Part 3

Planning Department <planning@edcgov.us>

FW: Saratoga Retail Phase 2 - DR-R18-0001 (email 5)

1 message

Brooke E. Washburn <BWashburn@murphyaustin.com> Thu, Aug 16, 2018 at 2:21 PM
To: "planning@edcgov.us" <planning@edcgov.us>

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From: Brooke E. Washburn
Sent: Thursday, August 16, 2018 1:25 PM
To: 'charlene.tim@edcgov.us' <charlene.tim@edcgov.us>
Cc: 'Timothy White' <tjwhitejd@gmail.com>; 'John Davey' <jdavey@daveygroup.net>; 'john.hidahl@edcgov.us' <john.hidahl@edcgov.us>; 'jvegna@edcgov.us' <jvegna@edcgov.us>; 'Hilary Krogh - Saratoga' <hilaryd73@gmail.com>; 'Kim S - Camom' <CAmom2345@hotmail.com>; 'Rebecca - neighbor' <rebecca.isbell@ymail.com>; 'Wes Washburn' <weswashburn@yahoo.com>
Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 5)

Attached, please find pdf documents that are collectively **Exhibit F**, substantial evidence submitted to demonstrate a significant impact to Noise (Section F. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

In addition, the following link is submitted:

Reference link to the Saratoga Estates Draft EIR

http://edcapps.edcgov.us/Planning/ProjectDocuments/TM14-1520%20PD14-0006%20Z14-0007%20DA15-0001%20-%20DEIR.pdf

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18-1215 Public Comment
PC Rcvd 08-16-18

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Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 4)

Attached, please find pdf documents that are collectively **Exhibit E**, substantial evidence submitted to demonstrate a significant impact to Land Use (Section E. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

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Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 3)

Attached, please find pdf documents that are collectively **Exhibit B**, substantial evidence submitted to demonstrate a significant impact to Air Pollution (Section B. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

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Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 2)

Attached, please find pdf documents that are collectively **Exhibit A**, substantial evidence submitted to demonstrate a significant impact to Aesthetics (Section A. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

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Subject: Saratoga Retail Phase 2 - DR-R18-0001

Dear Charlene,

Attached is public comment submitted by affected and concerned residents with regard to a proposed project (Saratoga Retail Phase 2 - DR-R18-0001). Due to the size of the documentation to be submitted, I will send all attachments under separate cover. Kindly include all comments and attachments in the public record for the project (Saratoga Retail Phase 2 - DR-R18-0001), and submit the same to the commission in advance of the **August 23, 2018**, hearing.

Brooke E. Washburn

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18-1215 Public Comment
PC Rcvd 08-16-18

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See email (HV

Draft

Environmental Impact Report/ Environmental Assessment

for the

U.S. Highway 50/ El Dorado Hills Boulevard-Latrobe Road Interchange Project

Volume I: Environmental Impact Report/ Environmental Assessment

El Dorado County
Department of Transportation

November 1999

Chapter 4. Noise

This chapter evaluates noise impacts associated with construction and operation of the proposed improvements to the U.S. Highway 50/El Dorado Hills Boulevard-Latrobe Road interchange. The contents of this chapter are based on the September 1, 1998 report entitled Environmental Noise Analysis - El Dorado Hills Boulevard/U.S. 50 Interchange Modification Project that was prepared by Brown-Buntin Associates (BBA) (Brown-Buntin Associates 1999). A copy of this report is provided in Appendix B-2. Background information on environmental acoustics and definitions of commonly used terminology are provided in Appendix B-1.

AFFECTED ENVIRONMENT

Plans and Policies

El Dorado County General Plan

The El Dorado County General Plan Noise Element establishes noise-level criteria for residential uses; these include an exterior noise-level criterion of 60 decibels (dB), day-night average sound level (L_{dn}) at outdoor activity areas exposed to transportation-related noise sources and an interior noise level criterion of 45 dB L_{dn}. Where it is not possible to reduce noise in outdoor activity areas to 60 dB L_{dn} or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB L_{dn} may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are below 45 dB L_{dn}. The noise element discourages the use of noise walls within the foreground viewshed of U.S. Highway 50 in favor of less intrusive noise mitigation (e.g., landscaped berms and setbacks).

The noise element also specifies noise level performance standards for noise-sensitive uses affected by non-transportation sources. These standards are summarized in Table 4-1. The County does not have planning noise criteria for commercial uses.

would be greater than 65 dB Ldn. The increases in noise resulting directly from the Preferred Alternative under 2005 conditions, therefore, would not be perceptible.

However, the overall traffic-noise levels resulting from the project and other major roadways in the area exceeds the County planning standard of 60 dB L_{dn} and the FHWA/Caltrans criteria of 67 dB L_{eq} for residential uses.

Mitigation Measure 4.3a involves the construction of sound barriers along the property line of affected residences. Although, the County general plan policy 6.5.1.5 discourages soundwall barriers, in this case, this measure is recommended because sufficient right-of-way for earthen barriers is not available in the locations required. Because the barrier would be designed to address design-year conditions (i.e., 2020 conditions), the use of barriers is discussed in detail in the discussion of 2020 conditions below.

Barriers typically will not provide noise reduction to second-story locations and in some cases barrier heights may be reduced for aesthetic reasons resulting in residential buildings being exposed to exterior noise in excess of 60 dB Ldn. According to general plan policy, noise levels in excess of 60 dB Ldn up to 65 dB Ldn are conditionally acceptable if available exterior noise level reduction measurements have been implemented and interior noise levels are below 45 dB Ldn. When exterior noise levels exceed 60 dB Ldn, potential exists for interior noise levels to exceed the 45 dB Ldn criteria. The potential also exists for the Caltrans 52 dBA Leq interior criterion to be exceeded. Mitigation Measure 4.3b involves upgrading the acoustical insulation of residential structures to ensure that interior noise levels are below 45 dB Ldn and 52 dBA Leq.

Mitigation Measure 4.3a: Construct Sound Barriers along the Eastern and Southern Property Lines of Residences Located in the Northwest Quadrant of the Interchange

Refer to the discussion under Mitigation Measure 4.5.

Mitigation Measure 4.3b: Evaluate the Interior Noise Levels of Residences and Improve the Acoustical Insulation to Result in Interior Noise Levels Below 45 dB Ldn or 52 dB Leq

Subsequent to completion of the proposed project and installation of sound barrier mitigation, the County shall hire a qualified acoustical consultant to conduct a detailed acoustical analysis of traffic noise reduction of the building facades of residences in the project area exposed to traffic noise in excess of 60 dB Ldn. The analysis shall include sampling of exterior and interior sound levels of at least 25% of the affected residences. The analysis shall include simultaneous interior and exterior traffic noise measurements of second-story rooms facing the roadway improvement project site and evaluation of ground-floor rooms where barriers do not reduce exterior levels to 60 dB Ldn or less. Measured exterior to interior noise reduction factors for buildings facades shall be applied to the future predicted traffic noise levels to determine the predicted future interior traffic noise levels. If future predicted traffic noise levels exceed the 45 dB Ldn or 52 dB Leq interior noise level criteria, the County shall determine and implement facade construction improvements to reduce interior noise levels to below 45 dB Ldn or 52 dB Leq. Potential facade improvements to be implemented and funded by the County include replacement of windows and sliding glass doors with acoustically rated windows and doors, treatment of exterior to interior vents to reduce sound

transmission, adding mass to facade walls, and installing fresh air ventilation systems to allow windows and doors to remain closed. This measure shall be implemented and funded by the County. FHWA and Caltrans will not participate in the initial and/or maintenance costs of any insulation measures proposed.

Impact 4.4: Exposure of Existing and Future Commercial Land Uses to Traffic Noise for 2005 Conditions

Receivers in the northeast quadrant are generally not considered noise sensitive and include fast food restaurants, gas stations and other commercial uses. One receiver location representing the nearest fast food restaurant along Saratoga Way was chosen for the analysis. The analysis indicated that future traffic-noise levels without implementation of the project would be 69 dB L_{eq} and 70 dB L_{dn}. Future traffic-noise levels after construction of the Preferred Alternative would not change.

Receivers in the southeast quadrant are also generally not considered noise sensitive, and include fast food restaurants, gas stations and other commercial uses. One receiver location representing the nearest gas station along Latrobe Road was chosen for the analysis. The analysis indicated that future traffic-noise levels without implementation of the project would be 69 dB L_{eq} and 70 dB L_{dn}. Future traffic-noise levels after construction of the Preferred Alternative would increase traffic-noise levels by approximately 1 dB.

There is no development in the southwest quadrant of the project site. One receiver, located approximately 200 meters (656 feet) from the U.S. Highway 50 centerline, was chosen for the analysis. The analysis indicated that future traffic-noise levels without implementation of the project would be 70 dB L_{eq} and 71 dB L_{dn}. Future traffic-noise levels after construction of the Preferred Alternative would not change.

The predicted increase in noise resulting from implementation of the Preferred Alternative compared to the No Project Alternative would be less than 3 dB where noise levels without the project would be below 65 dB L_{dn} and less than 1.5 dB where noise levels without the project would be greater than 65 dB L_{dn}. The increases in noise resulting directly from the Preferred Alternative would not be perceptible.

This impact is further considered less than significant because the overall traffic-noise levels resulting from the project and other major roadways in the area do not approach or exceed the Caltrans criteria of 72 dB Leq for commercial uses. The County does not have a planning standard for commercial uses.

Mitigation Measure: None proposed.

Impact 4.5: Exposure of Residents to Traffic Noise for 2020 Conditions

Table 4-8 shows the results of the traffic noise modeling for the Year 2020 under the No Project and Preferred Alternatives. The analysis assumed that under the No Project Alternative

the roadway ramp and mainline configurations would remain as they exist today and that the U.S. Highway 50 HOV project would be constructed.

The residential receivers identified within the northwest quadrant represent the first row of residential uses facing the project site. The analysis indicates that future traffic without implementation of the project would result in peak-hour traffic-noise levels ranging between 65 dB and 69 dB L_{eq}. The predicted L_{dn} values would range between 66 and 70 dB. Future traffic after implementation of the Preferred Alternative would result in peak-hour traffic-noise levels ranging between 65 dB and 69 dB L_{eq}, and L_{dn} values ranging between 66 dB and 70 dB. Project-related increases in all cases would be 1 dB or less.

Traffic noise at all residential uses adjacent to the project site would exceed or approach exceedance of the FHWA/Caltrans peak-hour noise abatement criterion of 67 dB L_{eq} and would exceed the El Dorado County normally acceptable exterior noise level criterion of 60 dB L_{dn} and the conditionally acceptable exterior noise level criterion of 65 dB L_{dn} with or without implementation of the Preferred Alternative. In effect, excess traffic noise conditions will exist regardless of whether the Preferred Alternative is implemented or not.

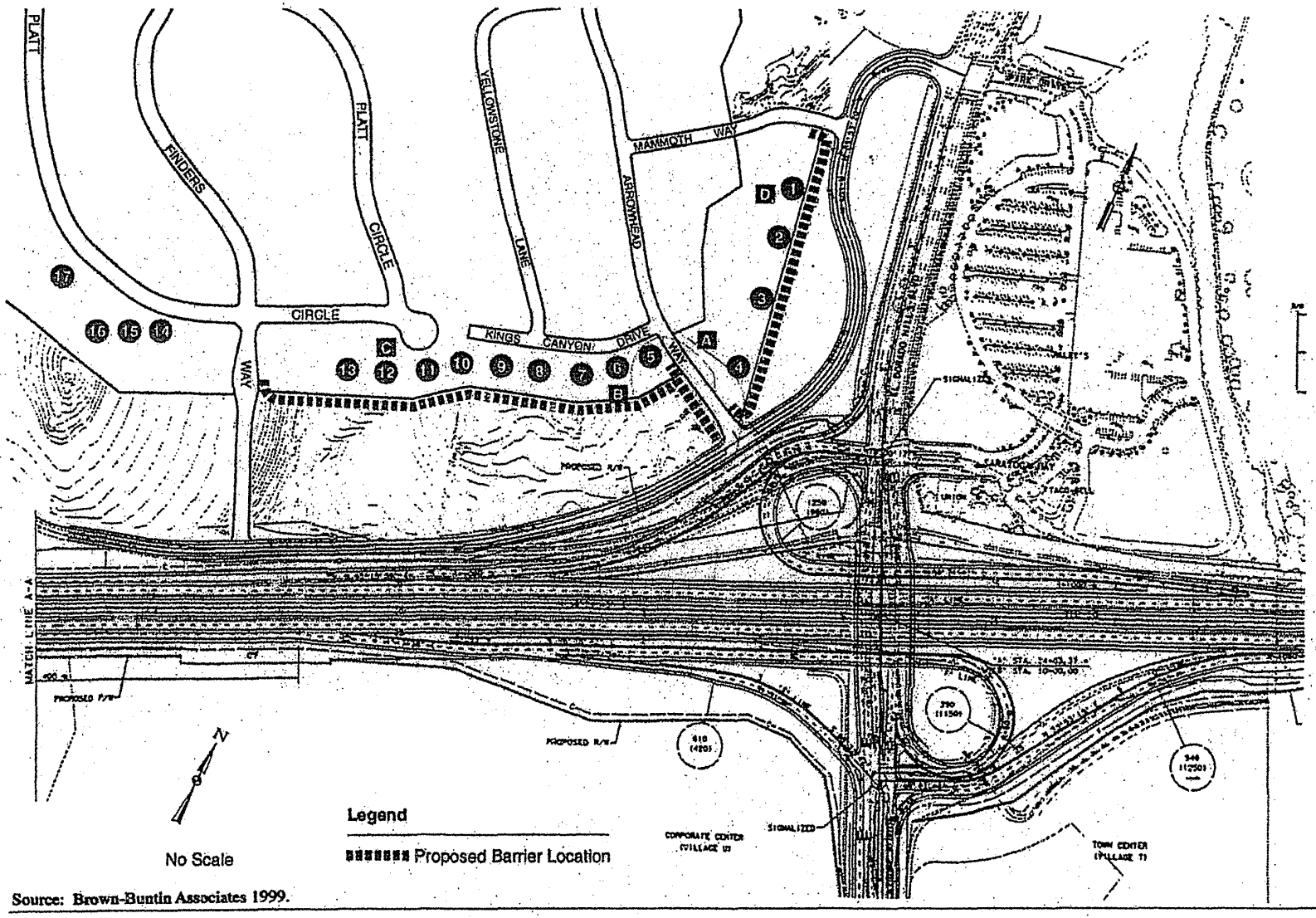
In general, the Preferred Alternative is expected to increase overall traffic noise by approximately 1 dB L_{eq}/L_{dn} at the townhouses located between Mammouth Way and Arrowhead Drive, and at the residences located along Kings Canyon Drive. Residences along Platt Circle further to the west are not expected to experience any increase in traffic noise as a result of the Preferred Alternative.

Predicted increases in noise resulting from implementation of the Preferred Alternative as compared to the No Project Alternative are less than 3 dB where noise levels without the project are below 65 dB L_{dn} and less than 1.5 dB where noise levels without the project are greater than 65 dB L_{dn}. The increases in noise resulting directly from the Preferred Alternative would not be perceptible.

However, the overall traffic-noise levels resulting from the Preferred Alternative and other major roadways in the area exceed the County planning standard of 60 dB L_{dn} and the FHWA/Caltrans criteria of 67 dB L_{eq} for residential uses.

Three sound barrier configurations have been evaluated to identify potential means of reducing traffic noise at residential locations. Shielding by barriers can be obtained by placing walls between the noise source and the receiver. The effectiveness of a barrier depends upon blocking line-of-sight between the source and receiver, and is improved with increases in the distance the sound must travel to pass over the barrier as compared to a straight line from source to receiver. The difference between the distance over a barrier and a straight line between source and receiver is called the "path length difference", and is the basis for calculating barrier noise reduction.

Barrier effectiveness depends upon the relative heights of the source, barrier and receiver. In general, barriers are most effective when placed close to either the receiver or the source. An intermediate barrier location yields a smaller path length difference for a given increase in barrier height than does a location closer to either source or receiver.



Source: Brown-Buntin Associates 1999.

Jones & Stokes Associates, Inc.

Figure 4-3

Location of Proposed Property Line Barrier: Option 1

Sound Wall that was Built - Dotted line

Table 4-10. Predicted Property Line Barrier Effectiveness
(Year 2020 Preferred Alternative)

Receiver	Location	dB L_{eq}/L_{dn} without Barrier	Predicted dB L_{eq}/L_{dn} 10-Foot Barrier	12-Foot Barrier	14-Foot Barrier
R1	Scenic Court	67/68	57/58	55/56	54/55
R2	Scenic Court	67/68	58/59	56/57	55/56
R3	Hills Court	68/69	59/60	57/58	56/57
R4	Hills Court	69/70	61/62	59/60	58/59
R5	Kings Canyon	69/70	61/62	59/60	58/59
R6	Kings Canyon	69/70	61/62	59/60	58/59
R7	Kings Canyon	69/70	61/62	59/60	58/59
R8	Kings Canyon	69/70	61/62	59/60	58/59
R9	Kings Canyon	68/69	61/62	59/60	58/59
R10	Platt Circle	68/69	60/61	59/60	58/59
R11	Platt Circle	68/69	60/61	59/60	58/59
R12	Platt Circle	69/69	62/63	60/61	58/59
R13	Platt Circle	69/70	62/63	60/61	59/60

Note: Because the backyards and residences on the western leg of Platt Circle (Receivers 14 through 17) are elevated and because they are receiving substantial shielding from existing topography, the barriers at these locations would provide little or no reduction (less than 5 dB) of traffic-noise levels at those residences.

The analysis contained within Table 4-10 indicates that a property-line barrier could reduce traffic-noise levels at residences along Hills Court, Scenic Court, Kings Canyon Way, and the eastern leg of Platt Circle to less than the Caltrans/FHWA 67 dB L_{eq} noise-level criterion, and to the El Dorado County 60 dB L_{dn} noise-level criteria. Because the backyards and residences on the western leg of Platt Circle (Receivers 14 through 17) are elevated and because they are receiving substantial shielding from existing topography, the barriers at these locations would provide little or no reduction (less than 5 dB) of traffic-noise levels at those residences. Barriers that do not provide at least 5 dB of noise attenuation are not considered feasible by Caltrans and FHWA.

Combined U.S. Highway 50 Right-of-Way and Property Line Barrier Configuration. The third barrier configuration that was analyzed included a barrier located along the right-of-way between the on-ramp and Saratoga Way, which extended from approximately Station 23+40 to approximately Station 20+25. Because of changes in topography, the barrier was then relocated to the hinge of the Westbound on-ramp at approximately Station 20+25, and extended to Station 19+00. As a means of providing shielding to the condominiums along Hills Court and Scenic Court, a property line barrier was proposed for those residences. Table 4-11 shows the results of this analysis. Figure 4-5 shows the locations of these barriers.

NOT used

Mitigation Measure 4.5a: Construct Sound Barriers Along the Eastern and Southern Property Lines of Residences Located in the Northwest Quadrant of the Interchange

Solid sound barriers shall be constructed along the eastern and southern property lines of residences located in the northwest quadrant of the interchange. Planning level analysis of these barriers indicates that the top of the barriers should be at least 10 feet above the existing ground and that the walls should be located as indicated in Figures 4-3 and 4-4 (Option 1 or Option 2). A qualified acoustical consultant shall be retained to determine the actual height and extent of the walls so as to provide at least 7 dB of noise reduction at the first row of houses located between Finders Way and Mammouth Way. The following criteria should be applied to the design of sound barriers:

- Sound walls should be a uniform, neutral, earth-tone color, such as beige or taupe. The finish should be matte and roughened, such as split-face concrete block and treated, to minimize glare and reduce graffiti potential and should be maintained in the same manner.

- Earthen berms may be substituted for sound walls where sufficient right-of-way exists and should be developed as specified in Mitigation Measure 6.3. Earth should be filled against the surface of the sound barrier that is visible from public roadways. The earth should be placed at a maximum slope of 2:1 and should reduce the exposed visible surface of the noise barrier to 2.2 meters (7 feet) or less.

- The fill slopes created adjacent to the sound walls should be vegetated with highway plantings planted close to the barrier to blend with existing backyard landscapes. Species should include native and drought-tolerant plants as recommended in the El Dorado Hills Specific Plan (El Dorado County 1988). Opportunities for planting clinging vines next to the wall should be maximized. All plantings should be irrigated and professionally maintained, including regular pruning and replacement of dead plants. Vegetative screening of the wall should provide for a minimum 25% cover of the wall surface visible from public roadways within 5 years and a maximum of 50% cover in 10 years. No foliage should extend beyond 18 inches from the top of the barrier.

Mitigation Measure 4.5b: Evaluate the Interior Noise Levels of Residences and Improve the Acoustical Insulation to Result in Interior Noise Levels Being Below 45 dB Ldn or 52 dB Leq

Refer to the discussion under Mitigation Measure 4.3b.

Impact 4.6: Exposure of Existing and Future Commercial Land Uses to Increased Noise for 2020 Conditions

Receivers in the northeast quadrant are generally not considered noise sensitive and include fast food restaurants, gas stations and other commercial uses. One receiver location representing the nearest fast food restaurant along Saratoga Way was chosen for the analysis. The analysis indicated

that future traffic-noise levels without implementation of the project would be 70 dB L_{eq} and 71 dB L_{dn}. Future traffic-noise levels after construction of the Preferred Alternative would not change.

Receivers in the southeast quadrant are generally not considered noise sensitive and include fast food restaurants, gas stations and other commercial uses. One receiver location representing the nearest gas station along Latrobe Road was chosen for the analysis. The analysis indicated that future traffic-noise levels without implementation of the project would be 70 dB L_{eq} and 71 dB L_{dn}. Future traffic-noise levels after construction of the Preferred Alternative would not change.

There is no development in the southwest quadrant of the project site. One receiver location at approximately 200 meters (656 feet) from the U.S. Highway 50 centerline was chosen for the analysis. The analysis indicated that future traffic-noise levels without implementation of the project would be 71 dB L_{eq} and 72 dB L_{dn}. Future traffic-noise levels after construction of the Preferred Alternative would not change.

The direct noise impact of the Preferred Alternative under 2020 conditions on nearby existing and planned commercial uses is considered less than significant because the predicted increase in noise resulting from implementation of the Preferred Alternative as compared to the No Project Alternative would be less than 3 dB where noise levels without the project would be below 65 dB L_{dn} and less than 1.5 dB where noise levels without the project would be greater than 65 dB L_{dn}. The increases in noise resulting directly from the Preferred Alternative would not be perceptible.

This impact is further considered less than significant because the overall traffic- noise levels resulting from the Preferred Alternative and other major roadways in the area do not exceed the Caltrans criteria of 72 dB L_{eq} for commercial uses. The County does not have a planning standard for commercial uses.

Mitigation Measure: None proposed.

SIGNIFICANCE CONCLUSIONS UNDER CEQA

Thresholds of significance for noise impacts were developed based on information contained in the State CEQA Guidelines and professional judgment. A project may have a significant effect on the environment if it will:

- substantially increase the ambient noise levels for adjoining areas or
- expose people to severe noise levels.

For this project, the significance of anticipated noise effects is based on a comparison between predicted noise levels and noise criteria defined by FHWA, Caltrans, and the County. The potential increase in noise from the project is also a factor in determining significance. Research into the human perception of changes in sound level indicates the following:

- a 3-dB change is barely perceptible,

- a 5-dB change is clearly perceptible, and
- a 10-dB change is perceived as being twice or half as loud.

These and other factors relating to the duration, frequency, and tonal content of project-related noise are considered when evaluating the significance of changes in sound levels.

Table 4-12 identifies significance thresholds for increases in noise based on recommendations made by the Federal Interagency Committee on Noise (FICON) to provide guidance in the assessment of changes in ambient noise levels resulting from aircraft operations (Federal Interagency Committee on Noise 1992). The recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been assumed for this analysis that they are applicable to all sources of noise that are described in terms of cumulative noise exposure metrics, such as the L_{dn} or community noise equivalent level (CNEL). These metrics are generally applied to transportation noise sources, and define noise exposure in terms of average noise exposure during a 24-hour period with penalties added to noise that occurs during the nighttime or evening.

Table 4-12. Significance of Changes in Cumulative Noise Exposure

Ambient Noise Level without Project (L_{dn} or CNEL)	Significant Impact
<60 dB	+5.0 dB or more
60-65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

Source: Federal Interagency Committee on Noise 1992 (as applied by Brown-Buntin Associates).

As indicated in Table 4-4, potentially affected noise sensitive uses in the northwest quadrant of the interchange are currently exposed to noise in excess of 60 dB L_{dn} and in some cases to noise in excess of 65 dB L_{dn}.

The direct noise impacts of the project are assessed by comparing project conditions to no-project conditions. If the increase in noise caused by the project exceeds the significant increase thresholds defined in Table 4-12, then the direct impact of the project is considered significant. If overall noise levels considering the project and other major sources of traffic noise in the area exceed FHWA/Caltrans or County criteria, then the impact of the project is considered significant regardless of the magnitude of the direct increase in noise from the project.

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Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 6)

Attached, please find pdf documents that are collectively **the traffic exhibits**, substantial evidence submitted to demonstrate a significant impact to Traffic (Section G. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

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Cc: 'Timothy White' <tjwhitejd@gmail.com>; 'John Davey' <jdavey@daveygroup.net>; 'john.hidahl@edcgov.us' <john.hidahl@edcgov.us>; 'jvegna@edcgov.us' <jvegna@edcgov.us>; 'Hilary Krogh - Saratoga' <hilaryd73@gmail.com>; 'Kim S - Camom' <CAmom2345@hotmail.com>; 'Rebecca - neighbor' <rebecca.isbell@ymail.com>; 'Wes Washburn' <weswashburn@yahoo.com>
Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 5)

Attached, please find pdf documents that are collectively **Exhibit F**, substantial evidence submitted to demonstrate a significant impact to Noise (Section F. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

In addition, the following link is submitted:

Reference link to the Saratoga Estates Draft EIR

http://edcapps.edcgov.us/Planning/ProjectDocuments/TM14-1520%20PD14-0006%20Z14-0007%20DA15-0001%20-%20DEIR.pdf

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From: Brooke E. Washburn
Sent: Thursday, August 16, 2018 1:22 PM
To: 'charlene.tim@edcgov.us' <charlene.tim@edcgov.us>
Cc: 'Timothy White' <tjwhitejd@gmail.com>; 'John Davey' <jdavey@daveygroup.net>; 'john.hidahl@edcgov.us' <john.hidahl@edcgov.us>; 'jvegna@edcgov.us' <jvegna@edcgov.us>; 'Hilary Krogh - Saratoga' <hilaryd73@gmail.com>; 'Kim S - Camom' <CAmom2345@hotmail.com>; 'Rebecca - neighbor' <rebecca.isbell@ymail.com>; 'Wes Washburn' <weswashburn@yahoo.com>
Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 4)

Attached, please find pdf documents that are collectively **Exhibit E**, substantial evidence submitted to demonstrate a significant impact to Land Use (Section E. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

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From: Brooke E. Washburn
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To: 'charlene.tim@edcgov.us' <charlene.tim@edcgov.us>
Cc: 'Timothy White' <tjwhitejd@gmail.com>; 'John Davey' <jdavey@daveygroup.net>; 'john.hidahl@edcgov.us' <john.hidahl@edcgov.us>; 'jvegna@edcgov.us' <jvegna@edcgov.us>; 'Hilary Krogh - Saratoga' <hilaryd73@gmail.com>; 'Kim S - Camom' <CAmom2345@hotmail.com>; 'Rebecca - neighbor' <rebecca.isbell@ymail.com>; 'Wes Washburn' <weswashburn@yahoo.com>
Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 3)

Attached, please find pdf documents that are collectively **Exhibit B**, substantial evidence submitted to demonstrate a significant impact to Air Pollution (Section B. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

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From: Brooke E. Washburn
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To: 'charlene.tim@edcgov.us' <charlene.tim@edcgov.us>
Cc: 'Timothy White' <tjwhitejd@gmail.com>; 'John Davey' <jdavey@daveygroup.net>; 'john.hidahl@edcgov.us' <john.hidahl@edcgov.us>; 'jvegna@edcgov.us' <jvegna@edcgov.us>; 'Hilary Krogh - Saratoga' <hilaryd73@gmail.com>; 'Kim S - Camom' <CAmom2345@hotmail.com>; 'Rebecca - neighbor' <rebecca.isbell@ymail.com>; 'Wes Washburn' <weswashburn@yahoo.com>
Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 2)

Attached, please find pdf documents that are collectively **Exhibit A**, substantial evidence submitted to demonstrate a significant impact to Aesthetics (Section A. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

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From: Brooke E. Washburn
Sent: Thursday, August 16, 2018 12:21 PM
To: 'charlene.tim@edcgov.us' <charlene.tim@edcgov.us>
Cc: 'Timothy White' <tjwhitejd@gmail.com>; John Davey <jdavey@daveygroup.net>; 'john.hidahl@edcgov.us' <john.hidahl@edcgov.us>; 'jvegna@edcgov.us' <jvegna@edcgov.us>; Hilary Krogh - Saratoga <hilaryd73@gmail.com>; 'Kim S - Camom' <CAmom2345@hotmail.com>; Rebecca - neighbor <rebecca.isbell@ymail.com>; 'Wes Washburn' <weswashburn@yahoo.com>
Subject: Saratoga Retail Phase 2 - DR-R18-0001

Dear Charlene,

Attached is public comment submitted by affected and concerned residents with regard to a proposed project (Saratoga Retail Phase 2 - DR-R18-0001). Due to the size of the documentation to be submitted, I will send all attachments under separate cover. Kindly include all comments and attachments in the public record for the project (Saratoga Retail Phase 2 - DR-R18-0001), and submit the same to the commission in advance of the **August 23, 2018**, hearing.

Brooke E. Washburn

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5 attachments

Attachment A - Traffic Study Analysis of Data 2018.pdf
30K

Attachment B - S ESTATES_ TRANSPORTATION_TM14-1520 PD14-0006 Z14-0007 DA....pdf
3994K

Attachment C - TC APTS - LOS F Saratoga Transportation_.pdf
160K

Attachment D - TC APTS - LOS F Saratoga Transportation_Cumulative.pdf
106K

Attachment E - DR-R 18-0001 Saratoga Retail Transportation section.pdf
669K

Project	Study Tables	Intersection	Existing conditions	LOS	Near Term	LOS	Existing with Project (2014)	LOS	Near Term (2024)+ project	LOS	Near Term + project+ mitigated Conditions	LOS	Cumulative NO Project 2035	LOS	Cumulative + Project 2035	LOS
Saratoga Estates - AM	Table 4.7-15 (2014), Table 4.7-22 (2024), Table 4.7-23 (2035)	Saratoga / EDH Blvd	22.4	LOS C			150.6	LOS F	159.6	LOS F	51.1	LOS D			66.1	LOS E
Saratoga Estates - PM			22	LOS C			102.4	LOS F	122.4	LOS F	70.8	LOS E			92.1	LOS F
Saratoga Estates - AM		Latrobe / Town Center Blvd.	27.7	LOS C			27.7	LOS C	29.5	LOS C	28.5	LOS C			43.1	LOS D
Saratoga Estates - PM			73.8	LOS E			89.8	LOS F	91.5	LOS F	39.7	LOS D			99.9	LOS F
Saratoga Estates - AM		Arrowhead	9.1	LOS A			28.3	LOS D							17.4	LOS C
Saratoga Estates - PM			9.2	LOS A			35.8	LOS E							17.4	LOS C
Town Center Apartments - AM	Table 4.8-10, Table 4.8-12, Table 4.8-15	Saratoga / EDH Blvd	19	LOS B	108	LOS F	125	LOS F					37	LOS D	37	LOS D
Town Center Apartments - PM			20	LOS C	47	LOS D	43	LOS D					48	LOS D	50	LOS D
Town Center Apartments - AM		Latrobe / Town Center / Post St	13	LOS B	15	LOS B	17	LOS C					13	LOS B	14	LOS B
Town Center Apartments - PM			48	LOS E	50	LOS F	52	LOS F					73	LOS F	82	LOS F
					Near Term (2026)		Existing w/ Project (2017)									
Chik Fil A - AM	Table 7, Table 8, Table 10, Table 11, Table 13	Saratoga / EDH Blvd	12.9	LOS B	33.2	LOS C	26.4	LOS C	36.9	LOS D	46.5	LOS D	57.6	LOS E	89.3	LOS F
Chik Fil A - PM			22.6	LOS C	70.4	LOS E	38.5	LOS D	92.7	LOS F			72.8	LOS E	77.2	LOS E
Chik Fil A - AM		Latrobe / Town Center Blvd.	16.3	LOS B	22.6	LOS C	17.9	LOS B	21.4	LOS C			22.8	LOS C	22.7	LOS C
Chik Fil A - PM			48.3	LOS D	84.6	LOS F	49.2	LOS D	82.5	LOS F	66.4	LOS E	75.3	LOS E	74.7	LOS E
Chik Fil A - AM		White Rock / Post	23.5	LOS C	86.4	LOS F	23.9	LOS C	92.4	LOS F	93.1	LOS F	55.4	LOS E	53.2	LOS D
Chik Fil A - PM			43.7	LOS D	51.5	LOS D	44.6	LOS D	50.7	LOS D			68.2	LOS E	66.4	LOS E
Chik Fil A - AM		Mammoth / Walgreens			20.6	LOS C			35.8	LOS E						
Chik Fil A - PM																
Chik Fil A - AM		Arrowhead			10.9	LOS B			10.9	LOS B						
Chik Fil A - PM					12.4	LOS B			12.5	LOS B						
Traffic Queing:	Table 14	Available storage 235					204		321		250					
Trip Generation:	Table 2	2700 new daily trips														

4.7 TRANSPORTATION AND CIRCULATION

This section describes existing traffic and circulation in the project area. Regulations and policies affecting transportation and circulation are discussed, and impacts are identified that may result from project implementation. Mitigation measures are recommended to reduce potential impacts, where appropriate. This section was prepared based on a Traffic Impact Analysis for the proposed project prepared by Kimley-Horn and Associates (Appendix B).

In response to the Notice of Preparation, comment letters were submitted that expressed concerns related to increased traffic in the surrounding neighborhoods and along Highway 50; potential conflicts with pedestrians and motorists along Saratoga Way, Wilson Boulevard, and Finders Way; general traffic safety; conflicting trip counts associated with pervious traffic studies; and construction-related traffic.

4.7.1 Environmental Setting

This section describes the existing transportation system in the vicinity of the proposed project. Existing roadway operations are described followed by an explanation of the methods used for the traffic analysis. The project study area, project site, and study intersections are illustrated in Exhibit 4.7-1. Existing roadway operation is expressed in a qualitative measure called level of service (LOS). LOS ranges from A (best), which represents minimal delay for motorists, to F (worst), which represents heavy delay for motorists and a facility that is operating at or near its functional capacity.

PROJECT AREA ROADWAYS

The following are descriptions of the primary roadways in the vicinity of the project.

Highway 50 is an east-west freeway located south of the project site. Generally, Highway 50 serves all of El Dorado County's major population centers and provides connections to Sacramento County to the west and the State of Nevada to the east. Primary access to the project site from Highway 50 is provided at the El Dorado Hills Boulevard/Latrobe Road interchange. Within the general project area, Highway 50 currently serves approximately 90,000 vehicles per day (vpd) west of El Dorado Hills Boulevard/Latrobe Road.

El Dorado Hills Boulevard is a north-south arterial roadway that provides a primary connection to Highway 50 for western El Dorado County. South of Highway 50, El Dorado Hills Boulevard becomes Latrobe Road. North of the Highway 50 interchange area, this roadway carries approximately 30,000 vpd with three through lanes in each direction. South of the interchange this roadway carries approximately 29,700 vpd, also with three travel lanes in each direction.

Saratoga Way is currently a two-lane roadway which parallels the north side of Highway 50 and terminates approximately 2,500-feet east of the El Dorado County/Sacramento County line. This roadway has long been planned as a four-lane divided facility (to be initially constructed as a two-lane roadway) providing vital connectivity between El Dorado Hills and Folsom, north of Highway 50. The proposed project includes the completion of this roadway whereby Saratoga Way would be extended west to the County line at which point it would connect with existing Iron Point Road in the City of Folsom. The extension of Saratoga Way to Iron Point Road is anticipated to alleviate traffic congestion along Highway 50 in western El Dorado County by providing a viable alternate route to the freeway for relatively short trips between these two communities.

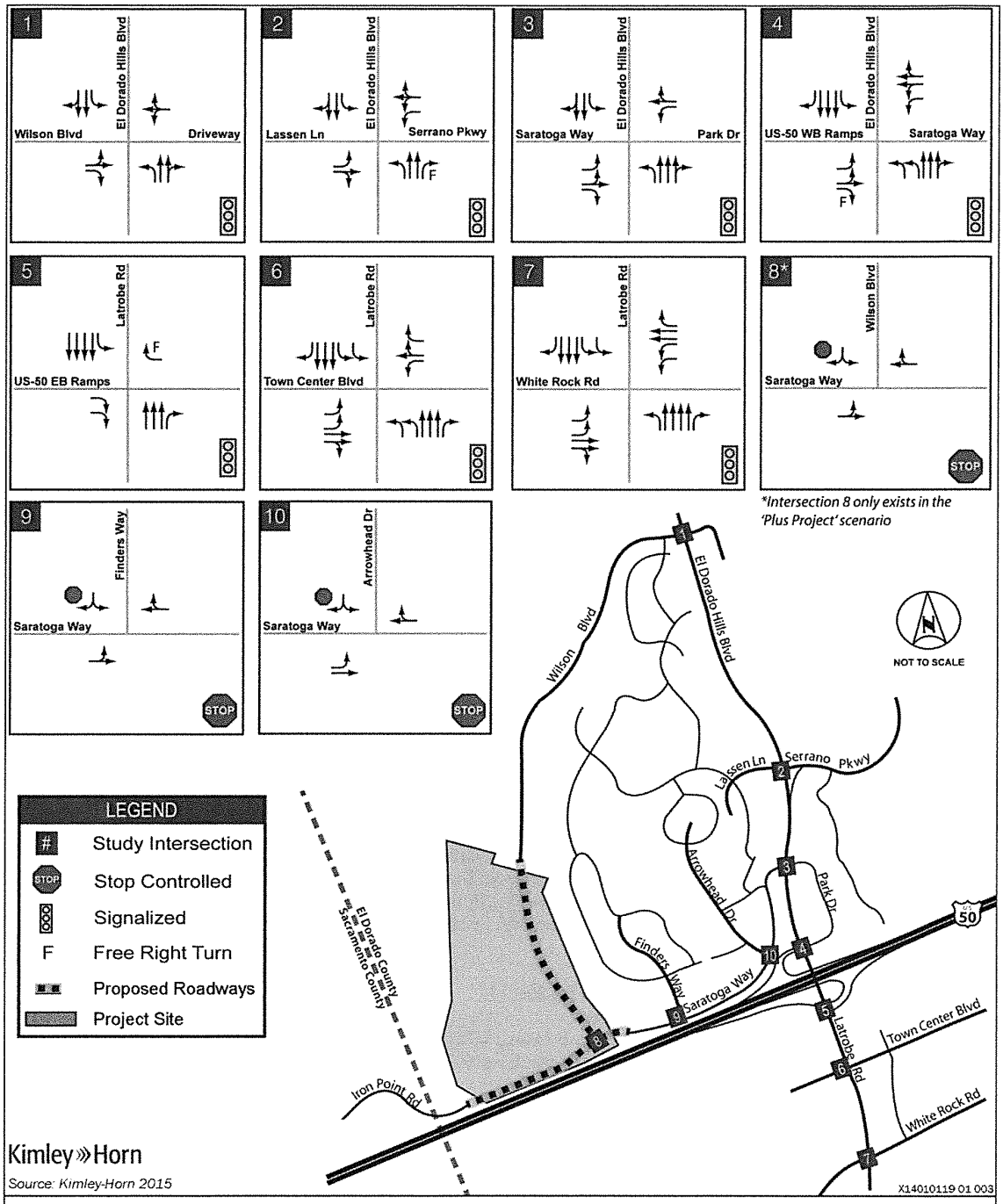


Exhibit 4.7-1 **Traffic Study Area and Existing Lane Configurations**

ASCENT

Similar to Saratoga Way, the proposed project would extend Wilson Boulevard from its existing terminus to provide connectivity to the aforementioned extension of Saratoga Way. This improved connectivity is anticipated to further alleviate traffic congestion in the area by providing an alternate route to El Dorado Hills Boulevard for traffic originating from or destined to points to the north. Wilson Boulevard currently carries approximately 5,000 vpd near El Dorado Hills Boulevard.

White Rock Road is an east-west arterial roadway that parallels Highway 50 to the south, connecting Rancho Cordova on the west with Latrobe Road in El Dorado County on the east. White Rock Road, which becomes Silva Valley Parkway north of Highway 50, accommodates approximately 10,500 vpd in the vicinity of Latrobe Road.

Potentially Affected Roads and Intersections

The transportation facilities selected for the analysis were based on coordination with the El Dorado County Community Development Agency and the City of Folsom Public Works Department. The following transportation facilities are analyzed in this evaluation:

Intersections:

1. El Dorado Hills Boulevard at Wilson Boulevard
2. El Dorado Hills Boulevard at Serrano Parkway/Lassen Lane
3. El Dorado Hills Boulevard at Saratoga Way/Park Drive
4. El Dorado Hills Boulevard at Highway 50 Westbound Ramps
5. Latrobe Road at Highway 50 Eastbound Ramps
6. Latrobe Road at Town Center Boulevard
7. Latrobe Road at White Rock Road
8. Saratoga Way at Wilson Boulevard *(Future)*
9. Saratoga Way at Finders Way
10. Saratoga Way at Arrowhead Drive

Roadway Segments:

1. Saratoga Way, west of Wilson Boulevard
2. Saratoga Way, east of Wilson Boulevard

Freeway:

1. Highway 50 Mainline
   a. Eastbound, west of El Dorado Hills Boulevard/Latrobe Road
   b. Westbound, west of El Dorado Hills Boulevard/Latrobe Road
   c. Eastbound, between Latrobe Road off-ramp and Latrobe Road on-ramp
   d. Westbound, between El Dorado Hills Boulevard off-ramp and El Dorado Hills Boulevard on-ramp
   e. Eastbound, east of El Dorado Hills Boulevard/Latrobe Road
   f. Westbound, east of El Dorado Hills Boulevard/Latrobe Road
2. Highway 50 Ramps
   a. Eastbound, diverge to Latrobe Road
   b. Eastbound, diverge to El Dorado Hills Boulevard
   c. Eastbound, merge from Latrobe Road
   d. Westbound, diverge to El Dorado Hills Boulevard/Latrobe Road
   e. Westbound, merge from El Dorado Hills Boulevard/Latrobe Road

EXISTING CONDITIONS

Intersection and Freeway Operation

Operating conditions during the weekday a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project, as well as the highest volumes on the local transportation

network. These counts were conducted between the hours of 6:30 a.m. and 9:30 a.m., and 3:30 p.m. and 6:30 p.m.

Eight weekday a.m. and p.m. peak period intersection turning movement traffic counts were conducted in November 2014 for study intersections 1 through 6, and 9 and 10. Counts for study intersection 7 were completed in September 2014, and data for intersection 8 could not be collected as it does not currently exist. Freeway mainline volumes were obtained from the California Department of Transportation's (Caltrans') Performance Measurement System using data from September 2014.

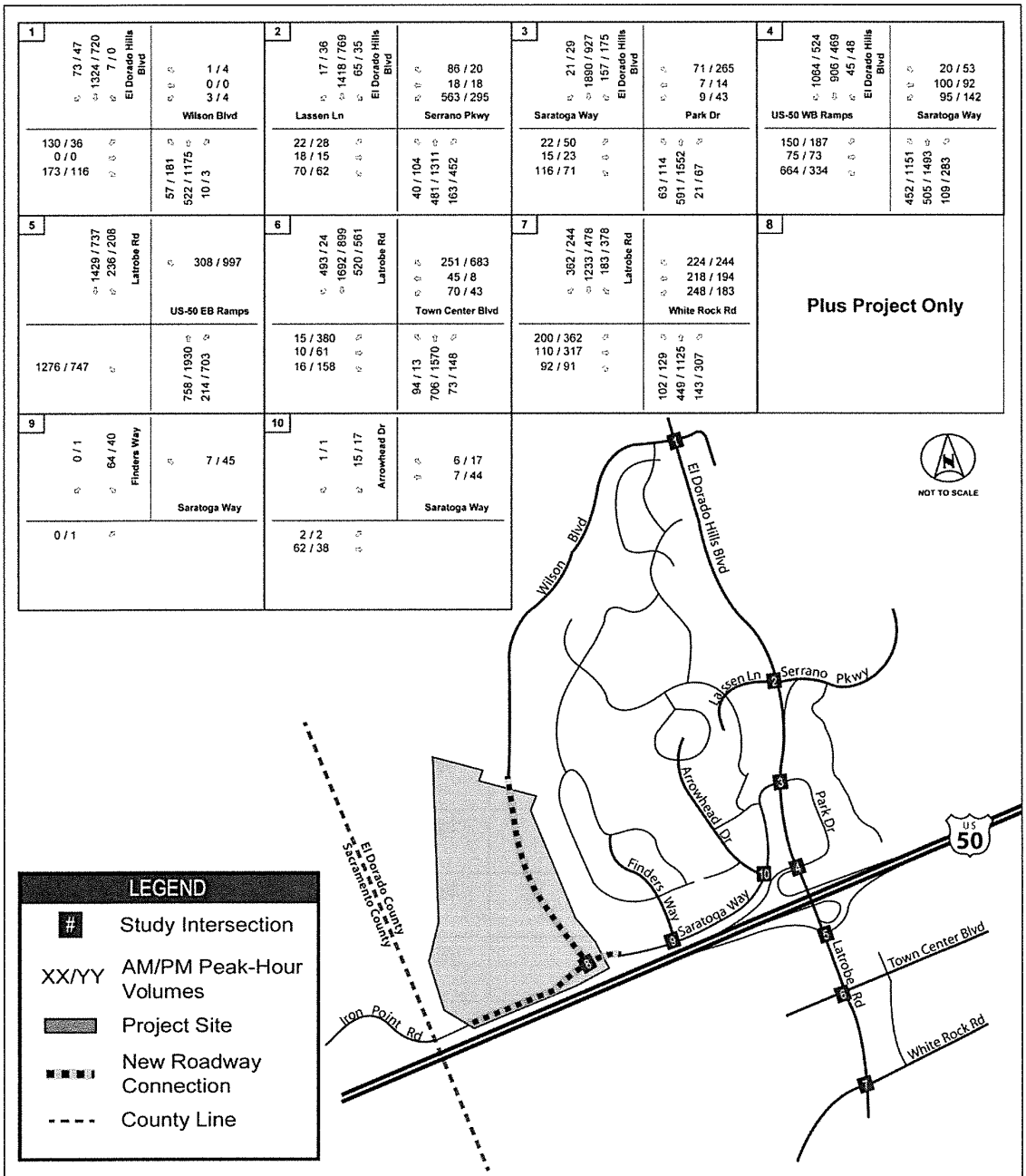
Intersection locations and existing (2014) peak-hour turn movement volumes are presented in Exhibit 4.7-2, and the traffic count data sheets are provided in Appendix B. Tables 4.7-1 and 4.7-2 present the peak-hour intersection and freeway operating conditions for this analysis scenario, and Table 4.7-3 presents roadway segment operating conditions. As indicated in these tables, the study intersections operate from LOS A to LOS E during the a.m. and p.m. peak hours. The freeway facilities are also shown to operate from LOS A to LOS E during the peak-hours. The study roadway segments operate at LOS A during peak a.m. and p.m. hours.

Table 4.7-1 Existing (2014) Intersection Levels of Service

ID	Intersection	Control	Peak Hour	Existing (2014)	
				Delay (seconds)	LOS
1	El Dorado Hills Boulevard at Wilson Boulevard	Signal	AM	20.8	C
			PM	22.5	C
2	El Dorado Hills Boulevard at Serrano Parkway/Lassen Lane	Signal	AM	44.2	D
			PM	21.5	C
3	El Dorado Hills Boulevard at Saratoga Way/Park Drive	Signal	AM	22.4	C
			PM	22.0	C
4	El Dorado Hills Boulevard at Highway 50 westbound ramps	Signal	AM	29.2	C
			PM	35.0	D
5	Latrobe Road at Highway 50 eastbound ramps	Signal	AM	31.0	C
			PM	11.7	B
6	Latrobe Road at Town Center Boulevard	Signal	AM	27.7	C
			PM	73.8	E
7	Latrobe Road at White Rock Road	Signal	AM	36.2	D
			PM	43.7	D
8	Saratoga Way at Wilson Boulevard (Project Only)	SSSC[1]	AM	-	-
			PM	-	-
9	Saratoga Way at Finders Way	SSSC[1]	AM	7.7 (8.8 southbound)	A
			PM	4.3 (8.9 southbound)	A
10	Saratoga Way at Arrowhead Drive	SSSC[1]	AM	1.8 (9.1 southbound)	A
			PM	1.7 (9.2 southbound)	A

1: Side Street Stop Controlled (SSSC) intersections are reported with the overall intersection delay followed by the delay of the worst approach. The reported LOS corresponds to the worst approach.

Source: Kimley-Horn 2015



Kimley»Horn

Source: Kimley-Horn 2015

X14010119 01 005

Exhibit 4.7-2 **Intersection Locations and Existing (2014) Peak Hour Traffic Volumes**

ASCENT ENVIRONMENTAL

Table 4.7-2 Existing (2014) Freeway Facilities Levels of Service

	Highway 50			Existing (2014)	
Direction	Segment	Type	Peak Hour	Density[1]	LOS
Eastbound	West of Latrobe Road southbound off ramp	Basic	AM	12.7	B
			PM	21.2	C
	Latrobe Road southbound off ramp	Diverge	AM	22.8	C
			PM	32.3	D
	El Dorado Hills Boulevard northbound off ramp	Diverge	AM	126	B
			PM	26.5	C
	El Dorado Hills Boulevard northbound off ramp to Latrobe Road on ramp	Basic	AM	5.2	A
			PM	11.7	B
	Latrobe Road on ramp	Merge	AM	13.4	B
			PM	24.2	C
	East of Latrobe Road on ramp	Basic	AM	7.3	A
			PM	16.3	B
Westbound	East of El Dorado Hills Boulevard off ramp	Basic	AM	28.8	D
			PM	14.5	B
	El Dorado Hills Boulevard off ramp	Diverge	AM	35.2	E
			PM	21.2	C
	El Dorado Hills Boulevard off ramp to El Dorado Hills Boulevard on ramp	Basic	AM	19.2	C
			PM	10.1	A
	El Dorado Hills Boulevard on ramp	Merge	AM	35.7	E
			PM	26.8	C
	West of El Dorado Hills Boulevard on ramp	Basic	AM	41.2	E
			PM	25.3	C

Notes: **Bold** represents unacceptable operations

1: Density measured in passenger cars/mile/lane

Source: Kimley-Horn 2015

Table 4.7-3 Existing (2014) Roadway Segment Levels of Service

Location	Peak-Hour	Analysis Direction	LOS	PFFS	v/c
Saratoga Way, East of Project	AM	WB	A	92.1	0.01
		EB	A	92.5	0.06
	PM	WB	A	91.9	0.05
		EB	A	91.9	0.04

Notes: PFFS=percent free-flow speed; LOS=level of service; v/c=volume to capacity

Source: Kimley-Horn 2015

Non-Auto Transportation Facilities

Existing Pedestrian Facilities

Pedestrian facilities in the project vicinity include sidewalks, as well as mixed-use paths shared with bicycles (see below for descriptions and locations of bicycle facilities). Sidewalks are provided on:

- El Dorado Hills Boulevard,
- Wilson Boulevard,
- Iron Point Road, and
- Finders Way.

Existing Bicycle Facilities

The *Highway Design Manual* (Caltrans 2006) classifies bikeways into three categories:

- Class I Multi-Use Path: a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- Class II Bike Lane: a striped and signed lane for one-way bike travel on a street or highway.
- Class III Bike Route: signing only for shared use with motor vehicles within the same travel lane on a street or highway.

Bicycle Facilities within El Dorado Hills include:

- Class II bike lanes on Sophia Parkway.
- Class II bike lanes on White Rock Road from Joerger Cut-Off Road to Latrobe Road.
- Class II bike lanes on White Rock Road from Latrobe Road to Carson Crossing Road.
- Class II bike lanes on Latrobe Road from Golden Foothill Parkway to Town Center Drive.
- Class II bike lanes on Green Valley Road, 400 feet west of El Dorado Hills Boulevard to the county line.
- Class I bike path along El Dorado Hills Boulevard from near Serrano Parkway to St Andrews Drive.
- Class I bike path along Bass Lake Road from Silver Dove Way to Serrano Parkway.
- Three bike route signs, one at Harvard Way and two at Governor's Drive intersection.

Bicyclists ride in the roadway and/or on sidewalks along all other streets within the project study area.

Existing Transit Services and Facilities

Transit Services

El Dorado Transit offers the following services:

- Sacramento Commuter: Weekday Commuter Service from Park & Ride locations throughout El Dorado County to worksites in downtown Sacramento.
- Iron Point Connector: Monday through Friday service between Placerville and the Iron Point Light Rail Station in Folsom. Also serves the Folsom Lake College main campus and Kaiser Folsom.
- Dial-A-Ride: Routes serving the western slope of El Dorado County Monday through Friday with limited Saturday service. Passengers can connect from one route to another in Placerville for travel within the county.

The project site is served by the Iron Point Connector with park-and-ride facilities and connections to local transit services. The closest park and ride lot is located less than 1 mile from the project site, south of Highway 50 at the northeast corner of the Latrobe Road/White Rock Road intersection.

FUTURE CONDITIONS

Near Term (2024) Conditions

Traffic volumes for the Near Term (2024) conditions were developed using the County's travel demand model (TDM) year 2035 and year 2010 land use conditions. Traffic volume estimates assume turn movements using 2010 and 2035 land use scenarios that both include a Saratoga Way extension (so that growth could be reasonably assessed on common links in the proximity of the project). A straight line analysis was conducted to establish year 2024 turn movement estimates. The difference between the resulting 2024 traffic estimate and the 2010 model results (the growth) was then added to Existing (2014) traffic volumes to establish base Near-Term (2024) traffic estimates for this study.

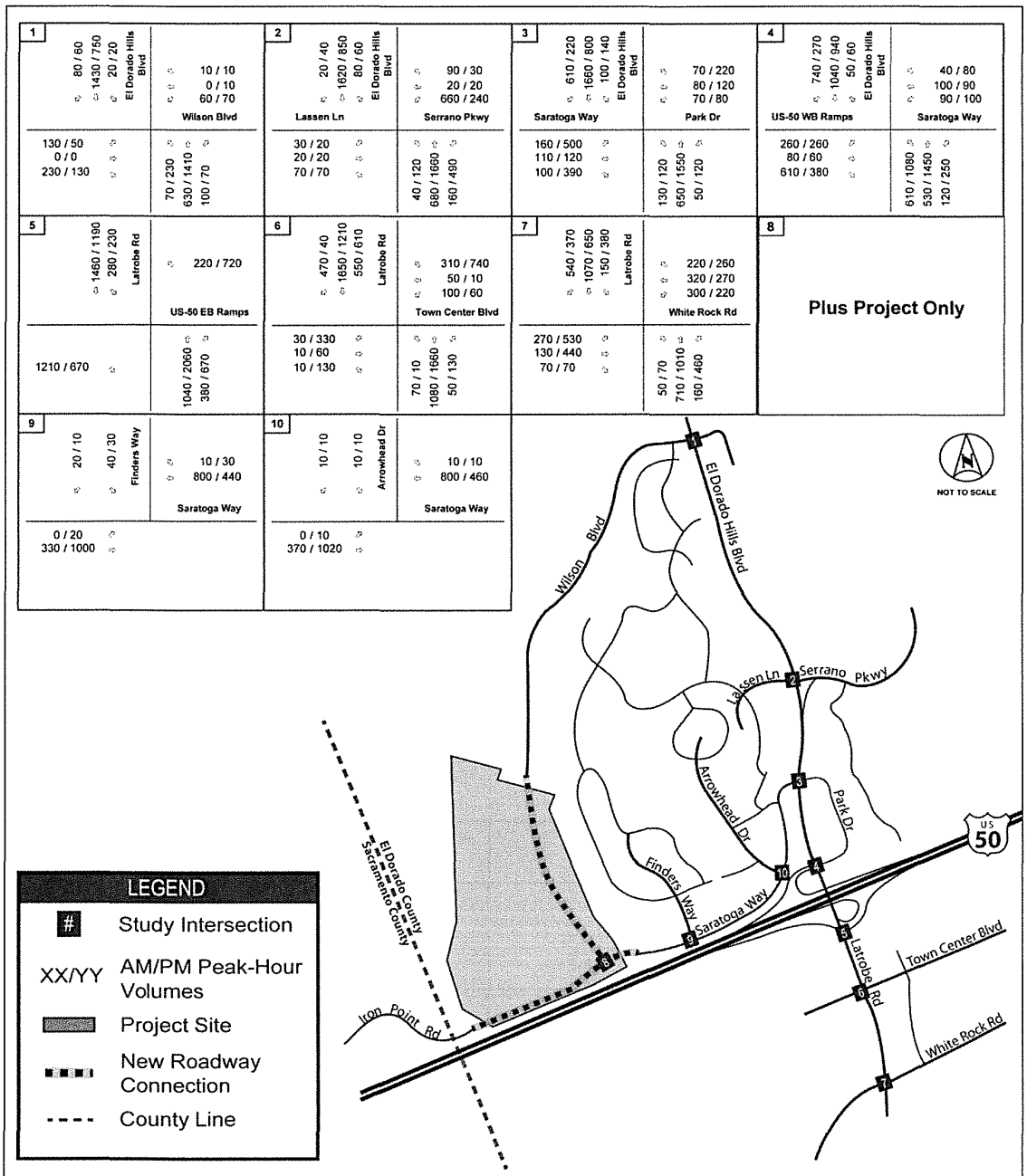
The Near Term scenario includes operation of the proposed extension of Saratoga Way as a two-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange, which are both planned in the County's Capital Improvement Program (CIP). Adjustment factors were developed based on draft Central El Dorado Hills Specific Plan intersection turning movement and freeway estimates. These factors were then applied to future traffic estimates for this project in an effort to maintain consistency between model post-processing completed for this project and other on-going project analyses in the county.

Near-Term (2024) peak-hour turn movement volumes are presented in Exhibit 4.7-3. Tables 4.7-4 and 4.7-5 present the peak-hour intersection and freeway operating conditions for this analysis scenario. As shown, LOS would range from LOS B to LOS F for intersections and LOS B to LOS E for freeway operating conditions.

Table 4.7-4 Near Term (2024) Intersection LOS

ID	Intersection	Control	Peak Hour	Near Term (2024)[1]	
				Delay (sec)	LOS
1	El Dorado Hills Boulevard at Wilson Boulevard	Signal	AM	24.3	C
			PM	61.6	E
2	El Dorado Hills Boulevard at Serrano Parkway/Lassen Lane	Signal	AM	57.7	E
			PM	50.4	D
3	El Dorado Hills Boulevard at Saratoga Way/Park Drive	Signal	AM	**167.6**	**F**
			PM	**149.2**	**F**
4	El Dorado Hills Boulevard at Highway 50 westbound ramps	Signal	AM	47.3	D
			PM	34.9	C
5	Latrobe Road at Highway 50 eastbound ramps	Signal	AM	19.2	B
			PM	11.7	B
6	Latrobe Road at Town Center Boulevard	Signal	AM	29.7	C
			PM	**84.1**	**F**
7	Latrobe Road at White Rock Road	Signal	AM	34.9	C
			PM	69.9	E
8	Saratoga Way at Wilson Boulevard (Project Only)	SSSC[2]	AM	-	-
			PM	-	-
9	Saratoga Way at Finders Way	SSSC[2]	AM	1.3 26.9 southbound)	D
			PM	1.3 (44.3 southbound)	E
10	Saratoga Way at Arrowhead Drive	SSSC[2]	AM	0.4 (21.4 southbound)	D
			PM	0.4 (27.2 southbound)	D

Notes: **Bold** represents unacceptable operations.
1: Assumes operation of the proposed extension of Saratoga Way as a two-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange.
2: Side Street Stop Controlled (SSSC) intersections are reported with the overall intersection delay followed by the delay of the worst approach. The reported LOS corresponds to the worst approach.
Source: Kimley-Horn 2015



Kimley»Horn

Source: Kimley-Horn 2015

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Exhibit 4.7-3 **Near Term (2024) Conditions Peak Hour Traffic Volumes**

ASCENT ENVIRONMENTAL

Table 4.7-5 Near Term (2024) Freeway Facilities LOS

Highway 50				Near Term (2024)[1]	
Direction	Segment	Type	Peak Hour	Density[2]	LOS
Eastbound	West of Latrobe Road southbound off ramp	Basic	AM	15.3	B
			PM	23.8	C
	Latrobe Road southbound off ramp	Diverge	AM	24.9	C
			PM	32.4	D
	El Dorado Hills Boulevard northbound off ramp	Diverge	AM	16.2	B
			PM	28.3	D
	El Dorado Hills Boulevard northbound off ramp to Latrobe Road on ramp	Basic	AM	8.5	A
			PM	15.5	B
	Latrobe Road on ramp	Merge	AM	18.5	B
			PM	27.8	C
	East of Latrobe Road on ramp	Weave[3]	AM	-	A
			PM	-	C
Westbound	East of El Dorado Hills Boulevard off ramp	Weave[3]	AM	-	B
			PM	-	A
	El Dorado Hills Boulevard off ramp	Diverge	AM	28.0	C
			PM	22.2	C
	El Dorado Hills Boulevard off ramp to El Dorado Hills Boulevard on ramp	Basic	AM	22.2	C
			PM	15.7	B
	El Dorado Hills Boulevard on ramp	Merge	AM	36.8	E
			PM	30.4	D
	West of El Dorado Hills Boulevard on ramp	Basic	AM	44.0	E
			PM	30.3	D

Notes: Bold represents unacceptable operations
1: Assumes the extension of Saratoga Way as a two-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange.
2: Density measured in passenger cars/mile/lane
3: Weave segments are analyzed using the Leisch Method, which is not based on density.

Source: Kimley-Horn 2015

Near-term conditions on Saratoga Way were modeled assuming Saratoga Way could be constructed as a two-lane roadway separate from the proposed project. As indicated in Table 4.7-6, under these hypothetical conditions, Saratoga Way would operate at LOS D and E, depending on direction and peak hour.

Table 4.7-6 Near Term (2024) Roadway Segment Levels of Service

Roadway Segment			Near Term (2024)[1]		
Location	Peak-Hour	Analysis Direction	LOS	PFFS	v/c
Saratoga Way, West of Project	AM	WB	D	71.1	0.54
		EB	D	73.3	0.25
	PM	WB	D	68.8	0.31
		EB	E	66.5	0.67
Saratoga Way, East of Project	AM	WB	D	70.9	0.53
		EB	D	73.7	0.27
	PM	WB	D	68.1	0.33
		EB	E	65.9	0.68

Notes: PFFS=percent free-flow speed; LOS=level of service; v/c=volume to capacity
1: Assumes operation of the proposed extension of Saratoga Way as a two-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange.

Source: Kimley-Horn 2015

Cumulative (2035) Conditions

As previously stated, the County's 2035 model was modified to include known development projects to create comprehensive year 2035 land use conditions. The following projects were included in the 2035 TDM:

- Bass Lake Hills Specific Plan
- Carson Creek Specific Plan
- Dixon Ranch
- Promontory
- Ridgeview
- San Stino Residential
- Serrano
- Valley View Specific Plan
- Central El Dorado Hills Specific Plan
- Village of Marble Valley Specific Plan
- Lime Rock Specific Plan
- Spanos Apartments

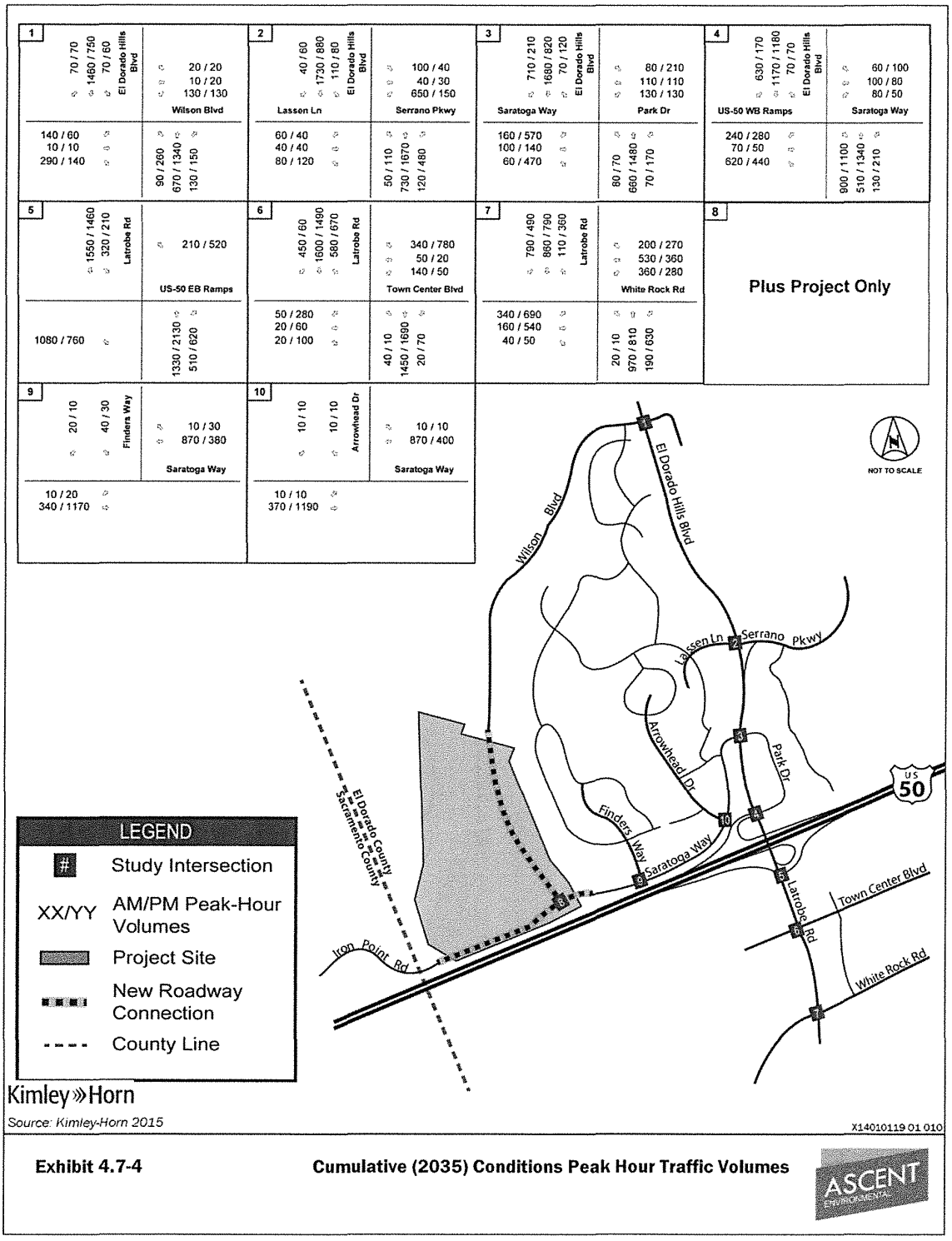
Traffic volumes for this scenario were developed using a process similar to the previous analysis scenarios; the model-generated volume differences between year 2035 and year 2010 were added to existing (2014) volumes to establish conservative cumulative (2035) conditions for this study. These volumes were further refined based on the results of other relevant model results prepared during the course of this study and those provided by the County to reflect differences between 2035 and 2010 conditions. In order to maintain consistency between post-processing model assumptions reflecting the circulation impacts of specific land use and transportation improvements made for this project's analysis and other ongoing project analyses in the County, factors based on draft turn movement and freeway estimates provided by the County the Central El Dorado Specific Plan project were developed and applied to future traffic estimates for this project.

The following capital improvement projects in the immediate vicinity of the project site are anticipated to be completed before year 2035 and are included in this scenario:

- Saratoga Way (4-Lane) Extension,
- El Dorado Hills Boulevard at Saratoga Way Intersection Improvements,
- Highway 50/Silva Valley Parkway Interchange, and
- Highway 50/Empire Ranch Road Interchange.

Cumulative (2035) lane geometries and peak-hour turn movement volumes are presented in Exhibits 4.7-4 and 4.7-5, respectively. Table 4.7-7 and Table 4.7-8 present the peak-hour intersection and freeway operating conditions for this analysis scenario. As shown, under the Cumulative (2035) scenario, intersections would operate between LOS B and F, freeway facilities would operate between LOS B and D, and segments would operate at LOS A and B.

Cumulative conditions on Saratoga Way were modeled assuming the proposed Saratoga Way extension would be expanded to a four-lane roadway (not included as part of the proposed project). As indicated in Table 4.7-9, under these hypothetical conditions, LOS on Saratoga Way would be LOS A and B, depending on direction and peak hour.



Kimley»Horn

Source: Kimley-Horn 2015

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Exhibit 4.7-4 **Cumulative (2035) Conditions Peak Hour Traffic Volumes**

ASCENT ENVIRONMENTAL

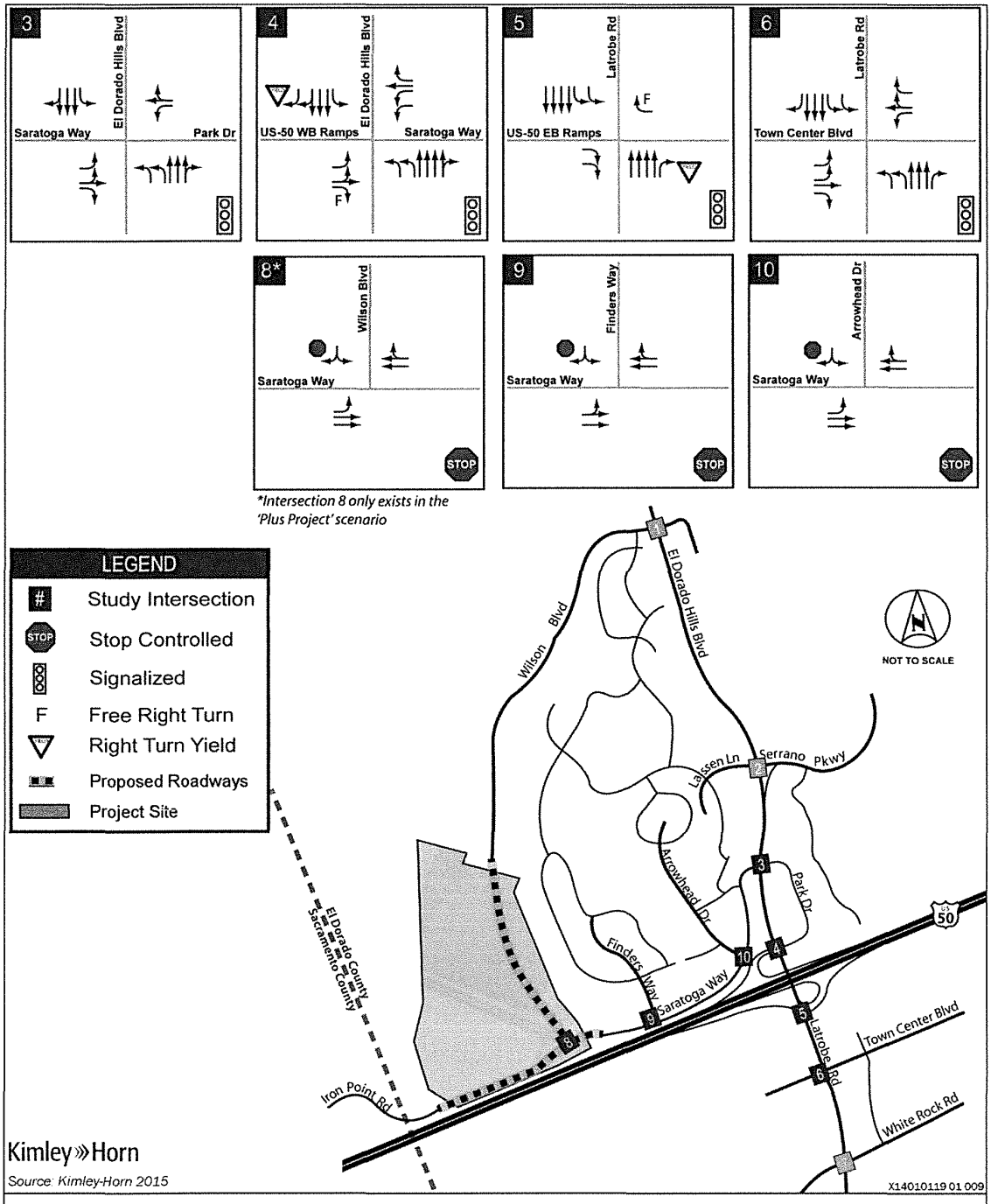


Exhibit 4.7-5 **Cumulative (2035) Conditions Lane Geometries**

Table 4.7-7 Cumulative (2035) Intersection Levels of Service

ID	Intersection	Control	Peak Hour	Cumulative (2035)[1]	
				Delay (sec)	LOS
1	El Dorado Hills Boulevard at Wilson Boulevard	Signal	AM	55.9	E
			PM	40.2	D
2	El Dorado Hills Boulevard at Serrano Parkway/Lassen Lane	Signal	AM	66.3	E
			PM	29.5	C
3	El Dorado Hills Boulevard at Saratoga Way/Park Drive	Signal	AM	**102.6**	**F**
			PM	**112.7**	**F**
4	El Dorado Hills Boulevard at Highway 50 westbound ramps	Signal	AM	30.2	C
			PM	37.5	D
5	Latrobe Road at Highway 50 eastbound ramps	Signal	AM	16.9	B
			PM	15.9	B
6	Latrobe Road at Town Center Boulevard	Signal	AM	42.5	D
			PM	**101.6**	**F**
7	Latrobe Road at White Rock Road	Signal	AM	32.0	C
			PM	60.5	E
8	Saratoga Way at Wilson Boulevard (Project Only)	SSSC[2]	AM	-	-
			PM	-	-
9	Saratoga Way at Finders Way	SSSC[2]	AM	1.0 (18.5 southbound)	C
			PM	0.6 (13.3 southbound)	B
10	Saratoga Way at Arrowhead Drive	SSSC[2]	AM	0.4 (19.4 southbound)	C
			PM	0.3 (17.0 southbound)	C

Notes: **Bold** represents unacceptable operations.

1: Assumes the extension of Saratoga Way as a four-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange.

2: Side Street Stop Controlled (SSSC) intersections are reported with the overall intersection delay followed by the delay of the worst approach. The reported LOS corresponds to the worst approach.

Source: Kimley-Horn 2015

Table 4.7-8 Cumulative (2035) Freeway Facility Levels of Service

Highway 50				Cumulative (2035)[1]	
Direction	Segment	Type	Peak Hour	Density[2]	LOS
Eastbound	West of Latrobe Road southbound off ramp	Basic	AM	13.7	B
			PM	19.0	C
	Latrobe Road southbound off ramp	Diverge	AM	24.4	C
			PM	27.9	C
	El Dorado Hills Boulevard northbound off ramp	Diverge	AM	16.3	B
			PM	23.5	C
	El Dorado Hills Boulevard northbound off ramp to Latrobe Road on ramp	Basic	AM	9.1	A
			PM	13.9	B
	Latrobe Road on ramp	Merge	AM	19.9	B
			PM	24.5	C
	East of Latrobe Road on ramp	Weave[3]	AM	-	B
			PM	-	C

Table 4.7-8 Cumulative (2035) Freeway Facility Levels of Service

Highway 50				Cumulative (2035)[1]	
Direction	Segment	Type	Peak Hour	Density[2]	LOS
Westbound	East of El Dorado Hills Boulevard off ramp	Weave[3]	AM	-	C
			PM	-	B
	El Dorado Hills Boulevard off ramp	Diverge	AM	20.8	C
			PM	19.0	B
	El Dorado Hills Boulevard off ramp to El Dorado Hills Boulevard on ramp	Basic	AM	12.4	B
			PM	11.2	B
	El Dorado Hills Boulevard on ramp	Merge	AM	25.2	C
			PM	21.8	C
	West of El Dorado Hills Boulevard on ramp	Weave[3]	AM	-	D
			PM	-	C

Notes: Bold represents unacceptable operations

1: Assumes the extension of Saratoga Way as a four-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange.

2: Density measured in passenger cars/mile/lane

3: Weave segments are analyzed using the Leisch Method, which is not based on density.

Source: Kimley-Horn 2015

Table 4.7-9 Cumulative (2035) Roadway Segment Levels of Service

Roadway Segment			Cumulative (2035)[1]	
Location	Peak-Hour	Analysis Direction	LOS	Density[2]
Saratoga Way, West of Project	AM	WB	B	11.1
		EB	A	4.3
	PM	WB	A	4.8
		EB	B	14.8
Saratoga Way, East of Project	AM	WB	A	10.9
		EB	A	4.7
	PM	WB	A	5.1
		EB	B	14.9

1: Assumes the extension of Saratoga Way as a four-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange

2: Density measured in passenger cars/mile/lane

Source: Kimley-Horn 2015

4.7.2 Regulatory Setting

FEDERAL

There are no federal transportation regulations or policies applicable to the proposed project.

STATE

California Department of Transportation Guide for the Preparation of Traffic Impact Studies

The *Guide for the Preparation of Traffic Impact Studies* (Caltrans 2002) provides guidance for the evaluation of traffic impacts to State highway facilities. The document identifies when a traffic impact study is needed and outlines what should be included in the scope of the study.

LOCAL

El Dorado County General Plan

The 2004 El Dorado County General Plan Circulation Map (Figure TC-1 of the General Plan) depicts the proposed circulation system of existing, approved, and planned development in unincorporated El Dorado County through 2025. This circulation system is shown on the General Plan Circulation Map using a set of roadway width classifications developed to guide the County's long-range transportation planning and programming. The General Plan Circulation Map identifies the extension of Saratoga Way to Iron Point Road and the widening of Saratoga Way to four lanes as a planned roadway improvement.

In addition, the following general plan policies are applicable to the project:

- **Policy TC-Xa:** The following policies shall remain in effect until December 31, 2018:

  Traffic from single-family residential subdivision development projects of five or more parcels of land shall not result in, or worsen, Level of Service F (gridlock, stop-and-go) traffic congestion during weekday, peak-hour periods on any highway, road, interchange or intersection in the unincorporated areas of the county.

  1. The County shall not add any additional segments of U.S. Highway 50, or any other roads, to the County's list of roads that are allowed to operate at Level of Service F without first getting the voters' approval or by a 4/5ths vote of the Board of Supervisors.

  2. Developer-paid traffic impact fees combined with any other available funds shall fully pay for building all necessary road capacity improvements to fully offset and mitigate all direct and cumulative traffic impacts from new development upon any highways, arterial roads and their intersections during weekday, peak-hour periods in unincorporated areas of the county.

- **Policy TC-Xd:** Level of Service (LOS) for County-maintained roads and state highways within the unincorporated areas of the county shall not be worse than LOS E in the Community Regions or LOS D in the Rural Centers and Rural Regions except as specified in Table TC-2. The volume to capacity ratio of the roadway segments listed in Table TC-2 shall not exceed the ratio specified in that table. Level of Service will be as defined in the latest edition of the Highway Capacity Manual (Transportation Research Board, National Research Council) and calculated using the methodologies contained in that manual. Analysis periods shall be based on the professional judgment of the Department of Transportation which shall consider periods including, but not limited to, Weekday Average Daily Traffic (ADT), a.m. peak hour, and p.m. peak hour traffic volumes.

- **Policy TC-Xe:** For the purposes of this Transportation and Circulation Element, "worsen" is defined as any of the following number of project trips using a road facility at the time of issuance of a use and occupancy permit for the development project:

  A. A 2 percent increase in traffic during the a.m. peak hour, p.m. peak hour, or daily, 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.

- **Policy TC-Xf:** 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 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.

- **Policy TC-Xg:** Each development project shall dedicate right-of-way and construct or fund improvements necessary to mitigate the effects of traffic from the project. The County shall require an analysis of impacts of traffic from the development project, including impacts from truck traffic, and require dedication of needed right-of-way and construction of road facilities as a condition of the development. For road improvements that provide significant benefit to other development, the County may allow a project to fund its fair share of improvement costs through traffic impact fees or receive reimbursement from impact fees for construction of improvements beyond the project's fair share. The amount and timing of reimbursements shall be determined by the County.

- **Policy TC-Xh:** All subdivisions shall be conditioned to pay the traffic impact fees in effect at the time a building permit is issued for any parcel created by the subdivision.

- **Policy TC-5a:** Sidewalks and curbs shall be required throughout residential subdivisions, including land divisions created through the parcel map process, where any residential lot or parcel size is 10,000 square feet or less.

El Dorado County Capital Improvement Program and Traffic Impact Mitigation Fee Program

The El Dorado County Capital Improvement Program (CIP) and Traffic Impact Mitigation (TIM) Fee Program are developed and implemented by the County's Community Development Agency, The CIP is a planning document that identifies capital projects and provides a schedule and funding options. The CIP serves as a planning and implementation tool for the development, construction, rehabilitation, and maintenance of the County's infrastructure. Capital improvements are projects that provide tangible, long-term improvements or additions of a fixed or permanent nature that have value and can be depreciated.

The CIP provides a means for the El Dorado County Board of Supervisors to determine capital priorities. The CIP is updated annually as new information becomes available regarding priorities, funding sources, project cost estimates, and timing.

The TIM Fee Program is the funding mechanism for projects in the CIP which mitigate cumulative traffic impacts identified in the General Plan EIR, and subsequent updates as required in the General Plan. TIM fees are collected at the time of issuance of a building permit. Where an impact is not directly attributed to an individual

development project as determined by General Plan Policies TCx-a through TCx-l, the County considers payment of TIM fees to satisfy a development project's proportionate fair share obligations for the improvements that are in the TIM Fee program. The TIM Fee Program makes up a portion of the funding for the CIP.

El Dorado County Implementation of General Plan Policies

General Plan Policy TC-Xf requires that the County "(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.

The project is proposed to be developed in phases, and may take several years to complete and become fully occupied (point in time where actual traffic impact is realized). Additionally, the actual background traffic growth rates for the 2024 scenario and the 2035 scenario may differ significantly from those projections analyzed in the Traffic Impact Analysis. The combined effect of these two variables could result in pre-mature construction of off-site transportation improvements and/or could introduce inefficiencies in expenditures of transportation funding.

In order to ensure that a project's impacts are fully mitigated, and that the improvements are constructed concurrently with the impact of the development, the County Transportation Division has developed a guideline conditioning template that is applied to major projects where these variabilities exist. The condition proposed to be applied to the Saratoga Estates Project is presented as follows:

Off-Site Improvements - Major Transportation Facilities:

A. The Project shall be responsible for design, Plans, Specifications and Estimate (PS&E), utility relocation, right of way acquisition, and construction of improvements to [*LIST IMPROVEMENTS*].

B. Timing of Improvements

   i. In order to ensure proper timing of the construction of the improvements identified, the Project shall perform a supplemental traffic analysis in conjunction with each final map application to determine Level of Service (LOS) of the [*IMPACT LOCATIONS*], to include existing traffic plus traffic generated by each final map.

   ii. If the supplemental traffic analysis indicates that the County's LOS policies would be exceeded by the existing traffic plus traffic generated by that final map, the Project shall construct the improvements prior to issuance of the first certificate of occupancy for any lot within that final map.

   iii. If the County's LOS policies are not exceeded upon application for the last final map within the Project, the Project shall pay its TIM fees toward the installation of proposed roadway improvements. In which case, payment of TIM fees is considered to be the project's proportionate fair share towards mitigation of this impact.

   iv. If the necessary improvements are constructed by the County or others prior to triggering of mitigation by the Project, payment of TIM fees is considered to be the Project's proportionate fair share towards mitigation of this impact.

C. Financing and Reimbursement

   i. Project may be reimbursed for the costs of any improvements listed above, to the extent such improvements are included in the County's Traffic Impact Mitigation (TIM) Fee Program, in accordance with the County's TIM Fee Reimbursement Guidelines, and subject to a Road Improvement and Reimbursement / Credit Agreement between the Project and the County.

ii. If any improvements are included in the County's 10-year CIP and TIM Fee Program, and agreed to by the County in a Road Improvement and Reimbursement / Credit Agreement, the Project may receive full or partial credit for the cost of the work against TIM Fees that would otherwise be paid at issuance of building permits.

iii. If any improvements are included in the County's 10-year CIP and TIM Fee Program, and agreed to by County in a Road Improvement and Reimbursement / Credit Agreement, the Project may provide funding and Bid-Ready PS&E to County, for bidding and construction management by County.

C. With respect to the improvements to the public roadways required in this condition, either one of the following shall be done prior to issuance of a building permit: (a) the subdivider shall be under contract for construction of the required improvements with proper sureties in place, or (b) the subdivider shall have submitted to the County a bid-ready package (PS&E) and adequate funding for construction.

D. The following requirements apply to all traffic signals identified in this condition.

i. In order to ensure proper timing for the installation of traffic signal controls, the Project shall be responsible to perform traffic signal warrants with each final map at intersections identified for potential signalization, in accordance with the Manual on Uniform Traffic Control Devices (version in effect at the time of application).

ii. If traffic signal warrants are met at the time of application for final map (including the lots proposed by that final map), the Project shall construct the improvements prior to issuance of the first certificate of occupancy for any lot within that final map.

iii. If traffic signal warrants are not met upon application for the last final map within the Project, the Project shall pay its TIM fees toward the installation of traffic signal controls. In which case, payment of TIM fees is considered to be the Project's proportionate fair share towards mitigation of this impact.

iv. If the traffic signal control at an intersection is constructed by the County or others prior to triggering of mitigation by the Project, payment of TIM fees is considered to be the Project's proportionate fair share towards mitigation of the impact.

Application of this condition ensures compliance with all General Plan Policies, ensures that required mitigation is implemented concurrently with impact, ensures that unnecessary improvements are not required to be constructed, and provides flexibility for implementation and funding of the required improvements.

El Dorado County Regional Transportation Plan

The El Dorado County Transportation Commission (EDCTC) is the Regional Transportation Planning Agency for El Dorado County (excluding the Tahoe Basin). The El Dorado County 2030 Regional Transportation Plan (RTP) was developed by the EDCTC to document the policy direction, actions, and funding recommendations intended to meet El Dorado County's short and long range transportation needs over the next 20 years. The RTP is designed to be a blueprint for the systematic development of a balanced, comprehensive, and multi-modal transportation system. In general, RTPs are developed to provide a clear vision of regional transportation goals, objectives, and policies, complemented by short- and long-term strategies for implementation.

The 2030 RTP also serves as the El Dorado County portion of the Sacramento Area Council of Governments Metropolitan Transportation Plan. The 2030 RTP identifies the County's 10-year CI P in its regional road network short-term action plan. The extension of Saratoga Way to Iron Point Road as a two-lane road with eight-foot shoulders is identified in the County's CIP.

El Dorado County Bicycle Transportation Plan

The Bicycle Transportation Plan represents the efforts of EDCTC staff, the Bicycle Transportation Plan Advisory Committee, El Dorado County, El Dorado Hills Community Services District, and numerous dedicated citizens in the area. The plan was developed with the overall goal of providing a safe, efficient, and convenient network of bicycle facilities that establish alternative transportation as a viable option in El Dorado County and its neighboring regions.

The plan addresses the following specific issues pertaining to non-motorized transportation:

- bicycle commuting;
- safety and education to maximize bicycle safety;
- identification of detailed and prioritized improvements in the El Dorado County Bicycle Transportation Plan;
- integrating bicycle and pedestrian planning with other regional and community planning;
- maximizing multi-modal connections to the bicycle transportation system;
- funding;
- connectivity; and
- developing Class I Bike Paths on the El Dorado Trail.

4.7.3 Impact Analysis

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the State CEQA Guidelines, the proposed project would result in a significant impact if it would:

- conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
- conflict with an applicable congestion management program, including, but not limited to LOS standards and travel demand measures, or other standards established by the County congestion management agency for designated roads or highways;
- result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- result in inadequate emergency access; or
- conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Project impacts were determined by comparing conditions with the proposed project to those without the project. Impacts for intersections are created when traffic from the proposed project forces the LOS to fall below a specific threshold. The County's standards specify the following:

- "Level of Service (LOS) for County-maintained roads and State highways within the unincorporated areas of the County *shall not be worse than LOS E in the Community Regions* or *LOS D in the Rural Centers and Rural Regions*..." (*El Dorado County General Plan* Policy TC-Xd). The study facilities are located within the El Dorado Hills Community Region; therefore, the LOS threshold applied to the project is LOS E.

- If a project causes the peak-hour level of service...on a County road or State highway that would otherwise meet the County standards (without the project) to exceed the [given] values, then the impact shall be considered significant.

- If any County road or State highway fails to meet the [given] standards for peak hour level of service...without the proposed project, and the project would significantly worsen conditions on the road or highway, then the impact shall be considered significant. According to *El Dorado County General Plan* Policy TC- Xe, worsen is defined as "a 2 percent increase in traffic during the a.m. peak hour, p.m. peak hour, or daily, or the addition of 100 or more daily trips, or the addition of 10 or more trips during the a.m. peak hour or the p.m. peak hour."

The Caltrans District 3 standard of significance was applied to intersections at the Highway 50 interchange with El Dorado Hills Boulevard/Latrobe Road. Caltrans has established an LOS E threshold for the peak 15 minutes for signalized intersections outside "high speed areas." The Highway 50 interchange ramp intersections with El Dorado Hills Boulevard/Latrobe Road are not considered to be located in high speed areas; therefore, the LOS E threshold for the peak 15 minutes applies to these facilities.

ISSUES OR POTENTIAL IMPACTS NOT DISCUSSED FURTHER

The project would not result in any changes to air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks. Further, there are no towers or other structures that could potentially affect air transport. Therefore, this issue is not discussed further in this Draft EIR.

Vehicle queuing for critical movements at the El Dorado Hills Boulevard intersection with Saratoga Way/Park Drive (Intersection #3) was evaluated. The calculated vehicle queues were compared to actual or anticipated vehicle storage lengths. Results of this evaluation indicate that the project would add a minimal amount of additional queuing to these movements. Thus, this issue is not addressed further in this Draft EIR. See Appendix B of this Draft EIR for more information.

METHODS OF ANALYSIS

This traffic impact analysis was performed in accordance with the County's traffic impact study protocols and procedures. LOS for this study was determined using methods defined in the Highway Capacity Manual (HCM) (Transportation Research Board 2010) using appropriate traffic analysis software.

Proposed Project Trip Generation and Assignment

The number of trips anticipated to be generated by the proposed project was derived using data included in *Trip Generation, 9th* Edition, published by the Institute of Transportation Engineers (ITE). The anticipated ITE trip generation characteristics for the proposed project are depicted in Table 4.7-10. At full build-out, the proposed project is estimated to generate approximately 3,000 daily trips, with 232 trips occurring during the a.m. peak-hour, and 297 trips occurring during the p.m. peak-hour.

Table 4.7-10 Proposed Project ITE Trip Generation

Land Use (ITE Code)	Size (# units)	Daily Trips	AM Peak Hour					PM Peak Hour				
			Total Trips	IN		OUT		Total Trips	IN		OUT	
				%	Trips	%	Trips		%	Trips	%	Trips
Single-Family Detached Housing (210)	317	3,036	232	25%	58	75%	174	297	63%	187	37%	110

Source: Trip Generation, 9th Edition, as cited in Kimley-Horn 2015

The El Dorado County TDM was used both as the basis to establish the relative assignment of proposed project trips, and to establish background traffic estimates for the analysis scenario. The project trip distribution percentages assuming baseline conditions (i.e., conditions in 2014) that resulted from analyses completed for this study are provided in Exhibit 4.7-6. Exhibit 4.7-7 shows the project trip distribution percentages for analysis of the near term and cumulative conditions.

Level of Service Definition

Analysis of significant environmental impacts to transportation facilities is based on the concept of LOS. The LOS of a facility is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay for motorists, to F (worst), which represents heavy delay for motorists and a facility that is operating at or near its functional capacity. Levels of Service for this study were determined using methods defined in the *Highway Capacity Manual (HCM)* (2000 for those intersections analyzed using Synchro®, and 2010 for those intersections analyzed using SimTraffic®).

Intersection Analysis

The HCM includes procedures for analyzing side-street stop-controlled, all-way stop-controlled, and signalized intersections. The side-street stop-controlled procedure defines LOS as a function of average control delay for each minor street approach movement. Conversely, the all-way stop-controlled and signalized intersection procedures define LOS as a function of average control delay for the intersection as a whole. Table 4.7-11 presents intersection LOS definitions as defined in the HCM.

Because of the close spacing of the El Dorado Hills Boulevard/Latrobe Road intersections in the vicinity of Highway 50, LOS for Intersections #3 through #7 was determined using the SimTraffic® micro-simulation analysis software. The existing conditions SimTraffic® models were originally provided by the County for use in this study. These models were validated based on field observations of traffic volumes, driver behavior, lane utilization, and maximum vehicle queue lengths. As a result of these observations, adjustments were incorporated that improve the accuracy of vehicles behavior as they position for downstream turns. SimTraffic® measures of effectiveness are compared against the HCM intersection delay thresholds to equate SimTraffic® results to HCM LOS. For this simulation effort, a seed time of 10 minutes is used and ten runs are averaged to obtain the results.

Freeway Facility Analysis

Caltrans' traffic study guidelines specify the use of vehicle density (passenger cars/mile/lane) as the appropriate measure of effectiveness for freeway facilities. The LOS criteria for basic freeway segments and merge/diverge segments are summarized in Table 4.7-12. Weaving sections (i.e., freeway segments with auxiliary lanes) were analyzed using the Leisch Method (Federal Highway Administration 1984).

Roadway Segment Analysis

The HCM also includes procedures for analyzing multilane and two-lane roadway segments. For multilane roadways segments, LOS is determined based on the density of the traffic stream. For two-lane highways, the LOS calculation is dependent on the class of the roadway. Class I two-lane highways are highways that generally have high speeds, Class II two-lane highways are lower speed highways that typically serve scenic routes or areas of rugged terrain, and Class III two-lane highways typically serve moderately developed areas with higher densities of local traffic and access.

Roadway segments along Saratoga Way are either a Class III two-lane or a multi-lane roadway, depending on the location and analysis scenario. For Class III highways, the percent of free-flow speed, which is the measure representing the ability of vehicles to travel at the posted speed limit, is used to determine LOS. The LOS criteria for multi-lane and two-lane roadway segments are shown in Tables 4.7-13 and 4.7-14, respectively.

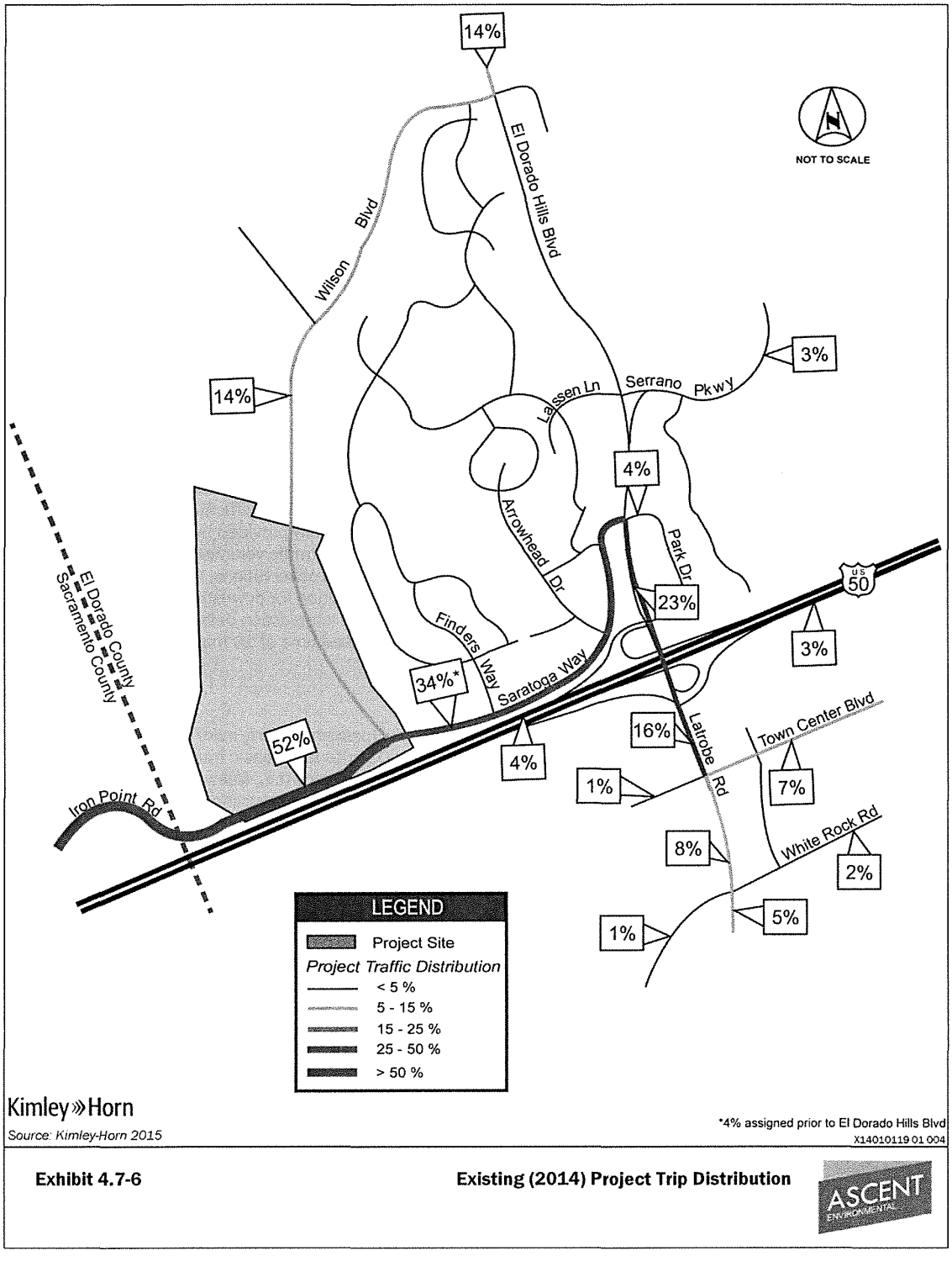


Exhibit 4.7-6 **Existing (2014) Project Trip Distribution**

ASCENT ENVIRONMENTAL

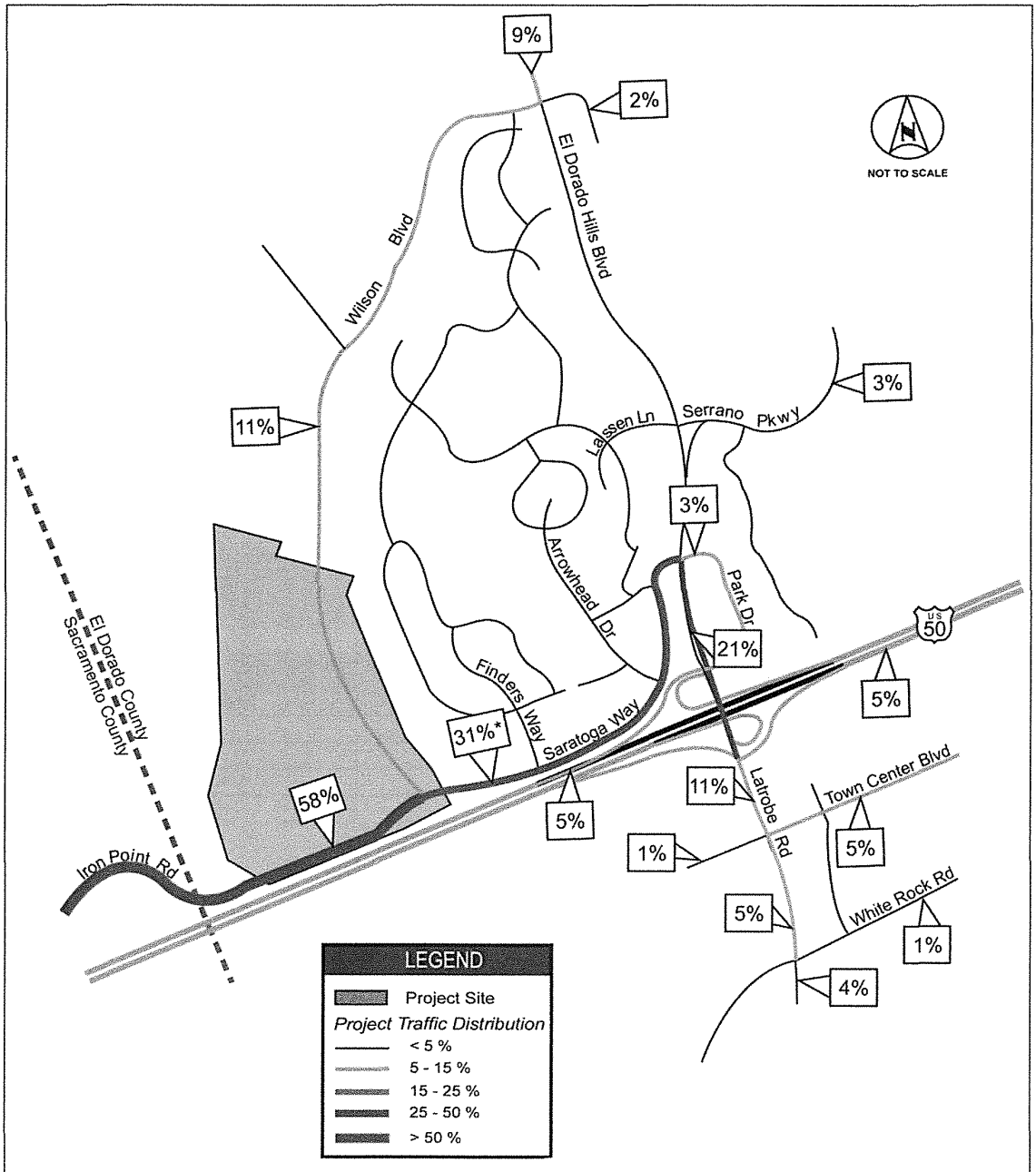


Exhibit 4.7-7 Near-Term (2024) and Cumulative (2035) Proposed Project Trip Distribution

ASCENT ENVIRONMENTAL

Table 4.7-11 Intersection Level of Service Criteria

LOS	Unsignalized	Signalized
	Average Control Delay[1] (seconds/vehicle)	Average Control Delay (seconds/vehicle)
A	≤ 10	≤ 10
B	> 10 – 15	> 10 – 20
C	> 15 – 25	> 20 – 35
D	> 25 – 35	> 35 – 55
E	> 35 – 50	> 55 – 80
F	> 50	> 80

1: Applied to the worst lane/lane group(s) for side-street stop controlled intersections

Source: *California Department of Transportation 2010*

Table 4.7-12 Freeway Facilities LOS Criteria

LOS	Basic Segments Density (pc/mi/ln)	Merge/Diverge Segments Density (pc/mi/ln)
A	≤ 11	≤ 10
B	> 11 – 18	> 10 – 20
C	> 18 – 26	> 20 – 28
D	> 26 – 35	> 28 – 35
E	> 35 – 45	> 35
F	> 45 (Demand exceeds capacity)	Demand exceeds capacity

Notes: pc/mi/ln = passenger cars per mile per lane

Source: Highway Capacity Manual, 2010

Table 4.7-13 Multi-Lane Roadway Segment Level of Service Criteria

Level of Service (LOS)	Free Flow Speed (mph)	Density (pc/mi/ln)
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

Source: California Department of Transportation 2010

Table 4.7-14 Two-Lane Roadway Segment (Class III) Level of Service Criteria

Level of Service (LOS)	Percent Free-Flow Speed (%)
A	> 91.7
B	> 83.3 – 91.7
C	> 75.0 – 83.3
D	> 66.7 – 75.0
E	≤ 66.7

Source: California Department of Transportation 2010

IMPACTS AND MITIGATION MEASURES

Impact 4.7-1: Existing plus project intersection LOS impacts.

Under the existing plus project conditions, operation of the study intersections range from LOS C to LOS F during the a.m. and p.m. peak hours. The freeway facilities are shown to operate from LOS A to LOS E during peak hours. Roadway segments would operate at LOS D and E. With the proposed project, operations of El Dorado Hills Boulevard at Saratoga Way/Park Drive and Latrobe Road at Town Center Boulevard intersections would operate at LOS F and result in more than 10 additional vehicle trips per peak hour. Thus, this impact would be **significant.**

With implementation of Mitigation Measures 4.7-1a, which would require the applicant to pay TIM fees, and Mitigation Measure 4.7-1b, which would optimize signal timing along the El Dorado Hills Boulevard/Latrobe Road corridor, this impact would be **less than significant.**

The County's TDM was used to generate and assign project traffic to the transportation network. Using these volumes and the associated roadway network changes (two-lane Saratoga Way extension and Wilson Boulevard extension), LOS was determined at the study facilities. Existing (2014) with project peak-hour turn movement volumes and LOS are presented in Exhibit 4.7-8 and Table 4.7-15. Table 4.7-16 presents the peak-hour freeway operating conditions for this analysis scenario. Table 4.7-17 shows the existing plus proposed project roadway segment LOS. (Note that the Traffic Study, included as Appendix B of this Draft EIR, includes a discussion regarding the potential traffic effects associated only with the proposed extension of Saratoga Way.)

Table 4.7-15 Existing (2014) and Existing plus Project Intersection LOS

ID	Intersection	Control	Peak Hour	Existing (2014)[1]		Existing (2014) with Project[2]	
				Delay (seconds)	LOS	Delay (seconds)	LOS
1	El Dorado Hills Boulevard at Wilson Boulevard	Signal	AM	20.8	C	25.3	C
			PM	22.5	C	29.9	C
2	El Dorado Hills Boulevard at Serrano Parkway/Lassen Lane	Signal	AM	44.2	D	42.4	D
			PM	21.5	C	26.5	C
3	El Dorado Hills Boulevard at Saratoga Way/Park Drive	Signal	AM	22.4	C	**150.6**	**F**
			PM	22.0	C	**102.4**	**F**
4	El Dorado Hills Boulevard at Highway 50 westbound ramps	Signal	AM	29.2	C	26.6	C
			PM	35.0	C	37.8	D
5	Latrobe Road at Highway 50 eastbound ramps	Signal	AM	31.0	C	37.5	D
			PM	11.7	B	11.8	C
6	Latrobe Road at Town Center Boulevard	Signal	AM	27.7	C	27.7	C
			PM	73.8	E	**89.8**	**F**
7	Latrobe Road at White Rock Road	Signal	AM	36.2	D	32.8	C
			PM	43.7	D	59.6	E
8	Saratoga Way at Wilson Boulevard (Project Only)	SSSC[1]	AM	-	-	4.9 (29.6 southbound)	D
			PM	-	-	2.6 (32.1 southbound)	D
9	Saratoga Way at Finders Way	SSSC[1]	AM	7.7 (8.8 southbound)	A	1.0 (22.1 southbound)	C
			PM	4.3 (8.9 southbound)	A	1.0 (21.0 southbound)	C
10	Saratoga Way at Arrowhead Drive	SSSC[1]	AM	1.8 (9.1 southbound)	A	0.5 (28.3 southbound)	D
			PM	1.7 (9.2 southbound)	A	0.6 (35.8 southbound)	E

Notes: **Bold and shaded** represents unacceptable operations.
1. The Existing Condition scenario assumes the project site in its current conditions with no extension of Saratoga Way or Wilson Boulevard.
2. The Existing (2014) with Project scenario assumes development of the proposed residential development and extension of the proposed Saratoga Way and Wilson Boulevard Extensions.
*Side Street Stop Controlled (SSSC) intersections are reported with the overall intersection delay followed by the delay of the worst approach. The reported LOS corresponds to the worst approach.
Source: Kimley-Horn 2015

Table 4.7-16 Existing and Existing plus Project Freeway Facilities LOS

Highway 50				Existing (2014)[1]		Existing (2014) with Project[2]	
Direction	Segment	Type	Peak Hour	Density[3]	LOS	Density[1]	LOS
Eastbound	West of Latrobe Road southbound off ramp	Basic	AM	12.7	B	12.8	B
			PM	21.2	C	21.3	C
	Latrobe Road southbound off ramp	Diverge	AM	22.8	C	22.8	C
			PM	32.3	D	31.4	D
	El Dorado Hills Boulevard northbound off ramp	Diverge	AM	12.6	B	12.1	B
			PM	26.5	C	27.2	C
	El Dorado Hills Boulevard northbound off ramp to Latrobe Road on ramp	Basic	AM	5.2	A	5.4	A
			PM	11.7	B	12.9	B
	Latrobe Road on ramp	Merge	AM	13.4	B	14.0	B
			PM	24.2	C	25.8	C
	East of Latrobe Road on ramp	Basic	AM	7.3	A	7.7	A
			PM	16.3	B	17.9	B
Westbound	East of El Dorado Hills Boulevard off ramp	Basic	AM	28.8	D	28.8	D
			PM	14.5	B	14.5	B
	El Dorado Hills Boulevard off ramp	Diverge	AM	35.2	E	35.3	E
			PM	21.2	C	21.3	C
	El Dorado Hills Boulevard off ramp to El Dorado Hills Boulevard on ramp	Basic	AM	19.2	C	18.5	C
			PM	10.1	A	9.9	A
	El Dorado Hills Boulevard on ramp	Merge	AM	35.7	E	32.3	D
			PM	26.8	C	24.6	C
	West of El Dorado Hills Boulevard on ramp	Basic	AM	41.2	E	33.5	D
			PM	25.3	C	22.5	C

Notes:
1. The Existing Condition scenario assumes the project site in its current conditions with no extension of Saratoga Way or Wilson Boulevard.
2. The Existing (2014) with Project scenario assumes development of the proposed residential development and extension of the proposed Saratoga Way and Wilson Boulevard Extensions.
3. Density measured in passenger cars/mile/lane
Source: Kimley-Horn 2015

Table 4.7-17 Existing (2014) and Existing plus Project Roadway Segment LOS

Location	Peak-Hour	Analysis Direction	Existing (2014)[1]			Existing (2014) plus Project[2]		
			LOS	PFFS	v/c	LOS	PFFS	v/c
Saratoga Way, West of Project	AM	WB	-	-	-	D	68.3	0.56
		EB	-	-	-	D	69.2	0.41
	PM	WB	-	-	-	D	67.5	0.40
		EB	-	-	-	E	66.3	0.63
Saratoga Way, East of Project	AM	WB	A	92.1	0.01	D	71.5	0.43
		EB	A	92.5	0.06	D	71.3	0.44
	PM	WB	A	91.9	0.05	D	69.9	0.39
		EB	A	91.9	0.04	D	68.8	0.55

Notes: PFFS=percent free-flow speed; LOS=level of service; v/c=volume to capacity

1. The Existing Condition scenario assumes the project site in its current conditions with no extension of Saratoga Way or Wilson Boulevard.

2. The Existing (2014) with Project scenario assumes development of the proposed residential development and extension of the proposed Saratoga Way and Wilson Boulevard Extensions.
Source: Kimley-Horn 2015

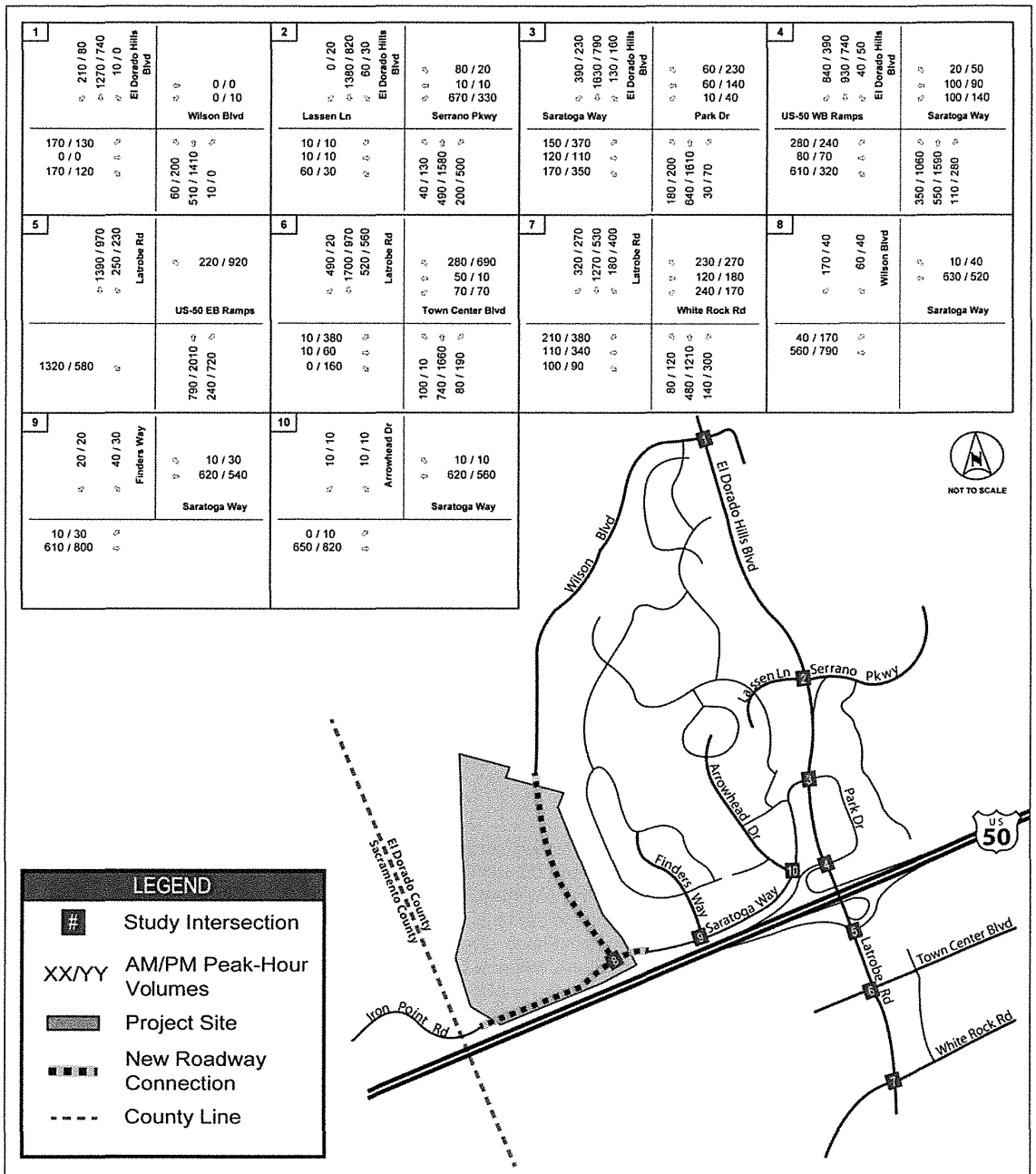


Exhibit 4.7-8 **Existing Plus Project Peak Hour Traffic Volumes**

As indicated above, with implementation of the project, operation of the study intersections would range from LOS B to LOS F during the a.m. and p.m. peak hours and operation of the freeway facilities would range from LOS A to LOS E during peak hours. The roadway segment operation conditions would degrade from LOS A to LOS D and LOS E. The addition of the proposed project to 2014 conditions would cause the following two intersections currently operating at acceptable levels to degrade to LOS F conditions:

- **El Dorado Hills Boulevard at Saratoga Way/Park Drive:** This intersection operates acceptably under existing (2014) conditions, but would degrade to LOS F during the a.m. and p.m. peak hours with the addition of the proposed project. (Note that this intersection would also operate at LOS F if the Saratoga Way extension were completed under the CIP separately from this development project, as indicated in Appendix B.)

- **Latrobe Road at Town Center Boulevard:** This intersection operates acceptably under existing (2014) conditions, but would degrade to LOS F during the p.m. peak hour with the addition of the proposed project.

Thus, this impact would be **significant.**

Mitigation Measures

Mitigation Measure 4.7-1a: Pay TIM Fees

The applicant shall pay fair share fees to El Dorado County to address the project's contribution to traffic at the El Dorado Hills Boulevard at Saratoga Way/Park Drive Intersection. Fee amount shall be determined by the County. All fees shall be paid at the time of issuance of building permits.

Mitigation Measure 4.7-1b: Complete a Signal Timing Plan

The project applicant shall prepare and implement a signal timing plan for the intersections along El Dorado Hills Boulevard/Latrobe Road corridor from Saratoga Way/Park Drive through Town Center Boulevard to provide acceptable LOS in the a.m. and p.m. peak hours. The plan for signal optimization shall be prepared by a California-licensed civil engineer or traffic engineer obtained by the project applicant and shall be submitted to the County Transportation Division and Caltrans, as appropriate. Prior to issuance of occupancy certificates, the applicant shall ensure the signal timing improvements are completed in coordination with the County Transportation Division and Caltrans.

Significance after Mitigation

With implementation of Mitigation Measures 4.7-1a and 1b, the applicant would pay TIM Fees and prepare and implement optimized signal timings along the El Dorado Hills Boulevard/Latrobe Road corridor. As discussed above, the Highway 50/Silva Valley Parkway interchange (Phase 1), a CIP project, is currently under construction and will be completed in 2016, prior to the time at which development of the project would begin. The Highway 50/Silva Valley Parkway interchange (Phase 1) consists of a new overcrossing over Highway 50, new on- and off-ramps with signalized intersections, and new bicycle and pedestrian facilities. The purpose of the project is to provide another access point to Highway 50 for motorists in El Dorado Hills. The completion of Highway 50/Silva Valley Parkway interchange will result in a redistribution of the traffic and would affect delays associated with roadways near the project site, including El Dorado Hills Boulevard and Latrobe Road. The interchange will decrease congestion on several roadways near the project site and improve travel time by providing more direct access to Highway 50 for many area residents and businesses that would otherwise be required to access Highway 50 from El Dorado Hills Boulevard, Latrobe Road, or Bass Lake Road.

Modeling of the project, in combination with operation of the Highway 50/Silva Valley Parkway and optimized signal cycle length and reallocation of the green time at intersections in the area, is provided in Table 4.7-18. As shown, under these conditions, LOS conditions would be acceptable and degraded conditions would improve. The new interchange, along with revised signal timings, would result in acceptable LOS E or better operations along the corridor during the a.m. and p.m. peak hours. Because this improvement is in the TIM Fee program and will be completed prior to development on the project site, payment of TIM Fees will satisfy the project's fair share obligation towards this improvement.

Table 4.7-18 Existing plus Project with Mitigation Intersection LOS

ID	Intersection	Control	Peak Hour	Existing (2014) Plus Project		Existing (2014) Plus Project with Mitigation	
				Delay (seconds)	LOS	Delay (seconds)	LOS
3	El Dorado Hills Boulevard at Saratoga Way/Park Drive	Signal	AM	**150.6**	**F**	67.7	E
			PM	**102.4**	**F**	55.1	E
4	El Dorado Boulevard at Highway 50 westbound ramps	Signal	AM	26.6	C	22.4	C
			PM	37.8	D	32.0	C
5	Latrobe Road at Highway 50 eastbound ramps	Signal	AM	37.5	D	15.4	B
			PM	11.8	B	12.4	B
6	Latrobe Road at Town Center Boulevard	Signal	AM	27.7	C	25.4	C
			PM	**89.8**	**F**	47.7	D
7	Latrobe Road at White Rock Road	Signal	AM	32.8	C	34.2	C
			PM	59.6	E	34.8	C

Notes: **Bold and shaded** represents unacceptable operations.

Source: Kimley-Horn 2015

With implementation of Mitigation Measures 4.7-1a and 4.7-1b, intersection LOS associated with the existing plus project condition would meet, and in some cases exceed, requirements for traffic operations within the County. Thus, this impact would be reduced to a **less-than-significant** level.

Impact 4.7-2: Near Term (2024) plus proposed project conditions intersection LOS impacts.

Under Near Term (2024) conditions, operation of the study intersections would range between LOS B and LOS F during the a.m. and p.m. peak hours. The study freeway facilities would operate acceptably and range from LOS A to LOS E during peak hours. The study roadway segments would operate acceptably at LOS E or better. The El Dorado Hills Boulevard at Saratoga Way/Park Drive and Latrobe Road at Town Center Boulevard intersections would operate unacceptably at LOS F without the proposed residential development under Near-Term conditions. Because the project would add 10 or more trips during the peak hour to these intersections, this impact would be **significant.**

With implementation of Mitigation Measures 4.7-2 and 4.7-3, which would improve intersection operations at the impacted intersections to acceptable levels, this impact would be **less than significant.**

Traffic volumes for Near Term (2024) conditions were developed using the El Dorado County TDM, as described previously. Traffic volume estimates assume turn movements using 2010 and 2035 land use scenarios that both include the Saratoga Way extension and the Highway 50/Silva Valley Parkway interchange. A straight-line analysis was conducted to establish year 2024 turn movement estimates. The difference between the resulting 2024 traffic estimate and the 2010 model results (the growth) was then added to Existing (2014) traffic volumes to establish base Near-Term (2024) traffic estimates for this study.

Near Term (2024) with project peak-hour turn movement volumes are presented in Exhibit 4.7-9. Tables 4.7-19, 4.7-20, and 4.7-21 present the peak-hour intersection, freeway segment, and roadway segment operating conditions for this analysis scenario. As indicated in Table 4.7-19, operation of the study intersections would range from LOS B to LOS F during the a.m. and p.m. peak hours both with and without implementation of the project. Modeling indicates that project implementation would result in a slightly reduced delay for the El Dorado Hills Boulevard at Saratoga Way/Park Drive intersection in the a.m. and p.m. peak hours, there would be an increase of more than 10 trips to this intersection associated with the project. In addition, the intersection of Latrobe Road at Town Center Boulevard would increase delay and result in more than 10 trips as a result of project implementation. Freeway facilities and roadway segments would operate at acceptable LOS (Tables 4.7-20 and 4.7-21).

The 2024 analysis includes planned roadway improvements, as well as growth consistent with the 2004 General Plan and with approved and reasonably foreseeable projects within the study area. Unacceptable operations at the El Dorado Hills Boulevard at Saratoga Way/Park Drive and Latrobe Road at Town Center Boulevard intersections are due to a combination of increased traffic from planned development and changes in travel patterns associated with the planned infrastructure improvements, such as the Saratoga Way extension and the Highway 50/Silva Valley Parkway interchange (discussed above under Impact 4.7-1). Because implementation of the project would worsen LOS F conditions by increasing traffic volumes by more than 10 vehicles during peak hours, this impact would be **significant.**

Table 4.7-19 Near Term and Near Term with Proposed Project Intersection LOS

ID	Intersection	Control	Peak Hour	Near Term (2024)[1]		Near Term (2024) with Project[2]	
				Delay (seconds)	LOS	Delay (seconds)	LOS
1	El Dorado Hills Boulevard at Wilson Boulevard	Signal	AM	24.3	C	25.6	C
			PM	61.6	E	63.9	E
2	El Dorado Hills Boulevard at Serrano Parkway/Lassen Lane	Signal	AM	57.7	E	44.0	D
			PM	50.4	D	41.4	D
3	El Dorado Hills Boulevard at Saratoga Way/Park Drive	Signal	AM	**167.6**	F	**159.6**	F
			PM	**149.2**	F	**122.4**	F
4	El Dorado Hills Boulevard at Highway 50 westbound ramps	Signal	AM	47.3	D	45.0	D
			PM	34.9	C	40.1	D
5	Latrobe Road at Highway 50 eastbound ramps	Signal	AM	19.2	B	21.5	C
			PM	11.7	B	12.8	B
6	Latrobe Road at Town Center Boulevard	Signal	AM	29.7	C	29.5	C
			PM	**84.1**	F	**91.5**	F
7	Latrobe Road at White Rock Road	Signal	AM	34.9	C	35.8	D
			PM	69.9	E	76.1	E
8	Saratoga Way at Wilson Boulevard (Project Only)	SSSC[3]	AM	-	-	4.8 (24.9 southbound)	C
			PM	-	-	2.4 (35.0 southbound)	D
9	Saratoga Way at Finders Way	SSSC[3]	AM	1.3 26.9 southbound)	D	1.0 (17.1 southbound)	C
			PM	1.3 (44.3 southbound)	E	0.8 (19.8 southbound)	C
10	Saratoga Way at Arrowhead Drive	SSSC[3]	AM	0.4 (21.4 southbound)	D	0.3 (19.2 southbound)	C
			PM	0.4 (27.2 southbound)	D	0.4 (27.0 southbound)	D

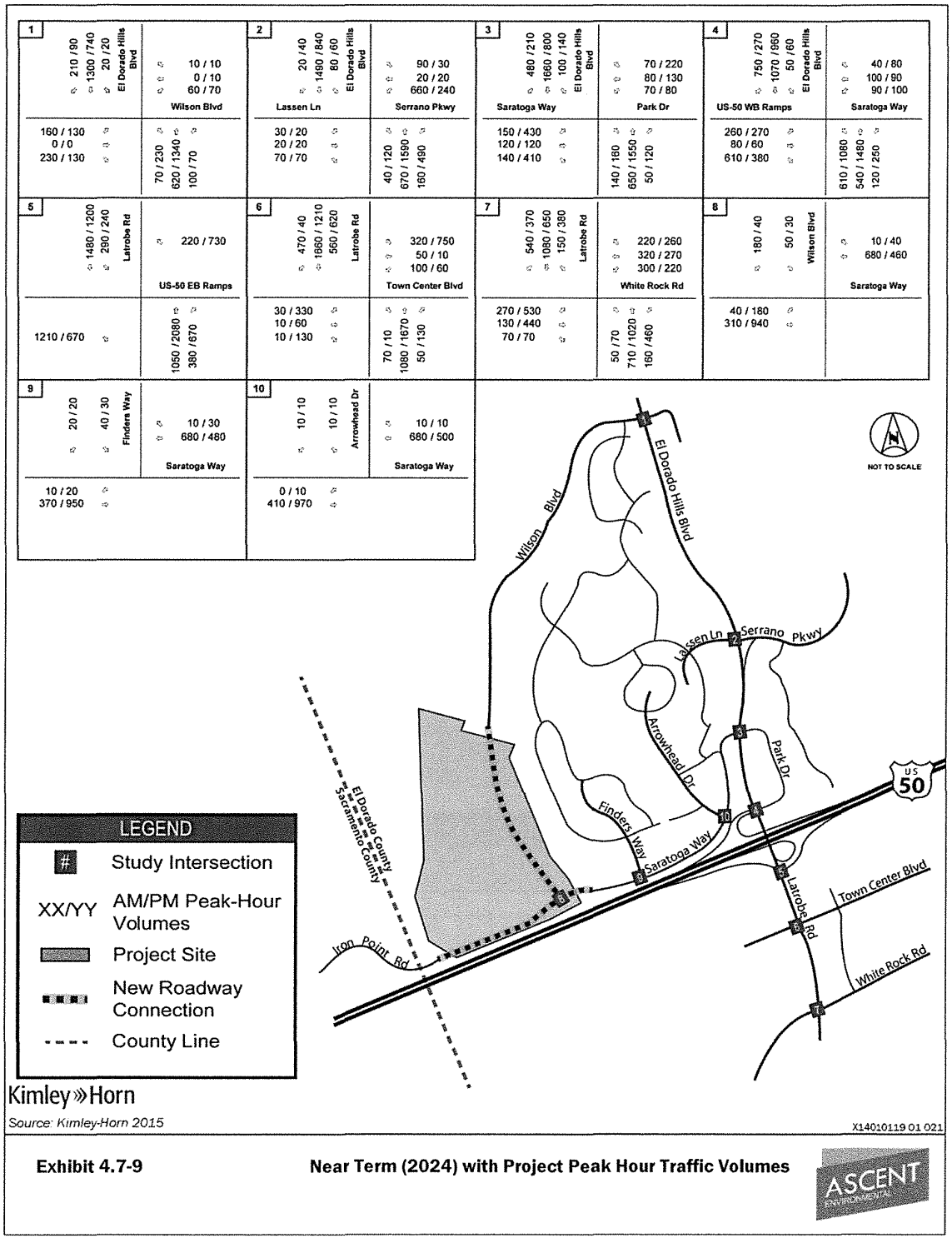
Notes: Bold and shaded represents unacceptable operations.

1: The Near Term (2024) scenario assumes operation of the extension of Saratoga Way as a two-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange without the implementation of the proposed residential development.

2: The Near Term (2024) with Project scenario assumes the extension of Saratoga Way as a two-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange and proposed residential development.

3: Side Street Stop Controlled (SSSC) intersections are reported with the overall intersection delay followed by the delay of the worst approach. The reported LOS corresponds to the worst approach.

Source: Kimley-Horn 2015



Source: Kimley-Horn 2015

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Exhibit 4.7-9 **Near Term (2024) with Project Peak Hour Traffic Volumes**

Table 4.7-20 Near Term and Near Term with Proposed Project Freeway Facilities LOS

	Highway 50			Near Term (2024)[1]		Near Term (2024) with Project[2]	
Direction	Segment	Type	Peak Hour	Density[3]	LOS	Density[3]	LOS
Eastbound	West of Latrobe Road southbound off ramp	Basic	AM	15.3	B	15.3	B
			PM	23.8	C	23.9	C
	Latrobe Road southbound off ramp	Diverge	AM	24.9	C	24.9	C
			PM	32.4	D	32.5	D
	El Dorado Hills Boulevard northbound Off Ramp	Diverge	AM	16.2	B	16.2	B
			PM	28.3	D	28.3	D
	El Dorado Hills Boulevard northbound off ramp to Latrobe Road on ramp	Basic	AM	8.5	A	8.5	A
			PM	15.5	B	15.5	B
	Latrobe Road on ramp	Merge	AM	18.5	B	18.6	B
			PM	27.8	C	27.9	C
	East of Latrobe Road on ramp	Weave[4]	AM	-	A	-	A
			PM	-	C	-	C
Westbound	East of El Dorado Hills Boulevard off ramp	Weave[4]	AM	-	B	-	B
			PM	-	A	-	A
	El Dorado Hills Boulevard off ramp	Diverge	AM	28.0	D	28.0	D
			PM	22.2	C	22.3	C
	El Dorado Hills Boulevard off ramp to El Dorado Hills Boulevard on ramp	Basic	AM	22.2	C	22.2	C
			PM	15.7	B	15.7	B
	El Dorado Hills Boulevard on ramp	Merge	AM	36.8	E	36.9	E
			PM	30.4	D	30.4	D
	West of El Dorado Hills Boulevard on ramp	Basic	AM	44.0	E	44.3	E
			PM	30.3	D	30.3	D

Notes:

1: The Near Term (2024) scenario assumes operation of the extension of Saratoga Way as a two-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange without the implementation of the proposed residential development.

2: The Near Term (2024) with Project scenario assumes the extension of Saratoga Way as a two-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange and proposed residential development.

3: Density measured in passenger cars/mile/lane

4: Weave segments are analyzed using the Leisch Method, which is not based on density.

Source: Kimley-Horn 2015

Table 4.7-21 Near Term (2024) and Near Term with Proposed Project Roadway Segment LOS

Location	Peak-Hour	Analysis Direction	Near Term (2024)[1]			Near Term (2024) plus Project[2]		
			LOS	PFFS	v/c	LOS	PFFS	v/c
Saratoga Way, West of Project	AM	WB	D	71.1	0.54	D	69.2	0.60
		EB	D	74.3	0.25	D	72.2	0.27
	PM	WB	D	68.8	0.31	E	65.7	0.36
		EB	E	66.5	0.67	E	63.9	0.74
Saratoga Way, East of Project	AM	WB	D	70.9	0.53	D	72.7	0.46
		EB	D	73.7	0.27	D	75.0	0.29
	PM	WB	D	68.1	0.33	D	68.3	0.35
		EB	E	65.9	0.68	E	66.6	0.64

Notes: PFFS=percent free-flow speed; LOS=level of service; v/c=volume to capacity

1: The Near Term (2024) scenario assumes operation of the extension of Saratoga Way as a two-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange without the implementation of the proposed residential development.

2: The Near Term (2024) with Project scenario assumes the extension of Saratoga Way as a two-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange and proposed residential development.

Source: Kimley-Horn 2015

The significant impact at the El Dorado Hills Boulevard at Saratoga Way/Park Drive intersection can be mitigated with the addition of a southbound right-turn lane and reallocation of the traffic signal's green time. The third southbound lane is included in the County's adopted 2015 CIP as a 20-Year CIP project (Project Number GP183) and as a through lane from Lassen Lane to Saratoga Way. This analysis shows the need for only the southbound right-turn lane at the intersection. Although the improvement is in the CIP, payment of TIM Fees may not be sufficient mitigation since the improvement is currently in the 20-Year CIP, not the 10-Year CIP as required by General Plan Policy TC-Xf.

The significant impact at the Latrobe Road at Town Center Boulevard intersection during the p.m. peak-hour can be mitigated with the following improvements: restriping of the westbound Town Center Boulevard approach to include one shared through/left-turn lane, and two right-turn lanes; the addition of a right-turn overlap signal phase for the westbound right-turn thereby restricting southbound u-turns; and the addition of a component of Phase 2B improvements at the adjacent Highway 50 interchange with El Dorado Hills Boulevard/Latrobe Road. The interchange Phase 2B improvements are included in the County's adopted 2015 CIP as a 20- Year CIP project (Project No: 71323). Specifically, the Phase 2B improvements applied under this mitigation include the additional northbound lane connecting Town Center Boulevard with the right-turn lane at the downstream Latrobe Road intersection with the Highway 50 eastbound ramps. This also requires the optimization of the El Dorado Hills Boulevard/Latrobe Road coordinated signal system. Although some of these improvements are in the CIP, payment of TIM Fees will not be sufficient mitigation since the improvements are currently in the 20-Year CIP, not the 10-Year CIP as required by General Plan Policy TC-Xf.

The CIP also includes a line item for unprogrammed traffic signal installation, operational, and safety improvements at intersections. The line item includes improvements like construction of new traffic signals, construction of turn pockets, and the upgrade of existing traffic signal systems. The County annually monitors intersections with potential need for improvement through the Intersection Needs Prioritization Process. The Intersection Needs Prioritization Process is then used to inform the annual update to the CIP, and potential intersection improvements can be added, by the Board of Supervisors, to the CIP as funding becomes available.

Mitigation Measures

Mitigation Measure 4.7-2: Road and intersection improvements

Prior to issuance of occupancy certificates, the applicant shall coordinate with the County to improve the El Dorado Hills at Saratoga Way/Park Drive intersection by adding a southbound right-turn pocket and re-allocating the traffic signal green time, and improve the Latrobe at Town Center Drive intersection by restriping of the westbound Town Center Boulevard approach to include one shared through/left-turn lane and two right-turn lanes, adding a right-turn overlap signal phase for the westbound right-turn, and adding a component of Phase 2B improvements at the adjacent Highway 50 interchange with El Dorado Hills Boulevard/Latrobe Road. As determined by the County's Community Development Agency (CDA), the project applicant shall pay TIM fees to satisfy the project's fair share obligation towards these improvements, if they are included in the 10-Year CIP. Alternatively, as determined by the CDA, the project applicant may construct the improvements if they are needed, but not included in future updates to the 10-Year CIP, and may be eligible for either reimbursement or fee credit for costs that exceed the project's proportional share.

Significance after Mitigation

Unacceptable operations at these intersections are due to a combination of increased traffic from planned development and changes in travel patterns associated with planned infrastructure improvements, like the Highway 50/Silva Valley Parkway interchange and the Saratoga Way extension. The Near Term (2024) analysis includes planned roadway improvements, as well as growth consistent with the 2004 General Plan and with approved and reasonably foreseeable projects within the study area. As noted, this intersection operates at unacceptable LOS F in the Near Term (2024) scenario without the project, which includes other foreseeable but unapproved projects. Therefore, the project is only responsible for its proportional share of the proposed mitigation under Near Term conditions. Because the impact is identified under the Near Term

scenario, the timing of the improvement is a function of the rate of population and employment growth. The County's TIM Fee program provides a mechanism for collecting fair share contributions for improvements in the 2015 CIP.

With implementation of Mitigation Measure 4.7-2, the applicant would be required to contribute to the County's TIM Fee program if the needed improvements are added to the 10-Year CIP, or construct the necessary improvements, as determined by the CDA. As shown in Table 4.7-22, implementation of the roadway improvements discussed above would result in acceptable intersection operations during the a.m. and p.m. peak-hours. Therefore, this impact would be reduced to a **less-than-significant** level.

Table 4.7-22 Near Term (2024) plus Project Intersection LOS with and without Mitigation

ID	Intersection	Control	Peak Hour	Near Term (2024) plus Project		Near Term (2024) plus Project, with Mitigation	
				Delay (seconds)	LOS	Delay (seconds)	LOS
3	El Dorado Hills Boulevard at Saratoga Way/Park Drive	Signal	AM	**159.6**	**F**	51.1	D
			PM	**122.4**	**F**	70.8	E
4	El Dorado Hills Boulevard at Highway 50 westbound ramps	Signal	AM	45.0	D	30.8	C
			PM	40.1	D	42.8	D
5	Latrobe Road at Highway 50 eastbound ramps	Signal	AM	21.5	C	14.9	B
			PM	12.8	B	24.0	C
6	Latrobe Road at Town Center Boulevard	Signal	AM	29.5	C	28.5	C
			PM	**91.5**	**F**	39.7	D
7	Latrobe Road at White Rock Road	Signal	AM	35.8	D	31.8	C
			PM	76.1	E	45.2	D

Notes: Bold and shaded represents unacceptable operations.

Source: Kimley-Horn 2015

Impact 4.7-3: Cumulative (2035) plus proposed project conditions intersection LOS impacts.

Under the cumulative (2035) conditions, the study intersections would operate between LOS B and LOS F during the a.m. and p.m. peak hours. Roadway segments would operate at LOS A and LOS B. The freeway facilities would operate from LOS B to LOS D during peak-hours. The results indicate inadequate LOS at the intersections of El Dorado Hills Boulevard and Saratoga Way/Park Drive, and Latrobe Road at Town Center Boulevard. Because these intersections would continue to experience LOS F conditions and the project would contribute more than 10 peak-hour trips, this impact would be **significant.**

With implementation of Mitigation Measures 4.7-1b and 2, however, these impacts would be **less than significant.**

Traffic volumes for Cumulative (2035) conditions were developed using the El Dorado County TDM, as described previously. In order to maintain consistency between post-processing model assumptions reflecting the circulation impacts of specific land use and transportation improvements made for this project's analysis and other ongoing project analyses in the County, factors based on draft turn movement and freeway estimates provided by the County for the Central El Dorado Specific Plan project were applied to future traffic estimates for this project. The cumulative plus project scenario includes four-lane Saratoga Way, in addition to projects listed in the prior section.

Cumulative plus project conditions are shown in Exhibit 4.7-10, as well as Tables 4.7-23, 4.7-24, and 4.7-25. Unacceptable operations at the El Dorado Hills Boulevard at Saratoga Way/Park Drive and Latrobe Road at Town Center Boulevard intersections are due to a combination of increased traffic from planned development and changes in travel patterns associated with the planned infrastructure improvements, such as the Highway 50/Silva Valley Parkway interchange. The Cumulative (2035) analysis includes planned

roadway improvements, as well as growth consistent with the *2004 General* Plan and with approved and reasonably foreseeable projects within the study area. These intersections operate at unacceptable LOS F in the Cumulative (2035) scenario without the project. In addition, more than 10 peak-hour trips would occur at these intersections as a result of implementation of the project. Thus, this impact would be **significant.**

Unacceptable operations at this intersection are due to a combination of increased traffic from planned development and due to changes in travel patterns associated with planned infrastructure improvements, such as the Highway 50/Silva Valley Parkway interchange and the Saratoga Way extension. The Cumulative (2035) analysis includes planned roadway improvements, as well as growth consistent with the 2004 General Plan and with approved and reasonably foreseeable projects within the study area. As noted, this intersection operates at unacceptable LOS F in the Cumulative (2035) scenario without the project. Therefore, the project is only responsible for its proportional share of the proposed mitigation under Cumulative conditions. Since the impact is identified under the Cumulative scenario, the timing of the improvement is a function of the rate of population and employment growth. The County's TIM Fee program provides a mechanism for collecting fair share contributions for improvements in the 2015 CIP.

Table 4.7-23 Cumulative (2035) and Cumulative plus Project Conditions Intersection LOS

ID	Intersection	Control	Peak Hour	Cumulative (2035)		Cumulative (2035) plus Project	
				Delay (seconds)	LOS	Delay (seconds)	LOS
1	El Dorado Hills Boulevard at Wilson Boulevard	Signal	AM	55.9	E	61.9	E
			PM	40.2	D	55.7	E
2	El Dorado Hills Boulevard at Serrano Parkway/Lassen Lane	Signal	AM	66.3	E	56.3	E
			PM	29.5	C	28.5	C
3	El Dorado Hills Boulevard at Saratoga Way/Park Drive	Signal	AM	**102.6**	**F**	66.1	E
			PM	**112.7**	**F**	**92.1**	**F**
4	El Dorado Hills Boulevard at Highway 50 westbound ramps	Signal	AM	30.2	C	29.7	C
			PM	37.5	D	39.7	D
5	Latrobe Road at Highway 50 eastbound ramps	Signal	AM	16.9	B	17.3	B
			PM	15.9	B	15.2	B
6	Latrobe Road at Town Center Boulevard	Signal	AM	42.5	D	43.1	D
			PM	**101.6**	**F**	**99.9**	**F**
7	Latrobe Road at White Rock Road	Signal	AM	32.0	C	33.4	C
			PM	60.5	E	60.3	E
8	Saratoga Way at Wilson Boulevard (Project Only)	SSSC[3]	AM	-	-	3.7 (20.3 southbound)	C
			PM	-	-	1.6 (18.2 southbound)	C
9	Saratoga Way at Finders Way	SSSC[3]	AM	1.0 (18.5 southbound)	C	0.9 (20.3 southbound)	C
			PM	0.6 (13.3 southbound)	B	0.7 (15.1 southbound)	C
10	Saratoga Way at Arrowhead Drive	SSSC[3]	AM	0.4 (19.4 southbound)	C	0.4 (17.4 southbound)	C
			PM	0.3 (17.0 southbound)	C	0.3 (17.4 southbound)	C

Notes: **Bold** and shaded represents unacceptable operations.

1: The Cumulative (2035) scenario assumes operation of the extension of Saratoga Way as a four-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange without the implementation of the proposed residential development.

2: The Cumulative (2035) with Project scenario assumes the extension of Saratoga Way as a four-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange and proposed residential development.

3: Side Street Stop Controlled (SSSC) intersections are reported with the overall intersection delay followed by the delay of the worst approach. The reported LOS corresponds to the worst approach.

Source: Kimley-Horn 2015

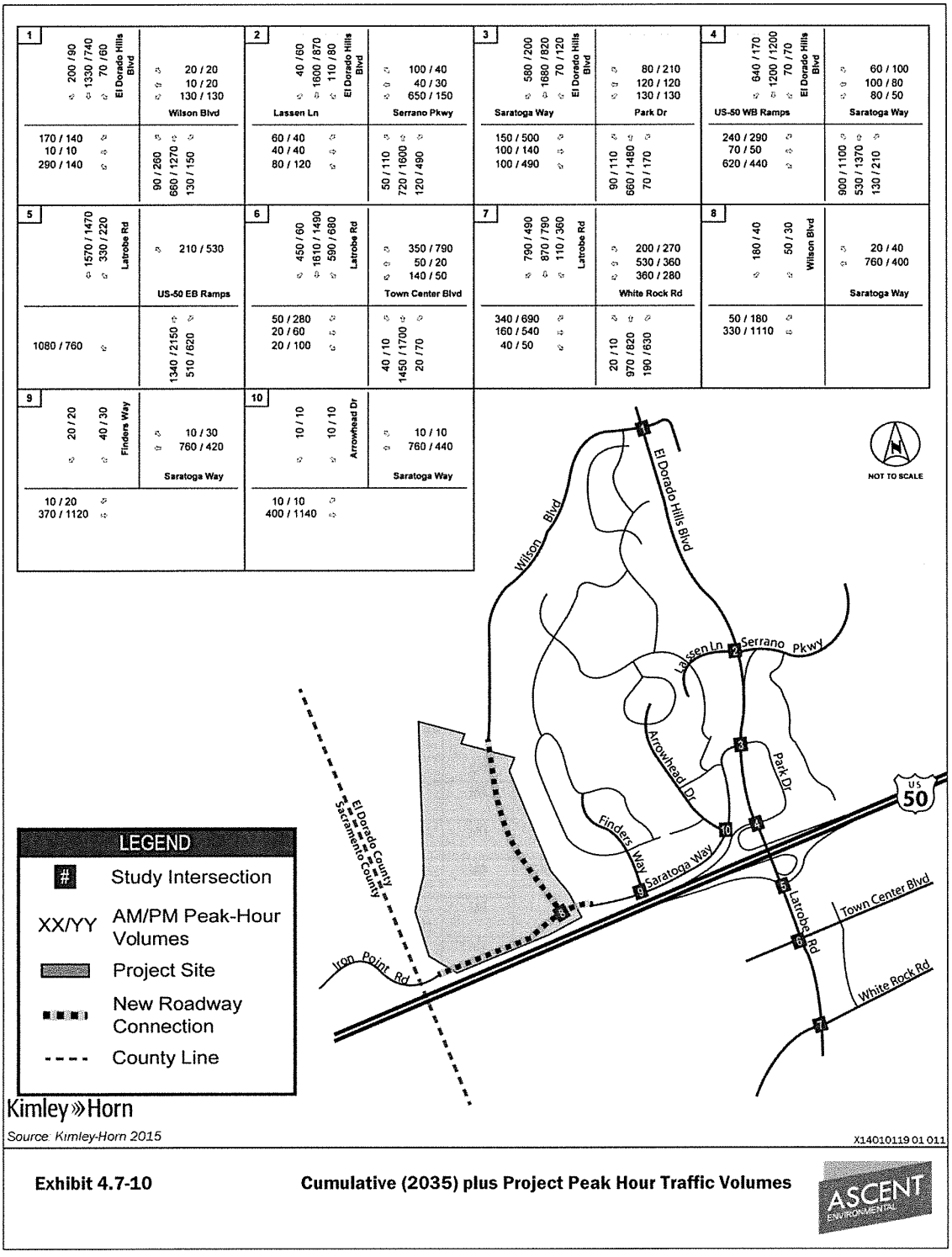

Exhibit 4.7-10 **Cumulative (2035) plus Project Peak Hour Traffic Volumes**

Table 4.7-24 Cumulative (2035) and Cumulative plus Project Freeway Facilities LOS

Highway 50				Cumulative (2035)[1]		Cumulative (2035) with Project[2]	
Direction	Segment	Type	Peak Hour	Density[3]	LOS	Density[3]	LOS
Eastbound	West of Latrobe Road southbound off ramp	Basic	AM	13.7	B	13.7	B
			PM	19.0	C	19.0	C
	Latrobe Road southbound off ramp	Diverge	AM	24.4	C	24.2	C
			PM	27.9	C	28.0	C
	El Dorado Hills Boulevard northbound off ramp	Diverge	AM	16.3	B	16.3	B
			PM	23.5	C	23.5	C
	El Dorado Hills Boulevard northbound off ramp to Latrobe Road on ramp	Basic	AM	9.1	A	9.2	A
			PM	13.9	B	13.9	B
	Latrobe Road on ramp	Merge	AM	19.9	B	20.0	B
			PM	24.5	C	24.6	C
	East of Latrobe Road on ramp	Weave[4]	AM	-	B	-	B
			PM	-	C	-	C
Westbound	East of El Dorado Hills Boulevard off ramp	Weave[4]	AM	-	C	-	C
			PM	-	B	-	B
	El Dorado Hills Boulevard off ramp	Diverge	AM	20.8	C	20.8	C
			PM	19.0	B	19.0	B
	El Dorado Hills Boulevard off ramp to El Dorado Hills Boulevard on ramp	Basic	AM	12.4	B	12.4	B
			PM	11.2	B	11.2	B
	El Dorado Hills Boulevard on ramp	Merge	AM	25.2	C	25.2	C
			PM	21.8	C	21.8	C
	West of El Dorado Hills Boulevard on ramp	Weave[4]	AM	-	D	-	D
			PM	-	C	-	C

Notes:
1: The Cumulative (2035) scenario assumes operation of the extension of Saratoga Way as a four-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange without the implementation of the proposed residential development.
2: The Cumulative (2035) with Project scenario assumes the extension of Saratoga Way as a four-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange and proposed residential development.
3: Density measured in passenger cars/mile/lane
4: Weave segments are analyzed using the Leisch Method, which is not based on density.
Source: Kimley-Horn 2015

Table 4.7-25 Cumulative (2035) and Cumulative plus Project Roadway Segment LOS

Location	Peak-Hour	Analysis Direction	Cumulative (2035)[1]		Cumulative (2035) plus Project[2]	
			LOS	Density	LOS	Density
Saratoga Way, West of Project	AM	WB	B	11.1	B	11.8
		EB	A	4.3	A	4.7
	PM	WB	A	4.8	A	5.8
		EB	B	14.8	B	16.0
Saratoga Way, East of Project	AM	WB	A	10.9	A	9.6
		EB	A	4.7	A	5.1
	PM	WB	A	5.1	A	5.6
		EB	B	14.9	B	14.3

Notes: Density measured in passenger cars/mile/lane
1: The Cumulative (2035) scenario assumes operation of the extension of Saratoga Way as a four-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange without the implementation of the proposed residential development.
2: The Cumulative (2035) with Project scenario assumes the extension of Saratoga Way as a four-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange and proposed residential development.
Source: Kimley-Horn 2015

Mitigation Measures

Mitigation Measure 4.7-1a: Pay TIM Fees

Implement Mitigation Measure 4.7-1a, as described above.

Mitigation Measure 4.7-1b: Complete a Signal Timing Plan

Implement Mitigation Measure 4.7-1b, as described above.

Mitigation Measure 4.7-2: Road and intersection improvements

Implement Mitigation Measure 4.7-2, as described above.

Significance after Mitigation

The significant impact at the El Dorado Hills Boulevard at Saratoga Way/Park Drive intersection can be mitigated by performing signal cycle length optimization and reallocation of green time. This would be implemented by the applicant through preparation and implementation of a signal timing plan for the El Dorado Hills Boulevard at Saratoga Way/Park Drive intersection, as described in Mitigation Measure 4.7-1b.

With implementation of Mitigation Measure 4.7-2, the applicant would be required to construct the necessary improvements or contribute to the County's TIM Fee program if the improvements are included in the 10-Year CIP, as determined by the CDA. As shown in Table 4.7-26, implementation of the roadway improvements discussed above would result in acceptable intersection operations during the p.m. peak-hour. Therefore, this impact would be reduced to a **less-than-significant** level.

Table 4.7-26 Cumulative (2035) plus Project Intersection LOS with and without Mitigation

ID	Intersection	Control	Peak Hour	Cumulative (2035) plus Project[1]		Cumulative (2035) plus Project[1], with Mitigation	
				Delay (seconds)	LOS	Delay (seconds)	LOS
3	El Dorado Hills Boulevard at Saratoga Way/Park Drive	Signal	AM	66.1	E	67.5	E
			PM	**92.1**	**F**	67.1	E
4	El Dorado Hills Boulevard at Highway 50 westbound ramps	Signal	AM	29.7	C	30.4	C
			PM	39.7	D	43.3	D
5	Latrobe Road at Highway 50 eastbound ramps	Signal	AM	17.3	B	17.1	B
			PM	15.2	B	15.8	B
6	Latrobe Road at Town Center Boulevard	Signal	AM	43.1	D	29.4	C
			PM	**99.9**	**F**	38.8	D
7	Latrobe Road at White Rock Road	Signal	AM	33.4	C	33.1	C
			PM	60.3	E	59.9	E

Notes: Bold and shaded represents unacceptable operations.

1: Assumes the extension of Saratoga Way as a four-lane roadway between Finders Way and Iron Point Road and the Highway 50/Silva Valley Parkway interchange and proposed residential development.

Source: Kimley-Horn 2015

Impact 4.7-4: Construction-related traffic impacts.

Construction of the project would result in temporary construction traffic and temporary disruption to traffic circulation along roadways near the project site. The amount of construction activity would vary depending on the particular type, number, and duration of usage for the varying equipment, and the phase of construction. This would be a **potentially significant** impact.

With preparation of a construction traffic management plan, as described in Mitigation Measure 4.7-4, this impact would be **less than significant.**

Construction would include four basic phases: grading, infrastructure improvements, building construction, and installation of park improvements. It is anticipated that construction would occur between 2017 and 2022. Up to 138 construction workers would be on the site during the most labor-intense phase of construction, which would generate approximately 240 one-way vehicle trips per day (assuming vehicle occupancy of 1.15 workers per vehicle). Up to 44 vendor trucks would access the site in a day, which would generate 87 one-way trips.

Project construction would result in a short-term traffic increase associated mostly with workers commuting and material delivery (typically by truck). The proposed project would use primarily onsite soil for fill requirements (a "balanced" site) and would, therefore, require minimal import/export of fill material. The amount of construction activity would vary depending on the particular type, number, and duration of usage for the varying equipment and the phase of construction. These variations would affect the amount of project-generated traffic for both worker commute trips and material deliveries. However, during peak periods of construction, it is anticipated that construction-related traffic would be substantial and, without appropriate controls in place to manage construction traffic, could adversely affect the operation of study area roadways and intersections. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 4.7-4: Prepare and implement a construction traffic management plan.

The applicant (or designated construction manager) shall prepare a construction Traffic Management Plan (TMP) in consultation with the El Dorado County Transportation Division, as well as all other applicable transportation entities, including Caltrans for state roadway facilities and City of Folsom for city roadway facilities. The TMP will ensure that construction traffic does not result in exceedance of peak-hour LOS at existing affected transportation facilities beyond baseline conditions. The County will ensure implementation of the construction TMP during all applicable construction phases. The TMP would address the following, as needed:

- scheduling for oversized material deliveries to the work site and haul routes, including flagging, scheduling off-peak deliveries (recognizing applicable noise standards may limit early morning/evening deliveries);
- coordination of construction traffic with other concurrent, major construction projects in the same local transportation network;
- other actions to be identified and developed as may be needed by the construction manager/resident engineer to ensure that temporary impacts on transportation facilities are minimized. Such actions could include offering a ride-sharing program for construction workers, offering some flexibility for start- and end-work times, and even restricting peak hour construction trips, if necessary.

The TMP would include an up-to-date evaluation of current operational characteristics of the roadways to verify that the plan is successful, or to identify whether additional measures should be added (as described above).

Significance after Mitigation
The construction TMP would reduce the significance of this impact by reducing peak hour construction traffic and would substantially improve and manage construction-related traffic conditions on area roadways. Therefore, this impact would be reduced to **less than significant.**

Impact 4.4-5: Pedestrian, bicycle, and transit facilities impacts.

The project would be required to construct onsite roadway and pedestrian facilities in accordance with County design guidelines. These onsite pedestrian and bicycle facilities would connect the project with the future adjacent Class II bike lanes along Saratoga Way. Through this connection to the proposed bike lane network, the project would provide continuity with adjacent projects, schools, parks, and other public facilities. This impact would be **less than significant.**

According to the El Dorado County Bicycle Transportation Plan, Class II bike lanes are proposed for Saratoga Way in the vicinity of the project site. While the project would not result in removal of a bikeway/bike lane or prohibition of implementation of the facilities identified in the plan, it is required to include pedestrian/bicycle paths connecting to adjacent commercial, research and development, or industrial projects and any schools, parks, or other public facilities. The proposed project would be required to construct on-site roadway and pedestrian facilities in accordance with County design guidelines. These onsite pedestrian and bicycle facilities would connect the project with the future adjacent Class II bike lanes along Saratoga Way. Through this connection to the proposed bike lane network, the project would provide continuity with adjacent projects, schools, parks, and other public facilities and would be consistent with the El Dorado County Bicycle Transportation Plan. This impact would be **less than significant.**

Mitigation Measures

No mitigation is required.

Impact 4.7-6: Access and circulation impacts.

Based on a review of general access and onsite circulation conducted by a traffic engineer, adequate access to/from Saratoga Way and the surrounding transportation network would be provided. Thus, this impact would be **less than significant.**

The project includes connection of Saratoga Way and Wilson Boulevard, which would increase community connectivity and promote emergency access. The project would be required to provide fire and emergency medical services to the project site consistent with the *El Dorado County General Plan*, State Fire Safety Regulations, as adopted by El Dorado County, and the California Fire Code, as amended locally. These include requirements related to emergency vehicle access, including roadway widths and turning radii. Through these measures, the project would be designed to allow for adequate emergency vehicle access and private vehicle evacuation.

The site plan for the proposed project was qualitatively reviewed for general access and onsite circulation. According to the site plan, primary access to the site would be provided from Wilson Boulevard via its connectivity to Saratoga Way and existing Wilson Boulevard to the north. Additionally, secondary right in/right out access would be provided from Saratoga Way, west of Wilson Boulevard. Detailed LOS and delay data were previously reported for the Saratoga Way intersection with Wilson Boulevard. The combination of these access points, as well as the onsite circulation system, would provide adequate access to/from Saratoga Way and improve connectivity associated with the surrounding transportation network. Thus, this impact would be **less than significant.**

Mitigation Measures

No mitigation is required.

Impact 4.7-7: Traffic safety impacts.

Several intersections in the project area have been identified as areas prone to vehicle accidents. Although the project is consistent with the amount of development contemplated in the County's recent TDM and land use update, it would result in introduction of additional people to unsafe intersections and roadway segments. However, because existing safety issues in the project vicinity have either recently been corrected, or improvements are imminent, this impact would be **less than significant.**

According to the County's *2011 Accident Location Study*, three or more accidents occurred during a three-year period between January 1, 2009, and December 31, 2011 at each of several study area sites (i.e., intersections and roadway segments). According to the study, these sites were selected for investigation and determination of corrective action(s). Table 4.7-27 provides a summary of the study area sites and the status of their identified actions.

Table 4.7-27 Project Area Sites Selected for Accident Investigation

Site #	Location Description	Accident Rate[1]	Identified Action Status
13	El Dorado Hills Boulevard, Highway 50 on/off ramps	1.07	Pending Improvements
14	El Dorado Hills Boulevard, North of Lassen/Serrano Parkway	0.25	None Required
15	El Dorado Hills Boulevard, South of Wilson Boulevard	0.12	None Required
32	Latrobe Road, at White Rock Road	0.24	None Required
33	Latrobe Road, Town Center Boulevard to Highway 50	1.34	Recent Improvements
57	Serrano Parkway, vicinity of El Dorado Hills Boulevard	0.32	None Required

1: Accidents per Million Vehicles for single sites (intersections/curves), Accidents per Million Vehicle Miles for roadway sections.

Source: El Dorado County 2012

According to the study, four sites do not require further review, but would continue to be monitored and any subsequent increase in the frequency of accidents may necessitate further review and analysis. One site has a pending improvement and it is anticipated that, upon completion, the improvement would substantially reduce the number of accidents.

The proposed project is consistent with the land use designation and zoning density for the site. As such, the size and magnitude of the proposed project (317 single-family units) is consistent with the amount of development contemplated in the County's recent TDM and land use update. Because this development is similar to surrounding land uses in the area, potential traffic safety impacts would be related to the introduction of additional people to unsafe intersections and roadway segments. However, existing safety issues in the project vicinity have either recently been corrected, or improvements are imminent. In addition, as described under Impact 4.7-6, the circulation system would provide adequate access to/from Saratoga Way and the surrounding transportation network, and does not contain sharp curves or other roadway features that could be considered unsafe. Thus, this impact would be **less than significant.**

Mitigation Measures

No mitigation is required.

does not constitute an analysis of transportation impacts for CEQA purposes, represents conditions 10 years beyond the existing baseline. The near-term cumulative impact analysis is referred to as "Measure E analysis" in the TIA, presented in **Appendix 4.8** of this Draft EIR.

This section also presents traffic impacts under long-term cumulative conditions (2035) as required by CEQA. The long-term cumulative impact analysis is referred to as "Cumulative Impact analysis" in the TIA.

Cumulative Impact C-TRANS-1: **Development of the proposed project would conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the traffic circulation system under Near-Term Cumulative (2027) plus Project Conditions. (*Significant; Less than Significant with Mitigation*)**

The following summarizes traffic operations for study intersections and freeway facilities under near-term cumulative conditions without and with the addition of trips from the El Dorado Hills Town Center Apartments project.[4]

Near-Term No Project Operations

Intersections

Table 4.8-10, Intersection LOS and Delay – Near-Term Conditions, compares existing AM and PM peak hour intersection operations to near-term cumulative conditions.

Table 4.8-10
Intersection LOS and Delay—Near-Term Conditions

	Intersection	Control	Existing (LOS/Delay) AM	Existing (LOS/Delay) PM	Near-Term (LOS/Delay) AM	Near-Term (LOS/Delay) PM
1.	El Dorado Hills Boulevard/Saratoga Way/Park Drive	Signal	B / 19	C / 20	F / 108	D / 47
2.	El Dorado Hills Boulevard/US 50 WB Ramps	Signal	C / 31	C / 33	D / 44	D / 37
3.	Latrobe Road/US 50 EB Ramps	Signal	C / 33	C / 20	C / 20	B / 18
4.	Latrobe Road/Town Center Boulevard	Signal	B / 16	D / 50	C / 20	D / 47

[4] *Although this section includes analysis of the private Town Center Boulevard/Post Street intersection for informational purposes, Policy TC-Xa(3) only applies to "highways, arterial roads and their intersections" and does not apply to private roads and their intersections. For this reason, the Town Center Boulevard/Post Street intersection is not subject to the requirements of this Measure E analysis.*

	Intersection	Control	Existing (LOS/Delay) AM	Existing (LOS/Delay) PM	Near-Term (LOS/Delay) AM	Near-Term (LOS/Delay) PM
5.	Latrobe Road/White Rock Road	Signal	C / 31	C / 27	C / 35	C / 33
6.	White Rock Road/Winfield Way	Signal	C / 20	C / 22	B / 18	C / 25
7.	White Rock Road/Post Street	Signal	B / 18	C / 27	C / 23	C / 30
8.	White Rock Road/Vine Street /Valley View Parkway	Signal	C / 24	D / 46	B / 18	C / 27
9.	Town Center Boulevard/Post Street[1]	AWSC	B / 13	E / 48	B / 15	F / 50
10.	Silva Valley Parkway/US 50 WB Ramps	Signal	B / 11	A / 10	B / 11	B / 12
11.	Silva Valley Parkway/US 50 EB Ramps	Signal	B / 10	B / 13	B / 12	B / 13

Source: Fehr & Peers, 2017
Notes: AWSC = all-way stop control
[1]The Town Center Boulevard/ Post Street intersection is private (i.e., not a County facility).
The average delay is measured in seconds per vehicle. For signalized and AWSC intersections, the delay shown is the average control delay for the overall intersection. For TWSC intersections, the LOS and control delay for the worst movement is shown. Intersection LOS and delay is calculated based on the procedures and methodology contained in the HCM 2010 (TRB, 2010). Intersections 6-11, were analyzed in Synchro 9. Intersections 1-5 were analyzed in SimTraffic.

As shown in **Table 4.8-10**, all relevant study intersections would continue to operate at LOS E or better, with the addition of 10 years of land use growth and the capital projects planned to begin construction in 10 years, except for the El Dorado Hills Boulevard/Saratoga Way/Park Drive intersection, which will operate unacceptably at LOS F during the AM peak hour.

The private Town Center Boulevard/Post Street intersection would operate at LOS F under near-term cumulative without project conditions. However, Policy TC-Xa(3) only applies to "highways, arterial roads and their intersections" and does not apply to private roads and their intersections.

Freeways

Table 4.8-11, Freeway Facility Peak Hour Level of Service – Near-Term Conditions, compares existing AM and PM peak hour freeway operations to near-term cumulative conditions.

Table 4.8-11
Freeway Facility Peak Hour Level of Service – Near-Term Conditions

Freeway	Segment	Facility Type	Existing Density[1] / LOS AM	Existing Density[1] / LOS PM	Near-Term Density[1] / LOS AM	Near-Term Density[1] / LOS PM
US 50 EB	Latrobe Road off-ramp	Diverge	22 / C	30 / D	22 / C	27 / C

Freeway	Segment	Facility Type	Existing Density[1] / LOS AM	Existing Density[1] / LOS PM	Near-Term Density[1] / LOS AM	Near-Term Density[1] / LOS PM
US 50 WB	El Dorado Hills Boulevard off-ramp	Diverge	14 / B	26 / C	13 / B	23 / C
	El Dorado Hills Boulevard on-ramp to Silva Valley Parkway off-ramp	Weave (HCM)[2]	10 / A	23 / C	11 / B	23 / C
		Basic	7 / A	15 / B	7 / A	14 / B
	Silva Valley Parkway on-ramp (loop)	Merge	11 / B	21 / C	15 / B	20 / C
	Silva Valley Parkway on-ramp to Bass Lake Road off-ramp	Basic	11 / A	20 / C	14 / B	19 / C
	Bass Lake Road off-ramp	Diverge	15 / B	25 / C	18 / B	25 / C
	Bass Lake Road on-ramp	Merge	32 / D	21 / C	33 / D	27 / C
	Bass Lake Road on-ramp to lane addition	Basic	29 / D	17 / B	30 / D	24 / C
	Lane addition to Silva Valley Parkway off-ramp	Basic	19 / C	12 / B	19 / C	16 / B
	Silva Valley Parkway off-ramp	Diverge	13 / B	5 / A	14 / B	11 / B
	Silva Valley Parkway on-ramp to El Dorado Hills Boulevard off-ramp	Weave (HCM)[2]	34 / D	18 / B	36 / E	21 / C
		Basic	19 / C	11 / A	19 / C	13 / B
	El Dorado Hills Boulevard on-ramp	Merge	34 / D	24 / C	34 / D	24 / C

Source: Fehr & Peers, 2017
Notes:
[1]Density reported as passenger cars per mile per pane. Density is not reported for LOS F operations.
[2] This weave section lies outside the realm of weaving using the Leisch Method. As a result, it is analyzed as a basic segment.

As shown in **Table 4.8-11**, all freeway facilities would continue to operate at LOS E or better, with the addition of 10 years of land use growth and the capital projects planned to begin construction in 10 years.

Near Term Plus Project Operations

The following summarizes intersection and freeway operations under near-term cumulative conditions with the addition of project traffic, and demonstrates compliance with General Plan Policy TC-Xa(3) at all relevant intersections and freeway facilities.

Intersections

Table 4.8-12, Intersection LOS and Delay—Near-Term Plus Project Conditions, compares AM and PM peak hour intersection operations under near-term cumulative conditions without and with the proposed project.

Table 4.8-12
Intersection LOS and Delay—Near-Term Plus Project Conditions

Intersection	Control	Near-Term (LOS/Delay) AM	Near-Term (LOS/Delay) PM	Near-Term Plus Project (LOS/Delay) AM	Near-Term Plus Project (LOS/Delay) PM
1. El Dorado Hills Boulevard/Saratoga Way/Park Drive	Signal	F / 108	D / 47	F / 125	D / 43
2. El Dorado Hills Boulevard/US 50 WB Ramps	Signal	D / 44	D / 37	D / 48	D / 40
3. Latrobe Road/US 50 EB Ramps	Signal	B / 20	B / 18	C / 20	B/ 15
4. Latrobe Road/Town Center Boulevard	Signal	C / 20	D / 47	C / 21	D / 51
5. Latrobe Road/White Rock Road	Signal	C / 35	C / 33	D / 36	C / 33
6. White Rock Road/Winfield Way	Signal	B / 18	C / 25	B / 18	C / 25
7. White Rock Road/Post Street	Signal	C / 23	C / 30	C / 23	C / 30
8. White Rock Road/Vine Street /Valley View Parkway	Signal	B / 18	C / 27	B / 20	C / 29
9. Town Center Boulevard/Post Street[1]	AWSC	B / 15	F / 50	C / 17	F / 52
10. Silva Valley Parkway/US 50 WB Ramps	Signal	B / 11	B / 12	B / 11	B / 12
11. Silva Valley Parkway/US 50 EB Ramps	Signal	B / 12	B / 13	B / 12	B / 13

Source: Fehr & Peers, 2017
Notes: AWSC = all-way stop control
[1]The Town Center Boulevard/ Post Street intersection is private (i.e., not a County facility).
The average delay is measured in seconds per vehicle. For signalized and AWSC intersections, the delay shown is the average control delay for the overall intersection. For TWSC intersections, the LOS and control delay for the worst movement is shown. Intersection LOS and delay is calculated based on the procedures and methodology contained in the HCM 2010 (TRB, 2010). Intersections 6-11, were analyzed in Synchro 9. Intersections 1-5 were analyzed in SimTraffic.

As shown in **Table 4.8-12**, with the exception of one County-owned intersection and one private intersection outside of County jurisdiction, all study intersections would continue to operate at LOS E or better, with the addition of project trips under near-term cumulative conditions.

El Dorado Hills Boulevard/Saratoga Way/Park Drive Intersection

The intersection of El Dorado Hills Boulevard/Saratoga Way/Park Drive would operate at LOS F prior to the addition of project traffic. Project traffic would worsen intersection operations (by adding more than 10 peak hour trips), resulting in a potentially significant impact at this location.

The operations at this intersection can be improved to meet the County LOS standards by adding a southbound right turn lane. This intersection improvement is included in the Saratoga Way Extension Phase 2 project (CIP # GP147), which is a project that is included in the County's CIP. Additionally, the County's annual Intersection Needs Prioritization Process will identify if the intersection triggers a LOS impact prior to 2035. Should the LOS become unacceptable, the potential intersection improvements can be added, by the Board of Supervisors, to the CIP as funding becomes available.

As the proposed project is not a single-family residential subdivision, the second paragraph under Policy TC-Xf is the guiding policy for mitigation of this project's impact. Therefore, payment of Traffic Impact Mitigation (TIM) fees will satisfy the project's fair share portion of the improvement project. **Mitigation Measure C-TRANS-1** is set forth below to ensure that the project will pay TIM fees to mitigate its impact at this intersection.

Town Center Boulevard/Post Street Intersection

The private Town Center Boulevard/Post Street intersection would operate at LOS F without or with the proposed project during the PM peak hour. However, as noted above, Measure E analysis applies to County "highways, arterial roads and their intersections" and does not apply to private roads and their intersections. For this reason, the LOS conditions at this intersection with and without the proposed project are reported in this Draft EIR for information only. The County is not required to draw a conclusion with respect to the significance of the impact at this location.

Freeways

Table 4.8-13, Freeway Facility Peak Hour Level of Service—Near-term Conditions, compares AM and PM peak hour freeway operations under near-term cumulative conditions without and with the proposed project.

Impacts at Study Intersections

Intersection levels of service under long-term cumulative no project and cumulative plus project conditions were calculated and are shown in **Table 4.8-15, Long-Term Cumulative Conditions – Study Intersection LOS Summary**.

Table 4.8-15
Long-Term Cumulative Conditions – Study Intersection LOS Summary

Intersection	Intersection Control	Peak Hour	Cumulative No Project Conditions		Cumulative Plus Project Conditions	
			Avg Delay[2]	LOS[4]	Avg Delay[2]	LOS[4]
1. El Dorado Hills Boulevard/Park Drive/Saratoga Way	Signal	AM	37	D	37	D
		PM	48	D	50	D
2. El Dorado Hills Boulevard/U.S. 50 WB Ramps	Signal	AM	34	C	47	D
		PM	48	D	49	D
3. Latrobe Road/U.S. 50 EB Ramps	Signal	AM	34	C	54	D
		PM	22	C	18	B
4. Latrobe Road/Town Center Boulevard	Signal	AM	36	D	42	D
		PM	66	E	76	E
5. Latrobe Road/White Rock Road	Signal	AM	60	E	67	E
		PM	51	D	80	E
6. White Rock Road/Winfield Way	Signal	AM	12	B	12	B
		PM	35	D	36	D
7. White Rock Road/Post Street	Signal	AM	15	B	15	B
		PM	17	B	18	B
8. White Rock Road/Vine Street/Valley View Drive	Signal	AM	20	B	19	B
		PM	29	C	31	C
9. Town Center Boulevard/Post Street[1]	AWSC	AM	13	B	14	B
		PM	73	F	82	F
10. Silva Valley Parkway/U.S. 50 WB Ramps	Signal	AM	10	A	10	A
		PM	20	C	20	C
11. Silva Valley Parkway/U.S. 50 EB Ramps	Signal	AM	3	A	3	A
		PM	11	B	11	B

Source: Fehr & Peers, 2017.
Notes: AWSC = all-way stop control
[1]The Town Center Boulevard/ Post Street intersection is private (i.e., not a County facility).
[2]The average delay is measured in seconds per vehicle. For signalized and AWSC intersections, the delay shown is the average control delay for the overall intersection. For side-street stop controlled intersections, the LOS and control delay for the worst movement is shown. Intersection LOS and delay is calculated based on the procedures and methodology contained in the HCM 2010 (TRB, 2010). Intersections 6-11 were analyzed in Synchro 9. Intersections 1-5 were analyzed in SimTraffic.

XV. RECREATION.	Potentially Significant Impact	Less than Significant with Mitigation	Less Than Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?			X	
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?			X	

Discussion

A substantial adverse effect on Recreational Resources would occur if the implementation of the project would:

- Substantially increase the local population without dedicating a minimum of 5 acres of developed parklands for every 1,000 residents; or
- Substantially increase the use of neighborhood or regional parks in the area such that substantial physical deterioration of the facility would occur.

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a-b. **Parks and Recreational Services:** The project does not include any increase in permanent population that would contribute to increased demand on recreation facilities or contribute to increased use of existing facilities such that physical deterioration of the facility would occur. The project would not generate an increase demand for park services, therefore, it would not require construction or expansion of additional facilities. Impacts would be less than significant.

FINDING: Less than significant impacts to open space or park facilities would result as part of the project. For this Recreation category, impacts would be less than significant.

XVI. TRANSPORTATION/TRAFFIC. *Would the project:*	Potentially Significant Impact	Less than Significant with Mitigation	Less Than Significant Impact	No Impact
a. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?		X		
b. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?		X		
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
e. Result in inadequate emergency access?				X
f. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?				X

Data Source/Methodology

The following analysis of traffic and transportation is based off of a Transportation Impact Study and a Supplemental Traffic Analysis Report prepared for the proposed project (Kimley Horn 2018).

Setting

The project site is undeveloped but located in an area with commercial and residential development. The site is adjacent to El Dorado Hills Boulevard to the east, Saratoga Way to the west, and the US Highway 50 on-ramp to the south. Access to the site is provided at the existing main site driveway intersection with Saratoga Way. Two additional driveways will serve the site; one full access driveway south of the main site driveway, and one egress-only driveway at the south end of the project site.

Parking

Pursuant to the El Dorado County ordinance code, the project is required to provide 35 parking spaces and one RV Spaces. The proposed project will exceed the parking requirement and provide a total of 63 parking spaces. The project will include 53 standard parking spaces, three (3) compact spaces, four (4) handicap accessible spaces, two (2) RV parking spaces, and 1 loading space. Of the 53 standard spaces, six (6) spaces will be for fuel efficient vehicles, four (4) spaces will be electric vehicle charging capable and one space will be electrical van charging capable. In addition, the project would include 13 bicycle parking racks.

Roadway System

The following are descriptions of the primary roadways in the vicinity of the project.

US Route 50 (US-50) is an east-west freeway located south of the project area. Generally, US-50 serves all of El Dorado County's major population centers and provides connections to Sacramento County to the west and the State of Nevada to the east. Primary access to the project area from US Highway 50 is provided at the El Dorado Hills Boulevard/Latrobe Road interchange. Within the general project area, US Highway 50 currently serves approximately 98,000 vehicles per day (vpd) west of El Dorado Hills Boulevard/Latrobe Road.

Latrobe Road is a north-south arterial roadway that provides a primary connection to US Highway 50 for western El Dorado County. North of US Highway 50, Latrobe Road becomes El Dorado Hills Boulevard. This roadway carries approximately 28,750 vpd also with three travel lanes in each direction.

El Dorado Hills Boulevard is a north-south arterial roadway that provides a primary connection to US-50 for western El Dorado County. South of US Highway 50, El Dorado Hills Boulevard becomes Latrobe Road. This roadway carries approximately 27,200 vpd with three through lanes in each direction.

Saratoga Way is currently a two-lane roadway which parallels the north side of US Highway 50 and terminates approximately 2,500-feet east of the El Dorado County/Sacramento County line. This roadway has long been planned as a four-lane divided facility (to be initially constructed as a two-lane roadway) providing vital connectivity between El Dorado Hills and Folsom, north of US Highway 50. Saratoga Way currently serves approximately 1,500 vpd just west of El Dorado Hills Boulevard.

Airports

No private or public airports are located within the El Dorado Hills area. The nearest public use airport is Cameron Airpark, located approximately 5-miles east of the project site. Cameron Airpark is not a commercial service airport.

Emergency Access

El Dorado County identifies most major streets in the county as emergency evacuation routes. No aspect of the proposed project would modify these streets in a way that would preclude their continued use as an emergency evacuation route. The minimum width available for driving or turning movements through the parking lot is 25-feet, to provide sufficient access for fire trucks.

Traffic Assessment

A Transportation Impact Study was prepared for a previous proposal of the Saratoga Retail Phase 2 project on May 3, 2017 by Kimley Horn. The previous iteration of the project included an additional drive-through restaurant, subsequently the report will provide a conservative analyses with a worst-case scenario projection. The purpose of this study is to identify potential environmental impacts to transportation facilities as required by the California Environmental Quality Act.

A supplemental transportation impact analysis was completed for Saratoga Retail Phase 2 by Kimley Horn on July 12, 2018. The study is supplemental to the previously completed traffic impact analysis mentioned above. The purpose of this evaluation was to complete a Near-Term (2026) analysis to provide an interim-year snapshot of the worst-case conditions. Conservatively, this analysis assumes the existing geometries for the study intersections, along with traffic volume growth expected by 2026. The Near-Term (2026) volumes were approximated using straight-line growth interpolation between Existing (2017) and Cumulative (2035) volumes per the original traffic study.

Trip Generation

Kimley-Horn completed a trip generation study in a manner consistent with the methodology contained in the *Trip Generation Manual, 9th Edition*, published by the Institute of Transportation Engineers (ITE). In addition, unique local trip

generation rate (trips per thousand square feet) were developed using data collected at the following three Chick-Fil-A locations with drive through facilities:

1. 2679 East Bidwell Street, Folsom, CA
2. 4644 Madison Avenue, Sacramento, CA
3. 2354 Sunrise Boulevard, Rancho Cordova, CA

The local trip generation data was collected on April 17, 2018, between the hours of 6:00 A.M. and 9:00 A.M. and 5:00 P.M. and 7:00 P.M. The trip generation data is included in Attachment 3. The calculated trip generation rates for the proposed project are presented in **Table 5**.

Table 5 -- Trip Generation Data

Existing Chick-fil-A Location	Building Floor Area (KSF)	Generation Rate	
		AM	PM
2354 Sunrise Blvd, Rancho Cordova	4.86	11.9	26.8
4644 Madison Ave, Sacramento	4.67	13.3	34.4
2679 E Bidwell Street, Folsom	4.48	18.4	54.6
Average		14.5	38.6

Source: Kimley Horn, Transportation Impact Analysis 2018.

The anticipated trip generation characteristics for the proposed project are presented in **Table 6**. As only A.M. and P.M. trip generation data was collected, ITE code 934 (Fast Food Restaurant with Drive Through) was used to approximate the daily trips generated by the restaurant use.

Table 6: Proposed Project Trip Generation Characteristics

Land Use (ITE Code)	Size (ksf)	Daily Trips	AM Peak-Hour					PM Peak-Hour				
			Total Trips	In		Out		Total Trips	In		Out	
				%	Trips	%	Trips		%	Trips	%	Trips
Chick-fil-A	4,658	2,312	68	53%	36	47%	32	180	64%	115	36%	65
Shopping Center (820)	5.5	1,032	27	62%	16	38%	11	86	48%	41	52%	45
Subtotal Trips:		3,344	95		52		43	266		156		110
Internal Trip Reduction	5%	-167	-5		-3		-2	-13		-8		-5
Net New Driveway Trips		3,177	90		49		40	253		148		104
Pass-By/Diverted Trip Reduction	15%	-477	-13		-7		-6	-38		-22		-16
Net New External Trips:		2,700	76		42		34	215		126		89

Source: ITE Trip Generation Manual, 9th Edition, ITE.

As shown in table 6, the proposed project is estimated to generate approximately 2,700 new daily trips, with 76 and 215 trips occurring during the A.M. and P.M. peak-hours, respectively.

Level of Service

Analysis of transportation facility significant environmental impacts is based on the concept of Level of Service (LOS). The LOS of a facility is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity. Levels of Service for this study were determined using methods defined in the *Highway Capacity Manual (HCM) 2010.*

Project impacts were determined by comparing conditions with the proposed project to those without the project and the cumulative impacts of the proposed projects in the area. The Transportation and Circulation Policies contained in the County General Plan establish a framework for review of thresholds of significance and identification of potential impacts of new development on the County's road system. These policies are enforced by the application of the Transportation Impact Study (TIS) Guidelines, the County Design and Improvements Standards Manual, and the County Encroachment Ordinance, with review of individual development projects by the Transportation and Long Range Planning Divisions of the Community Development Agency. A substantial adverse effect to traffic would occur if the implementation of the project would:

- Generate traffic volumes which cause violations of adopted level of service standards (project and cumulative); or Result in or "worsen" Level of Service (LOS) F traffic congestion during weekday, peak-hour periods on any highway, road, interchange or intersection in the unincorporated areas of the county.
- According to General Plan Policy TC-Xe, The term "worsen" is defined as any of the following number of project trips using a road facility at the time of issuance of a use of occupancy permit for the development project:
    - A 2 percent increase in traffic during the a.m. peak hour or p.m. peak hour or daily, or
    - The addition of 100 or more daily trips, or
    - The addition of 10 or more trips during the a.m. peak hour or the p.m. peak hour.

Existing (2017) Plus Proposed Project

Kimley Horns 2017 Transportation Impact Study analyzed the existing conditions (2017) of intersections, roadways and freeway facilities in the vicinity of the project and the existing conditions plus the proposed project. **Table 7** presents the existing intersection operating conditions and the existing conditions with the proposed project included.

Table 7: Existing (2017) plus Proposed Project Intersection Levels of Service

Intersection	Control	Peak Hour	Existing (2017)		Existing (2017) plus Proposed Project	
			Delay (sec)	LOS	Delay (sec)	LOS
El Dorado Hills Blvd @ Saratoga Way/Park Dr	Signal	AM	12.9	B	26.4	C
		PM	22.6	C	38.5	D
El Dorado Hills Blvd @ US-50 WB Ramps/ Park Dr	Signal	AM	30.9	C	29.7	C
		PM	44.2	D	52.5	D
Latrobe Rd @ US-50 EB Ramps	Signal	AM	14.5	B	14.9	B
		PM	13.7	B	14.1	B
Latrobe Rd @ Town Center Blvd	Signal	AM	16.3	B	17.9	B
		PM	48.3	D	49.2	D
Latrobe Rd @ White Rock Rd	Signal	AM	33.2	C	34.4	C
		PM	33.4	C	33.3	C
White Rock Rd @ Windfield Wy/ Town Center Blvd	Signal	AM	11.9	B	11.9	B
		PM	13.9	B	13.9	B
White Rock Rd @ Post St	Signal	AM	23.5	C	23.9	C

		PM	43.7	D	44.6	D
Saratoga Wy @ Mammouth Wy/ Walgreens Dwy	SSSC	AM	10.6	B	18.8	C
		PM	11.1	B	15.8	C
Saratoga Wy @ Main Project Site Dwy	SSSC	AM	8.6	A	9.4	A
		PM	8.8	A	9.6	A
Saratoga Wy @ Arrowhead Dr	SSSC	AM	9	A	9	A
		PM	9	A	9.1	A

Source: Kimley Horn 2017
Notes: Side Street Stop Controlled (SSSC) intersection LOS corresponds to the worst approach.

As reflected in table 7 above, the addition of the proposed project to the existing (2017) conditions does not result in any significant impacts to intersections. The Transportation Impact Study prepared by Kimley Horn in 2017 states that the addition of the proposed project to the existing conditions does not result in any significant impacts to roadway segments and freeway facilities (Kimley Horn 2017).

Cumulative (2035) Plus Proposed Project Conditions

The number of trips estimated to be generated by the proposed project were determined using the ITE *Trip Generation Manual* and were then assigned to the roadway network based on existing traffic volumes, output from the County's travel demand model, and professional judgment. Using these volumes, levels of service were determined at the study facilities. Cumulative (2035) plus Proposed Project peak-hour turn movement volumes are presented in Figure 13 of Attachment 7.

Table 8: Cumulative (2035) plus Proposed Project Intersection Levels of Service

Intersection	Control	Peak Hour	Cumulative (2035)		Cumulative (2035) Plus Proposed Project	
			Delay (sec)	LOS	Delay (sec)	LOS
El Dorado Hills Blvd @ Saratoga Way/Park Dr	Signal	AM	57.6	E	**89.3**	**F**
		PM	72.8	E	77.2	E
El Dorado Hills Blvd @ US-50 WB Ramps/ Park Dr	Signal	AM	47.7	D	53.2	D
		PM	59.3	E	61.3	E
Latrobe Rd @ US-50 EB Ramps	Signal	AM	12.6	B	12	B
		PM	13.4	B	13.1	B
Latrobe Rd @ Town Center Blvd	Signal	AM	22.8	C	22.7	C
		PM	75.3	E	74.7	E
Latrobe Rd @ White Rock Rd	Signal	AM	55.4	E	53.2	D
		PM	68.2	E	66.4	E
White Rock Rd @ Windfield Wy/ Town Center Blvd	Signal	AM	30.5	C	30.9	C
		PM	40.8	D	41.3	D
White Rock Rd @ Post St	Signal	AM	72.5	E	78.7	E
		PM	78.7	E	58	E
Saratoga Wy @ Mammouth Wy/ Walgreens Dwy	SSSC	AM	11	B	11.8	B
		PM	13.6	B	14.6	B
Saratoga Wy @ Main Project Site Dwy	SSSC	AM	10.7	B	15.2	C
		PM	20.5	C	24	C
Saratoga Wy @	SSSC	AM	30.7	D	32.8	D

Arrowhead Dr		PM	35.2	E	37.8	E

Bold represents unacceptable operations. Shaded represents significant impact.
Side Street Stop Controlled (SSSC) intersection LOS corresponds to the worst approach.

Near-Term (2026) Levels of Service

Kimley Horn prepared a Supplemental Analysis that examined Near-Term (2026) analysis. **Table 10** lists the Intersection level of service listed in the analysis.

Table 9: Near-Term (2026) Intersection Levels of Service

Intersection	Control	Peak Hour	Near-Term (2026)		Near-Term (2026) plus Proposed Project	
			Delay (sec)	LOS	Delay (sec)	LOS
El Dorado Hills Blvd @ Saratoga Way/ Park Dr	Signal	AM	33.2	C	36.9	D
		PM	70.4	E	**92.7**	**F**
El Dorado Hills Blvd @ US-50 WB Ramps/ Park Dr	Signal	AM	33.1	C	33.7	C
		PM	58	E	61.7	E
Latrobe Rd @ US-50 EB Ramps	Signal	AM	15.4	B	15.1	B
		PM	12	B	12.2	B
Latrobe Rd @ Town Center Blvd	Signal	AM	22.6	C	21.4	C
		PM	84.6	F	**82.5**	**F**
Latrobe Rd @ White Rock Rd	Signal	AM	57.4	E	57.6	E
		PM	66	E	65.3	E
White Rock Rd @ Windfield Wy/ Town Center Blvd	Signal	AM	19.7	B	19.7	B
		PM	23.6	C	23.7	C
White Rock Rd @ Post St	Signal	AM	84.6	F	92.4	F
		PM	51.5	D	50.7	D
Saratoga Wy @ Mammouth Wy/ Walgreens Dwy	SSSC	AM	2.1 (13.4 EB)	B	2.0 (15.0 EB)	C
		PM	3.2 (20.6 EB)	C	4.0 (35.8)	E
Saratoga Wy @ Main Project Site Dwy	SSSC	AM	0.4 (9.1 WB)	A	1.1 (9.4 WB)	A
		PM	0.9 (13.6 WB)	B	2.2 (19.1 WB)	C
Saratoga Wy @ Arrowhead Dr	SSSC	AM	0.5 (10.9 EB)	B	0.5 (10.9 EB)	B
		PM	0.4 (12.4 EB)	B	0.4 (12.5)	B

Source: Kimley Horn 2018
Notes: **Bold** represents unacceptable conditions.

The supplemental traffic analysis states that the Near-Term (2026) plus proposed project conditions will not have a significant impact on roadway segments or freeway facilities.
As reflected in the Kimley Horn Traffic Analysis and Transportation Study (Attachment 7) the proposed project will create a significant impact at the following intersections:

- El Dorado Hills Boulevard and Saratoga Way/Park Drive
- Latrobe Road and Town Center Boulevard

Table 11: Intersection Levels of Service Near-Term (2026) Plus Proposed Project Mitigated Conditions

ID	Intersection	Control	Peak Hour	Near-Term (2026)		Near-Term (2026) plus Proposed Project		Near-Term (2026) plus Proposed Project Mitigations	
				Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1	El Dorado Hills Blvd@ Saratoga Way/Park Dr	Signal	AM	33.2	C	36.9	D	37.2	D
			PM	70.4	E	92.7	F	46.5	D
2	El Dorado Hills Blvd @ US-50 WB Ramps/Park	Signal	AM	33.1	C	33.7	C	35.6	D
			PM	58.0	E	61.7	E	49.3	D
3	Latrobe Rd @ US-50 EB Ramps	Signal	AM	15.4	B	15.1	B	14.9	B
			PM	12.0	B	12.2	B	13.4	B
4	Latrobe Rd @ Town Center Blvd	Signal	AM	22.6	C	21.4	C	20.1	C
			PM	84.6	F	82.5	F	66.4	E
5	Latrobe Rd @ White Rock Rd	Signal	AM	57.4	E	57.6	E	56.5	E
			PM	66.0	E	65.3	E	76.6	E
7	White Rock Rd @ Post St	Signal	AM	86.4	F	92.4	F	93.1	F
			PM	51.5	D	50.7	D	60.7	E

Source: Kimley Horn 2018.

CEQA Checklist

a,b. **Traffic Increases:** This project is located on the northwest corner of the US Highway 50 interchange with El Dorado Hills Boulevard and southwest corner of El Dorado Hills Boulevard and Saratoga Way, in El Dorado Hills. The project seeks to encroach onto Saratoga Way, a County maintained road. The Traffic Study prepared by Kimley Horn established and analyzed existing and future traffic conditions based on additional traffic generated by the proposed development of the Saratoga Retail project. Results of this study are incorporated by reference to this document and are on file with El Dorado County Planning Services, 2850 Fairlane Court, Placerville, CA 95667. The report was circulated to the El Dorado County Department of Transportation and Long Range Planning Division of Community Development Services. Both agencies concurred with the findings of the report.

Access to the site is provided at the existing main site driveway intersection with Saratoga Way. Two additional driveways will serve the site; one full access driveway south of the main site driveway, and one egress-only driveway at the south end of the project site. These driveway will distribute traffic onto area roadways as described in the traffic study.

Based on the County's requirements, six different scenarios were analyzed for the traffic study. These scenarios included:

1. Existing (2017) Conditions
2. Existing (2017) plus Proposed Project Conditions
3. Cumulative (2035) Conditions
4. Cumulative (2035) plus Proposed Project Conditions
5. Near-Term (2026) Conditions
6. Near-Term (2026) plus Proposed Project Conditions

The study found that the project would be expected to generate approximately 2,700 new daily trips, with 76 new trips occurring during the AM peak-hour, and 215 new trips occurring during the PM peak-hour based on trip generation rates contained in the *Trip Generation Manual, 9th Edition,* published by the Institute of Transportation

Engineers (ITE). The traffic study identified two intersections that the proposed project could create a significant impact on, however with implementation of mitigation measures M1 and M2 (listed above) the impact would be decreased to a less than significant level.

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 condition the project to construct all road improvements necessary to maintain or attain Level of Service standards detailed in this Transportation and Circulation Element. All 2004 General Plan Traffic Impact Mitigation Fees for all projects shall be paid at the building permit stage. (Press Release August 8, 2017, Measure E updates)

Mitigation Measures

The proposed project would implement the following mitigation measures to reduce the projects potential significant impacts related to traffic and transportation to a level less than significant impact.

M1. Intersection #1, El Dorado Hills Blvd @ Saratoga Way/Park Drive

This intersection operates at acceptable LOS E during the PM peak-hour without the project, and the project results in LOS F. Consistent with the findings of the previous Saratoga Retail Phase 2 Cumulative (2035) Conditions analysis [1], the impacts at this intersection can be mitigated by off-site improvements including optimization of the Latrobe Road coordinated signal system and the restriping of the westbound Town Center Boulevard approach to include one left-through lane, and two right-turn lanes, with a permitted-overlap phase for the westbound right-turns. The El Dorado Hills Town Center Apartments project is responsible for, among other things, the lane designation and signal phasing mitigations described above. This mitigation affects an approach on a privately-owned roadway, and therefore, the improvement should be coordinated with the County and the property owner. As shown in **Table 13,** this mitigation measure result in the intersection operating at LOS D during the PM peak-hour. Therefore, ***this impact is less than significant.***

M2. Intersection #4, Latrobe Road and Town Center Boulevard

This intersection operates at Los F during the PM peak-hour without the project, and the project contributes more than 10 trips. Consistent with the findings of the previous Saratoga Retail Phase 2 Cumulative (2035) Conditions analysis[1], the impact at this intersection can be mitigated by optimization of the Latrobe Road coordinated signal system, along with the following improvements: the restriping of the westbound Town Center Boulevard approach to include one left-through lane, and two right-turn lanes, with a permitted-overlap phase for the westbound right-turns. The El Dorado Hills Town Center Apartments project is responsible for, among other things, the lane designation and signal phasing mitigations described above. This mitigation affects an approach on a privately-owned roadway, and therefore, the improvement should be coordinated with the County and the property owner. As shown in **Table 13**, this mitigation measure results in the intersection operating at LOS E during the PM peak-hour. Therefore, ***this impact is less than significant***.

Table 13 - Intersection Levels of Service Near-Term (2026) Plus Proposed Project Mitigated Conditions

ID	Intersection	Control	Peak Hour	Near-Term (2026)		Near-Term (2026) plus Proposed Project		Near-Term (2026) plus Proposed Project Mitigated	
				Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1	El Dorado Hills Blvd @ Saratoga Way/Park Dr	Signal	AM	33.2	C	36.9	D	37.2	D
			PM	70.4	E	**92.7**	**F**	46.5	D
2	El Dorado Hills Blvd @ US-50 WB Ramps/ Park	Signal	AM	33.1	C	33.7	C	35.6	D
			PM	58.0	E	61.7	E	49.3	D
3	Latrobe Rd @ US-50 EB Ramps	Signal	AM	15.4	B	15.1	B	14.9	B
			PM	12.0	B	12.2	B	13.4	B
4	Latrobe Rd @ Town Center Blvd	Signal	AM	22.6	C	21.4	C	20.1	C
			PM	**84.6**	**F**	**82.5**	**F**	66.4	E
5	Latrobe Rd @ White Rock Rd	Signal	AM	57.4	E	57.6	E	56.5	E
			PM	66.0	E	65.3	E	76.6	E
7	White Rock Rd @ Post St	Signal	AM	**86.4**	**F**	**92.4**	**F**	**93.1**	**F**
			PM	51.5	D	50.7	D	60.7	E

c. **Air Traffic:** The project site is not within an airport safety zone. No changes in air traffic patterns would occur or be affected by the proposed project. There would be no impact.

d. **Design Hazards:** Kimley-Horn and Associates, Inc. evaluated the project for potential hazards in their traffic analysis, which included a sight distance evaluation and a preliminary traffic safety evaluation. The study found that the project would not create or exacerbate hazards in the area, nor were there any hazards that might impact the project, as long as project landscaping is maintained in such a manner so as not to obstruct sight distance along Saratoga Way. According to the project site plan there appears to be adequate sight distance on-site to facilitate safe and orderly circulation. There would be no impact.

e. **Emergency Access:** Fire Safe Regulations state that on-site roadways shall "provide for safe access for emergency wildland fire equipment and civilian evacuation concurrently, and shall provide unobstructed traffic circulation during a wildfire emergency…" All project roadways shall be designed and constructed in accordance with these requirements. As shown in the project site plan, the turn radius for a firetruck is depicted circulating through the proposed project. As such, the proposed project is considered to allow for adequate access and on-site circulation for emergency vehicles. The fire department review of plans associated with building permit would ensure compliance with these standards. There would be no impact.

f. **Alternative Transportation.** El Dorado Transit currently operates a "Sacramento Commuter" bus route that operates Monday through Friday only. This route has multiple stops within the Town Center development located south of US-50 along Latrobe Road. No other public transit services are known to operate in the project area. Nevertheless, the proposed project promotes safe and efficient access to the existing transit system by providing pedestrian connectivity to and through the project site. Additionally, the project will install 13 bicycle racks to promote an alternative transportation option. The proposed project will have no impact on adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

FINDING: The project as mitigated would not exceed the thresholds for traffic identified within the General Plan. For this Transportation/Traffic category, the thresholds of significance would not be exceeded, and impacts would be less than significant.

Planning Department <planning@edcgov.us>

FW: Saratoga Retail Phase 2 - DR-R18-0001 (email 7)

1 message

Brooke E. Washburn <BWashburn@murphyaustin.com> Thu, Aug 16, 2018 at 2:22 PM
To: "planning@edcgov.us" <planning@edcgov.us>

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Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 7)

Attached, please find pdf documents that are collectively **the traffic exhibits**, substantial evidence submitted to demonstrate a significant impact to Traffic (Section G. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

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Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 6)

Attached, please find pdf documents that are collectively **the traffic exhibits**, substantial evidence submitted to demonstrate a significant impact to Traffic (Section G. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

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Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 5)

Attached, please find pdf documents that are collectively **Exhibit F**, substantial evidence submitted to demonstrate a significant impact to Noise (Section F. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

In addition, the following link is submitted:

Reference link to the Saratoga Estates Draft EIR

http://edcapps.edcgov.us/Planning/ProjectDocuments/TM14-1520%20PD14-0006%20Z14-0007%20DA15-0001%20-%20DEIR.pdf

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From: Brooke E. Washburn
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To: 'charlene.tim@edcgov.us' <charlene.tim@edcgov.us>
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Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 4)

Attached, please find pdf documents that are collectively **Exhibit E**, substantial evidence submitted to demonstrate a significant impact to Land Use (Section E. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

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Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 3)

Attached, please find pdf documents that are collectively **Exhibit B**, substantial evidence submitted to demonstrate a significant impact to Air Pollution (Section B. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

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Subject: RE: Saratoga Retail Phase 2 - DR-R18-0001 (email 2)

Attached, please find pdf documents that are collectively **Exhibit A**, substantial evidence submitted to demonstrate a significant impact to Aesthetics (Section A. of the public comment- previously submitted). Please add these documents to the public record for Saratoga Retail Phase 2 - DR-R18-0001.

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Subject: Saratoga Retail Phase 2 - DR-R18-0001

Dear Charlene,

Attached is public comment submitted by affected and concerned residents with regard to a proposed project (Saratoga Retail Phase 2 - DR-R18-0001). Due to the size of the documentation to be submitted, I will send all attachments under separate cover. Kindly include all comments and attachments in the public record for the project (Saratoga Retail Phase 2 - DR-R18-0001), and submit the same to the commission in advance of the **August 23, 2018**, hearing.

Brooke E. Washburn

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5 attachments

Attachment F - TC APTSTransportation Long Term Projects .pdf
105K

Attachment G - EDC General Plan Transportation Guidelines & Measure E - ....pdf
118K

Attachment H - Traffic Signal Synchronization in the Saturated High-Dens....docx
22K

Attachment I - How Does Chick-fil-A's Drive-Thru Move So Fast□ □ Chick-f....pdf
12163K

Attachment J - S ESTATES_MAIN_Exhibit M SaratogaEstates_FEIR_Transportat....pdf
152K

Significance after Mitigation: Payment of TIM fees will satisfy the project's fair share portion of the improvement project identified for the affected intersection. The impact would be reduced to a less than significant level.

Cumulative Impact C-TRANS-2: **Development of the proposed project would not conflict with applicable policies establishing measures of effectiveness for the performance of the local roadway system and regional freeway system under Long-Term Cumulative (2035) plus Project Conditions. (*Less than Significant*)**

Future year 2035 cumulative traffic volumes were developed in order to assess the cumulative traffic impacts of the proposed project. The long-term cumulative no project scenario corresponds to a 2035 cumulative horizon that accounts for reasonably foreseeable development projects, transportation improvements, and land use growth consistent with the 2004 General Plan.

Foreseeable Development Projects

The following development projects were included in projecting the traffic levels that would exist in the study area under 2035 conditions.

- Bass Lake Hills Specific Plan
- Carson Creek Specific Plan
- Central El Dorado Hills Specific Plan
- Dixon Ranch
- Promontory
- Lime Rock Valley Specific Plan
- Marble Valley Master Plan
- Saratoga Estates (Rancho Dorado)
- Ridgeview
- Serrano
- Tilden Park
- Valley View Specific Plan
- Mill Creek (San Stino) Residential Project

Capacity-Enhancing Roadway Improvements

The roadway improvements listed in **Table 4.8-14, Capacity-Enhancing Roadway Improvements (Anticipated Completion by 2035),** below were assumed to be completed and in place by 2035.

In May 2013, the EDCTC completed the *El Dorado Hills Community Transit Needs Assessment and U.S. 50 Corridor Operations Plan* (Plan), which explores how the recent growth and projected development impact the need for transit services, and identifies the most appropriate type and level of service needed given the demand. The Plan represents a recommendation from the Western El Dorado County 2008 Short-Range Transit Plan to study and consider improved transit service in the El Dorado Hills area.

In April 2015, the EDCTC adopted the Coordinated Public Transit – Human Services Transportation Plan, which is intended to improve mobility of individuals who are disabled, elderly, or of low-income status. The plan focuses on identifying needs specific to those population groups and identifying strategies to meet their needs.

County of El Dorado General Plan

The following presents relevant guiding and implementing policies from the current County of El Dorado General Plan (2004) contained within the Transportation and Circulation Element (additional policies are listed under the following subsection **El Dorado County Initiative Measure E**).

GOAL TC-X: To coordinate planning and implementation of roadway improvements with new development to maintain adequate levels of service on County roads.

Policy TC-Xd Level of Service (LOS) for County-maintained roads and state highways within the unincorporated areas of the county shall not be worse than LOS E in the Community Regions or LOS D in the Rural Centers and Rural Regions except as specified in Table TC-2. The volume to capacity ratio of the roadway segments listed in Table TC-2 shall not exceed the ratio specified in that table. Level of Service will be as defined in the latest edition of the Highway Capacity Manual (Transportation Research Board, National Research Council) and calculated using the methodologies contained in that manual. Analysis periods shall be based on the professional judgment of the Department of Transportation which shall consider periods including, but not limited to, Weekday Average Daily Traffic (ADT), AM Peak Hour, and PM Peak hour traffic volumes.

Policy TC-Xe For the purposes of this Transportation and Circulation Element, "worsen" is defined as any of the following number of project trips using a road facility at the time of issuance of a use and occupancy permit for the development project:

A. A 2 percent increase in traffic during the a.m. peak hour, p.m. peak hour, or daily, 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.

GOAL TC-2: To promote a safe and efficient transit system that provides service to all residents, including senior citizens, youths, the disabled, and those without access to automobiles that also helps to reduce congestion, and improves the environment.

GOAL TC-3: To reduce travel demand on the County's road system and maximize the operating efficiency of transportation facilities, thereby reducing the quantity of motor vehicle emissions and the amount of investment required in new or expanded facilities.

Policy TC-3c The County shall encourage new development within Community Regions and Rural Centers to provide appropriate on-site facilities that encourage employees to use alternative transportation modes. The type of facilities may include bicycle parking, shower and locker facilities, and convenient access to transit, depending on the development size and location.

GOAL TC-4: To provide a safe, continuous, and easily accessible non-motorized transportation system that facilitates the use of the viable alternative transportation modes.

GOAL TC-5: To provide safe, continuous, and accessible sidewalks and pedestrian facilities as a viable alternative transportation mode.

Policy TC-5b In commercial and research and development subdivisions, curbs and sidewalks shall be required on all roads. Sidewalks in industrial subdivisions may be required as appropriate.

The El Dorado County Community Development Agency's[1] (CDA) *Transportation Impact Study Guidelines* (El Dorado County 2014) set forth the protocols and procedures for conducting transportation analysis in the County, including the identification of the study area (TIS Guidelines). All of the study intersections for the proposed project are within the County's jurisdiction. This traffic analysis is consistent with the TIS Guidelines.

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1 As of May 18, 2017 the El Dorado County Community Development Agency (CDA) has been re-organized into separate departments within Community Development Service. These departments are Environmental Management Department, Planning and Building Department, and the Transportation Department.

El Dorado County Initiative Measure E

General Plan Policy TC-X was revised through the approval of Measure E by County voters in June 2016. The key updated policies state:

Policy TC-Xa1 Traffic from residential development projects of five or more units or parcels of land shall not result in, or worsen, Level of Service F (gridlock, stop-and-go) traffic congestion during weekday, peak-hour periods on any highway, road, interchange or intersection in the unincorporated areas of the county.

Policy TC-Xa3 All necessary road capacity improvements shall be fully completed to prevent cumulative traffic impacts from new development from reaching Level of Service F during peak hours upon any highways, arterial roads and their intersections during weekday, peak-hour periods in unincorporated areas of the county before any form of discretionary approval can be given to a project.

Policy TC-Xa7 Before approval of any kind to a residential development project of five or more units or parcels of land, the County shall make a finding that the project complies with the policies above. If this finding cannot be made, then the County shall not approve the project in order to protect the public's health and safety as provided by state law to assure that safe and adequate roads and highways are in place as such development occurs.

Policy TC-Xf 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 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 (defined as a project that triggers Policy TC-Xe [A] or [B] or [C]) traffic on the County road system, 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.

https://www.hindawi.com/journals/cin/2015/532960/

Research Article

Traffic Signal Synchronization in the Saturated High-Density Grid Road Network

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Received 3 October 2014; Accepted 4 December 2014

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Abstract

Most existing traffic signal synchronization strategies do not perform well in the saturated high-density grid road network (HGRN). Traffic congestion often occurs in the saturated HGRN, and the mobility of the network is difficult to restore. In order to alleviate traffic congestion and to improve traffic efficiency in the network, the study proposes a regional traffic signal synchronization strategy, named the long green and long red (LGLR) traffic signal synchronization strategy. The essence of the strategy is to control the formation and dissipation of queues and to maximize the efficiency of traffic flows at signalized intersections in the saturated HGRN. With this strategy, the same signal control timing plan is used at all signalized intersections in the HGRN, and the straight phase of the control timing plan has a long green time and a long red time. Therefore, continuous traffic flows can be maintained when vehicles travel, and traffic congestion can be alleviated when vehicles stop. Using the strategy, the LGLR traffic signal synchronization model is developed, with the objective of minimizing the number of stops. Finally, the simulation is executed to analyze the performance of the model by comparing it to other models, and the superiority of the LGLR model is evident in terms of delay, number of stops, queue length, and overall performance in the saturated HGRN.

1. Introduction

Since the 1990s, the New Urbanism Movement has inspired several urban road network development trends, including increased use of the high-density grid road network (HGRN). The structure of the HGRN is the orthogonal checkerboard

pattern, with narrow two-lane or four-lane roads, which are spaced approximately 100 to 300 meters apart. The density of roads in the HGRN is uniform, and there is no significant difference in the road grade.

The primary characteristic of the HGRN is homogeneity. In a district of HGRN, the distribution of the population in each block is uniform and the change in the intensity of the land use is small, so the amount of traffic volume generated in each unit area is almost the same [1]. In addition, due to the rational traffic organization, the HGRN also has the characteristics of good connectivity and selectivity [2]. HGRNs have been implemented in many urban centers around the world including Manhattan (New York City), Barcelona in Spain, Ginza (Tokyo) in Japan as well as the Bund area in Shanghai, the Xinjiekou area in Nanjing, and others.

Recently, regional traffic signal synchronization has become one of the main research directions in the field of urban traffic signal control, and some regional traffic signal control systems have been developed, such as TRANSYT, SCATS, and SCOOT. Unfortunately, when applied in the saturated HGRN, the performance of these systems has not been satisfactory. When the network is saturated, there is no extra time and space to optimize the traffic signals. Therefore, the regional signal control systems cannot optimize the signal control parameters at the intersections, and the control systems may operate as fixed-timed control systems. In this situation, the traffic system is more fragile and prone to traffic congestion.

Besides, the signalized intersections are densely distributed, and the accommodation space for the vehicle queues is limited. As a result, if congestion occurs at one intersection, the congestion will cause a domino effect, which may cause the regional congestion in the HGRN. Meanwhile, once it happens, the mobility in the HGRN will be difficult to restore.

This research aims at proposing a regional traffic signal synchronization strategy for the saturated HGRN to alleviate traffic congestion and to improve traffic efficiency in the saturated network. The paper is organized as follows. Section 2 summarizes research results in the field of the regional traffic signal synchronization. Then, the long green and long red (LGLR) traffic control strategy for the saturated HGRN is proposed and analyzed in Section 3. Section 4 presents the LGLR traffic signal synchronization model. In Section 5, the application of the control model is simulated in the saturated HGRN and the performance of the control model is analyzed. Finally, the advantages and disadvantages of the LGLR traffic control strategy are discussed and further studies are proposed in Section 6.

2. Literature Review

In the past several decades, a variety of deterministic and/or stochastic models have been developed to solve complex traffic and transportation engineering problems. Some traffic signal synchronization strategies have been applied practically, and others are still in the research stage. In this section, various models of traffic signal synchronization are reviewed.

It is by now well established that traffic signal synchronization is an effective measure for reducing traffic congestion; hence a great effort has been made in the area of signal timing optimization techniques. Most of these control strategies are based on fixed-time signal control, including Webster's model [3], semigraphical model [4], Pontryagin's control model [5], and store and forward model [6]. However, fixed-time signal control strategies are only applicable to undersaturated traffic conditions, whereby vehicle queues are only generated during the red phases and are dissolved during the green phases. The main drawback of fixed-time strategies is that their settings are based on historical data rather than real-time data. This may be a crude simplification because demands may vary on different days due to special events.

Regional coordinated traffic control strategies can synchronize traffic signals at the coordinated intersections to improve system performance. Regional coordinated traffic control strategies have been proposed by many researchers, which mainly employ artificial intelligence algorithms, including genetic algorithms, fuzzy logic algorithms, neural network algorithms, and mixed-integer linear programming.

Yu and Recker proposed an adaptive control model of a network of signalized intersections based on a discrete-time, stationary, Markov decision process. The model incorporated probabilistic forecasts of individual vehicle actuations at downstream inductance loop detectors. However, in order to be directly applicable, this proposed model requires complete information on the transition probabilities of the system, which is often not available [7].

Akiyama and Okushima modified the inflow traffic controller with continuous variables to optimize parameters for linguistic expression in fuzzy reasoning and proposed an advanced fuzzy traffic control as an extension of conventional inflow control traffic management to reduce the traffic congestion effectively on urban expressways in Japan [8].

Srinivasan et al. adopted the multiagent system approach to develop distributed unsupervised traffic responsive signal control models, where each agent in the system is a local traffic signal synchronizer for one intersection in the traffic network. The first multiagent system is developed using hybrid computational intelligent techniques. The second multiagent system is developed by integrating the simultaneous perturbation stochastic approximation theorem in fuzzy neural networks [9].

Li et al. presented a new signal control method based on a model-free action-dependent adaptive dynamic programming. This method could be used for cooperative control of multiple intersections. In each intersection, the signal controller was adopted to adjust signal time according to an integrated unity parameter. The unity parameter was designed to consider not only the control performance in local intersection but also those in the neighbor intersections [10].

Gokulan and Srinivasan proposed a distributed multiagent-based approach to develop a traffic-responsive signal control system, that is, the geometric fuzzy multiagent system. This system was capable of handling the various levels of uncertainty found in the inputs and rule base of the traffic signal synchronizer. Simulation models of the agents designed in PARAMICS were tested on virtual road network replicating a section of the central business district in Singapore [11].

Sánchez-Medina et al. developed and tested a new model for traffic signal optimization based on the combination of three key techniques: genetic algorithms for the optimization task; cellular-automata-based microsimulators for evaluating each possible solution for traffic-light programming times; and a Beowulf Cluster, which was a multiple-instruction-multiple-data multicomputer of excellent price/performance ratio [12].

Chen and Khorasani developed a robust decentralized congestion control strategy for a large scale network with differentiated services traffic. The proposed congestion controller did take into account the associated physical network resource limitations and was shown to be robust to the unknown and time-varying delays. This strategy was developed on the basis of differentiated services architecture by utilizing a robust adaptive technique. A linear matrix inequality condition was obtained to guarantee the ultimate boundedness of the closed-loop system [13].

Yun and Park presented a stochastic-optimization method for coordinated actuated traffic signal systems. The proposed method accounts for stochastic variability by using a well-calibrated microscopic simulation model, CORSIM, instead of a macroscopic and deterministic model, and it simultaneously optimizes actuated signal settings and the four traffic signal timing parameters by adopting a genetic algorithm with special decoding schemes. The proposed method has been applied to a real-world arterial network in Charlottescille, Virginia. The results indicated that the proposed method outperforms the existing timing plan and synchro-optimized traffic signal timing for the tested arterial network [14].

Varaiya introduced the max pressure (MP) control. At each intersection, MP selects a stage that depends only on the queues adjacent to the intersection. MP does require knowledge of mean turn ratios and saturation rates, but an adaptive version of MP will have the same performance, if turn movements and saturation rates can be measured. The advantage of MP over other SF network control formulations is that it only requires local information at each intersection and provably maximizes throughput [15].

Li proved that there exist infinite optimal solutions in the MAXBAND model if a known optimal solution holds some properties. Li developed a two-phase approach: in the first phase, he solved the MAXBAND models with perturbation controlled by a parameter and generated a number of optimal or suboptimal plans, and in the

second phase, he applied the Monte Carlo method to simulate random progression time, evaluate the generated plans, and rank them by the reliability [16].

In addition to those theoretical models, there are some coordinated traffic control strategies that have been applied practically. MAXBAND [17] is a bandwidth optimization program for arterials and triangular networks. TRANSYT-7F [18] is developed to optimize the signal control parameters for urban road networks. SYNCHRO [19] is a macroscopic analysis and optimization program based on ICU 2003 and HCM 2000. SCOOT [20] and SCATS [21] are two well-known and widely used coordinated traffic responsive strategies.

However, most of the existing algorithms for signal coordination do not explicitly consider saturated situations, because most of research has been devoted to the development of signal control algorithms under normal traffic conditions. Practical procedures or guidelines for signal timing of saturated network are not readily available [22]. As a result, implementation of the algorithms for saturated networks has caused undesirable outcomes. SCOOT, for example, has performed well in moderate traffic conditions but has shown major deficiencies in saturated and highly fluctuating conditions [23]. In addition, it is proved that SCATS is more effective at reducing delay during low volume periods than high volume periods.

3. Control Strategy

The long green and long red (LGLR) traffic signal synchronization strategy for the saturated HGRN is proposed in this section. In order to quickly remove queues and to improve traffic efficiency and stability, the approach of the control strategy is to control the formation and dissipation of queues and to maintain the continuous traffic flow.

3.1. The LGLR Traffic Signal Synchronization Strategy

The LGLR traffic signal synchronization strategy uses the same signal control timing plan at all signalized intersections in the HGRN, and the straight phases of the control timing plan have a long green time and a long red time. There are two statuses for horizontal direction and vertical direction of the HGRN in this strategy. More specifically, status one is long green (LG). In LG status, the straight phases in horizontal direction of all signalized intersections in the HGRN are all green, and green lights last for a long time. The straight vehicles in horizontal direction can form continuous traffic flows, maintain stable travel speeds, and go uninterrupted through several signalized intersections. Status two is long red (LR). In LR status, the straight phases in horizontal direction all change from green to red and red lights last for a long time. The straight vehicles in horizontal direction can stop at the stop lines at different intersections to avoid congestion when there are too many vehicles from the upstream roads. The statuses in vertical direction are similar to the statuses in horizontal direction.

3.2. Application Feasibility

This feasibility analysis assumes that the LGLR traffic signal synchronization strategy is used in a horizontal road including four adjacent signalized intersections, the lengths of sections between adjacent intersections are all short, and there are no turning vehicles entering and exiting the horizontal road. To simplify the analysis process, two-phase traffic signal synchronization is studied.

When the horizontal straight phases of all intersections are LR status, horizontal vehicles stop at the stop lines, and the number of stopping vehicles in each section is stable. Then the horizontal straight phases of all intersections change from LR status to LG status and the horizontal vehicles begin to travel. When the horizontal straight phases are LG status, the traffic flow will not be interrupted by the intersections, so the road can be regarded as a road without intersections. At first, the traffic flow on the road is discrete, but after a short time, the flow will form a continuous traffic flow.

Because the traffic flow is continuous when the horizontal straight phases of all intersections are LG status, the Greenshields et al.'s linear speed-density model can be used [24] to describe the average traffic density of the traffic flow on the road and formula (1) is derived: where is the average density of the flow on the road, is the congestion density on the road, is the average travel speed of the continuous traffic flow on the road, and is the free flow speed on the road.

According to formula (1), the average number of vehicles on each section is described as where is the average number of vehicles on the section and is the length of the section .

When the horizontal straight phases of all intersections change from LG status to LR status, vehicles on each section stop at the stop line and form a queue. The queue length on each section is described as where is the queue length on the section and is the average space headway of the queue.

Considering the relationship of the average space headway of the queue and the congestion density, the average space headway of the queue can be obtained by

Substitute formula (4) into formula (1):

When the horizontal straight phases are LG status, it is assumed that vehicles travel at the same speed on the road. After the horizontal straight phases of all intersections change from LR status to LG status, the time, when the head of the queue on the upstream section approaches the end of the queue on the downstream section, is determined as

The time when the end of the queue on the downstream section begins to move is determined as where is the starting wave speed of the queue.

According to traffic flow theory, the starting wave speed is determined as

Substitute formulas (5) and (8) into formula (7):

According to formulas (6) and (9), the following is obtained: where is the lost time of upstream and downstream queues connecting to each other.

means that the end of the downstream queue begins to move before the head of the upstream queue approaches the position at the end of the downstream queue and means that the end of the downstream queue does not move when the head of the upstream queue approaches the position at the end of the downstream queue. It is concluded that there is a lost time between upstream and downstream queues when or .

means that the end of the downstream queue begins to move, while the head of the upstream queue approaches the position of the end of the downstream queue. The upstream and downstream queues seamlessly connect to each other and restore a continuous traffic flow without any lost time.

Therefore, according to formula (10), it is concluded that, after the horizontal straight phases of all intersections change from LR status to LG status, if the length of the green time is longer than , the queues can become a continuous traffic flow at . In addition, the lengths of sections are all short, which ensures that the traffic flow is continuous during most of the duration of LG status (see Figure 1).
Figure 1: The LGLR traffic signal synchronization strategy in use on a road.

As shown in Figure 1, when the straight phases of all intersections change from LG status to LR status, the continuous traffic flow will be interrupted at the signalized intersections, and the queues are formed at the stop lines on the sections. The lengths of queues are unchanged during the LR status. When the straight phases of all intersections change from LR status to LG status, the discrete traffic flow on the road becomes a continuous traffic flow after , because the length of section 2 is longest. According to formula (10), during the process of forming the continuous traffic flow, there is no lost time. When the traffic flow is continuous, vehicles can pass through several signalized intersections without stopping.

If the area controlled by the LGLR traffic signal synchronization strategy extends to the HGRN, the strategy will also work effectively. When the strategy is used in the HGRN, the same signal control timing plan will be applied in all signalized intersections. In a signal cycle, when the horizontal straight phases in the HGRN are LG status (i.e., the vertical straight phases are LR status), the horizontal straight vehicles form continuous traffic flows and pass through several downstream signalized intersections at the steady travel speed. Meanwhile, the vertical straight vehicles stop at each section and wait for the green light. When the vertical straight phases in the HGRN change to LG status (i.e., the horizontal straight phases are LR status), the vertical straight vehicles form continuous traffic flows to travel, and the horizontal straight vehicles stop and wait for the green light. Additionally, the same

signal control timing plan is applied to all signalized intersections of the HGRN; therefore, the computational burden can be reduced and the optimal signal control timing plan can be easily generated at the control center.

Therefore, it is concluded that the LGLR traffic signal synchronization strategy is feasible in the HGRN.

4. Modeling

Traffic organization in the HGRN needs to be considered with the application of the LGLR traffic signal synchronization strategy. At present, the four-phase signal control is commonly used at the signalized intersections in the HGRN in China, and the four-phase signal control is one of the widely used traffic signal synchronizations in the world. Therefore, based on the four-phase signal control, the LGLR traffic signal synchronization model is proposed.

The purpose of using the LGLR traffic signal synchronization strategy in the HGRN is to maintain continuous traffic flows when vehicles travel and avoid excessive queuing when vehicles stop and wait for the green light. The objective of the model is to minimize the number of stops, because the number of stops not only reflects the continuity of the traffic flow, but also closely relates to traffic capacity, rear-end accidents, fuel consumption, exhaust emissions, noise pollution, and other congestion issues.

4.1. Model Objective Function

When the HGRN is saturated, the distribution of saturation flow rates on all parallel roads is uniform in the HGRN, and the traffic flows of all roads are stable without significant fluctuations [25]. According to the process of LGLR traffic signal synchronization strategy (formulas (1)~(10)), when the traffic flow on the lane travels through this area, the number of stops for a lane only relates to the road length, the average speed of the continuous traffic flow, the time interval of LG status, and the traffic volume. In addition, the number of intersections and the distances between adjacent intersections will not influence the number of stops. The number of stops in the west-to-east lane () is described as where is the average length of the horizontal roads in the HGRN, is the time interval of LG status for the horizontal straight phases in the HGRN, is the traffic volume in the west-to-east lane , and is the average speed of the continuous traffic flow when the horizontal straight phases are green.

According to formula (11), the number of stops from west to east () is described as where is the total traffic volume from west to east.

The average number of vehicle stops on the horizontal and vertical roads in the HGRN () is described as where is the time interval of LG status for the vertical straight phases in the HGRN, is the average length of the vertical roads in the HGRN, , , and are the total traffic volumes from east to west, from north to south, and from south to north, respectively, and is the total traffic volume in the HGRN, .

Considering the relationship of the speed, density, and volume of the continuous traffic flow, formula (13) is simplified as follows: where , , , and are the numbers of vehicles on the roads from west to east, from east to west, from north to south, and from south to north in the HGRN, respectively, and and are the numbers of vehicles on the horizontal and vertical roads, respectively, , .

However, formula (13) does not include all stops in the HGRN, because there are left-turn vehicles in the HGRN. When the straight phases are LG status, these vehicles go straight until they approach the intersections where the vehicles need to stop and wait for the green left-turn signals. According to formula (10), after the left-turn signals turn green, the left-turn vehicles will approach the end of the queues and stop again at the next intersections.

In addition, with the increase of the density of the HGRN, the average left-turn ratio decreases and the distribution of left-turn vehicles is more uniform [25]. Therefore, compared with formula (14), if the green time, during a signal cycle, for the left-turn phase is long enough for left-turn vehicles, each left-turn vehicle will add a new stop, and the average number of new stops of left-turn vehicles () is described as where , , , and are the left-turn ratios in the west, the east, the north, and the south at intersections, respectively.

According to formulas (14) and (15), the objective function of the average number of stops in the HGRN () is shown as

4.2. Constraints

In the model, the constraints include no more than one stop for each left-turn vehicle, the accommodation space for vehicles around the HGRN, the waiting tolerance of participants, and the stability of continuous traffic flows.

4.2.1. The Constraint of No More Than One Stop for Each Left-Turn Vehicle

In order to balance the traffic flows in different directions, it is necessary to ensure that most left-turn vehicles stop no more than once to turn left at the signalized intersections. In addition, formula (15) is correct only when the green time for the left-turn phase is long enough for left-turn vehicles during a signal cycle. Therefore, the LGLR traffic signal synchronization model must satisfy where and are the green times for the left-turn phases on the horizontal and vertical roads, respectively, is the number of the signalized intersections in the HGRN, is the average time headway of left-turn vehicles, and is the minimum green time for the left-turn phase.

4.2.2. The Constraint of the Accommodation Space for Vehicles around the HGRN

The signal control timing plan in the HGRN is quite different from that around the HGRN. Within a signal cycle in the HGRN, many vehicles need to leave and enter the HGRN, and these vehicles need enough space to be accommodated in a short time around the HGRN and may cause long queues. Therefore, the constraint of the accommodation space for vehicles around the HGRN is proposed to limit the length

of green time for the straight phases, as shown in where , , , and are the lengths of the roads that connect to the HGRN in four directions, respectively.

4.2.3. The Constraint of the Waiting Tolerance of Participants

When the straight phases on the roads are LR status, participants need to wait for the green light at the intersections. The influences of individual psychology, traffic means, and waiting environment are different, so is the waiting tolerance of different participants. According to the statistics of the United Kingdom and Japan, it is proposed that the average of maximum waiting tolerances should be 150 sec. Therefore, the constraint of the waiting tolerance of participants is shown as where is the signal cycle time.

4.2.4. The Constraint of the Stability of Continuous Traffic Flows

Given the advantages of the continuous traffic flow, the green time for the straight phases should be long enough to avoid frequent switching of the signals to interrupt the continuous traffic flow at the intersections. In addition, it is proposed that the traffic capacity on the road can be increased by 80% when the distance between the intersections increases from 200 to 800 meters [26], which means the traffic capacity increases with the increase of the distance between two intersections. Therefore, the constraint of the stability of continuous traffic flows is shown as where is the minimum travel distance of the continuous traffic flow.

Therefore, the LGLR traffic signal synchronization model is constituted with the objective function formula (16) and constraint formulas (17)–(20).

5. Simulation

The purpose of the simulation is to analyze the performance of the LGLR traffic signal synchronization strategy used in the saturated HGRN. First, the real-life conditions of the HGRN in Nanjing are considered, and the saturated HGRN is simulated in Vissim. Second, short-time traffic data are collected in Vissim and the solutions of the LGLR traffic signal synchronization model are optimized by Matlab's optimization toolbox to control the signal lights in the HGRN. Finally, the performance of the LGLR traffic signal synchronization model is compared with those of the two other models, and the feasibility of the LGLR traffic signal synchronization strategy is analyzed.

As shown in Figure 2, the HGRN of Nanjing is simulated in Vissim. In the HGRN, the spacing of the road grid is between 150 and 300 meters, the roads are all four-lane two-way, the approaches are expanded to three lanes, and there are no signification differences in the road grade. Within 20 signalized intersections, four-phase signal control is used, and traffic detectors are installed at the stop lines at signalized intersections. According to the statistics, the average turn-left ratio at the intersections is about 15%, and the saturation flow rate for a lane is 1800 veh/h.

Figure 2: The simulated HGRN.

During the simulation process, the signal control parameters at intersections are optimized by the LGLR traffic signal synchronization model according to short-time traffic data, which are collected by traffic detectors in Vissim, and the optimized traffic signal synchronization parameters are used to control the signal lights in the HGRN. The main parameters of the model are set as follows: the average length of the horizontal roads is 900 meters, the average length of the vertical roads is 660 meters, the average time headway of left-turn vehicles is 4 seconds, the minimum green time for the left-turn phase is 8 seconds, the minimum length of each road connecting with the HGRN from four directions is 500 meters, the minimum travel distance of the continuous traffic flow is 600 meters, and the congestion density is 140 veh/km.

An algorithm is developed to analyze the performance of the LGLR traffic signal synchronization model, with the following specific steps.

Step 1. Simulate traffic volume of each entrance lane into the HGRN to control the saturation rate of the HGRN. The traffic volume of each entrance lane is set to 1200 veh/h and increases by 200 veh/h each hour. The duration of the simulation is 3 hours.

Step 2. Using the LGLR traffic signal synchronization model, collect traffic data in the HGRN, such as traffic volume, travel speed, and left-turn ratio, and optimize and update the parameters of the signal lights every 15 minutes.

Step 3. Compare the performance of the LGLR traffic signal synchronization model used in the saturated HGRN with those of the fixed-time control model and the distributed adaptive signal control model [28], and then analyze the feasibility and advantages of the LGLR traffic signal synchronization strategy (see Figures 3–5).
Figure 3: Comparison of delay at the intersections.
Figure 4: Comparison of average numbers of stops at the intersections.
Figure 5: Comparison of average queue lengths at the intersections.

When the traffic volume of each entrance lane is 1200 veh/h, that is, the HGRN is close to saturation, the performance of the LGLR traffic signal synchronization model and that of the distributed adaptive signal control model are better than the performance of the fixed-time control model. However, the performance of the LGLR traffic signal synchronization model and that of the distributed adaptive signal control model are similar (see Figure 3(a)).

When the traffic volume increases to 1400 veh/h and 1600 veh/h, that is, the HGRN is saturated, the delays of the intersections all increase in the three control models, but the increase of the delays of the intersections in the LGLR traffic signal synchronization model is smallest in three control models (see Figures 3(b) and 3(c)). Meanwhile, when the traffic volumes are 1600 veh/h, the delays in the distributed adaptive signal control model are similar to the delays in the fixed-time

control model, which means the distributed adaptive signal control becomes the fixed-timed control in the saturated HGRN.

In terms of the number of stops in the intersections, the superiority of the LGLR traffic signal synchronization model is obvious. In three cases of 1200 veh/h, 1400 veh/h, and 1600 veh/h (see Figures 4(a), 4(b), and 4(c)), the average numbers of stops at all intersections are less than 0.6 in the LGLR model and are obviously less than those in other models.

Additionally, in the cases of 1400 veh/h and 1600 veh/h (Figures 4(b) and 4(c)), the numbers of stops in the distributed adaptive signal control model and the fixed-time control model are not less than one, which means almost every vehicle must stop at least once at each intersection.

In terms of average queue lengths at the intersections, because the optimization objective of the distributed adaptive signal control model is the minimum average queue lengths, the performance of the distributed adaptive signal control model is slightly better than that of other models in the case of 1200 veh/h (Figure 5(a)). However, when the traffic volumes increase, the performance of the LGLR traffic signal synchronization model gets better, which means the probability of spillback congestion is smaller. Meanwhile the performance of the other two models remains similar under all traffic volumes, and average queue lengths at the intersections are not controlled (see Figures 5(b) and 5(c)).

As shown in Table 1, all three models are evaluated in terms of their overall performance in the saturated HGRN. In the evaluations, total number of vehicles, total travel distance, average travel time, average travel speed, and average delay are included. In the case of 1200 veh/h, it is difficult to show the superiority of the LGLR traffic signal synchronization model, because the performance of the LGLR traffic signal synchronization model at this volume is worse than other models. However, in the cases of 1400 veh/h and 1600 veh/h (when the HGRNs are saturated), the superiority of the LGLR traffic signal synchronization model is gradually revealed, and the performance is obviously better than those of other controls. For example, compared with the performance of the distributed adaptive signal control model, with the slight increase of the total number of vehicles and the total travel distance, the average travel time decreases by 25.5%, average travel speed increases by 33.3%, and average delay decreases by 39.6%.
Table 1: Overall evaluation of the application of three control models in the HGRN [27].

6. Conclusions

The time and space for traffic signal optimization are limited in the saturated HGRN, so the performance of conventional signal control methods is not satisfactory. Therefore, the LGLR traffic signal synchronization strategy is proposed as an alternative. This strategy uses the same signal control timing plan to control all signalized intersections. The green time and the red time for the straight phases of

the timing plan are relatively long to limit the queue lengths at all intersections when the lights are red and to ensure that vehicles can form the continuous traffic flow and go through several downstream intersections without stopping when the lights are green. The performances of three signal control models were compared and analyzed by simulations, and results showed that, in the saturated HGRN, the LGLR traffic signal synchronization strategy is much more effective, for the following reasons.(i)First, in the LGLR traffic signal synchronization strategy, the same signal control timing plan is used at all intersections, which is helpful to uniformly distribute the traffic volumes in the HGRN and to fulfill the advantages of good equilibrium, connectivity, and selectivity of the HGRN.(ii)Second, when the straight phases of the intersections are LR status, the straight vehicles stop at the stop lines at different intersections in order to limit the queue lengths in the sections and to avoid the spillback congestions to the upstream intersections.(iii)Third, when the straight phases of the intersections are LG status, the straight vehicles can form continuous traffic flows and go uninterruptedly through several downstream signalized intersections at a steady speed.(iv)Finally, the optimization is simple, as the traffic parameters of the model can be obtained by the traffic detectors installed in the HGRN, and this requirement of the hardware and software is easy to implement.

In short, the essence of the LGLR traffic signal synchronization strategy is to control the formation and dissipation of queues and to maximize the efficiency of traffic flow at signalized intersections in the saturated HGRN, which is the same as Roess et al.'s point that the formation of queues and blockages is inevitable during saturation and removal of queues and blockages must be the prime objectives [29].

Moreover, according to Section 3.2, the LGLR traffic signal synchronization strategy is applicable not only in the HGRN, but also in the corridor or parallel corridors. If weight coefficients are introduced into the modeling of the strategy to focus on saturated traffic flow in the direction of corridors, the strategy may be adopted in the corridor or parallel corridors.

However, the LGLR traffic signal synchronization strategy is not suitable to the undersaturated HGRN, because, in this scenario, the LGLR traffic signal synchronization strategy cannot use the extra time and space to optimize the control signal parameters. As shown in Table 1, when the network is close to saturation (in the case of 1200 veh/h), the control effort of this strategy is slightly worse than others until the network reaches saturation (as shown in the cases of 1400 veh/h and 1600 veh/h).

To expand the application and widespread use of the LGLR traffic signal synchronization strategy, some details of the strategy require further research.(i)First, the coordinated traffic signal synchronization in the area around the HGRN needs to be studied to ensure the stability of traffic between the HGRN and its surrounding road network.(ii)Second, the average of maximum waiting

tolerance time for different participants using different modes, such as driver, bicyclist, and pedestrian, needs to be studied.

Conflict of Interests

The authors have no conflict of interests to declare.

Authors' Contribution

The authors attest to the fact that all authors listed on the title page have contributed significantly to the work, have read the paper, attest to the validity and legitimacy of the data and its interpretation, and agree to its submission to the Computational Intelligence and Neuroscience.

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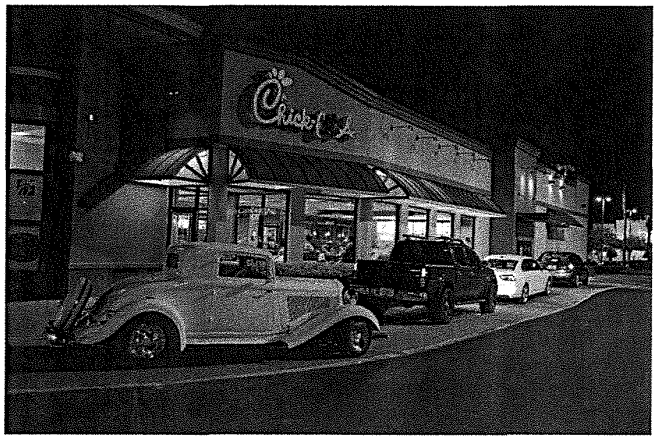
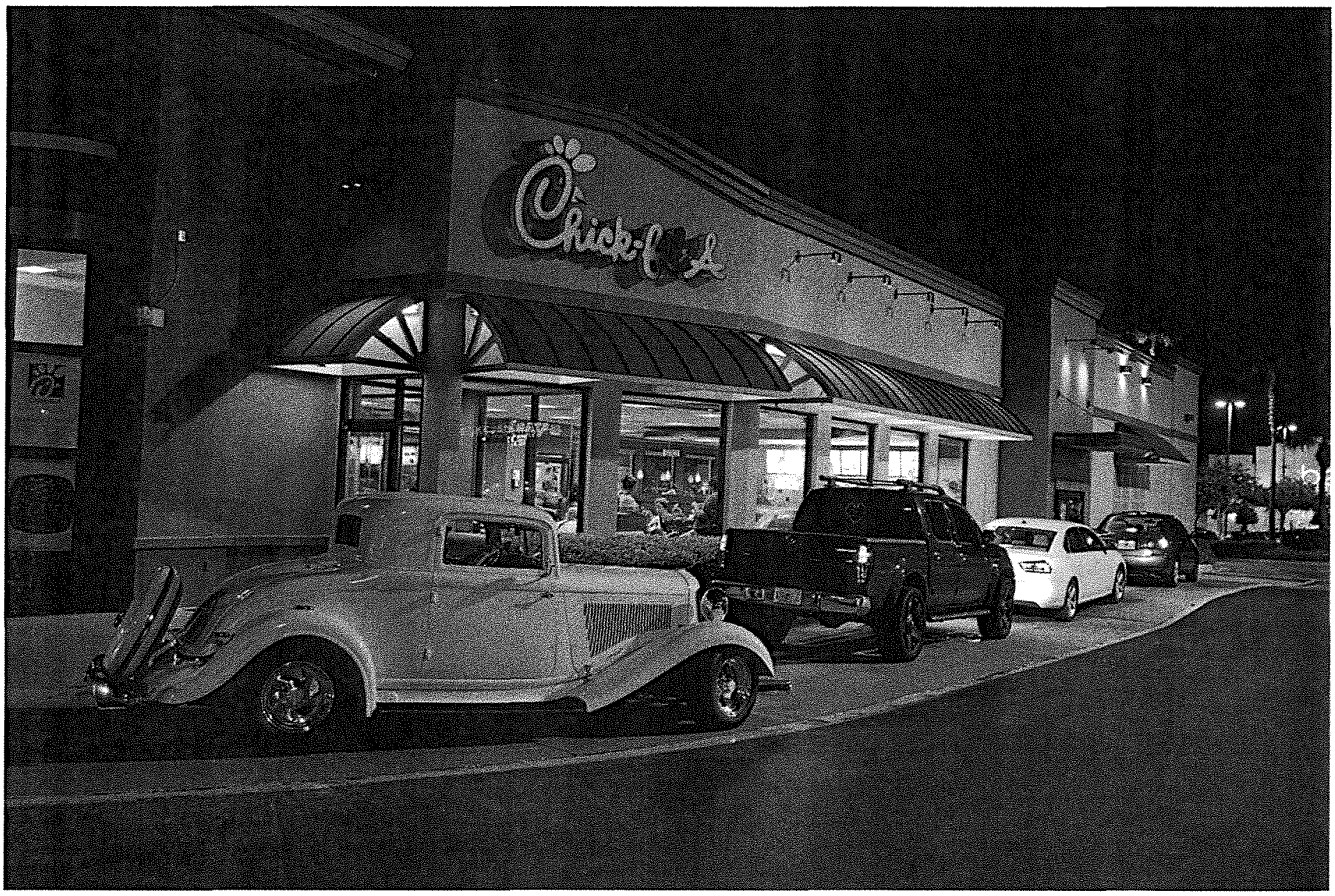


How Does Chick-fil-A's Drive-Thru Move So Fast?

SEAN WARD JUL 24, 2017



INSIDE **CHICK-FIL-A**

Behind-the-scenes of how we keep you moving, not waiting, at the drive-thru

It's a familiar scene. You're running your daily errands, and hunger strikes. You don't have time to spare, so you hit up the Chick-fil-A drive-thru. When you arrive, the line is wrapped around the restaurant. But you still get in the line, because you know you'll get your food in no time.

It's such a familiar phenomenon that this meme recently made its rounds on the internet, describing the experience in a way only the internet can:

So how do Chick-fil-A drive-thrus move so quickly? According to Jared Solid, who leads Chick-fil-A's drive-thru innovation, "The drive-thru experience is all a game of seconds. It's about putting the right people in the right places to shave off unnecessary time."

Though the drive-thru may seem like one continuous experience to customers, Solid and his team think about it in multiple stages, looking for innovation every step of the way.

One of the ways they do this is by building full-scale mockups at the Chick-fil-A Headquarters in Atlanta and driving real cars through them (indoors). Seriously. This way, they can ensure the design and process is just right, even before testing ideas in live restaurants.

How It Works

With most Chick-fil-A restaurants serving well over 100 cars in the drive-thru during peak hours, Solid and his team know that placing orders is an integral part of the drive-thru experience. That's why customers often see Chick-fil-A employees walking the drive-thru line armed with tablets.

The technology allows team members to go up to a customers' window, take their order and relay it to the kitchen, all while maintaining one-on-one service. As the order-taker walks the line, another team member comes to the customers' car to take payment, allowing cars to move through twice as fast as they do at a traditional speaker box drive-thru. Chick-fil-A calls the system "face-to-face ordering".

“It’s a great way for us to get really high volumes of cars through the drive-thru extremely efficiently,” says Solid. “It’s also a way for us to give customers personalized service in a place they may not expect it.”

Face-to-Face Face Ordering, like many drive-thru innovations, was first developed by Chick-fil-A franchised Operators and then refined by Solid and his team.

“Long before we had the technology to support it, team members would write down customers’ orders in the drive-thru and call it in on cell phones,” says Solid. “The best ideas always come from our restaurant Operators and team members.”

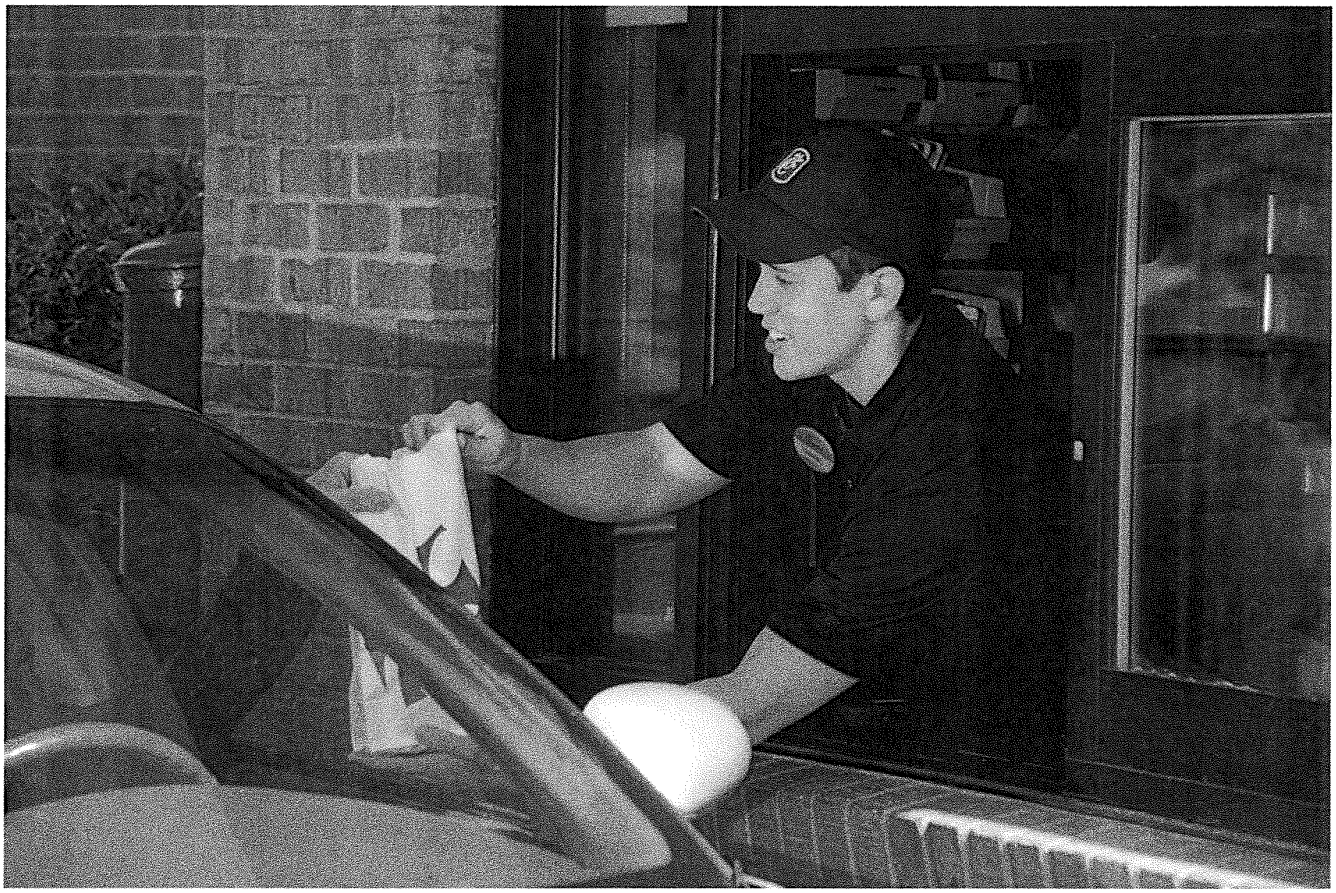
But drive-thru innovation doesn’t end with the technology team members use – it even extends to the uniforms they wear. To ensure team members working in the drive-thru line are comfortable in any weather, Chick-fil-A has partnered with clothing brands that design military-spec cooling vests and moisture-wicking uniforms for the summer, thermal options for the winter and more. Solid and his team are also working on additional ways to keep team members protected from the elements

throughout the year.

Getting it Right

Speed isn't everything. Solid and his team know customers want accuracy as well. To ensure customers get what they ordered, team members also take detailed descriptions of cars while they're placing orders.

"This way the kitchen knows what food orders to make first, and the cashier knows who to get payment from," says Solid.



When restaurants have two drive-thru lanes, the descriptions of cars help team members know exactly who should receive what food order at the window, regardless of the order in which cars merge.

Thinking Ahead

Even with the majority of Chick-fil-A's customers already choosing the drive-thru, Solid believes this

number will grow in coming years. So, what does the drive-thru of the future look like?

"I think the digital space will continue to play an important role in our drive-thru," says Solid. "We will continue exploring innovative ways to intersect the digital and the physical world."

Chick-fil-A is already preparing for that day with its mobile app, Chick-fil-A One. While customers can't yet pick up their mobile order in the drive-thru, they can order a customized meal, pay in advance and pick up the order inside the restaurant.

"We know our drive-thru can look daunting, but we work to maintain our our guests' trust," says Solid. "Our job is to make their experience perfect as many times as possible."

and maintenance of the County's infrastructure. Capital improvements are projects that provide tangible, long-term improvements or additions of a fixed or permanent nature that have value and can be depreciated.

The CIP provides a means for the El Dorado County Board of Supervisors to determine capital priorities. The CIP is updated annually as new information becomes available regarding priorities, funding sources, project cost estimates, and timing.

The TIM Fee Program is the funding mechanism for projects in the CIP which mitigate cumulative traffic impacts identified in the General Plan EIR, and subsequent updates as required in the General Plan. TIM fees are collected at the time of issuance of a building permit. ~~Where an impact is not directly attributed to an individual development project as determined by General Plan Policies TCx a through TCx I, the County considers payment of TIM fees to satisfy a development project's proportionate fair share obligations for the improvements that are in the TIM Fee program.~~ The TIM Fee Program makes up a portion of the funding for the CIP.

El Dorado County Implementation of General Plan Policies

General Plan Policy TC-Xf requires that the County "~~(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~~.

The project is proposed to be developed in phases, and may take several years to complete and become fully occupied (point in time where actual traffic impact is realized). Additionally, the actual background traffic growth rates for the 2024 scenario and the 2035 scenario may differ significantly from those projections analyzed in the Traffic Impact Analysis. The combined effect of these two variables could result in pre-mature construction of off-site transportation improvements ~~and/or could introduce inefficiencies in expenditures of transportation funding~~.

In order to ensure that a project's impacts are fully mitigated, and that the improvements are constructed concurrently with the impact of the development, the County Transportation Division has developed a guideline conditioning template that is applied to major projects where these variabilities exist. The conditions proposed to be applied to the Saratoga Estates Project is presented as follows:

Off-Site Improvements - Major Transportation Facilities:

A. The Project shall be responsible for design, Plans, Specifications and Estimate (PS&E), utility relocation, right of way acquisition, and construction of the following improvements~~:~~ ~~to [*LIST IMPROVEMENTS*]~~.

   i. Saratoga Way shall be constructed to a design speed of 45mph, consistent with the exhibit entitled "Saratoga Estates, Saratoga Way Plan and Profile" dated July 2015, prepared by CTA Engineering and Surveying. Typical Section as shown on the Approved Tentative Map and as specified in Table 1. Construction shall include the extension of Saratoga Way from the existing terminus to the boundary with APN 120-070-03with the first small lot final map. The construction of Saratoga Way shall be completed to include the connection with Iron Point Road prior to issuance of the 101st Building Permit, with the exception of model homes.

   ii. Saratoga Way Intersection with Wilson Boulevard shall include construction of a left turn pocket on the eastbound Saratoga Way approach to Wilson Boulevard, separate right and left turn lanes on the southbound Wilson Boulevard approach to Saratoga Way, and installation of a traffic signal. Traffic signal shall be designed with the first small lot final

map, and all under-pavement components of the traffic signal system shall be installed with the initial construction of the roadways. The remaining portions of the traffic signal system shall be installed and placed in operation in accordance with section E of this condition.

iii. The intersection of Saratoga Way and M Street shall be constructed as a "right-in, right out only" configuration.

iv. Wilson Boulevard shall be constructed to a design speed of 35mph as shown on the Approved Tentative Map. Full construction from Saratoga Way to the existing Wilson Way shall be completed prior to issuance of any Building permits, with the exception of model homes.

v. Design of Wilson Boulevard shall include left-turn pockets at "I Street", "K Street" and "L Street" to include three 12-foot lanes plus 6-foot paved shoulders (measured to face of curb), for a total width of 48 feet. These intersection improvements shall include all-way stop controls.

vi. Mitigation Measures M1 and M5, as identified in the project Environmental Impact Report, shall be implemented.

B. Timing of Improvements

i. In order to ensure proper timing of the construction of the improvements identified, the Project shall perform a supplemental traffic analysis in conjunction with each final map application to determine Level of Service (LOS) ~~of the [*IMPACT LOCATIONS*]~~, to include existing traffic plus traffic generated by each final map.

ii. If the supplemental traffic analysis indicates that the County's LOS policies would be exceeded by the existing traffic plus traffic generated by that final map, the ~~Project~~ applicant shall construct the improvements prior to issuance of the first ~~certificate of occupancy~~building permit for any lot within that final map.

iii. All traffic improvements will be constructed prior to issuance of building permits of the last final map.~~If the County's LOS policies are not exceeded upon application for the last final map within the Project, the Project shall pay its TIM fees toward the installation of proposed roadway improvements. In which case, payment of TIM fees is considered to be the project's proportionate fair share towards mitigation of this impact.~~

~~iv. If the necessary improvements are constructed by the County or others prior to triggering of mitigation by the Project, payment of TIM fees is considered to be the Project's proportionate fair share towards mitigation of this impact.~~

C. Financing and Reimbursement

i. To the extent not covered under the Development Agreement ("DA"), the Project may be reimbursed for the costs of any improvements listed above, to the extent that the cost of such improvements are beyond the project's fair share ~~are included in the County's Traffic Impact Mitigation (TIM) Fee Program, in accordance with the County's TIM Fee Reimbursement Guidelines~~, and subject to a Road Improvement and Reimbursement / Credit Agreement between the Project and the County.

~~ii. If any improvements are included in the County's 10-year CIP and TIM Fee Program, and agreed to by the County in a Road Improvement and Reimbursement / Credit Agreement, the Project may receive full or partial credit for the cost of the work against TIM Fees that would otherwise be paid at issuance of building permits.~~

~~iii. If any improvements are included in the County's 10 year CIP and TIM Fee Program, and agreed to by County in a Road Improvement and Reimbursement / Credit Agreement, the Project may provide funding and Bid-Ready PS&E to County, for bidding and construction management by County.~~

~~D. With respect to the improvements to the public roadways required in this condition, either one of the following shall be done prior to issuance of a building permit: (a) the subdivider shall be under contract for construction of the required improvements with proper sureties in place, or (b) the subdivider shall have submitted to the County a bid-ready package (PS&E) and adequate funding for construction.~~

D~~E~~. The following requirements apply to all traffic signals identified in this condition.

i. In order to ensure proper timing for the installation of traffic signal controls, the ~~Project~~applicant shall be responsible to perform traffic signal warrants with each final map at intersections identified for potential signalization, in accordance with the Manual on Uniform Traffic Control Devices (version in effect at the time of application).

ii. If traffic signal warrants are met at the time of application for final map (including the lots proposed by that final map), the ~~Project~~ applicant shall construct the improvements prior to issuance of the first ~~certificate of occupancy~~building permit for any lot within that final map.

iii. If traffic signal warrants are not met upon application for the last final map within the Project, the Project shall pay its TIM fees toward the installation of traffic signal controls. In which case, payment of TIM fees is considered to be the Project's proportionate fair share towards mitigation of this impact.

iv. If the traffic signal control at an intersection is constructed by the County or others prior to triggering of mitigation by the Project, payment of TIMf fees is considered to be the Project's proportionate fair share towards mitigation of the impact.

Application of this condition ensures compliance with all General Plan Policies, ensures that required mitigation is implemented concurrently with impact, ensures that unnecessary improvements are not required to be constructed, and provides flexibility for implementation and funding of the required improvements.

Page 4.7-26 of the Draft EIR is revised as follows:

Impact 4.7-1: Existing plus project intersection LOS impacts.

Under the existing plus project conditions, operation of the study intersections range from LOS C to LOS F during the a.m. and p.m. peak hours. The freeway facilities are shown to operate from LOS A to LOS E during peak hours. Roadway segments would operate at LOS D and E. With the proposed project, operations of El Dorado Hills Boulevard at Saratoga Way/Park Drive and Latrobe Road at Town Center Boulevard intersections would operate at LOS F and result in more than 10 additional vehicle trips per peak hour. Thus, this impact would be **significant.**

With implementation of Mitigation Measures 4.7-1a, which would require the applicant to pay ~~TIM~~ its fair share of the completed Highway 50/Silva Valley Parkway interchange (Phase 1) ~~fees~~, and Mitigation Measure 4.7-1b, which would optimize signal timing along the El Dorado Hills Boulevard/Latrobe Road corridor, this impact would be **less than significant.**

Page 4.7-29 of the Draft EIR is revised as follows:

Mitigation Measure4.7-1a: Pay ~~TIM Fee~~ project's fair share of the Highway 50/Silva Valley Parkway interchange (Phase 1).

The applicant shall pay fair share fees to El Dorado County for the Highway 50/Silva Valley Parkway interchange (Phase 1) to address the project's contribution to traffic at the El Dorado Hills Boulevard at Saratoga Way/Park Drive Intersection. Fee amount shall be determined by the County. All fees shall be paid at the time of issuance of building permits. Note that since the release of the Draft EIR, the interchange (Phase 1) has been completed; therefore, the physical traffic-related impact of the project on the El Dorado Hills Boulevard at Saratoga Way/Park Drive Intersection is already mitigated. Fair share fee contribution is required for reimbursement.

Mitigation Measure 4.7-1b: Complete a Signal Timing Plan

The project applicant shall prepare and implement a signal timing plan for the intersections along El Dorado Hills Boulevard/Latrobe Road corridor from Saratoga Way/Park Drive through Town Center Boulevard to provide acceptable LOS in the a.m. and p.m. peak hours. The plan for signal optimization shall be prepared by a California-licensed civil engineer or traffic engineer obtained by the project applicant and shall be submitted to the County Transportation Division and Caltrans, as appropriate. Prior to issuance of ~~occupancy certificates~~building permit, the applicant shall ensure the signal timing improvements are completed in coordination with the County Transportation Division and Caltrans.

Significance after Mitigation

With implementation of Mitigation Measures 4.7-1a and 1b, the applicant would ~~pay TIM Fees and~~ prepare and implement optimized signal timings along the El Dorado Hills Boulevard/Latrobe Road corridor~~. As discussed above, the Highway 50/Silva Valley Parkway interchange (Phase 1), a CIP project, is currently under construction and will be completed in 2016, prior to the time at which development of the project would begin.~~ The recently completed Highway 50/Silva Valley Parkway interchange (Phase 1) consists of a new overcrossing over Highway 50, new on- and off-ramps with signalized intersections, and new bicycle and pedestrian facilities. The ~~purpose of the project is to~~ interchange provides another access point to Highway 50 for motorists in El Dorado Hills. The ~~completion of~~completed Highway 50/Silva Valley Parkway interchange will result in a redistribution of the traffic and would affect delays associated with roadways near the project site, including El Dorado Hills Boulevard and Latrobe Road. The interchange will decrease congestion on several roadways near the project site and improve travel time by providing more direct access to Highway 50 for many area residents and businesses that would otherwise be required to access Highway 50 from El Dorado Hills Boulevard, Latrobe Road, or Bass Lake Road.

Modeling of the project, in combination with operation of the Highway 50/Silva Valley Parkway and optimized signal cycle length and reallocation of the green time at intersections in the area, is provided in Table 4.7-18. As shown, under these conditions, LOS conditions would be acceptable and degraded conditions would improve. The new interchange, along with revised signal timings, would result in acceptable LOS E or better operations along the corridor during the a.m. and p.m. peak hours. Because this improvement ~~is in the TIM Fee program and will be~~has been completed prior to development on the project site, payment ~~of TIM Fees~~ of fair share fees is necessary only for reimbursement of funds expended~~will satisfy the project's fair share obligation towards this improvement~~.

Pages 4.7-34 and 4.7-35 of the Draft EIR are revised as follows:

The significant impact at the El Dorado Hills Boulevard at Saratoga Way/Park Drive intersection can be mitigated with the addition of a southbound right-turn lane and reallocation of the traffic signal's green time. The third southbound lane is included in the County's adopted 2015 CIP as a 20-Year CIP project (Project Number GP183) and as a through lane from Lassen Lane to Saratoga Way. This

analysis shows the need for only the southbound right-turn lane at the intersection. ~~Although the improvement is in the CIP, payment of TIM Fees may not be sufficient mitigation since the improvement is currently in the 20-Year CIP, not the 10-Year CIP as required by General Plan Policy TC-Xf.~~

The significant impact at the Latrobe Road at Town Center Boulevard intersection during the p.m. peak-hour can be mitigated with the following improvements: restriping of the westbound Town Center Boulevard approach to include one shared through/left-turn lane, and two right-turn lanes; the addition of a right-turn overlap signal phase for the westbound right-turn thereby restricting southbound u-turns; and the addition of a component of Phase 2B improvements at the adjacent Highway 50 interchange with El Dorado Hills Boulevard/Latrobe Road. The interchange Phase 2B improvements are included in the County's adopted 2015 CIP as a 20- Year CIP project (Project No: 71323). Specifically, the Phase 2B improvements applied under this mitigation include the additional northbound lane connecting Town Center Boulevard with the right-turn lane at the downstream Latrobe Road intersection with the Highway 50 eastbound ramps. This also requires the optimization of the El Dorado Hills Boulevard/Latrobe Road coordinated signal system. ~~Although some of these improvements are in the CIP, payment of TIM Fees will not be sufficient mitigation since the improvements are currently in the 20-Year CIP, not the 10-Year CIP as required by General Plan Policy TC-Xf.~~

The CIP also includes a line item for unprogrammed traffic signal installation, operational, and safety improvements at intersections. The line item includes improvements like construction of new traffic signals, construction of turn pockets, and the upgrade of existing traffic signal systems. The County annually monitors intersections with potential need for improvement through the Intersection Needs Prioritization Process. The Intersection Needs Prioritization Process is then used to inform the annual update to the CIP, and potential intersection improvements can be added, by the Board of Supervisors, to the CIP as funding becomes available.

Mitigation Measures

Mitigation Measure 4.7-2: Road and intersection improvements. Prior to issuance of ~~occupancy~~ building permits, the applicant shall coordinate with the County to improve the El Dorado Hills at Saratoga Way/Park Drive intersection by adding a southbound right-turn lane and re-allocating the traffic signal green time, and improve the Latrobe at Town Center Drive intersection by restriping of the westbound Town Center Boulevard approach to include one shared through/left-turn lane and two right-turn lanes, adding a right-turn overlap signal phase for the westbound right-turn, and adding a component of Phase 2B improvements at the adjacent Highway 50 interchange with El Dorado Hills Boulevard/Latrobe Road. ~~As determined by the County's Community Development Agency (CDA), the project applicant shall pay TIM fees to satisfy the project's fair share obligation towards these improvements, if they are included in the 10-Year CIP. Alternatively, as determined by the CDA, the project applicant may construct the improvements if they are needed, but not included in future updates to the 10-Year CIP, and~~ The project applicant may be eligible for either reimbursement or fee credit for costs that exceed the project's proportional share.

Significance after Mitigation

Unacceptable operations at these intersections are due to a combination of increased traffic from planned development and changes in travel patterns associated with planned infrastructure improvements, like the Highway 50/Silva Valley Parkway interchange and the Saratoga Way extension. The Near Term (2024) analysis includes planned roadway improvements, as well as growth consistent with the 2004 General Plan and with approved and reasonably foreseeable projects within the study area. As noted, this intersection operates at unacceptable LOS F in the Near Term (2024) scenario without the project, which includes other foreseeable but unapproved projects. Therefore, the project ~~is only responsible for~~applicant may be reimbursed for costs expended beyond the project's ~~its~~ proportional share of the proposed mitigation under Near Term conditions. ~~The~~

~~County's TIM Fee program provides a mechanism for collecting fair share contributions for improvements in the 2015 CIP.~~

With implementation of Mitigation Measure 4.7-2, the applicant would be required to ~~contribute to the County's TIM Fee program if the needed improvements are added to the 10 Year CIP, or~~ construct the necessary improvements, as determined by the CDA. As shown in Table 4.7-22, implementation of the roadway improvements discussed above would result in acceptable intersection operations during the a.m. and p.m. peak-hours. Therefore, this impact would be reduced to a ~~less-than-significant~~ level.

Page 4.7-36 of the Draft EIR is revised as follows:

Unacceptable operations at this intersection are due to a combination of increased traffic from planned development and due to changes in travel patterns associated with planned infrastructure improvements, such as the Highway 50/Silva Valley Parkway interchange and the Saratoga Way extension. The Cumulative (2035) analysis includes planned roadway improvements, as well as growth consistent with the 2004 General Plan and with approved and reasonably foreseeable projects within the study area. As noted, this intersection operates at unacceptable LOS F in the Cumulative (2035) scenario without the project. Therefore, the project applicant may be reimbursed for cost of improvements beyond the project's ~~is only responsible for its~~ proportional share of the proposed mitigation under cumulative conditions. ~~Since the impact is identified under the Cumulative scenario, the timing of the improvement is a function of the rate of population and employment growth. The County's TIM Fee program provides a mechanism for collecting fair share contributions for improvements in the 2015 CIP.~~

Page 4.7-39 of the Draft EIR is revised as follows:

Mitigation Measures

Mitigation Measure 4.7-1a: Pay ~~TIM Fees~~project's fair share of the Highway 50/Silva Valley Parkway interchange (Phase 1).

Implement Mitigation Measure 4.7-1a, as described above.

Mitigation Measure 4.7-1b: Complete a Signal Timing Plan

Implement Mitigation Measure 4.7-1b, as described above.

Mitigation Measure 4.7-2: Road and intersection improvements

Implement Mitigation Measure 4.7-2, as described above.

Significance after Mitigation

The significant impact at the El Dorado Hills Boulevard at Saratoga Way/Park Drive intersection can be mitigated by performing signal cycle length optimization and reallocation of green time. This would be implemented by the applicant through preparation and implementation of a signal timing plan for the El Dorado Hills Boulevard at Saratoga Way/Park Drive intersection, as described in Mitigation Measure 4.7-1b.

With implementation of Mitigation Measure 4.7-2, the applicant would be required to construct the necessary improvements ~~or contribute to the County's TIM Fee program if the improvements are included in the 10 Year CIP~~, as determined by the CDA. As shown in Table 4.7-26, implementation of the roadway improvements discussed above would result in acceptable intersection operations during the p.m. peak-hour. Therefore, this impact would be reduced to a ~~less-than-significant~~ level.