

TRAFFIC IMPACT ANALYSIS
FOR
GREEN VALLEY SELF STORAGE – COMMERCIAL
El Dorado County CA

Prepared For:

GRANITE REALTY GROUP
4120 Douglas Blvd, #306-473
Roseville, CA 95746

Prepared By:

KDAnderson & Associates, Inc.
3853 Taylor Road, Suite G
Loomis, California 95650
(916) 660-1555



November 30, 2018

3509-01

0 Green Valley Self Storage-Commercial TIA.rpt

**TRAFFIC IMPACT ANALYSIS FOR
GREEN VALLEY SELF STORAGE – COMMERCIAL
El Dorado County**

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
INTRODUCTION.....	1
Study Purpose and Objectives	1
Project Description.....	2
EXISTING SETTING	7
Study Area	7
Study Area Roadways and Intersections.....	7
Analysis Criteria	8
Public Transit.....	15
Non-Motorized Transportation	15
Existing Traffic Operating Conditions.....	16
PROJECT CHARACTERISTICS	20
Trip Generation.....	20
Trip Distribution & Assignment	24
PROJECT TRAFFIC IMPACTS.....	26
Existing Plus Self-Storage Project Conditions.....	26
Existing Plus Commercial Project Conditions.....	31
CUMULATIVE IMPACTS (2040).....	36
Year 2040 Forecasts / Conditions	36
2040 Cumulative Less Self-Storage Project	36
2040 Cumulative Less Commercial Project.....	41
2040 Including Self-Storage and Commercial Projects.....	45
ON-SITE TRANSPORTATION REVIEW	49
FINDINGS / RECOMMENDATIONS / MITIGATIONS	56
REFERENCES.....	62
APPENDIX.....	63

**TRAFFIC IMPACT ANALYSIS FOR
GREEN VALLEY SELF STORAGE – COMMERCIAL**
El Dorado Hills, El Dorado County

EXECUTIVE SUMMARY

- **Project Description.** Two projects are proposed in the southeast quadrant of the Green Valley Road / Sophia Parkway intersection. One project, the Sophia Parkway Commercial site is located in the southwest quadrant of the Green Valley Road / Sophia Parkway intersection and consists of mixed-use retail land uses. The second project bordering the retail site and Shadowfax Lane along Green Valley Road includes a self-storage facility. Two alternative site layouts were considered and include:

Alternative #1

Sophia Parkway Commercial Site

- Retail – 14,400 square feet
- Fast Casual Restaurant – 1,800 square feet
- High Turnover (sit-down) Restaurant – 5,000 square feet
- Fast Food with Drive-Through – 2,270 square feet

Self-Storage Site

- Mini-Warehouse (Self-Storage) – 147,600 square feet
- Smog Shop – 1,300 square feet

Alternative #2

Sophia Parkway Commercial Site

- Automated Car Wash – 4,200 square feet (1 tunnel)
- Fast Casual Restaurant – 1,800 square feet
- High Turnover (sit-down) Restaurant – 5,000 square feet
- Fast Food with Drive-Through – 2,270 square feet
- Smog Shop – 1,800 square feet

Self-Storage Site

- Mini-Warehouse (Self-Storage) – 149,500 square feet

Alternative #1 was found to generate the highest a.m. and p.m. peak hour trips and was studied to provide a conservative evaluation of the potential impacts. The self-storage site is projected to generate approximately 18 a.m. peak hour trips and 29 p.m. peak hour trips. After accounting for pass-by trips the site will generate 16 new a.m. peak hour trips and 26 new p.m. peak hour trips. The commercial site is projected to generate approximately 158 a.m. peak hour trips and 278 p.m. peak hour trips. After accounting for internal and pass-by trips the site will generate 106 new a.m. peak hour trips and 155 new p.m. peak hour trips.

Access to the site will be from right-in, right-out driveways along Green Valley Road and Sophia Parkway. Both parcels intend to have a reciprocal access agreement that will allow passage between the parcels and the driveways. The self-storage site also intends to have an emergency vehicle access driveway in the southwest corner of the site, with access via Shadowfax Lane.

The traffic study included the following analysis scenarios as directed by County staff:

1. Existing Traffic Conditions
 2. Existing Plus Project Conditions for Sophia Parkway Commercial
 3. Existing Plus Project Conditions for Self-Storage
 4. 2040 No Project for Sophia Parkway Commercial (assumes Self-Storage site is built in the Cumulative condition)
 5. 2040 No Project for Self-Storage (assumes Sophia Parkway Commercial site is built in the Cumulative condition)
 6. 2040 plus Projects (includes Sophia Parkway Commercial and Self-Storage)
- **Existing Setting.** The study areas addressed traffic conditions at six existing intersections. New traffic counts were completed in August 2018 when school was in session.

Intersections

All intersections, except the Green Valley Road / Shadowfax Lane intersection operate within acceptable El Dorado County and City of Folsom LOS thresholds.

- Green Valley Road / Shadowfax Lane: The northbound approach of the intersection operates at LOS F in both a.m. and p.m. peak hours. The street has minimal traffic volumes and does not meet the peak hour signal warrant.

Queues

Under current conditions three movements have queues that exceed the available storage. These include:

Green Valley Road / Francisco Drive

- NB left turn
- EB left turn
- WB left turn

The westbound left turn lane at this intersection exceeds the available storage length by less than 25 feet and it is assumed that a vehicle would be able to queue in the left turn taper.

Roadway Segments

All roadway segments will operate within the County level of service threshold, at LOS E or better.

KDA

- **Existing Plus Self-Storage Project Impacts.** The operation of the proposed project will increase the volume of traffic on the study area circulation system.

Intersections

All intersections, except the Green Valley Road / Shadowfax Lane intersection operate within acceptable El Dorado County and City of Folsom LOS thresholds. The following mitigations are noted:

- Green Valley Road / Shadowfax Lane: The northbound approach of the intersection operates at LOS F in both a.m. and p.m. peak hours. The street has minimal traffic volumes and does not meet the peak hour signal warrant. The project will add more than 10 trips to the intersection along Green Valley Road in the p.m. peak hour but will not meet the peak hour signal warrant. Since the signal warrant is not met, this is not considered a significant impact.
- The project shall contribute its fair share to the cost of regional circulation improvements via the existing countywide traffic impact mitigation (TIM) fee program.
- The project should construct the following improvements:
 - o Add an exclusive right turn lane along Green Valley Road between Shadowfax Lane and the project driveway. This will allow turning vehicles to exit from the through lanes along Green Valley Road. With the commercial project completed this will become a right-only lane between Shadowfax Lane and Sophia Parkway.
 - o Sidewalk should be installed along the project frontage on Green Valley Road.
- The following on-site mitigations should be constructed:
 - o Landscaping adjacent to the driveway should be limited to vegetation no higher than 2 feet to provide visibility to see oncoming traffic along eastbound Green Valley Road.

Queues

Under Existing plus Self-Storage Project conditions four movements have queues that exceed the available storage. These include:

Green Valley Road / Sophia Parkway

- WB left turn

Green Valley Road / Francisco Drive

- NB left turn
- EB left turn
- WB left turn

The queue in the westbound left turn lane approaching Sophia Parkway will extend to 321 feet, 6 feet longer than the marked turn lane. Since the left turn lane transitions into a TWLTL this will allow the queue to store without blocking through traffic. The queues will increase at the Green Valley Road / Francisco Road intersection by up to 6 feet with the westbound left turn queue able to queue in the left turn taper.

KDA

Roadway Segments

All roadway segments will operate within the County level of service threshold, at LOS E or better.

- **Existing Plus Commercial Project Impacts.**

Intersections

All intersections, except the Green Valley Road / Shadowfax Lane intersection operate within acceptable El Dorado County and City of Folsom LOS thresholds. The following mitigations are noted:

- Green Valley Road / Shadowfax Lane: The northbound approach of the intersection will operate at LOS F in both a.m. and p.m. peak hours. The street has minimal traffic volumes and does not meet the peak hour signal warrant. The project will add more than 10 trips to the intersection along Green Valley Road in the p.m. peak hour but will not meet the peak hour signal warrant. Since the signal warrant is not met, this is not considered a significant impact.
- Green Valley Road / Project Driveway: The driveway approach will operate at LOS F in the p.m. peak hour. The intersection will not meet the peak hour signal warrant. Since the signal warrant is not met, this is not considered a significant impact.
- The project shall contribute its fair share to the cost of regional circulation improvements via the existing countywide traffic impact mitigation (TIM) fee program.
- The project should construct the following improvements:
 - o Add an exclusive right turn lane along Green Valley Road between the project driveway and Sophia Parkway. This will allow vehicles to accelerate into through traffic lanes. With the self-storage project completed this will become a right-only lane between Shadowfax Lane and Sophia Parkway.
 - o Sidewalk should be installed along the project frontage on Green Valley Road.
 - o Parking should be prohibited along the Sophia Parkway project frontage to maximize sight distance at the project driveway.
- The following on-site mitigations should be constructed:
 - o Landscaping adjacent to the drive-through entrance should be limited to vegetation no higher than 2 feet to provide visibility for traffic near the Sophia Parkway driveway;
 - o Landscaping adjacent to the drive-through exit should be limited to vegetation no higher than 2 feet to maintain visibility for exiting vehicles;
 - o Install a stop sign with limit line at the drive-through exit;
 - o Delivery truck access should be limited to off-hours to minimize disruption of traffic circulation.

Queues

Under Existing plus Commercial Project conditions four movements have queues that exceed the available storage. These include:

Green Valley Road / Sophia Parkway

- WB left turn

Green Valley Road / Francisco Drive

- NB left turn
- EB left turn
- WB left turn

The queue in the westbound left turn lane approaching Sophia Parkway will extend to 398 feet. However, the left turn lane transitions into a TWLTL that extends about 300 feet before approaching Amy’s Lane. The TWLTL will allow the queue to store without blocking through traffic or westbound traffic from Amy’s Lane. The queues will increase at the Green Valley Road / Francisco Road intersection by up to 6 feet with the westbound left turn queue able to queue in the left turn taper. These queues are not significant impacts.

Roadway Segments

The Green Valley Road segment will operate at LOS F in both eastbound and westbound directions. Mitigation will require addition of second lanes in both directions. The City of Folsom recently received bids to widen Green Valley Road between E. Natoma Street and Sophia Parkway. This project will improve the roadway segments to LOS B or better. As the project is imminent this is not considered significant.

- **Year 2040 Background Conditions.** Year 2040 traffic forecasts were based on the most recent Countywide traffic model. The proposed land uses are consistent with the land uses contained in the County’s Travel Demand Model (TDM). The study intersection approaches were balanced using the difference method. Turning movements were then developed using the techniques described in NCHRP Report 255 (Furness factoring). These forecasts represent projected Cumulative 2040 turning movement volumes at each of the study intersections and along the roadway segments. Roadways in 2040 are generally projected to remain with their current lane configurations except for the following modifications:
 - Green Valley Road from the E. Natoma Street to Sophia Parkway will be widened to a four-lane undivided highway. Bids closed for the project on October 19, 2018.
 - The City of Folsom is planning to reconfigure the northbound approach on Blue Ravine Road from two left turn lanes, two through lanes and two right turn lanes to two left turn lanes, three through lanes and one right turn lane.
- **2040 Cumulative Less Self-Storage Project Conditions.** This scenario assumes the Commercial site is built. Self-Storage project volumes were deducted from the Cumulative volumes.

KDA

Intersections

All intersections, except the Green Valley Road / Shadowfax Lane intersection operates within acceptable El Dorado County and City of Folsom LOS thresholds.

Green Valley Road / Shadowfax Lane: The northbound approach of the intersection operates at LOS F in both a.m. and p.m. peak hours. The street has minimal traffic volumes and does not meet the peak hour signal warrant.

Queues

Under 2040 less Self-Storage conditions three movements have queues that exceed the available storage. These include:

Green Valley Road / Francisco Drive

- NB left turn
- EB left turn
- WB left turn

The northbound and westbound left turn lanes at this intersection exceed the available storage length by less than 25 feet and it is expected that a vehicle would be able to queue in the left turn tapers of each approach. The eastbound left turn lane will exceed the available turn lanes by 112 feet.

Roadway Segments

All roadway segments will operate within the County level of service threshold, at LOS D or better.

- **2040 Cumulative Less Commercial Project Conditions.** This scenario assumes the Self-Storage site is built. Commercial project volumes were deducted from the Cumulative volumes.

Intersections

All intersections, except the Green Valley Road / Shadowfax Lane intersection operates within acceptable El Dorado County and City of Folsom LOS thresholds.

Green Valley Road / Shadowfax Lane: The northbound approach of the intersection operates at LOS F in both a.m. and p.m. peak hours. The street has minimal traffic volumes and does not meet the peak hour signal warrant.

Queues

Under 2040 less Commercial conditions three movements have queues that exceed the available storage. These include:

Green Valley Road / Francisco Drive

- NB left turn
- EB left turn
- WB left turn

The northbound and westbound left turn lanes at this intersection exceed the available storage length by less than 25 feet and it is expected that a vehicle would be able to queue in the left turn tapers of each approach. The eastbound left turn lane will exceed the available turn lanes by 103 feet.

Roadway Segments

All roadway segments will operate within the County level of service threshold, at LOS D or better.

• **2040 Cumulative Conditions Impacts.**

Intersections

All intersections, except the Green Valley Road / Shadowfax Lane intersection operate within acceptable El Dorado County and City of Folsom LOS thresholds.

- Green Valley Road / Shadowfax Lane: The northbound approach of the intersection will operate at LOS F in both a.m. and p.m. peak hours. The street has minimal traffic volumes and does not meet the peak hour signal warrant. The projects will add more than 10 trips to the intersection along Green Valley Road in both peak periods, but the intersection will not meet the peak hour signal warrant. Since the signal warrant is not met, this is not considered a significant impact.

Queues

Under Cumulative 2040 conditions three movements have queues that will exceed the available storage. These are identified below.

Green Valley Road / Francisco Drive

- NB left turn
- EB left turn
- WB left turn

The northbound left turn lanes are projected have queues of up to 238 feet in the p.m. peak hour. This is 7 feet longer than the projected queue under Cumulative less Self-Storage and 2 feet longer than the projected queue under Cumulative less Commercial scenarios. All three scenarios will have queues that exceed the existing turn lane by less than 25 feet. It is expected that a vehicle would be able to queue in the left turn taper. No mitigations are necessary.

The westbound left turn lanes are projected have queues of up to 217 feet in the p.m. peak hour. This is the same distance for all three study scenarios. The queue exceeds the existing turn lane by 17 feet. It is expected that a vehicle would be able to queue in the left turn taper. No mitigations are necessary.

The eastbound left turn lanes are projected to have queues of up to 410 feet in the p.m. peak hour. This is 12 feet longer than the projected queue under Cumulative less Self-Storage and 3 feet longer than the projected queue under Cumulative less Commercial scenarios. All three scenarios will have queues that exceed the existing turn lane by over 100 feet. As the relative impact of both projects is less than 25 feet this is not considered a significant impact.

Roadway Segments

All roadway segments will continue to operate within the County level of service threshold, at LOS D or better.

KDA

**TRAFFIC IMPACT ANALYSIS FOR
GREEN VALLEY SELF STORAGE – COMMERCIAL PROJECTS**
El Dorado Hills, El Dorado County

INTRODUCTION

Study Purpose and Objectives

This study evaluates the traffic impacts associated with the construction of two projects along Green Valley Road adjacent to the El Dorado County / Sacramento County line. One project, the Sophia Parkway Commercial site is located in the southwest quadrant of the Green Valley Road / Sophia Parkway intersection and consists of mixed-use retail land uses. The second project bordering the retail site and Shadowfax Lane along Green Valley Road includes a self-storage facility. Two alternative site layouts were considered with the alternative analyzed generating the highest a.m. and p.m. peak hours. The alternatives studied include:

Alternative #1

Sophia Parkway Commercial Site

- Retail – 14,400 square feet
- Fast Casual Restaurant – 1,800 square feet
- High Turnover (sit-down) Restaurant – 5,000 square feet
- Fast Food with Drive-Through - 2,270 square feet

Self-Storage Site

- Mini-Warehouse (Self-Storage) – 147,600 square feet
- Smog Shop – 1,300 square feet

Alternative #2

Sophia Parkway Commercial Site

- Automated Car Wash – 4,200 square feet (1 tunnel)
- Fast Casual Restaurant – 1,800 square feet
- High Turnover (sit-down) Restaurant – 5,000 square feet
- Fast Food with Drive-Through - 2,270 square feet
- Smog Shop – 1,800 square feet

Self-Storage Site

- Mini-Warehouse (Self-Storage) – 149,500 square feet

The scope of this traffic analysis has been identified through consideration of El Dorado County traffic study guidelines in consultation with El Dorado County Department of Transportation (DOT). Based on direction from DOT this study addresses the following scenarios:

1. Existing Traffic Conditions
2. Existing Plus Project Conditions for Sophia Parkway Commercial
3. Existing Plus Project Conditions for Self-Storage
4. 2040 No Project for Sophia Parkway Commercial (assumes Self-Storage site is built in the Cumulative condition)
5. 2040 No Project for Self-Storage (assumes Sophia Parkway Commercial site is built in the Cumulative condition)
6. 2040 plus Projects (includes Sophia Parkway Commercial and Self-Storage)

The objective of this study is to identify those roads and street intersections that may be impacted by development of each project based on El Dorado County significance criteria. Figure 1 presents a map of the vicinity with both projects identified.

Project Description

The applicant intends to construct two projects on adjacent parcels on property in the southwest quadrant of the Green valley Road / Sophia Parkway intersection. One parcel, abutting both Green Valley Road and Sophia Parkway is identified for commercial land uses. The second parcel abuts Green Valley Road and Shadowfax Lane directly west of the commercial parcel. Both sites are considering alternative uses. The proposed alternatives are proposed:

Alternative #1

Sophia Parkway Commercial Site

- Retail – 14,400 square feet
- Fast Casual Restaurant – 1,800 square feet
- High Turnover (sit-down) Restaurant – 5,000 square feet
- Fast Food with Drive-Through – 2,270 square feet

Self-Storage Site

- Mini-Warehouse (Self-Storage) – 147,600 square feet
- Smog Shop – 1,300 square feet

Alternative #2

Sophia Parkway Commercial Site

- Automated Car Wash – 4,200 square feet (1 tunnel)
- Fast Casual Restaurant – 1,800 square feet
- High Turnover (sit-down) Restaurant – 5,000 square feet
- Fast Food with Drive-Through – 2,270 square feet
- Smog Shop – 1,800 square feet

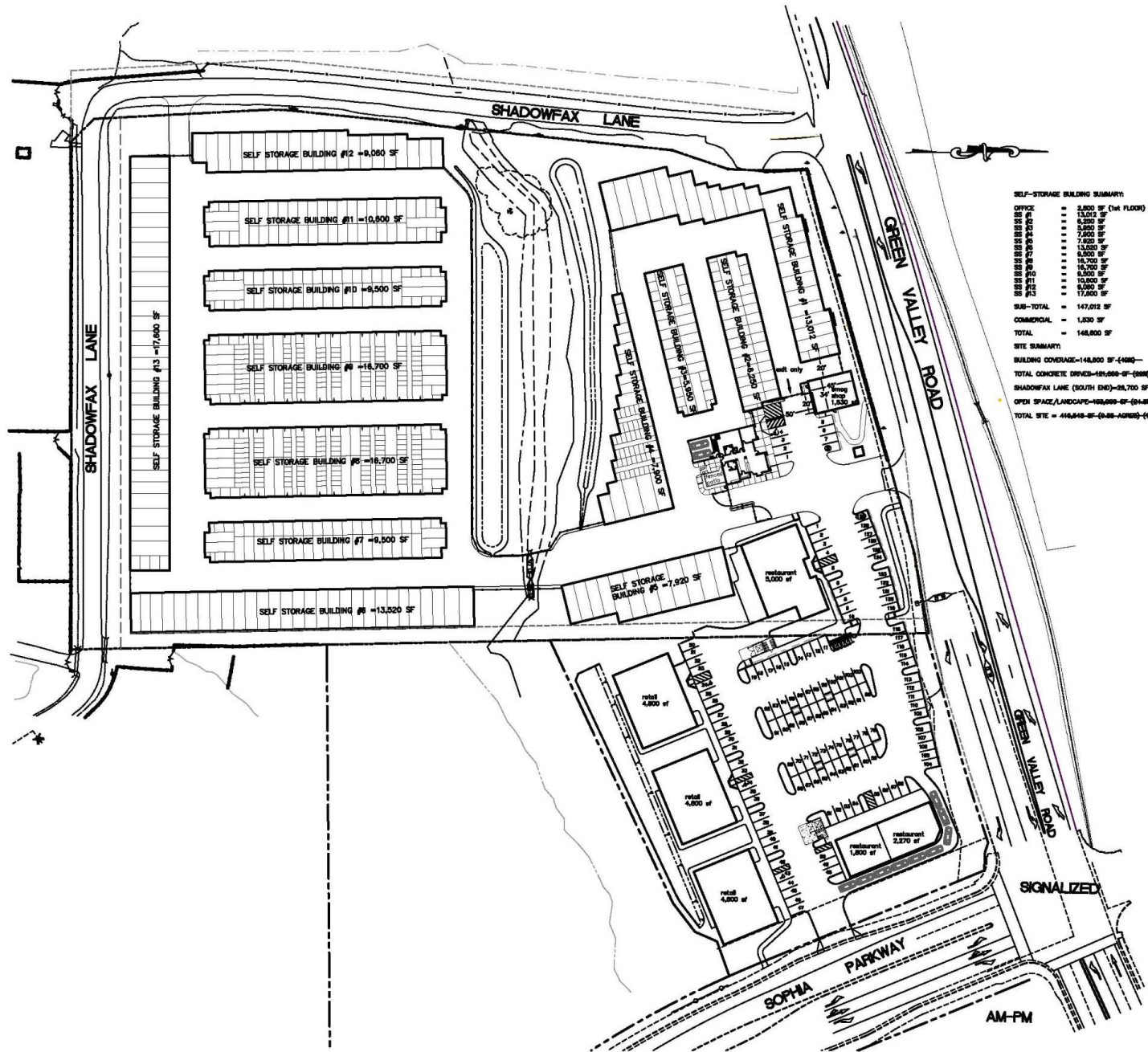
Self-Storage Site

- Mini-Warehouse (Self-Storage) – 149,500 square feet



VICINITY MAP

Access - Under both alternatives a reciprocal access easement is proposed to allow access from both sites onto Green Valley Road and Sophia Parkway. Project driveways along these streets will include right-in, right-out only movements. The Self-Storage site will also have an emergency vehicle access along Shadowfax in the southwest corner of the site. Figure 2A illustrates Alternative #1 with the proposed access locations while Figure 2B illustrates Alternative #2.



SELF-STORAGE BUILDING SUMMARY:

OFFICE	2,800 SF (1st FLOOR)
OFFICE	13,012 SF
OFFICE	6,208 SF
OFFICE	9,900 SF
OFFICE	7,900 SF
OFFICE	7,900 SF
OFFICE	13,000 SF
OFFICE	8,500 SF
OFFICE	18,700 SF
OFFICE	8,900 SF
OFFICE	10,800 SF
OFFICE	6,900 SF
OFFICE	17,800 SF
SUB-TOTAL	147,012 SF
COMMERCIAL	1,830 SF
TOTAL	148,800 SF

SITE SUMMARY:

- BUILDING COVERAGE-148,800 SF-(148%)
- TOTAL CONCRETE DRIVE-191,000 SF-(68%)
- SHADOWFAX LANE (SOUTH DED)-28,700 SF (I)
- OPEN SPACE/LANDSCAPE-102,000 SF-(64.4%)
- TOTAL SITE = 446,600 SF-(6.88-AG200)-(V08)

EXISTING SETTING

Study Area

This study addresses traffic conditions at six intersections in the western El Dorado County / City of Folsom area. The text that follows describes the facilities included in this analysis. The quality of traffic flow is typically governed by the operation of major intersections and the daily volume of traffic along the roadways. The study locations include:

Study Area Roadways and Intersections

Green Valley Road is an arterial roadway that extends from the City of Folsom in Sacramento County through the Sophia Parkway intersection beyond the El Dorado Hills area to its terminus at the Placerville Drive / Ray Lawyer Drive intersection in Placerville. Generally the eastern segment of Green Valley Road is a two lane rural highway, and the mile of Green Valley Road west of the Sacramento County line into the City of Folsom is also two lanes. Green Valley Road has been widened to a four lane width for approximately 1½ miles in the area starting just east of the Sacramento County line, past the project site to a point roughly 1,000 feet east of the Francisco Drive intersection. The posted speed limit on Green Valley Road in the immediate area of the project is 50 mph, and on-street parking is not allowed. Bid close of the City of Folsom's project to widen the remainder of Green Valley Road from the County line to E. Natoma Street occurred October 19, 2018.

Sophia Parkway is an Arterial street that extends south from its intersection on Green Valley Road for about 4 miles along the Sacramento County – El Dorado County line to its current terminus on Iron Pointe Road north of US 50. The southern portion of this route in Sacramento County is named Empire Ranch Road. In the area of the project Sophia Parkway is a divided two lane road. On-street parking is permitted on Sophia Parkway, and the posted speed limit in the immediate vicinity of the project is 50 mph.

The **Green Valley Road / Blue Ravine Road / E. Natoma Street intersection** is located within the City of Folsom, west of the project site. This intersection provides access between El Dorado Hills and the City of Folsom in Sacramento County. It is the first signalized intersection entering the City of Folsom from El Dorado County and is located about 1¼ miles from the site. Green Valley Road approaches the intersection from the north and includes two left turn lanes, three through lanes and a free right turn lane. The road changes name at the intersection to Blue Ravine Road on the south. The Blue Ravine Road approach includes two left turn lanes, two through lanes and two right turn lanes. East Natoma Street is the east-west street and consists of two left turn lanes, two through lanes and a right turn lane on both approaches.

The **Green Valley Road / Shadowfax Lane intersection** is located about 750 feet west of the Sophia Parkway intersection. It is located just east of the Sacramento – El Dorado County line. The intersection is a tee intersection and includes one through lane in each direction along Green

KDA

Valley Road; a left turn lane is present for westbound traffic. Shadowfax Lane is stop controlled with a single lane for traffic entering Green Valley Road.

The **Green Valley Road / Sophia Parkway intersection** provides access between El Dorado Hills and the City of Folsom in Sacramento County. This intersection is the last major intersection prior to entering Sacramento County. The eastbound Green Valley Road approach includes a protected left turn lane, two through lanes and a right turn lane. The westbound approach includes a left turn lane, a through lane and a shared through-right turn lane. The three lane Sophia Parkway approach includes a left lane, a left-through lane and a right only lane; the opposing single lane approach provides access to the Folsom Lake State Recreation Area (SRA). These approaches include a split phase signal while the Green Valley Road approach includes protected left turns.

The **Green Valley Road / Francisco Drive intersection** provides access to the north side of El Dorado Hills. The intersection is signalized and provides dual left turn lanes in the eastbound direction along Green Valley Road; the opposing westbound left is a single left turn lane. Both approaches include two through lanes and a right turn lane. Northbound Francisco Drive includes dual left turn lanes, a through lane and a shared through-right lane while the southbound approach includes left, through and right lanes. The intersection operates with protected left turns on all approaches.

The **Sophia Parkway / Elmores Way intersection** provides access between Green Valley Road and East Natoma Street in Folsom. The intersection is all-way stop controlled. Sophia Parkway consists of left turn lanes and shared through-right lanes in both north and southbound directions. Elmores Way includes a shared left-through-right lane along the eastbound approach and a shared left-through lane and a right only lane along the westbound approach.

The **Francisco Drive / El Dorado Hills Blvd intersection** provides access between US 50 and Green Valley Road. The intersection is all-way stop controlled; however, a free right turn exists for eastbound Francisco Drive to southbound El Dorado Hills Blvd. Eastbound Francisco Drive also includes a shared through-left lane. Westbound Francisco Drive includes a single shared left-through-right lane. El Dorado Hills Blvd includes left turn lanes and a shared through-right lane along both northbound and eastbound approaches.

The **Sophia Parkway / Melina Drive-Alexander Drive intersection** is located south of Elmores Way. The intersection is all-way stop controlled. Sophia Parkway consists of left turn lanes and shared through-right lanes in both north and southbound directions. Melina Drive includes a shared left-through-right lane along its eastbound approach while westbound Alexander Drive includes a left lane and a shared through-right lane.

Analysis Criteria

Level of Service Methodology. *Level of Service Analysis* has been employed to provide a basis for describing existing traffic conditions and for evaluating the significance of project traffic

impacts. Level of Service measures the *quality* of traffic flow and is represented by letter designations from "A" to "F", with a grade of "A" referring to the best conditions, and "F" representing the worst conditions. The guidelines and analyses used for this report follow El Dorado County standards.

Local agencies adopt minimum Level of Service standards for their facilities. The analysis techniques presented in the *Highway Capacity Manual 6th Edition* were used to calculate Level of Service and to provide a basis for describing existing traffic conditions and evaluating the significance of project traffic impacts.

Intersections. Various software programs have been developed to assist in calculating intersection Level of Service, and the level of sophistication of each program responds to factors that affect the overall flow of traffic. Synchro software was used for intersection analysis for this analysis.

The intersection Levels of Service presented in this analysis are based on the weighted average total delay per vehicle for the intersection as a whole at signalized intersections and at locations controlled by all-way stops. The average delay experienced by motorists yielding the right of way is the basis for identification of Level of Service at locations controlled by side street stop signs. Applicable Level of Service thresholds based on average delay are shown in Table 1.

El Dorado County Intersection Thresholds of Significance. El Dorado County identifies LOS 'E' as the acceptable Level of Service on roadways and state highways within the unincorporated areas of the County in the Community Regions and LOS D in the Rural Centers and Rural Regions except as specified in the General Plan.

A traffic impact is considered to be significant under El Dorado County guidelines if the project causes an intersection to change from LOS E to LOS F. Worsening of conditions at facilities already operating at unacceptable levels of service is also considered a significant impact. The County's General Plan Policy TC-Xe defines worsen as any of the following conditions:

- a. a 2% increase in traffic during the a.m. peak hour, p.m. peak hour or daily trips, or
- b. the addition of 100 or more daily trips, or
- c. the addition of 10 or more trips during the a.m. peak hour or the p.m. peak hour.

The County's current General Plan Policy TC-Xf notes that for all residential subdivisions of five or more parcels that worsens traffic on a County road as defined in Policies TC-Xe [A], [B] or [C] "the County shall condition the project to construct all road improvements necessary to maintain or attain Level of Service standards detailed in this Transportation and Circulation Element based on existing traffic plus traffic generated from the development plus forecasted traffic growth at 10-years from project submittal." For all other discretionary projects that worsen traffic "the County shall condition the project to construct all road improvements necessary to maintain or attain adopted LOS standards."

However, the El Dorado County Superior Court issued a ruling in July 2017 that found certain provisions in Measure E unconstitutional. The court ruled that the previous language contained in Measure Y was still valid as detailed below:

At the time of approval of a tentative map for a single-family residential subdivision of five or more parcels that worsens (defined as a project that triggers Policy TC-Xe [A] or [B] or [C]) traffic on the County road system, the County shall do one of the following:

- (1) condition the project to construct all road improvements necessary to maintain or attain Level of Service standards detailed in this Transportation and Circulation Element based on existing traffic plus traffic generated from the development plus forecasted traffic growth at 10-years from project submittal; or
- (2) ensure the commencement of construction of the necessary road improvements are included in the County's 10-year CIP.

For all other discretionary projects that worsen (defined as a project that triggers Policy TC-Xe [A] or [B] or [C]) traffic on the County road system, the County shall do one of the following:

- (1) condition the project to construct all road improvements necessary to maintain or attain Level of Service standards as detailed in this Transportation and Circulation Element; or
- (2) ensure the construction of the necessary road improvements are included in the County's 20-year CIP.

County policy notes that impacts to Caltrans facilities shall use Caltrans LOS standards and significance thresholds. Caltrans uses LOS E as the significance threshold on freeway facilities in this area of El Dorado County.

**TABLE 1
LEVEL OF SERVICE DEFINITIONS**

Level of Service	Signalized Intersection	Unsignalized Intersection	Roadway (Daily)
"A"	Uncongested operations, all queues clear in a single-signal cycle. Delay ≤ 10.0 sec	Little or no delay. Delay ≤ 10 sec/veh	Completely free flow.
"B"	Uncongested operations, all queues clear in a single cycle. Delay > 10.0 sec and ≤ 20.0 sec	Short traffic delays. Delay > 10 sec/veh and ≤ 15 sec/veh	Free flow, presence of other vehicles noticeable.
"C"	Light congestion, occasional backups on critical approaches. Delay > 20.0 sec and ≤ 35.0 sec	Average traffic delays. Delay > 15 sec/veh and ≤ 25 sec/veh	Ability to maneuver and select operating speed affected.
"D"	Significant congestion of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed. Delay > 35.0 sec and ≤ 55.0 sec	Long traffic delays. Delay > 25 sec/veh and ≤ 35 sec/veh	Unstable flow, speeds and ability to maneuver restricted.
"E"	Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es). Delay > 55.0 sec and ≤ 80.0 sec	Very long traffic delays, failure, extreme congestion. Delay > 35 sec/veh and ≤ 50 sec/veh	At or near capacity, flow quite unstable.
"F"	Total breakdown, stop-and-go operation. Delay > 80.0 sec	Intersection blocked by external causes. Delay > 50 sec/veh	Forced flow, breakdown.
Sources: <u>Highway Capacity Manual 6th Edition</u> , Transportation Research Board (TRB)			

Roadway Segments.

Two-Lane Roadway Segments. Two-lane roadways were analyzed using methods presented in the *Highway Capacity Manual (HCM)*. A two-lane highway is an undivided roadway with one lane in each direction. Passing a slower vehicle requires use of the opposing lane as sight distance and gaps in the opposing traffic stream permit. As volumes and geometric restrictions increase, the ability to pass decreases and platoons form. Motorists in platoons are subject to delay because they are unable to pass. The HCM divides these roadways into three types: Class I, Class II and Class III. They are defined as follows:

- *Class I two-lane highways* are highways where motorists expect to travel at relatively high speeds. Two-lane highways that are major intercity routes, primary connectors of major traffic generators, daily commuter routes, or major links in state or national

KDA

highway networks are generally assigned to Class I. These facilities serve mostly long-distance trips or provide the connections between facilities that serve long-distance trips.

- *Class II two-lane highways* are highways where motorists do not necessarily expect to travel at high speeds. Two-lane highways functioning as access routes to Class I facilities, serving as scenic or recreational routes (and not as primary arterials), or passing through rugged terrain (where high-speed operation would be impossible) are assigned to Class II. Class II facilities most often serve relatively short trips, the beginning or ending portions of longer trips, or trips for which sightseeing plays a significant role.
- *Class III two-lane highways* are highways serving moderately developed areas. They may be portions of a Class I or Class II highway that pass through small towns or developed recreational areas. On such segments, local traffic often mixes with through traffic, and the density of unsignalized roadside access points is noticeably higher than in a purely rural area. Class III highways may also be longer segments passing through more spread-out recreational areas, also with increased roadside densities. Such segments are often accompanied by reduced speed limits that reflect the higher activity level.

Levels of Service. Three measures of effectiveness are incorporated into the methodology to determine automobile LOS:

1. Average Travel Speed (ATS) reflects mobility on a two-lane highway. It is defined as the highway segment length divided by the average travel time taken by vehicles to traverse it during a designated time interval.
2. Percent Time Spent Following (PTSF) represents the freedom to maneuver and the comfort and convenience of travel. It is the average percentage of time that vehicles must travel in platoons behind slower vehicles due to the inability to pass. Because this characteristic is difficult to measure in the field, a surrogate measure is the percentage of vehicles traveling at headways of less than 3.0 at a representative location within the highway segment. PTSF also represents the approximate percentage of vehicles traveling in platoons.
3. Percent of free-flow speed (PFFS) represents the ability of vehicles to travel at or near the posted speed limit.

Speed and delay due to passing restrictions are both important to motorists on Class I two-lane highways; therefore, LOS is defined in terms of both ATS and PTSF. Travel speed is not a significant issue on Class II highways; therefore, LOS is defined in only terms of PTSF. High speeds are not expected on Class III highways and since the length of the Class III segments may be generally limited, passing restrictions are also not a major concern. In Class III segments drivers are expected to want to travel at or near the speed limit. Therefore, PFFS is used to define LOS. The LOS criteria for two-lane highways are shown in Table 2. All two-way road segments were identified as Class I facilities.

TABLE 2
AUTOMOBILE LOS FOR TWO-LANE HIGHWAYS†

LOS	Class I Highways		Class II Highways	Class III Highways
	ATS (mi / hr)	PTSF (%)	PTSF (%)	PFFS (%)
A	>55	≤35	≤40	>91.7
B	>50-55	>35-50	>40-55	>83.3 – 91.7
C	>45-50	>50-65	>55-70	>75.0 – 83.3
D	>40-45	>65-80	>70-85	>66.7 – 75.0
E	≤40	>80	>85	≤66.7

† HCM 2010, Chapter 15, December 2010

Multi-lane Highway Roadway Segments. Multi-lane highways were analyzed for this traffic impact study using methods presented in the *HCM*. Multi-lane highways usually have a total of four or six lanes, counting both directions and are typically located in suburban communities, leading into central cities, or along high-volume rural corridors connecting two cities or two significant activities that generate a substantial number of daily trips.

Multi-lane highways in suburban and rural settings have different operational characteristics from freeways, urban streets, and two-lane highways. They are not completely access controlled and can have at-grade intersections and traffic signals. They also may be divided highways or include TWLTL's. Free flow speed (FFS) and density describe the operating characteristics of multi-lane highways. FFS is impacted by the lane width, the lateral clearance, the type of median and the number of access points on a segment.

The capacity of a multilane highway is the maximum sustained hourly flow rate at which vehicles reasonably can be expected to traverse a uniform segment under prevailing roadway and traffic conditions. Level of Service on multilane highways is defined based on density of traffic. Table 3 defines the LOS based on the FFS and the density in passenger cars per mile per lane (pcpmpl).

**TABLE 3
AUTOMOBILE LOS FOR MULTI-LANE HIGHWAYS‡**

LOS	Free Flow Speed (mph)	Density (pcpmp)
A	All	>0 – 11
B	All	>11 – 18
C	All	>18 – 26
D	All	>26 – 35
E	60	>35 – 40
	55	>35 – 41
	50	>35 – 43
	45	>35 – 45
F	Demand Exceeds Capacity	
	60	>40
	55	>41
	50	>43
	45	>45

‡ HCM 2010, Chapter 14, December 2010

City of Folsom Intersection Thresholds. The City of Folsom identifies LOS ‘D’ as the acceptable Level of Service on roadways within the City. Policy M 4.1.3 of their recently updated General Plan notes: “Strive to achieve at least traffic Level of Service ‘D’ throughout the city. Level of Service ‘E’ conditions can be acceptable due to costs of mitigation or when there would be other unacceptable impacts, such as right-of-way acquisition or degradation of the pedestrian environment due to increased crossing distances or unacceptable crossing delays. Level of Service ‘E’ may also be accepted during peak commute periods at major intersections within one-quarter mile of a freeway interchange or river crossing”.

The City normally has a maximum accepted intersection geometry of dual left lanes, three through lanes and a free right lane on any given approach. The *HCM 6th Edition* was used to provide a basis for describing existing conditions and for evaluating the significance of project impacts.

An impact is considered significant if the project causes a signalized intersection to deteriorate from an acceptable LOS to an unacceptable LOS. If an intersection is operating at an unacceptable LOS without the project, a project is not considered to have a significant impact if the increase in delay is 5 seconds or less or the increase in the volume to capacity (v/c) ratio is 0.05.

City of Folsom Roadway Segments. Roadway segments in the City of Folsom were not studied.

KDA

Intersection Queuing Analysis.

The quality of traffic flow can also be affected by queuing at signalized intersections. For this study, the lengths of peak period queues have been identified and compared to available storage in order to determine whether spillover from turn lanes can affect adjoining travel or extend through adjacent intersections. 95th percentile queue lengths were calculated as a byproduct of Synchro. Those locations where the 95th percentile queue exceeds the available storage have also been noted.

Traffic Signal Warrants.

The extent to which existing or projected traffic volumes may justify signalization at unsignalized intersections has been determined based on consideration of traffic signal warrant presented in the *Manual of Uniform Traffic Control Devices, 2014*. For this analysis, the volume thresholds associated with Warrant 3 (Peak Hour Volume) have been assessed. “Rural” criteria were used based on speed limits in excess of 40 mph.

Public Transit

El Dorado County Transit Authority (EDCTA) operates buses throughout El Dorado County. In the vicinity of the site, there is no scheduled bus service.

Non-Motorized Transportation

The available facilities for bicycles and pedestrians in the area of the project were inventoried.

Sidewalks / Trails. Sidewalk is present along both sides of Green Valley Road east of Sophia Parkway; however, there is none west of the intersection. Along Sophia Drive sidewalk extends from Green Valley Road to south of Alexandra Drive along both sides of the street.

Crosswalks are striped on the eastern and southern legs of the Green Valley Road / Sophia Parkway intersection. The intersection is equipped with pedestrian indications and push buttons.

The Mormon Island Auxiliary Dam (MIAD) to Brown’s Ravine Marina Trail is a local trail along the Folsom Lake shore. The trailhead is located off of the northerly extension of Sophia Parkway beyond Green Valley Road. Parking for the trailhead is limited and most users park along Sophia Parkway and walk to the trailhead.

Bicycle Facilities. Few designated bicycle routes currently exist throughout El Dorado County due to the rural nature of the county, but bicycle lanes have been developed where new construction has occurred.

In the project vicinity, bike lanes already exist along Sophia Parkway. Along Green Valley Road a bike lane does not exist along the eastbound approach to the Sophia Parkway intersection, but

lanes are present on all other approaches and departures. The Mormon Island Auxiliary Dam (MIAD) to Brown’s Ravine Marina trail is a local trail along the Folsom Lake shore. Parking for the trailhead is limited and most users park along Sophia Parkway to access the site on the north leg of the Green Valley Road / Sophia Parkway intersection.

Existing Traffic Operating Conditions

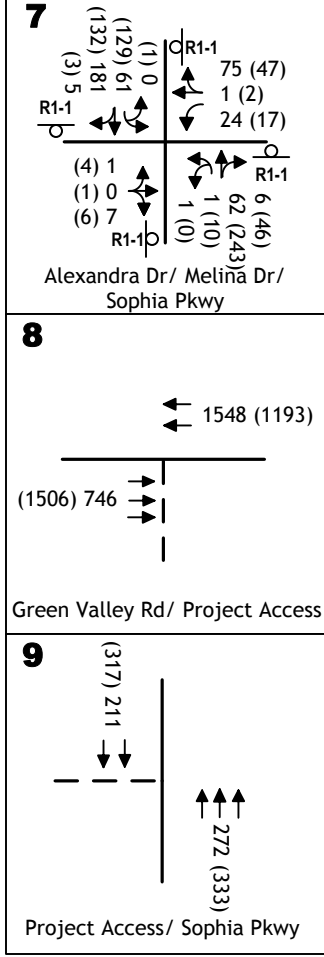
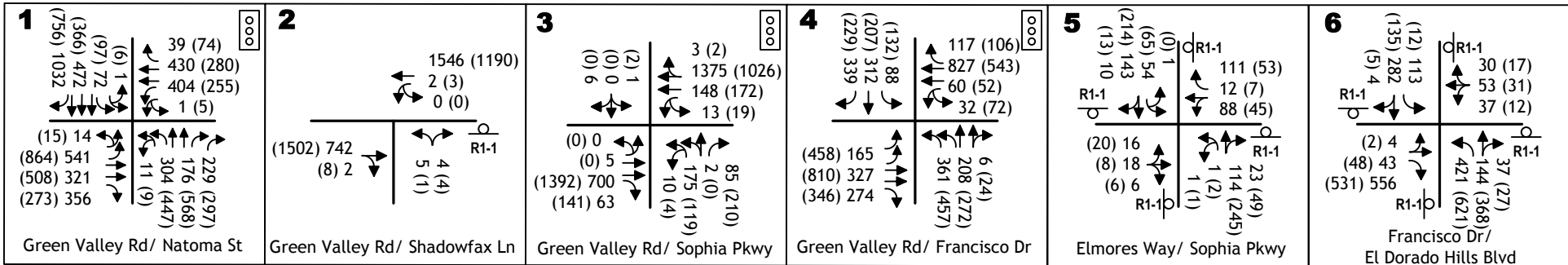
Intersection Levels of Service. New traffic counts were completed during the third weeks of August 2018 while school was in session. The intersection turning movements are presented in Figure 3. Table 4 summarizes current operating Levels of Service at the study area intersections for each time period. All study intersections except the northbound Shadowfax Lane approach to Green Valley Road currently operate at acceptable Levels of Service, LOS E or better, during the a.m. and p.m. peak hours. The northbound Shadowfax Lane approach operates at LOS F (85.9 seconds per vehicle [spv]) in the a.m. peak hour and LOS F (77.5 spv) in the p.m. peak hour. This intersection will not meet the peak hour signal warrant. Although operating within County LOS thresholds the Francisco Drive / El Dorado Hills Blvd intersection meets the peak hour warrant in the a.m. peak hour.

**TABLE 4
EXISTING PEAK HOUR LEVELS OF SERVICE AT INTERSECTIONS**

Location	Control	AM Peak Hour		PM Peak Hour		Traffic Signal Warranted?
		LOS	Average Delay	LOS	Average Delay	
1. Green Valley Rd / Blue Ravine Rd/ E. Natoma St	Signal	C	30.8	C	31.5	N/A
2. Green Valley Rd / Shadowfax Ln	NB Stop	F	85.9	F	77.5	No
NB WB Left		A	9.4	B	14.2	
3. Green Valley Rd / Sophia Parkway	Signal	B	13.2	C	28.8	N/A
4. Green Valley Rd / Francisco Dr	Signal	D	40.3	E	63.1	N/A
5. Sophia Parkway / Elmores Way	AWS	B	10.5	B	11.0	No
6. Francisco Dr / El Dorado Hills Blvd	AWS	B	19.7	E	44.8	Yes*
7. Sophia Parkway / Melina Dr – Alexandra Dr	AWS	A	9.2	B	10.4	No

* meets peak hour warrant in A.M. peak hour

KDA



KD Anderson & Associates, Inc.
 Transportation Engineers

EXISTING TRAFFIC VOLUMES AND LANE CONFIGURATIONS

figure 3

Intersection Queues. Table 5 presents information regarding current peak period queuing in lanes at signalized study intersections. The available storage is presented along with current peak hour traffic volumes and the 95th percentile queue length. On multiple lane approaches the longest queue is noted.

Most intersections have lane storage capacity that can accommodate peak period queues. Those 95th percentile queues with length exceeding the available storage have been highlighted. The 95th percentile queue exceeds available storage in three locations, all at the Green Valley Road / Francisco Road intersection. The existing northbound left turn queue and eastbound queues exceed the available storage by about 50 feet while the westbound left turn queue exceeds the available storage by about 15 feet; a vehicle in this lane is likely able to queue in the left turn taper.

**TABLE 5
EXISTING PEAK HOUR QUEUES AT SIGNALIZED INTERSECTIONS**

Location	Length (feet)	AM Peak Hour		PM Peak Hour	
		VPH	Queue (feet)	VPH	Queue (feet)
3. Green Valley Rd / Sophia Parkway					
NB left + left-through*	210	185	110	123	61
EB left turn	220	5	15	0	0
WB left turn	315†	161	287	191	266
4. Green Valley Rd / Francisco Dr					
NB left turn (2)	225	361	189	457	271
SB left turn	190	88	117	132	158
EB left turn (2)	295	165	98	458	345
WB left turn	200	32	149	72	215
<p>Highlighted values indicate queue length in excess of available storage</p> <p>Highlighted values indicate queue can store within left turn taper</p> <p>* left-through lane is approach lane</p> <p>† left turn turns into two-way-left-turn-lane (TWLTL)</p>					

Existing Roadway Segment Levels of Service. Table 6 summarizes the Levels of Service based on the current traffic volumes on study area roads with the existing roadway configuration. Applicable Level of Service thresholds and roadway classifications are presented. The Green Valley Road segments operate acceptably, at LOS E while the Sophia Parkway segments operate at LOS D or better, both within acceptable County LOS thresholds.

**TABLE 6
EXISTING ROADWAY SEGMENT LEVELS OF SERVICE**

Roadway	Location	Facility Classification	ATS/PTSF/LOS	ATS/PTSF/LOS
			Existing AM	Existing PM
Green Valley Rd	Folsom Limits to Sophia Parkway EB WB	Class I Highway	39.4 / 81.4 / E	35.9 / 96.3 / E
			39.1 / 97.8 / E	36.1 / 92.2 / E
Sophia Parkway	Green Valley Rd to Corsica Dr NB SB	Class I Highway	51.5 / 62.8 / C	50.5 / 51.5 / D
			51.6 / 51.3 / C	50.5 / 60.3 / C

ATS – average travel speed
PTSF – percent time spent following

KDA

PROJECT CHARACTERISTICS

The development of this project will attract traffic to the project site. The amount of additional traffic on a particular section of the street network is dependent upon two factors:

- Trip Generation, the number of new trips generated by the project, and
- Trip Distribution and Assignment, the specific routes that the new traffic takes.

Trip Generation

Trip generation is determined by identifying the type and size of land use being developed. Recognized sources of trip generation data may then be used to calculate the total number of trip ends resulting from the day to day operation of the businesses in the project.

The study considered two alternative projects on the two parcels. Trip generation was developed for both alternatives. The alternative generating the highest amount of new traffic was used to analyze the site. This provides a conservative analysis and would cover development of either project.

The trip generation for this project was calculated using trip generation rates published in the *Trip Generation Manual* (Institute of Transportation Engineers, 10th Edition, 2017). Alternative #1 uses the following applicable categories:

- | | |
|----------------------------------|--|
| - 151 (Mini-Warehouse) | - 942 (Auto Care Center) |
| - 820 (Shopping Center) | - 930 (Fast Casual Restaurant) |
| - 932 (High Turnover restaurant) | - 934 (Fast Food Restaurant with Drive-Through). |

Tables 7A and 7B display the daily, a.m. peak hour, and p.m. peak hour trip generation for the commercial site and mini-warehouse sites. Trips generated by retail commercial projects fit into two categories. Some trips will be made by patrons who would not otherwise be on the local street system and who go out of their way to reach the site. These are "new" trips. Other trips will be made by patrons who are already in the roadway network and stop by the site as part of a trip made for another purpose. These "pass-by" trips do not add traffic to the overall system.

A reduction of new trips was also considered based on 'internally captured' trips. A characteristic of mixed-use development is that trips between the various land uses can be made on the site, and none of these internal trips are made on the major street system. It is reasonable to assume that some trips will be made between the various uses on the sites. An internal capture rate is generally defined as a percentage reduction that is applied to trip generation estimates for individual land uses to account for the trips internal to the site.

ITE research has suggested typical "pass-by" percentages for various land uses. The ITE *Trip Generation Handbook, 3rd Edition* was used to determine pass-by rates. Where rates were unavailable, similar uses were considered with pass-by rates applied. A 5% internal trip reduction was applied to land uses were appropriate based on the Caltrans rate identified in their "Guide for the Preparation of Traffic Impact Studies."

After accounting for internal and pass-by trip reductions, the commercial project is expected to generate 1,642 ‘new’ daily trips, 106 ‘new’ a.m. peak hour trips and 155 ‘new’ p.m. peak hour trips. The mini-warehouse site is expected to generate 282 ‘new’ daily trips, 16 ‘new’ a.m. peak hour trips and 26 ‘new’ p.m. peak hour trips.

**TABLE 7A
TRIP GENERATION – ALTERNATIVE #1
COMMERCIAL**

Land Use	Unit Quantity	Size	Trips Per Unit						
			Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Retail – Shopping Center (LU 820)	KSF	14.40	37.75	62%	38%	0.94	48%	52%	8.99
Fast Casual Restaurant (LU 930)	KSF	1.80	315.17	67%	33%	2.07	55%	45%	14.13
High Turnover Restaurant (LU 932)	KSF	5.00	112.18	55%	45%	9.94	62%	38%	9.77
Fast Food with Drive-Through (LU 934)	KSF	2.27	470.95	51%	49%	40.19	52%	48%	32.67
Retail – Shopping Center (LU 820)			544	8	5	14	62	67	130
Fast Casual Restaurant (LU 930)			567	2	1	4	14	11	25
High Turnover Restaurant (LU 932)			561	27	22	50	30	19	49
Fast Food with Drive-Through (LU 934)			1,069	47	45	91	39	36	74
Sub-Total Trips			2,741	85	73	158	145	133	278
Internal Trips (5%)									
Retail – Shopping Center (LU 820)			(27)	(0)	(0)	(1)	(3)	(3)	(6)
Fast Casual Restaurant (LU 930)			(28)	(0)	(0)	(0)	(1)	(1)	(1)
High Turnover Restaurant (LU 932)			(28)	(1)	(1)	(2)	(2)	(1)	(2)
Fast Food with Drive-Through (LU 934)			(53)	(2)	(2)	(5)	(2)	(2)	(4)
Total Internal Trips			(137)	(4)	(4)	(8)	(7)	(7)	(14)
Pass-By Trips									
Retail – Shopping Center <i>(17% Daily, 34% PM)</i>			(88)	(0)	(0)	(0)	(3)	(3)	(6)
Fast Casual Restaurant <i>(49% Daily, 49% AM, 50% PM)</i>			(264)	(1)	(1)	(2)	(7)	(5)	(12)
High Turnover Restaurant <i>(21% Daily, 43% PM)</i>			(112)	(0)	(0)	(0)	(12)	(8)	(20)
Fast Food with Drive-Through <i>(49% Daily, 49% AM, 50% PM)</i>			(498)	(22)	(21)	(42)	(18)	(17)	(35)
Total Pass-By Trips			(961)	(23)	(21)	(44)	(57)	(52)	(109)
Net New Trips			1,642	58	48	106	80	75	155

KSF – thousand square feet

Numbers may not match due to rounding

KDA

**TABLE 7B
TRIP GENERATION – ALTERNATIVE #1
MINI-WAREHOUSE**

Land Use	Unit Quantity	Size	Trips Per Unit						
			Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Mini-Warehouse (LU 151)	KSF	147.60	1.51	60%	40%	0.10	47%	53%	0.17
Smog Shop* (LU 942)	KSF	1.30	69.57	66%	34%	2.25	48%	52%	3.11
Mini-Warehouse (LU 151)			223	9	6	15	12	13	25
Smog Shop (LU 942)			90	2	1	3	2	2	4
Sub-Total Trips			313	11	7	18	14	15	29
<i>Pass-By Trips</i>									
Mini-Warehouse (10% Daily, 10% AM, PM)			(22)	(1)	(1)	(1)	(1)	(1)	(3)
Smog Shop (10% Daily, 10% AM, PM)			(9)	(0)	(0)	(0)	(0)	(0)	(0)
Total Pass-By Trips			(31)	(1)	(1)	(2)	(1)	(2)	(3)
Net New Trips			282	10	6	16	12	14	26

KSF – thousand square feet Numbers may not match due to rounding
* - no land use for smog shop; used auto care center

Alternative #2 uses the following land uses:

- 151 (Mini-Warehouse)
- 948 (Automated Car Wash)
- 932 (High Turnover restaurant)
- 942 (Auto Care Center)
- 930 (Fast Casual Restaurant)
- 934 (Fast Food Restaurant with Drive-Through)

Tables 8A and 8B display the daily, a.m. peak hour, and p.m. peak hour trip generation for the commercial site with an automated car wash instead of retail shops and the mini-warehouse site. After accounting for internal and pass-by trip reductions, the commercial project is expected to generate 1,844 ‘new’ daily trips, 97 ‘new’ a.m. peak hour trips and 116 ‘new’ p.m. peak hour trips. The mini-warehouse site is expected to generate 282 ‘new’ daily trips, 16 ‘new’ a.m. peak hour trips and 26 ‘new’ p.m. peak hour trips.

Although Alternative #2 generates more daily trip traffic Alternative #1 generates more peak hour trips. Since level of service is based upon peak hour thresholds the Alternative #1 land uses were used for the project analysis.

**TABLE 8A
TRIP GENERATION – ALTERNATIVE #2
COMMERCIAL**

Land Use	Unit Quantity	Size	Trips Per Unit							
			Daily	AM Peak Hour			PM Peak Hour			
				In	Out	Total	In	Out	Total	
Commercial Site										
Automated Car Wash (LU 948)	KSF	4.20	156.20	---	---	†	50%	50%	14.20	
Fast Casual Restaurant (LU 930)	KSF	1.80	315.17	67%	33%	2.07	55%	45%	14.13	
High Turnover Restaurant (LU 932)	KSF	5.00	112.18	55%	45%	9.94	62%	38%	9.77	
Fast Food with Drive-Through (LU 934)	KSF	2.27	470.95	51%	49%	40.19	52%	48%	32.67	
Smog Shop* (LU 942)	KSF	1.80	69.57	66%	34%	2.25	48%	52%	3.11	
			Automated Car Wash (LU 948)	656	0	0	0	30	30	60
			Fast Casual Restaurant (LU 930)	567	2	1	4	14	11	25
			High Turnover Restaurant (LU 932)	561	27	22	50	30	19	49
			Fast Food with Drive-Through (LU 934)	1,069	47	45	91	39	36	74
			Smog Shop (LU 942)	125	3	1	4	3	3	6
			Sub-Total Trips	2,979	76	68	145	113	95	208
Internal Trips (5%)										
			Automated Car Wash (LU 948)	(33)	(0)	(0)	(0)	(1)	(1)	(3)
			Fast Casual Restaurant (LU 930)	(28)	(0)	(0)	(0)	(1)	(1)	(1)
			High Turnover Restaurant (LU 932)	(28)	(1)	(1)	(2)	(2)	(1)	(2)
			Fast Food with Drive-Through (LU 934)	(53)	(2)	(2)	(5)	(2)	(2)	(4)
			Total Internal Trips	(143)	(4)	(3)	(7)	(6)	(5)	(11)
Pass-By Trips										
			Automated Car Wash (17% Daily, 34% PM)	(106)	(0)	(0)	(0)	(10)	(10)	(19)
			Fast Casual Restaurant (49% Daily, 49% AM, 50% PM)	(264)	(1)	(1)	(2)	(7)	(5)	(12)
			High Turnover Restaurant (21% Daily, 43% PM)	(112)	(0)	(0)	(0)	(12)	(8)	(20)
			Fast Food with Drive-Through (49% Daily, 49% AM, 50% PM)	(498)	(22)	(21)	(42)	(18)	(17)	(35)
			Smog Shop (10% Daily, 10% AM, PM)	(13)	(0)	(0)	(0)	(0)	(0)	(1)
			Total Pass-By Trips	(992)	(23)	(22)	(45)	(47)	(40)	(87)
			Net New Trips	1,844	52	45	97	62	54	116

KSF – thousand square feet
† no data for a.m. peak hour

Numbers may not match due to rounding
* - no land use for smog shop; used auto care center

KDA

**TABLE 8B
TRIP GENERATION – ALTERNATIVE #2
MINI-WAREHOUSE**

Land Use	Unit Quantity	Size	Trips Per Unit						
			Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Mini-Warehouse (LU 151)	KSF	149.50	1.51	60%	40%	0.10	47%	53%	0.17
Mini-Warehouse (LU 151)			226	9	6	15	12	13	25
Sub-Total Trips			226	9	6	15	12	13	25
<i>Pass-By Trips</i>									
Mini-Warehouse (10% Daily, 10% AM, PM)			(23)	(1)	(1)	(1)	(1)	(1)	(3)
Total Pass-By Trips			(23)	(1)	(1)	(1)	(1)	(1)	(3)
Net New Trips			203	8	5	13	11	12	23

KSF – thousand square feet

Numbers may not match due to rounding

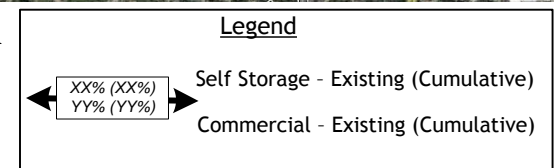
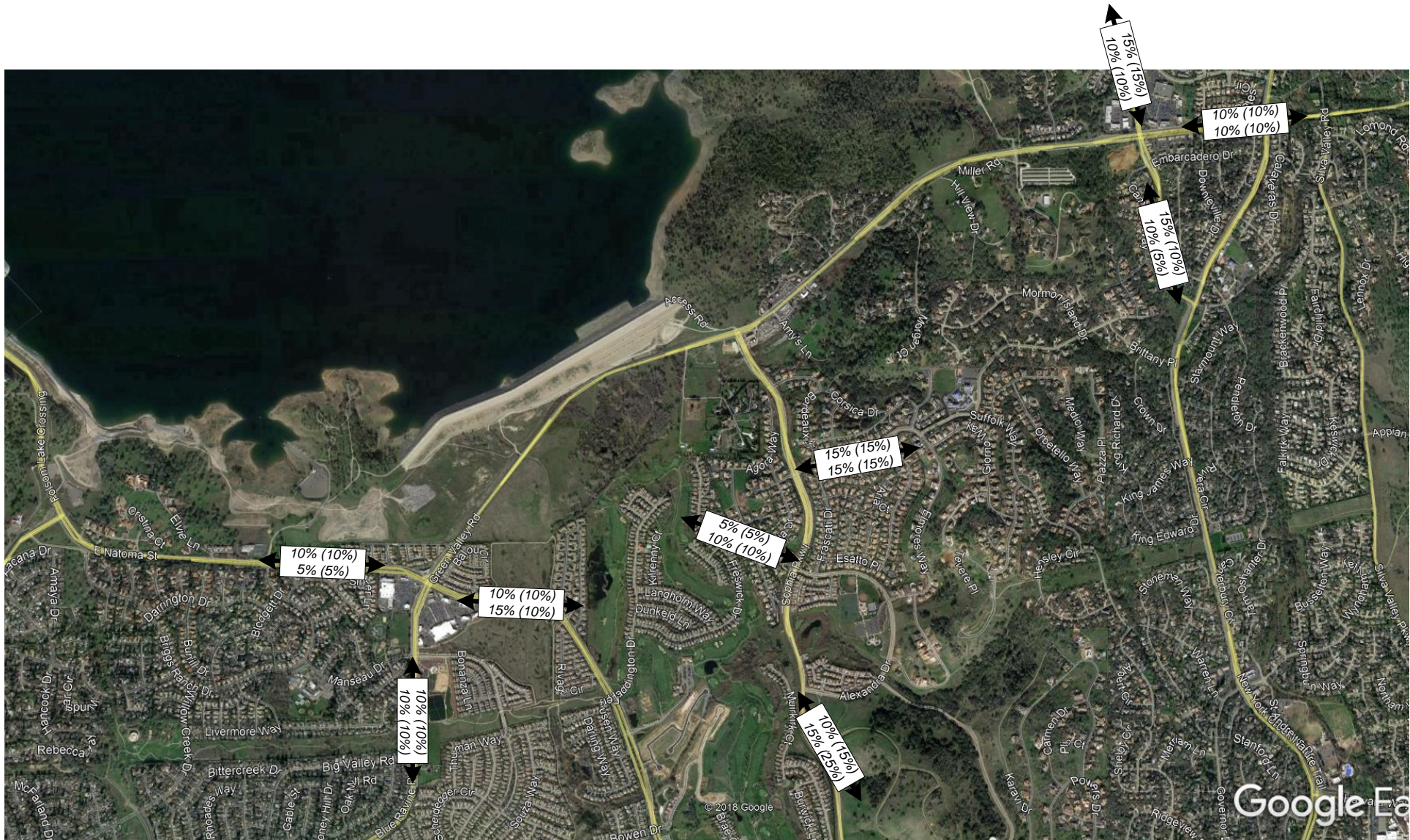
Trip Distribution & Assignment

Two trip distribution patterns were applied to trips related to the Project. One pattern was applied to Existing (i.e., Existing Plus Project) and another pattern was applied to Long-Term (2040) Conditions. As development along Sophia Parkway occurs, including a new interchange along US 50, traffic patterns will shift. Table 9 presents the project trip distributions which are also shown diagrammatically in Figure 4.

**TABLE 9
PROJECT TRIP DISTRIBUTION**

Direction	Route	Distribution			
		Self-Storage		Commercial	
		Existing	2040	Existing	2040
South	South on Sophia Parkway	10%	15%	15%	25%
	East on Elmores Way	15%	15%	15%	15%
	West on Melina Drive	5%	5%	10%	10%
West	West on E. Natoma Street	10%	10%	5%	5%
	East on E. Natoma Street	10%	10%	15%	10%
	South on Blue Ravine Road	10%	10%	10%	10%
East	East on Green Valley Road	10%	10%	10%	10%
	North on Francisco Drive	15%	15%	10%	10%
	South on Francisco Drive	15%	10%	10%	5%
Total		100%	100%	100%	100%

KDA



EXISTING AND CUMULATIVE TRIP DISTRIBUTION PERCENTAGES

KD Anderson & Associates, Inc.
Transportation Engineers

3509-01 RA 10/26/2018

figure 4

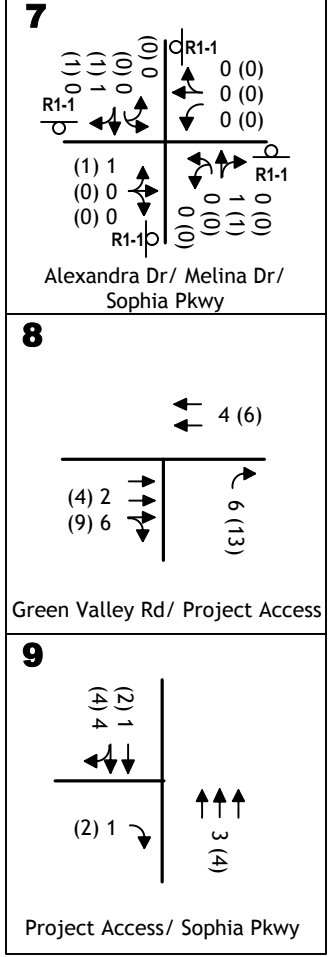
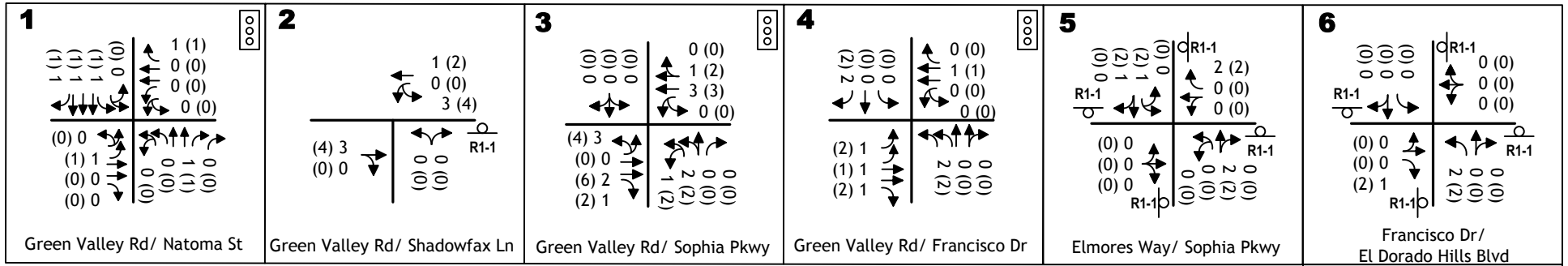
PROJECT TRAFFIC IMPACTS

Existing Plus Self-Storage Project Conditions

Traffic Volumes The impacts of developing the self-storage project uses been identified by superimposing self-storage project traffic onto existing background conditions. Figure 5 displays the self-storage project traffic with Figure 6 displaying the “Existing Plus Self-Storage Project” traffic volumes at each study intersection in both a.m. and p.m. peak hours.

Intersection Levels of Service. Intersection Levels of Service were calculated and used as the basis for evaluating project impacts. Table 10 displays the peak hour Levels of Service at each study intersection and compares existing Levels of Service with those accompanying the project. All intersections except the Green Valley Road / Shadowfax Lane intersection will continue to operate above the minimum El Dorado County standard (i.e., LOS E) and City of Folsom threshold (LOS D). The Shadowfax Lane intersection will operate with the northbound approach at LOS F in the a.m. peak hour (85.9 spv) and p.m. peak hour (80.5 spv). This intersection will not meet the peak hour signal warrant. The Francisco Drive / El Dorado Hills Blvd intersection will continue to operate within County LOS thresholds and meet the peak hour warrant in the a.m. peak hour.

Intersection Queues. Table 11 identifies peak period queues assuming the addition of project trips. Those 95th percentile queues with lengths exceeding the available storage have been highlighted. Under Existing Plus Project the 95th percentile queue exceeds the available storage in four locations, in the westbound left turn lane at the Green Valley Road / Sophia Parkway intersection and at three locations at the Green Valley Road / Francisco Road intersection. The westbound queue approaching Sophia Parkway exceeds the left turn lane by 8 feet and can queue in the left turn transition to the TWLTL. The queues will increase at the Green Valley Road / Francisco Road intersection by up to 2 feet with the westbound left turn queue able to queue in the left turn taper.

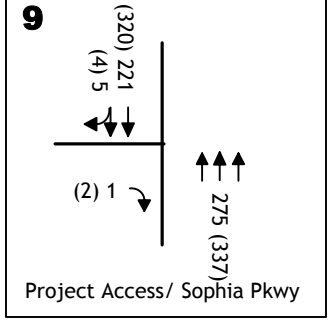
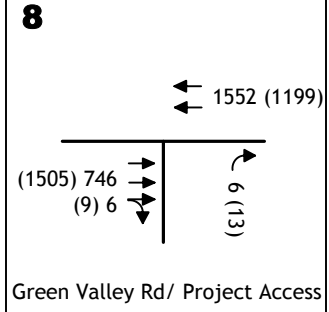
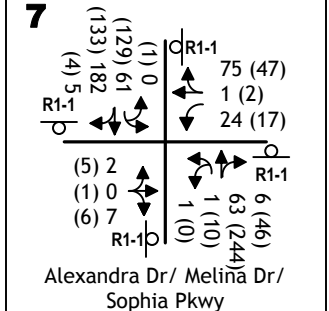
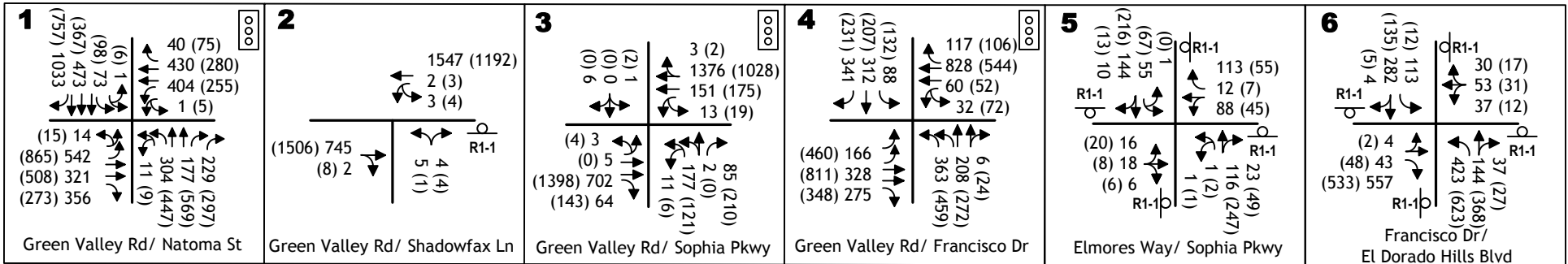


**SELF-STORAGE PROJECT ONLY
TRAFFIC VOLUMES AND LANE CONFIGURATIONS**

KD Anderson & Associates, Inc.
Transportation Engineers

3509-01 RA 10/26/2018

figure 5



EXISTING PLUS SELF-STORAGE TRAFFIC VOLUMES AND LANE CONFIGURATIONS

figure 6

**TABLE 10
PEAK HOUR INTERSECTION LEVELS OF SERVICE
EXISTING PLUS PROJECT CONDITIONS – SELF STORAGE PROJECT**

Location	Control	AM Peak Hour				PM Peak Hour				Traffic Signal Warranted?
		Existing		Ex Plus Project		Existing		Ex Plus Project		
		LOS	Average Delay	LOS	Average Delay	LOS	Average Delay	LOS	Average Delay	
1. Green Valley Rd / Blue Ravine Rd/ E. Natoma St	Signal	C	30.8	C	30.9	C	31.5	C	31.6	N/A
2. Green Valley Rd / Shadowfax Ln NB WB Left	NB Stop	F	85.9	F	85.9	F	77.5	F	80.5	No
		A	9.4	A	9.5	B	14.2	A	14.3	
3. Green Valley Rd / Sophia Parkway	Signal	B	13.2	B	18.2	C	28.8	C	30.5	N/A
4. Green Valley Rd / Francisco Dr	Signal	D	40.3	D	46.7	E	63.1	E	63.5	N/A
5. Sophia Parkway / Elmores Way	AWS	B	10.5	A	9.6	B	11.0	B	11.1	No
6. Francisco Dr / El Dorado Hills Blvd	AWS	B	19.7	B	19.8	E	44.8	E	45.4	Yes*
7. Sophia Parkway / Melina Dr – Alexandra Dr	AWS	A	9.2	A	9.0	B	10.4	A	10.5	No
8. Green Valley Rd / Project Access NB Right	NB Stop	---	---	B	14.7	---	---	E	38.0	No
9. Sophia Parkway / Project Access EB Right	EB Stop	---	---	A	9.0	---	---	A	9.3	No

* meets peak hour warrant in AM peak hour

KDA

**TABLE 11
EXISTING PLUS SELF STORAGE
PEAK HOUR QUEUES AT SIGNALIZED INTERSECTIONS**

Location	Length (feet)	AM Peak Hour		PM Peak Hour	
		VPH	Queue (feet)	VPH	Queue (feet)
3. Green Valley Rd / Sophia Parkway					
NB left + left-through*	210	188	111	127	74
EB left turn	220	8	23	4	14
WB left turn	315†	164	293	194	323
4. Green Valley Rd / Francisco Dr					
NB left turn (2)	225	363	192	459	273
SB left turn	190	88	111	132	158
EB left turn (2)	295	166	98	460	346
WB left turn	200	32	152	72	215
<p>Highlighted values indicate queue length in excess of available storage</p> <p>Highlighted values indicate queue can store within left turn taper</p> <p>* left-through lane is approach lane</p> <p>† left turn turns into TWLTL</p>					

Existing plus Self-Storage Project Roadway Segment Levels of Service. Table 12 summarizes the Levels of Service based on the Existing plus Self-Storage Project traffic volumes on study area roads. Applicable Level of Service thresholds and roadway classifications are presented. The Levels of Service were computed using the HCS two-lane roadway methodology. Both segments will operate within accepted County thresholds at LOS E along Green Valley Road and LOS D or better along Sophia Parkway.

**TABLE 12
EXISTING PLUS SELF -STORAGE
ROADWAY SEGMENT LEVELS OF SERVICE**

Roadway	Location	Facility Classification	ATS/PTSF/LOS	ATS/PTSF/LOS
			Existing AM	Existing PM
Green Valley Rd	Folsom Limits to Sophia Parkway	Class I Highway	39.4 / 81.5 / E 39.1 / 97.8 / E	35.9 / 96.3 / E 36.0 / 92.3 / E
	EB			
	WB			
Sophia Parkway	Green Valley Rd to Corsica Dr	Class I Highway	51.5 / 63.2 / C 51.6 / 51.3 / C	50.4 / 51.1 / D 50.5 / 60.4 / C
	NB			
	SB			

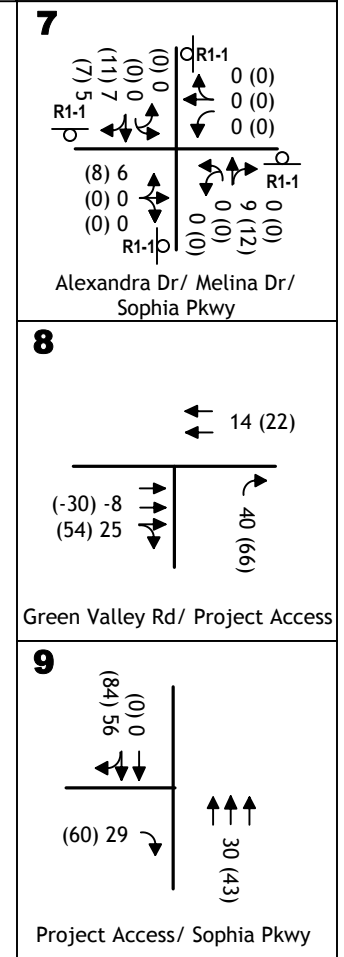
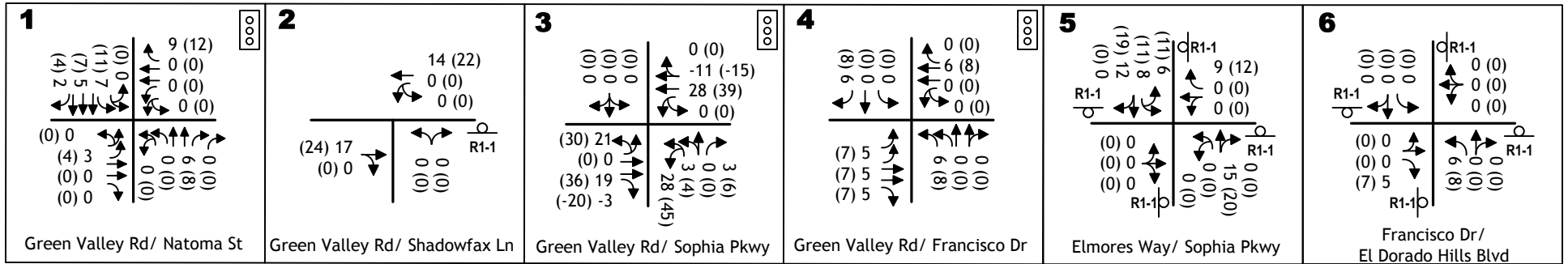
ATS – average travel speed
PTSF – percent time spent following

Existing Plus Commercial Project Conditions

Traffic Volumes The impacts of developing the commercial project uses has been identified by superimposing self-storage project traffic onto existing background conditions. Figure 7 displays the commercial project traffic with Figure 8 displaying the “Existing Plus Commercial Project” traffic volumes at each study intersection in both a.m. and p.m. peak hours.

Intersection Levels of Service. Intersection Levels of Service were calculated and used as the basis for evaluating project impacts. Table 13 displays the peak hour Levels of Service at each study intersection and compares existing Levels of Service with those accompanying the project. All intersections except the Green Valley Road / Shadowfax Lane intersection and the Green Valley Road / Project Access driveway will operate above the minimum El Dorado County standard (i.e., LOS E) and City of Folsom threshold (LOS D). The Shadowfax Lane intersection will operate with the northbound approach at LOS F in the a.m. peak hour (89.6 spv) and p.m. peak hour (85.6 spv) while the project driveway along Green valley Road will operate at LOS F (67.9 spv) in the p.m. peak hour. Neither intersection will meet the peak hour signal warrant. The Francisco Drive / El Dorado Hills Blvd intersection will continue to operate within County LOS thresholds and meet the peak hour warrant in the a.m. peak hour.

Intersection Queues. Table 14 identifies peak period queues assuming the addition of project trips. Those 95th percentile queues with lengths exceeding the available storage have been highlighted. Under Existing Plus Commercial Project conditions the 95th percentile queue exceeds the available storage in four locations, in the westbound left turn lane at the Green Valley Road / Sophia Parkway intersection and at three locations at the Green Valley Road / Francisco Road intersection. The queue in the westbound left turn lane approaching Sophia Parkway will extend to almost 400 feet. However, the left turn lane transitions into a TWLTL which will allow the queue to store without blocking through traffic. The queues will increase at the Green Valley Road / Francisco Road intersection by up to 6 feet with the westbound left turn queue able to queue in the left turn taper.

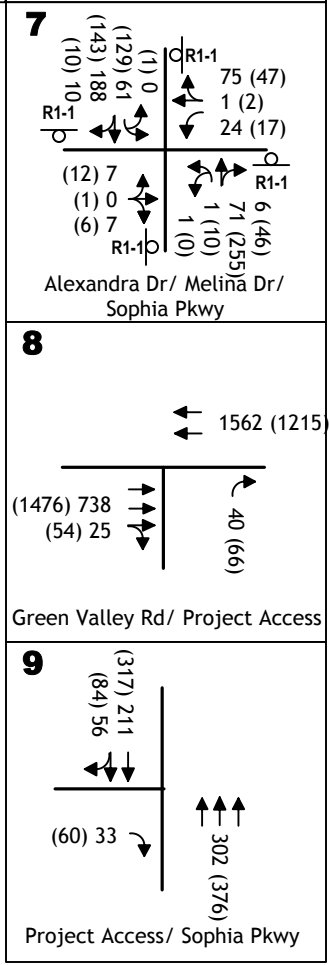
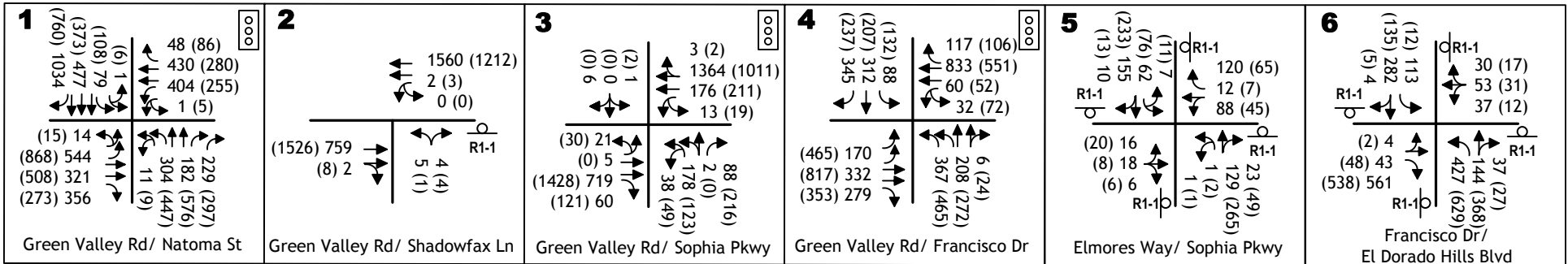


**EXISTING COMMERCIAL PROJECT ONLY
TRAFFIC VOLUMES AND LANE CONFIGURATIONS**

KD Anderson & Associates, Inc.
Transportation Engineers

3509-01 RA 10/26/2018

figure 7



EXISTING PLUS COMMERCIAL TRAFFIC VOLUMES AND LANE CONFIGURATIONS

**TABLE 13
PEAK HOUR INTERSECTION LEVELS OF SERVICE – COMMERCIAL PROJECT
EXISTING PLUS PROJECT CONDITIONS**

Location	Control	AM Peak Hour				PM Peak Hour				Traffic Signal Warranted?
		Existing		Ex Plus Project		Existing		Ex Plus Project		
		LOS	Average Delay	LOS	Average Delay	LOS	Average Delay	LOS	Average Delay	
1. Green Valley Rd / Blue Ravine Rd/ E. Natoma St	Signal	C	30.8	C	31.0	C	31.5	C	32.2	N/A
2. Green Valley Rd / Shadowfax Ln NB WB Left	NB Stop	F	85.9	F	89.6	F	77.5	F	85.6	No
		A	9.4	A	9.5	B	14.2	A	14.4	
3. Green Valley Rd / Sophia Parkway	Signal	B	13.2	B	15.1	C	28.8	D	39.2	N/A
4. Green Valley Rd / Francisco Dr	Signal	D	40.3	D	40.8	E	63.1	E	64.7	N/A
5. Sophia Parkway / Elmores Way	AWS	B	10.5	B	10.9	B	11.0	B	11.7	No
6. Francisco Dr / El Dorado Hills Blvd	AWS	B	19.7	C	20.2	E	44.8	E	47.2	Yes*
7. Sophia Parkway / Melina Dr – Alexandra Dr	AWS	A	9.2	A	9.3	B	10.4	B	10.8	No
8. Green Valley Rd / Project Access NB Right	NB Stop	---	---	C	15.8	---	---	F	67.9	No
9. Sophia Parkway / Project Access EB Right	EB Stop	---	---	A	9.3	---	---	B	10.0	No

* meets peak hour warrant in AM peak hour

KDA

**TABLE 14
EXISTING PLUS COMMERCIAL
PEAK HOUR QUEUES AT SIGNALIZED INTERSECTIONS**

Location	Length (feet)	AM Peak Hour		PM Peak Hour	
		VPH	Queue (feet)	VPH	Queue (feet)
3. Green Valley Rd / Sophia Parkway					
NB left + left-through*	210	216	128	172	98
EB left turn	220	26	48	30	52
WB left turn	315†	189	347	230	398
4. Green Valley Rd / Francisco Dr					
NB left turn (2)	225	367	192	465	277
SB left turn	190	88	117	132	158
EB left turn (2)	295	170	101	465	351
WB left turn	200	32	149	72	215
<p>Highlighted values indicate queue length in excess of available storage</p> <p>Highlighted values indicate queue can store within left turn taper</p> <p>* left-through lane is approach lane</p> <p>† left turn turns into TWLTL</p> <p>‡ queue length is maximum queue in lane group divided by the number of lanes and lane utilization factor.</p>					

Existing plus Commercial Project Roadway Segment Levels of Service. Table 15 summarizes the Levels of Service based on the Existing plus Self-Storage Project traffic volumes on study area roads. Applicable Level of Service thresholds and roadway classifications are presented. The Levels of Service were computed using the HCS two-lane roadway methodology. The Green valley Road segment will decline to LOS F conditions in both eastbound and westbound directions. However, as noted earlier, the City of Folsom received bids on October 19, 2018 to widen the segment to four lanes. The Sophia Parkway segment will operate within accepted County thresholds at LOS D or better.

**TABLE 15
EXISTING PLUS COMMERCIAL
ROADWAY SEGMENT LEVELS OF SERVICE**

Roadway	Location	Facility Classification	ATS/PTSF/LOS	ATS/PTSF/LOS
			Existing AM	Existing PM
Green Valley Rd	Folsom Limits to Sophia Parkway	Class I Highway	39.2 / 82.0 / F 38.8 / 99.8 / F	35.6 / 96.5 / E 35.7 / 92.5 / E
	EB			
	WB			
Sophia Parkway	Green Valley Rd to Corsica Dr	Class I Highway	51.1 / 65.8 / D 51.2 / 53.5 / C	49.7 / 68.8 / D 50.0 / 61.1 / C
	NB			
	SB			

ATS – average travel speed

PTSF – percent time spent following

CUMULATIVE IMPACTS (2040)

The analysis of the long range 2040 cumulative condition is intended to consider the impact of this project within the context of buildout of the General Plan circulation element occurring in 2040.

Year 2040 Forecasts / Conditions

Roadway Conditions

Roadways in 2040 are generally projected to remain with their current lane configurations with the following change to the roadway network:

- Green Valley Road from the E. Natoma Street to Sophia Parkway will be widened to a four-lane undivided highway. Bids closed for the project on October 19, 2018.
- The City of Folsom is planning to reconfigure the northbound approach on Blue Ravine Road from two left turn lanes, two through lanes and two right turn lanes to two left turn lanes, three through lanes and one right turn lane.

2040 Traffic Forecasts

Year 2040 traffic forecasts were based on the most recent Countywide traffic model. The proposed land uses are consistent with the land uses contained in the County's Travel Demand Model (TDM). County staff directed that the following scenarios be studied:

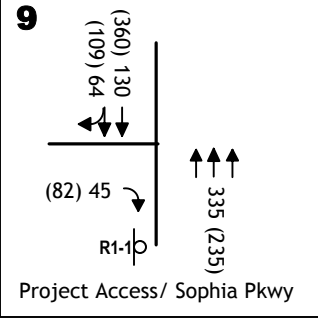
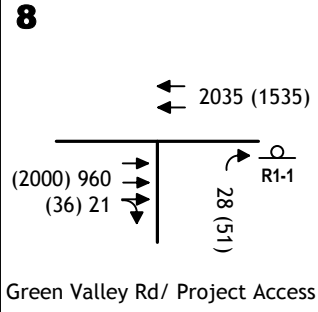
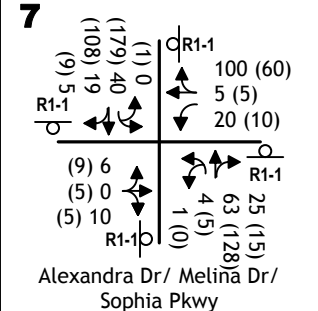
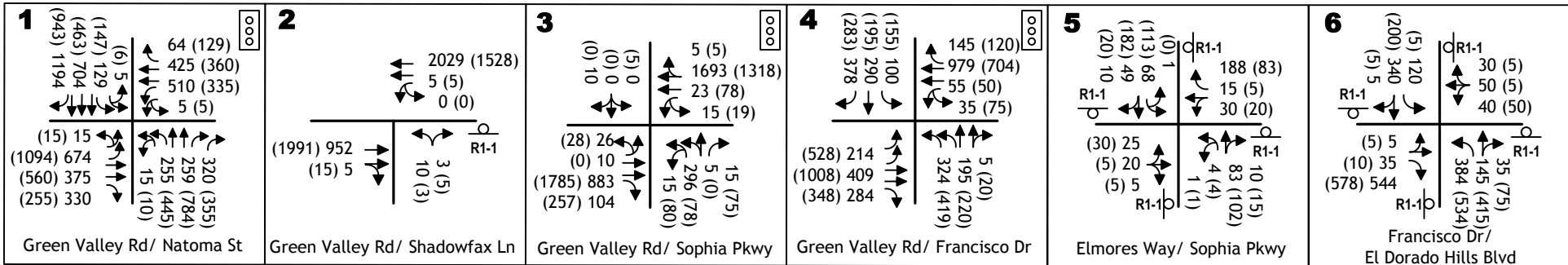
- Cumulative without Self-Storage project - This scenario assumes the Commercial site is built. Self-Storage project volumes were deducted from the Cumulative volumes.
- Cumulative without Commercial project - This scenario assumes the Self-Storage site is built. Commercial project volumes were deducted from the Cumulative volumes.
- Cumulative plus Self-Storage and Commercial projects - This scenario is the baseline Cumulative scenario.

The study intersection approaches were balanced using the difference method. Turning movements were then developed using the techniques described in NCHRP Report 255 (Furness factoring). These forecasts represent projected Cumulative 2040 turning movement volumes at each of the study intersections and along the roadway segments.

2040 Cumulative Less Self-Storage Project

Traffic Volumes. 2040 Cumulative Less Self-Storage Project traffic volumes were developed by deducting the traffic volumes generated from the self-storage project from the 2040 Cumulative volumes. Figure 9 displays the traffic volumes at each study intersection in both a.m. and p.m. peak hours.

KSDA



**CUMULATIVE WITHOUT SELF-STORAGE PROJECT
TRAFFIC VOLUMES AND LANE CONFIGURATIONS**

Intersection Levels of Service. Intersection Levels of Service were calculated and used as the basis for evaluating project impacts. Table 16 displays the peak hour Levels of Service at each study intersection under Year 2040 Less Self-Storage project conditions; the commercial site is considered built under this scenario. Within El Dorado County all intersections except the Green Valley Road / Shadowfax Lane intersection will continue to operate above the minimum El Dorado County standard (i.e., LOS E). The Shadowfax Lane intersection will operate with the northbound approach at LOS F in the a.m. peak hour (98.3 spv) and p.m. peak hour (212.2 spv). This intersection will not meet the peak hour signal warrant. The Francisco Drive / El Dorado Hills Blvd intersection will continue to operate within County LOS thresholds and meet the peak hour warrant in the a.m. peak hour.

Within the City of Folsom the Green Valley Road / East Natoma Street intersection will decline to LOS D conditions in the a.m. peak hour (37.4 spv) and p.m. peak hour (54.3 spv).

2040 Intersection Queues. Table 17 identifies peak period queues without the self-storage project constructed. Those 95th percentile queues with lengths exceeding the available storage have been highlighted. Under 2040 less Self-Storage project conditions the 95th percentile queue exceeds the available storage in three locations, all at the Green Valley Road / Francisco Road intersection. The northbound and westbound left turn lanes will have queues that exceed the turn lane by less than 25 feet; however, these queues should be able to be contained within the left turn tapers. The eastbound left lane queues are projected to extend to about 407 feet. This is about 110 feet beyond the existing turn lanes.

2040 Roadway Segment Levels of Service. Table 18 summarizes the Levels of Service based on the projected 2040 traffic volumes on study area roads with the future roadway configuration along Green Valley Road. Applicable Level of Service thresholds and roadway classifications are presented. The Levels of Service along Green Valley Road were computed using the HCS multilane highways methodology while Sophia Parkway was computed using the two-lane roadway methodology. All segments are projected to operate at LOS D or better.

**TABLE 16
PEAK HOUR INTERSECTION LEVELS OF SERVICE
2040 LESS SELF-STORAGE PROJECT CONDITIONS**

Location	Control	AM Peak Hour		PM Peak Hour		Traffic Signal Warranted?
		LOS	Average Delay	LOS	Average Delay	
1. Green Valley Rd / Blue Ravine Rd/ E. Natoma St	Signal	D	37.4	D	54.3	N/A
2. Green Valley Rd / Shadowfax Ln NB WB Left	NB Stop	F B	98.3 10.5	F C	212.2 20.3	No
3. Green Valley Rd / Sophia Parkway	Signal	B	16.4	D	36.5	N/A
4. Green Valley Rd / Francisco Dr	Signal	D	43.9	E	78.2	N/A
5. Sophia Parkway / Elmores Way	AWS	A	9.2	A	9.5	No
6. Francisco Dr / El Dorado Hills Blvd	AWS	C	17.9	D	25.5	Yes*
7. Sophia Parkway / Melina Dr – Alexandra Dr	AWS	A	8.1	A	9.4	No
8. Green Valley Rd / Project Access NB Right	NB Stop	B	12.7	D	28.0	No
9. Sophia Parkway / Project Access EB Right	EB Stop	A	9.1	B	10.5	No

* meets peak hour warrant in AM peak hour

**TABLE 17
QUEUES AT SIGNALIZED INTERSECTIONS
2040 LESS SELF-STORAGE PROJECT CONDITIONS**

Location	Length (feet)	AM Peak Hour		PM Peak Hour	
		VPH	Queue (feet)	VPH	Queue (feet)
3. Green Valley Rd / Sophia Parkway					
NB left + left-through*	210	311	182	158	101
EB left turn	220	36	51	28	51
WB left turn	315†	38	63	97	167
4. Green Valley Rd / Francisco Dr					
NB left turn (2)	225	324	170	419	236
SB left turn	190	100	128	155	181
EB left turn (2)	295	214	124	528	407
WB left turn	200	35	145	75	217
<p>Highlighted values indicate queue length in excess of available storage</p> <p>Highlighted values indicate queue can store within left turn taper</p> <p>* left-through lane is approach lane</p> <p>† left turn turns into TWLTL</p>					

KSDA

**TABLE 18
ROAD SEGMENT LEVELS OF SERVICE
2040 LESS SELF-STORAGE PROJECT CONDITIONS**

Roadway	Location	Facility Classification	ATS/PTSF/Density /LOS	ATS/PTSF/Density/LOS
			Existing AM	Existing PM
Green Valley Rd	Folsom Limits to Sophia Parkway	Multi-Lane Highway	--- / --- / 9.0 / A	--- / --- / 18.9 / C
	EB WB		--- / --- / 19.2 / C	--- / --- / 14.4 / B
Sophia Parkway	Green Valley Rd to Corsica Dr	Class I Highway	52.4 / 68.7 / --- / D	51.2 / 53.6 / --- / C
	NB SB		51.9 / 31.1 / --- / B	51.0 / 66.9 / --- / D

ATS – average travel speed
 PTSF – percent time spent following
 Density – passenger cars / mile / lane

KDA

2040 Cumulative Less Commercial Project

Traffic Volumes. 2040 Cumulative Less Commercial Project traffic volumes were developed by deducting the traffic volumes generated from the commercial site from the 2040 Cumulative volumes. Figure 10 displays the traffic volumes at each study intersection in both a.m. and p.m. peak hours.

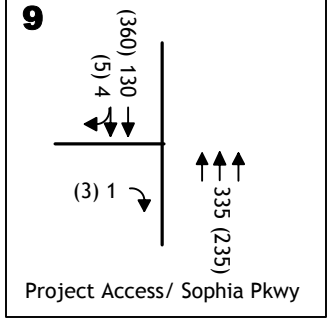
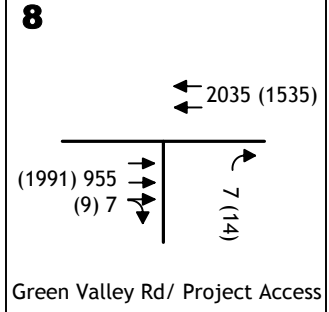
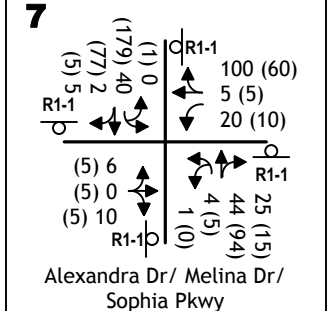
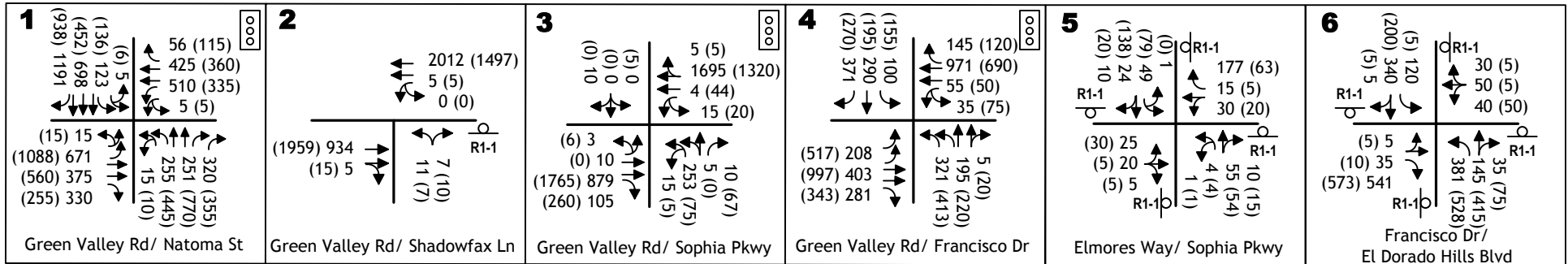
Intersection Levels of Service. Table 19 displays the peak hour Levels of Service at each study intersection under Year 2040 Less Commercial project conditions; the self-storage site is considered built under this scenario. Within El Dorado County all intersections except the Green Valley Road / Shadowfax Lane intersection will continue to operate above the minimum El Dorado County standard (i.e., LOS E). The Shadowfax Lane intersection will operate with the northbound approach at LOS F in the a.m. peak hour (79.5 spv) and p.m. peak hour (316.9 spv). This intersection will not meet the peak hour signal warrant. The Francisco Drive / El Dorado Hills Blvd intersection will continue to operate within County LOS thresholds and meet the peak hour warrant in the a.m. peak hour.

Within the City of Folsom the Green Valley Road / East Natoma Street intersection will decline to LOS D conditions in the a.m. peak hour (37.2 spv) and p.m. peak hour (53.3 spv).

2040 Intersection Queues. Table 20 identifies peak period queues without the commercial project constructed. Those 95th percentile queues with lengths exceeding the available storage have been highlighted. Under 2040 less Commercial project conditions the 95th percentile queue exceeds the available storage in three locations, all at the Green Valley Road / Francisco Road intersection. The northbound and westbound left turn lanes will have queues that exceed the turn lane by less than 25 feet, and these queues should be able to be contained within the left turn tapers. The eastbound left lane queues are projected to extend to about 398 feet, about 100 feet beyond the existing turn lanes.

2040 Roadway Segment Levels of Service. Table 21 summarizes the Levels of Service based on the projected 2040 traffic volumes on study area roads with the future roadway configuration along Green Valley Road. All segments are projected to operate at LOS D or better.

KDA



CUMULATIVE WITHOUT COMMERCIAL PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

**TABLE 19
PEAK HOUR INTERSECTION LEVELS OF SERVICE
2040 LESS COMMERCIAL PROJECT CONDITIONS**

Location	Control	AM Peak Hour		PM Peak Hour		Traffic Signal Warranted?
		LOS	Average Delay	LOS	Average Delay	
1. Green Valley Rd / Blue Ravine Rd/ E. Natoma St	Signal	D	37.2	D	53.3	N/A
2. Green Valley Rd / Shadowfax Ln NB WB Left	NB Stop	F B	79.5 10.4	F C	316.9 19.8	No
3. Green Valley Rd / Sophia Parkway	Signal	B	14.4	C	27.4	N/A
4. Green Valley Rd / Francisco Dr	Signal	D	42.8	E	75.0	N/A
5. Sophia Parkway / Elmores Way	AWS	A	8.7	A	8.8	No
6. Francisco Dr / El Dorado Hills Blvd	AWS	C	17.7	C	24.8	Yes*
7. Sophia Parkway / Melina Dr – Alexandra Dr	AWS	A	7.9	A	9.1	No
8. Green Valley Rd / Project Access NB Right	NB Stop	B	12.3	C	23.2	No
9. Sophia Parkway / Project Access EB Right	EB Stop	A	8.7	A	9.5	No

* meets peak hour warrant in AM peak hour

**TABLE 20
QUEUES AT SIGNALIZED INTERSECTIONS
2040 LESS COMMERCIAL PROJECT CONDITIONS**

Location	Length (feet)	AM Peak Hour		PM Peak Hour	
		VPH	Queue (feet)	VPH	Queue (feet)
3. Green Valley Rd / Sophia Parkway					
NB left + left-through*	210	268	157	80	57
EB left turn	220	13	30	6	20
WB left turn	315†	19	39	64	95
4. Green Valley Rd / Francisco Dr					
NB left turn (2)	225	321	169	413	231
SB left turn	190	100	128	155	181
EB left turn (2)	295	208	120	517	398
WB left turn	200	35	145	75	217
<p>Highlighted values indicate queue length in excess of available storage</p> <p>Highlighted values indicate queue can store within left turn taper</p> <p>* left-through lane is approach lane</p> <p>† left turn turns into TWLTL</p>					

**TABLE 21
ROAD SEGMENT LEVELS OF SERVICE
2040 LESS COMMERCIAL PROJECT CONDITIONS**

Roadway	Location	Facility Classification	ATS/PTSF/Density /LOS	ATS/PTSF/Density/LOS
			Existing AM	Existing PM
Green Valley Rd	Folsom Limits to Sophia Parkway	Multi-Lane Highway	--- / --- / 8.8 / A	--- / --- / 18.6 / C
	EB WB		--- / --- / 19.0 / C	--- / --- / 14.1 / B
Sophia Parkway	Green Valley Rd to Corsica Dr	Class I Highway	53.7 / 66.0 / --- / D	52.4 / 39.7 / --- / B
	NB SB		52.6 / 22.4 / --- / B	52.8 / 60.6 / --- / C

ATS – average travel speed
 PTSF – percent time spent following
 Density – passenger cars / mile / lane

KDA

2040 Including Self-Storage and Commercial Projects

Traffic Volumes. 2040 Cumulative traffic volumes within the TDM include commercial zoning in the Traffic Analysis Zone (TAZ) which contains the two projects. As noted earlier intersection turning movements were developed from the TDM using Furness factoring methodologies. Figure 11 displays the traffic volumes at each study intersection in both a.m. and p.m. peak hours.

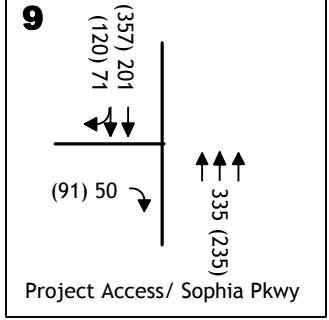
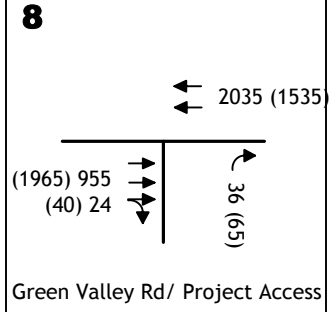
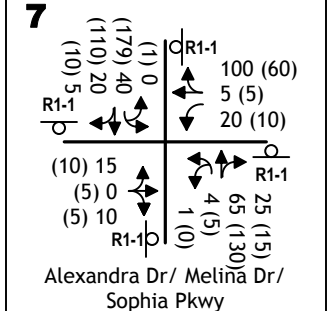
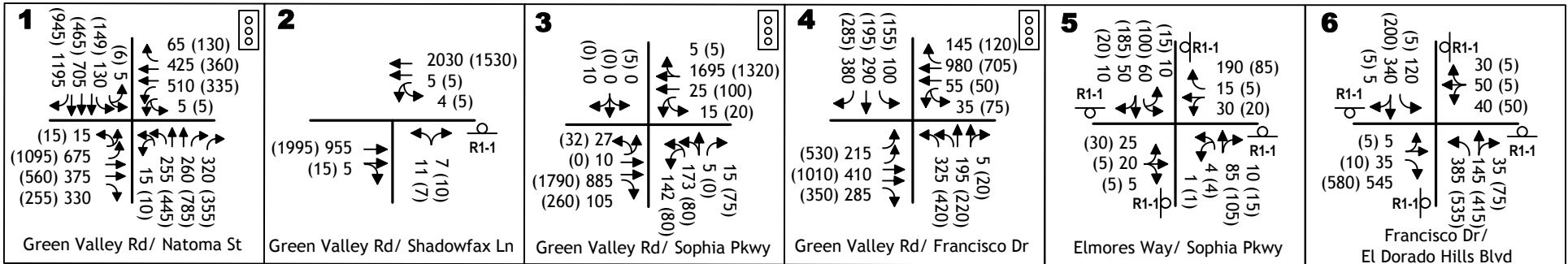
Intersection Levels of Service. Table 22 displays the peak hour Levels of Service at each study intersection under Year 2040 condition. Within El Dorado County all intersections except the Green Valley Road / Shadowfax Lane intersection will operate above the minimum El Dorado County standard (i.e., LOS E). The Shadowfax Lane intersection will operate with the northbound approach at LOS F in the a.m. peak hour (89.7 spv) and p.m. peak hour (359.2 spv). This intersection will not meet the peak hour signal warrant. The Francisco Drive / El Dorado Hills Blvd intersection will continue to operate within County LOS thresholds and meet the peak hour warrant in the a.m. peak hour.

Within the City of Folsom the Green Valley Road / East Natoma Street intersection will operate at LOS D conditions in the a.m. peak hour (37.5 spv) and p.m. peak hour (54.4 spv).

2040 Intersection Queues. Table 23 identifies peak period queues under cumulative 2040 conditions. Those 95th percentile queues with lengths exceeding the available storage have been highlighted. The 95th percentile queue exceeds the available storage in three locations, all at the Green Valley Road / Francisco Road intersection. The northbound and westbound left turn lanes will have queues that exceed the turn lane by less than 25 feet, and these queues should be able to be contained within the left turn tapers. The eastbound left lane queues are projected to extend to about 410 feet, about 115 feet beyond the existing turn lanes.

2040 Roadway Segment Levels of Service. Table 24 summarizes the Levels of Service based on the projected 2040 traffic volumes on study area roads with the future roadway configuration along Green Valley Road. All segments are projected to operate at LOS D or better.

KDA



**CUMULATIVE PLUS SELF-STORAGE AND COMMERCIAL PROJECTS
TRAFFIC VOLUMES AND LANE CONFIGURATIONS**

KD Anderson & Associates, Inc.
Transportation Engineers

3509-01 RA 10/26/2018

figure 11

**TABLE 22
PEAK HOUR INTERSECTION LEVELS OF SERVICE
2040 CUMULATIVE PLUS SELF STORAGE AND COMMERCIAL PROJECT CONDITIONS**

Location	Control	AM Peak Hour		PM Peak Hour		Traffic Signal Warranted?
		LOS	Average Delay	LOS	Average Delay	
1. Green Valley Rd / Blue Ravine Rd/ E. Natoma St	Signal	D	37.5	D	54.4	N/A
2. Green Valley Rd / Shadowfax Ln NB WB Left	NB Stop	F B	89.7 10.5	F C	359.2 20.8	No
3. Green Valley Rd / Sophia Parkway	Signal	B	17.0	D	41.9	N/A
4. Green Valley Rd / Francisco Dr	Signal	D	44.1	E	78.8	N/A
5. Sophia Parkway / Elmores Way	AWS	A	9.2	A	9.6	No
6. Francisco Dr / El Dorado Hills Blvd	AWS	C	18.0	D	25.6	Yes*
7. Sophia Parkway / Melina Dr – Alexandra Dr	AWS	A	8.2	A	9.4	No
8. Green Valley Rd / Project Access NB Right	NB Stop	B	12.8	D	29.2	No
9. Sophia Parkway / Project Access EB Right	EB Stop	A	9.4	B	10.6	No

* meets peak hour warrant in AM peak hour

**TABLE 23
QUEUES AT SIGNALIZED INTERSECTIONS
2040 CUMULATIVE PLUS SELF STORAGE AND COMMERCIAL PROJECT CONDITIONS**

Location	Length (feet)	AM Peak Hour		PM Peak Hour	
		VPH	Queue (feet)	VPH	Queue (feet)
3. Green Valley Rd / Sophia Parkway					
NB left + left-through*	210	315	185	160	102
EB left turn	220	37	63	32	58
WB left turn	315†	40	66	120	214
4. Green Valley Rd / Francisco Dr					
NB left turn (2)	225	325	170	420	238
SB left turn	190	100	128	155	181
EB left turn (2)	295	215	124	530	410
WB left turn	200	35	145	75	217
<p>Highlighted values indicate queue length in excess of available storage</p> <p>Highlighted values indicate queue can store within left turn taper</p> <p>* left-through lane is approach lane</p> <p>† left turn turns into TWLTL</p>					

**TABLE 24
ROAD SEGMENT LEVELS OF SERVICE
2040 CUMULATIVE PLUS SELF STORAGE AND COMMERCIAL PROJECT CONDITIONS**

Roadway	Location	Facility Classification	ATS/PTSF/Density /LOS	ATS/PTSF/Density/LOS
			Existing AM	Existing PM
Green Valley Rd	Folsom Limits to Sophia Parkway	Multi-Lane Highway	--- / --- / 9.0 / A	--- / --- / 18.9 / C
	EB WB		--- / --- / 19.2 / C	--- / --- / 14.5 / B
Sophia Parkway	Green Valley Rd to Corsica Dr	Class I Highway	52.3 / 68.8 / --- / D	51.1 / 53.4 / --- / C
	NB SB		51.9 / 32.3 / --- / B	50.9 / 67.1 / --- / D

ATS – average travel speed
PTSF – percent time spent following
Density – passenger cars / mile / lane

KDA

ON-SITE TRANSPORTATION REVIEW

An on-site review of the facilities was conducted based on the County's TIS Guidelines.

Accident Review of Local Roadways. County staff was contacted to obtain accident history in the area adjacent to the project location. The County noted that there have been several accidents near the Green Valley Road / Sophia Parkway intersection and along Green Valley Road in the project vicinity. The accident rate along Green Valley Road in the Sophia Parkway vicinity is below the County threshold to investigate improvements; therefore, no additional action to address safety is currently being considered in this area. Two collisions were also reported on Sophia Parkway, but not in the vicinity of the project area.

Site Circulation / Driveway Locations. There are two alternative site layouts for the projects. Both alternatives were reviewed. In both alternatives a reciprocal access easement is proposed at both Green Valley Drive and Sophia Parkway driveways. Both will be right-in, right-out accesses. It is anticipated that the project frontage along Green Valley Road will be widened to three lanes between Shadowfax Lane and Sophia Parkway. The third lane will be a trap lane for right turning vehicles, to enter the project driveway or Sophia Parkway.

Alternative #1 – This alternative consists of the self-storage site with smog shop on one parcel and retail / restaurant uses on the commercial site. The self-storage site is split by a seasonal water course running east to west. The self-storage area is gated to provide security with the office on both sides of the secure area. The inbound access to the self-storage area is from Green Valley Road and Sophia Parkway while an emergency vehicle access is located along Shadowfax Lane, in the southwest corner of the parcel. The Green Valley Road access is a direct access while traffic using the Sophia Parkway driveway will have to make right and left turns internally between the driveway and the gated access. Access to the smog shop will be similar.

The commercial parcel will also have access to the site via the Green Valley Road and Sophia Parkway driveways. The retail building is located on the south side of the parcel while the sit-down restaurant is along the west side of the parcel adjacent to the self-storage site. The fast-casual restaurant and fast food restaurant are adjacent to one another in the northeast quadrant of the site adjacent to the Green Valley Road / Sophia Parkway intersection. The fast food restaurant includes a drive-through lane with access adjacent to the Sophia Parkway driveway. The County's Parking and Loading Standards identifies requirements for fast food restaurants with drive-through facilities. The drive-through facility shall be located at the rear or side of a commercial site with the stacking lane physically separated from other on-site circulation. A minimum of four cars per drive-through window in addition to the car receiving service is required. The drive-through provides for eight vehicles to queue before reaching the main aisle of circulation. It is recommended that the order window be located to allow four vehicles to queue when ordering and when picking up.

Both driveways are designed to provide the minimum 25' throat depth at each of the driveways. The worst on-site queues are projected to occur under Existing plus Project p.m. peak hour conditions where the outbound queue along Green Valley Road would be three vehicles. However, with construction of the four-lane section of Green Valley Road imminent this queue will be reduced to a single vehicle. In 2040 both driveways are projected to have a single vehicle queue. Adequate queueing appears available. It is possible that vehicles exiting the Green Valley Road driveway and heading to the U/left turn lane along Sophia Parkway may create short term queues while waiting for a gap in eastbound traffic to occur.

Alternative #2 – Alternative #2 includes the self-storage facility on the west parcel with the east parcel including a one-tunnel automated car wash, the smog shop and the three restaurants. The car wash and smog shop replace the retail portion of the site along the south side of the parcel. The smog shop is adjacent to the Sophia Parkway driveway with access to the service bays via a drive aisle on the south side of the site. This drive aisle also provides access to the car wash entrance. Vehicles exit the car wash adjacent to the Sophia Parkway driveway. Access between the Sophia Parkway driveway and the self-storage parcel will require customers to make right and left turns internally between the driveway and the gated access. Access with the fast food restaurant drive-through lane is similar to Alternative #1.

Parking and Drive-Through Requirements. Parking requirements were reviewed to determine needed parking due to the zoning code and requirements relative to projected parking demand. Parking requirements relate to vehicles parked for extended periods of time for employees and customers within the office and retail uses as well as short-term parking and drive-through storage for the fast food restaurant site. Table 130.35.030.1 of the County's zoning code identifies off-street parking requirements for various uses. Table 25 displays the parking space requirements for each use type and the projected parking needs for both alternative site plans. Based on the zoning code 97 stalls are required for Alternative #1 which includes the retail element. Alternative #1 provides 129 parking stalls. Alternative #2 replaces the retail element with an automated car wash. The County's zoning code does not quantify automated car washes; therefore, a single car wash stall was used as the basis to estimate parking requirements. Under Alternative #2 51 stalls are required while the site provides 102 spaces. Based on the zoning code a single RV stall needs to be provided in both alternatives.

**TABLE 25
PARKING REQUIREMENTS PER ZONING CODE**

Use Type	Parking Space Requirement	Size	Parking Required
Alternative #1			
Mini-Warehouse (Self-Storage) – outdoor access with drive aisles	2 spaces	147,600 sf	2
Smog Shop	3 per service bay + 400 sf of office	1,300 sf	7
Shopping Center	1 per 300 sf (GFA)	14,400 sf	48
Fast Casual Restaurant	1 per 300 sf. of dining room area; plus 1 per 2 employees; plus 1 RV space for every 20 parking spaces.	1,800 sf	8†
High Turnover Restaurant	1 per 300 sf. of dining room area; plus 1 per 2 employees; plus 1 RV space for every 20 parking spaces.	5,000 sf	24‡
Fast Food Restaurant with Drive-Through	1 per 300 sf. of dining room area; plus 1 RV space for every 20 parking spaces.	2,270 sf	8
Total Stalls Required			97
Alternative #2			
Mini-Warehouse (Self-Storage) – outdoor access with drive aisles	2 spaces	149,500 sf	2
Smog Shop	3 per service bay + 400 sf of office	1,800 sf	7
Automated Car Wash	2 per washing stall◇	1 tunnel	2
Fast Casual Restaurant	1 per 300 sf. of dining room area; plus 1 per 2 employees; plus 1 RV space for every 20 parking spaces.	1,800 sf	8†
High Turnover Restaurant	1 per 300 sf. of dining room area; plus 1 per 2 employees; plus 1 RV space for every 20 parking spaces.	5,000 sf	24‡
Fast Food Restaurant with Drive-Through	1 per 300 sf. of dining room area; plus 1 RV space for every 20 parking spaces.	2,270 sf	8
Total Stalls Required			51

AUA – active use area † assumed 2 employees in shift
GFA – gross floor area ‡ assumed 14 employees in shift
◇ automated tunnels not identified in zoning code; provided 2 stalls for employees

Three types of design vehicles will need to access the site. One includes a California Legal truck (CA-Legal) to access the fast food restaurant. The second design vehicle is expected to be a mobile home with trailer accessing the self-storage site while the third is a fire truck using the

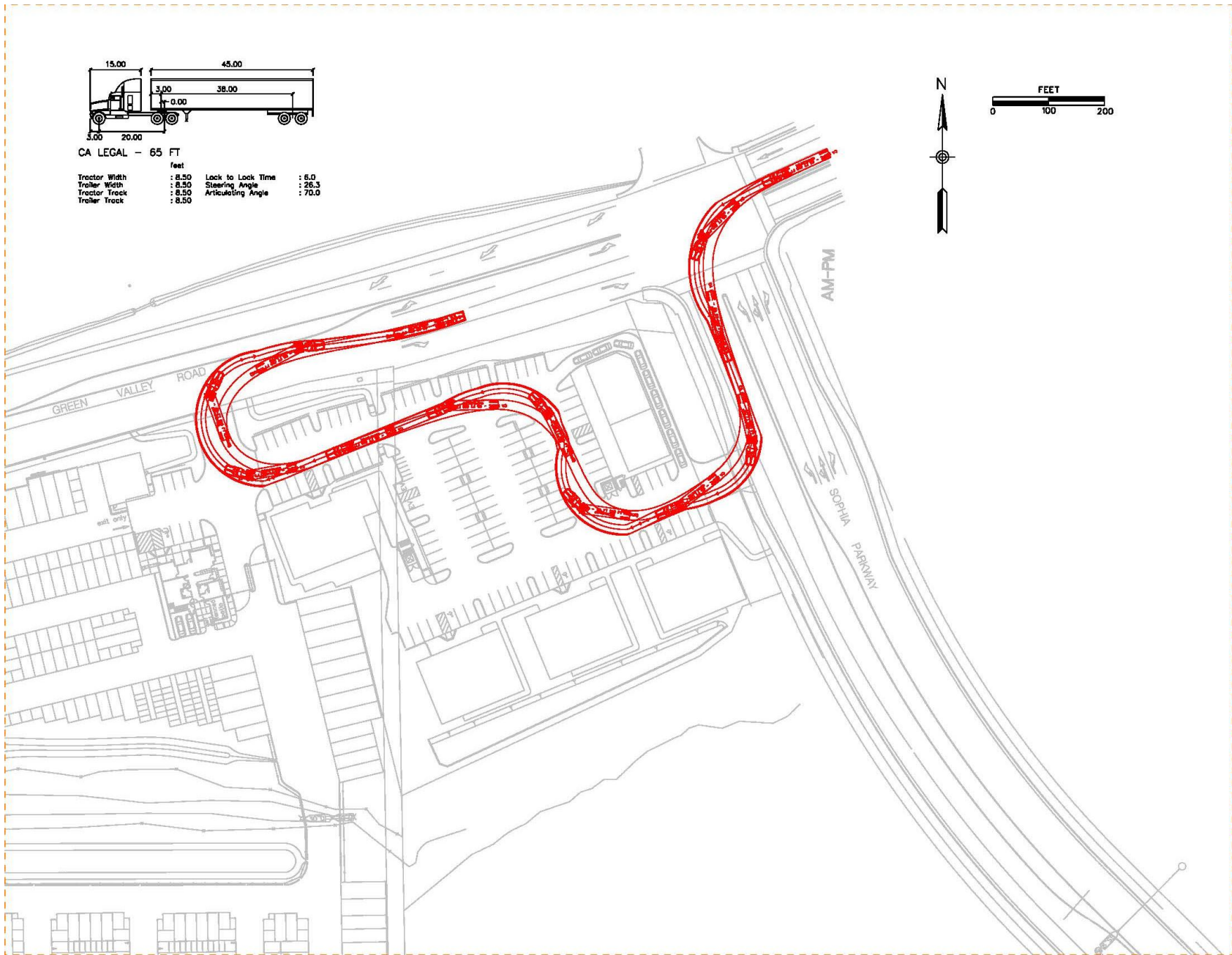
KDA

emergency access along Shadowfax Lane. An AutoTurn assessment was completed and is shown in Figures 12 -14. CA-Legal trucks will be able to enter the site from Sophia Parkway and exit via the Green Valley Road driveway. Truck access should be limited to off-hours as a Cal-Legal truck will encroach into parking stalls when turning into the drive aisle adjacent to the fast food / fast casual restaurants. In addition, the drive aisle could be blocked while trucks are unloading. Figures 13 and 14 present the turning templates for a motor home with trailer combination. This would appear to be the worst-case scenario for the self-storage site. Figure 13 presents access from Green Valley Road with all three exit points shown. Figure 14 shows inbound access from Sophia Parkway with exiting onto Green Valley Road. A motor home with trailer approaching the site from Sophia Parkway cannot make a U-turn at either the Green Valley Road / Sophia Parkway intersection or the Green valley Road / Shadowfax Lane intersection. These vehicles would need to approach the site from Green Valley Road; however, a passenger car with trailer can complete a U-turn at Shadowfax Lane which is illustrated in Figure 13. Similar to instructions given to truck drivers for deliveries the self-storage site should indicate how all vehicle types should enter the site. Figure 13 also presents fire truck accessibility through the emergency vehicle access on Shadowfax Lane and into the back of the self-storage site.

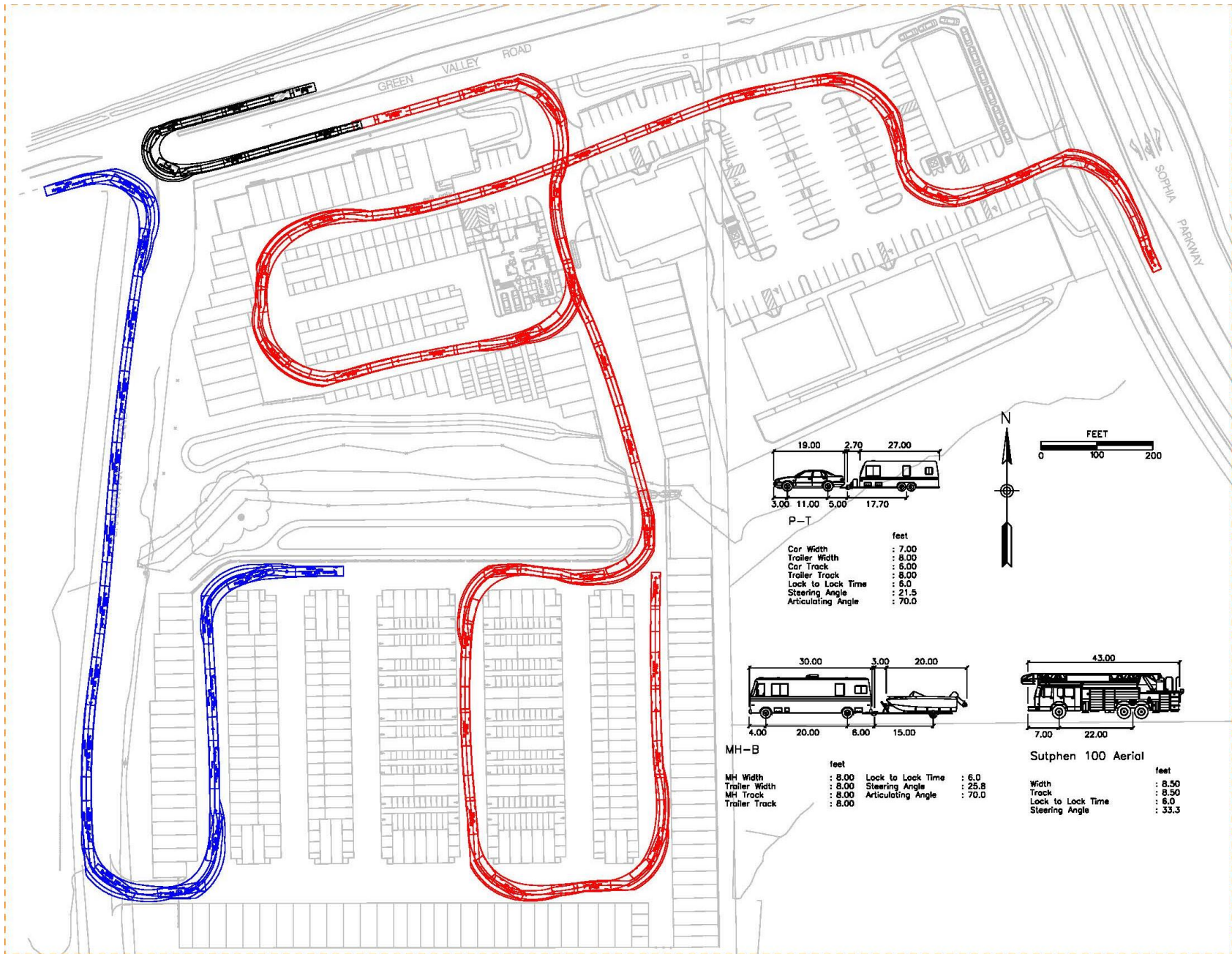
Sight Distance. A sight distance analysis was completed at the proposed project driveways along Green Valley Road and Sophia Parkway. Available sight distance was evaluated using the standards documented in the Caltrans *Highway Design Manual* (HDM). Based on the locations of the driveways “**Minimum Stopping Sight Distance**” (MSSD) and “**Corner Sight Distance**” (CSD) was considered. These criteria are documented in Tables 201.1 and 405.1A of the HDM; the HDM notes that the MSSD criterion is used for CSD evaluation at driveways.

Green Valley Road Right-In/Right-Out Driveway. The posted speed limit along Green Valley Road west of Shadowfax Lane is 55 miles per hour (mph) and 50 mph east of Shadowfax Lane. The 55-mph speed was used to establish sight distance conditions due to the proximity of the driveway to the speed limit change. The corresponding minimum sight distance standard for this speed is 500 feet. It is expected that frontage improvements including adding a trap lane for right turning vehicles will be constructed along Green Valley Road between Shadowfax Lane and Sophia Parkway. The driveway is expected to be located about midway between Shadowfax Lane and Sophia Parkway, about 400 feet from either intersection. To maintain adequate sight distance looking west the sight line should be clear of all fencing and landscaping materials over 2 feet in height. Signage should also be placed outside of the sight lines where practicable.

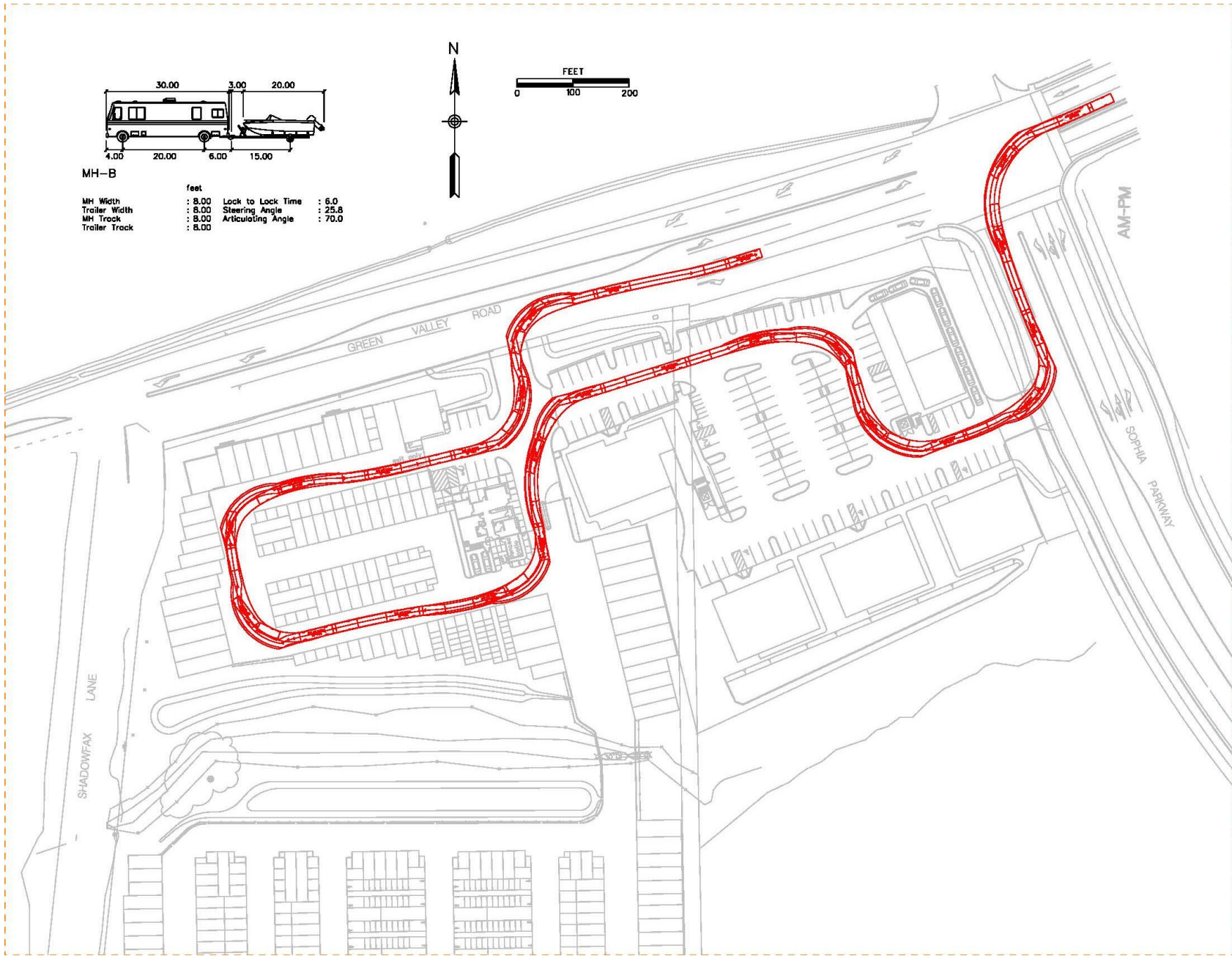
Sophia Parkway Driveway. This driveway is projected to be located about 170 feet from the Green Valley Road / Sophia Parkway intersection. As the adjacent intersection is controlled by a traffic signal there are gaps created by the phases to allow vehicles to enter southbound Sophia Parkway. The posted speed along Sophia Parkway is 50 mph; however, vehicles will not be traveling at that speed passing the driveway. The sight lines from the driveway are about 200 feet to the eastbound right turn lane. These correspond to speeds of 35 mph and 30 mph, respectively and would appear adequate based on the local conditions, i.e. driveway location relative to intersection, speeds of vehicles completing right and left turns and traffic signal.



CAL LEGAL ACCESS



MOTOR HOME WITH TRAILER INBOUND VIA GREEN VALLEY ROAD



MOTOR HOME WITH TRAILER INBOUND VIA SOPHIA PARKWAY

FINDINGS / RECOMMENDATIONS / MITIGATIONS

The preceding analysis has identified project impacts that may occur without mitigation. The text that follows identifies a strategy for mitigating the impacts of the proposed project. Recommendations are identified for facilities that have deficiencies in the roadway network without the project. If the project causes a significant impact, mitigations are identified for the facility.

Existing Conditions

Intersections

All intersections, except the Green Valley Road / Shadowfax Lane intersection operate within acceptable El Dorado County and City of Folsom LOS thresholds.

- Green Valley Road / Shadowfax Lane: The northbound approach of the intersection operates at LOS F in both a.m. and p.m. peak hours. The street has minimal traffic volumes and does not meet the peak hour signal warrant.

Queues

Under current conditions three movements have queues that exceed the available storage. These include:

Green Valley Road / Francisco Drive

- NB left turn
- EB left turn
- WB left turn

The westbound left turn lane at this intersection exceeds the available storage length by less than 25 feet and it is assumed that a vehicle would be able to queue in the left turn taper.

Roadway Segments

All roadway segments will operate within the County level of service threshold, at LOS E or better.

Existing Plus Self-Storage Project Impacts

Intersections

All intersections, except the Green Valley Road / Shadowfax Lane intersection operate within acceptable El Dorado County and City of Folsom LOS thresholds. The following mitigations are noted:

- Green Valley Road / Shadowfax Lane: The northbound approach of the intersection operates at LOS F in both a.m. and p.m. peak hours. The street has minimal traffic volumes and does not meet the peak hour signal warrant. The project will add more than 10 trips to the intersection along Green Valley Road in the p.m. peak hour but will not meet the peak hour signal warrant. Since the signal warrant is not met, this is not considered a significant impact.

- The project shall contribute its fair share to the cost of regional circulation improvements via the existing countywide traffic impact mitigation (TIM) fee program.
- The project should construct the following improvements:
 - o Add an exclusive right turn lane along Green Valley Road between Shadowfax Lane and the project driveway. This will allow turning vehicles to exit from the through lanes along Green Valley Road. With the commercial project completed this will become a right-only lane between Shadowfax Lane and Sophia Parkway.
 - o Sidewalk should be installed along the project frontage on Green Valley Road.
- The following on-site mitigations should be constructed:
 - o Landscaping adjacent to the driveway should be limited to vegetation no higher than 2 feet to provide visibility to see oncoming traffic along eastbound Green Valley Road.

Queues

Under Existing plus Self-Storage Project conditions four movements have queues that exceed the available storage. These include:

Green Valley Road / Sophia Parkway

- WB left turn

Green Valley Road / Francisco Drive

- NB left turn
- EB left turn
- WB left turn

The queue in the westbound left turn lane approaching Sophia Parkway will extend to 321 feet, 6 feet longer than the marked turn lane. Since the left turn lane transitions into a TWLTL this will allow the queue to store without blocking through traffic. The queues will increase at the Green Valley Road / Francisco Road intersection by up to 6 feet with the westbound left turn queue able to queue in the left turn taper.

Roadway Segments

All roadway segments will operate within the County level of service threshold, at LOS E or better.

Existing Plus Commercial Project Impacts

Intersections

All intersections, except the Green Valley Road / Shadowfax Lane intersection operate within acceptable El Dorado County and City of Folsom LOS thresholds. The following mitigations are noted:

- Green Valley Road / Shadowfax Lane: The northbound approach of the intersection will operate at LOS F in both a.m. and p.m. peak hours. The street has minimal traffic volumes and does not meet the peak hour signal warrant. The project will add more than 10 trips to the intersection along Green Valley Road in the p.m. peak hour but will not meet the peak

KDA

hour signal warrant. Since the signal warrant is not met, this is not considered a significant impact.

- Green Valley Road / Project Driveway: The driveway approach will operate at LOS F in the p.m. peak hour. The intersection will not meet the peak hour signal warrant. Since the signal warrant is not met, this is not considered a significant impact.
- The project shall contribute its fair share to the cost of regional circulation improvements via the existing countywide traffic impact mitigation (TIM) fee program.
- The project should construct the following improvements:
 - o Add an exclusive right turn lane along Green Valley Road between the project driveway and Sophia Parkway. This will allow vehicles to accelerate into through traffic lanes. With the self-storage project completed this will become a right-only lane between Shadowfax Lane and Sophia Parkway.
 - o Sidewalk should be installed along the project frontage on Green Valley Road.
 - o Parking should be prohibited along the Sophia Parkway project frontage to maximize sight distance at the project driveway.
- The following on-site mitigations should be constructed:
 - o Landscaping adjacent to the drive-through entrance should be limited to vegetation no higher than 2 feet to provide visibility for traffic near the Sophia Parkway driveway;
 - o Landscaping adjacent to the drive-through exit should be limited to vegetation no higher than 2 feet to maintain visibility for exiting vehicles;
 - o Install a stop sign with limit line at the drive-through exit;
 - o Delivery truck access should be limited to off-hours to minimize disruption of traffic circulation.

Queues

Under Existing plus Commercial Project conditions four movements have queues that exceed the available storage. These include:

Green Valley Road / Sophia Parkway

- WB left turn

Green Valley Road / Francisco Drive

- NB left turn
- EB left turn
- WB left turn

The queue in the westbound left turn lane approaching Sophia Parkway will extend to 398 feet. However, the left turn lane transitions into a TWLTL that extends about 300 feet before approaching Amy’s Lane. The TWLTL will allow the queue to store without blocking through traffic or westbound traffic from Amy’s Lane. The queues will increase at the Green Valley Road / Francisco Road intersection by up to 6 feet with the westbound left turn queue able to queue in the left turn taper. These queues are not significant impacts.

KDA

Roadway Segments

The Green Valley Road segment will operate at LOS F in both eastbound and westbound directions. This is considered a significant impact.

Mitigation will require addition of second lanes in both directions and is included in the County's CIP Project #72376, Green Valley Widening from County Line to Sophia Parkway. This identified mitigation is included in the 20-year CIP. Therefore, consistent with General Plan Goal TC-X and supporting policy TC-Xf, payment of traffic impact mitigation fees would satisfy the project's fair share obligation towards this improvement. The City of Folsom is currently undertaking this construction project and once completed, the roadway segment will improve to LOS B or better.

2040 Cumulative Less Self-Storage Project Conditions

Intersections

All intersections, except the Green Valley Road / Shadowfax Lane intersection operates within acceptable El Dorado County and City of Folsom LOS thresholds.

- Green Valley Road / Shadowfax Lane: The northbound approach of the intersection operates at LOS F in both a.m. and p.m. peak hours. The street has minimal traffic volumes and does not meet the peak hour signal warrant.

Queues

Under 2040 less Self-Storage conditions three movements have queues that exceed the available storage. These include:

Green Valley Road / Francisco Drive

- NB left turn
- EB left turn
- WB left turn

The northbound and westbound left turn lanes at this intersection exceed the available storage length by less than 25 feet and it is expected that a vehicle would be able to queue in the left turn tapers of each approach. The eastbound left turn lane will exceed the available turn lanes by 112 feet.

Roadway Segments

All roadway segments will operate within the County level of service threshold, at LOS D or better.

2040 Cumulative Less Commercial Project Conditions

Intersections

All intersections, except the Green Valley Road / Shadowfax Lane intersection operates within acceptable El Dorado County and City of Folsom LOS thresholds.

- Green Valley Road / Shadowfax Lane: The northbound approach of the intersection operates at LOS F in both a.m. and p.m. peak hours. The street has minimal traffic volumes and does not meet the peak hour signal warrant.

Queues

Under 2040 less Commercial conditions three movements have queues that exceed the available storage. These include:

Green Valley Road / Francisco Drive

- NB left turn
- EB left turn
- WB left turn

The northbound and westbound left turn lanes at this intersection exceed the available storage length by less than 25 feet and it is expected that a vehicle would be able to queue in the left turn tapers of each approach. The eastbound left turn lane will exceed the available turn lanes by 103 feet.

Roadway Segments

All roadway segments will operate within the County level of service threshold, at LOS D or better.

2040 Cumulative Conditions Impacts

Intersections

All intersections, except the Green Valley Road / Shadowfax Lane intersection operates within acceptable El Dorado County and City of Folsom LOS thresholds.

- Green Valley Road / Shadowfax Lane: The northbound approach of the intersection will operate at LOS F in both a.m. and p.m. peak hours. The street has minimal traffic volumes and does not meet the peak hour signal warrant. The projects will add more than 10 trips to the intersection along Green Valley Road in both peak periods, but the intersection will not meet the peak hour signal warrant. Since the signal warrant is not met, this is not considered a significant impact.

Queues

Under Cumulative 2040 conditions three movements have queues that will exceed the available storage. These are identified below.

Green Valley Road / Francisco Drive

- NB left turn
- EB left turn
- WB left turn

The northbound left turn lanes are projected have queues of up to 238 feet in the p.m. peak hour. This is 7 feet longer than the projected queue under Cumulative less Self-Storage and 2 feet longer than the projected queue under Cumulative less Commercial scenarios. All three scenarios will have queues that exceed the existing turn lane by less than 25 feet. It is expected that a vehicle would be able to queue in the left turn taper. No mitigations are necessary.

The westbound left turn lanes are projected have queues of up to 217 feet in the p.m. peak hour. This is the same distance for all three study scenarios. The queue exceeds the existing turn lane by 17 feet. It is expected that a vehicle would be able to queue in the left turn taper. No mitigations are necessary.

The eastbound left turn lanes are projected to have queues of up to 410 feet in the p.m. peak hour. This is 12 feet longer than the projected queue under Cumulative less Self-Storage and 3 feet longer than the projected queue under Cumulative less Commercial scenarios. All three scenarios will have queues that exceed the existing turn lane by over 100 feet. As the relative impact of both projects is less than 25 feet this is not considered a significant impact.

Roadway Segments

All roadway segments will continue to operate within the County level of service threshold, at LOS D or better.

REFERENCES

1. Transportation Research Board, *Highway Capacity Manual*, 2010 and 6th Edition
2. Caltrans *Highway Design Manual*, 2016
3. California *Manual of Uniform Traffic Control Devices*, 2014
4. Institute of Transportation Engineers. 2017. *Trip Generation*, 10th Edition. Washington, D.C.
5. Telephone and E-mail correspondence, Natalie Porter, El Dorado County, August through October 2018
6. Telephone and E-mail correspondence, Katie Jackson, El Dorado County, June-July 2018
7. *Trip Generation Handbook*, Institute of Transportation Engineers, 3rd Edition, 2017
8. National Cooperative Highway Research Program (NCHRP) Report 255, *Highway Traffic Data for Urbanized Area Project Planning and Design*, December 1982

KDA

APPENDICES

(under separate cover)