 feet west of the future alignment of Merv Griffin Way (centerline to centerline) and 670 feet east of the Primary Access serving the Merv Griffin Estate. The Secondary Access would be relocated approximately 125 feet westerly in conjunction with the proposed development. Once relocated, Street 'F' will be approximately 585 feet west of Merv Griffin Way (centerline to centerline) and 545 feet east of the existing Primary Access.

The existing Class II bikeway on the south side of Avenue 54 opposite the project site conforms to Caltrans specifications and design criteria as well as City requirements (including a minimum width of six feet and a maximum width of eight feet). The proposed street improvement plans and signing and striping plans will be submitted to the City of La Quinta for review and approval. These plans will detail any changes to be made within the Avenue 54 right-of-way to accommodate site access. For example, access ramps compliant with ADA standards (per City Standard 250) shall be constructed at both proposed site entries within the public right-of-way associated with Avenue 54. The westbound left-turn bays within the median on Avenue 54, opposite the proposed site access points, shall be modified as required by the City Engineer.

Adequacy of the Gated Site Access Intersections

Engineering Bulletin #06-13 specifies that the minimum left-turn bay length is 100 feet plus a 50-foot taper. Two existing driveways on the south side of Avenue 54 (see Figure 2-2) currently provide access to the project site. Both full-turn driveways are opposite breaks in the painted (flush) median with left-turn bays. The existing left-turn bay

opposite the Primary Site Access is approximately 160 feet long (including taper). The existing westbound left-turn bay at the Secondary Site Access, is approximately 170 feet long (including taper). Both of these existing left-turn bays provide sufficient queue storage space to accommodate the future turning volumes generated by the proposed project.

The initial concept included a single site access connection on Avenue 54 located at the existing Primary Site Access that would accommodate activities at the Merv Griffin estate and future residents. The existing Secondary Access was envisioned as an emergency access only. The site access design evolved during the development review process. Through coordination with City engineering and planning staff, it was concluded that distributing the site traffic beyween two access driveways would minimize the potential traffic impacts on Avenue 54 and separate traffic associated with the Merv Griffin estate activities from the residential traffic.

The existing gated Secondary Access to the Merv Griffin estate is located approximately 440 feet west of the future alignment of Merv Griffin Way (centerline to centerline) and 670 feet east of the existing Primary Access serving the Merv Griffin estate. This Secondary Access would be relocated approximately 125 feet to the west in conjunction with the proposed development. Once relocated, the new Residential Access would be approximately 565 feet west of Merv Griffin Way (centerline to centerline) and 545 feet east of the existing Primary Access serving the Merv Griffin estate. Moving the Residential Access further to the west would improve the separation between the Residential Access and the entry to the right-turn deceleration lane on Avenue 54 at Merv Griffin Way.

Both of the proposed access connections will serve only development within the Griffin Lake Estates Specific Plan area and be unsignalized gated T intersections. The relatively low exiting traffic volumes would be insufficient to meet traffic signal warrants (less than one-half of the minimum approach volume threshold for signalization). The proposed site access intersections are projected to provide acceptable levels of service with General Plan buildout traffic volumes. However, the proposed Residential Access location would be inconsistent with the 1,060-foot minimum intersection spacing design standard for Primary Arterials identified in the 2012 *City of La Quinta General Plan.* The proposed Residential Access location would require the approval of the City Engineer.

Gated Site Access Design

As shown in Figure 2-3, the proposed project would include gated entries at both of the site access connections on Avenue 54 (Street “A” and Street “D”). The proposed Estate Access (Street “A” in Figure 5-2) is projected to have very low entering traffic volumes during weekday peak hours. The queue of entering vehicles must be accommodated entirely within the site. The City of La Quinta requires a minimum entering queue storage length of 37 feet (measured between the call box and the flow line on Avenue 54) to accommodate two vehicles in the entry lane. The project would provide 200 feet of queue storage length at this access, which could accommodate an entering queue of 8 to 10 vehicles.

The estate facilities will periodically be used to host events that will attract more traffic than expected to arrive during the peak hours on weekdays. The project provides a stacking distance of 200 feet for entering vehicles at the Estate Access (100 feet per entry lane). Separate gates will be provided at the Estate Access for entering vehicles turning right onto Estate Drive within the site and those turning left to enter the residential area. A bulb will be constructed at the southern terminus of Street “A,” outside the gates. Non-accepted vehicles will be able to turn around at this bulb and exit without entering the gates.

As shown in Figure 5-2, the Residential Access (Street “D”) is projected to accommodate more entering vehicles during the peak hours on weekdays than the Estate Access (Street “A”). The City of La Quinta requires a stacking space of 62 feet to accommodate three entering vehicles between the call box and the flow line at the Residential Access. The proposed project would provide a stacking distance of approximately 180 feet on Street “D” between the call box and the flow line (two entry lanes with 90 feet of queue storage per lane). A 40-foot wide space would be provided on Street “D” in advance of the gate to allow non-accepted vehicles to turn around and exit (see Figure 2-3).

Both the proposed site access points would provide sufficient on-site queue storage space to accommodate vehicles entering to the site. The provision of two 12-foot wide entry lanes at each site access would permit residents with transponders to bypass vehicles stopped awaiting authorization to enter the site. The provision of two northbound exit lanes at each site access would reduce the control delay experienced by motorists exiting the site. The proposed two-way STOP control would be appropriate at both of these intersections. These access points would provide acceptable levels of service during the peak hours on weekdays (as shown in Table 6-5). The northbound volumes at both access point would be less than one half of the minimum volume required before consideration would be given to traffic control signals.

Auxiliary Lanes

An auxiliary lane is a left-turn or right-turn lane or bay used to limit the speed differential between turning vehicles and following through vehicles to a safe level. Engineering Bulletin #06-13 (EB 06-13) documents the City of La Quinta requirements regarding auxiliary speed change lanes on all Secondary Arterial, Primary Arterial, and higher order General Plan streets. A right-turn deceleration lane is required for any driveway with a projected peak hour right-turn entering volume estimated to be 50 or more vehicles per hour. A left-turn deceleration lane is required for any driveway with a projected peak hour left-turn entering volume estimated to be 25 or more vehicles per hour.

Median Left-Turn Deceleration and Storage Lanes

As shown in Figure 5-2, the evening peak hour left-turn volume entering the project site is projected to be 3 vehicles per hour at the Estate Access and 11 vehicles per hour at the Residence Access. These volumes would be insufficient to require a left-turn auxiliary lane. A westbound left-turn bay is currently painted at each of the breaks in the flush (painted) median located opposite the existing site access intersections. Although the existing left-turn bays are consistent with the minimum 100-foot length plus taper specified in EB 06-13, they do not provide the deceleration length of 484 feet identified in EB 06-13 for a posted speed limit of 55 mph.

Improvements proposed at the two site access intersections would require the existing painted median on Avenue 54 to be modified to reflect the wider proposed site access intersections and the relocation of the existing Secondary Access 125 feet to the west. The City of La Quinta may elect to retain the westbound left-turn bay lengths, based upon the low projected left-turn volumes, or modify the left-turn bay lengths to provide additional space for deceleration out of the through travel lanes based upon the design speed of Avenue 54. The projected 95th-percentile back-of-queue length associated with the future peak hour westbound left-turn movements at both site access intersections is one car length.

Right-Turn Deceleration Lane

The potential need for an auxiliary right-turn deceleration lane at the site access intersections was evaluated in a letter report prepared by Endo Engineering on June 11, 2014 (*Auxiliary Right-Turn Lane at the Merv Griffin Estates Access on Avenue 54)*. The letter concluded that the future eastbound right-turn entering traffic volume on Avenue 54 would not exceed 50 vehicles per hour at either site driveway, except during major events when the event traffic would be controlled by the Riverside County Sheriff's Department. A right-turn deceleration lane will not be required at either site access on Avenue 54.

Median Left-Turn Acceleration and Storage Lane (MAL)

MALs can be used at T-intersections on high-volume high-speed roadways where signalization is not warranted, but left-turn entry may be difficult. These lanes provide a refuge area in the median that permits two-stage gap acceptance to enhance left-turn maneuvers from side streets onto mainline streets. AASHTO design policies indicate that MALs are justified where many vehicles are making left turns from the minor street and few vehicles are turning left from the major street onto the minor street.

MALs give mainline traffic more advance warning of left-turning vehicles. This reduces conflicts between the two merging traffic streams. Traffic flow is improved as a result of higher merging speeds where adequate acceleration length is provided. Far-side MALs at unsignalized T-intersections increase the left-turn capacity of the minor street and reduce the need for signalization at minor street intersections, thereby improving traffic operations.

While not required to achieve an acceptable LOS at the proposed Residential Site Access, a far-side MAL on Avenue 54 could improve the peak hour operation of the northbound approach by reducing control delay. Storage for two vehicles in the median refuge lane would facilitate left turns onto Avenue 54 from the project site.

Internal Circulation

The proposed internal circulation appears to be adequate to accommodate the proposed land uses. The lot layout appears to distribute the traffic on the internal circulation system.

The applicant shall retain for private use all private street rights-of-way in conformance with the City of La Quinta General Plan and Municipal Code. Parking shall be permitted on both sides of the private residential streets on-site which provide 40-foot travel widths (measured at gutter flow line to gutter flow line).
Improvement plans for streets and site access gates and parking areas should be stamped and signed by qualified engineers. Improvements should be designed and constructed in accordance with City adopted standards, supplemental drawings and specifications, or as approved by the City Engineer.

Streets within the proposed residential area shall be installed and maintained as private streets. Private streets should be designed to meet the City's public street standards at the point where they connect with public streets. A sidewalk exists on the south side of Avenue 54 across the entire project frontage that will connect to the meandering sidewalk to be constructed east of the project site in conjunction with the Griffin Ranch Specific Plan development.

Sight Distance

Providing adequate sight distance at access connections ensures that drivers can enter a roadway safely and drivers approaching the access connection can see a vehicle waiting to enter the roadway in time to take evasive action if necessary. Adequate sight distance between pedestrians, drivers, and cyclists should be provided within the street space at driveways, intersections, and crosswalks. Although no on-street parking is permitted on Avenue 54, where on-street parking within the development can obstruct sight distance, parking may need to be prohibited within the sight triangle associated with an access connection.

Stopping Sight Distance

Stopping sight distance is the distance along a roadway required for a driver to perceive and react to an object in the roadway and to brake to a complete stop before reaching the object. Adequate stopping sight distance shall be provided at every point along the private streets within the proposed residential development.

The minimum stopping sight distance provided shall conform to the target speed for the private residential streets within the proposed development. When determining the stopping sight distance on horizontal curves, where residential access connections will be located on the inside of the curve, consideration shall be given to the potential for on-street parking on or near the horizontal curve. For a target speed of 20 mph on the neighborhood streets, a minimum stopping sight distance of 115 shall be provided (minimum horizontal curve radius of 100 feet). For a target speed of 25 mph on the residential streets, a minimum stopping sight distance of 155 shall be provided (minimum horizontal curve radius of 180 feet).

Intersection Sight Distance

Intersection sight distance is required for drivers to safely make a left turn or right turn from an access connection onto or cross a roadway. Intersection sight distance is also required for drivers on a roadway to safely turn into an access

connection. Uncontrolled local intersections within residential subdivisions may require restrictions on the locations of buildings, fences, landscaping etc. to provide adequate intersection sight distance. Vehicles parked both on-street and off-street may obstruct sight distance and should be taken into account. For a target approach speed of 20 mph or 25 mph, the recommended clear sight distance would be 90 feet and 115 feet, respectively.

6.4 Other Considerations

Feasibility of Roundabouts at the Two Key Intersections

No significant project-specific impact is projected to occur at either of the two key intersections. Therefore, no mitigation is required at either of the two key intersections to maintain peak hour operations at acceptable levels of service upon project completion.

The *City of La Quinta 2035 General Plan* identifies both of the key intersections as potential candidates for signalization or conversion to two-lane roundabouts in the future. Roundabouts are appropriate at intersections with relatively balanced flows on the major street and the minor street. A four-leg two-lane roundabout can typically handle daily service volumes of approximately 45,000 vehicles per day (total entering volume). Exit flows exceeding 1,200 vehicles per hour typically indicate the need for a double-lane exit. Unbalanced conditions cause a loss of capacity at high demand flow conditions. Consequently, intersections with highly directional (unbalanced) traffic flows are typically not good candidates for roundabouts. Isolated intersections in a network of traffic signals are typically not good candidates for roundabouts.

Assuming that 8.7 percent of the daily traffic occurs during the peak hour, a two-lane roundabout would reach its daily design capacity (at the upper limit of LOS D) when the two streets each carry approximately 20,200 vehicles per day. Madison Street is projected to accommodate more than 50,000 vehicles per day and Monroe Street is projected to carry more than 40,000 vehicles per day. A two-lane roundabout would not be a viable option at their intersection with Avenue 54, which is projected to serve 25,000 to 35,000 vehicles per day upon General Plan buildout .

The 2010 HCM provides a lane-based capacity model for single-lane and two-lane roundabouts. Both of the key intersections were evaluated as roundabouts with the General Plan buildout peak hour traffic projections. The analysis assumed four two-lane entries with right-turn bypass lanes and a two-lane circulating roadway with no pedestrians crossing the entries. During the evening peak hours, excessive intersection delay consistent with LOS F would occur at both of these roundabouts. The approach delay on all four approaches at each of these roundabouts would be consistent with LOS F operation. The roundabout reports are included in Appendix C.

Even with right-turn bypass lanes, a two-lane roundabout would not be a viable alternative at either of the two key intersections to accommodate General Plan buildout traffic. A two-lane roundabout would not provide acceptable levels of service at either intersection upon General Plan buildout.

7.0 FINDINGS AND RECOMMENDATIONS

7.1 Traffic Impact Findings

Trip Generation Findings

The existing plus future proposed land uses within the project site are expected to generate a total of approximately 890 weekday trip-ends. During the morning peak hour, a total of 68 trip-ends would be generated (18 inbound and 50 outbound). During the evening peak hour, a total of 89 trip-ends would be associated with the proposed project (56 inbound and 33 outbound).

Project Specific Impact Findings

Intersections

With the existing+project buildout scenario, no potentially significant project-specific impacts were identified on the peak hour operations at the key intersections evaluated within the study area.

With the year 2017+project buildout scenario, no potentially significant project-specific impacts were identified on the peak hour operations at the key intersections evaluated within the study area.

Roadway Links

With the existing+project buildout scenario, no potentially significant project-specific impacts were identified on the roadway links evaluated within the study area.

With the year 2017+project buildout scenario, no potentially significant project-specific impacts were identified on the roadway links evaluated within the study area.

Site Access

The peak hour analysis of the two proposed site access intersections on Avenue 54 determined that acceptable levels of service would be maintained during the peak hours on weekdays with two-way STOP control. No potentially significant project-specific impacts were identified at the site access connections proposed on Avenue 54 upon project completion in the year 2017 or upon General Plan buildout.

Traffic Signal Findings

The key intersection of Madison Street with Avenue 54, appears to currently meet the rural peak hour traffic signal volume warrants. This intersection currently provides acceptable levels of service during the peak hours in the peak season. This intersection is projected to provide acceptable levels of service upon project completion in the year 2017. A traffic signal is not justified with year 2017+project traffic volumes.

With year 2017+project traffic volumes, the key intersection of Monroe Street and Avenue 54 does not appear to meet rural peak hour traffic signal volume warrants. This intersection is projected to provide acceptable levels of service upon project completion in the year 2017. A traffic signal is not justified with year 2017+project traffic volumes at this intersection.

7.2 Site Access and Internal Circulation Findings

The proposed improvements at the Estate Access (Street 'A' at Avenue 54) and the Residential Access (Street 'D' at Avenue 54) would accommodate future peak hour traffic volumes upon project completion and upon General Plan buildout with two-way STOP control. While not required to provide an acceptable LOS, consideration should be given to the provision of a far-side left-turn median acceleration/storage lane on Avenue 54 at the proposed Residential Access. A far side median acceleration/storage lane on Avenue 54 at the Residential Access (Street "D") could improve traffic safety and operations at this intersection upon General Plan buildout.

The two gated entries would provide sufficient queue storage space to accommodate all entering vehicles on-site. A turn around area would be provided at both gated entries that would allow non-accepted vehicles to exit without first passing through the entry gates. A two-lane entry at the Estate Access would permit entering residents to pass vehicles waiting at the call box for entry authorization. The Residential Access would be controlled by transponder and provide two entry lanes with ample queue storage space to accommodate the queue of entering vehicles within the site.

Pavement Marking Modifications

The pavement on the south side of Avenue 54, east of the Estate Access, currently has lane reduction transition markings (in what would otherwise be the outer lane) to guide traffic through an area where the number of through lanes is reduced. An eastbound right-turn deceleration lane is provided on Avenue 54 in advance of the intersection of Merv Griffin Way. Solid white lines with white chevron markings in the neutral area (between the inner through lane and the right-turn deceleration lane) discourage motorists from using the outer lane on the south side of Avenue 54. These pavement markings effectively narrow the roadway from two lanes to one eastbound lane opposite the Secondary Site Access (where there is no lane drop). This striping directs high-speed through traffic into the inner lane.

The existing break in the neutral area associated with the existing Secondary Site Access intersection on Avenue 54 should be modified when the Secondary Site Access is relocated 125 feet to the west in conjunction with the construction of the proposed project. When the pavement markings on Avenue 54 are modified, it may be desirable to eliminate the lane reduction pavement markings west of Merv Griffin Way. Street improvement plans and signing and striping plans (off-site) will be prepared and submitted to the City Engineer for review and approval showing the proposed modifications along Avenue 54.

Avenue 54 has been improved to its full pavement width from Madison Street to approximately one-quarter mile west of Monroe Street. The eastbound roadway capacity on Avenue 54 could be increased by restriping the street to provide two eastbound lanes that extend beyond the project site to Merv Griffin Way. Avenue 54 currently has lane reduction transition markings east of Merv Griffin Way for approximately 830 feet in advance of the point where the pavement on the south side of Avenue 54 narrows (i.e., approximately one-quarter mile west of Monroe Street).

Auxiliary Lanes

Based on EB 06-13, the turning volumes at the site access intersections upon project completion would not be sufficient to warrant the provision of right-turn or left-turn auxiliary lanes on Avenue 54. Westbound left-turn bays are currently located on Avenue 54 at both site access intersections. The relocation of the Residential Access 125 feet west of the existing Secondary Site Access location would require modifications to the pavement markings in the median on Avenue 54 to relocate the left-turn bay opposite the proposed Residential Access. Street improvement plans and signing and striping plans (off-site) will be prepared and submitted to the City Engineer for review and approval showing the proposed modifications along Avenue 54.

7.3 Standard Mitigation Required of All Developments

1. The project proponent shall dedicate appropriate right-of-way (54 feet from the centerline) to accommodate the ultimate improvement of Avenue 54 as a Primary Arterial where it abuts the project site, as required by the City of La Quinta.

2. Intersection sight distance shall be provided in accordance with CalTrans, City, and AASHTO standards.

3. The project developer shall participate in the TUMF program and contribute fees prior to the issuance of building permits.

4. The project developer may be required to contribute Development Impact Fees prior to the issuance of building permits on a fair-share basis to fund future transportation improvements of regional benefit (such as traffic signals at the two key intersections or the construction of a raised median on Avenue 54 when warranted in the future).

7.4 Roadway Improvements Needed

None of the roadway links evaluated within the study area would require widening to accommodate site traffic at acceptable levels of service upon project completion in the year 2017. Neither of the key intersections evaluated within the study area would require additional approaches lanes or changes in the existing traffic control to accommodate site traffic at acceptable levels of service upon project completion in the year 2017. With General Plan buildout traffic volumes, two-lane roundabouts would operate at LOS F during the peak hours at the two key intesections. Therefore, the two key intersections would not be good candidates for two-lane roundabouts.

Both of the proposed site access intersections will provide acceptable levels of service with two-way STOP control upon project completion in the year 2017 and upon General Plan buildout. The existing pavement markings on Avenue 54 would require modification in conjunction with the proposed site access improvements. The existing westbound left-turn bay on Avenue 54 would be relocated 125 feet to the west, opposite the proposed Residential Access at Street “D”.

Consideration should be given to the provision of a far-side left-turn median acceleration/storage lane on Avenue 54 at the proposed Residential Access. A far side median acceleration/storage lane on Avenue 54 at the Residential Access (Street “D”) could improve traffic safety and operations at this intersection upon General Plan buildout.

7.5 Recommendations

1. The developer shall provide the lane geometrics shown in Figure 6-1 at the site access points in conjunction with the development of the proposed project.

2. A “STOP” sign shall be installed facing northbound vehicles at both of the site access connections on Avenue 54 and a westbound left-turn bay shall be provided in the median on Avenue 54 at both of the proposed site access connections (Street “A” and Street “D”).

3. Two northbound exit lanes shall be provided, including a dedicated right-turn lane and a dedicated left-turn lane. Two southbound entry lanes shall be provided at each site access.

4. Adequate stacking distance shall be provided on-site for entering vehicles on the approach to each of the gated entries to store the 95th-percentile back-of-queue length during the peak hours on weekdays. The pavement in advance of the gate shall be wide enough to allow non-accepted vehicles to turn around in advance of the gate. Any gated entry that allows visitor access should provide two entry lanes to allow residents to bypass the vehicles of visitors awaiting entry authorization.

5. The gated access points proposed to serve the site development may be required to include provisions to facilitate access by emergency vehicles. If required, all power-operated controlled access devices shall have a radio-controlled override system capable of opening the gate or barrier when activated by a special transmitter located in emergency vehicles and be equipped to facilitate opening in the event of a power failure.

Appendices

A. Work Scope for Traffic Impact Analysis
B. Traffic Count Data
C. HCM Intersection Analysis Methodology and Worksheets
D. Traffic Signal Warrants
E. List of Acronyms and Traffic Glossary

Appendix A

WORK SCOPE FOR TRAFFIC IMPACT ANALYSIS

ATTACHMENT A

CITY OF LA QUINTA DATE June 20, 2014

TRAFFIC IMPACTS ANALYSIS SCOPE

Work to be done per Engineering Bulletin 06-13

Project Name: Merv Griffin Estates Specific Plan, Tentative Tract Map, Tentative Parcel Map

Project Location: South of Avenue 54 between Madison Street and Monroe Street

Project Description: 78 Single-Family Detached Dwellings and Residential Lake in a private gated community surrounded on three sides by the Griffin Ranch Specific Plan and adjacent to the Merv Griffin Estate facilities

	Developer	Traffic Engineer
Name	Griffin Ranch Investors L.P.	Endo Engineering
Address	23 Corporate Plaza, Suite 150	28811 Woodcock Drive
	Newport Beach, CA 92660	Laguna Niguel, CA 92677-1330
Contact	Mr. Mark Majer	Mr. Gregory Endo
Phone	(949) 629-2580	(949) 362-0020
Email	mm@mdminvestment.com	endoengr@cox.net

Study Intersection	Study Segments
Madison Street @ Avenue 54	Madison Street (North & South of Avenue 54)
Monroe Street @ Avenue 54	Monroe Street (North & South of Avenue 54)
Site Access Intersections	Avenue 54 (West of Madison to East of Monroe)

ITE Land Use Code	ITE Trip Gen. Rate	Unit of Measure	Daily Trips	Pass by %
LUC 210 Single-Family Detached	Regression Eqn.	Dwellings	830	NA
	(Approx. 10.64/DU)			

Time periods to be analyzed:	Year(s) to be analyzed:
☒ AM ☒ PM ☐ Sat ☐ Other _____	Existing (2014 Peak Season) Year 2017 (Opening Year & Project Buildout)

Special issues to be addressed: Eastbound right-turn deceleration lane on Avenue 54 @ site entries.
Signal warrants at Madison St./Avenue 54 and Monroe St./Avenue 54. Private internal street widths/on-street parking. Gated entry design (adequacy of stacking distance, turn around area, and entry lanes).

Attachments:

- ☒ Site Plan
- ☒ Study Intersections/Segments Map
- ☒ Distribution Assumption Map
- ☐ Cumulative Impacts

City Approval _____ Date _____

June 20, 2014

Mr. Ed Wimmer
Principal Engineer
City of La Quinta
78-495 Calle Tampico
La Quinta, CA 92253

Subject: Merv Griffin Estates Specific Plan - Traffic Impact Study Assumptions

Dear Mr. Wimmer;

Endo Engineering has been retained to assess the traffic impacts associated with the proposed Merv Griffin Estates Specific Plan in the City of La Quinta. The Merv Griffin Estates Specific Plan, Tentative Tract Map, and Tentative Parcel Map are proposed for a 39.9-acre parcel (APN 767-320-013) located south of The Madison Club and Avenue 54, between Madison Street and Monroe Street. The required scoping form entitled "Work Scope for Traffic Impact Analysis" is included as Attachment A for your review and approval.

This letter documents our understanding of the City of La Quinta requirements for the traffic impact study evaluating the proposed development, based upon the preliminary design review comments made by the Public Works Department. It also includes the key parameters and assumptions being utilized in the development of the traffic impact study, per the requirements set forth in Engineering Bulletin No. 06-13 dated April 7, 2014 (EB #06-13). The information regarding the scope of the analysis is intended for your review and approval. If you have any concerns regarding these topics, please notify me as soon as possible so that your concerns can be fully identified and thoroughly addressed in the traffic impact study.

Project Location

The 39.9-acre project site is located within the City of La Quinta, south of The Madison Club and Avenue 54, between Madison Street and Monroe Street. Figure 1 depicts the project site in its regional context. The property is currently developed as the Merv Griffin estate and surrounded on the west, south and east by the Griffin Ranch Specific Plan, as shown in the Figure 2. The Merv Griffin estate has two existing access connections on Avenue 54, as shown in Figure 2.

The currently proposed project includes: the Merv Griffin Estates Specific Plan, a Tentative Tract Map, and a Tentative Parcel Map for the 39.9-acre parcel (APN 767-320-013) surrounded on three sides by the Griffin Ranch Specific Plan. The proposed project is not part of the previously approved Griffin Ranch Specific Plan 2004-074 or the associated Tentative Tract Map 32879.

Figure 2, the Vicinity Map, depicts the project site in relation to the study area and the adjacent intersections. As shown therein, the northern site boundary is Avenue 54. The western site boundary is located approximately one-quarter mile east of Madison Street. The eastern site boundary is located approximately one-half mile west of Monroe Street.

Existing and Approved On-Site Land Uses

Although the project site currently has entitlements for one single-family detached residential dwelling unit, the Merv Griffin estate is unique. The main house has 5,400 square feet and is scaled for

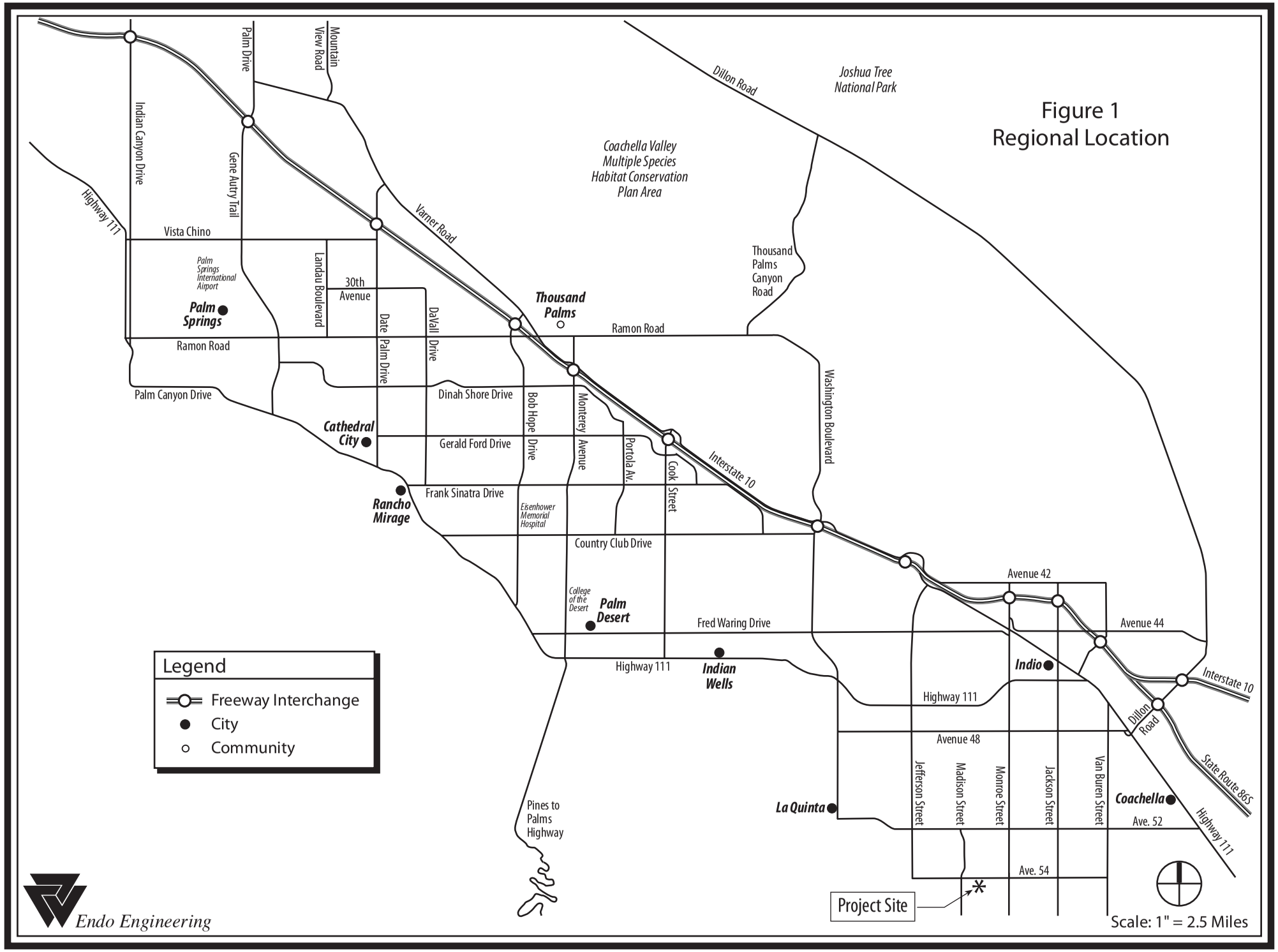
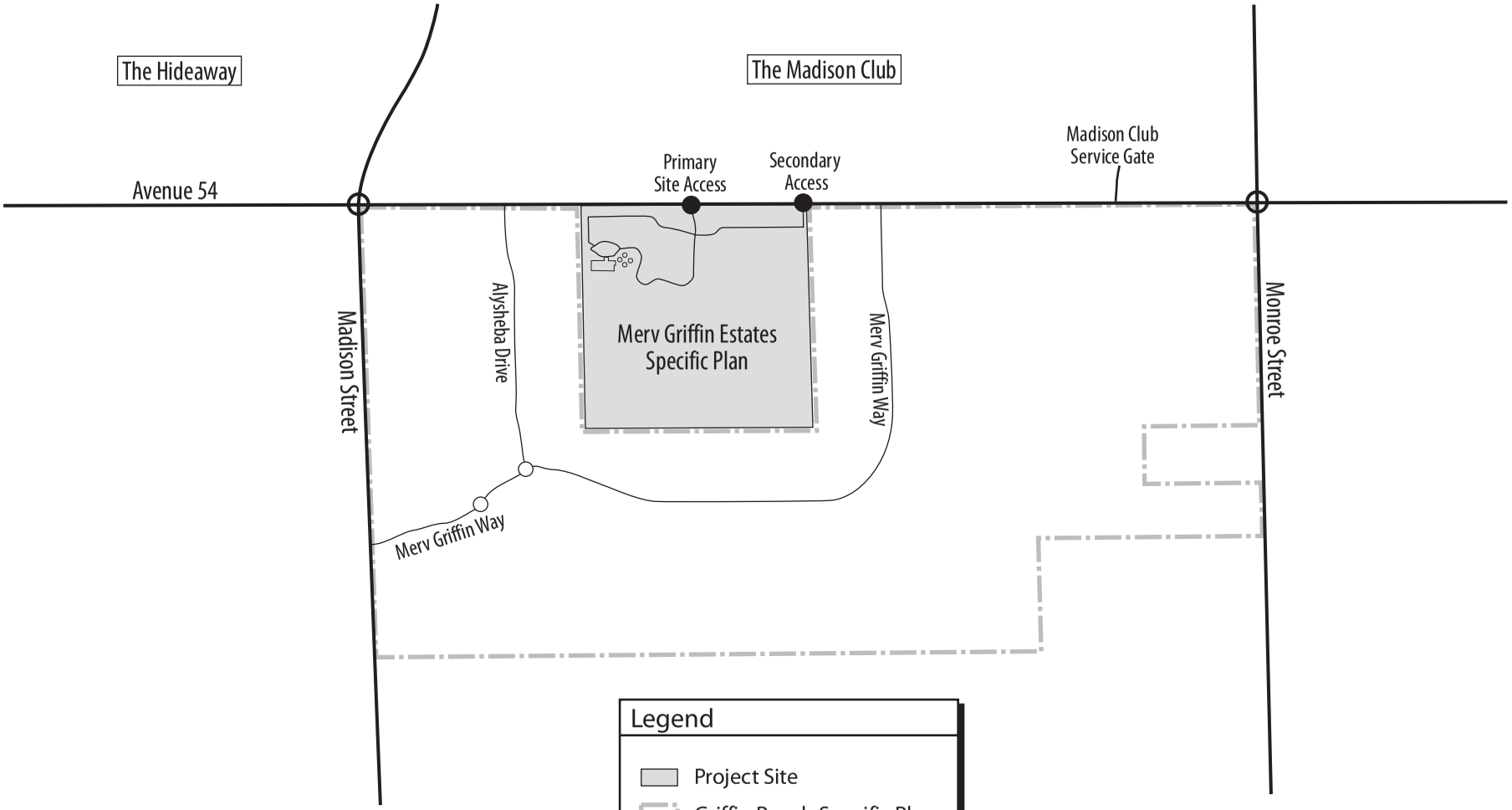


Figure 1
Regional Location
Palm Drive
Mountain View Road
Dillon Road
Joshua Tree National Park
Indian Canyon Drive
Gene Autry Trail
Coachella Valley Multiple Species Habitat Conservation Plan Area
Highway 111
Varner Road
Vista Chino
Thousand Palms Canyon Road
Palm Springs International Airport
Landau Boulevard
30th Avenue
Palm Springs
Thousand Palms
Ramon Road
Date
Palm Drive
DaVall Drive
Palm Canyon Drive
Dinah Shore Drive
Bob Hope Drive
Monterey Avenue
Portola Av.
Cook Street
Interstate 10
Washington Boulevard
Cathedral City
Gerald Ford Drive
Frank Sinatra Drive
Rancho Mirage
Eisenhower Memorial Hospital
Country Club Drive
College of the Desert
Palm Desert
Fred Waring Drive
Avenue 42
Avenue 44
Indian Wells
Indio
Highway 111
Interstate 10
Dillon Road
Avenue 48
Jefferson Street
Madison Street
Monroe Street
Jackson Street
Van Buren Street
La Quinta
Coachella
Ave. 52
State Route 865
Highway 111
Pines to Palms Highway
Ave. 54
Project Site
Legend
Freeway Interchange
City
Community
Endo Engineering
Scale: 1" = 2.5 Miles

Figure 2
Study Area and Key Intersections



Endo Engineering

Scale: 1" = 945'

entertaining and hosting social events. It includes two guest quarters as well as four separate one-bedroom poolside guest casitas (none of which have kitchen facilities).

Over the past year, the Merv Griffin estate has been renovated and rented as a gated luxury residential retreat for family vacations and reunions that include overnight stays. On average, two multi-night family vacations occurred on-site per month during the peak season for a total of four to ten days per month. On most weekdays the existing the Merv Griffin estate facilities are not rented and generate relatively little traffic.

The estate has also been booked as a private event grounds for upscale social gatherings, corporate dinner parties, fund raisers, and other social activities. When the existing facilities on-site have been rented for short-term social activities (dinners, fund raisers, etc.) the events typically lasted a few hours and occurred on weekends or on weekdays, after the evening peak hour on the adjacent streets. Weekday events have typically started between 7:00 p.m. and 8:00 p.m.

During the peak season, the Merv Griffin estate was booked for an average of two dinner/parties per month. No bookings occurred during the summer months. Eight dinner parties were scheduled for the first ten months of the year 2014. This year, two dinners were held during January and four were booked during April.

Temporary Use Permit 2014-1252 was issued for a major event held in March at the Merv Griffin estate in connection with the 2014 Coachella Valley Music and Arts Festival. During that major event, up to 375 of the music festival patrons gathered to socialize at the Merv Griffin estate.

The *City of La Quinta General Plan* land use designation of the project site is LDR (Low Density Residential). This designation allows up to 4 dwelling units per acre. With this designation, the 39.9 acres within the site could be developed with a maximum of 159 single-family detached residential dwelling units. The area within the site that would not be retained as the Merv Griffin estate luxury vacation and event grounds rental (34.79 acres) could be developed with a maximum of 139 single-family detached residential dwelling units.

Project Description

As shown in Figure 3, the proposed project would restore and preserve the Merv Griffin estate by retaining and upgrading the existing estate facilities on 5.11 acres within the northwest corner of the site (Lot 79 in Figure 3) for continued use as a gated luxury residential rental and private event grounds. The remaining 34.79 acres of the site would be developed as a gated high-end residential enclave surrounding a private recreational lake (Lot “A” in Figure 3) with boat docks for residents.

A total of 78 single-family residential dwelling units are proposed along the northeast and south side of a private recreational lake. A portion of the existing Merv Griffin estate stables located adjacent to the lake would be converted into a community recreation center. The project could be completed by the year 2017.

Two existing gated driveways on Avenue 54 (see Figure 2) are currently being used at the property. The primary gated driveway is located near the middle of the project site, approximately 0.37 miles east of Madison Street. A secondary gated access is currently located at the eastern property boundary. With the proposed project, the main gated driveway would be retained at its current location (Street “D” in Figure 2). However, the secondary gated driveway would be relocated approximately 125 feet west of its current location and closer to the main gate. As shown in Figure 3, this would align the future gated entry on Street “F” opposite internal Street “H” to better serve the future residential component of the development.

Separate and controlled access to each component of the on-site development would be provided, as shown in Figure 3**.** The gated entrance to the luxury estate rental facilities (Lot 79 in Figure 3) would be located on the west side of the southern terminus of Street “D” and accessed via the existing main entry. A separate gated entrance to the residential enclave would be located east of the main entry. The tee-intersection at the southern terminus of the main entry road (Street “D”)

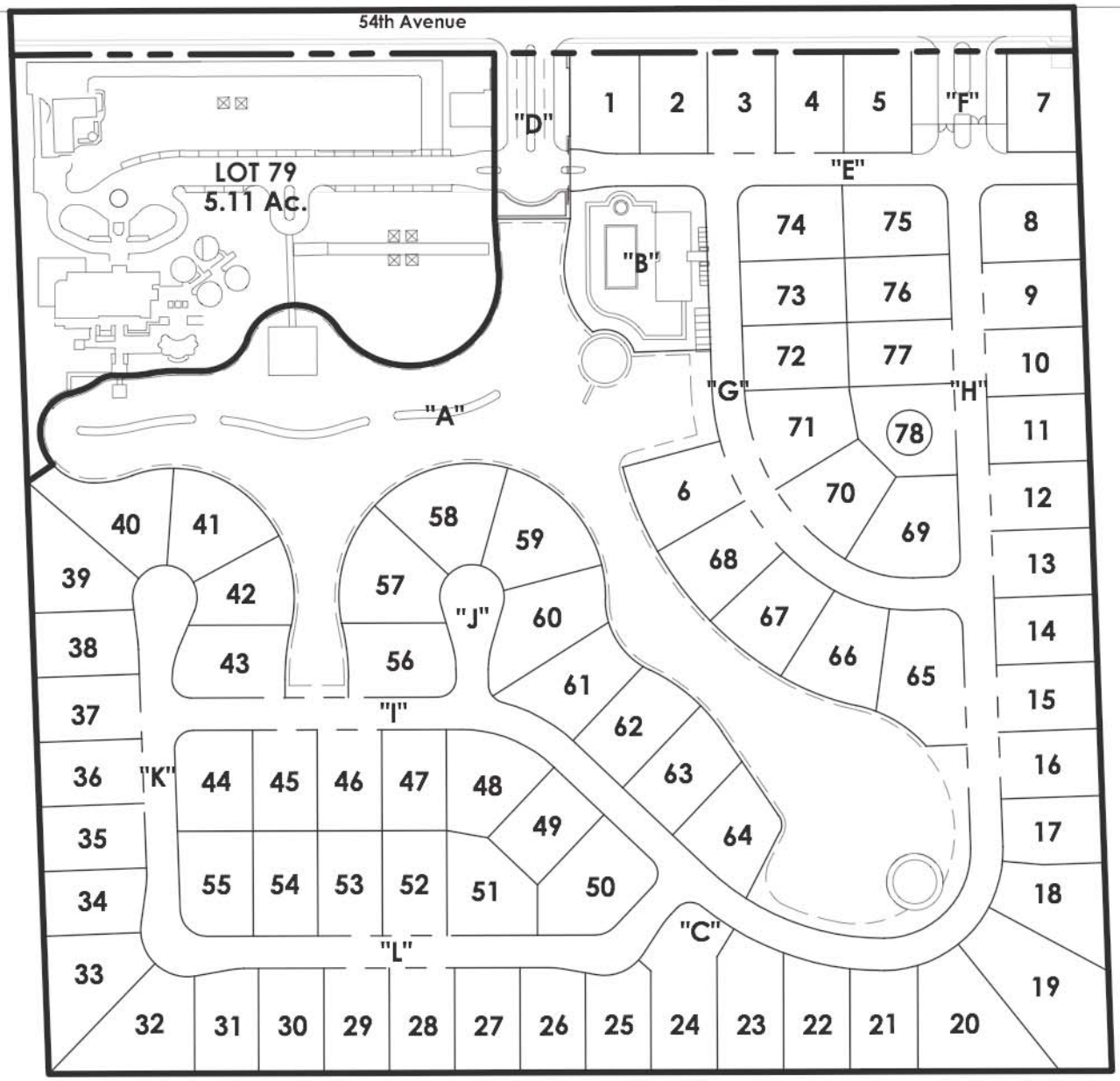


Figure 3
Merv Griffin Estates Development Plan

Exhibit Date: May 15, 2014

MSA CONSULTING, INC.
www.msaconsultinginc.com

NORTH
0' 200'
SCALE: 1" = 200'

GRIFFIN ESTATES SPECIFIC PLAN
TENTATIVE TRACT MAP LOTTING STUDY

would be designed to accommodate non-accepted vehicles by providing space for them to turn around and exit the site without entering either gate.

The eastern access (Street "F" in Figure 3) would be constructed with a transponder-controlled gated entry for use by future residents. Since the eastern access would provide the most convenient and direct access for most of the residential development, approximately 85 percent of the residential traffic will be assumed to use Street "F" for access. Adequate queue storage space and a turn-around area for non-accepted vehicles would be provided on Street "F" outside of the access gate. The remaining fifteen percent of the future residential trips will be assumed to use the main entry (Street "E" and Street "D") for access except during major events.

The project appears to be consistent with the *La Quinta 2012 General Plan* land use designation of the project site. The 78 residential dwelling units proposed would represent 56 percent of the maximum (139 residential dwelling units) permitted for the 34.79 acres within the residential component of the project. The project site was included in the *La Quinta 2012 General Plan* Preferred Alternative Year 2035 Traffic Model projections of peak season average weekday trips. Since the proposed project appears to be consistent with the General Plan land use, a General Plan buildout traffic impact analysis will not be required.

Overnight Rentals/Social Events

Attachment B summarizes the proposed future overnight rental and private event guidelines for the Merv Griffin estate facilities located in the northwest portion of the project site (Lot 79 in Figure 3). With the proposed project, the Merv Griffin estate facilities may be rented by families with up to 24 guests and 12 vehicles vacationing for periods ranging from two nights to a week. The Merv Griffin estate facilities may be used for overnight rentals up to four times per month.

In addition to overnight rentals, the estate facilities may be used for minor and moderate private short-term social events (such as desert retreats, political functions, corporate events, executive dinner parties, etc.) that do not include overnight stays. These bookings may occur up to five times per month (four minor events and one moderate event) during the peak season. Minor events may include up to 50 guests with up to 26 vehicles in the future. Moderate events may accommodate up to 100 guests and up to 50 vehicles in the future. Minor and moderate events may include on-site valet service.

In addition to the minor and moderate events, major events may occur up to two times per year in the future. These major events would be consistent with the provisions identified in Temporary Use Permit 2014-1252, which was issued prior to the 2014 Coachella Valley Music and Arts Festival. Up to 450 guests would be allowed on-site over a three-day period during a major event. The sponsor of the event will contract with the Riverside County Sheriff's Department for traffic and crowd control as well as internal/external security.

Study Area and Key Intersections

The study area and two existing key intersections were identified per EB #06-13. As shown in Figure 2, the key intersections to be evaluated include: (1) Madison Street at Avenue 54, and (2) Monroe Street at Avenue 54. The traffic impact study will also include an evaluation of whether or not an eastbound right-turn deceleration lane would be required on Avenue 54 at the two site access intersections (at Street "D" and Street "F", as shown in Figure 3) with the proposed development. This analysis was previously presented to the City of La Quinta in a letter report (dated June 11, 2014) prepared by Endo Engineering.

Existing Conditions

New weekday peak hour traffic counts were made by Counts Unlimited, Inc. at the two key intersections to be evaluated. The traffic counts were made from 5:30 a.m. through 9:00 a.m. and from 2:30 p.m. through 5:30 p.m. on Wednesday April 30, consistent with the City of La Quinta Engineering Bulletin #06-13.

Attachment B

MERV GRIFFIN ESTATE EVENT GUIDELINES				
	Overnight Rental	**Minor Event**	**Moderate Event**	**Major Event**
a. Allowable events	▪ Overnight stay	▪ Political functions ▪ Fundraisers ▪ Dinner party ▪ Corporate events ▪ Family gatherings	▪ Political functions ▪ Fundraisers ▪ Dinner party ▪ Corporate events ▪ Family gatherings	▪ Vehicle parking ▪ Dinner party
b. Max frequency	▪ 4 per month	▪ 4 per month	▪ 1 per month	▪ 2 per year
c. On site guest limits	▪ 24 persons	▪ 50 persons	▪ 100 persons	▪ 450 persons
d. On site vehicle limits	▪ 12 vehicles	▪ 26 vehicles	▪ 50 vehicles	▪ 150 vehicles
e. Max length	▪ 1 week	▪ 1 day	▪ 1 day	▪ 3 days
f. Days Allowed	▪ M-F, Weekends	▪ M-F, Weekends	▪ M-F, Weekends	▪ M-F, Weekends
g. Hours Allowed	▪ N/A	▪ Indoor 12 pm to 2 am ▪ Outdoor 12 pm to 12 am	▪ Indoor 12 pm to 2 am ▪ Outdoor 12 pm to 12 am	▪ Indoor 12 pm to 2 am ▪ Outdoor 12 pm to 12 am
h. Event notification	▪ None	▪ None	▪ Griffin Ranch HOA ▪ Griffin Estates HOA	▪ Griffin Ranch HOA ▪ Griffin Estates HOA
i. Noise criteria	▪ 60 decibels - 7 am to 10 pm ▪ 50 decibels - 10 pm to 1 am ▪ 45 decibels - 1 am to 7 am	▪ 60 decibels - 7 am to 10 pm ▪ 50 decibels - 10 pm to 1 am ▪ 45 decibels - 1 am to 7 am	▪ 60 decibels - 7 am to 10 pm ▪ 50 decibels - 10 pm to 1 am ▪ 45 decibels - 1 am to 7 am	▪ 60 decibels - 7 am to 10 pm ▪ 50 decibels - 10 pm to 1 am ▪ 45 decibels - 1 am to 7 am
j. Traffic control	▪ Self-park	▪ Valet or self-park	▪ Valet or self-park ▪ On-site traffic control	▪ Valet only ▪ On-site traffic control ▪ County Sheriff
k. Event Security	▪ None	▪ Event operator	▪ Event operator ▪ Private security	▪ County Sheriff ▪ Private security
l. Event Deposit	▪ None	▪ None	▪ None	▪ $25,000 refundable
m. City Approvals	▪ None	▪ None	▪ Staff Approval	▪ Comply with TUP 2014-152
1. *Decibels = dB{A)*				

Seasonal Variations

Engineering Bulletin #06-13 specifies that a five percent seasonal expansion be applied to counts completed in April, and a ten percent seasonal expansion be applied to counts completed in May. Since the counts were made on the last day of April, the use of a 7.5 percent seasonal expansion factor is proposed to increase the peak hour traffic counts to reflect year 2014 peak season conditions.

Highest Volume Hours

Based upon a 24-hour traffic count made on November 5, 2009 on Madison Street, south of Avenue 56, 8.7 percent of the daily traffic occurs during the highest hour (3:00 p.m. - 4:00 p.m.). This 8.7 percent expansion factor will be used to estimate the daily traffic volumes throughout the study area from the peak season evening peak hour traffic volumes.

Operational Methodology

Peak season weekday morning and afternoon peak hour conditions will be evaluated at the key intersections with the methodology outlined in the *Highway Capacity Manual* (HCM 2000) via the McTrans "Highway Capacity Software" (HCS+). The proposed site access intersections shall also be evaluated with the HCS+ Software to ensure that these intersections will provide acceptable levels of service upon project completion.

Peak Hour Factor

The peak hour factor (PHF) determined during the traffic counts at the existing key intersections will be utilized for the existing and near-term operational analysis of the key intersections, per EB #06-13. The PHF assumed for the future site access intersections for the year 2017 scenarios will be the same as the PHF associated with the current traffic count data at the adjacent key intersection.

Heavy Vehicle Mix

A five percent heavy vehicle mix will be assumed for the baseline and both future scenarios. This assumption for roadways south of Avenue 52, is consistent with the direction provided by City staff[1] for the approved *Isle of Travertine Specific Plan Amendment No. 1 Traffic Impact Study* (Endo Engineering; November 2008).

Future Conditions

Scenarios To Be Evaluated

Since the development will be relatively small, the project opening year and the project buildout year will be the same (i.e., the year 2017). Based upon EB #06-13, the traffic study will provide an analysis of the following four scenarios:

- Existing Conditions (Year 2014 Peak Season)
- Existing + Project Buildout
- Existing + 2017 Cumulative
- Existing + 2017 Cumulative + Project Buildout

Since the project is consistent with the LDR (Low Density Residential) General Plan land use designation of the site, project-related traffic was assumed to be included in the *La Quinta General Plan Circulation Element Update Traffic Impact Analysis* (Iteris, Inc.; May 14, 2012) year 2035 traffic model projections. Therefore, a General Plan buildout analysis will not be required.

[1] Telephone communication with Mr. Rusty Beardsley, City of La Quinta Department of Public Works/Engineering on July 30, 2008.

Cumulative Development

The year 2017 peak hour cumulative traffic volumes will be determined by interpolating between the existing (year 2014) seasonally adjusted traffic counts at the two key intersections and the year 2035 General Plan buildout peak hour traffic projections for each turning movement at these same intersections.

Trip Generation Forecast

Existing Residential Entitlement Trip-Generation Estimate

The project site has entitlements for one single-family detached residential dwelling unit. As shown in Table 1, a single residence would generate approximately 10 weekday trips. During the morning peak hour, one outbound trip would be generated. During the evening peak hour, one inbound trip would be generated by a single residence.

Table 1
Weekday Site Trip-Generation Forecast[a]

Land Use Category	Land Use Quantity[b]	Morning Peak Hour In	Out	Total	Evening Peak Hour In	Out	Total	Daily 2-Way
Existing Estate Entitlements								
Residential - SFD (210)	1 DU	0	1	1	1	0	1	10
Future Residential Uses								
Residential - SFD (210)	78 DU	16	48	64	53	31	84	830
Luxury Residential Rental (310)	6 Rooms	2	1	3	2	2	4	50
Existing Subtotal		18	49	67	55	33	88	880
Total (Existing Plus Future Uses)		18	50	68	56	33	89	890

a. Based upon trip-generation data published by the ITE in *Trip Generation* (8th Edition, December, 2008). The ITE Land Use Codes (LUC) assumed include: LUC 210 for single-family detached residential dwellings and LUC 310 (hotel) for the luxury residential rental use. The rental of the existing estate house is currently ongoing and not a part of the proposed project. The trips generated by upscale dinner parties and other short-term social events were not included in Table 1 because they only occur a few hours per month and typically do not involve guest arrivals during the peak hours.
b. DU=Dwelling Units.

Proposed Residential Enclave Trip-Generation Estimate

For single-family detached housing on individual lots (ITE Land Use Code 210) a total of 314 trip-generation studies of subdivisions with an average of 208 dwelling units were used by the ITE to develop the weekday evening peak hour data plot. The 78 single-family detached dwelling units proposed are within the cluster of the ITE data points (which is associated with developments containing fewer than 400 dwelling units).

Based upon the ITE guidance, the regression equations were utilized to estimate the weekday morning and evening peak hour trip generation associated with the proposed single-family dwelling units. The coefficients of determination (0.89 and 0.91) indicated a very good fit between the number of dwelling units and the number of trips generated during the morning and evening peak hour on a weekday.

Table 1 shows the number of inbound and outbound trips generated by the proposed 78 single-family detached dwellings. Approximately 64 trip-ends would be generated during the morning peak hour on an average weekday by the 78 single-family dwelling units proposed. The ITE identified the

directional distribution of these trips as 25 percent entering and 75 percent exiting the site (i.e., 16 inbound and 48 outbound vehicles per hour). During the evening peak hour on an average weekday, approximately 84 trip-ends would be generated by the 78 single-family dwelling units proposed. The ITE identified the directional distribution of these trips as 63 percent entering and 37 percent exiting the site (i.e., 53 inbound and 31 outbound vehicles per hour).

Future Merv Griffin Estate Rental Trip-Generation Estimate

The number of entering trips that will be generated in the future by the Merv Griffin estate will vary from day to day and month to month. The future trip generation will be affected by the private events that are held at the estate and the number of people on-site at any given time, as well as the number of vehicles used to transport guests to the site.

Attachment B provides a summary of the proposed future Merv Griffin estate event guidelines including the on-site guest limits, the maximum frequency of the events by type, and the hours during which the various events will be permitted. It also details the traffic control by event type. Although the traffic volume generated by the rental of the Merv Griffin estate facilities will often be relatively low, it should be considered in determining whether or not an eastbound right-turn deceleration lane will be required in the future at the site access connections on Avenue 54.

Overnight Luxury Residential Rental

The ITE does not publish trip-generation rates for luxury residential rentals with private event grounds. However, it does publish trip-generation data for single-family dwellings and a variety of lodging, resort, and hotel units. When the main house and casitas are rented for large family gatherings involving overnight stays, the Merv Griffin estate functions from a trip-generation perspective like a single-family home and six hotel rooms. When visiting couples stay overnight in the guest quarters, the estate functions like a residence and a series of hotel rooms.

Although the luxury residential rental units may be occupied only a fraction of the time each year, the potential trip generation of the Merv Griffin estate was estimated by assuming (for a worst-case analysis) that the visitors during overnight rentals make trips like both a single-family residence and six hotel rooms. The trip generation associated with the main house at the Merv Griffin estate was estimated from the ITE weighted average trip-generation rates because a single residence was not within the cluster of the data points and the use of the regression equation to estimate the trips generated by a single residence produced anomalous results. Since the six hotel rooms assumed for the luxury rental were fewer than the hotels studied by the ITE to develop the trip-generation rates, the weighted average trip-generation rate per hotel room was used.

Table 1 provides the peak hour and daily trip generation associated with both the existing and the future land uses (excluding short-term social events) on a typical weekday during the peak season. As shown therein, the existing Merv Griffin estate, the proposed future luxury residential rentals, and the proposed future residential development could generate approximately 890 weekday trip-ends. During the morning peak hour, approximately 68 trip-ends could be generated (18 inbound and 50 outbound). During the evening peak hour, approximately 91 trip-ends could be generated (56 inbound and 35 outbound).

Short-Term Social Event Rental

Short-term social events are expected to occur approximately ten to twenty hours per month during the peak season and generally occur at times other than the morning and evening peak traffic hours. The number of attendees at major events will comply with the requirements of Temporary Use Permit 2014-1252. Since these short-term events are expected to occur for only a few hours per month, (which are typically outside of the peak travel hours) the trips generated by short-term events were not included in Table 1.

Traffic Distribution and Assignment

The site traffic distribution throughout the study area assumed for the proposed residential uses is shown in Figure 4. The overall traffic distribution is similar to the approved traffic distribution in the original *Griffin Ranch Specific Plan Traffic Impact Study*. Seventy-five percent of the traffic from the project access was assigned to the west toward the City of La Quinta and twenty-five percent was assigned to the east. This distribution is similar to the ratio of the year 2013 daily CVAG counts south of Avenue 54 on Madison Street (10,067 ADT) and on Monroe Street (3,208 ADT). Since there are few attractions south of the site, only ten percent of the overall project was assigned to the south, including eight percent south on Madison Street and two percent south on Monroe Street.

Of the remaining 68 percent of the project traffic assigned west of the project site, 47 percent was assigned to Avenue 54, west of Madison Street, and 20 percent was assigned to the north on Madison Street. This distribution was based upon the year 2013 daily CVAG counts of 3,696 ADT for Madison Street (south of Avenue 52) and 8,841 ADT for Avenue 54 (west of Madison Street).

Of the remaining 23 percent of the project traffic assigned east of the project site, 11 percent was assigned to Avenue 54, east of Monroe Street, and 12 percent to the north on Monroe Street. This distribution was based upon the year 2013 daily CVAG counts of 3,867 ADT (Monroe Street, south of Avenue 52) and 3,731 ADT (Avenue 54, east of Monroe Street).

Project-Specific Impacts

A summary of all significant project-specific impacts at the key intersections and along the roadway segments adjacent to the key intersections shall be provided, as specified in EB #06-13. All significant adverse cumulative traffic impacts at intersections and along roadway segments shall be identified, as specified in EB #06-13.

Mitigation Measures

A list of and an exhibit depicting the approach lanes recommended to achieve and maintain LOS D or better operation at the two key intersections shall be provided for: (1) existing+project buildout conditions, and (2) year 2017+project conditions. The City of La Quinta volume threshold criteria associated with auxiliary right-turn deceleration lanes will be utilized in developing mitigation recommendations for the two site access connections on Avenue 54.

The traffic study will indicate that the installation of a roundabout will be the first option in mitigating any exceedances of future intersection traffic capacity. However, a preliminary evaluation of two-lane roundabouts at the two key intersections indicates that these intersections would exceed LOS D with the projected General Plan buildout traffic volumes.

We trust that this information provides an accurate picture of the traffic study. We would greatly appreciate your input and concurrence, particularly with regard to the traffic distribution. Please review the site traffic distribution assumptions and make any modifications that you deem appropriate, then transmit any changes by e-mail at: endoengr@cox.net so that we may proceed with the impact assessment as expeditiously as possible. If you require other changes in the traffic study assumptions or the methodology outlined above, please do not hesitate to contact me by telephone at: (949) 362-0020. Thank you for your consideration and assistance.

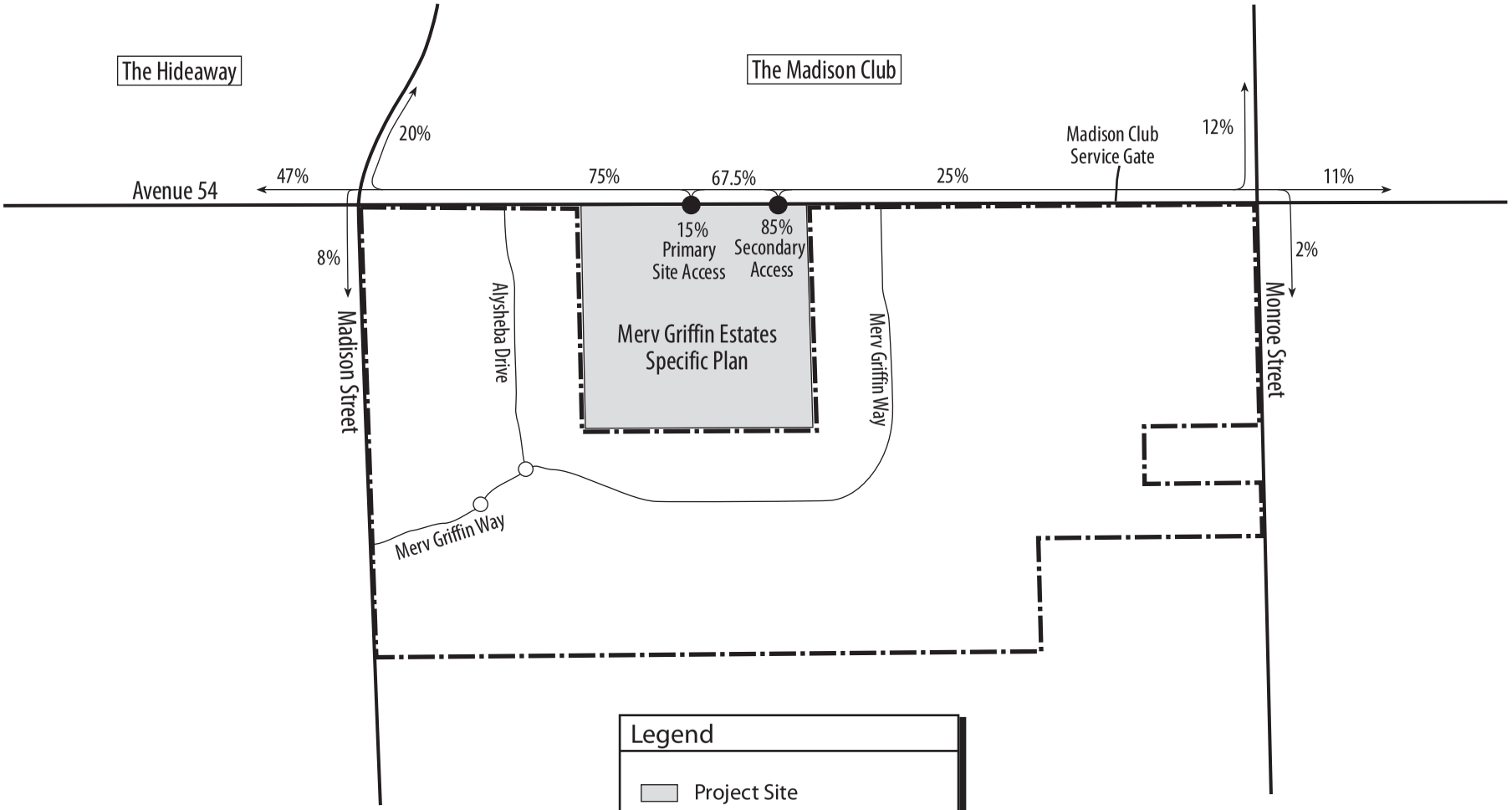
Sincerely,

ENDO ENGINEERING

Gregory Endo
Principal

Attachments

Figure 4
Project Outbound Site Distribution



Endo Engineering

Scale: 1" = 945'

Subject: Merv Griffin Estates Traffic Study Assumptions
From: Nazir Lalani <nazirlalani1@gmail.com>
Date: 7/21/14 7/21/14 11:49 AM
To: Gregory Endo <endoengr@cox.net>
CC: Bryan McKinney <Bmckinney@la-quinta.org>

Greg, you are approved for preparing the traffic for Merv Griffin Estates traffic study based oh your assumptions letter dated June 20th, 2014.

Sorry for the delay in the response.

Nazir

Appendix B

24-HOUR MACHINE COUNT DATA
PEAK HOUR TURNING MOVEMENT COUNTS

Counts Unlimited, Inc.
25286 Jaclyn Avenue
Moreno Valley, CA 92557
(951) 485-7934

City of La Quinta
Madison Street
S/ Airport Boulevard (Avenue 56)
24 Hour Directional Volume Count

LQAMASAI
Site Code: 0099286
Date Start: 05-Nov-09
Date End: 05-Nov-09

Start Time	05-Nov-09 Thu	Northbound		Hour Totals		Southbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		3	76			2	79				
12:15		0	78			2	58				
12:30		2	68			1	59				
12:45		1	57	6	279	2	75	7	271	13	550
01:00		1	57			0	50				
01:15		1	56			0	63				
01:30		0	59			2	76				
01:45		1	73	3	245	1	69	3	258	6	503
02:00		0	66			0	66				
02:15		1	76			2	72				
02:30		1	73			0	63				
02:45		0	61	2	276	0	55	2	256	4	532
03:00		0	**81**			4	65				
03:15		3	**74**			0	**79**				
03:30		2	**77**			3	**65**				
03:45		0	**67**	5	299	4	**66**	11	275	16	574
04:00		2	41			3	**78**				
04:15		2	56			2	59				
04:30		3	53			4	53				
04:45		11	59	18	209	5	64	14	254	32	463
05:00		14	54			7	45				
05:15		9	72			17	46				
05:30		13	48			15	45				
05:45		19	47	55	221	36	46	75	182	130	403
06:00		19	21			17	35				
06:15		36	23			23	38				
06:30		31	18			50	29				
06:45		47	19	133	81	86	41	176	143	309	224
07:00		49	10			63	44				
07:15		61	11			37	33				
07:30		42	11			49	26				
07:45		55	10	207	42	**62**	26	211	129	418	171
08:00		54	7			**63**	23				
08:15		76	6			**75**	32				
08:30		91	5			**52**	20				
08:45		56	9	277	27	56	21	246	96	523	123
09:00		76	6			40	22				
09:15		60	7			43	13				
09:30		**80**	5			60	16				
09:45		**63**	3	279	21	68	8	211	59	490	80
10:00		**80**	4			33	11				
10:15		**80**	3			45	8				
10:30		63	1			57	8				
10:45		69	2	292	10	58	5	193	32	485	42
11:00		63	4			70	6				
11:15		71	3			52	5				
11:30		54	2			59	3				
11:45		53	3	241	12	56	3	237	17	478	29
Total		1518	1722	1518	1722	1386	1972	1386	1972	2904	3694
Combined Total		3240		3240		3358		3358		6598	
AM Peak		09:30				07:45					
Vol.		303				252					
P.H.F.		0.832				0.733					
PM Peak			03:00				03:15				
Vol.			299				288				
P.H.F.			0.923				0.911				
Percentage		46.9%	53.1%			41.3%	58.7%				
ADT/AADT		ADT 6,598		AADT 6,598							

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of La Quinta
N/S: Madison Street
E/W: Avenue 54
Weather: Clear

File Name : LQAMA54AM
Site Code : 00000031
Start Date : 4/30/2014
Page No : 1

Groups Printed- Total Volume

	Madison Street Southbound				Avenue 54 Westbound				Madison Street Northbound				Avenue 54 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:00 AM	2	16	0	18	5	17	2	24	18	11	5	34	0	9	29	38	114
06:15 AM	6	20	3	29	14	21	5	40	27	11	0	38	0	18	32	50	157
06:30 AM	17	36	5	58	11	21	0	32	32	25	3	60	1	45	42	88	238
06:45 AM	16	19	5	40	9	41	11	61	30	11	1	42	0	42	46	88	231
Total	41	91	13	145	39	100	18	157	107	58	9	174	1	114	149	264	740
07:00 AM	8	21	2	31	3	34	8	45	50	29	3	82	1	26	40	67	225
07:15 AM	7	21	4	32	0	30	7	37	50	24	1	75	0	29	57	86	230
07:30 AM	8	22	4	34	1	30	6	37	45	29	3	77	1	36	71	108	256
07:45 AM	7	28	2	37	4	11	5	20	43	17	5	65	0	32	51	83	205
Total	30	92	12	134	8	105	26	139	188	99	12	299	2	123	219	344	916
08:00 AM	4	19	3	26	6	23	4	33	46	33	2	81	1	30	54	85	225
08:15 AM	6	14	5	25	7	21	9	37	47	38	2	87	0	25	56	81	230
Grand Total	81	216	33	330	60	249	57	366	388	228	25	641	4	292	478	774	2111
Apprch %	24.5	65.5	10		16.4	68	15.6		60.5	35.6	3.9		0.5	37.7	61.8		
Total %	3.8	10.2	1.6	15.6	2.8	11.8	2.7	17.3	18.4	10.8	1.2	30.4	0.2	13.8	22.6	36.7	

	Madison Street Southbound				Avenue 54 Westbound				Madison Street Northbound				Avenue 54 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:45 AM																	
06:45 AM	**16**	19	**5**	**40**	**9**	**41**	**11**	**61**	30	11	1	42	0	**42**	46	88	231
07:00 AM	8	21	2	31	3	34	8	45	**50**	**29**	**3**	**82**	**1**	26	40	67	225
07:15 AM	7	21	4	32	0	30	7	37	50	24	1	75	0	29	57	86	230
07:30 AM	8	**22**	4	34	1	30	6	37	45	29	3	77	1	36	**71**	**108**	**256**
Total Volume	39	83	15	137	13	135	32	180	175	93	8	276	2	133	214	349	942
% App. Total	28.5	60.6	10.9		7.2	75	17.8		63.4	33.7	2.9		0.6	38.1	61.3		
PHF	.609	.943	.750	.856	.361	.823	.727	.738	.875	.802	.667	.841	.500	.792	.754	.808	.920

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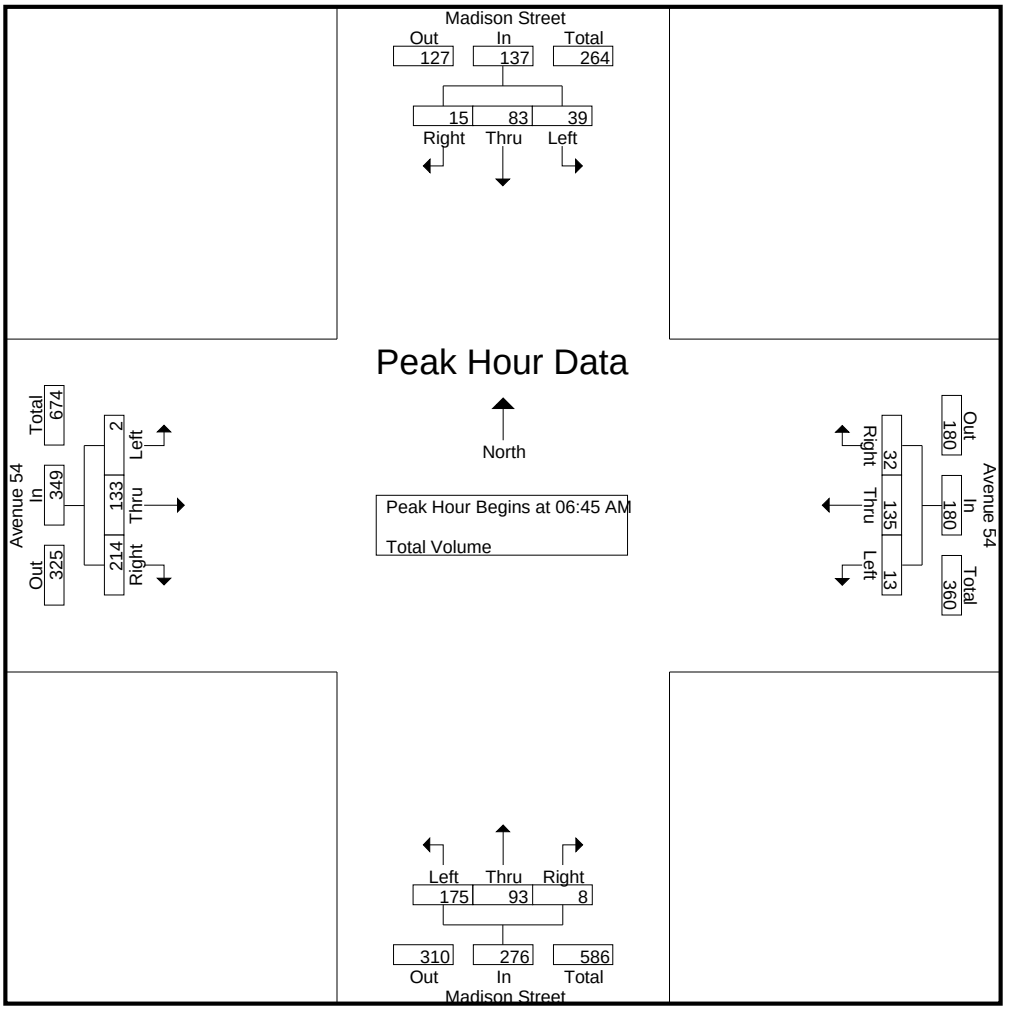
City of La Quinta
N/S: Madison Street
E/W: Avenue 54
Weather: Clear

File Name : LQAMA54AM
Site Code : 00000031
Start Date : 4/30/2014
Page No : 2



Peak Hour Analysis From 06:00 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	06:30 AM				06:45 AM				07:30 AM				07:15 AM			
+0 mins.	**17**	**36**	**5**	**58**	**9**	**41**	**11**	**61**	45	29	3	77	0	29	57	86
+15 mins.	16	19	5	40	3	34	8	45	43	17	**5**	65	**1**	**36**	**71**	**108**
+30 mins.	8	21	2	31	0	30	7	37	46	33	2	81	0	32	51	83
+45 mins.	7	21	4	32	1	30	6	37	**47**	**38**	2	**87**	1	30	54	85
Total Volume	48	97	16	161	13	135	32	180	181	117	12	310	2	127	233	362
% App. Total	29.8	60.2	9.9		7.2	75	17.8		58.4	37.7	3.9		0.6	35.1	64.4	
PHF	.706	.674	.800	.694	.361	.823	.727	.738	.963	.770	.600	.891	.500	.882	.820	.838

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City of La Quinta
N/S: Madison Street
E/W: Avenue 54
Weather: Clear

File Name : LQAMA54PM
Site Code : 00000031
Start Date : 4/30/2014
Page No : 1

Groups Printed- Total Volume

	Madison Street Southbound				Avenue 54 Westbound				Madison Street Northbound				Avenue 54 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
02:30 PM	6	24	1	31	4	22	7	33	53	47	5	105	1	29	48	78	247
02:45 PM	5	26	3	34	2	25	8	35	59	30	2	91	0	20	52	72	232
Total	11	50	4	65	6	47	15	68	112	77	7	196	1	49	100	150	479
03:00 PM	11	30	0	41	2	26	8	36	46	30	3	79	1	21	44	66	222
03:15 PM	6	31	1	38	1	28	3	32	55	36	13	104	4	30	49	83	257
03:30 PM	5	33	3	41	1	35	12	48	70	53	8	131	4	26	36	66	286
03:45 PM	6	36	1	43	3	26	3	32	56	28	2	86	2	26	51	79	240
Total	28	130	5	163	7	115	26	148	227	147	26	400	11	103	180	294	1005
04:00 PM	6	23	1	30	2	16	12	30	40	42	3	85	1	17	58	76	221
04:15 PM	6	25	1	32	3	21	8	32	41	38	3	82	0	30	54	84	230
04:30 PM	4	32	2	38	2	21	6	29	47	39	7	93	1	16	55	72	232
04:45 PM	3	16	0	19	0	20	5	25	45	30	2	77	2	33	51	86	207
Total	19	96	4	119	7	78	31	116	173	149	15	337	4	96	218	318	890
05:00 PM	2	23	1	26	3	38	6	47	35	29	4	68	0	22	42	64	205
05:15 PM	2	23	0	25	2	22	2	26	32	34	1	67	1	26	49	76	194
Grand Total	62	322	14	398	25	300	80	405	579	436	53	1068	17	296	589	902	2773
Apprch %	15.6	80.9	3.5		6.2	74.1	19.8		54.2	40.8	5		1.9	32.8	65.3		
Total %	2.2	11.6	0.5	14.4	0.9	10.8	2.9	14.6	20.9	15.7	1.9	38.5	0.6	10.7	21.2	32.5	

	Madison Street Southbound				Avenue 54 Westbound				Madison Street Northbound				Avenue 54 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	**11**	30	0	41	2	26	8	36	46	30	3	79	1	21	44	66	222
03:15 PM	6	31	1	38	1	28	3	32	55	36	**13**	104	**4**	**30**	49	**83**	257
03:30 PM	5	33	**3**	41	1	**35**	**12**	**48**	**70**	**53**	8	**131**	4	26	36	66	**286**
03:45 PM	6	**36**	1	**43**	**3**	26	3	32	56	28	2	86	2	26	**51**	79	240
Total Volume	28	130	5	163	7	115	26	148	227	147	26	400	11	103	180	294	1005
% App. Total	17.2	79.8	3.1		4.7	77.7	17.6		56.8	36.8	6.5		3.7	35	61.2		
PHF	.636	.903	.417	.948	.583	.821	.542	.771	.811	.693	.500	.763	.688	.858	.882	.886	.878

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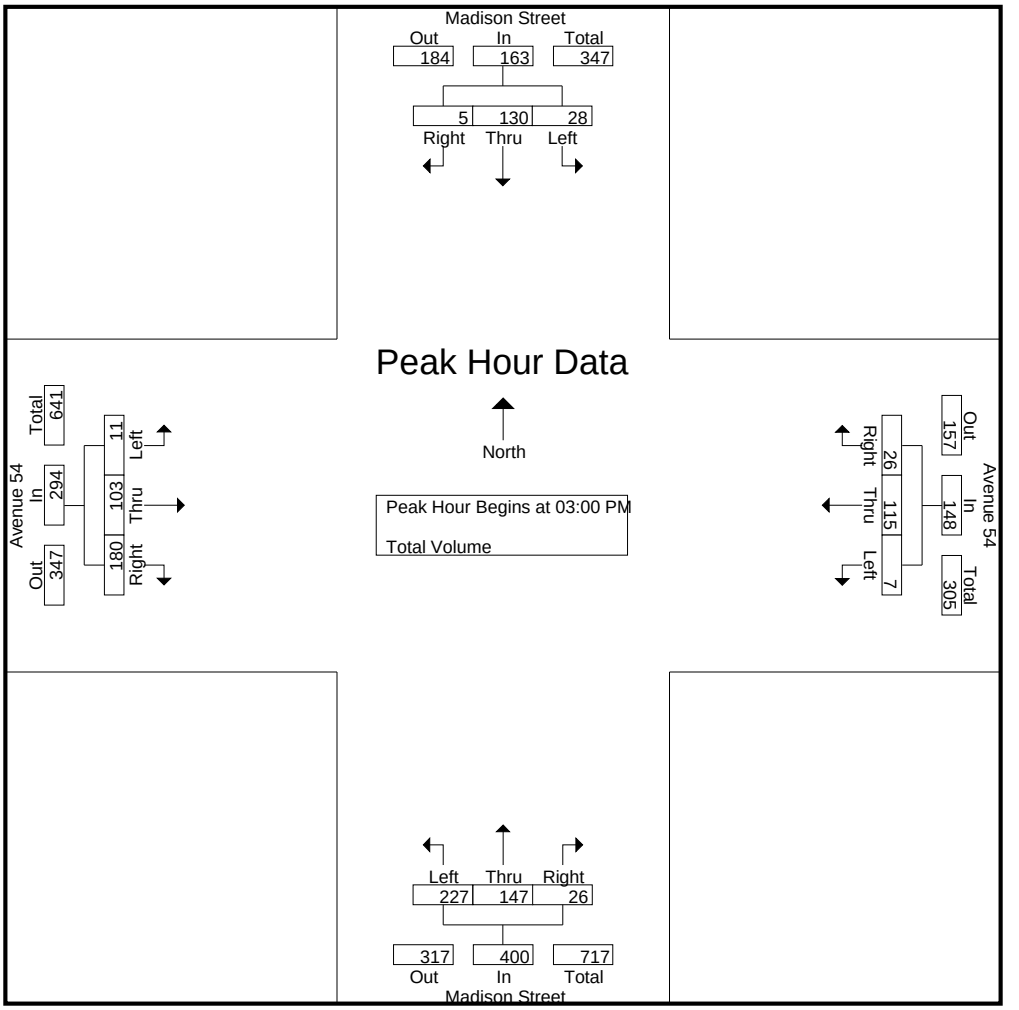
City of La Quinta
N/S: Madison Street
E/W: Avenue 54
Weather: Clear

File Name : LQAMA54PM
Site Code : 00000031
Start Date : 4/30/2014
Page No : 2



Peak Hour Analysis From 02:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	03:00 PM				02:45 PM				03:15 PM				04:00 PM			
+0 mins.	**11**	30	0	41	**2**	25	8	35	55	36	**13**	104	1	17	**58**	76
+15 mins.	6	31	1	38	2	26	8	36	**70**	**53**	8	**131**	0	30	54	84
+30 mins.	5	33	**3**	41	1	28	3	32	56	28	2	86	1	16	55	72
+45 mins.	6	**36**	1	**43**	1	**35**	**12**	**48**	40	42	3	85	**2**	**33**	51	**86**
Total Volume	28	130	5	163	6	114	31	151	221	159	26	406	4	96	218	318
% App. Total	17.2	79.8	3.1		4	75.5	20.5		54.4	39.2	6.4		1.3	30.2	68.6	
PHF	.636	.903	.417	.948	.750	.814	.646	.786	.789	.750	.500	.775	.500	.727	.940	.924

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City of La Quinta
N/S: Monroe Street
E/W: Avenue 54
Weather: Clear

File Name : LQAMO54AM
Site Code : 00000024
Start Date : 4/30/2014
Page No : 1

Groups Printed- Total Volume

	Monroe Street Southbound				Avenue 54 Westbound				Monroe Street Northbound				Avenue 54 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:00 AM	1	13	4	18	1	16	3	20	4	10	0	14	1	14	0	15	67
06:15 AM	5	14	7	26	2	24	6	32	3	4	1	8	0	12	2	14	80
06:30 AM	6	24	10	40	0	46	5	51	5	8	0	13	1	23	4	28	132
06:45 AM	11	41	26	78	9	58	10	77	2	15	0	17	1	34	5	40	212
Total	23	92	47	162	12	144	24	180	14	37	1	52	3	83	11	97	491
07:00 AM	9	25	8	42	5	43	7	55	4	18	1	23	7	33	4	44	164
07:15 AM	6	24	6	36	0	42	7	49	3	26	0	29	8	27	1	36	150
07:30 AM	10	22	7	39	1	32	14	47	3	26	0	29	10	23	2	35	150
07:45 AM	19	33	7	59	1	27	11	39	3	16	4	23	7	28	5	40	161
Total	44	104	28	176	7	144	39	190	13	86	5	104	32	111	12	155	625
08:00 AM	6	25	6	37	2	15	2	19	1	23	3	27	11	25	2	38	121
08:15 AM	12	15	7	34	4	23	5	32	1	22	1	24	10	20	4	34	124
Grand Total	85	236	88	409	25	326	70	421	29	168	10	207	56	239	29	324	1361
Apprch %	20.8	57.7	21.5		5.9	77.4	16.6		14	81.2	4.8		17.3	73.8	9		
Total %	6.2	17.3	6.5	30.1	1.8	24	5.1	30.9	2.1	12.3	0.7	15.2	4.1	17.6	2.1	23.8	

	Monroe Street Southbound				Avenue 54 Westbound				Monroe Street Northbound				Avenue 54 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:45 AM																	
06:45 AM	**11**	**41**	**26**	**78**	**9**	**58**	10	**77**	2	15	0	17	1	**34**	**5**	40	**212**
07:00 AM	9	25	8	42	5	43	7	55	**4**	18	**1**	23	7	33	4	**44**	164
07:15 AM	6	24	6	36	0	42	7	49	3	**26**	0	**29**	8	27	1	36	150
07:30 AM	10	22	7	39	1	32	**14**	47	3	26	0	29	**10**	23	2	35	150
Total Volume	36	112	47	195	15	175	38	228	12	85	1	98	26	117	12	155	676
% App. Total	18.5	57.4	24.1		6.6	76.8	16.7		12.2	86.7	1		16.8	75.5	7.7		
PHF	.818	.683	.452	.625	.417	.754	.679	.740	.750	.817	.250	.845	.650	.860	.600	.881	.797

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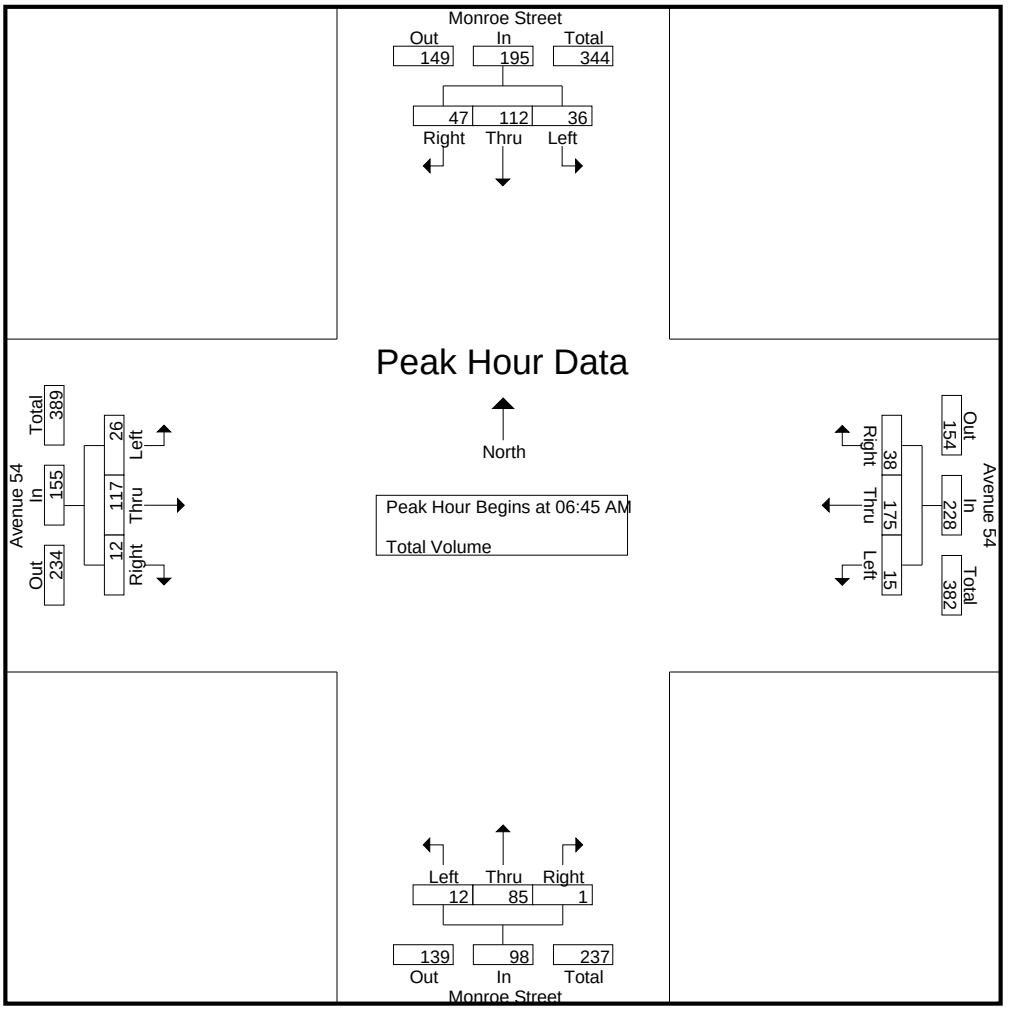
City of La Quinta
N/S: Monroe Street
E/W: Avenue 54
Weather: Clear

File Name : LQAMO54AM
Site Code : 00000024
Start Date : 4/30/2014
Page No : 2



Peak Hour Analysis From 06:00 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	06:30 AM				06:30 AM				07:15 AM				06:45 AM			
+0 mins.	6	24	10	40	0	46	5	51	**3**	**26**	0	**29**	1	**34**	**5**	40
+15 mins.	**11**	**41**	**26**	**78**	**9**	**58**	**10**	**77**	3	26	0	29	7	33	4	**44**
+30 mins.	9	25	8	42	5	43	7	55	3	16	**4**	23	8	27	1	36
+45 mins.	6	24	6	36	0	42	7	49	1	23	3	27	**10**	23	2	35
Total Volume	32	114	50	196	14	189	29	232	10	91	7	108	26	117	12	155
% App. Total	16.3	58.2	25.5		6	81.5	12.5		9.3	84.3	6.5		16.8	75.5	7.7	
PHF	.727	.695	.481	.628	.389	.815	.725	.753	.833	.875	.438	.931	.650	.860	.600	.881

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City of La Quinta
N/S: Monroe Street
E/W: Avenue 54
Weather: Clear

File Name : LQAMO54PM
Site Code : 00000024
Start Date : 4/30/2014
Page No : 1

Groups Printed- Total Volume

	Monroe Street Southbound				Avenue 54 Westbound				Monroe Street Northbound				Avenue 54 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
02:30 PM	10	19	5	34	2	22	6	30	2	18	3	23	5	41	5	51	138
02:45 PM	9	19	4	32	5	17	10	32	3	36	3	42	7	19	5	31	137
Total	19	38	9	66	7	39	16	62	5	54	6	65	12	60	10	82	275
03:00 PM	12	18	4	34	2	13	10	25	2	20	2	24	12	32	2	46	129
03:15 PM	10	14	1	25	1	17	6	24	3	30	5	38	13	35	5	53	140
03:30 PM	13	22	2	37	1	31	3	35	0	41	6	47	19	53	5	77	196
03:45 PM	12	12	2	26	2	22	4	28	2	29	4	35	5	35	4	44	133
Total	47	66	9	122	6	83	23	112	7	120	17	144	49	155	16	220	598
04:00 PM	8	20	2	30	1	21	6	28	1	21	7	29	5	18	4	27	114
04:15 PM	5	8	2	15	2	25	6	33	2	21	2	25	9	38	2	49	122
04:30 PM	10	15	2	27	0	23	11	34	3	15	0	18	5	30	3	38	117
04:45 PM	5	12	3	20	2	25	6	33	1	17	4	22	5	24	3	32	107
Total	28	55	9	92	5	94	29	128	7	74	13	94	24	110	12	146	460
05:00 PM	8	11	2	21	2	31	5	38	3	23	1	27	1	26	3	30	116
05:15 PM	14	8	3	25	0	24	2	26	4	28	1	33	5	25	8	38	122
Grand Total	116	178	32	326	20	271	75	366	26	299	38	363	91	376	49	516	1571
Apprch %	35.6	54.6	9.8		5.5	74	20.5		7.2	82.4	10.5		17.6	72.9	9.5		
Total %	7.4	11.3	2	20.8	1.3	17.3	4.8	23.3	1.7	19	2.4	23.1	5.8	23.9	3.1	32.8	

	Monroe Street Southbound				Avenue 54 Westbound				Monroe Street Northbound				Avenue 54 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:45 PM																	
02:45 PM	9	19	**4**	32	**5**	17	**10**	32	**3**	36	3	42	7	19	**5**	31	137
03:00 PM	12	18	4	34	2	13	10	25	2	20	2	24	12	32	2	46	129
03:15 PM	10	14	1	25	1	17	6	24	3	30	5	38	13	35	5	53	140
03:30 PM	**13**	**22**	2	**37**	1	**31**	3	**35**	0	**41**	**6**	**47**	**19**	**53**	5	**77**	**196**
Total Volume	44	73	11	128	9	78	29	116	8	127	16	151	51	139	17	207	602
% App. Total	34.4	57	8.6		7.8	67.2	25		5.3	84.1	10.6		24.6	67.1	8.2		
PHF	.846	.830	.688	.865	.450	.629	.725	.829	.667	.774	.667	.803	.671	.656	.850	.672	.768

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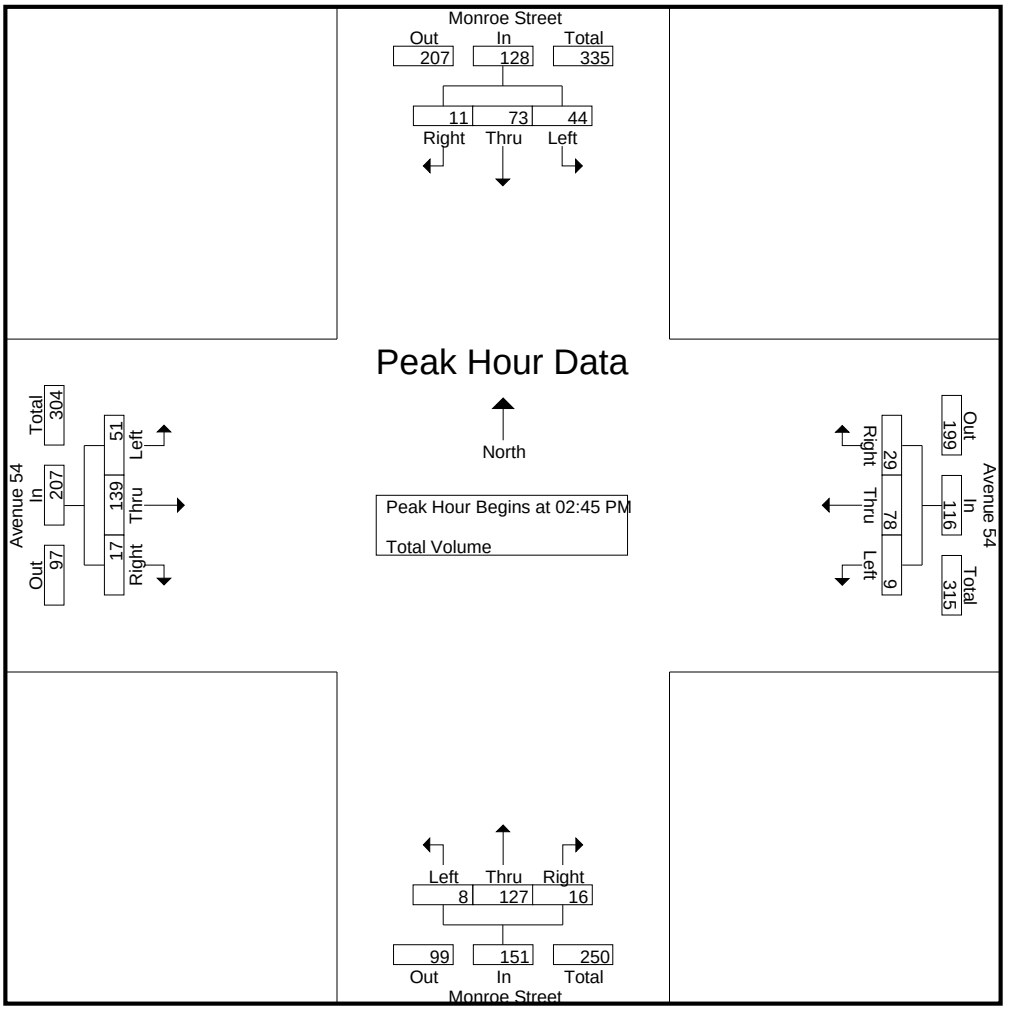
Site Code : 00000024
Start Date : 4/30/2014
Page No : 2



Peak Hour Analysis From 02:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	02:45 PM				04:15 PM				02:45 PM				03:00 PM			
+0 mins.	9	19	**4**	32	**2**	25	6	33	**3**	36	3	42	12	32	2	46
+15 mins.	12	18	4	34	0	23	**11**	34	2	20	2	24	13	35	**5**	53
+30 mins.	10	14	1	25	2	25	6	33	3	30	5	38	**19**	**53**	5	**77**
+45 mins.	**13**	**22**	2	**37**	2	**31**	5	**38**	0	**41**	**6**	**47**	5	35	4	44
Total Volume	44	73	11	128	6	104	28	138	8	127	16	151	49	155	16	220
% App. Total	34.4	57	8.6		4.3	75.4	20.3		5.3	84.1	10.6		22.3	70.5	7.3	
PHF	.846	.830	.688	.865	.750	.839	.636	.908	.667	.774	.667	.803	.645	.731	.800	.714

Appendix C

HCM INTERSECTION ANALYSIS METHODOLOGY AND WORKSHEETS

Appendix C
Highway Capacity Manual Methodology

Some of the key intersections in the study area are unsignalized and controlled by stop signs on one or more of the approaches. Unsignalized intersections are typically categorized as either two-way stop-controlled (TWSC) or all-way stop-controlled (AWSC) intersections. At TWSC intersections, the approaches controlled by the stop sign are referred to as the minor street approaches. Minor street approaches can be either public streets or private driveways. The intersection approaches that are not controlled by stop signs are called the major street approaches.

To evaluate the ability of these intersections to serve traffic demands during peak hours, the capacity is determined for each minor approach movement and the left-turn movements from the major street onto the minor street, and then compared to the demand for each movement. The methodology utilized to determine the maximum capacity of the minor approach movements and the left turn onto the minor street (in passenger car equivalents per hour or PCPH) accounts for approach grade and speed, heavy vehicle mix, lane configuration, and type of traffic control. It allows the maximum potential capacity to be determined from the conflicting volumes and the critical gap associated with each type of vehicle maneuver. Once the capacity of each of the critical movements is calculated, the anticipated delay and the level of service for each of the intersection movements and each minor approach can be evaluated.

Typically, the movement with the longest average control delay or worst level or service defines the overall intersection evaluation; however, this may be tempered by engineering judgment, when conditions warrant it. Although the level of service is primarily related to the average control delay, which is given in terms of seconds of delay per vehicle by minor movement and intersection approach, other performance measures for TWSC and AWSC intersections include: delay to major street through vehicles, queue length, and volume-to-capacity ratio.

For example, left turns from the minor leg may experience delay consistent with LOS F operation, while the major street through movements experience little or no delay and LOS A. Since the major-street through movements typically accommodate the majority of the traffic demand at the intersection, the overall intersection LOS would most likely be LOS A or LOS B. If the delay for the traffic on the minor leg is reduced by installing a traffic signal, the overall intersection delay will increase, as large numbers of vehicles on the major through moves are delayed by the new signal. The increase in total delay may lower the overall intersection LOS. For this reason, excessive delays on the minor legs of two-way stop intersections are only mitigated with a traffic signal when the minor street can no longer effectively provide access, as evidenced by traffic signal warrants being met. This eliminates situations where a large number of motorists are delayed for the benefit of only a few cars.

A two-way left-turn lane (TWLTL) or a raised or striped median allows a minor stream vehicle to cross one major traffic stream at a time. It results in two-stage gap acceptance, provided that sufficient storage space is available in the median or TWLTL to store vehicles. It reduces the critical gap (the minimum gap that would be acceptable to a driver on the minor approach) in the stream of traffic on the major street and increases the capacity of the minor approach.

The grade of the approach directly affects the capacity of each minor movement. Compared to a level approach, downgrades increase capacity and upgrades decrease the approach capacity.

A flared approach on the minor street increases the capacity of the minor street approach. It allows more vehicles to be served simultaneously. Increasing the length of the flared pavement improves access to the additional lane. Even with a flared approach, vehicles seeking to use the flared lane may be delayed by queued vehicles blocking access to the additional lane. Therefore, flaring does not increase the capacity of the approach to the extent that an additional lane would.

The presence of traffic signals upstream from the intersection on the major street will produce platoons and affect the capacity of the minor street approaches if the signal is located within 0.25 mile of the intersection. Four flow regimes can result: no platoons, platoons from the left only, platoons from the right only and platoons from both directions.

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Madison St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Existing - Year 2014*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Madison Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*2*	*143*	*230*	*14*	*145*	*34*
%Thrus Left Lane	*50*			*50*		

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*188*	*100*	*9*	*42*	*89*	*16*
%Thrus Left Lane				*35*		

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LT*	*TR*	*LT*	*TR*	*L*	*TR*	*LT*	*TR*
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Flow Rate (veh/h)	*79*	*327*	*93*	*115*	*204*	*117*	*78*	80
% Heavy Vehicles	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*
No. Lanes	*2*		*2*		*2*		*2*	
Geometry Group	*5*		*5*		*5*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*	*0.0*	*0.2*	*0.0*	*1.0*	*0.0*	*0.6*	*0.0*
Prop. Right-Turns	*0.0*	*0.8*	*0.0*	*0.3*	*0.0*	*0.1*	*0.0*	*0.2*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.1*	*-0.4*	*0.2*	*-0.1*	*0.6*	*0.0*	*0.4*	*-0.1*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*
x, initial	*0.07*	*0.29*	*0.08*	*0.10*	*0.18*	*0.10*	*0.07*	*0.07*
hd, final value (s)	*6.38*	*5.83*	*6.71*	*6.41*	*7.02*	*6.47*	*7.10*	*6.66*
x, final value	*0.14*	*0.53*	*0.17*	*0.20*	*0.40*	*0.21*	*0.15*	*0.15*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*4.1*	*3.5*	*4.4*	*4.1*	*4.7*	*4.2*	*4.8*	*4.4*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*329*	*577*	*343*	*365*	*454*	*367*	*328*	*330*
Delay (s/veh)	*10.12*	*14.92*	*10.81*	*10.75*	*14.29*	*10.88*	*11.08*	*10.51*
LOS	*B*	*B*	*B*	*B*	*B*	*B*	*B*	*B*
Approach: Delay (s/veh)	*13.98*		*10.78*		*13.05*		*10.79*	
LOS	*B*		*B*		*B*		*B*	
Intersection Delay (s/veh)	*12.64*							
Intersection LOS	*B*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Madison St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Existing - Year 2014*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Madison Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*12*	*111*	*194*	*8*	*124*	*28*
%Thrus Left Lane	*50*			*50*		

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*244*	*158*	*28*	*30*	*140*	*5*
%Thrus Left Lane				*35*		

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LT*	*TR*	*LT*	*TR*	*L*	*TR*	*LT*	*TR*
PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Flow Rate (veh/h)	*75*	*283*	*79*	*101*	*277*	*210*	*89*	108
% Heavy Vehicles	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*
No. Lanes	*2*		*2*		*2*		*2*	
Geometry Group	*5*		*5*		*5*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.2*	*0.0*	*0.1*	*0.0*	*1.0*	*0.0*	*0.4*	*0.0*
Prop. Right-Turns	*0.0*	*0.8*	*0.0*	*0.3*	*0.0*	*0.1*	*0.0*	*0.0*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.2*	*-0.5*	*0.1*	*-0.1*	*0.6*	*-0.0*	*0.3*	*0.1*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*
x, initial	*0.07*	*0.25*	*0.07*	*0.09*	*0.25*	*0.19*	*0.08*	*0.10*
hd, final value (s)	*6.93*	*6.30*	*7.19*	*6.91*	*7.02*	*6.41*	*7.16*	*6.94*
x, final value	*0.14*	*0.50*	*0.16*	*0.19*	*0.54*	*0.37*	*0.18*	*0.21*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*4.6*	*4.0*	*4.9*	*4.6*	*4.7*	*4.1*	*4.9*	*4.6*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*325*	*533*	*329*	*351*	*501*	*460*	*339*	*358*
Delay (s/veh)	*10.80*	*15.03*	*11.23*	*11.27*	*17.65*	*12.90*	*11.39*	*11.45*
LOS	*B*	*C*	*B*	*B*	*C*	*B*	*B*	*B*
Approach: Delay (s/veh)	*14.15*		*11.25*		*15.60*		*11.43*	
LOS	*B*		*B*		*C*		*B*	
Intersection Delay (s/veh)	*13.86*							
Intersection LOS	*B*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Madison St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Existing + Project*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Madison Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	2	151	230	18	169	44
%Thrus Left Lane	50			50		

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	188	100	10	46	89	16
%Thrus Left Lane				35		

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	TR	LT	TR	L	TR	LT	TR
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Flow Rate (veh/h)	83	331	110	139	204	118	82	80
% Heavy Vehicles	5	5	5	5	5	5	5	5
No. Lanes	2		2		2		2	
Geometry Group	5		5		5		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.2	0.0	1.0	0.0	0.6	0.0
Prop. Right-Turns	0.0	0.8	0.0	0.3	0.0	0.1	0.0	0.2
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
hLT-adj	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
hRT-adj	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.1	-0.4	0.2	-0.2	0.6	0.0	0.4	-0.1

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.07	0.29	0.10	0.12	0.18	0.10	0.07	0.07
hd, final value (s)	6.49	5.95	6.79	6.46	7.18	6.62	7.27	6.82
x, final value	0.15	0.55	0.21	0.25	0.41	0.22	0.17	0.15
Move-up time, m (s)	2.3		2.3		2.3		2.3	
Service Time, t_s (s)	4.2	3.7	4.5	4.2	4.9	4.3	5.0	4.5

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	333	581	360	389	454	368	332	330
Delay (s/veh)	10.33	15.62	11.25	11.30	14.71	11.14	11.41	10.74
LOS	B	C	B	B	B	B	B	B
Approach: Delay (s/veh)	14.56		11.28		13.41		11.08	
LOS	B		B		B		B	
Intersection Delay (s/veh)	13.03							
Intersection LOS	B							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Madison St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Existing + Project*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Madison Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*12*	*137*	*194*	*11*	*140*	*35*
%Thrus Left Lane	*50*			*50*		

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*244*	*158*	*32*	*41*	*140*	*5*
%Thrus Left Lane				*35*		

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LT*	*TR*	*LT*	*TR*	*L*	*TR*	*LT*	*TR*
PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Flow Rate (veh/h)	*90*	*298*	*91*	*118*	*277*	*215*	*101*	108
% Heavy Vehicles	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*
No. Lanes	*2*		*2*		*2*		*2*	
Geometry Group	*5*		*5*		*5*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.1*	*0.0*	*0.1*	*0.0*	*1.0*	*0.0*	*0.5*	*0.0*
Prop. Right-Turns	*0.0*	*0.7*	*0.0*	*0.3*	*0.0*	*0.2*	*0.0*	*0.0*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.2*	*-0.4*	*0.2*	*-0.1*	*0.6*	*-0.0*	*0.3*	*0.1*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*
x, initial	*0.08*	*0.26*	*0.08*	*0.10*	*0.25*	*0.19*	*0.09*	*0.10*
hd, final value (s)	*7.07*	*6.48*	*7.36*	*7.06*	*7.24*	*6.62*	*7.43*	*7.17*
x, final value	*0.18*	*0.54*	*0.19*	*0.23*	*0.56*	*0.40*	*0.21*	*0.22*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*4.8*	*4.2*	*5.1*	*4.8*	*4.9*	*4.3*	*5.1*	*4.9*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*340*	*537*	*341*	*368*	*486*	*465*	*351*	*358*
Delay (s/veh)	*11.29*	*16.45*	*11.73*	*11.87*	*18.67*	*13.59*	*12.08*	*11.82*
LOS	*B*	*C*	*B*	*B*	*C*	*B*	*B*	*B*
Approach: Delay (s/veh)	*15.25*		*11.81*		*16.45*		*11.95*	
LOS	*C*		*B*		*C*		*B*	
Intersection Delay (s/veh)	*14.62*							
Intersection LOS	*B*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Madison St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Year 2017 - No Project*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Madison Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*4*	*174*	*289*	*19*	*162*	*43*
%Thrus Left Lane	*50*			*50*		

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*213*	*139*	*12*	*53*	*126*	*19*
%Thrus Left Lane				*35*		

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LT*	*TR*	*LT*	*TR*	*L*	*TR*	*LT*	*TR*
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Flow Rate (veh/h)	*98*	*408*	*108*	*134*	*231*	*164*	*104*	109
% Heavy Vehicles	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*
No. Lanes	*2*		*2*		*2*		*2*	
Geometry Group	*5*		*5*		*5*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*	*0.0*	*0.2*	*0.0*	*1.0*	*0.0*	*0.5*	*0.0*
Prop. Right-Turns	*0.0*	*0.8*	*0.0*	*0.3*	*0.0*	*0.1*	*0.0*	*0.2*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.1*	*-0.5*	*0.2*	*-0.2*	*0.6*	*0.0*	*0.4*	*-0.0*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*
x, initial	*0.09*	*0.36*	*0.10*	*0.12*	*0.21*	*0.15*	*0.09*	*0.10*
hd, final value (s)	*6.96*	*6.40*	*7.44*	*7.11*	*7.65*	*7.09*	*7.77*	*7.37*
x, final value	*0.19*	*0.73*	*0.22*	*0.26*	*0.49*	*0.32*	*0.22*	*0.22*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*4.7*	*4.1*	*5.1*	*4.8*	*5.3*	*4.8*	*5.5*	*5.1*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*348*	*552*	*358*	*384*	*456*	*414*	*354*	*359*
Delay (s/veh)	*11.27*	*24.14*	*12.26*	*12.34*	*17.50*	*13.14*	*12.71*	*12.17*
LOS	*B*	*C*	*B*	*B*	*C*	*B*	*B*	*B*
Approach: Delay (s/veh)	*21.64*		*12.31*		*15.69*		*12.43*	
LOS	*C*		*B*		*C*		*B*	
Intersection Delay (s/veh)	*16.80*							
Intersection LOS	*C*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Madison St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Year 2017 - No Project*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Madison Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*16*	*137*	*250*	*11*	*149*	*42*
%Thrus Left Lane	*50*			*50*		

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*291*	*220*	*38*	*41*	*184*	*7*
%Thrus Left Lane				*35*		

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LT*	*TR*	*LT*	*TR*	*L*	*TR*	*LT*	*TR*
PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Flow Rate (veh/h)	*95*	*362*	*96*	*132*	*330*	*293*	*118*	143
% Heavy Vehicles	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*
No. Lanes	*2*		*2*		*2*		*2*	
Geometry Group	*5*		*5*		*5*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.2*	*0.0*	*0.1*	*0.0*	*1.0*	*0.0*	*0.4*	*0.0*
Prop. Right-Turns	*0.0*	*0.8*	*0.0*	*0.4*	*0.0*	*0.1*	*0.0*	*0.0*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.2*	*-0.5*	*0.1*	*-0.2*	*0.6*	*-0.0*	*0.3*	*0.1*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*
x, initial	*0.08*	*0.32*	*0.09*	*0.12*	*0.29*	*0.26*	*0.10*	*0.13*
hd, final value (s)	*7.70*	*7.05*	*8.09*	*7.78*	*7.78*	*7.18*	*8.06*	*7.84*
x, final value	*0.20*	*0.71*	*0.22*	*0.29*	*0.71*	*0.58*	*0.26*	*0.31*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*5.4*	*4.8*	*5.8*	*5.5*	*5.5*	*4.9*	*5.8*	*5.5*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*345*	*501*	*346*	*382*	*457*	*494*	*368*	*393*
Delay (s/veh)	*12.35*	*25.14*	*13.00*	*13.55*	*27.56*	*19.46*	*13.64*	*14.04*
LOS	*B*	*D*	*B*	*B*	*D*	*C*	*B*	*B*
Approach: Delay (s/veh)	*22.48*		*13.32*		*23.75*		*13.86*	
LOS	*C*		*B*		*C*		*B*	
Intersection Delay (s/veh)	*20.22*							
Intersection LOS	*C*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Madison St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Year 2017 - W/ Project*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Madison Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*4*	*182*	*289*	*23*	*186*	*53*
%Thrus Left Lane	*50*			*50*		

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*213*	*139*	*13*	*57*	*126*	*19*
%Thrus Left Lane				*35*		

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LT*	*TR*	*LT*	*TR*	*L*	*TR*	*LT*	*TR*
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Flow Rate (veh/h)	*102*	*412*	*125*	*158*	*231*	*165*	*108*	109
% Heavy Vehicles	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*
No. Lanes	*2*		*2*		*2*		*2*	
Geometry Group	*5*		*5*		*5*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*	*0.0*	*0.2*	*0.0*	*1.0*	*0.0*	*0.6*	*0.0*
Prop. Right-Turns	*0.0*	*0.8*	*0.0*	*0.4*	*0.0*	*0.1*	*0.0*	*0.2*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.1*	*-0.4*	*0.2*	*-0.2*	*0.6*	*0.0*	*0.4*	*-0.0*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*
x, initial	*0.09*	*0.37*	*0.11*	*0.14*	*0.21*	*0.15*	*0.10*	*0.10*
hd, final value (s)	*7.09*	*6.53*	*7.53*	*7.18*	*7.81*	*7.25*	*7.95*	*7.54*
x, final value	*0.20*	*0.75*	*0.26*	*0.32*	*0.50*	*0.33*	*0.24*	*0.23*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*4.8*	*4.2*	*5.2*	*4.9*	*5.5*	*5.0*	*5.7*	*5.2*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*352*	*542*	*375*	*408*	*446*	*415*	*358*	*359*
Delay (s/veh)	*11.56*	*26.09*	*12.87*	*13.14*	*18.11*	*13.53*	*13.12*	*12.46*
LOS	*B*	*D*	*B*	*B*	*C*	*B*	*B*	*B*
Approach: Delay (s/veh)	*23.21*		*13.02*		*16.20*		*12.79*	
LOS	*C*		*B*		*C*		*B*	
Intersection Delay (s/veh)	*17.59*							
Intersection LOS	*C*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Madison St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Year 2017 - W/ Project*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Madison Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*16*	*163*	*250*	*14*	*165*	*49*
%Thrus Left Lane	*50*			*50*		

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*291*	*220*	*42*	*52*	*184*	*7*
%Thrus Left Lane				*35*		

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LT*	*TR*	*LT*	*TR*	*L*	*TR*	*LT*	*TR*
PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Flow Rate (veh/h)	*110*	*377*	*108*	*149*	*330*	*297*	*131*	143
% Heavy Vehicles	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*
No. Lanes	*2*		*2*		*2*		*2*	
Geometry Group	*5*		*5*		*5*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.2*	*0.0*	*0.1*	*0.0*	*1.0*	*0.0*	*0.5*	*0.0*
Prop. Right-Turns	*0.0*	*0.8*	*0.0*	*0.4*	*0.0*	*0.2*	*0.0*	*0.0*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.2*	*-0.4*	*0.2*	*-0.2*	*0.6*	*-0.0*	*0.3*	*0.1*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*
x, initial	*0.10*	*0.34*	*0.10*	*0.13*	*0.29*	*0.26*	*0.12*	*0.13*
hd, final value (s)	*7.85*	*7.24*	*8.27*	*7.94*	*8.02*	*7.40*	*8.33*	*8.07*
x, final value	*0.24*	*0.76*	*0.25*	*0.33*	*0.73*	*0.61*	*0.30*	*0.32*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*5.6*	*4.9*	*6.0*	*5.6*	*5.7*	*5.1*	*6.0*	*5.8*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*360*	*490*	*358*	*399*	*444*	*479*	*381*	*393*
Delay (s/veh)	*13.01*	*29.24*	*13.68*	*14.48*	*29.85*	*21.05*	*14.61*	*14.53*
LOS	*B*	*D*	*B*	*B*	*D*	*C*	*B*	*B*
Approach: Delay (s/veh)	*25.58*		*14.14*		*25.68*		*14.57*	
LOS	*D*		*B*		*D*		*B*	
Intersection Delay (s/veh)	*22.00*							
Intersection LOS	*C*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Monroe St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Existing - Year 2014*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Monroe Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*28*	*126*	*13*	*16*	*188*	*41*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*13*	*91*	*1*	*39*	*120*	*51*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*LTR*		*LTR*		*LT*	*R*
PHF	*0.80*	*0.80*	*0.80*		*0.80*		*0.80*	*0.80*
Flow Rate (veh/h)	*35*	*173*	*304*		*130*		*197*	63
% Heavy Vehicles	*5*	*5*	*5*		*5*		*5*	*5*
No. Lanes	*2*		*1*		*1*		*2*	
Geometry Group	*5*		*4b*		*4b*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*	*0.0*	*0.1*		*0.1*		*0.2*	*0.0*
Prop. Right-Turns	*0.0*	*0.1*	*0.2*		*0.0*		*0.0*	*1.0*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.6*	*0.0*	*-0.0*		*0.1*		*0.2*	*-0.6*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*		*3.20*		*3.20*	*3.20*
x, initial	*0.03*	*0.15*	*0.27*		*0.12*		*0.18*	*0.06*
hd, final value (s)	*6.84*	*6.27*	*6.11*		*6.70*		*6.53*	*5.70*
x, final value	*0.07*	*0.30*	*0.52*		*0.24*		*0.36*	*0.10*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*4.5*	*4.0*	*3.8*		*4.4*		*4.2*	*3.4*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*285*	*423*	*554*		*380*		*447*	*313*
Delay (s/veh)	*10.03*	*11.65*	*15.12*		*11.53*		*12.82*	*9.03*
LOS	*B*	*B*	*C*		*B*		*B*	*A*
Approach: Delay (s/veh)	*11.38*		*15.12*		*11.53*		*11.91*	
LOS	*B*		*C*		*B*		*B*	
Intersection Delay (s/veh)	*12.81*							
Intersection LOS	*B*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Monroe St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Existing - Year 2014*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Monroe Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*55*	*149*	*18*	*10*	*84*	*31*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*9*	*137*	*17*	*47*	*78*	*12*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*LTR*		*LTR*		*LT*	*R*
PHF	*0.77*	*0.77*	*0.77*		*0.77*		*0.77*	*0.77*
Flow Rate (veh/h)	*71*	*216*	*161*		*210*		*162*	15
% Heavy Vehicles	*5*	*5*	*5*		*5*		*5*	*5*
No. Lanes	*2*		*1*		*1*		*2*	
Geometry Group	*5*		*4b*		*4b*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*	*0.0*	*0.1*		*0.1*		*0.4*	*0.0*
Prop. Right-Turns	*0.0*	*0.1*	*0.2*		*0.1*		*0.0*	*1.0*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.6*	*0.0*	*-0.0*		*0.0*		*0.3*	*-0.6*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*		*3.20*		*3.20*	*3.20*
x, initial	*0.06*	*0.19*	*0.14*		*0.19*		*0.14*	*0.01*
hd, final value (s)	*6.58*	*6.00*	*6.18*		*6.20*		*6.48*	*5.58*
x, final value	*0.13*	*0.36*	*0.28*		*0.36*		*0.29*	*0.02*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*4.3*	*3.7*	*3.9*		*3.9*		*4.2*	*3.3*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*321*	*466*	*411*		*460*		*412*	*265*
Delay (s/veh)	*10.26*	*12.04*	*11.23*		*12.38*		*11.83*	*8.42*
LOS	*B*	*B*	*B*		*B*		*B*	*A*
Approach: Delay (s/veh)	*11.60*		*11.23*		*12.38*		*11.54*	
LOS	*B*		*B*		*B*		*B*	
Intersection Delay (s/veh)	*11.71*							
Intersection LOS	*B*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Monroe St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Existing + Project*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Monroe Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*34*	*132*	*14*	*16*	*190*	*41*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*13*	*91*	*1*	*39*	*120*	*53*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*LTR*		*LTR*		*LT*	*R*
PHF	*0.80*	*0.80*	*0.80*		*0.80*		*0.80*	*0.80*
Flow Rate (veh/h)	*42*	*181*	*307*		*130*		*197*	66
% Heavy Vehicles	*5*	*5*	*5*		*5*		*5*	*5*
No. Lanes	*2*		*1*		*1*		*2*	
Geometry Group	*5*		*4b*		*4b*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*	*0.0*	*0.1*		*0.1*		*0.2*	*0.0*
Prop. Right-Turns	*0.0*	*0.1*	*0.2*		*0.0*		*0.0*	*1.0*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.6*	*0.0*	*-0.0*		*0.1*		*0.2*	*-0.6*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*		*3.20*		*3.20*	*3.20*
x, initial	*0.04*	*0.16*	*0.27*		*0.12*		*0.18*	*0.06*
hd, final value (s)	*6.87*	*6.30*	*6.15*		*6.78*		*6.60*	*5.77*
x, final value	*0.08*	*0.32*	*0.52*		*0.24*		*0.36*	*0.11*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*4.6*	*4.0*	*3.9*		*4.5*		*4.3*	*3.5*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*292*	*431*	*557*		*380*		*447*	*316*
Delay (s/veh)	*10.17*	*11.89*	*15.45*		*11.66*		*12.98*	*9.15*
LOS	*B*	*B*	*C*		*B*		*B*	*A*
Approach: Delay (s/veh)	*11.57*		*15.45*		*11.66*		*12.02*	
LOS	*B*		*C*		*B*		*B*	
Intersection Delay (s/veh)	*13.00*							
Intersection LOS	*B*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Monroe St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Existing + Project*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Monroe Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*59*	*153*	*19*	*10*	*90*	*31*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*10*	*137*	*17*	*47*	*78*	*19*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*LTR*		*LTR*		*LT*	*R*
PHF	*0.77*	*0.77*	*0.77*		*0.77*		*0.77*	*0.77*
Flow Rate (veh/h)	*76*	*222*	*168*		*211*		*162*	*24*
% Heavy Vehicles	*5*	*5*	*5*		*5*		*5*	*5*
No. Lanes	*2*		*1*		*1*		*2*	
Geometry Group	*5*		*4b*		*4b*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*	*0.0*	*0.1*		*0.1*		*0.4*	*0.0*
Prop. Right-Turns	*0.0*	*0.1*	*0.2*		*0.1*		*0.0*	*1.0*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.6*	*0.0*	*-0.0*		*0.0*		*0.3*	*-0.6*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*		*3.20*		*3.20*	*3.20*
x, initial	*0.07*	*0.20*	*0.15*		*0.19*		*0.14*	*0.02*
hd, final value (s)	*6.64*	*6.06*	*6.25*		*6.28*		*6.56*	*5.66*
x, final value	*0.14*	*0.37*	*0.29*		*0.37*		*0.30*	*0.04*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*4.3*	*3.8*	*4.0*		*4.0*		*4.3*	*3.4*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*326*	*472*	*418*		*461*		*412*	*274*
Delay (s/veh)	*10.42*	*12.33*	*11.51*		*12.60*		*11.98*	*8.58*
LOS	*B*	*B*	*B*		*B*		*B*	*A*
Approach: Delay (s/veh)	*11.84*		*11.51*		*12.60*		*11.54*	
LOS	*B*		*B*		*B*		*B*	
Intersection Delay (s/veh)	*11.90*							
Intersection LOS	*B*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Monroe St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Year 2017 - No Project*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Monroe Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*36*	*152*	*19*	*21*	*207*	*41*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*17*	*127*	*2*	*40*	*166*	*62*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*LTR*		*LTR*		*LT*	*R*
PHF	*0.80*	*0.80*	*0.80*		*0.80*		*0.80*	*0.80*
Flow Rate (veh/h)	*44*	*212*	*335*		*181*		*256*	*77*
% Heavy Vehicles	*5*	*5*	*5*		*5*		*5*	*5*
No. Lanes	*2*		*1*		*1*		*2*	
Geometry Group	*5*		*4b*		*4b*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*	*0.0*	*0.1*		*0.1*		*0.2*	*0.0*
Prop. Right-Turns	*0.0*	*0.1*	*0.2*		*0.0*		*0.0*	*1.0*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.6*	*0.0*	*0.0*		*0.1*		*0.2*	*-0.6*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*		*3.20*		*3.20*	*3.20*
x, initial	*0.04*	*0.19*	*0.30*		*0.16*		*0.23*	*0.07*
hd, final value (s)	*7.60*	*7.01*	*6.83*		*7.41*		*7.13*	*6.32*
x, final value	*0.09*	*0.41*	*0.64*		*0.37*		*0.51*	*0.14*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*5.3*	*4.7*	*4.5*		*5.1*		*4.8*	*4.0*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*294*	*462*	*506*		*431*		*477*	*327*
Delay (s/veh)	*11.07*	*14.55*	*20.70*		*14.44*		*16.94*	*10.01*
LOS	*B*	*B*	*C*		*B*		*C*	*B*
Approach: Delay (s/veh)	*13.95*		*20.70*		*14.44*		*15.34*	
LOS	*B*		*C*		*B*		*C*	
Intersection Delay (s/veh)	*16.50*							
Intersection LOS	*C*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Monroe St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Year 2017 - No Project*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Monroe Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*67*	*183*	*26*	*14*	*116*	*40*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*12*	*194*	*20*	*57*	*116*	*16*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*LTR*		*LTR*		*LT*	*R*
PHF	*0.77*	*0.77*	*0.77*		*0.77*		*0.77*	*0.77*
Flow Rate (veh/h)	*87*	*270*	*219*		*291*		*224*	*20*
% Heavy Vehicles	*5*	*5*	*5*		*5*		*5*	*5*
No. Lanes	*2*		*1*		*1*		*2*	
Geometry Group	*5*		*4b*		*4b*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*	*0.0*	*0.1*		*0.1*		*0.3*	*0.0*
Prop. Right-Turns	*0.0*	*0.1*	*0.2*		*0.1*		*0.0*	*1.0*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.6*	*-0.0*	*-0.0*		*0.0*		*0.3*	*-0.6*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*		*3.20*		*3.20*	*3.20*
x, initial	*0.08*	*0.24*	*0.19*		*0.26*		*0.20*	*0.02*
hd, final value (s)	*7.53*	*6.93*	*7.21*		*7.08*		*7.39*	*6.50*
x, final value	*0.18*	*0.52*	*0.44*		*0.57*		*0.46*	*0.04*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*5.2*	*4.6*	*4.9*		*4.8*		*5.1*	*4.2*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*337*	*492*	*460*		*482*		*454*	*270*
Delay (s/veh)	*11.90*	*16.90*	*15.42*		*18.85*		*16.22*	*9.45*
LOS	*B*	*C*	*C*		*C*		*C*	*A*
Approach: Delay (s/veh)	*15.68*		*15.42*		*18.85*		*15.66*	
LOS	*C*		*C*		*C*		*C*	
Intersection Delay (s/veh)	*16.46*							
Intersection LOS	*C*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Morning Peak Hour*

Site Information

Intersection	*Monroe St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Year 2017 - W/ Project*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Monroe Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*42*	*158*	*20*	*21*	*209*	*41*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*17*	*127*	*2*	*40*	*166*	*64*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*LTR*		*LTR*		*LT*	*R*
PHF	*0.80*	*0.80*	*0.80*		*0.80*		*0.80*	*0.80*
Flow Rate (veh/h)	*52*	*221*	*338*		*181*		*256*	*79*
% Heavy Vehicles	*5*	*5*	*5*		*5*		*5*	*5*
No. Lanes	*2*		*1*		*1*		*2*	
Geometry Group	*5*		*4b*		*4b*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*	*0.0*	*0.1*		*0.1*		*0.2*	*0.0*
Prop. Right-Turns	*0.0*	*0.1*	*0.2*		*0.0*		*0.0*	*1.0*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.6*	*0.0*	*0.0*		*0.1*		*0.2*	*-0.6*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*		*3.20*		*3.20*	*3.20*
x, initial	*0.05*	*0.20*	*0.30*		*0.16*		*0.23*	*0.07*
hd, final value (s)	*7.64*	*7.05*	*6.90*		*7.51*		*7.22*	*6.40*
x, final value	*0.11*	*0.43*	*0.65*		*0.38*		*0.51*	*0.14*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*5.3*	*4.8*	*4.6*		*5.2*		*4.9*	*4.1*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*302*	*471*	*501*		*431*		*471*	*329*
Delay (s/veh)	*11.29*	*15.03*	*21.41*		*14.68*		*17.27*	*10.15*
LOS	*B*	*C*	*C*		*B*		*C*	*B*
Approach: Delay (s/veh)	*14.32*		*21.41*		*14.68*		*15.59*	
LOS	*B*		*C*		*B*		*C*	
Intersection Delay (s/veh)	*16.88*							
Intersection LOS	*C*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*8/1/2014*
Analysis Time Period	*Evening Peak Hour*

Site Information

Intersection	*Monroe St. @ Avenue 54*
Jurisdiction	*City of La Quinta*
Analysis Year	*Year 2017 - W/ Project*

Project ID *Griffin Ranch Estates*

East/West Street: *Avenue 54* North/South Street: *Monroe Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*71*	*187*	*27*	*14*	*122*	*40*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*13*	*194*	*20*	*57*	*116*	*23*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*LTR*		*LTR*		*LT*	*R*
PHF	*0.77*	*0.77*	*0.77*		*0.77*		*0.77*	*0.77*
Flow Rate (veh/h)	*92*	*277*	*227*		*292*		*224*	*29*
% Heavy Vehicles	*5*	*5*	*5*		*5*		*5*	*5*
No. Lanes	*2*		*1*		*1*		*2*	
Geometry Group	*5*		*4b*		*4b*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*	*0.0*	*0.1*		*0.1*		*0.3*	*0.0*
Prop. Right-Turns	*0.0*	*0.1*	*0.2*		*0.1*		*0.0*	*1.0*
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*	*0.0*
hLT-adj	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*	*0.5*	*0.5*
hRT-adj	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.7*	*-0.7*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.6*	*-0.0*	*-0.0*		*0.0*		*0.3*	*-0.6*

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*		*3.20*		*3.20*	*3.20*
x, initial	*0.08*	*0.25*	*0.20*		*0.26*		*0.20*	*0.03*
hd, final value (s)	*7.61*	*7.01*	*7.30*		*7.20*		*7.50*	*6.61*
x, final value	*0.19*	*0.54*	*0.46*		*0.58*		*0.47*	*0.05*
Move-up time, m (s)	*2.3*		*2.3*		*2.3*		*2.3*	
Service Time, t_s (s)	*5.3*	*4.7*	*5.0*		*4.9*		*5.2*	*4.3*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*342*	*487*	*455*		*474*		*447*	*279*
Delay (s/veh)	*12.15*	*17.64*	*16.09*		*19.51*		*16.58*	*9.68*
LOS	*B*	*C*	*C*		*C*		*C*	*A*
Approach: Delay (s/veh)	*16.27*		*16.09*		*19.51*		*15.79*	
LOS	*C*		*C*		*C*		*C*	
Intersection Delay (s/veh)	*16.95*							
Intersection LOS	*C*							

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*5/12/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Site Access. @ Avenue 54*
Jurisdiction	*La Quinta*
Analysis Year	*Existing + Project*

Project Description *Griffin Estates*

East/West Street: *Avenue 54* | North/South Street: *Site Access West*

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

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*204*	*3*	*1*	*225*	
Peak-Hour Factor, PHF	*1.00*	*0.92*	*0.92*	*0.92*	*0.92*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*221*	*3*	*1*	*244*	*0*
Percent Heavy Vehicles	*0*	--	--	*5*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*7*		*2*			
Peak-Hour Factor, PHF	*0.92*	*1.00*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*7*	*0*	*2*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*0*	*5*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*1*	*7*		*2*			
C (m) (veh/h)		*1320*	*617*		*930*			
v/c		*0.00*	*0.01*		*0.00*			
95% queue length		*0.00*	*0.03*		*0.01*			
Control Delay (s/veh)		*7.7*	*10.9*		*8.9*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*10.5*					
Approach LOS	--	--	*B*					

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Generated: 8/1/2014 11:32 PM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*5/12/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Site Access. @ Avenue 54*
Jurisdiction	*La Quinta*
Analysis Year	*Existing + Project*

Project Description *Griffin Estates*

East/West Street: *Avenue 54* | North/South Street: *Site Access West*

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

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*203*	*8*	*3*	*179*	
Peak-Hour Factor, PHF	*1.00*	*0.88*	*0.88*	*0.88*	*0.88*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*230*	*9*	*3*	*203*	*0*
Percent Heavy Vehicles	*0*	--	--	*5*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*5*		*2*			
Peak-Hour Factor, PHF	*0.88*	*1.00*	*0.88*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*5*	*0*	*2*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*0*	*5*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*3*	*5*		*2*			
C (m) (veh/h)		*1303*	*620*		*921*			
v/c		*0.00*	*0.01*		*0.00*			
95% queue length		*0.01*	*0.02*		*0.01*			
Control Delay (s/veh)		*7.8*	*10.9*		*8.9*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*10.3*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*5/12/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Site Access. @ Avenue 54*
Jurisdiction	*La Quinta*
Analysis Year	*Year 2017 - W/ Project*

Project Description *Griffin Estates*

East/West Street: *Avenue 54* | North/South Street: *Site Access West*

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

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*249*	*3*	*1*	*259*	
Peak-Hour Factor, PHF	*1.00*	*0.92*	*0.92*	*0.92*	*0.92*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*270*	*3*	*1*	*281*	*0*
Percent Heavy Vehicles	*0*	--	--	*5*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*7*		*2*			
Peak-Hour Factor, PHF	*0.92*	*1.00*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*7*	*0*	*2*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*0*	*5*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*1*	*7*		*2*			
C (m) (veh/h)		*1266*	*559*		*902*			
v/c		*0.00*	*0.01*		*0.00*			
95% queue length		*0.00*	*0.04*		*0.01*			
Control Delay (s/veh)		*7.8*	*11.5*		*9.0*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*11.0*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*5/12/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Site Access. @ Avenue 54*
Jurisdiction	*La Quinta*
Analysis Year	*Year 2017 - W/ Project*

Project Description *Griffin Estates*

East/West Street: *Avenue 54* | North/South Street: *Site Access West*

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

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*252*	*8*	*3*	*228*	
Peak-Hour Factor, PHF	*1.00*	*0.88*	*0.88*	*0.88*	*0.88*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*286*	*9*	*3*	*259*	*0*
Percent Heavy Vehicles	*0*	--	--	*5*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*5*		*2*			
Peak-Hour Factor, PHF	*0.88*	*1.00*	*0.88*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*5*	*0*	*2*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*0*	*5*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*3*	*5*		*2*			
C (m) (veh/h)		*1242*	*549*		*888*			
v/c		*0.00*	*0.01*		*0.00*			
95% queue length		*0.01*	*0.03*		*0.01*			
Control Delay (s/veh)		*7.9*	*11.6*		*9.1*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*10.9*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*5/12/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Site Access. @ Avenue 54*
Jurisdiction	*La Quinta*
Analysis Year	*Year 2035 - W/ Project*

Project Description *Griffin Estates*

East/West Street: *Avenue 54* | North/South Street: *Site Access West*

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

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*871*	*3*	*1*	*649*	
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*871*	*3*	*1*	*649*	*0*
Percent Heavy Vehicles	*0*	--	--	*5*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*7*		*2*			
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*7*	*0*	*2*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*0*	*5*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*1*	*7*		*2*			
C (m) (veh/h)		*749*	*174*		*609*			
v/c		*0.00*	*0.04*		*0.00*			
95% queue length		*0.00*	*0.13*		*0.01*			
Control Delay (s/veh)		*9.8*	*26.6*		*10.9*			
LOS		*A*	*D*		*B*			
Approach Delay (s/veh)	--	--	*23.1*					
Approach LOS	--	--	*C*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*5/12/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Site Access. @ Avenue 54*
Jurisdiction	*La Quinta*
Analysis Year	*Year 2035 - W/ Project*

Project Description *Griffin Estates*

East/West Street: *Avenue 54* | North/South Street: *Site Access West*

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

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*1034*	*8*	*3*	*1054*	
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*1034*	*8*	*3*	*1054*	*0*
Percent Heavy Vehicles	*0*	--	--	*5*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*5*		*2*			
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*5*	*0*	*2*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*0*	*5*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*3*	*5*		*2*			
C (m) (veh/h)		*646*	*98*		*545*			
v/c		*0.00*	*0.05*		*0.00*			
95% queue length		*0.01*	*0.16*		*0.01*			
Control Delay (s/veh)		*10.6*	*43.7*		*11.6*			
LOS		*B*	*E*		*B*			
Approach Delay (s/veh)	--	--	*34.5*					
Approach LOS	--	--	*D*					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*5/12/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Site Access. @ Avenue 54*
Jurisdiction	*La Quinta*
Analysis Year	*Existing + Project*

Project Description *Griffin Estates*

East/West Street: *Avenue 54* | North/South Street: *Site Access East*

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

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*196*	*10*	*3*	*195*	
Peak-Hour Factor, PHF	*1.00*	*0.92*	*0.92*	*0.92*	*0.92*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*213*	*10*	*3*	*211*	*0*
Percent Heavy Vehicles	*0*	--	--	*5*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*31*		*10*			
Peak-Hour Factor, PHF	*0.92*	*1.00*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*33*	*0*	*10*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*0*	*5*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*3*	*33*		*10*			
C (m) (veh/h)		*1321*	*631*		*930*			
v/c		*0.00*	*0.05*		*0.01*			
95% queue length		*0.01*	*0.17*		*0.03*			
Control Delay (s/veh)		*7.7*	*11.0*		*8.9*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*10.5*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*5/12/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Site Access. @ Avenue 54*
Jurisdiction	*La Quinta*
Analysis Year	*Existing + Project*

Project Description *Griffin Estates*

East/West Street: *Avenue 54* | North/South Street: *Site Access East*

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

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*171*	*34*	*11*	*162*	
Peak-Hour Factor, PHF	*1.00*	*0.88*	*0.88*	*0.88*	*0.88*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*194*	*38*	*12*	*184*	*0*
Percent Heavy Vehicles	*0*	--	--	*5*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*20*		*7*			
Peak-Hour Factor, PHF	*0.88*	*1.00*	*0.88*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*22*	*0*	*7*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*0*	*5*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*12*	*22*		*7*			
C (m) (veh/h)		*1311*	*626*		*925*			
v/c		*0.01*	*0.04*		*0.01*			
95% queue length		*0.03*	*0.11*		*0.02*			
Control Delay (s/veh)		*7.8*	*11.0*		*8.9*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*10.5*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*5/12/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Site Access. @ Avenue 54*
Jurisdiction	*La Quinta*
Analysis Year	*Year 2017 - W/ Project*

Project Description *Griffin Estates*

East/West Street: *Avenue 54* | North/South Street: *Site Access East*

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

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*241*	*10*	*3*	*229*	
Peak-Hour Factor, PHF	*1.00*	*0.92*	*0.92*	*0.92*	*0.92*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*261*	*10*	*3*	*248*	*0*
Percent Heavy Vehicles	*0*	--	--	*5*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*31*		*10*			
Peak-Hour Factor, PHF	*0.92*	*1.00*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*33*	*0*	*10*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*0*	*5*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*3*	*33*		*10*			
C (m) (veh/h)		*1268*	*572*		*902*			
v/c		*0.00*	*0.06*		*0.01*			
95% queue length		*0.01*	*0.18*		*0.03*			
Control Delay (s/veh)		*7.8*	*11.7*		*9.0*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*11.1*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*5/12/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Site Access. @ Avenue 54*
Jurisdiction	*La Quinta*
Analysis Year	*Year 2017 - W/ Project*

Project Description *Griffin Estates*

East/West Street: *Avenue 54* | North/South Street: *Site Access East*

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

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*220*	*34*	*11*	*211*	
Peak-Hour Factor, PHF	*1.00*	*0.88*	*0.88*	*0.88*	*0.88*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*250*	*38*	*12*	*239*	*0*
Percent Heavy Vehicles	*0*	--	--	*5*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*20*		*7*			
Peak-Hour Factor, PHF	*0.88*	*1.00*	*0.88*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*22*	*0*	*7*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*0*	*5*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*12*	*22*		*7*			
C (m) (veh/h)		*1249*	*555*		*892*			
v/c		*0.01*	*0.04*		*0.01*			
95% queue length		*0.03*	*0.12*		*0.02*			
Control Delay (s/veh)		*7.9*	*11.8*		*9.1*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*11.1*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*5/12/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Site Access. @ Avenue 54*
Jurisdiction	*La Quinta*
Analysis Year	*Year 2035 - W/ Project*

Project Description *Griffin Estates*

East/West Street: *Avenue 54* | North/South Street: *Site Access East*

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

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*863*	*10*	*3*	*619*	
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*863*	*10*	*3*	*619*	*0*
Percent Heavy Vehicles	*0*	--	--	*5*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*31*		*10*			
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*31*	*0*	*10*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*0*	*5*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*3*	*31*		*10*			
C (m) (veh/h)		*750*	*177*		*610*			
v/c		*0.00*	*0.18*		*0.02*			
95% queue length		*0.01*	*0.62*		*0.05*			
Control Delay (s/veh)		*9.8*	*29.6*		*11.0*			
LOS		*A*	*D*		*B*			
Approach Delay (s/veh)	--	--	*25.1*					
Approach LOS	--	--	*D*					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Greg*
Agency/Co.	*Endo Engineering*
Date Performed	*5/12/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Site Access. @ Avenue 54*
Jurisdiction	*La Quinta*
Analysis Year	*Year 2035 - W/ Project*

Project Description *Griffin Estates*

East/West Street: *Avenue 54* | North/South Street: *Site Access East*

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

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*1002*	*34*	*11*	*1037*	
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*1002*	*34*	*11*	*1037*	*0*
Percent Heavy Vehicles	*0*	--	--	*5*	--	--
Median Type	*Raised curb*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*1*	*2*	*0*
Configuration		*T*	*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*20*		*7*			
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*20*	*0*	*7*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*0*	*5*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*11*	*20*		*7*			
C (m) (veh/h)		*649*	*98*		*547*			
v/c		*0.02*	*0.20*		*0.01*			
95% queue length		*0.05*	*0.72*		*0.04*			
Control Delay (s/veh)		*10.6*	*50.9*		*11.7*			
LOS		*B*	*F*		*B*			
Approach Delay (s/veh)	--	--	*40.7*					
Approach LOS	--	--	*E*					

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ROUNDABOUT REPORT

General Information		Site Information	
Analyst	*Greg*	Intersection	*Madison St. @ Avenue 54*
Agency or Co.	*Endo Engineering*	E/W Street Name	*Avenue 54*
Date Performed	*8/12/2014*	N/S Street Name	*Madison Street*
Time Period	*PM Peak Hour*	Analysis Year	*Year 2035+Project*
		Project ID	*Griffin Estates*

Project Description:

Volume Adjustment and Site Characteristics

	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	*0*	*2*	*0*		*0*	*2*	*0*		*0*	*2*	*0*		*0*	*2*	*0*	
Volume (V), veh/h	*80*	*496*	*1172*	*0*	*114*	*450*	*470*	*0*	*846*	*1582*	*241*	*0*	*263*	*969*	*51*	*0*
Heavy Veh. Adj. (f_{HV}), %	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*
Peak Hour Factor (PHF)	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
No. of Pedestrians Crossing Entry	*0*				0				0				0			

Critical and Follow-Up Headway Adjustment

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (sec)	*4.2929*	*4.1129*	*5.1929*	*4.2929*	*4.1129*	*5.1929*	*4.2929*	*4.1129*	*5.1929*	*4.2929*	*4.1129*	*5.1929*
Follow-Up Headway (sec)	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*

Flow Computations

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Circulating Flow (V_c), pc/h	*1413*			*2633*			*881*			*1480*		
Exiting Flow (V_{ex}), pc/h	*797*			*1360*			*1745*			*1137*		
Entry Flow (V_e), pc/h	*1515*	*321*	*1231*	*772*	*314*	*494*	*1451*	*1351*	*253*	*662*	*685*	*54*
Entry Volume veh/h	*1443*	*306*	*1172*	*735*	*299*	*470*	*1382*	*1287*	*241*	*630*	*652*	*51*

Capacity and v/c Ratios

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Capacity (c_{PCE}), pc/h	*392*	*420*	*362*	*157*	*179*	*197*	*584*	*610*	*509*	*372*	*401*	*290*
Capacity (*c*), veh/h	*373*	*400*	*345*	*150*	*170*	*188*	*556*	*581*	*485*	*354*	*382*	*276*
v/c Ratio (X)	*3.87*	*0.76*	*3.40*	*4.90*	*1.76*	*2.51*	*2.49*	*2.21*	*0.50*	*1.78*	*1.71*	*0.19*

Delay and Level of Service

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	*1318.3*	*36.7*	*1110.3*	*1814.4*	*411.3*	*733.1*	*690.6*	*568.8*	*17.0*	*388.5*	*354.2*	*16.9*
Lane LOS	*F*	*E*		*F*	*F*		*F*	*F*		*F*	*F*	
Lane 95% Queue	*137.7*	*6.3*	*107.6*	*76.7*	*21.4*	*39.9*	*108.0*	*93.4*	*2.7*	*40.4*	*39.9*	*0.7*
Approach Delay, s/veh	*1100.54*			*1197.52*			*580.95*			*357.51*		
Approach LOS, s/veh	*F*			*F*			*F*			*F*		
Intersection Delay, s/veh	*828.67*											
Intersection LOS	*F*											

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ROUNDABOUT REPORT

General Information		Site Information	
Analyst	*Greg*	Intersection	*Monroe St. @ Avenue 54*
Agency or Co.	*Endo Engineering*	E/W Street Name	*Avenue 54*
Date Performed	*8/12/2014*	N/S Street Name	*Monroe Street*
Time Period	*PM Peak Hour*	Analysis Year	*Year 2035+Project*
		Project ID	*Griffin Estates*

Project Description:

Volume Adjustment and Site Characteristics

	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	*0*	*2*	*0*		*0*	*2*	*0*		*0*	*2*	*0*		*0*	*2*	*0*	
Volume (V), veh/h	*215*	*609*	*205*	*0*	*135*	*802*	*189*	*0*	*114*	*1578*	*46*	*0*	*181*	*1180*	*94*	*0*
Heavy Veh. Adj. (f_{HV}), %	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*
Peak Hour Factor (PHF)	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
No. of Pedestrians Crossing Entry	*0*				0				0				0			

Critical and Follow-Up Headway Adjustment

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (sec)	*4.2929*	*4.1129*	*5.1929*	*4.2929*	*4.1129*	*5.1929*	*4.2929*	*4.1129*	*5.1929*	*4.2929*	*4.1129*	*5.1929*
Follow-Up Headway (sec)	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*

Flow Computations

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Circulating Flow (V_c), pc/h	*1571*			*2003*			*1055*			*1104*		
Exiting Flow (V_{ex}), pc/h	*829*			*962*			*1883*			*1381*		
Entry Flow (V_e), pc/h	*622*	*458*	*215*	*660*	*522*	*198*	*883*	*942*	*48*	*771*	*757*	*99*
Entry Volume veh/h	*592*	*436*	*205*	*629*	*497*	*189*	*841*	*897*	*46*	*734*	*721*	*94*

Capacity and v/c Ratios

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Capacity (c_{PCE}), pc/h	*348*	*376*	*284*	*252*	*278*	*172*	*512*	*540*	*493*	*494*	*522*	*432*
Capacity (*c*), veh/h	*331*	*358*	*270*	*240*	*265*	*164*	*488*	*514*	*470*	*470*	*497*	*411*
v/c Ratio (X)	*1.79*	*1.22*	*0.76*	*2.62*	*1.88*	*1.15*	*1.72*	*1.75*	*0.10*	*1.56*	*1.45*	*0.23*

Delay and Level of Service

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	*394.4*	*153.2*	*49.2*	*772.1*	*440.0*	*172.9*	*354.6*	*363.1*	*9.0*	*285.4*	*236.1*	*12.5*
Lane LOS	*F*	*F*		*F*	*F*		*F*	*F*		*F*	*F*	
Lane 95% Queue	*38.5*	*18.6*	*5.6*	*53.0*	*34.4*	*10.1*	*50.4*	*54.1*	*0.3*	*39.9*	*35.6*	*0.9*
Approach Delay, s/veh	*251.72*			*560.45*			*349.95*			*245.93*		
Approach LOS, s/veh	*F*			*F*			*F*			*F*		
Intersection Delay, s/veh	*349.03*											
Intersection LOS	*F*											

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Appendix D

TRAFFIC SIGNAL WARRANTS

Peak Hour Signal Warrants

Signal Warrants Spreadsheet

Appendix D
MUTCD Traffic Control Signal Warrants

The Federal Highway Administration (FHWA) publishes the *Manual on Uniform Traffic Control Devices* (MUTCD), which contains all national design, application, and placement standards for traffic control devices. The purpose of these devices, which include signs, signals, and pavement markings, is to promote highway safety, efficiency, and uniformity so that traffic can move efficiently on the Nation's streets and highways. All traffic control devices nationwide must conform to the MUTCD. Although the FHWA adopts the standards, the individual State and local highway agencies, not the FHWA, select, install, operate, and maintain traffic control devices on all roadways (including the Interstate and the U.S. numbered systems) nationwide.

A traffic signal assigns intersection right-of-way and promotes the orderly movement of pedestrians and vehicles. However, improper signal controls sometimes lead to intentional violations, unnecessary delays and traffic diversion to less desirable routes.

The selection and use of traffic control signals should be based on an engineering study of roadway, traffic, and other conditions. A careful analysis of traffic operations, pedestrian and bicyclist needs, and other factors at a large number of signalized and unsignalized intersections, coupled with engineering judgment, has provided a series of signal warrants detailed in the FHWA's MUTCD (2009 Edition)[1] that define the minimum conditions under which installing traffic control signals might be justified. As of January 13, 2012, Caltrans has adopted the *California Manual on Uniform Traffic Control Devices* (California MUTCD 2012) to include FHWA's 2009 MUTCD to prescribe uniform standards for traffic control devices in California.

In order to justify the installation of a traffic control signal, a traffic control signal needs study is required that demonstrates delay, congestion, approach conditions, driver confusion, future land use, physical characteristics of the location, the factors contained in the traffic signal warrants, and/or other evidence of the need for right-of-way assignment beyond that which could be provided by a STOP sign. The FHWA's MUTCD (2009 Edition)[2] and the California MUTCD 2012 provide guidance and signal warrant sheets for use in developing traffic control signal needs studies.

The following are warrants for installation of a traffic control signal.

Warrant 1 - Eight Hour Vehicular Volume (including minimum vehicle volume and interruption of continuous traffic warrants)

Warrant 2 - Four-Hour Vehicular Volume

Warrant 3 - Peak Hour

Warrant 4 - Pedestrian Volume

Warrant 5 - School Crossing

Warrant 6 - Coordinated Signal System

Warrant 7 - Crash Experience

Warrant 8 - Roadway Network

Warrant 9 - Intersection Near A Grade Crossing

Disadvantages of Signalization

Improperly designed or installed traffic signals, those that are poorly maintained, and unjustified traffic signals can result in one or more of the following disadvantages:

- Excessive delay;
- Excessive disobedience of the signal indications;
- Increased use of less adequate routes (as road users attempt to avoid traffic signals); and
- Significant increases in the frequency of collisions (especially rear-end collisions).

1 U.S. Department of Transportation, Federal Highway Administration, *Manual on Uniform Traffic Control Devices for Streets and Highways,* (2009 Edition).
2 Ibid.

Advantages of Signalization

Traffic signals that are properly designed, located, operated, and maintained have one or more of the following advantages:

- They provide for the orderly movement of vehicular and pedestrian traffic.
- They increase the traffic handling capacity of the intersection (if the signal operational parameters are reviewed and updated on a regular basis and when land use changes have occurred).
- They reduce the frequency and severity of certain types of crashes (especially right- angle collisions).
- They are coordinated to provide for continuous or nearly continuous movement of traffic at a definite speed along a given route under favorable conditions.
- They interrupt heavy traffic at intervals to permit other traffic (vehicular or pedestrian) to cross.

Alternatives to Signalization

Since vehicular delay and the frequency of some types of collisions can be greater under traffic signal control than under STOP sign control, consideration should be given to providing alternatives to traffic signals even if one or more of the signal warrants has been satisfied.

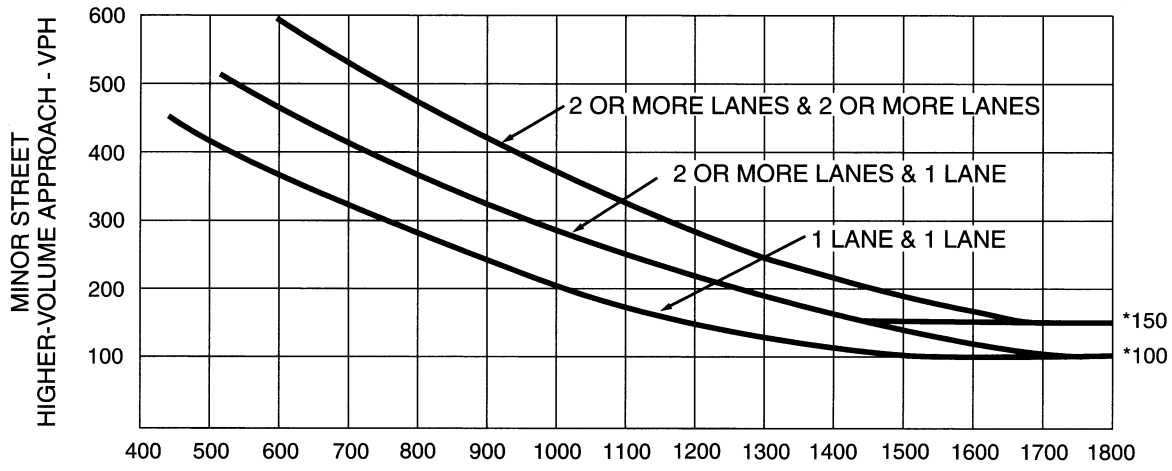
Alternatives for consideration may include:

- Improving the sight distance at the intersection by moving the stop line(s) and making other changes;
- Adding one or more lanes on a minor street approach to reduce the number of vehicles per lane on the approach;
- Channelizing vehicular movements;
- Installing roadway lighting if a disproportionate number of collisions occur at night;
- Restricting one or more turning movements, perhaps on a time-of-day basis, if alternative routes are available;
- Installing multiway STOP sign control if the warrant is satisfied;
- Installing a roundabout intersection;
- Installing warning signs on the major street regarding the approaching intersection;
- Installing flashing beacons on warning signs in advance of the intersection or at the intersection; and
- Installing measures designed to reduce speeds on the approaches.

General Notes

1. The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.
2. A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection.
3. A signal should not be installed if it will seriously disrupt progressive traffic flow.
4. Bicycles may be counted as either vehicles or pedestrians for signal warrant analysis.
5. Pedestrian volume counts should be taken on each crosswalk during the same periods as the vehicular counts and during the hours of highest pedestrian volume.
6. Quantify pedestrian delay time for at least two 30 minute peak pedestrian delay periods of an average weekday or like periods of a Saturday or Sunday.
7. The posted or statutory speed limit or the 85th-percentile speed on the uncontrolled approaches to the location should be noted.
8. The distance to the nearest traffic control signals should be noted.
9. Where feasible, note the queue length on stop-controlled approaches.
10. For signal warrant analysis, a location with a wide median (even if the median is greater than 30 feet) should be considered as one intersection.
11. For detailed guidance regarding the application of signal warrants refer to the California MUTCD 2012.

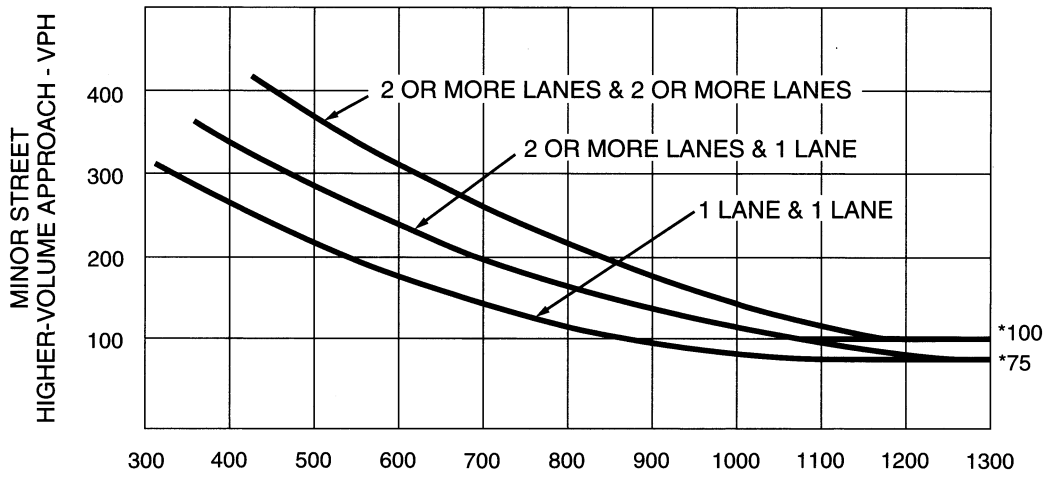
Figure 4C-3. Warrant 3, Peak Hour



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

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

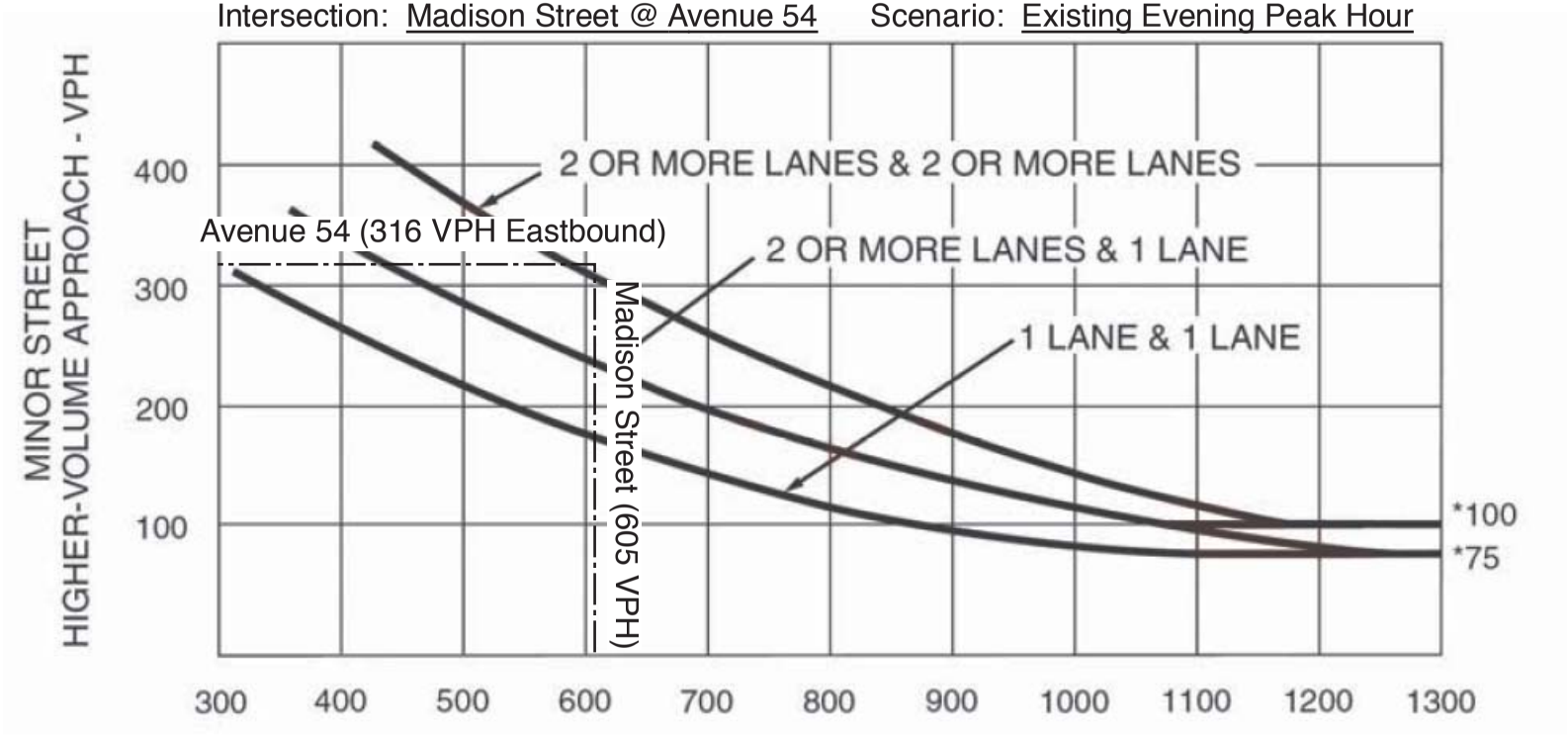
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

WARRANT 3, PEAK HOUR (70% FACTOR)
COMMUNITY LESS THAN 10,000 OR ABOVE 40 MPH ON MAJOR STREET

Intersection: Madison Street @ Avenue 54 Scenario: Existing Evening Peak Hour

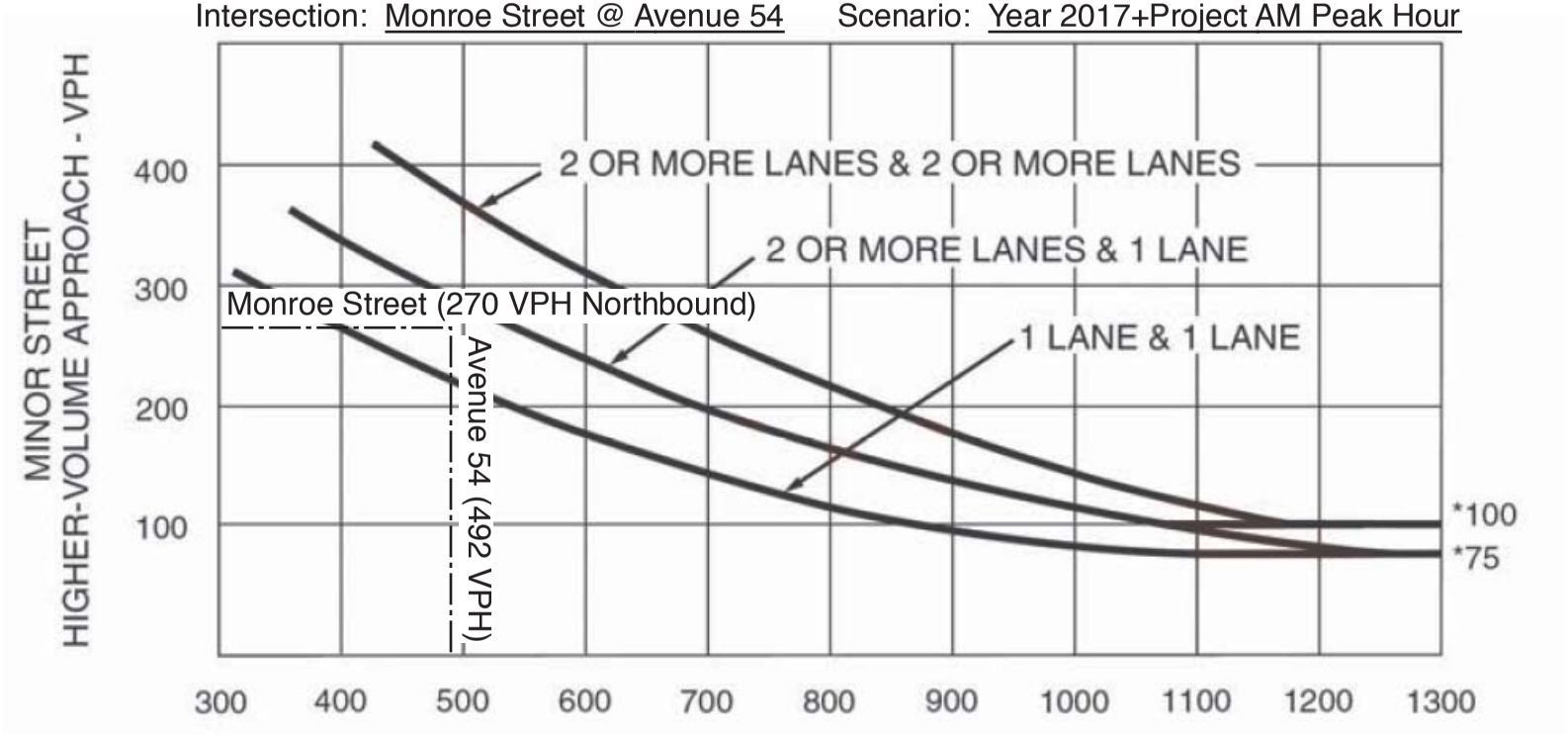


MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

WARRANT 3, PEAK HOUR (70% FACTOR)
COMMUNITY LESS THAN 10,000 OR ABOVE 40 MPH ON MAJOR STREET

Intersection: Monroe Street @ Avenue 54 Scenario: Year 2017+Project AM Peak Hour



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Peak Hour Volume Warrant

Intersection: Madison Street @ Avenue 54

Major Approach: 2 Lanes Minor Approach: 2 Lanes Rural Warrants

Approach	AM Pk Hr Existing	2017 Ambient	2017+ Project		PM Pk Hr Existing	2017 Ambient	2017+ Project
Northbound	297	364	365		430	549	553
Southbound	147	199	203		175	233	244
Eastbound	375	466	474		316	403	429
Meets 1-Hr. Warrant	No	Yes	Yes		Yes	Yes	Yes

Intersection: Monroe Street @ Avenue 54

Major Approach: 2 Lanes Minor Approach: 1 Lane Rural Warrants

Approach	AM Pk Hr Existing	2017 Ambient	2017+ Project		PM Pk Hr Existing	2017 Ambient	2017+ Project
Eastbound	167	208	221		223	275	284
Westbound	245	269	271		125	170	176
North/Southbound	210	268	270		162	226	227
Meets 1-Hr. Warrant	No	No	No		No	No	No

Intersection: Primary Site Access @ Avenue 54

Major Approach: 2 Lanes Minor Approach: 1 Lane Rural Warrants

Approach	AM Pk Hr	2017+ Project		PM Pk Hr	2017+ Project
Eastbound		252			260
Westbound		260			231
Northbound		9			7
Meets 1-Hr. Warrant		No			No

Intersection: Secondary Site Access @ Avenue 54

Major Approach: 2 Lanes Minor Approach: 1 Lane Rural Warrants

Approach	AM Pk Hr	2017+ Project		PM Pk Hr	2017+ Project
Eastbound		251			254
Westbound		232			222
Northbound		41			27
Meets 1-Hr. Warrant		No			No

Appendix EX

LIST OF ACRONYMS AND TRAFFIC GLOSSARY

List of Acronyms

AB	Assembly Bill
AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADT	Average Daily Traffic
APN	Assessor's Parcel Number
AVO	Average Vehicle Occupancy
AWSC	All-Way STOP Control
CA MUTCD	California Manual on Uniform Traffic Control Devices
CEQA	California Environmental Quality Act
CIP	Capital Improvement Program
CMA	Congestion Management Agency
CMP	Congestion Management Program
CVAG	Coachella Valley Association of Governments
DU	Dwelling Units
EB 06-13	Engineering Bulletin #06-13
FAR	Floor Area Ratio
GFA	Gross Floor Area
GLA	Gross Leasable Area
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
ITE	Institute of Transportation Engineers
LOS	Level of Service
MAL	Median Acceleration Lane
MPH	Miles per Hour
NEV	Neighborhood Electric Vehicle
PHF	Peak Hour Factor
RCTC	Riverside County Transportation Commission
RIVTAM	Riverside County Transportation Analysis Model
ROW	Right-Of-Way
RTP	Regional Transportation Plan
SCAG	Southern California Association of Governments
TAZ	Traffic Analysis Zone
TDM	Transportation Demand Management
TIP	Transportation Improvement Program
TPM	Tentative Parcel Map
TRB	Transportation Research Board
TSF	Thousand Square Feet
TSM	Transportation Systems Management
TTM	Tentative Tract Map
TWLTL	Two-Way Left-Turn Lane
TWSC	Two-Way STOP Control
V/C	Volume-to-Capacity
VMT	Vehicle Miles Traveled
VPD	Vehicles Per Day
VPH	Vehicles Per Hour

Appendix E - Traffic Glossary

Access point -- An intersection, driveway, or opening on the right-hand side of a roadway. An entry on the opposite side of a roadway or a median opening also can be considered as an access point if it is expected to influence traffic flow significantly in the direction of interest.

All-way stop controlled -- An intersection with stop signs at all approaches. The driver's decision to proceed is based on the rules of the road (e.g., the driver on the right has the right-of-way) and also on the traffic conditions of the other approaches.

Annual Average Daily Traffic (AADT) -- The total volume passing a point or segment of a highway facility in both directions for one year divided by the number of days in the year.

Average Daily Traffic (ADT) -- The total volume passing a point or segment of a highway facility in both directions on an average day during a specified interval (which can be the peak month or weekdays etc.).

Average Day -- A day representing traffic volumes normally and repeatedly found at a location, typically a weekday when volumes are influenced by employment or a weekend day when volumes are influenced by entertainment or recreation.

Approach -- All lanes of traffic moving towards an intersection of a midblock location from one direction including any adjacent parking lanes.

Arterial -- Signalized streets that serve primarily through traffic and provide access to abutting properties as a secondary function, having signal spacing of 2 miles or less and turn movements at intersections that usually do not exceed 20 percent of total traffic.

Average approach delay -- Average stopped-time delay at a signalized intersection plus average time lost because of deceleration to and acceleration from a stop, generally estimated as 1.3 times the average stopped time delay.

Average control delay -- the total time vehicles are stopped in an intersection approach during a specified time interval divided by the volume departing from the approach during the same time period. It does not include queue follow-up time (i.e. the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position).

Average stopped-time delay -- The total time vehicles are stopped in an intersection approach or lane group during a specified time interval divided by the volume departing from the approach or lane group during the same time period, in seconds per vehicle.

Average total delay -- The total additional travel time experienced by drivers, passengers, or pedestrians as a result of control measures and interaction with other users of the facility divided by the volume departing from the corresponding cross section of the facility.

AWSC intersection -- an all-way stop-controlled intersection, which can be a three-way stop if the intersection has only three legs or a four-way stop if the intersection has four legs.

Bike lane -- A portion of a roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicycles.

Bike path -- A bikeway physically separated from motorized traffic by an open space or barrier, either within the highway right-of-way or within an independent right-of-way.

Bikeway -- Any road, path, or way that in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicyclists or are to be shared with other vehicles.

Capacity -- The maximum rate of flow at which persons or vehicles can be reasonable expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic, and control conditions, usually expressed as vehicles per hour or persons per hour.

Clearance lost time -- The minimum possible time interval between the departure of one bus from a bus berth and the entrance of another.

Clearance time -- The time, in seconds, between signal phases during which an intersection is not used by any traffic.

Conflicting approach -- The approach at approximately 90 degrees to the subject approach at an all-way stop-controlled (AWSC) intersection.

Conflicting traffic volume -- The volume of traffic that conflicts with a specific movement at an unsignalized intersection.

Control delay -- The component of delay that results when a control signal causes a lane group to reduce speed or to stop; it is measured by comparison with the uncontrolled condition.

CMP -- Congestion Management Program, designed to ensure that a balanced transportation system is developed that relates population growth, traffic growth, and land use decisions to transportation system level of service performance standards to help reduce traffic congestion and improve air quality.

Constrained operation -- An operating condition in a weaving area in which, because of geometric constraints, weaving vehicles are unable to occupy as large a portion of available lanes as required to achieve balanced operation.

Critical gap -- The minimum time interval between vehicles in a major traffic stream that permits side-street vehicles in a stop-controlled approach to enter the intersection under prevailing traffic and roadway conditions, in seconds.

Critical lane group -- The lane groups that have the highest flow ratio for a given signal phase.

Critical volume-to-capacity ratio -- The proportion of available intersection capacity used by vehicles in critical lane groups.

Crosswalk -- That part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs (or in the absence of curbs, from the edges of the traversable roadway) and in the absence of a sidewalk on one side of the roadway, the part of a roadway included within the extension of the lateral lines of the sidewalk at right angles to the centerline. Any portion of a roadway at an intersection or elsewhere distinctly indicated as a pedestrian crossing by lines on the surface, which may be supplemented by a contrasting pavement texture, style or color.

Cycle -- Any complete sequence of signal indications.

Cycle length -- The total time required for one complete sequence of signal indications.

Deceleration lane -- A paved auxiliary lane, including tapered areas, allowing vehicles leaving the through-traffic lane of the roadway to decelerate.

Delay -- Additional travel time experienced by a driver, passenger, or pedestrian beyond what would reasonably be desired for a given trip.

Demand volume -- The traffic volume expected to desire service past a point or segment of the highway system at some future time, or the traffic currently arriving or desiring service past such a point, usually expressed as vehicles per hour.

Effective green time -- The time allocated for a given traffic movement (green plus yellow) at a signalized intersection less the start-up and clearance lost times for the movement.

Exclusive turn lane -- A designated left- or right-turn lane or lanes used only by vehicles making those turns.

Expressway -- An arterial which increases vehicular capacity by reducing at-grade access and increased signal spacing.

Flared approach -- A shared right-turn lane that allows right-turning vehicles to complete their movement while other vehicles are occupying the lane.

Free flow speed -- (1) The theoretical speed of traffic when density is zero, that is, when no vehicles are present; (2) the average speed of vehicles over an arterial segment not close to signalized intersections under conditions of low volume.

Gap acceptance -- The process by which a minor-street vehicle accepts an available gap to maneuver.

Green time -- The actual length of the green indication for a given movement at a signalized intersection.

HCM -- Highway Capacity Manual

HCS -- Highway Capacity Software implementing the Highway Capacity Manual procedures.

Ideal conditions-- Characteristics for a given type of facility that are assumed to be the best possible from the point of view of capacity, that is, characteristics that if further improved would not result increased capacity.

Intersection -- The area embraced within the prolongation or connection of the lateral curb lines, or if none the lateral boundary lines of the roadways of two highways that join one another at, or approximately at right angles, or the area within which vehicles traveling on different highways that join at any other angle might come into conflict. The junction of an alley or driveway with a roadway or highway does not constitute an intersection.

Intersection delay -- The total additional travel time experienced by drivers, passengers, or pedestrians as a result of control measures and interaction with other users of the facility, divided by the volume departing from the corresponding cross section of the facility.

Interval -- The part of a signal cycle during which signal indications do not change.

Level of service (LOS) -- A qualitative measure describing operational conditions within a traffic stream, generally described in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

Lost time -- The time during which the intersection is not effectively used by any movement. Clearance lost time plus start-up lost time.

Major street -- The street not controlled by stop signs at a two-way stop-controlled intersection. The street normally carrying the higher volume of vehicular traffic.

Maximum service flow rate -- The highest 15-minute rate of flow that can be accommodated on a highway facility under ideal conditions while maintaining the operating characteristics for a stated level of service, expressed as passenger cars per hour per lane.

Minor Street -- The street controlled by stop signs at a two-way stop-controlled intersection; also referred to as a side street. The street normally carrying the lower volume of vehicular traffic.

Passenger car equivalent -- The number of passenger cars that are displaced by a single heavy vehicle of a particular type under prevailing roadway, traffic, and control conditions.

Peak hour -- The hour during which the greatest number of vehicles are traveling on a given facility.

Peak hour factor -- The hourly volume during the maximum volume hour of the day divided by the peak 15-minute rate of flow within the peak hour; a measure of traffic demand fluctuation within the peak hour.

Pedestrian Clearance Time -- The time provided for a pedestrian crossing in a crosswalk, after leaving the curb or shoulder, to travel to the far side of the traveled way or to a median.

Performance measure -- A quantitative or qualitative characteristic describing the quality of service provided by a transportation facility or service.

Permitted plus protected -- Compound left-turn protection that displays the permitted phase before the protected phase.

Permitted turns -- Left or right turns at a signalized intersection that are made against an opposing or conflicting vehicular or pedestrian flow.

Phase -- The part of a signal cycle allocated to any combination of traffic movements receiving the right-of-way simultaneously during one or more intervals.

Planning analysis -- A use of capacity analysis procedures to estimate the number of lanes required by a facility in order to provide for a specified level of service based on approximate and general planning data in the early stages of project development.

Platoon -- A group of vehicles or pedestrians traveling together as a group, either voluntarily or involuntarily because of signal control, geometrics, or other factors.

Platoon -- A group of vehicles or pedestrians traveling together as a group, either voluntarily or involuntarily, because of traffic signal controls, geometrics, or other factors.

Protected turns -- Left or right turns at a signalized intersection made with no opposing or conflicting vehicular or pedestrian flow.

Queue -- A line of vehicles or persons waiting to be served by the system in which the rate of low from the front of the queue determines the average speed within the queue. Slowly moving vehicles or people joining the rear of the queue are usually considered a part of the queue. The internal queue dynamics may involve a series of starts and stops. A faster-moving line of vehicles is often referred to as a moving queue or a platoon.

Red Clearance Interval -- An optional interval that follows a yellow change interval and precedes the next conflicting green interval.

Right-of-Way Assignment -- The permitting of vehicles and/or pedestrians to proceed in a lawful manner in preference to other vehicles or pedestrians by the display of signal indications.

Roadway Network -- A geographical arrangement of intersecting roadways.

RTIP -- Regional Transportation Improvement Program is a list of transportation projects, their costs and projected funding sources, and their anticipated date of completion.

RTP -- Regional Transportation Plan is a plan adopted for the region's transit, highways, bicycle programs, commuter and inter-city rail lines.

Shared lane capacity -- The capacity of a lane at an unsignalized intersection that is shared by two or three movements, in passenger cars per hour.

Signal Coordination -- The establishment of timed relationships between adjacent traffic control signals.

Signal Phase -- the right-of-way, yellow change, and red clearance intervals in a cycle that are assigned to an independent traffic movement or combination of movements.

Signal System -- two or more traffic control signals operating in signal coordination.

Signal Timing -- the amount of time allocated for the display of a signal indication.

Signal Warrant -- a threshold condition that, if found to be satisfied as part of an engineering study, shall result in analysis of other traffic conditions or factors to determine whether a traffic control signal or other improvement is justified.

TDM -- Transportation Demand Management is a program designed to decrease the demand for peak hour commute and truck travel and increase the use of alternative transportation modes.

TIS -- Traffic Impact Study A Congestion Management Program (TIS) analysis is required for all large projects.

Total delay -- The sum of all components of delay for any lane group, including control delay, traffic delay, geometric delay, and incident delay.

Trip-end -- one end of a trip at either the origin or the destination; i.e. each trip has two trip-ends.

Traffic -- pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances either singularly or together while using any highway for purposes of travel.

Traffic Control Signal -- any highway traffic signal by which traffic is alternately directed to stop and permitted to proceed.

Travel speed -- The average speed, in miles per hour, of a traffic stream computed as the length of a highway segment divided by the average travel time of the vehicles traversing the segment.

Travel time -- The average time spent by vehicles traversing a highway segment, including control delay, in seconds per vehicle or minutes per vehicle.

TSM -- Transportation Systems Management is a program to facilitate low cost traffic flow improvements like coordinating traffic signals, metering freeway ramps and incident management.

Two-way left-turn lane (TWLTL) -- The center lane on a three-lane or multi-lane highway that is used continuously for vehicles turning left in either direction of flow at mid-block locations.

Two-way stop-controlled -- The type of traffic control at an intersection where drivers on the minor street or a driver turning left from the major street wait for a gap in the major-street traffic to complete a maneuver.

Unconstrained Operation -- An operating condition in a weaving area where geometric constraints do not limit the ability of weaving vehicles to achieve balanced operation.

Unsignalized intersection -- Any intersection not controlled by traffic signals.

V/C ratio -- The ratio of demand flow rate to capacity for a traffic facility.

Volume -- The number of persons or vehicles passing a point on a lane, roadway, sidewalk etc. during some time interval, often taken to be one hour, expressed in vehicles.

VMT -- Vehicle miles traveled.

Yellow Change Interval -- the first interval following the green interval during which the yellow signal indication is displayed.