DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT
1010 10TH Street, Suite 3400, Modesto, CA 95354
Planning Phone: (209) 525-6330 Fax: (209) 525-5911
Building Phone: (209) 525-6557 Fax: (209) 525-7759

CEQA Referral Initial Study And Notice of Intent to Adopt a Mitigated Negative Declaration

Date: **January 26, 2023**

To: **Distribution List (See Attachment A)**

From: **Kristen Anaya, Associate Planner**
Planning and Community Development

Subject: **REZONE APPLICATION NO. PLN2018-0057 – KAMIR INCORPORATED**

Comment Period: **January 26, 2023 – February 28, 2023**

Respond By: **February 28, 2023**

Public Hearing Date: **Not yet scheduled. A separate notice will be sent to you when a hearing is scheduled.**

You may have previously received an Early Consultation Notice regarding this project, and your comments, if provided, were incorporated into the Initial Study. Based on all comments received, Stanislaus County anticipates adopting a Mitigated Negative Declaration for this project. This referral provides notice of a 30-day comment period during which Responsible and Trustee Agencies and other interested parties may provide comments to this Department regarding our proposal to adopt the Mitigated Negative Declaration.

All applicable project documents are available for review at: Stanislaus County Department of Planning and Community Development, 1010 10th Street, Suite 3400, Modesto, CA 95354. Please provide any additional comments to the above address or call us at (209) 525-6330 if you have any questions. Thank you.

Applicant: **Kumil & Amir Kayhani, Kamir Incorporated**

Project Location: **East Keyes Road, between North Golden State Boulevard and State Route 99, in the Community of Keyes.**

APN: **045-050-007**

Williamson Act Contract: **N/A**

General Plan: **Planned Development**

Community Plan: **Commercial - Highway**

Current Zoning: **General Agriculture (A-2-10)**

Project Description: **Request to rezone a 5.15± acre parcel from General Agriculture (A-2-10) to Planned Development (P-D) to develop various commercial uses for the traveling public. Specifically, the request includes the construction of a 3,276 square-foot gasoline fueling canopy with 12 gas pumps, a 2,750 square-foot diesel fueling canopy with 5 diesel pumps, a 4,800 square-foot convenience store, a 5,400 square-foot truck shop, two 3,000 square-foot shell buildings for future fast food restaurants, a truck scale, 55 vehicle parking spaces, and ten parking spaces for overnight parking of truck-trailer combination vehicles. Each proposed 3,000 square-foot shell**

buildings for future fast food restaurants will include a drive-through. The site will also feature an 85-foot freeway sign, a 16-foot monument sign fronting East Keyes Road, and a monument sign fronting North Golden State Boulevard. The site will also feature landscaping along the perimeter of the development as well as within the drive aisles. The site will also feature a reciprocal access between the northern undeveloped property and the subject site. The facility is planned to operate 24 hours a day, with individual hours for each future tenant. The site will be served by the Keyes Community Service District for public water and sanitary sewer services. The applicant anticipates 10 employees on a minimum shift and 18 employees on a maximum for each shift with a total of three shifts per day for the site. The applicant has proposed the development in two phases: Phase 1 will include the fueling stations, convenience market, and truck parking and anticipated to be completed within 24 months of project approval. Phase 2 will include the fast food restaurants and is anticipated to develop within 36 months of project approval.

Full document with attachments available for viewing at:
http://www.stancounty.com/planning/pl/act-projects.shtm

DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT
1010 10TH Street, Suite 3400, Modesto, CA 95354
Planning Phone: (209) 525-6330 Fax: (209) 525-5911
Building Phone: (209) 525-6557 Fax: (209) 525-7759

REZONE APPLICATION NO. PLN2018-0057 – KAMIR INCORPORATED
Attachment A

Distribution List

X	CA DEPT OF CONSERVATION Land Resources		STAN CO ALUC
X	CA DEPT OF FISH & WILDLIFE		STAN CO ANIMAL SERVICES
	CA DEPT OF FORESTRY (CAL FIRE)	X	STAN CO BUILDING PERMITS DIVISION
X	CA DEPT OF TRANSPORTATION DIST 10	X	STAN CO CEO
X	CA OPR STATE CLEARINGHOUSE		STAN CO CSA
X	CA RWQCB CENTRAL VALLEY REGION	X	STAN CO DER
	CA STATE LANDS COMMISSION	X	STAN CO ERC
	CEMETERY DISTRICT	X	STAN CO FARM BUREAU
	CENTRAL VALLEY FLOOD PROTECTION	X	STAN CO HAZARDOUS MATERIALS
X	CITY OF: TURLOCK		STAN CO PARKS & RECREATION
X	COMMUNITY SERVICES DIST: KEYES	X	STAN CO PUBLIC WORKS
X	COOPERATIVE EXTENSION		STAN CO RISK MANAGEMENT
	COUNTY OF:	X	STAN CO SHERIFF
	DER - GROUNDWATER RESOURCES DIVISION	X	STAN CO SUPERVISOR DIST 5: C. CONDIT
X	FIRE PROTECTION DIST: KEYES	X	STAN COUNTY COUNSEL
X	GSA: TURLOCK SUBBASIN	X	StanCOG
	HOSPITAL DIST:	X	STANISLAUS FIRE PREVENTION BUREAU
X	IRRIGATION DIST: TURLOCK	X	STANISLAUS LAFCO
X	MOSQUITO DIST: TURLOCK		STATE OF CA SWRCB – DIV OF DRINKING WATER DIST. 10
X	STANISLAUS COUNTY EMERGENCY MEDICAL SERVICES	X	SURROUNDING LANDOWNERS
X	MUNICIPAL ADVISORY COUNCIL: KEYES		INTERESTED PARTIES
X	PACIFIC GAS & ELECTRIC	X	TELEPHONE COMPANY: AT&T
X	POSTMASTER: KEYES		TRIBAL CONTACTS (CA Government Code §65352.3)
X	RAILROAD: UNION PACIFIC		US ARMY CORPS OF ENGINEERS
X	SAN JOAQUIN VALLEY APCD	X	US FISH & WILDLIFE
X	SCHOOL DIST 1: KEYES UNION		US MILITARY (SB 1462)
X	SCHOOL DIST 2: TURLOCK JOINT UNIFIED HIGH		USDA NRCS
	WORKFORCE DEVELOPMENT		WATER DIST:
X	STAN CO AG COMMISSIONER		

STANISLAUS COUNTY
CEQA REFERRAL RESPONSE FORM

TO: **Stanislaus County Planning & Community Development**
1010 10th Street, Suite 3400
Modesto, CA 95354

FROM: ____

SUBJECT: **REZONE APPLICATION NO. PLN2018-0057 – KAMIR INCORPORATED**

Based on this agency's particular field(s) of expertise, it is our position the above described project:

______ Will not have a significant effect on the environment.
______ May have a significant effect on the environment.
______ No Comments.

Listed below are specific impacts which support our determination (e.g., traffic general, carrying capacity, soil types, air quality, etc.) – (attach additional sheet if necessary)

1.
2.
3.
4.

Listed below are possible mitigation measures for the above-listed impacts: *PLEASE BE SURE TO INCLUDE WHEN THE MITIGATION OR CONDITION NEEDS TO BE IMPLEMENTED (PRIOR TO RECORDING A MAP, PRIOR TO ISSUANCE OF A BUILDING PERMIT, ETC.):*

1.
2.
3.
4.

In addition, our agency has the following comments (attach additional sheets if necessary).

____

____

Response prepared by:

____

Name	Title	Date

DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT
1010 10TH Street, Suite 3400, Modesto, CA 95354
Planning Phone: (209) 525-6330 Fax: (209) 525-5911
Building Phone: (209) 525-6557 Fax: (209) 525-7759

CEQA INITIAL STUDY

Adapted from CEQA Guidelines APPENDIX G Environmental Checklist Form, Final Text, January 1, 2020

1.	**Project title:**	Rezone Application No. PLN2018-0057 – Kamir Incorporated SCH No. 2018112006
2.	**Lead agency name and address:**	Stanislaus County 1010 10th Street, Suite 3400 Modesto, CA 95354
3.	**Contact person and phone number:**	Kristen Anaya, Associate Planner (209) 525-6330
4.	**Project location:**	East Keyes Road, between North Golden State Boulevard and State Route 99, in the Community of Keyes. (APN: 045-050-007).
5.	**Project sponsor's name and address:**	Kumil & Amir Kayhani, Kamir Incorporated 5196 Grayhawk Lane, Dublin, CA 94568
6.	**General Plan designation:**	Planned Development
7.	**Zoning:**	General Agriculture (A-2-10)

8. Description of project:

Request to rezone a 5.15± acre parcel from General Agriculture (A-2-10) to Planned Development (P-D) to develop various commercial uses for the traveling public. Specifically, the request includes the construction of a 3,276 square-foot gasoline fueling canopy with 12 gas pumps, a 2,750 square-foot diesel fueling canopy with 5 diesel pumps, a 4,800 square-foot convenience store, a 5,400 square-foot truck shop, two 3,000 square-foot shell buildings for future fast food restaurants, a truck scale, 55 vehicle parking spaces, and ten parking spaces for overnight parking of truck-trailer combination vehicles. Each proposed 3,000 square-foot shell buildings for future fast food restaurants will include a drive-through. The site will also feature an 85-foot freeway sign, a 16-foot monument sign fronting East Keyes Road, and a monument sign fronting North Golden State Boulevard. The site will also feature landscaping along the perimeter of the development as well as within the drive aisles. The site will also feature a reciprocal access between the northern undeveloped property and the subject site. The facility is planned to operate 24 hours a day, with individual hours for each future tenant. The site will be served by the Keyes Community Service District for public water and sanitary sewer services. The applicant anticipates 10 employees on a minimum shift and 18 employees on a maximum shift with a total of three shifts per day for the site. The applicant has proposed the development in two phases: Phase 1 will include the fueling stations, convenience market, and truck parking and anticipated to be completed within 24 months of project approval. Phase 2 will include the fast food restaurants and is anticipated to develop within 36 months of project approval.

9.	**Surrounding land uses and setting:**	Vacant and agricultural property to the east, north, and south; State Route (SR) 99 to the south and west; the Community of Keyes to the north; commercial and light industrial uses to the southeast; and trucking businesses to the west.

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.):

San Joaquin Valley Air Pollution Control District
Stanislaus County Department of Public Works
Keyes Community Services District
California Department of Transportation

11. Attachments:

I. Health Risk Assessment and CalEEMod analysis entitled "Response to Comments Dated November 16, 2018", prepared by Environmental Permitting Specialists, dated January 21, 2020
II. Technical memo entitled "Health Risks Associated with DPM Emissions from Construction" prepared by Environmental Permitting Specialists, dated April 27, 2020
III. Technical memo entitled "Health Risks – Operational Phase," prepared by Environmental Permitting Specialists, dated April 27, 2020
IV. Biological Survey dated June 26, 2015, conducted by Moore Biological Consultants
V. Archaeological Inventory Survey, dated April 30, 2015, prepared by the Genesis Society.
VI. Central California Information Center records search, dated May 29, 2018
VII. Keyes Community Plan Area Transportation Impact Assessment, prepared by Fehr and Peers, dated February 2020.
VIII. Mitigation Monitoring and Reporting Program (MMRP) for the Keyes Community Plan, adopted April 18, 2000 (MMRP Keyes)

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:
The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☒Aesthetics	☐ Agriculture & Forestry Resources	☐ Air Quality
☒Biological Resources	☐ Cultural Resources	☐ Energy
☐Geology / Soils	☐ Greenhouse Gas Emissions	☒ Hazards & Hazardous Materials
☐ Hydrology / Water Quality	☐ Land Use / Planning	☐ Mineral Resources
☒ Noise	☐ Population / Housing	☐ Public Services
☐ Recreation	☒ Transportation	☐ Tribal Cultural Resources
☐ Utilities / Service Systems	☐ Wildfire	☐ Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)
On the basis of this initial evaluation:

☐ **I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.**

☒ **I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.**

☐ **I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.**

☐ **I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.**

☐ **I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.**

Signature on file.
Prepared by Kristen Anaya, Associate Planner

January 24, 2023
Date

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, than the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration.

Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

a) Earlier Analysis Used. Identify and state where they are available for review.

b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). References to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

a) the significant criteria or threshold, if any, used to evaluate each question; and

b) the mitigation measure identified, if any, to reduce the impact to less than significant.

ISSUES

I. AESTHETICS – Except as provided in Public Resources Code Section 21099, could the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse effect on a scenic vista?			X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?			X	
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			X	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?		X		

Discussion: The site itself is not considered to be a scenic resource or unique scenic vista. The project site is currently vacant. Phase 1 will include construction of the fueling stations, convenience market, a truck scale, 55 vehicle parking spaces, ten parking spaces for overnight parking, landscaping throughout the drive aisles and road frontages, the 85-foot freeway sign, 16-foot monument sign fronting East Keyes Road, and a monument sign fronting North Golden State Boulevard. Phase 2 will include the fast food restaurants. All buildings are proposed to be a maximum of 32± feet in height, with the fueling canopies up to 20 feet in height. Lighting will include wall-mounted lights on the buildings and fueling canopies, as well as 35 to 45 pole-mounted lights throughout the parking lot. The project was referred to the Department of Public Works, who added a development standard to the project requiring the parcel to annex into the Golden State Lighting District for street lighting

The site is located within the Keyes Community Plan. The EIR prepared for the Keyes Community Plan Update, adopted by the Board of Supervisors in April of 2000, identifies the project site as a Gateway area to Keyes, visible from State Route 99, that should be designed and landscaped to improve and enhance the appearance of the site and area. There is no existing design criteria for the Keyes Community; however, the Keyes Community Plan encourages attractive and orderly development which preserves a small town atmosphere; the development of large, non-residential sites, with generous landscaping and Highway Commercial type uses along State Route 99/Keyes Road Interchange; and the development of “Gateway” treatments and positive, high quality landscaped edges along State Route 99 and major roads. A development standard has been added to the project requiring that a minimum of 15 percent of the total lot shall be landscaped. The referral response from Public Works also required that a 3-foot to 5-foot-wide landscape strip between the sidewalk and curb and gutter, and a 5-foot-wide meandering sidewalk be installed as part of the off-site improvements. A minimum of five percent of the total lot area shall also be landscaped along the road frontage behind the sidewalk. The landscaping strip within the public right-of-way will be maintained through the County Service Area (CSA) #26 – Keyes. A development standard requiring the parcel to annex into the CSA #26 has been added to the project.

The Mitigation Monitoring and Reporting Program adopted with the Keyes Community Plan requires that all existing and future exterior lighting to be shielded and be aimed downward and towards the site so as to provide adequate illumination without off-site light spillage or a glare effect to adjacent properties and that the use of reflective surfaces on new multi-story development be oriented in such a way as to reduce glare to the adjacent roadways. With these mitigation measures applied to the project, aesthetic impacts associated with the project are considered to be less than significant with mitigation included.

Mitigation:

1. New multi-story development shall minimize the use of reflective surface and have those reflective surfaces which are used to be oriented in such a manner so as to reduce glare impacts along roadways.

2. New development shall include cut-off luminaries and/or shields. All exterior lighting shall be designed (aimed

down and towards the site) to provide adequate illumination without a glare effect. Low intensity lights shall be used to minimize the visibility of the lighting from nearby areas, and to prevent "spill over" of light onto adjacent residential properties.

References: Application materials; Keyes Community Plan, EIR and MMRP adopted April 2000; Stanislaus County Zoning Ordinance; the Stanislaus County General Plan; and Support Documentation[1].

II. AGRICULTURE AND FOREST RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. -- Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?			X	
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?			X	
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?			X	

Discussion: The USDA Natural Resources Conservation Service's Eastern Stanislaus County Soil Survey indicates that the property is made up of Dinuba sandy loam (DyA), with an Index Rating rating of 33 and a Grade of 4, which do not qualify as prime soils. The California Department of Conservation's Important Farmland Maps identifies the site as vacant and disturbed land. The site is not enrolled in a Williamson Act Contract and does not include lands designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance.

The project site is currently vacant. Agricultural land is adjacent to the parcel to the east and north. State Route 99 and light industrial development are adjacent to the site to the west and south and the Community of Keyes is northwest of the site. The land west and southwest of the Nunes Road and East Keyes intersection to State Route 99 are designated on the California Farmland and Mapping Program as either vacant and disturbed lands or urban and built-up lands. A 25.5-acre parcel designated as Unique Farmland, a portion of which is designated as Highway Commercial in the Keyes Community Plan, is located approximately 200 feet from the site across East Keyes Road to the southeast and several parcels ranging in size between 9 and 19 acres and one 65.5-acre parcel which have land designated as Prime Farmland are located approximately 1/3 mile northeast of the project site. The nearest parcels under Williamson Act Contracts include a 10-acre parcel, which is located ½ mile from the project site, and a 59-acre parcel, currently in the non-renewal process, located ¼ mile from the project site.

The EIR for the Keyes Community Plan identified loss of farmland as an impact that could not be mitigated to a level of insignificance and as part of the approval process a Statement of Overriding Considerations with respect to loss of prime farmland was adopted. The Mitigation Monitoring and Reporting Plan (MMRP) called for a mitigation measure to address the conversion of Prime or Important Farmland to non-agricultural use. This mitigation measure is not applicable to the proposed project as the project site does not include any Prime or Important Farmland.

All new or expanding uses approved by discretionary permit in the A-2 zoning district or on a parcel adjoining the A-2 zoning district are required to incorporate a minimum 150-foot-wide agricultural buffer setback, or 300-foot-wide buffer setback for people-intensive uses. Public roadways, utilities, drainage facilities, rivers and adjacent riparian areas, landscaping, parking lots, and similar low people-intensive uses are permitted uses within the buffer setback area. The proposed project includes a fast food restaurant at the eastern property line which is located approximately 220 feet from an A-2 zoned property located across East Keyes Road. The project meets the 300-foot buffer requirement on all other sides.

A referral response received from the Turlock Irrigation District (TID) which stated that any project related development that impacts TID district irrigation or electric facilities meet TID requirements. This includes an existing irrigation pipeline located on the project site which must be removed and capped to TID standards. The response also indicated that a 10-foot utility easement is required to be dedicated along Golden State Boulevard and that all development plans shall be submitted to TID for review and approval.

Impacts to agricultural resources are considered to be less than significant.

Mitigation: None.

References: Application materials; Referral response from Turlock Irrigation District (TID), dated November 9, 2018; Keyes Community Plan, EIR and MMRP adopted April 2000; United States Department of Agriculture NRCS Web Soil Survey; California State Department of Conservation Farmland Mapping and Monitoring Program - Stanislaus County Farmland 2018; Stanislaus County General Plan and Support Documentation[1].

III. AIR QUALITY: Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. -- Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of the applicable air quality plan?			X	
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?			X	
c) Expose sensitive receptors to substantial pollutant concentrations?			X	
d) Result in other emissions (such as those odors adversely affecting a substantial number of people)?			X	

Discussion: The proposed project is located within the San Joaquin Valley Air Basin (SJVAB) and, therefore, falls under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). In conjunction with the Stanislaus Council of Governments (StanCOG), the SJVAPCD is responsible for formulating and implementing air pollution control strategies. The SJVAPCD's most recent air quality plans are the 2007 PM10 (respirable particulate matter) Maintenance Plan, the 2008 PM2.5 (fine particulate matter) Plan, and the 2007 Ozone Plan. These plans establish a comprehensive air pollution control program leading to the attainment of state and federal air quality standards in the SJVAB, which has been classified as “extreme non-attainment” for ozone, “attainment” for respirable particulate matter (PM-10), and “non-attainment” for PM 2.5, as defined by the Federal Clean Air Act.

The primary source of air pollutants generated by this project would be classified as being generated from "mobile" sources. Mobile sources would generally include dust from roads, farming, and automobile exhausts. Mobile sources are generally regulated by the Air Resources Board of the California Environmental Protection Agency (EPA) which sets emissions for vehicles and acts on issues regarding cleaner burning fuels and alternative fuel technologies. As such, the District has addressed most criteria air pollutants through basin wide programs and policies to prevent cumulative deterioration of air quality within the Basin. The project will increase traffic in the area and, thereby, impacting air quality.

A referral response was received from the SJVAPCD indicating that emissions resulting from construction and/or operation of the project may exceed the District’s thresholds of significance for carbon monoxide (CO), oxides of nitrogen (NOx), reactive organic gases (ROG), oxides of sulfur (SOx), and particulate matter (PM10 and PM2.5). The SJVAPCD recommended that a more detailed preliminary review of the project be conducted for the project’s construction and operational emissions. Further, the Air District recommended other potential air impacts related to Toxic Air Contaminants, Ambient Air Quality Standards, and Hazards and Odors be addressed. The SJVAPCD recommended the project be evaluated for potential health impacts to surrounding receptors (on-site and off-site) resulting from operational and multiyear construction Toxic Air Contaminants (TAC) emissions and stated that a Health Risk Assessment should evaluate the risk associated with sensitive receptors in the area and mitigate any potentially significant risk to help limit emission exposure to sensitive receptors.

A Health Risk Assessment (HRA) for the project, dated January 21, 2020 was prepared by Ray Kapahi of Environmental Permitting Specialists, with revised technical detail submitted via e-mail correspondence dated April 27, 2020. The document examined the combined impacts from construction and operations of the project, quantifying direct emissions from construction, quantified through the California Emissions Estimator Model (CalEEMod) as the modeling tool of project analysis. Operational emissions for the project were based on an assumption 9,800 daily trips at max buildout. The analysis found that the overall project emissions from construction and operations, including mobile (non-permitted) and stationary sources, did not exceed the Air District’s screening thresholds for any of the criteria pollutants. As mentioned in the referral response, their SJVAPCD recommended a screening that evaluates toxic air contaminant (TAC) emissions that may have a significant health impact with respect to both carcinogenic and non-carcinogenic health risks on nearby sensitive receptors. The screening method is calculated based on the procedures set forth in the California Air Pollution Control Officer’s Association (CAPCOA) Prioritization Guidelines, which have been adopted by the SJVAPCD, and produces a “prioritization score.” The prioritization score places consideration on potency, toxicity, and quantity of TAC emissions and proximity to sensitive receptors such as hospitals, daycare centers, schools, and residences. In the case of carcinogens, the threshold for cancer risk from emissions resulting from the project is expressed as excess cancer cases per one million exposed persons. Non-carcinogenic risk is expressed as a hazard index via a ratio of expected exposure levels to acceptable exposure levels. The nearest known sensitive receptor is a single residence approximately 0.18 miles to the north of the facility. Based on TAC emissions from the project and the distance to the nearest sensitive receptor, the facility’s cancer and non-cancer prioritization score for construction and operations associated with the project is 0.259 and 0.00637 respectively, which are well below the threshold scores of 10 for cancer and 1.0 for non-cancer set by the SJVAPCD. The document found that the cancer risk at all receptor locations were predicted to be below the SJVAPCD significance threshold. The project is not in an area with suitable habitat for Valley fever spores and is not in area known to have naturally occurring asbestos. Therefore, the project would not result in significant impacts to sensitive receptors. Although the project is less than one mile from the nearest sensitive receptor, the project is not expected to be a significant source of odors. Because of this, the project is not considered to pose a potential health risk to nearby sensitive receptors.

The California Air Resources Board’s (CARB) San Joaquin Valley Air Quality Plan (AQP) includes control measures that are required for construction activities and for various operational activities including Rule 2201, Rule 4201, Rule 4309, Rule 4601, Rule 4641, Rule 9510, and Regulation VIII. The project is subject to District Rules 2201 and 2010 requiring the applicant to submit applications for an Authority to Construct for the gasoline dispensing stations prior to construction. Rule 9510 which requires that the applicant pay emissions fees for emissions above 2 tons per year. Annual NOx emissions are estimated to be 2.38 tons per year which is subject to emission fees for 0.38 tons. Although under-fire charbroilers are not proposed with the project, a development standard requiring future tenants utilizing under-fire charbroilers to comply with District Rule 4692. Future attainment of federal and State ambient air quality standards is a function of successful implementation of the SJVAPCD’s attainment plans. Consequently, the application of significance thresholds for criteria pollutants is relevant to the determination of whether a project’s individual emissions would have a cumulatively significant impact on air quality. Pursuant to the SJVAPCD’s guidance, if project-specific emissions would be less than the thresholds of significance for criteria pollutants, the project would not be expected to result in a cumulatively considerable net increase of any criteria pollutant for which the SJVAPCD is in nonattainment under applicable federal or State ambient air quality standards. As project emissions would be below SJVAPCD significance thresholds as mentioned above, the project would not have impacts that are cumulatively considerable. Assuming adherence to applicable Air District rules and regulations, the project is considered consistent with CARB's San Joaquin Valley AQP, that the project's regional emissions would not exceed the applicable regional criteria pollutant emissions quantitative thresholds and would not result in significant cumulative health impacts. In summary, the project would not exceed SJVAPCD localized emission daily screening levels for any criteria pollutant.

The project site is located within the Keyes Community Plan. The Mitigation Monitoring and Reporting Program (MMRP) prepared for the April 2000 update to the Keyes Community Plan included several mitigation measures regarding air impacts associated with construction and the operation of projects developed within the Keyes Community Plan to ensure Air District standards are met. However, the mitigation measures identified in the Keyes Community Plan MMRP are already required to be met through applicable Air District permitting and through enforcement of the California Building Code. Accordingly, Air Quality requirements are not applied as mitigation, but instead will be applied as development standards applicable to the project, which require that all applicable Air District permits be obtained, and that California Green Building Code be met.

An early consultation referral response received from the Department of Public Works indicated that a grading, drainage, and erosion/sediment control plan for the project will be required, subject to Public Works review and Standards and Specifications. The project will be required to meet all applicable air district standards and to obtain all applicable Air District permits. Both of these requirements will be incorporated into the project as development standards.

Additionally, air impacts associated with the project are considered to be less than significant with development standards requiring that all applicable Air District permits be obtained and applied to the project. Based on the analysis prepared for the project, impacts to air quality are considered to be less than significant.

Mitigation: None.

References: Application materials; Referral response received from the San Joaquin Valley Air Pollution Control District, dated November 16, 2018; E-mail correspondence from the San Joaquin Valley Air Pollution Control District, dated May 15, 2020 and June 11, 2020; Health Risk Assessment and CalEEMod analysis entitled "Response to Comments Dated November 16, 2018", prepared by Environmental Permitting Specialists, dated January 21, 2020; Technical memo entitled "Health Risk Associated with DPM Emissions from Construction" prepared by Environmental Permitting Specialists, e-mailed April 27, 2020; Technical memo entitled "Health Risks – Operational Phase," prepared by Environmental Permitting Specialists, e-mailed April 27, 2020; Keyes Community Plan, EIR and MMRP adopted April 2000; Referral response received from the City of Turlock, dated February 15, 2022; Referral response received from the Department of Public Works, dated August 30, 2022; San Joaquin Valley Air Pollution Control District - Regulation VIII Fugitive Dust/PM-10 Synopsis; www.valleyair.org; and the Stanislaus County General Plan and Support Documentation[1].

IV. BIOLOGICAL RESOURCES -- Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		**X**		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?			**X**	

c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			X	
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			X	
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?		X		

Discussion: The project is located within the Ceres Quad of the California Natural Diversity Database. There are nine animal species which are state or federally listed, threatened, or identified as species of special concern or a candidate of special concern within the Ceres CNDDB Quad. Animal species include Swainson's hawk (SWHA), tricolored blackbird, burrowing owl, riffle sculpin, hardhead, chinook salmon - Central Valley fall / late fall-run ESU, valley elderberry longhorn beetle and Townsend's big-eared bat.

An EIR was prepared for the Keyes Community Plan Update, which was adopted by the Board of Supervisors on April 18, 2000. A Mitigation Monitoring and Reporting Program for the Keyes Community Plan includes mitigation measures related to biological resources; specifically, regarding potential impacts to wetlands, valley elderberry longhorn beetle (VELB), Swainson’s hawk and other raptors, oak trees, and special status species associated with valley grassland habitats. A Biological Survey, conducted by Moore Biological Consultants dated June 26, 2015, was prepared for a rezone project adjacent to the project to the west. The Biological Study found likelihood for special status species listed within the Ceres quad to range from none to low. Although the Biological Study was not specific to the project site, it did evaluate the surrounding area, which includes the project site. The Biological Survey included a field survey, conducted on June 10, 2015, which consisted of walking throughout the project site, making observations of current habitat conditions, and noting surrounding land uses, general habitat types, and plant and wildlife species. The survey included an assessment of the project site for presence or absence of potentially jurisdictional Waters of the U.S. (a term that includes wetlands) as defined by the U.S. Army Corps of Engineers, special-status species, and suitable habitat for special-status species. Additionally, trees and other vegetation within and near the project site were assessed for the potential use by nesting raptors, especially SWHA; and, the site itself was searched for burrowing owls or ground squirrel burrows that could be utilized by burrowing owl. The survey found that while the project site may have provided habitat for special-status wildlife species at some time in the past, farming and development have substantially modified natural habitats in the greater project vicinity. Of the wildlife species identified in the California Natural Diversity Database (CNDDB), Swainson’s hawk and VELB were the only species that has the potential to occur in the site on more than a transitory or very occasional basis. Other special-status birds including tricolor blackbird, and burrowing owl, may fly over the area on occasion, but would not be expected to nest in or immediately adjacent to the project site. No burrowing owls or ground squirrels were observed in the site. Two small blue elderberry shrubs in the northeast corner of the site and a larger blue elderberry shrub was noted as existing on the project site. However, the shrubs lacked bore holes indicative of valley elderberry longhorn beetle (VELB), nor were VELB identified within the subject shrubs. In conclusion, based on the biological survey, the site does not appear to have or provide likely habitat for special-status flora or fauna, nor were any special-status species, Waters of the U.S., or wetlands found on-site.

Based on the location and lack of suitable habitat on-site, the likelihood for special status species to exist on-site are very low. However, mitigation measures, as recommended by the survey and applicable mitigation measures as incorporated into the Mitigation Monitoring and Reporting Program of the Keyes Community Plan are incorporated below. An early consultation referral response was sent to the California Department of Fish and Game (CDFG); however, no response has been received to date. The project will not conflict with a Habitat Conservation Plan, a Natural Community Conservation Plan, or other locally approved conservation plans. Impacts to biological resources are considered to be less than significant with mitigation.

Mitigation:

3. Pre-construction surveys for Valley Elderberry Longhorn Beetle (VELB) on the site shall be conducted by a qualified biologist, in accordance with any applicable United States Fish and Wildlife protocols. Prior to the removal of any elderberry shrubs, the applicant shall obtain concurrence from US Fish and Wildlife Service regarding removing the shrubs. Prior to securing concurrence to remove the blue elderberry shrubs, the shrubs shall be protected with a no-disturbance buffer extending 10 feet from the driplines of the shrubs. Construction in the vicinity of the blue elderberry shrubs should occur between June 15 and April 15. During this time period, VELB (if present) would be within the interior portion of the stems of the shrubs and would not move (i.e., fly or walk) into the construction area.

4. If ground disturbing activity or construction commences between March 1 and September 15, pre-construction surveys for nesting Swainson's hawks (SWHA) shall be conducted by a qualified biologist. SWHA surveys shall be conducted a maximum of 10 days prior to the onset of grading or construction activities, within 0.5 miles of the project site area, in accordance with protocol developed by the Swainson's Hawk Technical Advisory Committee (SWHA TAC, 2000). If active nests are found, a qualified biologist, in consultation with the California Department of Fish and Wildlife (CDFW), shall determine the need (if any) for temporal restrictions on construction, including but not limited to a minimum no-disturbance buffer of 0.5 miles to be maintained around active nests prior to and during any ground-disturbing activities until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival. If take cannot be avoided, take authorization through the issuance of an Incidental Take Permit (ITP), pursuant to Fish and Game Code section 2081 subdivision (b) is necessary to comply with CESA. The determination shall utilize criteria set forth by CDFW (CDFG, 1994).

5. If construction commences between February 1 and August 31, pre-construction surveys for burrowing owls on the site shall be conducted. If occupied burrows are found, a qualified biologist should determine the need (if any) for temporal restrictions on construction. The determinations shall be pursuant to criteria set forth by CDFW (CDFG, 2012).

6. Trees, shrubs, and grasslands in the site could be used by other birds protected by the Migratory Bird Treaty Act of 1918. If vegetation removal or construction commences during the general avian nesting season (March 1 through July 31), a pre-construction survey for nesting birds shall be completed. If active nests are found, work in the vicinity of the nest shall be delayed until the young fledge.

7. All oak trees over four inches in diameter shall be preserved to the maximum extent practical. Final development plans shall depict all oak trees proposed for removal. If oak trees four inches in diameter or more exist on the project site, the applicant shall submit a tree preservation plan to the Stanislaus County Planning Division for review and approval. The tree preservation plan shall include the following:

    - Any removed oak trees shall be replaced at a two to one tree replacement ratio.

    - The tree preservation plan shall include the location, number, species, and size of proposed replacement plantings.

    - The tree preservation plan shall include monitoring provisions for watering and landscaping to ensure survival and health of planted oak trees.

    - Replacement trees shall be monitored for a period not less than 5-years after replacement trees have been planted; Dead or dying trees shall be replaced.

References: Application materials; Biological Survey, conducted by Moore Biological Consultants dated June 26, 2015; California Department of Fish and Wildlife's Natural Diversity Database Quad Species List; Keyes Community Plan, EIR and MMRP adopted April 2000; Stanislaus County General Plan and Support Documentation[1].

V. CULTURAL RESOURCES -- Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Included	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource pursuant to in § 15064.5?			X	
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?			X	
c) Disturb any human remains, including those interred outside of formal cemeteries?			X	

Discussion: As this project is not a General Plan Amendment it was not referred to the tribes listed with the Native American Heritage Commission (NAHC), in accordance with SB 18. Tribal notification of the project was not referred to any tribes in conjunction with AB 52 requirements, as Stanislaus County has not received any requests for consultation from the tribes listed with the NAHC. A records search conducted by the Central California Information Center (CCIC) indicated that there are no historical, cultural, or archeological resources recorded on-site and that the site has a low sensitivity for the discovery of such resources. Additionally, an Archaeological Inventory Survey, dated April 30, 2015, was prepared by the Genesis Society for a rezone project adjacent to the project to the west which found likelihood for cultural, historical, archeological, or paleontological resources to exist on the project site or surrounding area to be low.

A development standard will be added to the project which requires if any cultural or tribal resources are discovered during project-related activities, all work is to stop, and the lead agency and a qualified professional are to be consulted to determine the importance and appropriate treatment of the find. Cultural Impacts are considered to be less than significant.

Mitigation: None.

References: Application materials; Central California Information Center Report for the project site, dated May 29, 2018; Archaeological Inventory Survey, dated April 30, 2015, prepared by the Genesis Society; Stanislaus County General Plan and Support Documentation[1].

VI. ENERGY. -- Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Included	Less Than Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			X	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			X	

Discussion: The CEQA Guidelines Appendix F states that energy consuming equipment and processes, which will be used during construction or operation such as energy requirements of the project by fuel type and end use, energy conservation equipment and design features, energy supplies that would serve the project, total estimated daily vehicle trips to be generated by the project, and the additional energy consumed per-trip by mode, shall be taken into consideration when evaluating energy impacts. Additionally, the project's compliance with applicable state or local energy legislation, policies, and standards must be considered.

All construction activities shall be in compliance with all San Joaquin Valley Air Pollution Control District (SJVAPCD) regulations and with Title 24, Green Building Code, which includes energy efficiency requirements. The operation proposes the construction of a 3,276 square-foot gasoline fueling canopy with 12 gas pumps, a 2,750 square-foot diesel fueling canopy with 5 diesel pumps, a 4,800 square-foot convenience store, a 5,400 square-foot truck shop, and two 3,000 square-foot shell buildings for future fast food restaurants, for which a building permit will be required. Any future construction activities will be required to occur in compliance with all SJVAPCD regulations.

All vehicular traffic to the site will initially take access off North Golden State Boulevard via two paved driveways. A development standard requiring that a reciprocal access agreement with the parcel to the northwest be recorded, and future installation with a drive aisle allowing connectivity between the two lots be installed should the parcel to the northwest ever develop for uses which are open to the public will be added to the project. In the event this requirement is triggered, traffic may access the site via an existing shared driveway located on parcels 045-074-004 and 045-074-003, providing access to North Golden State Boulevard. The facility is planned to operate 24 hours a day, with individual hours for each future tenant. The applicant anticipates 10 employees on a minimum shift and 18 employees on a maximum shift with a total of three shifts per day for the site. Based on the Traffic Impact Assessment prepared for the project, this request is anticipated to add 126 new AM and 76 new PM peak hour vehicle trips.

Energy consuming equipment and processes include equipment, trucks, and the employee and customer vehicles. Trucks and passenger vehicles are the main consumers of energy associated with this project but shall be required to meet all Air District regulations. Consequently, emissions would be minimal. Therefore, consumption of energy resources would be less than significant without mitigation for the proposed project.

The project was referred to SJVAPCD, who responded with a request for additional analysis on construction and operational emissions, on health risks, and odor impacts.

A Health Risk Assessment (HRA) for the project, dated January 21, 2020, was prepared by Ray Kapahi of Environmental Permitting Specialists, with revised technical detail submitted via e-mail correspondence dated April 27, 2020. The document examined the combined impacts from construction and operational emissions, quantifying direct emissions from construction and operations, quantified through the California Emissions Estimator Model (CalEEMod) as the modeling tool of project analysis which included an analysis of energy usage. Operational emissions, including indirect energy consumption associated with water and wastewater services, were modeled using CalEEMod. CalEEMod assumes compliance with some, but not all, applicable rules and regulations regarding energy efficiency, vehicle fuel efficiency, renewable energy usage, and other GHG reduction policies. Operational emissions for the project were based on an assumption of 9,800 daily trips at max buildout (Phases 1 and 2 combined). The emissions associated with the building electricity and natural gas usage (non-hearth) were estimated based on the land use type and size. Values for a project served by Turlock Irrigation District (TID) were used in the analysis. Phase 1 is proposed to include the fueling stations and convenience market. Phase 2 will include the fast food restaurants. The CalEEMod analysis found the project's construction and operational emissions, for criteria pollutants and other pollutants such a greenhouse gas emissions, to be below the threshold of significance.

The site is proposed to be served by the Turlock Irrigation District (TID) for electrical services. A referral response was received from TID requiring that a new 10-foot public utility easement shall be dedicated along the North Golden State Boulevard frontage for safe placement of utilities, that application shall be made for a facility change for electrical facility relocation, and that an existing 30-inch irrigation pipeline located on the parcel shall be removed. The developer should consult with District Electrical Engineering for an application for new service and a design for the project and abandonment of parcels from Improvement District 161A and 642A if no longer irrigating.

All construction must meet California Green Building Standards Code (CALGreen Code), which includes mandatory provisions applicable to all new residential, commercial, and school buildings. The intent of the CALGreen Code is to establish minimum statewide standards to significantly reduce the greenhouse gas emissions from new construction. The Code includes provisions to reduce water use, wastewater generation, and solid waste generation, as well as requirements for bicycle parking and designated parking for fuel-efficient and carpool/vanpool vehicles in commercial development. It is the intent of the CALGreen Code that buildings constructed pursuant to the Code achieve at least a 15 percent reduction in energy usage when compared to the State's mandatory energy efficiency standards contained in Title 24. The Code also sets limits on VOCs (volatile organic compounds) and formaldehyde content of various building materials, architectural coatings, and adhesives. A development standard will be added to this project to address compliance with Title 24, Green Building Code, which includes energy efficiency requirements.

Senate Bill 743 (SB743) requires that the transportation impacts under the California Environmental Quality Act (CEQA) evaluate impacts by using Vehicle Miles Traveled (VMT) as a metric. Stanislaus County has currently not adopted any significance thresholds for VMT, and projects are treated on a case-by-case basis for evaluation under CEQA. However, the State of California - Office of Planning and Research (OPR) has issued guidelines regarding VMT significance under CEQA. The addition of project land uses is expected to increase Total VMT generated by the Keyes Community Plan Area by approximately 17,800 miles under existing conditions and 16,500 miles under cumulative conditions. Additionally, total

VMT would increase overall in Stanislaus County, but decrease in the adjacent cities of Modesto and Ceres. Results of the VMT analysis indicate the project would contribute to an increase in vehicle miles of travel; however, the project application was submitted in 2018 prior to the VMT standards taking effect.

The project site is located within the Keyes Community Plan. The Mitigation Monitoring and Reporting Program (MMRP) prepared for the April 2000 update to the Keyes Community Plan included several mitigation measures regarding impacts to air quality during construction and operation of projects developed within the Keyes Community Plan to ensure Air District standards are met. However, the mitigation measures identified in the Keyes Community Plan MMRP are already required to be met through applicable Air District permitting and through enforcement of the California Building Code. Accordingly, Air Quality requirements are not applied as mitigation, but instead will be applied as development standards applicable to the project, which require that all applicable Air District permits be obtained, and that California Green Building Code be met.

The project will be required to meet all applicable Air District standards and to obtain all applicable Air District permits. The proposed project would be consistent with all applicable renewable energy or energy efficiency requirements. Impacts related to Energy are considered to be less than significant.

Mitigation: None.

References: Application materials; Keyes Community Plan, EIR and MMRP adopted April 2000; Referral response from Turlock Irrigation District (TID), dated November 9, 2018; Referral response received from the Department of Public Works, dated August 30, 2022; Referral response received from the San Joaquin Valley Air Pollution Control District, dated November 16, 2018; Health Risk Assessment and CalEEMod analysis entitled “Response to Comments Dated November 16, 2018”, prepared by Environmental Permitting Specialists, dated January 21, 2020; Technical memo entitled “Health Risk Associated with DPM Emissions from Construction” prepared by Environmental Permitting Specialists, e-mailed April 27, 2020; Technical memo entitled “Health Risks – Operational Phase,” prepared by Environmental Permitting Specialists, e-mailed April 27, 2020; Keyes Community Plan, EIR and MMRP adopted April 2000; 2016 California Green Building Standards Code Title 24, Part 11(Cal Green); 2016 California Energy Code Title 24, Part 6; State of California - Office of Planning and Research (OPR) guidelines regarding VMT significance under CEQA; Keyes Community Plan Area Transportation Impact Assessment, prepared by Fehr & Peers, dated February 2020; Stanislaus County General Plan and Support Documentation[1].

VII. GEOLOGY AND SOILS -- Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:			X	
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.			X	
ii) Strong seismic ground shaking?			X	
iii) Seismic-related ground failure, including liquefaction?			X	
iv) Landslides?			X	
b) Result in substantial soil erosion or the loss of topsoil?			X	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			X	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?			X	

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?			X	
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?			X	

Discussion: The USDA Natural Resources Conservation Service's Eastern Stanislaus County Soil Survey indicates that the property is made up of Dinuba sandy loam (DyA). As contained in Chapter 5 of the General Plan Support Documentation, the areas of the County subject to significant geologic hazard are located in the Diablo Range, west of Interstate 5; however, as per the California Building Code, all of Stanislaus County is located within a geologic hazard zone (Seismic Design Category D, E, or F) and a soils test may be required at building permit application. Results from the soils test will determine if unstable or expansive soils are present. If such soils are present, special engineering of the structure will be required to compensate for the soil deficiency. This will be evaluated with the building permit process which is required as a development standard applied to the project.

The proposed development will alter the existing drainage pattern of the site. Stormwater is proposed to be maintained on-site through on-site stormwater drainage basins. The Department of Public Works reviewed the project and responded that a grading and drainage plan shall be submitted for review and approval which includes drainage calculations which verify compliance with the current State of California National Pollutant Discharge Elimination System (NPDES) General Construction Permit. The project will be served by public sewer and water and has a will-serve letter from Keyes Community Service District for service. Storm drainage will be managed on-site through a storm drain basin.

The Mitigation Monitoring and Reporting Program (MMRP) prepared for the April 2000 update to the Keyes Community Plan included mitigation measures regarding the preparation of geotechnical reports and regarding septic systems prior to construction to ensure that they are developed appropriately based on the project site's soil type. The Building Permits Division reviews building permits and determines if geotechnical reports are required with submission of building permits. A referral response received from DER indicated that, in the event the site did not connect to Keyes Community Service District's sewer, the site would be subject to installing a Measure X septic system that would require the approval of the Department of Environmental Resources (DER) through the building permit process, which also takes soil type into consideration within the specific design requirements. DER's requirements will be applied to the project as a development standard, not a mitigation measure, as the requirements are regulatory; however, one of the requirements of the rezone process is that the project connect to public sewer when available.

Impacts to Geology and Soils associated with the project are considered to be less than significant.

Mitigation: None.

References: Application materials; Keyes Community Plan, EIR and MMRP adopted April 2000; Referral response received from the Department of Public Works, dated August 30, 2022; Referral response received from the Department of Environmental Resources, dated November 8, 2018; Will-serve letter received from the Keyes Community Services District, dated December 21, 2017; Title 24 California Code of Regulations; Stanislaus County General Plan and Support Documentation[1].

VIII. GREENHOUSE GAS EMISSIONS -- Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			X	

Discussion: The principal Greenhouse Gasses (GHGs) are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulfur hexafluoride (SF6), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and water vapor (H2O). CO2 is the reference gas for climate change because it is the predominant greenhouse gas emitted. To account for the varying warming potential of different GHGs, GHG emissions are often quantified and reported as CO2 equivalents (CO2e). In 2006, California passed the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] No. 32), which requires the California Air Resources Board (ARB) design and implement emission limits, regulations, and other measures, such that feasible and cost-effective statewide GHG emissions are reduced to 1990 levels by 2020. Two additional bills, SB 350 and SB32, were passed in 2015 further amending the states Renewables Portfolio Standard (RPS) for electrical generation and amending the reduction targets to 40% of 1990 levels by 2030.

The project was referred to SJVAPCD, who responded with a request for additional analysis on construction and operational emissions, on health risks, and odor impacts.

A Health Risk Assessment (HRA) for the project, dated January 21, 2020, was prepared by Ray Kapahi of Environmental Permitting Specialists, with revised technical detail submitted via e-mail correspondence dated April 27, 2020. The document examined the combined impacts from construction and operational emissions, quantifying direct emissions from construction and operations, quantified through the California Emissions Estimator Model (CalEEMod) as the modeling tool of project analysis which included an analysis of energy usage. Operational emissions, including indirect energy consumption associated with water and wastewater services, were modeled using CalEEMod. CalEEMod assumes compliance with some, but not all, applicable rules and regulations regarding energy efficiency, vehicle fuel efficiency, renewable energy usage, and other GHG reduction policies. Operational emissions for the project were based on an assumption of 9,800 daily trips at max buildout (Phases 1 and 2 combined). The emissions associated with the building electricity and natural gas usage (non-hearth) were estimated based on the land use type and size. Values for a project served by Turlock Irrigation District (TID) were used in the analysis. Phase 1 is proposed to include the fueling stations and convenience market. Phase 2 will include the fast food restaurants. The CalEEMod analsysis found the project's construction and operational emissions, for criteria pollutants and other pollutants such as greenhouse gas emissions, to be below the threshold of significance.

All construction must meet California Green Building Standards Code (CALGreen Code), which includes mandatory provisions applicable to all new residential, commercial, and school buildings. The intent of the CALGreen Code is to establish minimum statewide standards to significantly reduce the greenhouse gas emissions from new construction. The Code includes provisions to reduce water use, wastewater generation, and solid waste generation, as well as requirements for bicycle parking and designated parking for fuel-efficient and carpool/vanpool vehicles in commercial development. It is the intent of the CALGreen Code that buildings constructed pursuant to the Code achieve at least a 15 percent reduction in energy usage when compared to the State's mandatory energy efficiency standards contained in Title 24. The Code also sets limits on VOCs (volatile organic compounds) and formaldehyde content of various building materials, architectural coatings, and adhesives. A development standard will be added to this project to address compliance with Title 24, Green Building Code, which includes energy efficiency requirements.

Senate Bill 743 (SB743) requires that the transportation impacts under the California Environmental Quality Act (CEQA) evaluate impacts by using Vehicle Miles Traveled (VMT) as a metric. Stanislaus County has currently not adopted any significance thresholds for VMT, and projects are treated on a case-by-case basis for evaluation under CEQA. However, the State of California - Office of Planning and Research (OPR) has issued guidelines regarding VMT significance under CEQA. The addition of project land uses is expected to increase Total VMT generated by the Keyes Community Plan Area by approximately 17,800 miles under existing conditions and 16,500 miles under cumulative conditions. Additionally, total VMT would increase overall in Stanislaus County, but decrease in the adjacent cities of Modesto and Ceres. Results of the VMT analysis indicate the project would contribute to an increase in vehicle miles of travel; however, the project application was submitted in 2018 prior to the VMT standards taking effect.

The Mitigation Monitoring and Reporting Program (MMRP) prepared for the April 2000 update to the Keyes Community Plan included several mitigation measures regarding air quality impacts from construction and operation of projects developed within the Keyes Community Plan to ensure Air District standards are met. However, the mitigation measures identified in the Keyes Community Plan MMRP are already required to be met through applicable Air District permitting and through enforcement of the California Building Code. Accordingly, Air Quality requirements are not applied as mitigation, but instead will be applied as development standards applicable to the project, which require that all applicable Air District permits be obtained, and that California Green Building Code be met.

The project will be required to meet all applicable Air District standards and to obtain all applicable Air District permits. Impacts associated with Greenhouse Gas Emissions are expected to have a less than significant impact.

Mitigation: None.

References: Application materials; Referral response received from the San Joaquin Valley Air Pollution Control District, dated November 16, 2018; Health Risk Assessment and CalEEMod analysis entitled "Response to Comments Dated November 16, 2018", prepared by Environmental Permitting Specialists, dated January 21, 2020; Technical memo entitled "Health Risk Associated with DPM Emissions from Construction" prepared by Environmental Permitting Specialists, e-mailed April 27, 2020; Technical memo entitled "Health Risks – Operational Phase," prepared by Environmental Permitting Specialists, e-mailed April 27, 2020; Keyes Community Plan, EIR and MMRP adopted April 2000; 2016 California Green Building Standards Code Title 24, Part 11(Cal Green); 2016 California Energy Code Title 24, Part 6; State of California - Office of Planning and Research (OPR) guidelines regarding VMT significance under CEQA; Keyes Community Plan Area Transportation Impact Assessment, prepared by Fehr & Peers, dated February 2020; Stanislaus County General Plan and Support Documentation[1].

IX. HAZARDS AND HAZARDOUS MATERIALS -- Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?		X		
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?			X	
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?			X	
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?				X
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X	
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?			X	

Discussion: The project will include underground storage of fuel, which is considered a hazardous substance, in new tank facilities. Since hazardous materials will be stored on-site, the project would be required to obtain all applicable permits through the Department of Environmental Resources Hazardous Materials Division. The applicant is required to use, store, and dispose of any hazardous materials in accordance with all applicable federal, state, and local regulations. These requirements will be applied to the development standards for the project.

Pesticide exposure is a risk in areas located in the vicinity of agriculture. Sources of exposure include contaminated groundwater, which is consumed, and drift from spray applications. Application of sprays is strictly controlled by the Agricultural Commissioner and can only be accomplished after first obtaining permits. Additionally, agricultural buffers are intended to reduce the risk of spray exposure to surrounding people. The project was referred to the Stanislaus County Agricultural Commissioner and no comments have been received to date.

The project is not within the vicinity of any airport. The groundwater is not known to be contaminated in this area. The project does not interfere with the Stanislaus County Local Hazard Mitigation Plan, which identifies risks posed by disasters and identifies ways to minimize damage from those disasters. The site is located in a Local Responsibility Area (LRA) for fire protection and is served by Keyes Fire Protection District. The project was referred to the District, however no response was received. Per the Transportation Impact Analysis prepared for the project, emergency vehicle access to the project site will be provided via paved driveways onto North Golden State Boulevard. The fire station most likely to serve the site is the Keyes Fire Department located on Maud Avenue at 7th Street, approximately 0.6± miles northwest of the project site. Emergency vehicles would likely travel southbound on 7th Street, eastbound on Nunes Road, and then southbound on Golden State Boulevard to access the project site.

Though the project is located outside the City of Turlock's Sphere of Influence (SOI), it is located within one mile of the City's SOI, which requires referral to the city in accordance with Policy Twenty-Six of the Land Use Element of the Stanislaus County General Plan. A referral response received from the City of Turlock was received which requested that the project sewer connection be installed to City standards, and installation of both a grease interceptor and sand and oil interceptor to City standards.

The Mitigation Monitoring and Reporting Program (MMRP) for the Keyes Community Plan included several mitigation measures that were specific to hazards and hazardous materials. However, only the mitigation measure requiring a stop work provision in the event previously unidentified contamination is discovered during construction has been applied to the project as a mitigation measure. The other mitigation measure from the MMRP regarding hazardous materials requires a Phase 1 or 2 study if the site is suspected or known to have hazardous materials on-site. The project is not suspected or known to have hazardous materials on-site, it is not listed on the EnviroStor database managed by the CA Department of Toxic Substances Control, and the project was referred to the Stanislaus County Department of Environmental Resources, Hazardous Materials Division (Haz Mat) and no Phase 1 or 2 study was requested in their project response; however, Haz Mat's response did request submittal of hazardous business information into the California Electronic Reporting System (CERS) and preparation, approval of a Risk Management Prevention Program, and monitoring well boring permitting requirements be applied to the project. These will be reflected in the project's development standards.

Project impacts related to Hazards and Hazardous Materials are considered to be less than significant impact with mitigation.

Mitigation:

8. Construction contracts shall include a stop-work provision in the event previously unidentified contamination is discovered during construction so that appropriate actions can be taken to reduce potential human health and environmental hazards.

References: Application materials; Keyes Community Plan, EIR and MMRP adopted April 2000; Keyes Community Plan Area Transportation Impact Assessment, prepared by Fehr & Peers, dated February 2020; Referral response from the City of Turlock, dated November 18, 2018; Referral response received from the San Joaquin Air Pollution Control District, dated November 18, 2018; Referral response received from the Department of Environmental Resources, dated November 8, 2018; Referral response received from the Department of Environmental Resources – Hazardous Materials Division, dated November 14, 2018; California Department of Toxic Substance Control's EnviroStor database; Stanislaus County General Plan and Support Documentation[1].

X. HYDROLOGY AND WATER QUALITY - Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			**X**	

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:			X	
(i) result in substantial erosion or siltation on – or off-site;			X	
(ii) substantially increase the rate of amount of surface runoff in a manner which would result in flooding on- or off-site;			X	
(iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or			X	
(iv) impede or redirect flood flows?			X	
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?			X	
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?			X	

Discussion: The project proposes to be served by the Keyes Community Services District (CSD) for sewer and water services and to maintain storm drainage on-site through a storm drain basin. Keyes CSD provided a will serve letter that states the project site can hook up to the District for water provided they meet all Keyes CSD standards for public water services. The project site is located within the West Turlock Subbasin and is covered by the Turlock Subbasin Groundwater Sustainability Management Agency. The Keyes CSD is required to meet any applicable state or regional Groundwater Sustainability Agency requirements. A referral response received from the Department of Environmental Resources (DER) indicating any on-site septic system would be required to meet Measure X standards for on-site private waste systems. DER reviews and approves septic systems through the building permit process, which takes setbacks, soil type, and water table depth into consideration within the specific design requirements. Additionally, if the project were to be served by a private well, then it would be required to meet public water system standards, including concurrence from the State Water Boards prior to occupancy. All of these requirements will be incorporated into the project as development standards.

This project was referred to the Regional Water Quality Control Board (RWQCB) which responded with a list of permitting programs that the project may be subject to. The Department of Public Works reviewed the project and responded with a request that a grading and drainage plan be submitted for review and approval which includes drainage calculations that verify compliance with the current State of California National Pollutant Discharge Elimination System (NPDES) General Construction Permit. A referral response received from the Turlock Irrigation District (TID) indicated that if the site will not utilize irrigation water, then the developer shall apply for abandonment from Improvement Districts 161A and 642A. Further, that there is an existing 30-foot irrigation pipeline belonging to Improvement District 642A, entering the project site from the east, from North Golden State Boulevard, approximately 375 feet north of East Keyes Road, and comes to a “T” where it runs north and south through the site. The developer shall remove these pipelines and seal the remaining pipeline east of Golden State Boulevard. All work on irrigation facilities must be performed during non-irrigation season, typically during November 1 through March 1. These requirements will be applied to the development standards required for project implementation. Additionally, a development standard will be applied to the project that requires the landscaping plans comply with the California State Water Model Ordinance.

Areas subject to flooding have been identified in accordance with the Federal Emergency Management Act (FEMA). Run-off is not considered an issue because of several factors which limit the potential impact. These factors include the relatively flat terrain of the subject site, and relatively low rainfall intensities in the Central Valley. Areas subject to flooding have been identified in accordance with the Federal Emergency Management Act. The project site itself is located in Zone X (outside the 0.2% floodplain) and, as such, exposure to people or structures to a significant risk of loss/injury/death involving flooding due to levee/dam failure and/or alteration of a watercourse, at this location is not an issue with respect to this project. Flood zone requirements are enforced through the building permit process. The Building Permits Division also reviews building permits and determines if geotechnical reports are required with submission of building permits. A requirement to obtain all applicable building permits will be incorporated into the project's development standards.

The Mitigation Monitoring and Reporting Program (MMRP) prepared for the April 2000 update to the Keyes Community Plan included mitigation measures regarding hydrology and water quality and to ensure septic systems are developed appropriately based on the project site's soil type; however, the mitigation measures are all covered by regulatory requirements which will be enforced through the review of grading and building permits required to be obtained as development standards required to be met for project implementation.

As a result of the development standards required for this project, impacts associated with drainage, water quality, and runoff are expected to have a less than significant impact.

Mitigation: None.

References: Application materials; Keyes Community Plan, EIR and MMRP adopted April 2000; Referral response received from the Department of Public Works, dated May 10, 2022; Referral response from Turlock Irrigation District (TID), dated November 8, 2018; Referral response received from the Department of Environmental Resources (DER), dated November 8, 2018; Referral response received from the Regional Water Quality Control District, dated November 14, 2018; Will-serve letter received from the Keyes Community Services District, dated December 31, 2017; Stanislaus County General Plan and Support Documentation[1].

XI. LAND USE AND PLANNING - Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Physically divide an established community?			X	
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?			X	

Discussion: This is a request to amend the zoning designation of a 5.15± acre parcel from General Agriculture (A-2-10) to Planned Development (P-D) to allow for development of various commercial uses for the traveling public in two phases. The project is proposed to be served with public water by the Keyes Community Services District (CSD) and to have a private on-site septic system. All stormwater will be maintained on-site. A rezone is required in order to approve development of the site with non-agricultural uses. In addition to RV storage, the project also proposes to maintain the ability to conduct uses permitted in the A-2 zoning district.

The Land Use Element describes the Planned Development designation as a designation intended for land which, because of demonstrably unique characteristics, may be suitable for a variety of uses without detrimental effects on other property. To approve a Rezone, the Planning Commission must find that it is consistent with the General Plan. Pursuant to the General Plan, the Planned Development zoning designation is consistent with the Planned Development General Plan Land Use designation.

The project site is designated, Highway Planned Development in the Keyes Community Plan. The Mitigation Monitoring and Reporting Program for the Keyes Community Plan included mitigation measures addressing lighting, air quality, hydrology, hazardous materials, noise, biological resources, agricultural resources, traffic, public facilities, fire and school fees, and geology and soils. All of the mitigation measures applicable to the project, that are not already covered by regulatory programs or permitting, which will be required through the application of development standards, have been applied to the project. Those mitigation measures have been incorporated into the Aesthetics, Agricultural Resources, Hazards and Hazardous Materials, and Noise Sections of this initial study.

Though the project is located outside the City of Turlock's Sphere of Influence (SOI), it is located within one mile of the City's SOI, which requires referral to the city in accordance with Policy Twenty-Six of the Land Use Element of the Stanislaus County General Plan. A referral response received from the City of Turlock was received which requested that the project sewer connection be installed to City standards, and installation of both a grease interceptor and sand and oil interceptor to

City standards.

Surrounding uses include vacant and agricultural land to the east, north, and south; State Route (SR) 99 to the south and west; the Community of Keyes to the north; commercial and light industrial uses to the southeast; and trucking-related businesses to the west. In December of 2007, Stanislaus County adopted an updated Agricultural Element which incorporated guidelines for the implementation of agricultural buffers applicable to new and expanding non-agricultural uses within or adjacent to the A-2 Zoning District. These projects are required to incorporate a minimum 150-foot-wide agricultural buffer setback, or 300-foot-wide buffer setback for people-intensive uses. Public roadways, utilities, drainage facilities, rivers and adjacent riparian areas, landscaping, parking lots, and similar low people-intensive uses are permitted uses within the buffer setback area. The proposed project includes a fast food restaurant near the eastern property line which is located approximately 220 feet from an A-2 zoned property located across East Keyes Road. The project meets the 300-foot buffer requirement on all other sides.

The project will not physically divide an established community nor conflict with any habitat conservation plans. Project impacts related to land use and planning are considered to be less than significant.

Mitigation: None.

References: Application materials; Keyes Community Plan, EIR and MMRP adopted April 2000; Referral response received from the City of Turlock, dated November 18, 2018; Stanislaus County General Plan and Support Documentation[1].

XII. MINERAL RESOURCES - Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?			**X**	
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?			**X**	

Discussion: The location of all commercially viable mineral resources in Stanislaus County has been mapped by the State Division of Mines and Geology in Special Report 173. There are no known significant resources on the site, nor is the project site located in a geological area known to produce resources.

No significant impacts related to Mineral Resources have been identified.

Mitigation: None.

References: Application materials; Stanislaus County General Plan and Support Documentation[1].

XIII. NOISE - Would the project result in:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		**X**		
b) Generation of excessive groundborne vibration or groundborne noise levels?			**X**	

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X

Discussion: The Stanislaus County General Plan Noise Element identifies daytime (7:00 a.m. to 10:00 p.m.) maximum allowable average noise exposure for stationary noise sources to be an hourly average of 55 decibels and maximum level of 75 decibels, and nighttime (10:00 p.m. to 7:00 a.m.) to be an hourly average of 45 decibels and maximum of 65 decibels, measured at residential or other noise-sensitive land use on neighboring properties. Noise consisting of speech, music, or recurring impulsive noises are subject to a reduction of these thresholds by an additional 5 decibels. However, where measured ambient noise levels exceed these standards, the standards shall be increased to the ambient levels, pursuant to the County General Plan Noise Element standards. The Stanislaus County General Plan identifies noise levels up to 75 dB Ldn (or CNEL) as the normally acceptable level of noise environment for industrial, manufacturing, utilities, and agriculture uses. The site itself is impacted by the noise generated from State Route 99. On-site grading resulting from this project may result in a temporary increase in the area's ambient noise levels; however, noise impacts associated with on-site activities and traffic are not anticipated to exceed the normally acceptable level of noise. Any noise associated with the proposed construction work would be required to meet the noise ordinance and Noise Element standards. Proposed operating hours are 24 hours a day, with individual hours for each future tenant. The applicant anticipates 10 employees on a minimum shift and 18 employees on a maximum shift with a total of three shifts per day for the site. The site is not located within an airport land use plan. Noise impacts are considered to be less than significant with mitigation included.

The Mitigation Monitoring and Reporting Program for the Keyes Community Plan included several mitigation measures that were specific to noise. Those mitigation measures applicable to the project which have to do with mitigating potential noise impacts during construction have been applied to the project.

Impacts associated with noise are considered to be less than significant with mitigation.

Mitigation:

9. Hours of construction on the project site shall be limited to 7:00 a.m. to 6:00 p.m. Monday thru Friday, with no construction allowed on holidays.

References: Application materials; Keyes Community Plan, EIR and MMRP adopted April 2000; Stanislaus County Noise Control Ordinance, General Plan, and Support Documentation[1].

XIV. POPULATION AND HOUSING - Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?			X	
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?			X	

Discussion: The site is not included in the vacant sites inventory for the 2016 Stanislaus County Housing Element, which covers the 5th cycle Regional Housing Needs Allocation (RHNA) for the county and will therefore not impact the County's ability to meet their RHNA. No population growth will be induced, nor will any existing housing be displaced as a result of this project.

Impacts related to Population and Housing are considered to be less than significant.

Mitigation: None.

References: Application materials; Stanislaus County General Plan and Support Documentation[1].

XV. PUBLIC SERVICES - Would the project result in:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:			X	
Fire protection?			X	
Police protection?			X	
Schools?			X	
Parks?			X	
Other public facilities?			X	

Discussion: The project site is served by the Keyes Fire District for fire protection services, the Keyes Union and Turlock Unified school districts for school services, the Stanislaus County Sheriff Department for police protection, the Keyes Community Services District for public water and sewer, Stanislaus County Parks and Recreation Department for parks facilities, and the Turlock Irrigation District (TID) for power. County adopted Public Facilities Fees, as well as fire and school fees are required to be paid based on the development type prior to issuance of a building permit. Payment of the applicable district fees will be required prior to issuance of a building permit.

The Mitigation Monitoring and Reporting Program (MMRP) prepared for the April 2000 update to the Keyes Community Plan included mitigation measures regarding the payment of applicable fire, parks, and public facility fees. Development standards regarding the payment of public facility and fire fees will be applied to the project. Residential subdivisions are required to pay park in lieu fees or to dedicate parkland based on the policies included in the State of California's Quimby Act and the Stanislaus County's Conservation and Open Space Element. However, as a highway commercial use the proposed development will only be responsible for paying the parks fees identified in the public facility fee schedules adopted by the Board of Supervisors. Development standards also require that the project site annex into the Golden State Lighting District for streetlights and that TID standards be met for the connection to electrical services.

The project proposes to hook up to the Keyes CSD for water and sewer services, and to maintain storm drainage on-site through a storm drain basin. Keyes CSD provided a will serve letter that states the project site can hook up to the District for water provided they meet all Keyes CSD standards for public water and sewer services. A referral response received from the Department of Environmental Resources (DER) indicated that any on-site septic system is required to meet Measure X standards for on-site private waste systems and public water system standards for any on-site private well. DER reviews and approves septic systems through the building permit process, which takes setbacks, soil type, and water table depth into consideration within the specific design requirements. The project site is also required to annex into the Golden State Lighting District for street lighting, per a referral response received from the Department of Public Works. All of these requirements will be incorporated into the project as development standards.

The project is not anticipated to have any significant adverse impact on public services.

Mitigation: None.

References: Application materials; Keyes Community Plan, EIR and MMRP adopted April 2000; Referral response received from the Department of Environmental Resources, dated November 8, 2018; Referral response from Turlock Irrigation District (TID), dated November 9, 2018; Referral response letter received from the Department of Public Works, dated August 30, 2022; Will-serve letter received from the Keyes Community Services District, dated December 21, 2017; Stanislaus County General Plan and Support Documentation[1].

XVI. RECREATION - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Included	Less Than Significant Impact	No Impact
a) 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) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?			X	

Discussion: This project does not include any recreational facilities and is not anticipated to increase demands for recreational facilities, as such impacts typically are associated with residential development.

The Mitigation Monitoring and Reporting Program for the Keyes Community Plan included a mitigation measure regarding the payment of a fair share towards parks. Non-residential development pays parks fees through the payment of public facilities fees, which are collected during the issuance of a building permit. This requirement will be incorporated into the project as a development standard.

No significant impacts related to Recreation were identified.

Mitigation: None.

References: Application materials; EIR and MMRP adopted April 2000; Stanislaus County General Plan and Support Documentation[1].

XVII. TRANSPORTATION - Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Included	Less Than Significant Impact	No Impact
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?		X		
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?			X	
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?		X		
d) Result in inadequate emergency access?			X	

Discussion: This request includes the construction of a 3,276 square-foot gasoline fueling canopy with 12 gas pumps, a 2,750 square-foot diesel fueling canopy with 5 diesel pumps, a 4,800 square-foot convenience store, a 5,400 square-foot truck shop, two 3,000 square-foot shell buildings with drive-throughs for future fast food restaurants, a truck scale, 55 vehicle parking spaces, and ten parking spaces for overnight parking of truck-trailer combination vehicles.

A Transportation Impact Assessment (TIA) was prepared at the County's request, which analyzed the project specific and cumulative impacts of three project within the Keyes Community Plan area which are all in the land use entitlement process. The three projects include:

- **ITC Enterprises (ITC) -** 30,000 square-foot semi-truck lease, rental and service facility, and 5,000 square-foot office located at the southwest corner of Keyes Road at North Golden State Boulevard.

- **Nunes Road Travel Plaza (NRTP) -** 7,000 square-foot convenience market, 4,278 square-foot potential restaurant, 16-pump fuel station, 14,100 square-foot truck wash and repair, 43 truck parking spaces, and a secondary fueling area with 5 diesel fueling stations at the northeast corner of Keyes Road at North Golden State Boulevard.

- **Kamir Incorporated (KI) -** 3,276 square-foot gasoline fueling canopy with 12 gas pumps, a 2,750 square-foot diesel fueling canopy with 5 diesel pumps, a 4,800 square-foot convenience store, a 5,400 square-foot truck shop, two 3,000 square-foot shell buildings with drive-throughs at the northwest corner of Keyes Road at North Golden State Boulevard.

The transportation impacts at 14 intersections and six freeway mainline segments were evaluated, consistent with the Stanislaus County General Plan and Caltrans guidelines. The following study scenarios were evaluated: existing conditions; existing with project conditions; cumulative (Year 2040) without project conditions; and cumulative (Year 2040) with project conditions. The TIA analysis identified potentially significant adverse impacts of the proposed project on the surrounding transportation system and recommended mitigation measures to mitigate significant impacts to a less than significant level.

The TIA anticipated that ITC Enterprise would add 40 new AM and 43 new PM peak hour vehicle trips to the roadway network; Nunes Road Travel Plaza would add 161 new AM and 82 new PM peak hour vehicle trips to the roadway network; and Kamir Incorporated would add 126 new AM and 76 new PM peak hour vehicle trips to the roadway network. The TIA found that the addition of ITC Enterprises project traffic under Existing with Project Conditions would not cause any impacts based on the significance criteria; however, the TIA also found that the addition of Nunes Road Travel Plaza project traffic and Kamir Incorporated project traffic was anticipated to cause significant impacts at three intersections under Existing with Project Conditions. The mitigation measures for these impacts include the following:

- SR 99 Southbound Ramps at Keyes Road (Intersection 3) and SR 99 Northbound Ramps at Keyes Road (Intersection 4):
    - Modifications to the SR 99 and Keyes Road Interchange to include an eastbound right-turn pocket and a southbound right-turn pocket at the intersection of SR 99 Southbound Ramps at Keyes Road, and to include a westbound right-turn lane and a northbound right-turn pocket at the intersection of SR 99 Northbound Ramps at Keyes Road.
- Golden State Boulevard at Keyes Road (Intersection 6):
    - Modifications to the intersection of Golden State Boulevard at Keyes Road to include a second eastbound left-turn pocket and receiving lane, and a channelized free southbound right-turn pocket and receiving lane. Keyes Road between SR 99 Northbound Ramps and Golden State Boulevard must be widened to two lanes in the westbound direction.

Implementation of these improvements would result in reducing the impacts to less than significant levels.

The addition of ITC Enterprise project traffic, Nunes Road Travel Plaza project traffic, and Kamir Incorporated project traffic is anticipated to cause significant impacts at six intersections under Cumulative with Project Conditions. The mitigation measures for these impacts include the following:

- Faith Home Road at Keyes Road (Intersection 1)
    - Widen Keyes Road from two to four lanes between Faith Home Road and Golden State Boulevard. Modify the intersection of Faith Home Road at Keyes Road to include a northbound right-turn pocket.
- SR 99 Southbound Ramps at Keyes Road (Intersection 3) and SR 99 Northbound Ramps at Keyes Road (Intersection 4):
    - Widen Keyes Road from two to four lanes between Faith Home Road and Golden State Boulevard. Modifications to the SR 99 and Keyes Road Interchange to include a second westbound left-turn pocket and the southbound approach to include one right-turn pocket, one left-turn pocket, and one shared left/through lane at the intersection of SR 99 Southbound Ramps at Keyes Road, and to include a westbound right-turn lane and the northbound approach to include one right-turn pocket and one shared left/through lane at the intersection of SR 99 Northbound Ramps at Keyes Road.

- 9th St/Golden State Blvd at Nunes Road (Intersection 5):
    - Widen Golden State Boulevard from two to four lanes between Nunes Road and the ITC Enterprises Project Driveway and construct a one-lane roundabout at the intersection of 9th Street and Golden State Boulevard at Nunes Road. This improvement shall include Class II bicycle lanes along Golden State Boulevard south of Nunes Road and along Nunes Road west of Golden State Boulevard.

- Golden State Boulevard at Keyes Road (Intersection 6):
    - Widen Keyes Road from two to four lanes between Faith Home Road and Golden State Boulevard. Widen Golden State Boulevard from two to four lanes between Nunes Road and the ITC Enterprises Project Driveway. Modify the intersection of Golden State Boulevard at Keyes Road to have two left-turn pockets and one right-turn pocket on all approaches; the southbound approach should have a channelized free southbound right-turn pocket and receiving lane. Keyes Road between SR 99 Northbound Ramps and Golden State Boulevard should be widened to three lanes in the westbound direction to accommodate the free southbound right-turn. This improvement shall include Class II bicycle lanes along Golden State Boulevard.

- Nunes Road at Keyes Road (Intersection 8):
    - Construct a receiving lane/acceleration lane for the southbound left-turn movement at the intersection of Nunes Road at Keyes Road.

Project applicants are expected to pay their fair share towards cumulative mitigations through the Keyes Community Plan Area Traffic Impact Fee program. Implementation of these improvements would result in reducing the impacts to less than significant levels. Therefore, the intersection impacts for these six locations are less than significant with mitigation.

The TIA recommended the following also be incorporated into the Kamir project to improve site access and circulation:

- As a part of the final site plan, indicate locations where traffic control devices would be installed. Consider striping stop bars on minor approaches at intersections throughout the site.

- Reconfigure the site plan to include a two-way internal drive aisle between the north side of the property and the south side of the property. Vehicles will use the KI Middle Driveway to make left turns into and out of the site. Restrict left-turn access into and out of the KI South Driveway by constructing a raised median on Golden State Boulevard. Install wayfinding signage as necessary.

  Install a traffic signal at the intersection of NRTP North Driveway and KI Middle Driveway at Golden State Boulevard, and align both driveways. The eastbound approach operates at acceptable levels with one shared left/through/right lane, however, should the site plan changes increase the volume of right-turns out of the KI Middle Driveway, reconfigure the eastbound approach to include one shared left/through lane and one right-turn pocket.

- Golden State Boulevard along the project frontage should be constructed to accommodate four travel lanes with turn pockets (five vehicle lanes total), a raised median, and two bicycle lanes in each direction.

- As the restaurant portion of the site is leased, conduct parking surveys to determine if the proposed tenant mix is effectively sharing the available parking supply, and implement additional parking demand management strategies, if necessary.

- Consult with Stanislaus County to ensure that the proposed project design does not conflict with the ultimate provision of bicycle facilities along the project frontage.

- Identify areas where short-term bicycle parking would be accommodated on the final site plan.

After coordinating with Public Works staff, applicable recommendations have been implemented as mitigation measures for the project. As part of the mitigation measures, the applicant will be responsible for dedicating the required right-of-way necessary to build-out the adjacent County roadways identified above; construct an all-way stop at the main (northwesternmost) driveway on the parcel on North Golden State Boulevard; construct a southbound channelized right turn lane at the intersection of Keyes Road and North Golden State Boulevard, along with modifying the existing traffic signal to accommodate the improvements; and payment of the project's fair share towards the Keyes Community Plan Mitigation Funding Program fees based on land use that is adopted at the time of building permit issuance. A fee update for the Keyes Community Plan Mitigation Funding Program is planned to be scheduled for the Board of Supervisors sometime in 2023; however, an updated fee program has not been adopted to date.

The TIA also identified that emergency vehicle access to the project site will be provided via paved driveways onto North Golden State Boulevard. The fire station most likely to serve the site is the Keyes Fire Department located on Maud Avenue at 7th Street, approximately 0.6± miles northwest of the project site. Emergency vehicles would likely travel southbound on 7th Street, eastbound on Nunes Road, and then southbound on Golden State Boulevard to access the project site.

A referral response received from the Department of Public Works requested the irrevocable offers of dedication for North Golden State Boulevard and Keyes Road be provided to execute traffic improvements mitigation recommended by the TIA, submittal of a financial guarantee to ensure construction of the road frontage improvements, submittal of an encroachment permit, submittal of a sidewalk and landscape improvement plan, annexation into the County Service Area (CSA) #26 – Keyes, annexation into the Keyes Community Services District, submittal of the first year's operating and maintenance cost of streetlights, installation of signage at the developers cost of requested payment of applicable public facility fees, regional transportation impact fees, and Keyes Community Traffic Impact Fees. A grading, drainage, and erosion/sediment control plan for the project site shall be submitted that includes drainage calculations and enough information to verify that runoff from the project will not flow onto adjacent properties and Stanislaus County road right-of-way and is in compliance with the current State of California National Pollutant Discharge Elimination System (NPDES) General Construction Permit. All of these requirements will be applied to the project as development standards.

Senate Bill 743 (SB743) requires that the transportation impacts under the California Environmental Quality Act (CEQA) evaluate impacts by using Vehicle Miles Traveled (VMT) as a metric. Stanislaus County has currently not adopted any significance thresholds for VMT, and projects are treated on a case-by-case basis for evaluation under CEQA. However, the State of California - Office of Planning and Research (OPR) has issued guidelines regarding VMT significance under CEQA. As stated above, Kamir Incorporated is expected to add 126 new AM and 76 new PM peak hour vehicle trips to the road networks. The project's trip generation was estimated using standard rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition for the various project components. The resulting vehicle trip generation estimate, which considers internalized, pass-by, and diverted trips. The addition of project land uses is expected to increase total VMT generated by the Keyes Community Plan Area by approximately 17,800 miles under existing conditions and 16,500 miles under cumulative conditions. Additionally, total VMT would increase overall in Stanislaus County, but decrease in the adjacent cities of Modesto and Ceres. Results of the VMT analysis indicate the project would contribute to an increase in vehicle miles of travel; however, the project application was submitted in 2018 prior to the VMT standards taking effect.

The project site is located within the Keyes Community Plan. The Mitigation Monitoring and Reporting Program (MMRP) prepared for the April 2000 update to the Keyes Community Plan included mitigation measures regarding the payment of a traffic mitigation fee for roadway projects identified in the Keyes Community Plan. Public Facility Fees, which includes funding for the Regional Transportation Impact Fee (RTIF) that provides funding for identified County roads projects throughout the County, will be required to be paid prior to issuance of a building permit.

Impacts associated with Transportation are expected to have a less than significant impact with mitigation included.

Mitigation:

10. Prior to issuance of a building permit, the applicant shall pay the Keyes Community Plan Mitigation Funding Program fees for the proposed land uses per the Keyes Community Plan fee program adopted at the time of building permit issuance. These fees are adjusted for inflation using the Engineering News-Record construction cost index and shall be paid prior to building permit issuance.

11. Prior to final of a building permit for Phase 1 (gas station and convenience store), the applicant shall:

- Dedicate the required right-of-way along the property's frontage along North Golden State Boulevard and Keyes Road.
    - North Golden State Boulevard is designated as a 110-foot-wide Urban Minor Arterial with a standard of 150-foot-wide intersections.
    - Dedicate the required right-of-way of 67.5 feet southwest of the centerline of North Golden State Boulevard and up to 75 feet as necessary to accommodate the required lane configurations of the intersections as described in the Traffic Impact Analysis and the Keyes Community Plan.
    - Keyes Road is designated as a 135-foot-wide six-lane urban expressway with a standard of 180-foot-wide intersections.

      The existing right-of-way at its narrowest point is 50 feet north of Keyes Road centerline as shown in Record of Survey 19-S-036. An additional 40 feet of right-of-way shall be dedicated along the southern property line adjacent to Keyes Road, unless applicant's engineer can demonstrate to the Department of Public Works that less right-of-way can accommodate the necessary roadway improvements and fill slopes for the raised roadway without encroaching beyond the right-of-way line.
    - Construct an all-way stop intersection at the main driveway along Golden State Boulevard, in a location approved by the Department of Public Works approximately 550 feet north of Keyes Road, that can accommodate a future traffic signal to the satisfaction of the Public Works Traffic Engineering Division. These improvements include the installation of traffic signal poles in-lieu of street light poles and the installation of a four-inch conduit across Golden State Boulevard on both the north and south sides of the driveway and across the site's main entrance such that a future traffic signal installation will be less disruptive to traffic. Applicant to coordinate with the Traffic Engineering Division.

12. Prior to issuance of a building permit for anything beyond Phase 1 (gas station and convenience store), the applicant shall:

    - Have constructed and met all conditions and mitigations associated with Phase 1 (gas station and convenience store).
    - Construct a southbound channelized right-turn lane at the intersection of Keyes Road and Golden State Boulevard and modify the existing traffic signal as necessary to accommodate the improvements.

References: Application materials; Keyes Community Plan, EIR and MMRP adopted April 2000; Referral response received from the Department of Public Works, dated August 30, 2022; Referral response received from Caltrans, dated November 30, 2018; Referral response received from the Stanislaus County Environmental Review Committee, dated November 16, 2018; Keyes Community Plan Area Transportation Impact Assessment, prepared by Fehr & Peers, dated February 2020; Stanislaus County General Plan and Support Documentation[1].

XVIII. TRIBAL CULTURAL RESOURCES - Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California native American tribe, and that is:			**X**	

i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or			X	
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set for the in subdivision (c) of Public Resource Code section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.			X	

Discussion: It does not appear this project will result in significant impacts to any tribal cultural resources. Tribal notification of the project was not referred to any tribes in conjunction with AB 52 requirements, as Stanislaus County has not received any requests for consultation from the tribes listed with the NAHC. A records search conducted by the Central California Information Center (CCIC) indicated that there are no historical, cultural, or archeological resources recorded on-site and that the site has a low sensitivity for the discovery of such resources. A development standard will be added to the project which requires if any cultural or tribal resources are discovered during project-related activities, all work is to stop, and the lead agency and a qualified professional are to be consulted to determine the importance and appropriate treatment of the find. Cultural Impacts are considered to be less than significant.

Mitigation: None.

References: Application materials; Central California Information Center Report for the project site, dated May 29, 2018; County General Plan and Support Documentation[1].

XIX. UTILITIES AND SERVICE SYSTEMS - Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?			X	
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?			X	
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			X	
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?			X	
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?			X	

Discussion: Limitations on providing services have not been identified. The project proposes to hook up to the Keyes Community Service District (CSD) for water and sewer services, and to maintain storm drainage on-site through a storm drain basin. There is an existing easement for shared use of the storm drainage basin which will remain. Keyes CSD provided a will serve letter that states the project site can hook up to the District for water provided they meet all Keyes CSD standards for public water services. A referral response received from the Department of Environmental Resources (DER) indicating that any on-site septic system is required to meet Measure X standards for on-site private waste systems and that any on-site private well meet public water system standards with concurrence from the State Water Boards. DER reviews and approves septic systems through the building permit process, which takes setbacks, soil type, and water table depth into consideration within the specific design requirements. The project site is also required to annex into the Keyes Community Services District for street lighting, per a referral response received from the Department of Public Works. Public Works also commented that the developer shall deposit the first year's operating. All of these requirements will be incorporated into the project as development standards.

The site is proposed to be served by the Turlock Irrigation District (TID) for electrical services. A referral response received from TID indicated that the developer should consult with District Electrical Engineering for an application for new service and a design for the project. Facility changes are performed at developer's expense. Additionally, the response indicated that a 10-foot Public Utility Easement is required to be dedicated along all street frontages for electrical utility service. Further, the TID response stated that in the event irrigation water service was no longer required, the developer shall apply for abandonment from Improvement Districts 161A and 642A if the property. These requirements will be incorporated into the project's development standards.

The Mitigation Monitoring and Reporting Program (MMRP) prepared for the April 2000 update to the Keyes Community Plan included mitigation measures regarding stormwater, water supply and quality, and regarding the preparation of geotechnical reports prior to installation of an on-site septic system. The water supply will be provided by Keyes CSD which makes the mitigation regarding on-site well inapplicable. The remaining mitigation measures are being met through the grading and building permit review process, which will be incorporated into the project as a requirement per the development standards applied to the project.

The project is not anticipated to have a significant impact to utilities and service systems.

Mitigation: None.

References: Application materials; Keyes Community Plan, EIR and MMRP adopted April 2000; Referral response received from the Department of Environmental Resources, dated November 8, 2018; Referral response from Turlock Irrigation District (TID), dated November 9, 2018; Referral response letter received from the Department of Public Works, dated August 30, 2022; Will-serve letter received from the Keyes Community Services District, dated December 21, 2017; Stanislaus County General Plan and Support Documentation[1].

XX. WILDFIRE – If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?			X	
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?			X	
c) Require the installation of maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?			X	
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?			X	

Discussion: The Stanislaus County Local Hazard Mitigation Plan identifies risks posed by disasters and identifies ways to minimize damage from those disasters. With the Wildfire Hazard Mitigation Activities of this plan in place, impacts to an adopted emergency response plan or emergency evacuation plan are anticipated to be less than significant. The terrain of the site is relatively flat, and the site has access to a County-maintained road. The site is located in a Local Responsibility Area (LRA) for fire protection, the majority of the site is designated as non-urban and the southwestern portions are designated as urban and is served by Keyes Fire Protection District. The project was referred to the District, but no response was received. California Building Code establishes minimum standards for the protection of life and property by increasing the ability of a building to resist intrusion of flame and embers. All construction is required to meet fire code, which will be verified through the building permit review process. A grading and drainage plan will be required for the parking area and all fire protection, and emergency vehicle access standards met. These requirements will be applied as development standards for the project. Per the Transportation Impact Analysis prepared for the project, emergency vehicle access to the project site will be provided via paved driveways onto North Golden State Boulevard. The fire station most likely to serve the site is the Keyes Fire Department located on Maud Avenue at 7th Street, approximately 0.6± miles northwest of the project site. Emergency vehicles would likely travel southbound on 7th Street, eastbound on Nunes Road, and then southbound on Golden State Boulevard to access the project site.

The Mitigation Monitoring and Reporting Program for the Keyes Community Plan included a mitigation measure regarding the payment of fire district fees. Fire fees are collected prior to the issuance of a building permit. This requirement will be incorporated into the project as a development standard.

Wildfire risk and risks associated with postfire land changes are considered to be less than significant.

Mitigation: None.

References: Application materials; Keyes Community Plan, EIR and MMRP adopted April 2000; Keyes Community Plan Area Transportation Impact Assessment, prepared by Fehr & Peers, dated February 2020; California Building Code Title 24, Part 2, Chapter 7; Stanislaus County Local Hazard Mitigation Plan; Stanislaus County General Plan and Support Documentation[1].

XXI. MANDATORY FINDINGS OF SIGNIFICANCE -	**Potentially Significant Impact**	**Less Than Significant With Mitigation Included**	**Less Than Significant Impact**	**No Impact**
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?			**X**	
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)			**X**	
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			**X**	

Discussion: The site is located on the northwest corner of East Keyes Road and North Golden State Boulevard, in the unincorporated community of Keyes, just east of State Route 99. The site has a General Plan designation of Planned Development, a Keyes Community Plan designation of Highway Commercial, and a zoning designation of General Agriculture (A-2-10). Accordingly, a rezone to Planned Development is required in order to approve development of the site with non-agricultural uses.

The project is proposed to be served with public sewer and water by the Keyes Community Services District (CSD). All stormwater will be maintained on-site.

Though the project is located outside the City of Turlock's Sphere of Influence (SOI), it is located within one mile of the City's SOI which requires referral to the city in accordance with Policy Twenty-Six of the Land Use Element of the Stanislaus County General Plan. The City of Turlock is located approximately one mile south of the project site. A referral response received from the City of Turlock requested that grease interceptors be designed to city standards.

Vacant, agricultural land, and commercial development surround the site to the north, east, and south. State Route 99 borders the site to the southwest. Parcels with a General Plan designation of Planned Development abut the site to the north and south. Agriculturally zoned parcels are located to the north, west, and south. The site is surrounded by parcels with a Keyes Community Plan designation of Highway Commercial. There are several rezone applications being processed proposing highway commercial development on vacant parcels located north and south of the project site, within the Keyes Community Plan boundary. These projects include Nunes Road Travel Plaza (Rezone Application No. PLN2018-0022), a request to rezone an 8.6± acre parcel to develop a travel plaza and accessory commercial uses; ITC Enterprises (Rezone No. PLN2018-0078), a request to rezone a 7± acre parcel to allow development of a semi-truck sales and service lot. Recent approved projects include Keyes Truck Center (Staff Approval Permit No. PLN2020-0060), a semi-truck sales and service business; Keyes 19 Subdivision (Subdivision Map No. PLN2015-0102 and -0101); and Top Shelf Mega Storage (Rezone No. PLN2021-0112), an RV storage facility.

The project was referred to both Caltrans and Department of Public Works who requested a comprehensive Transportation Impact Analysis (TIA), evaluating the Nunes Road Travel Plaza, ITC Enterprises, and Kamir Incorporated projects' project-specific and cumulative traffic-related impacts. The TIA, identified mitigation measures that have been added to this project to reduce both cumulative and project-specific traffic impacts to less than significant. Additionally, these projects, the Keyes Truck Center, and a portion of the Top Shelf Mega Storage are within the Keyes Community Plan boundaries, development for which has been analyzed under the Keyes Community Plan Environmental Impact Analysis (EIR). A Health Risk Assessment (HRA) was prepared at the request of the San Joaquin Valley Air Pollution Control District which identified the project will have a less than significant impact for health risk on nearby sensitive receptors. The application of significance thresholds for criteria pollutants is relevant to the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality. Pursuant to the SJVAPCD's guidance, if project-specific emissions would be less than the thresholds of significance for criteria pollutants, the project would not be expected to result in a cumulatively considerable net increase of any criteria pollutant for which the SJVAPCD is in nonattainment under applicable federal or State ambient air quality standards. As described in Section III – *Air Quality* of this initial study, project emissions would be below SJVAPCD significance thresholds as mentioned above, the project would not have impacts that are cumulatively considerable.

The Mitigation Monitoring and Reporting Program for the Keyes Community Plan included mitigation measures addressing lighting, air quality, hydrology, hazardous materials, noise, biological resources, agricultural resources, traffic, public facilities, fire and school fees, and geology and soils. All of the mitigation measures applicable to the project, that are not already covered by regulatory programs or permitting, which will be required through the application of development standards have been applied to the project. Those mitigation measures have been incorporated into the Aesthetics, Agricultural Resources, Biological Resources, Hazards and Hazardous Materials, and Noise Sections of this initial study.

Further development of the Keyes area would be subject to an amendment of the Keyes Community Plan, which would require environmental review, including a cumulative impact analysis. Review of this project has not indicated any potential for cumulative impacts which might significantly impact the environmental quality of the site and/or the surrounding area.

Mitigation: None.

References: Application materials; Referral response received from the Department of Public Works, dated August 30, 2022; Referral response received from Caltrans, dated November 30, 2018; Referral response received from the Stanislaus County Environmental Review Committee, dated November 16, 2018; Keyes Community Plan Area Transportation Impact Assessment, prepared by Fehr & Peers, dated February 2020; Referral response received from the San Joaquin Valley Air Pollution Control District, dated November 16, 2018; E-mail correspondence from the San Joaquin Valley Air Pollution Control District, dated May 15, 2020 and June 11, 2020; Health Risk Assessment and CalEEMod analysis entitled "Response to Comments Dated November 16, 2018", prepared by Environmental Permitting Specialists, dated January 21, 2020; Technical memo entitled "Health Risk Associated with DPM Emissions from Construction" prepared by Environmental

Permitting Specialists, e-mailed April 27, 2020; Technical memo entitled "Health Risks – Operational Phase," prepared by Environmental Permitting Specialists, e-mailed April 27, 2020; Keyes Community Plan, EIR and MMRP adopted April 2000; Initial Study; Stanislaus County General Plan and Support Documentation[1].

[1] Stanislaus County General Plan and Support Documentation adopted in August 23, 2016, as amended. ***Housing Element*** adopted on April 5, 2016.

Stanislaus County

DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT
1010 10TH Street, Suite 3400, Modesto, CA 95354
Planning Phone: (209) 525-6330 Fax: (209) 525-5911
Building Phone: (209) 525-6557 Fax: (209) 525-7759

Stanislaus County

Planning and Community Development

Mitigation Monitoring and Reporting Program

Adapted from CEQA Guidelines APPENDIX G Environmental Checklist Form, Final Text, January 1, 2020

January 26, 2023

1. Project title and location:	Rezone Application No. PLN2018-0057 – Kamir Incorporated East Keyes Road, between North Golden State Boulevard and State Route 99, in the Community of Keyes. APN: 045-050-007.
2. Project Applicant name and address:	Kumil & Amir Kayhani 5196 Grayhawk Lane, Dublin, CA 94568
3. Person Responsible for Implementing Mitigation Program (Applicant Representative):	Amir Kayhani, Kamir Incorporated
4. Contact person at County:	Kristen Anaya, Associate Planner (209) 525-6330

MITIGATION MONITORING AND REPORTING PROGRAM:

List all Mitigation Measures by topic as identified in the Mitigated Negative Declaration and complete the form for each measure.

I. AESTHETICS

No. 1 Mitigation Measure: New multistory development shall minimize the use of reflective surfaces and have those reflective surfaces which are used to be oriented in such a manner so as to reduce glare impacts along roadways.

Who Implements the Measure:	Applicant/Developer
When should the measure be implemented:	Prior to issuance of a building permit
When should it be completed:	Prior to issuance of the Final Occupancy Permit
Who verifies compliance:	Stanislaus County Planning and Community Development Department
Other Responsible Agencies:	None

No. 2 Mitigation Measure: New development shall include cut-off luminaries and/or shields. All exterior lighting shall be designed (aimed down and towards the site) to provide adequate illumination without a glare effect. Low intensity lights shall be used to minimize the visibility of the lighting from nearby areas, and to prevent “spill over” of light onto adjacent residential properties.

Who Implements the Measure:	Applicant/Developer
When should the measure be implemented:	Prior to issuance of a building or grading permit
When should it be completed:	Prior to issuance of the Final Occupancy Permit
Who verifies compliance:	Stanislaus County Planning and Community Development Department
Other Responsible Agencies:	None

IV. BIOLOGICAL RESOURCES

No. 3 Mitigation Measure: Pre-construction surveys for Valley Elderberry Longhorn Beetle (VELB) on the site shall be conducted by a qualified biologist, in accordance with any applicable United States Fish and Wildlife protocols. Prior to the removal of any elderberry shrubs, the applicant shall obtain concurrence from US Fish and Wildlife Service regarding removing the shrubs. Prior to securing concurrence to remove the blue elderberry shrubs, the shrubs shall be protected with a no-disturbance buffer extending 10 feet from the driplines of the shrubs. Construction in the vicinity of the blue elderberry shrubs should occur between June 15 and April 15. During this time period, VELB (if present) would be within the interior portion of the stems of the shrubs and would not move (i.e., fly or walk) into the construction area.

Who Implements the Measure:	Applicant/Developer
When should the measure be implemented:	Prior to removal of any blue elderberry shrubs
When should it be completed:	After United States Fish and Wildlife (USFW) approval of a plan to remove any blue elderberry shrubs
Who verifies compliance:	Stanislaus County Planning and Community Development Department, in consultation with USFW and a qualified biologist
Other Responsible Agencies:	California Department of Fish and Wildlife (CDFW); Stanislaus County Planning and Community Development Department.

No. 4 Mitigation Measure: If ground disturbing activity or construction commences between March 1 and September 15, pre-construction surveys for nesting Swainson's hawks (SWHA) shall be conducted by a qualified biologist. SWHA surveys shall be conducted a maximum of 10 days prior to the onset of grading or construction activities, within 0.5 miles of the project site area, in accordance with protocol developed by the Swainson's Hawk Technical Advisory Committee (SWHA TAC, 2000). If active nests are found, a qualified biologist, in consultation with the California Department of Fish and Wildlife (CDFW), shall determine the need (if any) for temporal restrictions on construction, including but not limited to a minimum no-disturbance buffer of 0.5 miles to be maintained around active nests prior to and during any ground-disturbing activities until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival. If take cannot be avoided, take authorization through the issuance of an Incidental Take Permit (ITP), pursuant to Fish and Game Code section 2081 subdivision (b) is necessary to comply with CESA. The determination shall utilize criteria set forth by CDFW (CDFG, 1994).

Who Implements the Measure: Applicant/Developer

When should the measure be implemented: Prior to any commencement of any construction activity between March 1 and September 1 of the year

When should it be completed: As determined by a qualified biologist when construction activities take place between March 1 and September 1 during the year

Who verifies compliance: Stanislaus County Planning and Community Development Department, in consultation with California Department of Fish and Wildlife (CDFW) and a qualified biologist

Other Responsible Agencies: Stanislaus County Planning and Community Development Department

No. 5 Mitigation Measure: If construction commences between February 1 and August 31, pre-construction surveys for burrowing owls on the site shall be conducted. If occupied burrows are found, a qualified biologist should determine the need (if any) for temporal restrictions on construction. The determinations shall be pursuant to criteria set forth by CDFW (CDFG, 2012).

Who Implements the Measure: Applicant/Developer

When should the measure be implemented: Prior to any commencement of any grading, grubbing or construction activity between February 1 and August 31 of the year

When should it be completed: Prior to any grading, grubbing, or construction activities

Who verifies compliance: Stanislaus County Planning and Community Development Department, in consultation with California Department of Fish and Wildlife (CDFW) and a qualified biologist

Other Responsible Agencies: Stanislaus County Planning and Community Development Department

No. 6 Mitigation Measure: Trees, shrubs, and grasslands in the site could be used by other birds protected by the Migratory Bird Treaty Act of 1918. If vegetation removal or construction commences during the general avian nesting season (March 1 through July 31), a pre-construction survey for nesting birds shall be completed. If active nests are found, work in the vicinity of the nest shall be delayed until the young fledge.

Who Implements the Measure: Applicant/Developer

When should the measure be implemented: Prior to any commencement of any grading, grubbing or construction activity between March 1 and July 31 of the year

When should it be completed: Prior to any grading, grubbing or construction activities

Who verifies compliance:	Stanislaus County Planning and Community Development Department, in consultation with California Department of Fish and Wildlife (CDFW) and a qualified biologist
Other Responsible Agencies:	Stanislaus County Planning and Community Development Department

No. 7 Mitigation Measure: All oak trees over four inches in diameter shall be preserved to the maximum extent practical. Final development plans shall depict all oak trees proposed for removal. If oak trees four inches in diameter or more exist on the project site, the applicant shall submit a tree preservation plan to the Stanislaus County Planning Division for review and approval. The tree preservation plan shall include the following:

- Any removed oak trees shall be replaced at a two-to-one tree replacement ratio.
- The tree preservation plan shall include the location, number, species, and size of proposed replacement plantings.
- The tree preservation plan shall include monitoring provisions for watering and landscaping to ensure survival and health of planted oak trees.
- Replacement trees shall be monitored for a period no less than 5 years after replacement trees have been planted; Dead or dying trees shall be replaced.

Who Implements the Measure:	Applicant/Developer
When should the measure be implemented:	Prior to any commencement of any grading, grubbing or construction activity
When should it be completed:	Prior to any grading, grubbing or construction activities
Who verifies compliance:	Stanislaus County Planning and Community Development Department, in consultation with California Department of Fish and Wildlife (CDFW) and a qualified biologist
Other Responsible Agencies:	Stanislaus County Planning and Community Development Department

IX. HAZARDS AND HAZARDOUS MATERIALS

No. 8 Mitigation Measure: Construction contracts shall include a stop-work provision in the event previously unidentified contamination is discovered during construction so that appropriate actions can be taken to reduce potential human health and environmental hazards.

Who Implements the Measure:	Applicant/Developer
When should the measure be implemented:	Prior to grading and construction activity

When should it be completed: When grading and construction activities are completed

Who verifies compliance: Stanislaus County Planning and Community Development Department

Other Responsible Agencies: Stanislaus County Department of Environmental Resources, Hazardous Materials Division

XIII. NOISE

No. 9. Mitigation Measure: Hours of construction on the project site shall be limited to 7:00 a.m. to 6:00 p.m. Monday thru Friday, with no construction allowed on holidays.

Who Implements the Measure: Applicant

When should the measure be implemented: Prior to any grading, grubbing or construction activities

When should it be completed: Upon completion of any grading, grubbing or construction activities

Who verifies compliance: Stanislaus County Public Works Department

Other Responsible Agencies: Stanislaus County Planning and Community Development Department

XVII. TRANSPORTATION

No. 10 Mitigation Measure: Prior to issuance of a building permit, the applicant shall pay the Keyes Community Plan Mitigation Funding Program fees for the proposed land uses per the Keyes Community Plan fee program adopted at the time of building permit issuance. These fees are adjusted for inflation using the Engineering News-Record construction cost index and shall be paid prior to building permit issuance.

Who Implements the Measure: Applicant

When should the measure be implemented: Prior to issuance of a building permit for each specified use

When should it be completed: Prior to issuance of a building permit for each specified use

Who verifies compliance: Stanislaus County Public Works Department

Other Responsible Agencies: Stanislaus County Planning and Community Development Department

No. 11 Mitigation Measure: Prior to final of a building permit for Phase 1 (gas station and convenience store), the applicant shall:

- Dedicate the required right of way along the property’s frontage along North Golden State Boulevard and Keyes Road.
    - North Golden State Boulevard is designated as a 110-foot Urban Minor Arterial with a standard of 150-foot wide intersections.

Dedicate the required right-of-way of 67.5 feet southwest of the centerline of North Golden State Boulevard and up to 75 feet as necessary to accommodate the required lane configurations of the intersections as described in the Traffic Impact Analysis and the Keyes Community Plan.

- Keyes Road is designated as a 135-foot six-lane urban expressway with a standard of 180-foot wide intersections.

  The existing right-of-way at its narrowest point is 50 feet north of Keyes Road centerline as shown in Record of Survey 19-S-036. An additional 40 feet of right-of-way shall be dedicated along the southern property line adjacent to Keyes Road, unless applicant's engineer can demonstrate to the Department of Public Works that less right-of-way can accommodate the necessary roadway improvements and fill slopes for the raised roadway without encroaching beyond the right-of-way line.

- Construct an all-way stop intersection at the main driveway along Golden State Boulevard, in a location approved by the Department of Public Works approximately 550 feet north of Keyes Road, that can accommodate a future traffic signal to the satisfaction of the Public Works Traffic Engineering Division. These improvements include the installation of traffic signal poles in-lieu of street light poles and the installation of a four-inch conduit across Golden State Boulevard on both the north and south sides of the driveway and across the site's main entrance such that a future traffic signal installation will be less disruptive to traffic. Applicant to coordinate with the Traffic Engineering Division.

Who Implements the Measure:	Applicant
When should the measure be implemented:	Prior to final of a building permit for Phase 1
When should it be completed:	Prior to final of a building permit for Phase 1
Who verifies compliance:	Stanislaus County Public Works Department
Other Responsible Agencies:	Stanislaus County Planning and Community Development Department

No. 12 Mitigation Measure: Prior to issuance of a building permit for anything beyond Phase 1 (gas station and convenience store), the applicant shall:

- Have constructed and met all conditions and mitigations associated with Phase 1 (gas station and convenience store).
- Construct a southbound channelized right turn lane at the intersection of Keyes Road and Golden State Boulevard and modify the existing traffic signal as necessary to accommodate the improvements.

Who Implements the Measure:	Applicant
When should the measure be implemented:	Prior to issuance of a building permit for anything beyond Phase 1

When should it be completed:	Prior to issuance of a building permit for anything beyond Phase 1
Who verifies compliance:	Stanislaus County Public Works Department
Other Responsible Agencies:	Stanislaus County Planning and Community Development Department

I, the undersigned, do hereby certify that I understand and agree to be responsible for implementing the Mitigation Monitoring and Reporting Program (MMRP) for the above listed project.

Signature on file.
Person Responsible for Implementing MMRP

January 23, 2023
Date

KAMIR INCORPORATED

REZ PLN2018-0057

AREA MAP

LEGEND

Project Site

Sphere of Influence

City

Road

River

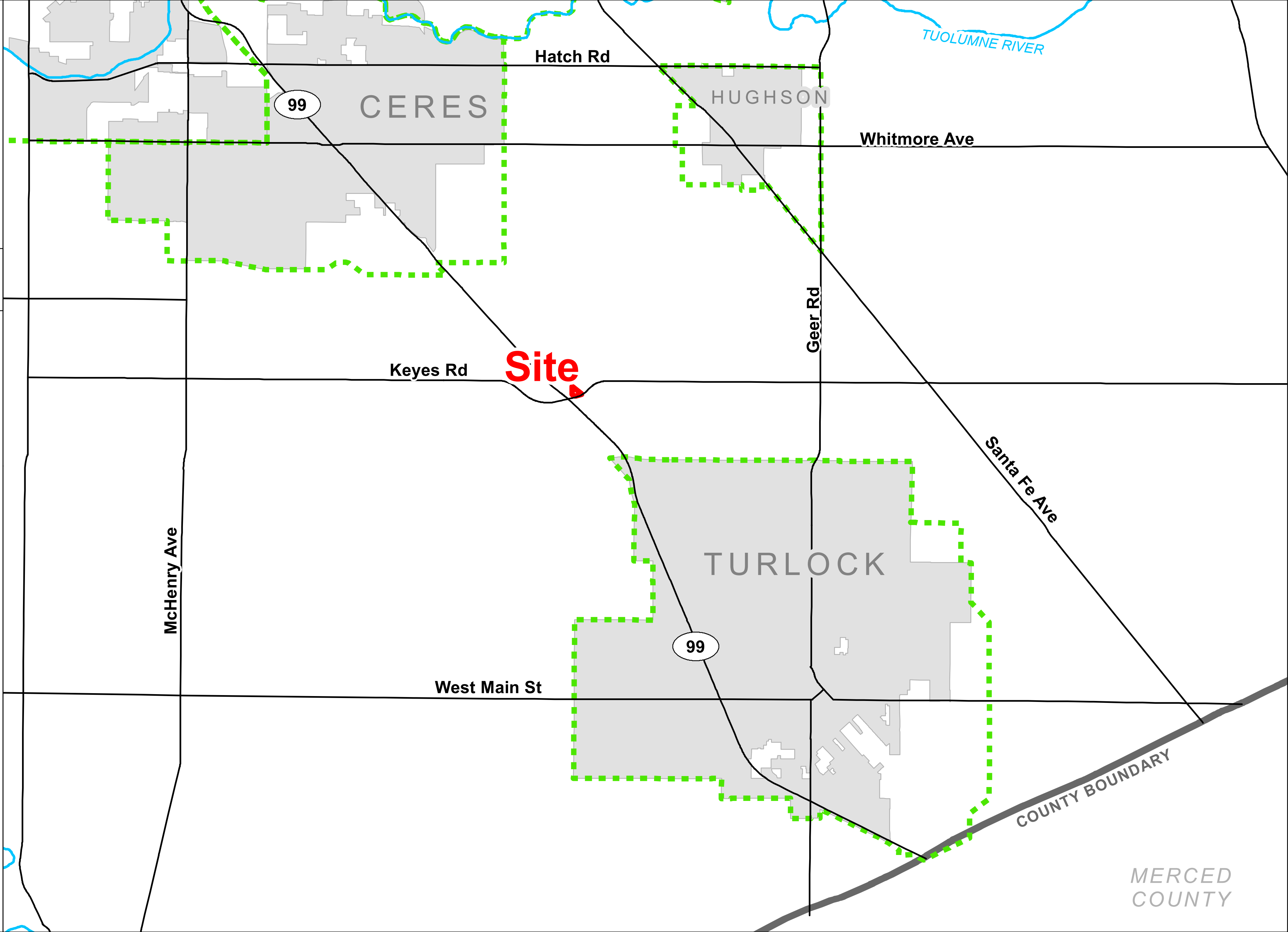
N

0 2 mi

0 2 km

Source: Planning Department GIS

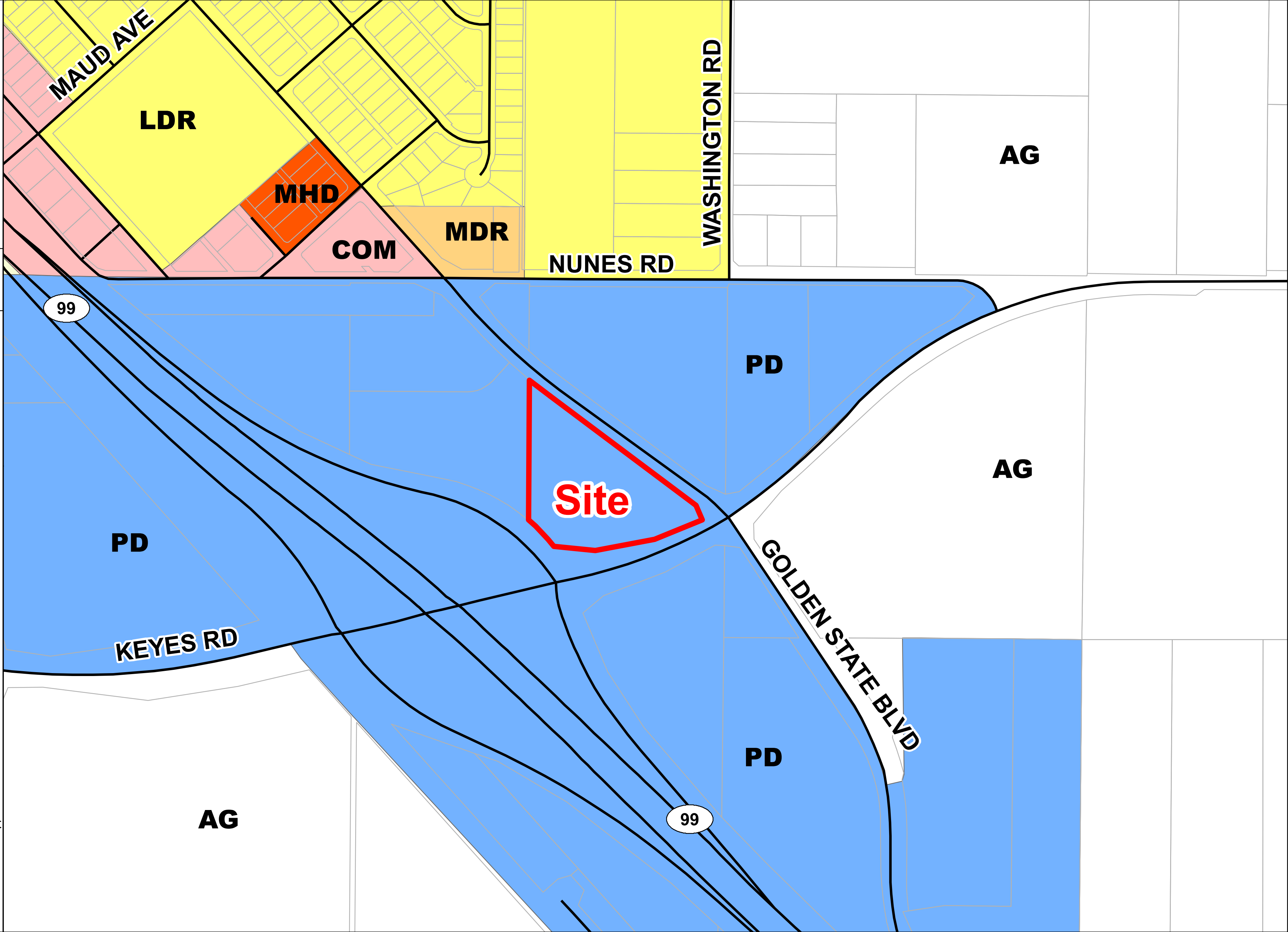
Date: 12/28/2022



KAMIR INCORPORATED

REZ PLN2018-0057

GENERAL PLAN MAP



LEGEND

- Project Site
- Parcel
- Road

General Plan

- Agriculture
- Planned Development
- Low Density Residential
- Medium Density Residential
- Medium High Density Residential
- Commercial

N

0 1,000 ft

0 300 m

Source: Planning Department GIS

Date: 12/28/2022

KAMIR INCORPORATED

REZ PLN2018-0057

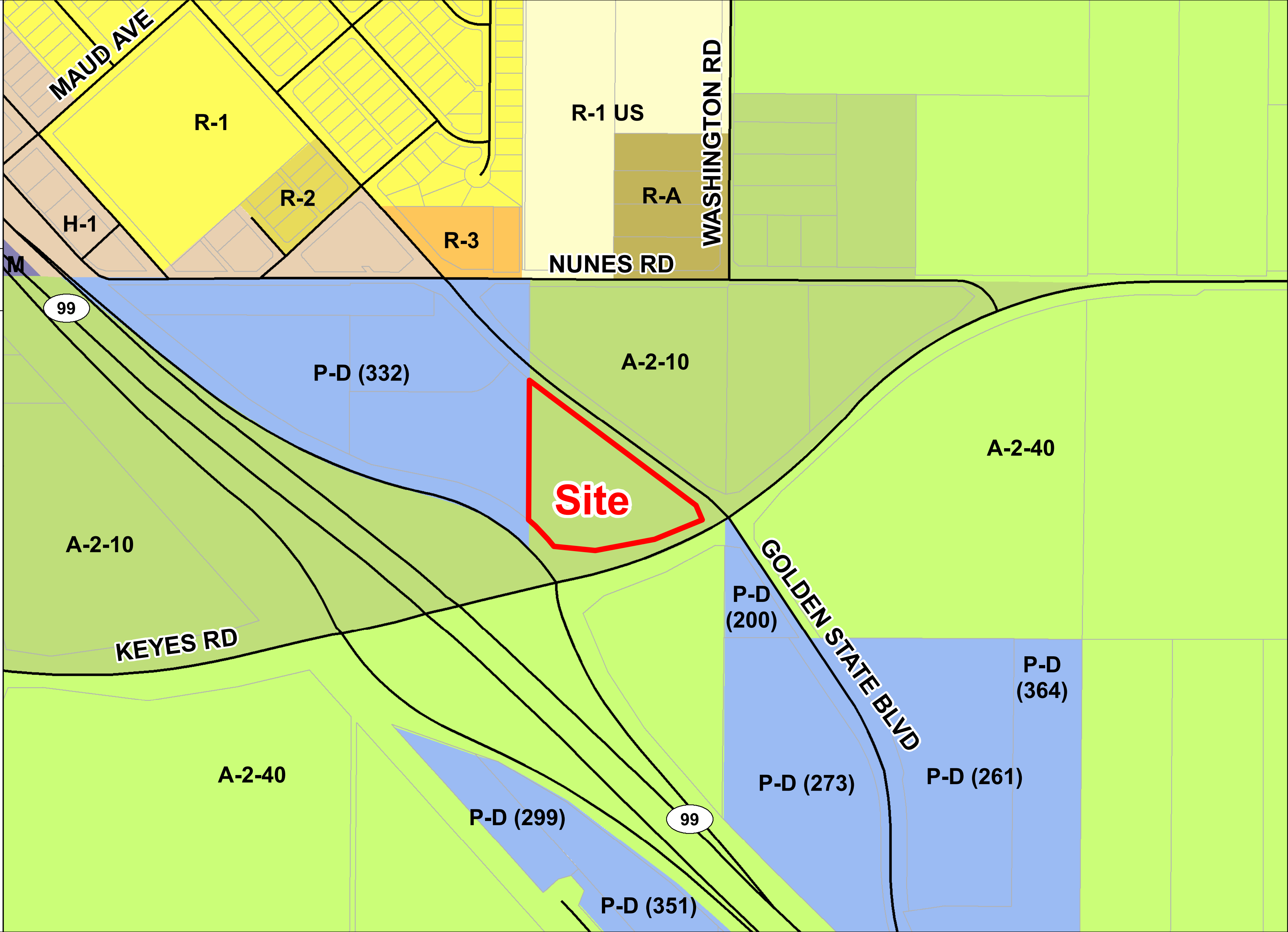
ZONING MAP

LEGEND

- Project Site
- Parcel
- Road

Zoning Designation

- General Agriculture 10 Acre
- General Agriculture 40 Acre
- Industrial
- Planned Development
- Single Family Residential
- Single Family Residential
- Medium Density Residential
- Multiple Family
- Rural Residential
- Highway Frontage



Source: Planning Department GIS

Date: 12/28/2022

KAMIR INCORPORATED

REZ PLN2018-0057

2022 AERIAL AREA MAP

LEGEND

Project Site

Road

N

0 1,000 ft

0 300 m

Source: Planning Department GIS

Date: 12/28/2022

KAMIR INCORPORATED

REZ
PLN2018-0057

2022 AERIAL SITE MAP

LEGEND

Project Site

Road

N

Source: Planning Department GIS

Date: 12/28/2022

KAMIR INCORPORATED

REZ PLN2018-0057

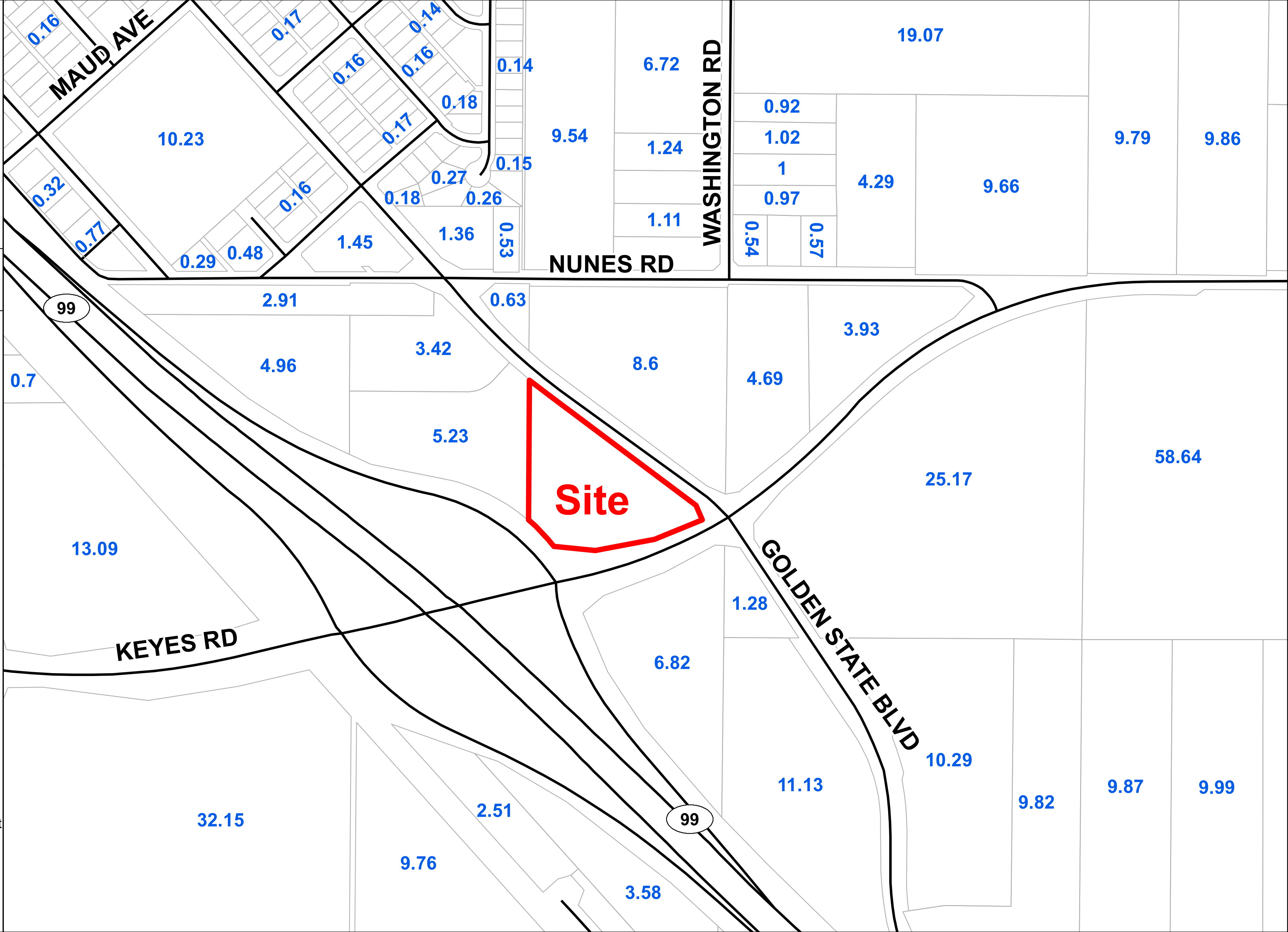
ACREAGE MAP

LEGEND

Project Site

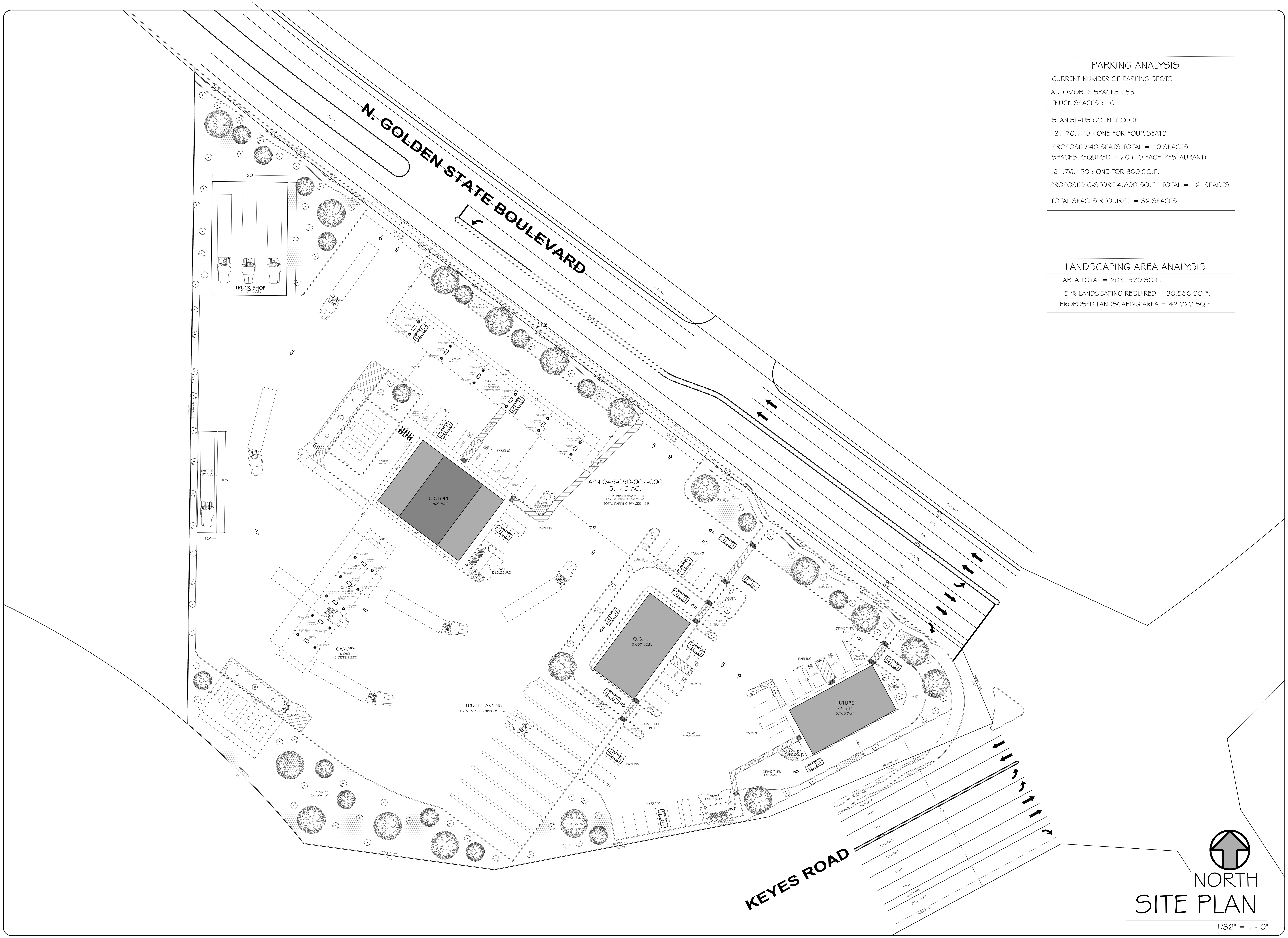
Parcel/Acres

Road



N 0 1,000 ft 0 300 m

Source: Planning Department GIS Date: 12/28/2022



SITE PLAN

1/32" = 1'- 0"

PARKING ANALYSIS

CURRENT NUMBER OF PARKING SPOTS

AUTOMOBILE SPACES : 55
TRUCK SPACES : 10

STANISLAUS COUNTY CODE

.21.76.140 : ONE FOR FOUR SEATS

PROPOSED 40 SEATS TOTAL = 10 SPACES
SPACES REQUIRED = 20 (10 EACH RESTAURANT)

.21.76.150 : ONE FOR 300 SQ.F.

PROPOSED C-STORE 4,800 SQ.F. TOTAL = 16 SPACES

TOTAL SPACES REQUIRED = 36 SPACES

LANDSCAPING AREA ANALYSIS

AREA TOTAL = 203, 970 SQ.F.

15 % LANDSCAPING REQUIRED = 30,586 SQ.F.

PROPOSED LANDSCAPING AREA = 42,727 SQ.F.

REVISIONS	BY

MAGALLON CONSTRUCTION CO., INC.
GENERAL BUILDING CONTRACTORS
-Four Decades of Building Excellence-
State License No. 396394

DESIGN & DEVELOPMENT

SITE PLAN

KEYES RD. TRUCK STOP

NEW CONVENIENCE STORE / 3 FAST FOOD RESTAURANT AND TRUCK / AUTO FUELING FACILITY

N. GOLDEN STATE BLVD. / KEYES RD.
TURLOCK, CALIFORNIA 95382

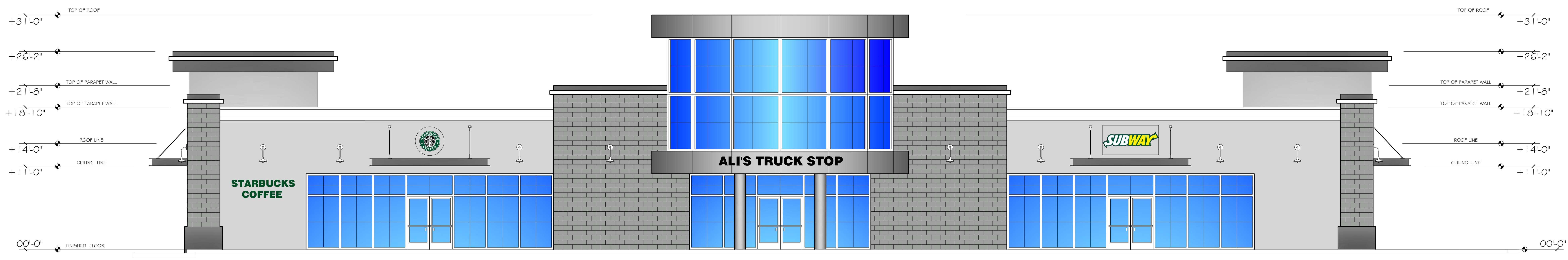
DATE 01/17/23

SCALE 1/32" = 1'- 0"

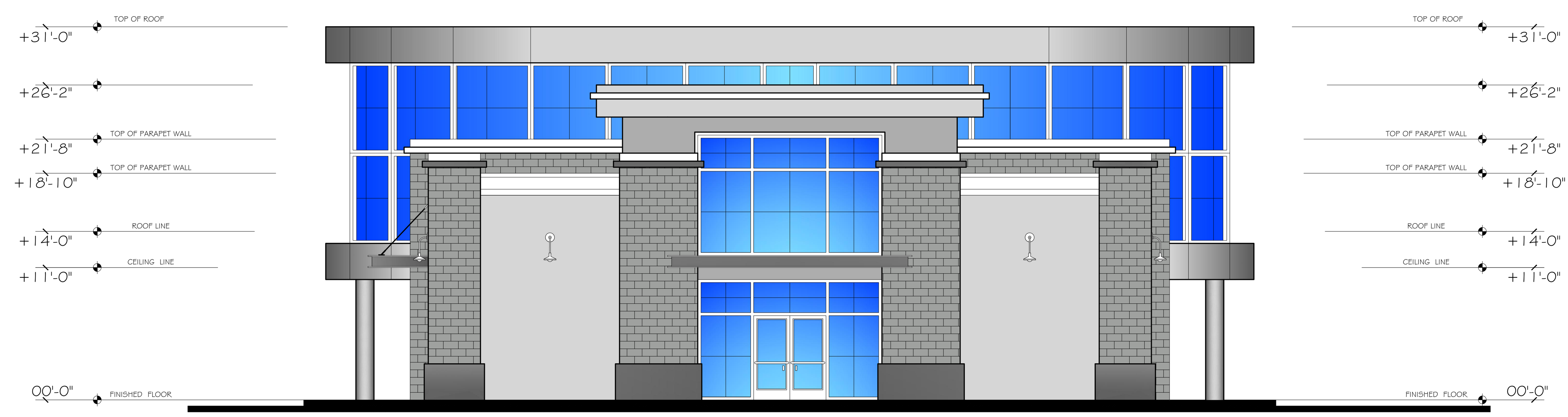
DRAWN M.BARRETO

JOB

SHEET A 5



SOUTH EAST ELEVATION



NORTH EAST ELEVATION

ELEVATIONS

1/8" = 1'- 0"

REVISIONS	BY

MAGALLON CONSTRUCTION CO., INC.
GENERAL BUILDING CONTRACTORS
-Four Decades of Building Excellence-

DESIGN & DEVELOPMENT

ELEVATIONS

KEYES RD. TRUCK STOP
NEW CONVENIENCE STORE / 3 FAST FOOD RESTAURANT AND TRUCK / AUTO FUELING FACILITY

N. GOLDEN STATE BLVD. / KEYES RD.
TURLOCK, CALIFORNIA 95382

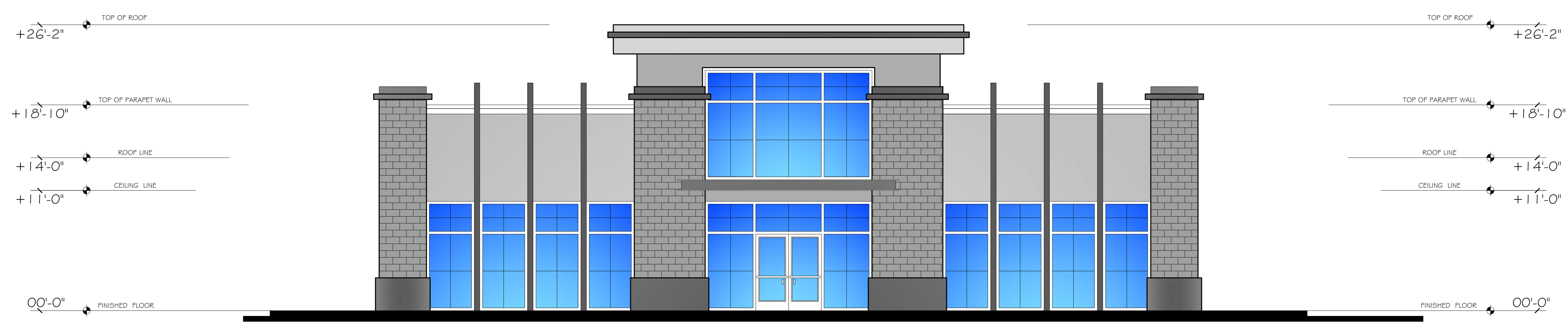
DATE 10/04/18

SCALE 1/8" = 1'- 0"

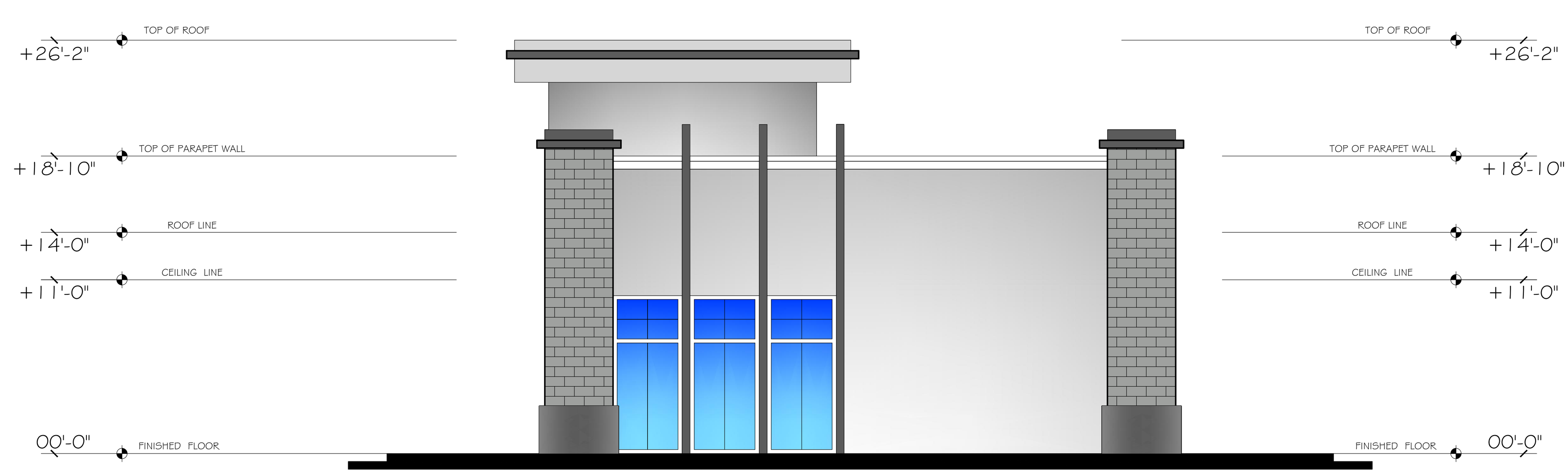
DRAWN M.BARRETO

JOB

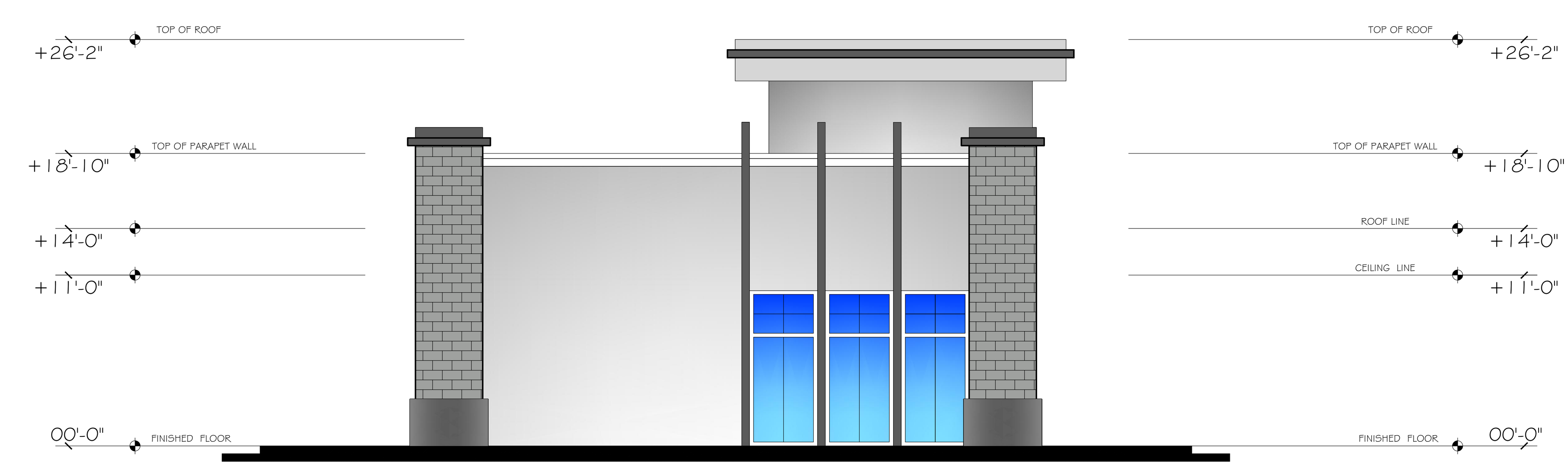
SHEET A 2



NORTH ELEVATION



WEST ELEVATION



EAST ELEVATION

ELEVATIONS

1/8" = 1'- 0"

REVISIONS	BY

MAGALLON CONSTRUCTION CO., INC.
GENERAL BUILDING CONTRACTORS
-Four Decades of Building Excellence-

DESIGN & DEVELOPMENT

ELEVATIONS

KEYES RD. TRUCK STOP
NEW CONVENIENCE STORE / 3 FAST FOOD RESTAURANT AND TRUCK / AUTO FUELING FACILITY

N. GOLDEN STATE BLVD. / KEYES RD.
TURLOCK, CALIFORNIA 95382

DATE 10/04/18

SCALE 1/8" = 1'- 0"

DRAWN M.BARRETO

JOB

SHEET A 3

EPS
ENVIRONMENTAL PERMITTING SPECIALISTS
Air Quality • Permitting • OHSA • RMP/PSM

January 21, 2020

Mr. Michael Corder
San Joaquin Valley APCD
1990 East Gettysburg Ave
Fresno, CA 93726

Subject: Response to Comments Dated November 16, 2018
Kamir Inc. Travel Plaza, Keyes, CA CEQA Reference 20181226

Dear Mr. Corder:

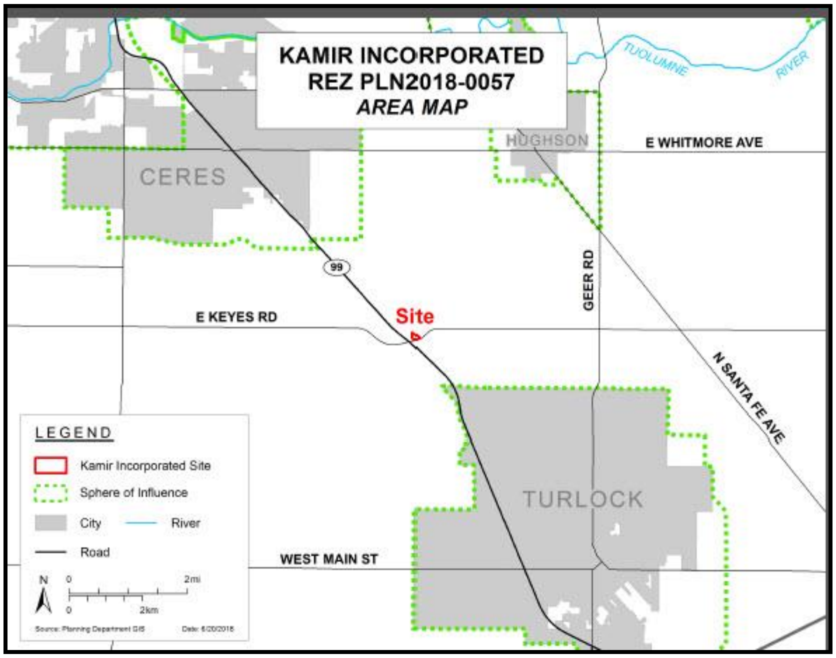
In response to District comments on the above referenced project I am providing the requested analysis and other information for the proposed travel plaza to be located in Keyes, CA. The project would be located at the intersection of North Golden State Blvd., and East Keyes Road. Figure 1 illustrates the project site.

The travel plaza consists of car and truck fueling stations, a convenience store, two buildings for future fast food restaurants. A truck scale and parking spaces. Specific project details are provided in Tables 1 and 2:

Table 1
Project Components

Item	Description	Details
1	Site Area	5.15Acres
2	Convenience Store	4,800 Square Feet
3	Shell Building #1 for Future Fast Food Restaurant	3,000 Square Feet
4	Shell Building #2 for Future Fast Food Restaurant	2,000 Square Feet
5	Gasoline Fueling Stations	6
6	Diesel Fuelling Truck Stations	6
7	Truck Parking Spaces	30
8	Truck Scale	1

Figure 1
Project Location and Site Maps



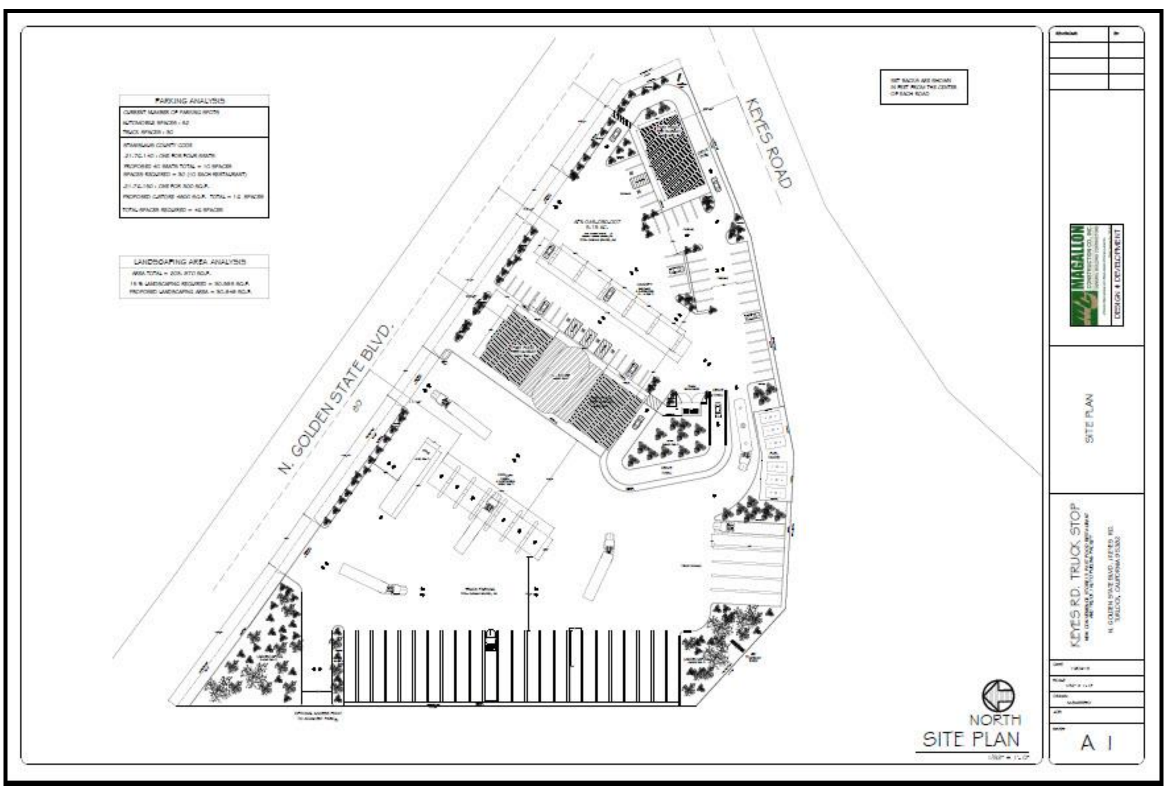


Table 2 Project Metrics		
Item	**Description**	**Details**
9	Daily Traffic Volume	1,150 new trips per day *Ref: Fehr & Peers Traffic Engineers, Irvine, CA*
10	Monthly Gasoline Throughput	200,000 Gallons per Month
11	Monthly Diesel Throughput	250,000 Gallons per Month
12	Construction Schedule	May 2020 to April 2021
13	Operational Year	June 2021

The District's comments identified the following items that needed to be addressed:

1. CONSTRUCTION EMISSIONS
2. OPERATIONAL EMISSIONS
3. NUISANCE ODORS
4. HEALTH RISK SCREENING EVALUATION
5. AMBIENT AIR ANALYSIS
6. MITIGATED NEGATIVE DECLARATION
7. NEED FOR AN EIR
8. COMPLIANCE WITH RULES 2201 AND 2010
9. COMPLIANCE WITH RULE 9510 (ISR)
10. COMPLIANCE WITH RULE 4692 (PM-25 FROM UNDERFIRE CHARBROILERS)
11. COMPLANCE WITH MISC. DISTRICT REGULATIONS

The responses to these items are provided below. Detailed calculations and data are provided in Attachments 1 to 5.

1. CONSTRUCTION EMISSIONS

As requested in the District's comment, we have used the CalEEMod emissions estimation model Version 2016.3.2 to determine construction emissions. The model results are based on the project data presented in Tables and 1 and 2. Construction is expected to begin May 1, 2020 and finish by the end of April 2021. No significant demolition or importing/exporting of soil is anticipated. In addition, since the site is relatively flat with no existing structures, minimal grading will be required. The choice and number of construction equipment, load factors, etc., are based on recommended default CalEEMod values. A copy of the CalEEMod model results are provided in Attachments 1 and 3. Electronic copies of the input/output files are attached. The results in terms of annual and daily emissions of criteria air pollutants are provided in Tables 3 and 4.

Table 3
Maximum Annual Construction Emissions

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1987	1.8835	1.4554	2.4600e-003	0.1764	0.1029	0.2793	0.0931	0.0961	0.1892	0.0000	213.4368	213.4368	0.0551	0.0000	214.8140
2021	0.1673	0.6385	0.6210	1.0300e-003	2.0900e-003	0.0346	0.0367	5.7000e-004	0.0325	0.0331	0.0000	88.7196	88.7196	0.0214	0.0000	89.2546
Maximum	**0.1987**	**1.8835**	**1.4554**	**2.4600e-003**	**0.1764**	**0.1029**	**0.2793**	**0.0931**	**0.0961**	**0.1892**	**0.0000**	**213.4368**	**213.4368**	**0.0551**	**0.0000**	**214.8140**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Table 4
Maximum Daily Construction Emissions

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	4.1681	42.4677	22.3103	0.0402	18.2141	2.1985	20.4126	9.9699	2.0226	11.9925	0.0000	3,880.867 3	3,880.867 3	1.1969	0.0000	3,907.421 5
2021	18.0220	17.6616	16.7445	0.0278	0.1232	0.9595	1.0058	0.0327	0.9021	0.9147	0.0000	2,646.896 1	2,646.896 1	0.7177	0.0000	2,662.436 1
Maximum	18.0220	42.4677	22.3103	0.0402	18.2141	2.1985	20.4126	9.9699	2.0226	11.9925	0.0000	3,880.867 3	3,880.867 3	1.1969	0.0000	3,907.421 5

2. OPERATIONAL EMISSIONS

As requested in the District's comment, we have used the CalEEMod emissions estimation model. As with construction emissions, the model calculations are based on the project data presented in Tables and 1 and 2. The travel plaza is expected to be operational by June 2021.

Default trip lengths for this project range from 7.3 miles to 9 miles. That means that the CalEEMod model assumes the trips would originate either in Modesto or just South of Salida.

Clearly, that will not be the case for this project as there are many other gasoline stations and convenience stores in Modesto and Salida and residents in these towns would not travel to Keyes to purchase gasoline or visit a convenience store. Use of default trip lengths would mischaracterize the actual trip lengths associated with this project.

For the current project, most of the customers will be “Pass Thru” that will exit Highway 99 for re-fueling and then return to the Highway. This trip length is estimated to be less than 0.5 mile. Customers residing in the town of Keyes who travel to the gas station would have a maximum trip length of 1.35 miles. We have used a trip length of 1.35 miles. This trip length is a conservative estimate of each trip length as not every customer who resides in Keyes would travel 1.35 miles to get to the gas stations. Most residents live less than 1 mile from the project location. See Figure 2.

Table 5
Maximum Annual Operational Emissions

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0589	0.0000	1.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.3000e-004	2.3000e-004	0.0000	0.0000	2.4000e-004
Energy	8.1000e-004	7.3400e-003	6.1700e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004	0.0000	65.0442	65.0442	2.1400e-003	5.6000e-004	65.2637
Mobile	0.2924	2.3710	1.6896	5.0900e-003	0.1895	4.7000e-003	0.1942	0.0510	4.4300e-003	0.0554	0.0000	474.4475	474.4475	0.0830	0.0000	476.5234
Waste						0.0000	0.0000		0.0000	0.0000	7.8091	0.0000	7.8091	0.4615	0.0000	19.3466
Water						0.0000	0.0000		0.0000	0.0000	0.3008	2.7084	3.0092	0.0310	7.5000e-004	4.0072
Total	**0.3521**	**2.3783**	**1.6959**	**5.1300e-003**	**0.1895**	**5.2600e-003**	**0.1947**	**0.0510**	**4.9900e-003**	**0.0560**	**8.1099**	**542.2004**	**550.3103**	**0.5777**	**1.3100e-003**	**565.1411**

Table 6
Maximum Daily Operational Emissions

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.3228	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.8000e-003	2.8000e-003	1.0000e-005		2.9900e-003
Energy	4.4200e-003	0.0402	0.0338	2.4000e-004		3.0600e-003	3.0600e-003		3.0600e-003	3.0600e-003		48.2708	48.2708	9.3000e-004	8.8000e-004	48.5576
Mobile	2.0372	13.0857	8.7525	0.0296	1.0694	0.0250	1.0945	0.2870	0.0236	0.3106		3,034.6830	3,034.6830	0.4769		3,046.6048
Total	**2.3644**	**13.1259**	**8.7876**	**0.0298**	**1.0694**	**0.0281**	**1.0975**	**0.2870**	**0.0266**	**0.3136**		**3,082.9565**	**3,082.9565**	**0.4778**	**8.8000e-004**	**3,095.1653**

3. NUISANCE ODORS

As requested in the District's comment, we have used the CalEEMod emissions estimation model. As with construction emissions, the model calculations are based on the

4. HEALTH RISK SCREENING

The health risk screening analysis involves calculating the annual and hourly emission rates of various toxic air contaminants and then using the District's recommended Prioritization Calculator to determine cancer and non-cancer risk scores.

TACs are released from on-site truck idling and gasoline dispensing and storage. In addition, we evaluated TAC emissions from off-site travel within 0.25 miles of the project location. Detailed calculation of emissions from truck idling, gasoline dispensing and store, etc. are provided in Attachment 4 and summarized in Table 7.

Table 7
Summary of Annual Toxic Air Emissions

	On-Site Truck Idle	Off-Site Truck Travel	Off-Site Auto Travel	On-Site Gasoline Dispensing and Storage	TOTAL (lbs/yr)
Reference Appendix 4	Table 3	Tab;le 4	Table 5	Tables 6 and 7	
1,3 Butadiene			0.78		0.78
Acetaldehyde			0.64		0.64
Benzene			10.47	14.42	24.89
DPM	12.99	4.82			17.81
Ethyl Benzene				39.28	39.28
Formaldehyde			2.97		2.97
Toluene				196.42	196.42
Xylene				58.92	58.92

The results of the screening analysis shows that the cancer and non-cancer prioritization scores are 0.259 and 0.00637 respectively at the nearest residence located 294 meters (0.18 miles) North of the project as shown below. There are no schools within 1,000 feet of the project. A copy of the prioritization calculation is provided in Attachment 4 (Table 2).

Figure 2
Location of Nearest Residence

Since the prioritization scores are well below the thresholds of significance, a detail health risk assessment is not required. The thresholds of significance are:

Cancer Score: 10

Non-Cancer Score: 1.0

5. AMBIENT AIR ANALYSIS

An ambient air impact analysis is not required as daily emissions of any single air pollutant will be below 100 lbs/day. An estimate of daily emissions is shown in Table 6.

6. MITIGATED NEGATIVE DECLARATION

An estimate for construction and operational emissions indicates that a mitigated negative declaration will not be required.

7. NEED FOR AN EIR

The project impacts will be less than significant, and therefore, an EIR will not be required.

8. COMPLIANCE WITH DISTRICT RULES 2201 AND 2210

This project is subject to Rule 2201 and 2010. The applicant will submit applications for an Authority to Construct the gasoline dispensing stations prior to construction.

9. COMPLIANCE WITH DISTRICT RULE 9510 (ISR)

This project is subject to District Rule 2201 (New Source Review) however, it will be subject to the ISR rule. Since the annual NOx emissions exceed 2 tons/yr. It is our understanding that the project will be subject to emissions fees for emissions above 2 tons/year. Annual operational NOx emissions are estimated to be 2.38 tons/yr. Therefore, 0.38 tons of NOx will be subject to emission fees. We estimate these fees to be approximately $9,350/ton x 0.38 tons = $3,553. The fees will be paid pursuant to District Rule 9510.

10. COMPLIANCE WITH DISTRICT RULE 4692

The proposed project would not involve construction of under-fire charbroilers. Compliance with District Rule 4692, if applicable, will be the responsibility of future tenants occupying the two shell buildings who choose to install under-fire charbroilers.

11. COMPLIANCE WITH DISTRICT RULES

The project will be subject compliance with the following District Rules.

Rule	Description	Compliance How?
Regulation VIII	Control of Fugitive Dust	The construction contractor will adhere to Regulation VIII requirements and if necessary file a dust mitigation plan prior to start of construction No fugitive dust is expect during the operational phase as vehicle movement will occur on paved areas
Rule 4102	Nuisance	No noise or odors are expect during the operational phase. Future tenants (fat food restaurants) would be subject to nuisance requirements.
Rule 4601	Architectural Coatings	All coating will comply with the VOC limits as noted in Rule 4601.
Rule 4641	Paving and Maintenance	The paving contractor will be notified of the requirements for slow cure and/or emulsified asphalt. Rapid and medium cure cutback asphalt will not be used

If you have any questions or require additional information, please contact me at (916) 687-8352 or by e-mail: ray.kapahi@gmail.com.

Sincerely,

Ray Kapahi

Ray Kapahi
Environmental Permitting Specialists

Copies: Jeremy Ballard – County of Stanislaus
Kumil Kandahari – CFO Kumil, Inc.

Attachments 1 to 5

Attachment 1:	Annual Construction and Operational Emission Calculations
Attachment 2:	Traffic Data from Fehr & Pers
Attachment 3:	Daily Construction and Operational Emission Calculations
Attachment 4:	Toxic Emission Calculations
Attachment 5:	Screening Level Risk Evaluation

Attachment 1: Annual Construction and Operational Emission Calculations

Kamir Travel Plaza

Stanislaus County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Convenience Market With Gas Pumps	12.80	1000sqft	5.50	12,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	46
Climate Zone	2			**Operational Year**	2021
Utility Company	Modesto Irrigation District				
CO2 Intensity (lb/MWhr)	833.46	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project area, Lot Size per project specifications.

Construction Phase - Per project specs

Vehicle Trips - Per traffic report. Also see Figure 2.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	11.00
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	230.00	185.00
tblConstructionPhase	NumDays	20.00	10.00
tblConstructionPhase	NumDays	20.00	10.00
tblGrading	AcresOfGrading	11.00	10.00
tblLandUse	LotAcreage	0.29	5.50
tblVehicleTrips	CC_TL	7.30	1.35
tblVehicleTrips	CC_TTP	80.20	95.00
tblVehicleTrips	CNW_TTP	19.00	1.00
tblVehicleTrips	CW_TL	9.50	1.35
tblVehicleTrips	CW_TTP	0.80	4.00
tblVehicleTrips	DV_TP	21.00	16.00
tblVehicleTrips	PB_TP	65.00	4.00
tblVehicleTrips	PR_TP	14.00	80.00
tblVehicleTrips	ST_TR	1,448.33	90.00
tblVehicleTrips	SU_TR	1,182.08	90.00
tblVehicleTrips	WD_TR	845.60	90.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1987	1.8835	1.4554	2.4600e-003	0.1764	0.1029	0.2793	0.0931	0.0961	0.1892	0.0000	213.4370	213.4370	0.0551	0.0000	214.8143
2021	0.1673	0.6385	0.6210	1.0300e-003	2.0900e-003	0.0346	0.0367	5.7000e-004	0.0325	0.0331	0.0000	88.7197	88.7197	0.0214	0.0000	89.2547
Maximum	**0.1987**	**1.8835**	**1.4554**	**2.4600e-003**	**0.1764**	**0.1029**	**0.2793**	**0.0931**	**0.0961**	**0.1892**	**0.0000**	**213.4370**	**213.4370**	**0.0551**	**0.0000**	**214.8143**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1987	1.8835	1.4554	2.4600e-003	0.1764	0.1029	0.2793	0.0931	0.0961	0.1892	0.0000	213.4368	213.4368	0.0551	0.0000	214.8140
2021	0.1673	0.6385	0.6210	1.0300e-003	2.0900e-003	0.0346	0.0367	5.7000e-004	0.0325	0.0331	0.0000	88.7196	88.7196	0.0214	0.0000	89.2546
Maximum	**0.1987**	**1.8835**	**1.4554**	**2.4600e-003**	**0.1764**	**0.1029**	**0.2793**	**0.0931**	**0.0961**	**0.1892**	**0.0000**	**213.4368**	**213.4368**	**0.0551**	**0.0000**	**214.8140**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
2	4-2-2020	7-1-2020	0.5229	0.5229
3	7-2-2020	10-1-2020	0.8345	0.8345
4	10-2-2020	1-1-2021	0.7087	0.7087
5	1-2-2021	4-1-2021	0.6278	0.6278
6	4-2-2021	7-1-2021	0.1711	0.1711
		Highest	0.8345	0.8345

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0589	0.0000	1.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.3000e-004	2.3000e-004	0.0000	0.0000	2.4000e-004
Energy	8.1000e-004	7.3400e-003	6.1700e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004	0.0000	65.0442	65.0442	2.1400e-003	5.6000e-004	65.2637
Mobile	0.2924	2.3710	1.6896	5.0900e-003	0.1895	4.7000e-003	0.1942	0.0510	4.4300e-003	0.0554	0.0000	474.4475	474.4475	0.0830	0.0000	476.5234
Waste						0.0000	0.0000		0.0000	0.0000	7.8091	0.0000	7.8091	0.4615	0.0000	19.3466
Water						0.0000	0.0000		0.0000	0.0000	0.3008	2.7084	3.0092	0.0310	7.5000e-004	4.0072
Total	**0.3521**	**2.3783**	**1.6959**	**5.1300e-003**	**0.1895**	**5.2600e-003**	**0.1947**	**0.0510**	**4.9900e-003**	**0.0560**	**8.1099**	**542.2004**	**550.3103**	**0.5777**	**1.3100e-003**	**565.1411**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0589	0.0000	1.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.3000e-004	2.3000e-004	0.0000	0.0000	2.4000e-004
Energy	8.1000e-004	7.3400e-003	6.1700e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004	0.0000	65.0442	65.0442	2.1400e-003	5.6000e-004	65.2637
Mobile	0.2924	2.3710	1.6896	5.0900e-003	0.1895	4.7000e-003	0.1942	0.0510	4.4300e-003	0.0554	0.0000	474.4475	474.4475	0.0830	0.0000	476.5234
Waste						0.0000	0.0000		0.0000	0.0000	7.8091	0.0000	7.8091	0.4615	0.0000	19.3466
Water						0.0000	0.0000		0.0000	0.0000	0.3008	2.7084	3.0092	0.0310	7.5000e-004	4.0072
Total	**0.3521**	**2.3783**	**1.6959**	**5.1300e-003**	**0.1895**	**5.2600e-003**	**0.1947**	**0.0510**	**4.9900e-003**	**0.0560**	**8.1099**	**542.2004**	**550.3103**	**0.5777**	**1.3100e-003**	**565.1411**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	5/1/2020	5/15/2020	5	11	
2	Grading	Grading	6/1/2020	6/30/2020	5	22	
3	Site Preparation	Site Preparation	7/1/2020	7/15/2020	5	10	
4	Building Construction	Building Construction	7/16/2020	3/31/2021	5	185	
5	Paving	Paving	4/1/2021	4/14/2021	5	10	
6	Architectural Coating	Architectural Coating	4/16/2021	4/30/2021	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 19,200; Non-Residential Outdoor: 6,400; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	4.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0182	0.1826	0.1196	2.1000e-004		9.1200e-003	9.1200e-003		8.4800e-003	8.4800e-003	0.0000	18.6992	18.6992	5.2800e-003	0.0000	18.8312
Total	**0.0182**	**0.1826**	**0.1196**	**2.1000e-004**		**9.1200e-003**	**9.1200e-003**		**8.4800e-003**	**8.4800e-003**	**0.0000**	**18.6992**	**18.6992**	**5.2800e-003**	**0.0000**	**18.8312**

3.2 Demolition - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7000e-004	2.5000e-004	2.6500e-003	1.0000e-005	6.6000e-004	1.0000e-005	6.6000e-004	1.8000e-004	0.0000	1.8000e-004	0.0000	0.6065	0.6065	2.0000e-005	0.0000	0.6070
Total	**3.7000e-004**	**2.5000e-004**	**2.6500e-003**	**1.0000e-005**	**6.6000e-004**	**1.0000e-005**	**6.6000e-004**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**0.6065**	**0.6065**	**2.0000e-005**	**0.0000**	**0.6070**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0182	0.1826	0.1196	2.1000e-004		9.1200e-003	9.1200e-003		8.4800e-003	8.4800e-003	0.0000	18.6992	18.6992	5.2800e-003	0.0000	18.8312
Total	**0.0182**	**0.1826**	**0.1196**	**2.1000e-004**		**9.1200e-003**	**9.1200e-003**		**8.4800e-003**	**8.4800e-003**	**0.0000**	**18.6992**	**18.6992**	**5.2800e-003**	**0.0000**	**18.8312**

3.2 Demolition - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7000e-004	2.5000e-004	2.6500e-003	1.0000e-005	6.6000e-004	1.0000e-005	6.6000e-004	1.8000e-004	0.0000	1.8000e-004	0.0000	0.6065	0.6065	2.0000e-005	0.0000	0.6070
Total	**3.7000e-004**	**2.5000e-004**	**2.6500e-003**	**1.0000e-005**	**6.6000e-004**	**1.0000e-005**	**6.6000e-004**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**0.6065**	**0.6065**	**2.0000e-005**	**0.0000**	**0.6070**

3.3 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0716	0.0000	0.0716	0.0370	0.0000	0.0370	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0267	0.2902	0.1766	3.3000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	28.6646	28.6646	9.2700e-003	0.0000	28.8964
Total	**0.0267**	**0.2902**	**0.1766**	**3.3000e-004**	**0.0716**	**0.0140**	**0.0856**	**0.0370**	**0.0129**	**0.0499**	**0.0000**	**28.6646**	**28.6646**	**9.2700e-003**	**0.0000**	**28.8964**

3.3 Grading - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.4000e-004	5.0000e-004	5.3100e-003	1.0000e-005	1.3200e-003	1.0000e-005	1.3300e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.2131	1.2131	4.0000e-005	0.0000	1.2140
Total	**7.4000e-004**	**5.0000e-004**	**5.3100e-003**	**1.0000e-005**	**1.3200e-003**	**1.0000e-005**	**1.3300e-003**	**3.5000e-004**	**1.0000e-005**	**3.6000e-004**	**0.0000**	**1.2131**	**1.2131**	**4.0000e-005**	**0.0000**	**1.2140**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0716	0.0000	0.0716	0.0370	0.0000	0.0370	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0267	0.2902	0.1766	3.3000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	28.6646	28.6646	9.2700e-003	0.0000	28.8964
Total	**0.0267**	**0.2902**	**0.1766**	**3.3000e-004**	**0.0716**	**0.0140**	**0.0856**	**0.0370**	**0.0129**	**0.0499**	**0.0000**	**28.6646**	**28.6646**	**9.2700e-003**	**0.0000**	**28.8964**

3.3 Grading - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.4000e-004	5.0000e-004	5.3100e-003	1.0000e-005	1.3200e-003	1.0000e-005	1.3300e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.2131	1.2131	4.0000e-005	0.0000	1.2140
Total	**7.4000e-004**	**5.0000e-004**	**5.3100e-003**	**1.0000e-005**	**1.3200e-003**	**1.0000e-005**	**1.3300e-003**	**3.5000e-004**	**1.0000e-005**	**3.6000e-004**	**0.0000**	**1.2131**	**1.2131**	**4.0000e-005**	**0.0000**	**1.2140**

3.4 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0994	0.0000	0.0994	0.0546	0.0000	0.0546	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0224	0.2333	0.1183	2.1000e-004		0.0121	0.0121		0.0111	0.0111	0.0000	18.3869	18.3869	5.9500e-003	0.0000	18.5355
Total	**0.0224**	**0.2333**	**0.1183**	**2.1000e-004**	**0.0994**	**0.0121**	**0.1115**	**0.0546**	**0.0111**	**0.0657**	**0.0000**	**18.3869**	**18.3869**	**5.9500e-003**	**0.0000**	**18.5355**

3.4 Site Preparation - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	3.0000e-004	3.1900e-003	1.0000e-005	7.9000e-004	1.0000e-005	8.0000e-004	2.1000e-004	1.0000e-005	2.2000e-004	0.0000	0.7279	0.7279	2.0000e-005	0.0000	0.7284
Total	**4.4000e-004**	**3.0000e-004**	**3.1900e-003**	**1.0000e-005**	**7.9000e-004**	**1.0000e-005**	**8.0000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**0.7279**	**0.7279**	**2.0000e-005**	**0.0000**	**0.7284**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0994	0.0000	0.0994	0.0546	0.0000	0.0546	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0224	0.2333	0.1183	2.1000e-004		0.0121	0.0121		0.0111	0.0111	0.0000	18.3869	18.3869	5.9500e-003	0.0000	18.5355
Total	**0.0224**	**0.2333**	**0.1183**	**2.1000e-004**	**0.0994**	**0.0121**	**0.1115**	**0.0546**	**0.0111**	**0.0657**	**0.0000**	**18.3869**	**18.3869**	**5.9500e-003**	**0.0000**	**18.5355**

3.4 Site Preparation - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	3.0000e-004	3.1900e-003	1.0000e-005	7.9000e-004	1.0000e-005	8.0000e-004	2.1000e-004	1.0000e-005	2.2000e-004	0.0000	0.7279	0.7279	2.0000e-005	0.0000	0.7284
Total	**4.4000e-004**	**3.0000e-004**	**3.1900e-003**	**1.0000e-005**	**7.9000e-004**	**1.0000e-005**	**8.0000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**0.7279**	**0.7279**	**2.0000e-005**	**0.0000**	**0.7284**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1283	1.1608	1.0193	1.6300e-003		0.0676	0.0676		0.0636	0.0636	0.0000	140.1240	140.1240	0.0342	0.0000	140.9787
Total	**0.1283**	**1.1608**	**1.0193**	**1.6300e-003**		**0.0676**	**0.0676**		**0.0636**	**0.0636**	**0.0000**	**140.1240**	**140.1240**	**0.0342**	**0.0000**	**140.9787**

3.5 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.6000e-004	0.0148	2.5400e-003	3.0000e-005	8.0000e-004	8.0000e-005	8.8000e-004	2.3000e-004	7.0000e-005	3.1000e-004	0.0000	3.2356	3.2356	2.7000e-004	0.0000	3.2424
Worker	1.0900e-003	7.4000e-004	7.7900e-003	2.0000e-005	1.9300e-003	1.0000e-005	1.9500e-003	5.1000e-004	1.0000e-005	5.3000e-004	0.0000	1.7792	1.7792	6.0000e-005	0.0000	1.7806
Total	**1.5500e-003**	**0.0155**	**0.0103**	**5.0000e-005**	**2.7300e-003**	**9.0000e-005**	**2.8300e-003**	**7.4000e-004**	**8.0000e-005**	**8.4000e-004**	**0.0000**	**5.0148**	**5.0148**	**3.3000e-004**	**0.0000**	**5.0230**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1283	1.1608	1.0193	1.6300e-003		0.0676	0.0676		0.0636	0.0636	0.0000	140.1239	140.1239	0.0342	0.0000	140.9785
Total	**0.1283**	**1.1608**	**1.0193**	**1.6300e-003**		**0.0676**	**0.0676**		**0.0636**	**0.0636**	**0.0000**	**140.1239**	**140.1239**	**0.0342**	**0.0000**	**140.9785**

3.5 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.6000e-004	0.0148	2.5400e-003	3.0000e-005	8.0000e-004	8.0000e-005	8.8000e-004	2.3000e-004	7.0000e-005	3.1000e-004	0.0000	3.2356	3.2356	2.7000e-004	0.0000	3.2424
Worker	1.0900e-003	7.4000e-004	7.7900e-003	2.0000e-005	1.9300e-003	1.0000e-005	1.9500e-003	5.1000e-004	1.0000e-005	5.3000e-004	0.0000	1.7792	1.7792	6.0000e-005	0.0000	1.7806
Total	**1.5500e-003**	**0.0155**	**0.0103**	**5.0000e-005**	**2.7300e-003**	**9.0000e-005**	**2.8300e-003**	**7.4000e-004**	**8.0000e-005**	**8.4000e-004**	**0.0000**	**5.0148**	**5.0148**	**3.3000e-004**	**0.0000**	**5.0230**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0608	0.5578	0.5304	8.6000e-004		0.0307	0.0307		0.0288	0.0288	0.0000	74.1239	74.1239	0.0179	0.0000	74.5710
Total	**0.0608**	**0.5578**	**0.5304**	**8.6000e-004**		**0.0307**	**0.0307**		**0.0288**	**0.0288**	**0.0000**	**74.1239**	**74.1239**	**0.0179**	**0.0000**	**74.5710**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0000e-004	7.1100e-003	1.1700e-003	2.0000e-005	4.2000e-004	2.0000e-005	4.4000e-004	1.2000e-004	2.0000e-005	1.4000e-004	0.0000	1.6953	1.6953	1.4000e-004	0.0000	1.6988
Worker	5.3000e-004	3.5000e-004	3.7500e-003	1.0000e-005	1.0200e-003	1.0000e-005	1.0300e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	0.9113	0.9113	3.0000e-005	0.0000	0.9120
Total	**7.3000e-004**	**7.4600e-003**	**4.9200e-003**	**3.0000e-005**	**1.4400e-003**	**3.0000e-005**	**1.4700e-003**	**3.9000e-004**	**3.0000e-005**	**4.2000e-004**	**0.0000**	**2.6066**	**2.6066**	**1.7000e-004**	**0.0000**	**2.6108**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0608	0.5578	0.5304	8.6000e-004		0.0307	0.0307		0.0288	0.0288	0.0000	74.1238	74.1238	0.0179	0.0000	74.5709
Total	**0.0608**	**0.5578**	**0.5304**	**8.6000e-004**		**0.0307**	**0.0307**		**0.0288**	**0.0288**	**0.0000**	**74.1238**	**74.1238**	**0.0179**	**0.0000**	**74.5709**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0000e-004	7.1100e-003	1.1700e-003	2.0000e-005	4.2000e-004	2.0000e-005	4.4000e-004	1.2000e-004	2.0000e-005	1.4000e-004	0.0000	1.6953	1.6953	1.4000e-004	0.0000	1.6988
Worker	5.3000e-004	3.5000e-004	3.7500e-003	1.0000e-005	1.0200e-003	1.0000e-005	1.0300e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	0.9113	0.9113	3.0000e-005	0.0000	0.9120
Total	**7.3000e-004**	**7.4600e-003**	**4.9200e-003**	**3.0000e-005**	**1.4400e-003**	**3.0000e-005**	**1.4700e-003**	**3.9000e-004**	**3.0000e-005**	**4.2000e-004**	**0.0000**	**2.6066**	**2.6066**	**1.7000e-004**	**0.0000**	**2.6108**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.2800e-003	0.0646	0.0733	1.1000e-004		3.3900e-003	3.3900e-003		3.1200e-003	3.1200e-003	0.0000	10.0117	10.0117	3.2400e-003	0.0000	10.0927
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.2800e-003**	**0.0646**	**0.0733**	**1.1000e-004**		**3.3900e-003**	**3.3900e-003**		**3.1200e-003**	**3.1200e-003**	**0.0000**	**10.0117**	**10.0117**	**3.2400e-003**	**0.0000**	**10.0927**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1000e-004	2.0000e-004	2.2000e-003	1.0000e-005	6.0000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5340	0.5340	2.0000e-005	0.0000	0.5344
Total	**3.1000e-004**	**2.0000e-004**	**2.2000e-003**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**6.0000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.5340**	**0.5340**	**2.0000e-005**	**0.0000**	**0.5344**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.2800e-003	0.0646	0.0733	1.1000e-004		3.3900e-003	3.3900e-003		3.1200e-003	3.1200e-003	0.0000	10.0117	10.0117	3.2400e-003	0.0000	10.0927
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.2800e-003**	**0.0646**	**0.0733**	**1.1000e-004**		**3.3900e-003**	**3.3900e-003**		**3.1200e-003**	**3.1200e-003**	**0.0000**	**10.0117**	**10.0117**	**3.2400e-003**	**0.0000**	**10.0927**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1000e-004	2.0000e-004	2.2000e-003	1.0000e-005	6.0000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5340	0.5340	2.0000e-005	0.0000	0.5344
Total	**3.1000e-004**	**2.0000e-004**	**2.2000e-003**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**6.0000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.5340**	**0.5340**	**2.0000e-005**	**0.0000**	**0.5344**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0979					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2000e-003	8.4000e-003	0.0100	2.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	1.4043	1.4043	1.0000e-004	0.0000	1.4067
Total	**0.0991**	**8.4000e-003**	**0.0100**	**2.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**1.4043**	**1.4043**	**1.0000e-004**	**0.0000**	**1.4067**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	1.6000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0392	0.0392	0.0000	0.0000	0.0392
Total	**2.0000e-005**	**1.0000e-005**	**1.6000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0392**	**0.0392**	**0.0000**	**0.0000**	**0.0392**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0979					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2000e-003	8.4000e-003	0.0100	2.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	1.4043	1.4043	1.0000e-004	0.0000	1.4067
Total	**0.0991**	**8.4000e-003**	**0.0100**	**2.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**1.4043**	**1.4043**	**1.0000e-004**	**0.0000**	**1.4067**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	1.6000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0392	0.0392	0.0000	0.0000	0.0392
Total	**2.0000e-005**	**1.0000e-005**	**1.6000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0392**	**0.0392**	**0.0000**	**0.0000**	**0.0392**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2924	2.3710	1.6896	5.0900e-003	0.1895	4.7000e-003	0.1942	0.0510	4.4300e-003	0.0554	0.0000	474.4475	474.4475	0.0830	0.0000	476.5234
Unmitigated	0.2924	2.3710	1.6896	5.0900e-003	0.1895	4.7000e-003	0.1942	0.0510	4.4300e-003	0.0554	0.0000	474.4475	474.4475	0.0830	0.0000	476.5234

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Convenience Market With Gas Pumps	1,152.00	1,152.00	1152.00	498,153	498,153
Total	1,152.00	1,152.00	1,152.00	498,153	498,153

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Convenience Market With Gas	1.35	1.35	7.30	4.00	95.00	1.00	80	16	4

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Convenience Market With Gas Pumps	0.509246	0.034164	0.173036	0.129334	0.024846	0.005682	0.027468	0.086660	0.001831	0.001147	0.004743	0.000856	0.000987

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	57.0525	57.0525	1.9900e-003	4.1000e-004	57.2245
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	57.0525	57.0525	1.9900e-003	4.1000e-004	57.2245
NaturalGas Mitigated	8.1000e-004	7.3400e-003	6.1700e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004	0.0000	7.9918	7.9918	1.5000e-004	1.5000e-004	8.0393
NaturalGas Unmitigated	8.1000e-004	7.3400e-003	6.1700e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004	0.0000	7.9918	7.9918	1.5000e-004	1.5000e-004	8.0393

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Convenience Market With Gas Pumps	149760	8.1000e-004	7.3400e-003	6.1700e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004	0.0000	7.9918	7.9918	1.5000e-004	1.5000e-004	8.0393
Total		**8.1000e-004**	**7.3400e-003**	**6.1700e-003**	**4.0000e-005**		**5.6000e-004**	**5.6000e-004**		**5.6000e-004**	**5.6000e-004**	**0.0000**	**7.9918**	**7.9918**	**1.5000e-004**	**1.5000e-004**	**8.0393**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Convenience Market With Gas Pumps	149760	8.1000e-004	7.3400e-003	6.1700e-003	4.0000e-005		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004	0.0000	7.9918	7.9918	1.5000e-004	1.5000e-004	8.0393
Total		**8.1000e-004**	**7.3400e-003**	**6.1700e-003**	**4.0000e-005**		**5.6000e-004**	**5.6000e-004**		**5.6000e-004**	**5.6000e-004**	**0.0000**	**7.9918**	**7.9918**	**1.5000e-004**	**1.5000e-004**	**8.0393**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Convenience Market With Gas Pumps	150912	57.0525	1.9900e-003	4.1000e-004	57.2245
Total		**57.0525**	**1.9900e-003**	**4.1000e-004**	**57.2245**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Convenience Market With Gas Pumps	150912	57.0525	1.9900e-003	4.1000e-004	57.2245
Total		**57.0525**	**1.9900e-003**	**4.1000e-004**	**57.2245**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0589	0.0000	1.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.3000e-004	2.3000e-004	0.0000	0.0000	2.4000e-004
Unmitigated	0.0589	0.0000	1.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.3000e-004	2.3000e-004	0.0000	0.0000	2.4000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	8.9000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0500					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.3000e-004	2.3000e-004	0.0000	0.0000	2.4000e-004
Total	**0.0589**	**0.0000**	**1.2000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.3000e-004**	**2.3000e-004**	**0.0000**	**0.0000**	**2.4000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	8.9000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0500					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.3000e-004	2.3000e-004	0.0000	0.0000	2.4000e-004
Total	**0.0589**	**0.0000**	**1.2000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.3000e-004**	**2.3000e-004**	**0.0000**	**0.0000**	**2.4000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	3.0092	0.0310	7.5000e-004	4.0072
Unmitigated	3.0092	0.0310	7.5000e-004	4.0072

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Convenience Market With Gas Pumps	0.948128 / 0.581111	3.0092	0.0310	7.5000e-004	4.0072
Total		**3.0092**	**0.0310**	**7.5000e-004**	**4.0072**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Convenience Market With Gas Pumps	0.948128 / 0.581111	3.0092	0.0310	7.5000e-004	4.0072
Total		**3.0092**	**0.0310**	**7.5000e-004**	**4.0072**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	7.8091	0.4615	0.0000	19.3466
Unmitigated	7.8091	0.4615	0.0000	19.3466

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Convenience Market With Gas Pumps	38.47	7.8091	0.4615	0.0000	19.3466
Total		**7.8091**	**0.4615**	**0.0000**	**19.3466**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Convenience Market With Gas Pumps	38.47	7.8091	0.4615	0.0000	19.3466
Total		**7.8091**	**0.4615**	**0.0000**	**19.3466**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Attachment 2: Traffic Data from Fehr & Peers

Total Net New Trips		**430**	**27**	**13**	**40**	**10**	**33**	**43**
Nunes Road Travel Plaza								
Convenience Market/ Gas Station[2]	21 vehicle fueling stations	4,800	295	295	590	241	241	482
Pass-by Trips (60%)		(-2,880)	(-177)	(-177)	(-354)	(-145)	(-145)	(-290)
Diverted Trips (20% AM/30% PM & Daily)		(-1,440)	(-59)	(-59)	(-118)	(-72)	(-72)	(-144)
Fast Food Restaurant with Drive Thru[3]	4,278 sq. ft.	2,000	88	84	172	73	67	140
Pass-by Trips (50%)		(-1,000)	(-44)	(-42)	(-86)	(-37)	(-34)	(-71)
Diverted Trips (25%)		(-500)	(-22)	(-21)	(-43)	(-18)	(-17)	(-35)
Total Net New Trips		**980**	**81**	**80**	**161**	**42**	**40**	**82**
Kamir Incorporated								
Convenience Market/ Gas Station[2]	12 vehicle fueling stations	2,800	168	169	337	138	138	276
Pass-by Trips (60%)		(-1680)	(-101)	(-101)	(-202)	(-83)	(-83)	(-166)
Diverted Trips (20% AM/30% PM & Daily)		(-840)	(-34)	(-34)	(-68)	(-41)	(-41)	(-82)
Fast Food Restaurant with Drive Thru[3]	6,000 sq. ft.	2,800	123	118	241	102	94	196
Pass-by Trips (50%)		(-1400)	(-62)	(-59)	(-121)	(-51)	(-47)	(-98)
Diverted Trips (25%)		(-700)	(-31)	(-30)	(-61)	(-26)	(-24)	(-50)
Fast Food Restaurant without Drive Thru[4]	2,000 sq. ft.	700	30	20	50	28	29	57
Pass-by Trips (50%)		(-350)	(-15)	(-10)	(-25)	(-14)	(-15)	(-29)
Diverted Trips (25%)		(-180)	(-8)	(-5)	(-13)	(-7)	(-7)	(-14)
Total Net New Trips		**1,150**	**70**	**68**	**138**	**46**	**44**	**90**

Notes:

1. Based on trip generation rate observed at Peterbilt Development:
   AM = 1.14 * X (68% In, 32% Out); PM = 1.24 * X (24% In, 76% Out); Daily = 10 * PM; X = 1,000 square feet
2. Based on trip generation rates for land use 960, Super Convenience Market/Gas Station
3. Based on trip generation rates for land use 934, Fast Food Restaurant with Drive Thru
4. Based on trip generation rates for land use 933, Fast Food Restaurant without Drive Thru

Source: *Trip Generation Manual, 10th Edition* (Institute of Transportation Engineers, 2017); Fehr & Peers, 2019.

Attachment 3: Daily Construction and Operational Emission Calculations

Kamir Travel Plaza

Stanislaus County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Convenience Market With Gas Pumps	12.80	1000sqft	5.50	12,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	46
Climate Zone	2			**Operational Year**	2021
Utility Company	Modesto Irrigation District				
CO2 Intensity (lb/MWhr)	833.46	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project area, Lot Size per project specifications.

Construction Phase - Per project specs

Vehicle Trips - Per traffic report. Also see Figure 2.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	11.00
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	230.00	185.00
tblConstructionPhase	NumDays	20.00	10.00
tblConstructionPhase	NumDays	20.00	10.00
tblGrading	AcresOfGrading	11.00	10.00
tblLandUse	LotAcreage	0.29	5.50
tblVehicleTrips	CC_TL	7.30	1.35
tblVehicleTrips	CC_TTP	80.20	95.00
tblVehicleTrips	CNW_TTP	19.00	1.00
tblVehicleTrips	CW_TL	9.50	1.35
tblVehicleTrips	CW_TTP	0.80	4.00
tblVehicleTrips	DV_TP	21.00	16.00
tblVehicleTrips	PB_TP	65.00	4.00
tblVehicleTrips	PR_TP	14.00	80.00
tblVehicleTrips	ST_TR	1,448.33	90.00
tblVehicleTrips	SU_TR	1,182.08	90.00
tblVehicleTrips	WD_TR	845.60	90.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	4.1681	42.4677	22.3103	0.0402	18.2141	2.1985	20.4126	9.9699	2.0226	11.9925	0.0000	3,880.867 3	3,880.867 3	1.1969	0.0000	3,907.421 5
2021	18.0220	17.6616	16.7445	0.0278	0.1232	0.9595	1.0058	0.0327	0.9021	0.9147	0.0000	2,646.896 1	2,646.896 1	0.7177	0.0000	2,662.436 1
Maximum	**18.0220**	**42.4677**	**22.3103**	**0.0402**	**18.2141**	**2.1985**	**20.4126**	**9.9699**	**2.0226**	**11.9925**	**0.0000**	**3,880.867 3**	**3,880.867 3**	**1.1969**	**0.0000**	**3,907.421 5**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	4.1681	42.4677	22.3103	0.0402	18.2141	2.1985	20.4126	9.9699	2.0226	11.9925	0.0000	3,880.867 3	3,880.867 3	1.1969	0.0000	3,907.421 5
2021	18.0220	17.6616	16.7445	0.0278	0.1232	0.9595	1.0058	0.0327	0.9021	0.9147	0.0000	2,646.896 1	2,646.896 1	0.7177	0.0000	2,662.436 1
Maximum	**18.0220**	**42.4677**	**22.3103**	**0.0402**	**18.2141**	**2.1985**	**20.4126**	**9.9699**	**2.0226**	**11.9925**	**0.0000**	**3,880.867 3**	**3,880.867 3**	**1.1969**	**0.0000**	**3,907.421 5**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.3228	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.8000e-003	2.8000e-003	1.0000e-005		2.9900e-003
Energy	4.4200e-003	0.0402	0.0338	2.4000e-004		3.0600e-003	3.0600e-003		3.0600e-003	3.0600e-003		48.2708	48.2708	9.3000e-004	8.8000e-004	48.5576
Mobile	2.0372	13.0857	8.7525	0.0296	1.0694	0.0250	1.0945	0.2870	0.0236	0.3106		3,034.6830	3,034.6830	0.4769		3,046.6048
Total	**2.3644**	**13.1259**	**8.7876**	**0.0298**	**1.0694**	**0.0281**	**1.0975**	**0.2870**	**0.0266**	**0.3136**		**3,082.9565**	**3,082.9565**	**0.4778**	**8.8000e-004**	**3,095.1653**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.3228	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.8000e-003	2.8000e-003	1.0000e-005		2.9900e-003
Energy	4.4200e-003	0.0402	0.0338	2.4000e-004		3.0600e-003	3.0600e-003		3.0600e-003	3.0600e-003		48.2708	48.2708	9.3000e-004	8.8000e-004	48.5576
Mobile	2.0372	13.0857	8.7525	0.0296	1.0694	0.0250	1.0945	0.2870	0.0236	0.3106		3,034.6830	3,034.6830	0.4769		3,046.6048
Total	**2.3644**	**13.1259**	**8.7876**	**0.0298**	**1.0694**	**0.0281**	**1.0975**	**0.2870**	**0.0266**	**0.3136**		**3,082.9565**	**3,082.9565**	**0.4778**	**8.8000e-004**	**3,095.1653**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	5/1/2020	5/15/2020	5	11	
2	Grading	Grading	6/1/2020	6/30/2020	5	22	
3	Site Preparation	Site Preparation	7/1/2020	7/15/2020	5	10	
4	Building Construction	Building Construction	7/16/2020	3/31/2021	5	185	
5	Paving	Paving	4/1/2021	4/14/2021	5	10	
6	Architectural Coating	Architectural Coating	4/16/2021	4/30/2021	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 19,200; Non-Residential Outdoor: 6,400; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	4.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.3121	33.2010	21.7532	0.0388		1.6587	1.6587		1.5419	1.5419		3,747.7049	3,747.7049	1.0580		3,774.1536
Total	**3.3121**	**33.2010**	**21.7532**	**0.0388**		**1.6587**	**1.6587**		**1.5419**	**1.5419**		**3,747.7049**	**3,747.7049**	**1.0580**		**3,774.1536**

3.2 Demolition - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0763	0.0420	0.5571	1.3400e-003	0.1232	9.2000e-004	0.1241	0.0327	8.5000e-004	0.0335		133.1624	133.1624	4.2200e-003		133.2679
Total	**0.0763**	**0.0420**	**0.5571**	**1.3400e-003**	**0.1232**	**9.2000e-004**	**0.1241**	**0.0327**	**8.5000e-004**	**0.0335**		**133.1624**	**133.1624**	**4.2200e-003**		**133.2679**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.3121	33.2010	21.7532	0.0388		1.6587	1.6587		1.5419	1.5419	0.0000	3,747.7049	3,747.7049	1.0580		3,774.1536
Total	**3.3121**	**33.2010**	**21.7532**	**0.0388**		**1.6587**	**1.6587**		**1.5419**	**1.5419**	**0.0000**	**3,747.7049**	**3,747.7049**	**1.0580**		**3,774.1536**

3.2 Demolition - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0763	0.0420	0.5571	1.3400e-003	0.1232	9.2000e-004	0.1241	0.0327	8.5000e-004	0.0335		133.1624	133.1624	4.2200e-003		133.2679
Total	**0.0763**	**0.0420**	**0.5571**	**1.3400e-003**	**0.1232**	**9.2000e-004**	**0.1241**	**0.0327**	**8.5000e-004**	**0.0335**		**133.1624**	**133.1624**	**4.2200e-003**		**133.2679**

3.3 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5041	0.0000	6.5041	3.3623	0.0000	3.3623			0.0000			0.0000
Off-Road	2.4288	26.3859	16.0530	0.0297		1.2734	1.2734		1.1716	1.1716		2,872.485 1	2,872.485 1	0.9290		2,895.710 6
Total	**2.4288**	**26.3859**	**16.0530**	**0.0297**	**6.5041**	**1.2734**	**7.7776**	**3.3623**	**1.1716**	**4.5338**		**2,872.485 1**	**2,872.485 1**	**0.9290**		**2,895.710 6**

3.3 Grading - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0763	0.0420	0.5571	1.3400e-003	0.1232	9.2000e-004	0.1241	0.0327	8.5000e-004	0.0335		133.1624	133.1624	4.2200e-003		133.2679
Total	**0.0763**	**0.0420**	**0.5571**	**1.3400e-003**	**0.1232**	**9.2000e-004**	**0.1241**	**0.0327**	**8.5000e-004**	**0.0335**		**133.1624**	**133.1624**	**4.2200e-003**		**133.2679**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5041	0.0000	6.5041	3.3623	0.0000	3.3623			0.0000			0.0000
Off-Road	2.4288	26.3859	16.0530	0.0297		1.2734	1.2734		1.1716	1.1716	0.0000	2,872.4851	2,872.4851	0.9290		2,895.7106
Total	**2.4288**	**26.3859**	**16.0530**	**0.0297**	**6.5041**	**1.2734**	**7.7776**	**3.3623**	**1.1716**	**4.5338**	**0.0000**	**2,872.4851**	**2,872.4851**	**0.9290**		**2,895.7106**

3.3 Grading - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0763	0.0420	0.5571	1.3400e-003	0.1232	9.2000e-004	0.1241	0.0327	8.5000e-004	0.0335		133.1624	133.1624	4.2200e-003		133.2679
Total	**0.0763**	**0.0420**	**0.5571**	**1.3400e-003**	**0.1232**	**9.2000e-004**	**0.1241**	**0.0327**	**8.5000e-004**	**0.0335**		**133.1624**	**133.1624**	**4.2200e-003**		**133.2679**

3.4 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.0765	42.4173	21.5136	0.0380		2.1974	2.1974		2.0216	2.0216		3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**4.0765**	**42.4173**	**21.5136**	**0.0380**	**18.0663**	**2.1974**	**20.2637**	**9.9307**	**2.0216**	**11.9523**		**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

3.4 Site Preparation - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0916	0.0504	0.6685	1.6100e-003	0.1479	1.1000e-003	0.1490	0.0392	1.0200e-003	0.0402		159.7949	159.7949	5.0600e-003		159.9215
Total	**0.0916**	**0.0504**	**0.6685**	**1.6100e-003**	**0.1479**	**1.1000e-003**	**0.1490**	**0.0392**	**1.0200e-003**	**0.0402**		**159.7949**	**159.7949**	**5.0600e-003**		**159.9215**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.0765	42.4173	21.5136	0.0380		2.1974	2.1974		2.0216	2.0216	0.0000	3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**4.0765**	**42.4173**	**21.5136**	**0.0380**	**18.0663**	**2.1974**	**20.2637**	**9.9307**	**2.0216**	**11.9523**	**0.0000**	**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

3.4 Site Preparation - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0916	0.0504	0.6685	1.6100e-003	0.1479	1.1000e-003	0.1490	0.0392	1.0200e-003	0.0402		159.7949	159.7949	5.0600e-003		159.9215
Total	**0.0916**	**0.0504**	**0.6685**	**1.6100e-003**	**0.1479**	**1.1000e-003**	**0.1490**	**0.0392**	**1.0200e-003**	**0.0402**		**159.7949**	**159.7949**	**5.0600e-003**		**159.9215**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.5 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.4100e-003	0.2411	0.0390	5.7000e-004	0.0135	1.2800e-003	0.0148	3.9000e-003	1.2300e-003	5.1200e-003		59.7060	59.7060	4.7400e-003		59.8244
Worker	0.0204	0.0112	0.1486	3.6000e-004	0.0329	2.5000e-004	0.0331	8.7200e-003	2.3000e-004	8.9400e-003		35.5100	35.5100	1.1300e-003		35.5381
Total	**0.0278**	**0.2523**	**0.1876**	**9.3000e-004**	**0.0464**	**1.5300e-003**	**0.0479**	**0.0126**	**1.4600e-003**	**0.0141**		**95.2160**	**95.2160**	**5.8700e-003**		**95.3625**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.5 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.4100e-003	0.2411	0.0390	5.7000e-004	0.0135	1.2800e-003	0.0148	3.9000e-003	1.2300e-003	5.1200e-003		59.7060	59.7060	4.7400e-003		59.8244
Worker	0.0204	0.0112	0.1486	3.6000e-004	0.0329	2.5000e-004	0.0331	8.7200e-003	2.3000e-004	8.9400e-003		35.5100	35.5100	1.1300e-003		35.5381
Total	**0.0278**	**0.2523**	**0.1876**	**9.3000e-004**	**0.0464**	**1.5300e-003**	**0.0479**	**0.0126**	**1.4600e-003**	**0.0141**		**95.2160**	**95.2160**	**5.8700e-003**		**95.3625**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	5.9900e-003	0.2195	0.0337	5.6000e-004	0.0135	5.9000e-004	0.0141	3.9000e-003	5.6000e-004	4.4600e-003		59.1456	59.1456	4.5700e-003		59.2600
Worker	0.0188	9.9700e-003	0.1356	3.5000e-004	0.0329	2.4000e-004	0.0331	8.7200e-003	2.2000e-004	8.9400e-003		34.3866	34.3866	1.0100e-003		34.4119
Total	**0.0248**	**0.2295**	**0.1693**	**9.1000e-004**	**0.0464**	**8.3000e-004**	**0.0472**	**0.0126**	**7.8000e-004**	**0.0134**		**93.5322**	**93.5322**	**5.5800e-003**		**93.6718**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	5.9900e-003	0.2195	0.0337	5.6000e-004	0.0135	5.9000e-004	0.0141	3.9000e-003	5.6000e-004	4.4600e-003		59.1456	59.1456	4.5700e-003		59.2600
Worker	0.0188	9.9700e-003	0.1356	3.5000e-004	0.0329	2.4000e-004	0.0331	8.7200e-003	2.2000e-004	8.9400e-003		34.3866	34.3866	1.0100e-003		34.4119
Total	**0.0248**	**0.2295**	**0.1693**	**9.1000e-004**	**0.0464**	**8.3000e-004**	**0.0472**	**0.0126**	**7.8000e-004**	**0.0134**		**93.5322**	**93.5322**	**5.5800e-003**		**93.6718**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2556	12.9191	14.6532	0.0228		0.6777	0.6777		0.6235	0.6235		2,207.2109	2,207.2109	0.7139		2,225.0573
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2556**	**12.9191**	**14.6532**	**0.0228**		**0.6777**	**0.6777**		**0.6235**	**0.6235**		**2,207.2109**	**2,207.2109**	**0.7139**		**2,225.0573**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0705	0.0374	0.5085	1.3000e-003	0.1232	8.9000e-004	0.1241	0.0327	8.2000e-004	0.0335		128.9497	128.9497	3.7900e-003		129.0445
Total	**0.0705**	**0.0374**	**0.5085**	**1.3000e-003**	**0.1232**	**8.9000e-004**	**0.1241**	**0.0327**	**8.2000e-004**	**0.0335**		**128.9497**	**128.9497**	**3.7900e-003**		**129.0445**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2556	12.9191	14.6532	0.0228		0.6777	0.6777		0.6235	0.6235	0.0000	2,207.2109	2,207.2109	0.7139		2,225.0573
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2556**	**12.9191**	**14.6532**	**0.0228**		**0.6777**	**0.6777**		**0.6235**	**0.6235**	**0.0000**	**2,207.2109**	**2,207.2109**	**0.7139**		**2,225.0573**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0705	0.0374	0.5085	1.3000e-003	0.1232	8.9000e-004	0.1241	0.0327	8.2000e-004	0.0335		128.9497	128.9497	3.7900e-003		129.0445
Total	**0.0705**	**0.0374**	**0.5085**	**1.3000e-003**	**0.1232**	**8.9000e-004**	**0.1241**	**0.0327**	**8.2000e-004**	**0.0335**		**128.9497**	**128.9497**	**3.7900e-003**		**129.0445**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	17.7984					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941		281.4481	281.4481	0.0193		281.9309
Total	**18.0173**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**		**281.4481**	**281.4481**	**0.0193**		**281.9309**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	4.7000e-003	2.4900e-003	0.0339	9.0000e-005	8.2100e-003	6.0000e-005	8.2700e-003	2.1800e-003	5.0000e-005	2.2300e-003		8.5967	8.5967	2.5000e-004		8.6030
Total	**4.7000e-003**	**2.4900e-003**	**0.0339**	**9.0000e-005**	**8.2100e-003**	**6.0000e-005**	**8.2700e-003**	**2.1800e-003**	**5.0000e-005**	**2.2300e-003**		**8.5967**	**8.5967**	**2.5000e-004**		**8.6030**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	17.7984					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2189	1.5268	1.8176	2.9700e-003		0.0941	0.0941		0.0941	0.0941	0.0000	281.4481	281.4481	0.0193		281.9309
Total	**18.0173**	**1.5268**	**1.8176**	**2.9700e-003**		**0.0941**	**0.0941**		**0.0941**	**0.0941**	**0.0000**	**281.4481**	**281.4481**	**0.0193**		**281.9309**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	4.7000e-003	2.4900e-003	0.0339	9.0000e-005	8.2100e-003	6.0000e-005	8.2700e-003	2.1800e-003	5.0000e-005	2.2300e-003		8.5967	8.5967	2.5000e-004		8.6030
Total	**4.7000e-003**	**2.4900e-003**	**0.0339**	**9.0000e-005**	**8.2100e-003**	**6.0000e-005**	**8.2700e-003**	**2.1800e-003**	**5.0000e-005**	**2.2300e-003**		**8.5967**	**8.5967**	**2.5000e-004**		**8.6030**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.0372	13.0857	8.7525	0.0296	1.0694	0.0250	1.0945	0.2870	0.0236	0.3106		3,034.683 0	3,034.683 0	0.4769		3,046.604 8
Unmitigated	2.0372	13.0857	8.7525	0.0296	1.0694	0.0250	1.0945	0.2870	0.0236	0.3106		3,034.683 0	3,034.683 0	0.4769		3,046.604 8

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Convenience Market With Gas Pumps	1,152.00	1,152.00	1152.00	498,153	498,153
Total	1,152.00	1,152.00	1,152.00	498,153	498,153

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Convenience Market With Gas	1.35	1.35	7.30	4.00	95.00	1.00	80	16	4

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Convenience Market With Gas Pumps	0.509246	0.034164	0.173036	0.129334	0.024846	0.005682	0.027468	0.086660	0.001831	0.001147	0.004743	0.000856	0.000987

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
NaturalGas Mitigated	4.4200e-003	0.0402	0.0338	2.4000e-004		3.0600e-003	3.0600e-003		3.0600e-003	3.0600e-003		48.2708	48.2708	9.3000e-004	8.8000e-004	48.5576
NaturalGas Unmitigated	4.4200e-003	0.0402	0.0338	2.4000e-004		3.0600e-003	3.0600e-003		3.0600e-003	3.0600e-003		48.2708	48.2708	9.3000e-004	8.8000e-004	48.5576

5.2 Energy by Land Use - NaturalGas

Unmitigated

Land Use	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	kBTU/yr	lb/day										lb/day					
Convenience Market With Gas Pumps	410.301	4.4200e-003	0.0402	0.0338	2.4000e-004		3.0600e-003	3.0600e-003		3.0600e-003	3.0600e-003		48.2708	48.2708	9.3000e-004	8.8000e-004	48.5576
Total		**4.4200e-003**	**0.0402**	**0.0338**	**2.4000e-004**		**3.0600e-003**	**3.0600e-003**		**3.0600e-003**	**3.0600e-003**		**48.2708**	**48.2708**	**9.3000e-004**	**8.8000e-004**	**48.5576**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Convenience Market With Gas Pumps	0.410301	4.4200e-003	0.0402	0.0338	2.4000e-004		3.0600e-003	3.0600e-003		3.0600e-003	3.0600e-003		48.2708	48.2708	9.3000e-004	8.8000e-004	48.5576
Total		**4.4200e-003**	**0.0402**	**0.0338**	**2.4000e-004**		**3.0600e-003**	**3.0600e-003**		**3.0600e-003**	**3.0600e-003**		**48.2708**	**48.2708**	**9.3000e-004**	**8.8000e-004**	**48.5576**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.3228	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.8000e-003	2.8000e-003	1.0000e-005		2.9900e-003
Unmitigated	0.3228	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.8000e-003	2.8000e-003	1.0000e-005		2.9900e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0488					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2739					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.2000e-004	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.8000e-003	2.8000e-003	1.0000e-005		2.9900e-003
Total	**0.3228**	**1.0000e-005**	**1.3100e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.8000e-003**	**2.8000e-003**	**1.0000e-005**		**2.9900e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0488					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2739					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.2000e-004	1.0000e-005	1.3100e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.8000e-003	2.8000e-003	1.0000e-005		2.9900e-003
Total	**0.3228**	**1.0000e-005**	**1.3100e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.8000e-003**	**2.8000e-003**	**1.0000e-005**		**2.9900e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Attachment 4: Toxic Emission Calculations

Table 1
Summary of TAC Emissions

	On-Site Truck Idle	Off-Site Truck Travel	Off-Site Auto Travel	On-Site Gasoline Dispensing and Storage	TOTAL (lbs/yr)
Reference Appendix 4	Table 3	Tab;le 4	Table 5	Tables 6 and 7	
1,3 Butadiene			0.78		0.78
Acetaldehyde			0.64		0.64
Benzene			10.47	14.42	24.89
DPM	12.99	4.82			17.81
Ethyl Benzene				39.28	39.28
Formaldehyde			2.97		2.97
Toluene				196.42	196.42
Xylene				58.92	58.92

Table 2
Results of Screening Level Health Risk Analysis

Name	Prioritization Calculator					
Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in grey areas.					
Author or updater	Matthew Cegielski	*Last Update*	August 20, 2018			
Facility: **ID#:** **Project #:** **Unit and Process#**	Kamir, Inc. Travel Plaza Risk Score Calculation Keyes, CA					
Operating Hours hr/yr	8,760.00					

Receptor Proximity and Proximity Factors		Cancer Score	Chronic Score	Acute Score	Max Score
0< R<100	1.000	6.46E+00	1.59E-01	0.00E+00	6.46E+00
100≤R<250	0.250	1.62E+00	3.98E-02	0.00E+00	1.62E+00
250≤R<500	0.040	2.59E-01	6.37E-03	0.00E+00	2.59E-01
500≤R<1000	0.011	7.11E-02	1.75E-03	0.00E+00	7.11E-02
1000≤R<1500	0.003	1.94E-02	4.78E-04	0.00E+00	1.94E-02
1500≤R<2000	0.002	1.29E-02	3.19E-04	0.00E+00	1.29E-02
2000<R	0.001	6.46E-03	1.59E-04	0.00E+00	6.46E-03

Receptor proximity is in meters. Priortization scores are calculated by multiplying the total scores summed below by the proximity factors. Record the Max score for your receptor distance. If the substance list for the unit is longer than the number of rows here or if there are multiple processes use additional worksheets and sum the totals of the Max Scores.

0

Enter the unit's CAS# of the substances emitted and their amounts.

Prioritization score for each substance generated below. Totals on last row.

Substance	CAS#	Annual Emissions (lbs/yr)	Maximum Hourly (lbs/hr)	Average Hourly (lbs/hr)	Cancer	Chronic	Acute
1,3 Butadiene	106990	7.80E-01		8.90E-05	0.00E+00	0.00E+00	0.00E+00
Acetaldehyde	75070	6.40E-01		7.31E-05	1.33E-02	7.83E-05	0.00E+00
Benzene	71432	2.49E+01		2.84E-03	5.56E+00	1.42E-01	0.00E+00
DPM	9901	1.78E+01		2.03E-03	0.00E+00	0.00E+00	0.00E+00
Ethyl Benzene	100414	3.93E+01		4.48E-03	7.56E-01	3.36E-04	0.00E+00
Formaldehyde	50000	2.97E+00		3.39E-04	1.37E-01	5.65E-03	0.00E+00
Toluene	108883	1.96E+02		2.24E-02	0.00E+00	1.12E-02	0.00E+00
Xylene	1330207	5.89E+01		6.73E-03	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				Totals	**6.46E+00**	**1.59E-01**	**0.00E+00**

Use the substance dropdown list in the CAS# Finder to locate CAS# of substances.

Substance	CAS# Finder
Vinylidene chloride	75354

Table 3
Calculation of DPM Emissions from
Idling of Diesel Fuelled Trucks

IDLING EMISSIONS FUEL DELIVERY	**Units**	
Deliveries per year (45 deliveried/month)		540
Idle Time per Truck (min)	*min*	5
Total Annual Idle Time	*min*	2700
	`	45.0
Emission Factor for Truck Idling (Note 1)	*(grams/hr)*	0.123
Idling Emissions All Trucks	*(grams/yr)*	5.535
	(lbs/yr)	0.0122
IDLING EMISSIONS FROM HD TRUCKS RE-FUELING	**Units**	
Number of re-fueling trucks per day	*(trucks/day)*	25
Idle time 1 truck	*(min)*	5
Idle time all trucks	*(min/day)*	125
	(hrs/day)	2.08
	(hrs/yr)	760.4
Emission Factor for Truck Idling (Note 1)	*(grams/hr)*	0.123
Idling Emissions All Trucks	*(grams/yr)*	93.53125
	(lbs/yr)	0.2060

EMISSIONS FROM TRUs	**Units**	
TRU Count		1.325
Assume 5.3% of trucks have TRUs		
Average TRU Engine Size	*hp*	25
Emission Factor for TRUs (Note 2)	*(grams/hp-hr)*	0.02
TRU Emissions per truck	*(grams/hr)*	0.5
all trucks	*(grams/hr)*	0.7
all trucks	*(lbs/hr)*	0.001
	(lbs/yr)	12.8
Total (Idling +TRUs)		12.99

Note 1. From EMFAC 2011 Idle EFs for various vehicle types and air districts

CY	EMFAC2007 Vehicle Ca	Fuel_Typ	air_basi	season	HC (g/hr-v	CO (g/hr-ve	NOX (g	PM10 (g/hr-veh)	PM2.5 (g/hr-veh	CO2 (g
2020	HHDT	D	NEP	s	5.273847479	28.7827361	45.703218	0.117257036	0.107876473	7452.596
2020	HHDT	D	NEP	w	6.041237826	54.56350484	42.311895	0.169250173	0.155710159	6457.5
2020	HHDT	D	SC	a	5.318626375	37.90816039	47.219829	0.116801038	0.107456955	7042.896
2020	HHDT	D	SC	s	5.012306167	27.54563051	48.738789	0.098463833	0.090586726	7461.326
2020	HHDT	D	SC	w	5.741639996	52.21832068	45.122217	0.142123844	0.130753937	6465.065
2020	HHDT	D	SCC	a	5.241959324	36.9400936	51.070483	0.153637104	0.141346135	7041.806
2020	HHDT	D	SCC	s	4.940054668	26.84219332	52.713311	0.129516812	0.119155467	7460.171
2020	HHDT	D	SCC	w	5.658875279	50.88481303	48.801817	0.186946077	0.171990391	6464.063
2020	HHDT	D	SD	a	5.324889077	37.91755434	47.530144	0.120807823	0.111143197	7044.37
2020	HHDT	D	SD	s	5.018208176	27.55245655	49.059086	0.101841572	0.093694246	7462.888
2020	HHDT	D	SD	w	5.748400797	52.23126082	45.418747	0.146999312	0.135239367	6466.417
2020	HHDT	D	SF	a	5.325775021	37.88786118	47.70744	0.123774674	0.1138727	7043.954
2020	HHDT	D	SF	s	5.019043095	27.53088028	49.242086	0.104342642	0.09599523	7462.446
2020	HHDT	D	SF	w	5.749357204	52.19035862	45.588168	0.150609386	0.138560635	6466.035
2020	HHDT	D	SJV	a	5.518568251	39.14631056	45.341775	0.133419159	0.122745626	7039.998
2020	HHDT	D	SJV	s	5.200732619	28.44532142	46.800323	0.112472989	0.10347515	7458.256
2020	HHDT	D	SJV	w	5.957484123	53.92386699	43.327591	0.162344823	0.149357237	6462.404

Note 2. TRU Emission Factors (EFs) applicable to Ultra Low Emission Standard effective 2020.
Information available at: https://ww3.arb.ca.gov/regact/trude03/uid.pdf. Page 3

Table 4
Calculation of DPM Emissions from
Truck Travel within 0.25 Miles of Truck Stop

Daily Vehicle Count	*(vehicles/day)*	25
Fraction Trucks		25%
	(trucks/day)	6
	(trucks/yr)	2,281
Emission Factor EMFAC 2017 (Note 1)	*(grams/mile)*	0.1053
Distance Travelled	*(mile/truck)*	0.25
	(total miles)	570
Emissions of DPM	*(grams/yr)*	2,190
	(lbs/yr)	4.82

Note 1:
Emissions based on EMFAC 2017 Aggregate statewide for HD trucks
Excerts of EMFAC 2017 Model appear below.

Table 5
Calculation of Toxic Emissions from Automobile Traffic

No. of Vehicles per Day	1,150	veh/day total
	419,750	veh/yr total
	209,875	veh/yr per 0.25 mile segment
Length of Roadway	0.25	mile
Annual Miles per Roadway Segment	52,469	miles/yr per 0.25 mile segment

	EF	Emission Rate (Vehicle Travel)			Emission Rate (vehicle travel + idle + start-up/shut down)
TAC	(mg/mile)	(mg/yr)	(g/yr)	(lb/yr)	(lb/yr)
1,3 Butadiene	4.48	235,060	235.060	0.518	0.7766
Benzene	45.28	2,375,785	2375.785	5.233	10.4660
Formaldehyde	12.87	675,273	675.273	1.487	2.9748
Acetaldehyde	2.77	145,338	145.338	0.320	0.6403

NOTES

1. Emission Factors From: Zhu, Durbin, Norbeck and Cocker (July 2004)
"Internal Combustion Engine (ICE) Air Toxic Emissions"
Final Report to Research Division CARB, Sacramento, CA

2. Emissions from Vehicle Idle + start-up and shut-down estimated to equal 50% of emissions from vehicle travel

Table 6

Calculation of VOC Emissions

Gasoline Dispensing Operations VOC Calculator

Applicability	Use this spreadsheet to calculate VOC emissions from gasoline dispensing operations. Entries required in yellow areas, output in grey areas.			
Author or updater	Matthew Cegielski		*Last Update*	January 25, 2017
Facility: **ID#:** **Project #:**	Kamir Inc. Gas Station Keyes, CA			
Inputs	gal/day	gal/yr	**Formula**	
	5.00E+03	2.40E+06		
	1,000 gal /hr	1,000 gal /yr		
Gasoline Throughput	2.08E-01	2.40E+03	Enter the **change** in gas station throughput in units of gallons/day and gallons/yr. Select the Phase I and Phase II type using the drop down provided. VOC emissions are calculated by the multiplication of Throughput Rates and Emission Factors.	
Application Type	Type #			
EVR Phase I and EVR Phase II (VR-501 only) Installed Aboveground tank	6			
Substances	**lb VOC/ 1,000 gal**	**LB/HR**	**LB/YR**	
Vapor Tank Filling Loss VOC	0.17	3.54E-02	4.08E+02	
Vehicle Refueling VOC	0.38	7.92E-02	9.12E+02	
Breathing Loss VOC	0.05	1.10E-02	1.27E+02	
Spillage VOC	0.42	8.75E-02	1.01E+03	
Total VOC	1.02	2.13E-01	2.46E+03	

References:

* The emission factors are derived from Appendix A in the 1997 CAPCOA Air Toxics "Hot Spots" Program document, *Gasoline Service Station Industrywide Risk Asessment Guidelines* .

Table 6
Calculation of VOC Emissions

	1	2	3	4	5	6	**7**
	Phase 1 and Phase II Exempt Aboveground tank	Non-EVR Phase I and Phase II Exempt Aboveground tank	EVR Phase I and Phase II Exempt Aboveground tank	Non-EVR Phase I and Non-EVR Phase II Installed Aboveground tank	EVR Phase I and Non-EVR Phase II Installed (or Phase II Exempt Due to ORVR) Aboveground tank	EVR Phase I and EVR Phase II (VR-501 only) Installed Aboveground tank	**Phase I and Phase II Exempt Underground Tank**
Process						lb VOC/1,000 gal	
Tank Filling Loss	8.4	0.42	0.17	0.42	0.17	0.17	8.4
Vehicle Refueling	8.4	8.4	8.4	0.42	0.42	0.38	8.4
Breathing Loss	2.1	0.053	0.053	0.053	0.053	0.053	0.84
Vapor VOC EF	18.90	8.87	8.62	0.89	0.64	0.60	17.64
Spillage	0.61	0.42	0.42	0.42	0.42	0.42	0.61
Total VOC	19.51	9.29	9.04	1.31	1.06	1.02	18.25

1	Phase 1 and Phase II Exempt Aboveground tank
2	Non-EVR Phase I and Phase II Exempt Aboveground tank
3	EVR Phase I and Phase II Exempt Aboveground tank
4	Non-EVR Phase I and Non-EVR Phase II Installed Aboveground tank
5	EVR Phase I and Non-EVR Phase II Installed (or Phase II Exempt Due to ORVR) Aboveground Tank
6	EVR Phase I and EVR Phase II (VR-501 only) Installed Aboveground tank

Table 6
Calculation of VOC Emissions

8	9	10	11	12
EVR Phase I and Phase II Exempt Underground Tank	EVR Phase I and EVR Phase II Installed Underground Tank	EVR Phase I and Non-EVR Phase II Installed Underground Tank	Non-EVR Phase I and Phase II Exempt Underground Tank	Non-EVR Phase I and Non-EVR Phase II Installed Underground Tank
0.084	0.084	0.084	0.42	0.42
8.4	0.42	0.42	8.4	0.42
0.025	0.025	0.025	0.025	0.025
8.51	0.53	0.53	8.85	0.87
0.61	0.42	0.42	0.61	0.42
9.12	0.95	0.95	9.46	1.29

Table 7
Calculation of TACs from Gasoline Storage Tank Filling

	lbs/hr	lbs/yr	
Total Vapor VOCs (Re-Fuel) Less Spillage	1.26E-01	1.45E+03	*(From Table 1)*
Total Liquid VOCs (Spillage)	8.75E-02	1.01E+03	*(From Table 1)*
TOTAL VOCs	0.213	2455.2	

	Benzene	**Ethyl Benzene**	**Toluene**	**Xylenes**
EF Vapor (lbs/lb VOC)	3.00E-03	1.60E-02	8.00E-02	2.40E-02
Emissions (lbs/hr)	3.77E-04	2.01E-03	1.01E-02	3.02E-03
Emissions (lbs/yr)	4.34E+00	2.32E+01	1.16E+02	3.47E+01
EF Liquid (lb/lb VOC)	1.00E-02	1.60E-02	8.00E-02	2.40E-02
Emissions (lbs/hr)	8.75E-04	1.40E-03	7.00E-03	2.10E-03
Emissions (lbs/yr)	1.01E+01	1.61E+01	8.06E+01	2.42E+01
Total (lbs/hr)	1.25E-03	3.41E-03	1.71E-02	5.12E-03
Total (lbs/yr)	1.44E+01	3.93E+01	1.96E+02	5.89E+01

EFs from SJVAPCD Speciation Guidance March 27, 2017.

Attachment 5: Screening Level Risk Evaluation

Table 2
Results of Screening Level Health Risk Analysis

Name	Prioritization Calculator						
Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in grey areas.						
Author or updater	Matthew Cegielski		*Last Update*	August 20, 2018			
Facility: **ID#:** **Project #:** **Unit and Process#**	Kamir, Inc. Travel Plaza Risk Score Calculation Keyes, CA						

Operating Hours hr/yr	8,760.00				
Receptor Proximity and Proximity Factors	**Cancer Score**	**Chronic Score**	**Acute Score**	**Max Score**	Receptor proximity is in meters. Priortization scores are calculated by multiplying the total scores summed below by the proximity factors. Record the Max score for your receptor distance. If the substance list for the unit is longer than the number of rows here or if there are multiple processes use additional worksheets and sum the totals of the Max Scores.
0< R<100 1.000	6.46E+00	1.59E-01	0.00E+00	6.46E+00	
100≤R<250 0.250	1.62E+00	3.98E-02	0.00E+00	1.62E+00	
250≤R<500 0.040	2.59E-01	6.37E-03	0.00E+00	2.59E-01	
500≤R<1000 0.011	7.11E-02	1.75E-03	0.00E+00	7.11E-02	
1000≤R<1500 0.003	1.94E-02	4.78E-04	0.00E+00	1.94E-02	
1500≤R<2000 0.002	1.29E-02	3.19E-04	0.00E+00	1.29E-02	
2000<R 0.001	6.46E-03	1.59E-04	0.00E+00	6.46E-03	

0	Enter the unit's CAS# of the substances emitted and their amounts.				Prioritization score for each substance generated below. Totals on last row.		
Substance	**CAS#**	**Annual Emissions (lbs/yr)**	**Maximum Hourly (lbs/hr)**	**Average Hourly (lbs/hr)**	**Cancer**	**Chronic**	**Acute**
1,3 Butadiene	**106990**	7.80E-01		8.90E-05	0.00E+00	0.00E+00	0.00E+00
Acetaldehyde	**75070**	6.40E-01		7.31E-05	1.33E-02	7.83E-05	0.00E+00
Benzene	**71432**	2.49E+01		2.84E-03	5.56E+00	1.42E-01	0.00E+00
DPM	**9901**	1.78E+01		2.03E-03	0.00E+00	0.00E+00	0.00E+00
Ethyl Benzene	**100414**	3.93E+01		4.48E-03	7.56E-01	3.36E-04	0.00E+00
Formaldehyde	**50000**	2.97E+00		3.39E-04	1.37E-01	5.65E-03	0.00E+00
Toluene	**108883**	1.96E+02		2.24E-02	0.00E+00	1.12E-02	0.00E+00
Xylene	**1330207**	5.89E+01		6.73E-03	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				Totals	**6.46E+00**	**1.59E-01**	**0.00E+00**

Use the substance dropdown list in the CAS# Finder to locate CAS# of substances.	
Substance	CAS# Finder
Vinylidene chloride	75354

Response to Comments/Additional Information
Kumir Inc., Travel Plaza, Keyes, CA

Health Risks Associated with DPM Emissions from Construction

We have calculated the health risks associated with exposure to diesel particulate matter. The emission rates used in the analysis is from the CalEEMod model reports provided in the January 27th submittal. The duration of the construction phase is 12 months. Annual emissions were estimated to be 0.0961 tons/yr (PM-2.5) in the CalEEMod Report dated 1/23/2020. This equates to 191.2 lbs/yr of DPM. Excerpt of the CalEEMod is attached.

Plot files were created using Lakes AERMODVIEW and exported into HARP. Key inputs and model options are as follows:

Grid Size	50 x 50 x 25 meter spacing
Sensitive Receptors	Nearest homes, Workplaces and Schools
Urban/Rural Option	Rural
Terrain Option (Y/N)	Option Used
Met Data	5 Years data from Modesto (2013 to 2017) U-Star Adjusted

The results are shown on the next page and summarized below.

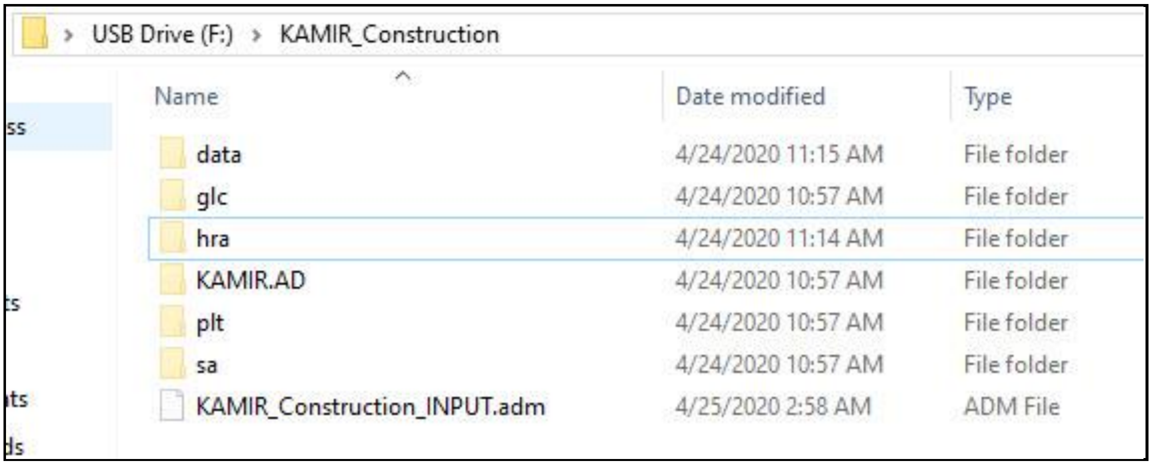
Maximum Residential Risk: 0.607 to 0.228 cancers/million

Maximum Workplace Risk: 6.98 to 0.201 cancers/million

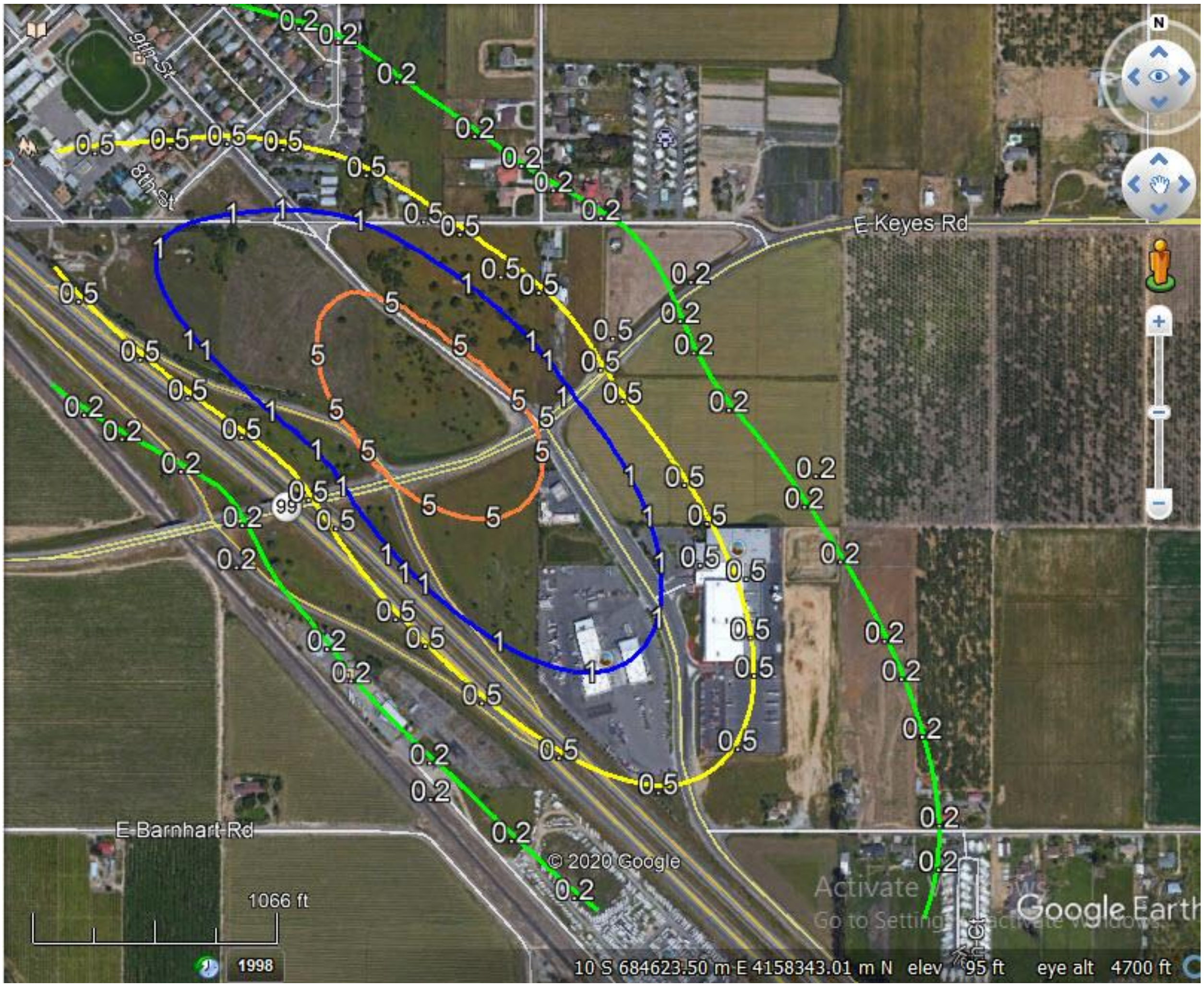
Risk at Nearby Schools: 0.763 to 0.581 cancers/million

There are no acute RELs for DPM.

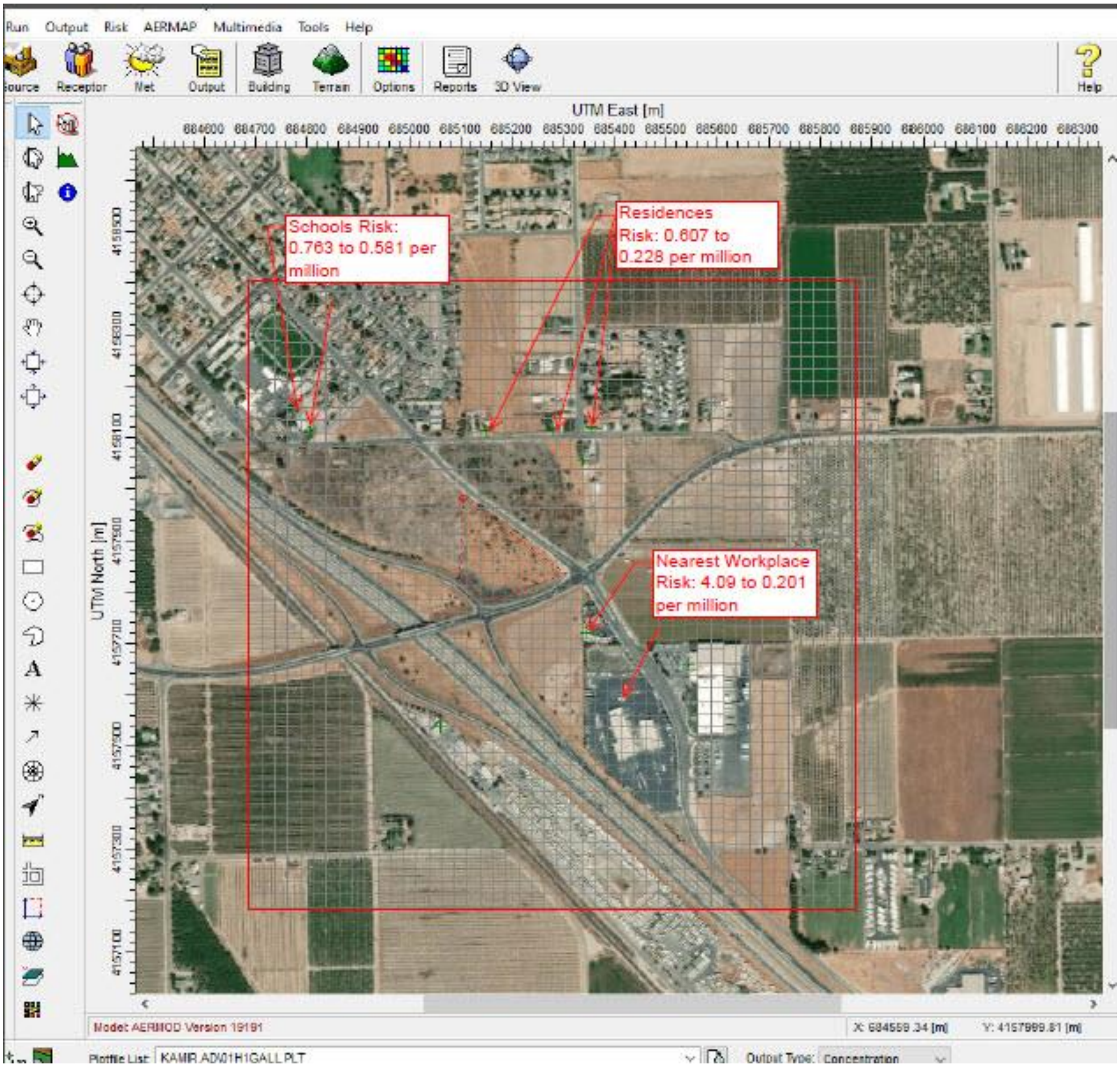
Screenshots of the AERMOD and HARP Model are attached. An electronic copy of the HARP files is attached. Input file are as follows:



USB Drive (F:) › KAMIR_Construction
Name
Date modified
Type
data
4/24/2020 11:15 AM
File folder
glc
4/24/2020 10:57 AM
File folder
hra
4/24/2020 11:14 AM
File folder
KAMIR.AD
4/24/2020 10:57 AM
File folder
plt
4/24/2020 10:57 AM
File folder
sa
4/24/2020 10:57 AM
File folder
KAMIR_Construction_INPUT.adm
4/25/2020 2:58 AM
ADM File



9th St
8th St
E Keyes Rd
E Barnhart Rd
99
0.2
0.5
1
5
1066 ft
© 2020 Google
Google Earth
1998
10 S 684623.50 m E 4158343.01 m N elev 95 ft eye alt 4700 ft



Schools Risk: 0.763 to 0.581 per million
Residences Risk: 0.607 to 0.228 per million
Nearest Workplace Risk: 4.09 to 0.201 per million
UTM East [m]
UTM North [m]
Model: AERMOD Version 19191

Excerpt of Annual Construction Emissions

Kamir Travel Plaza - Stanislaus County, Annual

2.1 Overall Construction

Unmitigated Construction

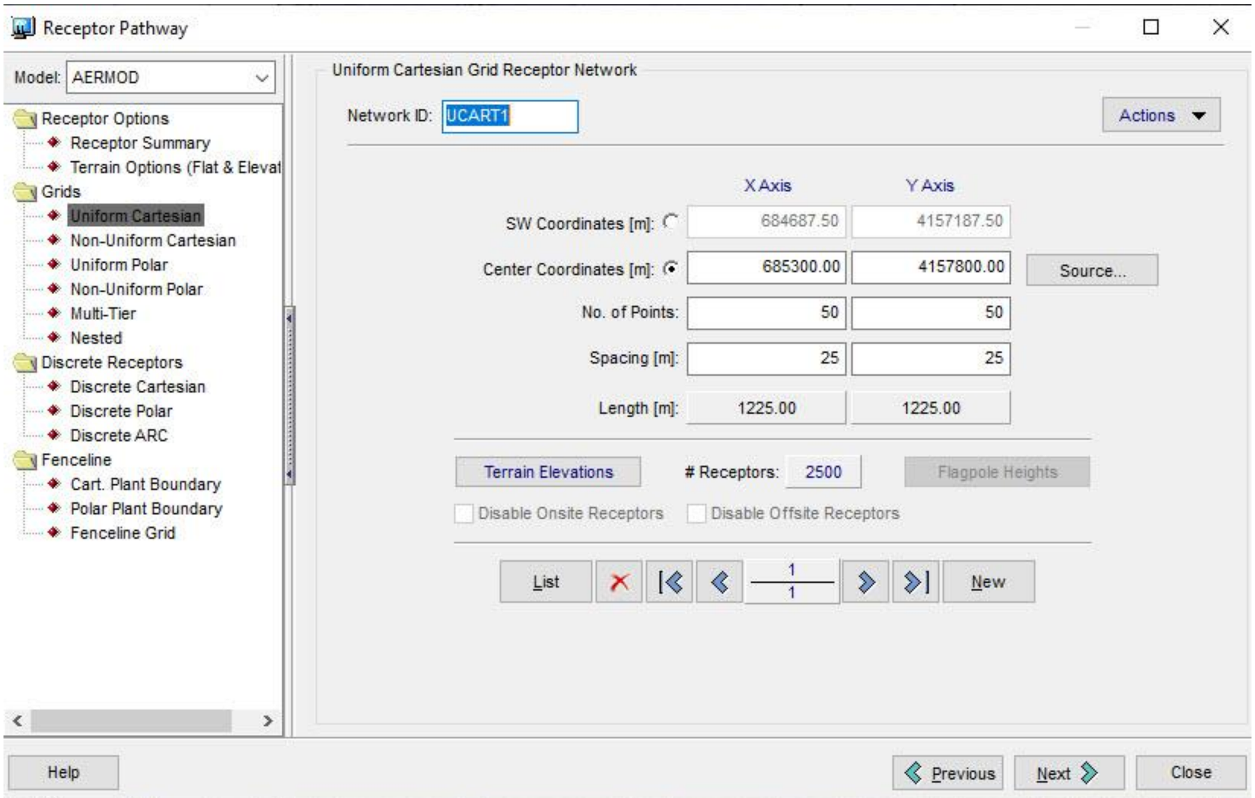
	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2
Year	tons/yr										MT/yr				
2020	0.1987	1.8835	1.4554	2.4600e-003	0.1764	0.1029	0.2793	0.0931	0.0961	0.1892	0.0000	213.4370	213.4370	0.0551	0.00
2021	0.1673	0.6385	0.6210	1.0300e-003	2.0900e-003	0.0346	0.0367	5.7000e-004	0.0325	0.0331	0.0000	88.7197	88.7197	0.0214	0.00
Maximum	**0.1987**	**1.8835**	**1.4554**	**2.4600e-003**	**0.1764**	**0.1029**	**0.2793**	**0.0931**	**0.0961**	**0.1892**	**0.0000**	**213.4370**	**213.4370**	**0.0551**	**0.00**

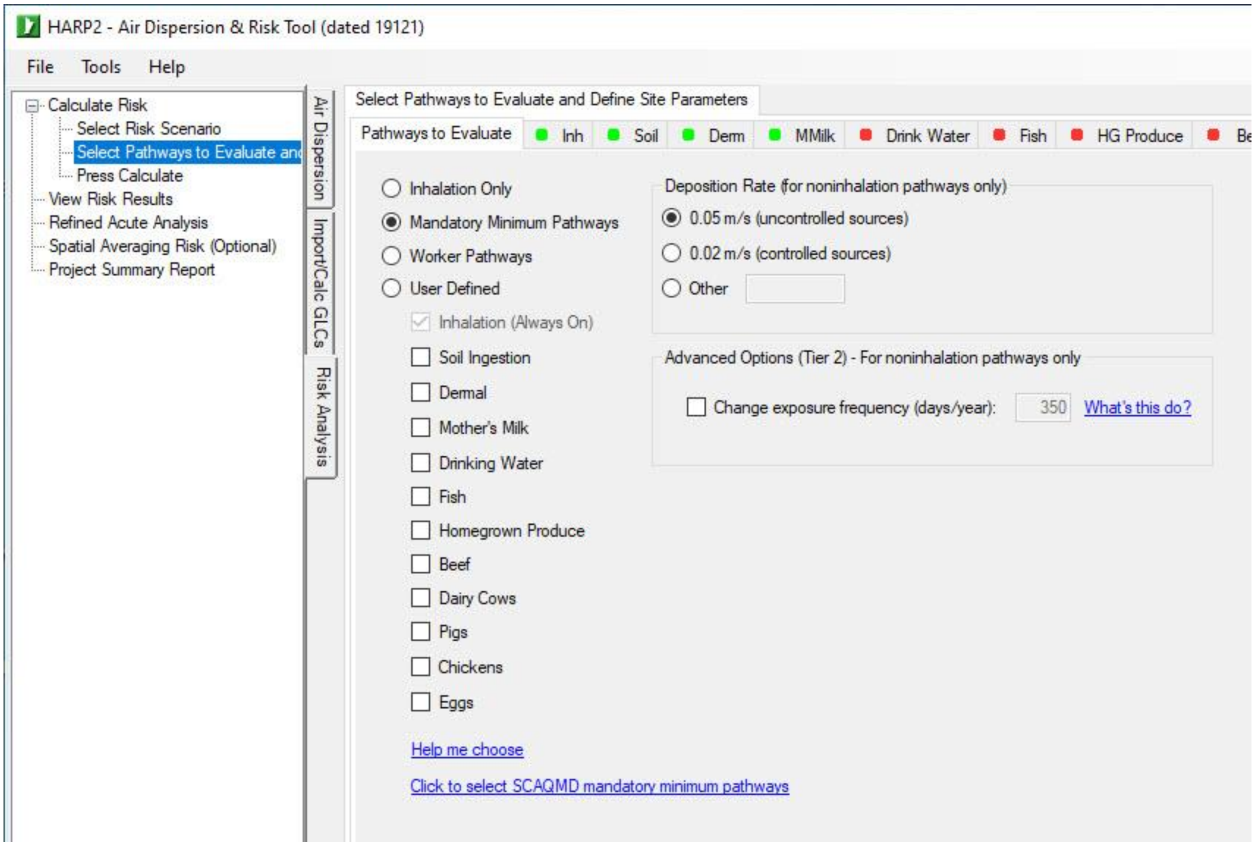
Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2
Year	tons/yr										MT/yr				

Discrete Cartesian Receptors

No.	ID	X - Coord. [m]	Y - Coord. [m]
1	R1	685339.00	4158056.00
2	R2	685279.00	4158116.00
3	R3	685353.00	4158121.00
4	R4	685148.00	4158114.00
5	W1	685061.00	4157536.00
6	W2	685345.00	4157721.00
7	W3	685545.00	4157659.00
8	SCH1	684805.00	4158114.00
9	SCH2	684770.00	4158159.00


Receptor Pathway
Model: AERMOD
Receptor Options
Receptor Summary
Terrain Options (Flat & Elevat
Grids
Uniform Cartesian
Non-Uniform Cartesian
Uniform Polar
Non-Uniform Polar
Multi-Tier
Nested
Discrete Receptors
Discrete Cartesian
Discrete Polar
Discrete ARC
Fenceline
Cart. Plant Boundary
Polar Plant Boundary
Fenceline Grid
Uniform Cartesian Grid Receptor Network
Network ID: UCART1
Actions
X Axis
Y Axis
SW Coordinates [m]: 684687.50 4157187.50
Center Coordinates [m]: 685300.00 4157800.00
Source...
No. of Points: 50 50
Spacing [m]: 25 25
Length [m]: 1225.00 1225.00
Terrain Elevations
Receptors: 2500
Flagpole Heights
Disable Onsite Receptors
Disable Offsite Receptors
List
New
Help
Previous
Next
Close


HARP2 - Air Dispersion & Risk Tool (dated 19121)
File
Tools
Help
Calculate Risk
Select Risk Scenario
Select Pathways to Evaluate and
Press Calculate
View Risk Results
Refined Acute Analysis
Spatial Averaging Risk (Optional)
Project Summary Report
Air Dispersion
Import/Calc GLCs
Risk Analysis
Select Pathways to Evaluate and Define Site Parameters
Pathways to Evaluate
Inh
Soil
Derm
MMilk
Drink Water
Fish
HG Produce
Inhalation Only
Mandatory Minimum Pathways
Worker Pathways
User Defined
Inhalation (Always On)
Soil Ingestion
Dermal
Mother's Milk
Drinking Water
Fish
Homegrown Produce
Beef
Dairy Cows
Pigs
Chickens
Eggs
Help me choose
Click to select SCAQMD mandatory minimum pathways
Deposition Rate (for noninhalation pathways only)
0.05 m/s (uncontrolled sources)
0.02 m/s (controlled sources)
Other
Advanced Options (Tier 2) - For noninhalation pathways only
Change exposure frequency (days/year):
350
What's this do?

View Risk Results

Cancer | Chronic | 8-hour | Acute

Load File | Risk Views | Options | Export

REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO
2485	ALL	UCART1	685537.5	4158412.5	5.2370e-08	1YrCancerDerived_InhSoilDermMMilk
2486	ALL	UCART1	685562.5	4158412.5	5.2129e-08	1YrCancerDerived_InhSoilDermMMilk
2487	ALL	UCART1	685587.5	4158412.5	5.2159e-08	1YrCancerDerived_InhSoilDermMMilk
2488	ALL	UCART1	685612.5	4158412.5	5.2223e-08	1YrCancerDerived_InhSoilDermMMilk
2489	ALL	UCART1	685637.5	4158412.5	5.2134e-08	1YrCancerDerived_InhSoilDermMMilk
2490	ALL	UCART1	685662.5	4158412.5	5.1834e-08	1YrCancerDerived_InhSoilDermMMilk
2491	ALL	UCART1	685687.5	4158412.5	5.1284e-08	1YrCancerDerived_InhSoilDermMMilk
2492	ALL	UCART1	685712.5	4158412.5	5.0473e-08	1YrCancerDerived_InhSoilDermMMilk
2493	ALL	UCART1	685737.5	4158412.5	4.9440e-08	1YrCancerDerived_InhSoilDermMMilk
2494	ALL	UCART1	685762.5	4158412.5	4.8231e-08	1YrCancerDerived_InhSoilDermMMilk
2495	ALL	UCART1	685787.5	4158412.5	4.6888e-08	1YrCancerDerived_InhSoilDermMMilk
2496	ALL	UCART1	685812.5	4158412.5	4.5463e-08	1YrCancerDerived_InhSoilDermMMilk
2497	ALL	UCART1	685837.5	4158412.5	4.3998e-08	1YrCancerDerived_InhSoilDermMMilk
2498	ALL	UCART1	685862.5	4158412.5	4.2508e-08	1YrCancerDerived_InhSoilDermMMilk
2499	ALL	UCART1	685887.5	4158412.5	4.1023e-08	1YrCancerDerived_InhSoilDermMMilk
2500	ALL	UCART1	685912.5	4158412.5	3.9592e-08	1YrCancerDerived_InhSoilDermMMilk
2501	ALL	Residences	685339	4158056	3.5713e-07	1YrCancerDerived_InhSoilDermMMilk
2502	ALL		685279	4158116	3.0807e-07	1YrCancerDerived_InhSoilDermMMilk
2503	ALL		685353	4158121	2.2822e-07	1YrCancerDerived_InhSoilDermMMilk
2504	ALL		685148	4158114	6.0681e-07	1YrCancerDerived_InhSoilDermMMilk
2505	ALL	Workplaces	685061	4157536	2.0090e-07	1YrCancerDerived_InhSoilDermMMilk
2506	ALL		685345	4157721	4.0974e-06	1YrCancerDerived_InhSoilDermMMilk
2507	ALL		685545	4157659	6.9800e-07	1YrCancerDerived_InhSoilDermMMilk
2508	ALL	Schools	684805	4158114	7.6285e-07	1YrCancerDerived_InhSoilDermMMilk
2509	ALL		684770	4158159	5.8124e-07	1YrCancerDerived_InhSoilDermMMilk

.

Response to Comments/Additional
Information Kumir Inc., Travel Plaza, Keyes, CA

Health Risks – Operational Phase

We have calculated the health risks for the operational phase. Emissions of toxic air contaminants from the following sources were modeled:

- On-Site Truck Idling (revised from 5 minutes to 15 minutes)
- Off-Site Truck Travel within ¼ Mile
- On-site Auto Emissions
- On-site Gasoline Dispensers
- Two (2) Fast Food Restaurants (underfire charbroilers releasing PAHs)

The emissions associated with each of the sources is shown in Table 1. Additional tables are attached. With the exception of on-site truck idling and inclusion of emissions from underfire charbroiler, all other emission rates remain unchanged from the previous submittal. Truck idling was increased from 5 minutes to 15 minutes.

Charbroiler emissions were estimated based on the District air toxics emissions from restaurants (Calculation of total PAH emissions from underfire charbroiling, see Table 7). We used emissions from underfire charbroiler involving cooking of meat from fast food restaurants.

We assumed the annual charbroiler activity involved processing of 1,330.64 pounds/week for each of the two restaurants (0.665 tons/week, 34.6 tons/yr per restaurant). Assuming the restaurants are open 12 hours per day, this equates to 15.9 lbs/hr per restaurant and results is 6.29 lbs/yr of total PAHs. The maximum hourly emission rate is calculated to be 1.58E-01 lbs/hr. See next page. The electronic copy of the HARP run is attached. The input file is Kamir2_Input.adm. The directory listing is shown on the next page.

USB Drive (F:) > KAMIR2

Name	Date modified	Type
data	4/16/2020 10:35 AM	File folder
glc	4/21/2020 3:12 AM	File folder
hra	4/27/2020 2:39 AM	File folder
kAMIR2.AD	4/21/2020 2:32 AM	File folder
plt	4/16/2020 10:32 AM	File folder
sa	4/16/2020 10:32 AM	File folder
KAMIR2_Acute	4/21/2020 3:49 AM	KML
KAMIR2_Cancer_Plot_Residential	4/21/2020 3:31 AM	KML
KAMIR2_Cancer_Plot_Worker2	4/21/2020 3:44 AM	KML
KAMIR2_INPUT.adm	4/21/2020 3:51 AM	ADM File

	1 Restaurant		2 Restaurants	
Amount of Meat Cooked	1,330.64	lbs/week	2,661.28	lbs/week
	0.67	tons/week	1.33	tons/week
	34.60	tons/year	69.19	tons/yr
Hourly Amount Cooked	15.84	lbs/hr	31.68	lbs/hr
12 hrs/day x 7 days/week	0.008	tons/hr	0.016	tons/yr

Source: Charbroiling Activity Estimation
Table 14 for Fast Food Restaurants
Michael Potepan, PhD
Public Research Institute, San Francisco
June 50, 2001

Available at: https://ww2.arb.ca.gov/sites/default/files/classic//research/apr/reports/l943.pdf

Author or updater:	Matthew Cegielski	*Last Update:*	February 25, 2016
Facility:	Kamir Inc. Truck Plaza		
ID#:	Prepared by Ray Kapahi April 19_2020		
Project #:	Annual Amount based on 34.5 tons/yr per restaurant, operaintg 12 hours/day		

Inputs:	Capacity Ton/hr	Capacity Ton /yr	**Formula**
Process Rate	0.0158	69.20	Emissions are calculated by the multiplication of Process Rates and Emission Factors

Substances	**CAS#**	**Emission Factor Lb/Ton**	**LB/HR**	**LB/YR**
Acenaphthene	**83329**	3.00E-04	4.74E-06	2.08E-02
Acenaphthylene	**208968**	8.48E-03	1.34E-04	5.87E-01
Anthracene	**120127**	1.88E-03	2.97E-05	1.30E-01
Benz[a]Anthracene	**56553**	4.40E-04	6.95E-06	3.04E-02
Benzo[a]Pyrene	**50328**	3.00E-04	4.74E-06	2.08E-02
Benzo[g,h,i,]Perylene	**191242**	3.40E-04	5.37E-06	2.35E-02
Biphenyl	**92524**	3.44E-03	5.44E-05	2.38E-01
Fluoranthene	**206440**	2.80E-03	4.42E-05	1.94E-01
Fluorene	**86737**	2.52E-03	3.98E-05	1.74E-01
Indeno[1,2,3-c,d]Pyrene	**193395**	1.80E-04	2.84E-06	1.25E-02
Naphthalene	**91203**	3.80E-02	6.00E-04	2.63E+00
Phenanthrene	**85018**	9.76E-03	1.54E-04	6.75E-01
Pyrene	**129000**	3.80E-03	6.00E-05	2.63E-01
Total PAH	**1150**	1.00E-01	1.58E-03	6.92E+00

UC Hamburger | Charbroiler | 0 Summary | 1 Summary | 2Gasol

As with the construction phase, plot files were created using Lakes AERMODView and exported into HARP. The model options were the same as with the construction phase.

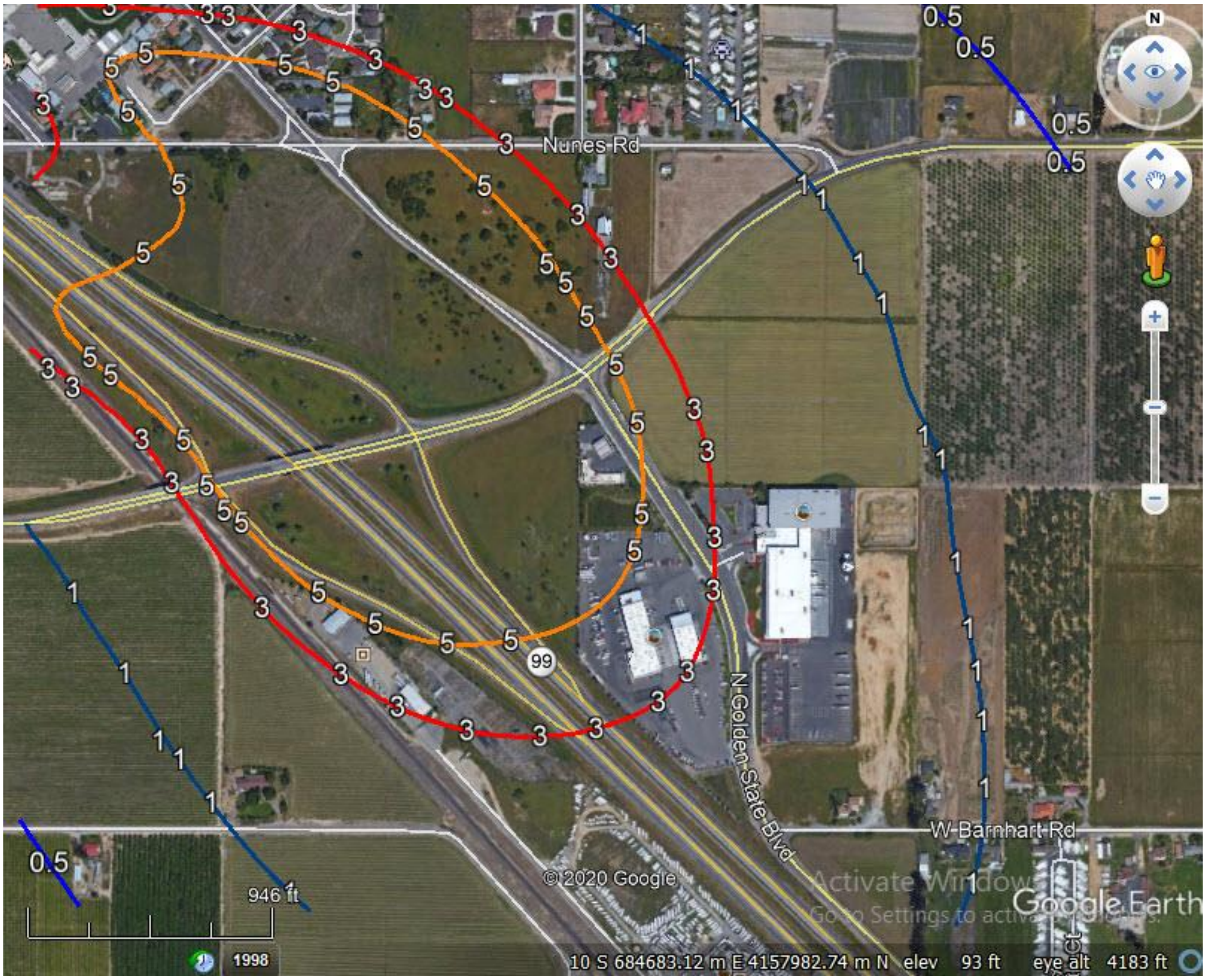
The results are shown on the next page and summarized below and shown in the attached figure.

Risk Metric	Cancer Risk (per million)	Acute Hazard Index (unitless)	Chronic Hazard Index (unitless)
Max. 70 Year Cancer Risk at Nearby Homes	4.14	0.0141	0.0033
70 year Cancer Risk at Nearby Workplace	8.43	0.0183	0.151
25 year Cancer Risk at Nearby Workplace	0.529	0.0183	0.151
Max. 70 Year Risk at School (Keyes Head Start School) (Keyes Elementary School)	4.64	0.015	0.00441

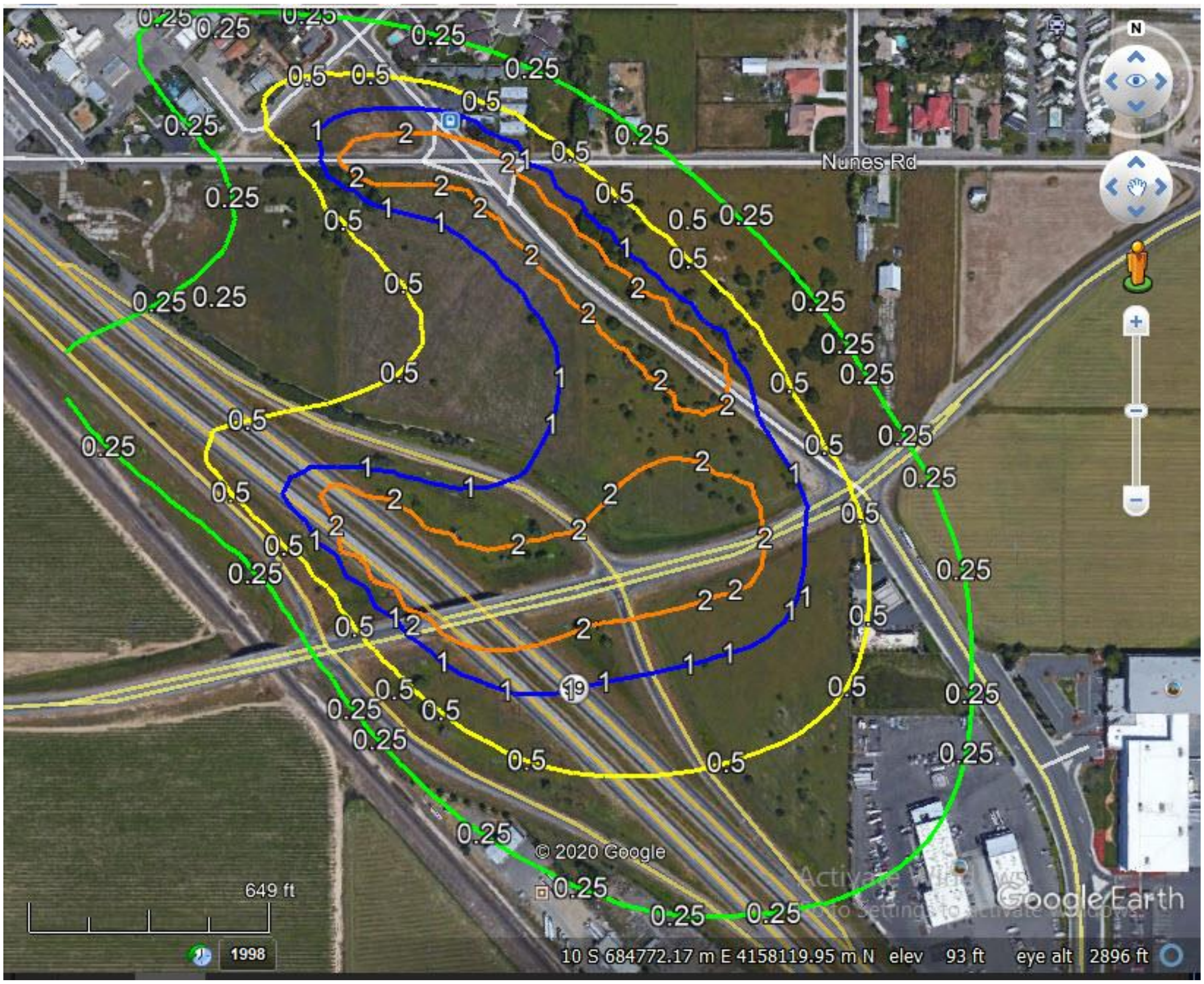
Note: The nearest hospitals are in Turlock or Modesto.

Screenshots of the HARP Model are attached. An electronic copy of the HARP files is attached.

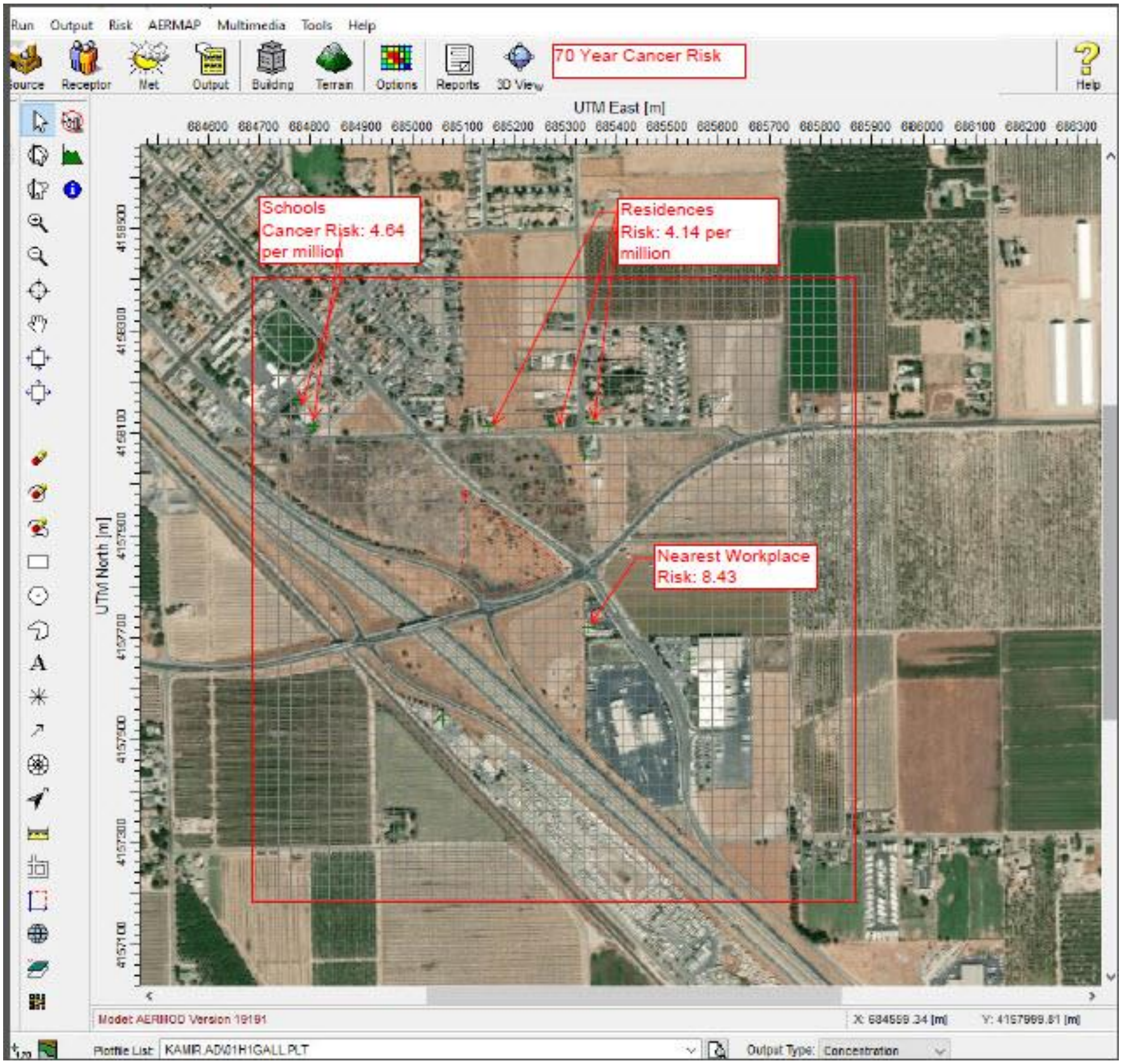
70 Year (Residential) Cancer Risk (per million)



25 Year (Worker) Cancer Risk (per million)



Nunes Rd
0.25
0.5
1
2
19
© 2020 Google
649 ft
1998
10 S 684772.17 m E 4158119.95 m N elev 93 ft eye alt 2896 ft
Google Earth



Run Output Risk AERMAP Multimedia Tools Help
Source Receptor Net Output Building Terrain Options Reports 3D View
70 Year Cancer Risk
Help
UTM East [m]
UTM North [m]
Schools
Cancer Risk: 4.64 per million
Residences
Risk: 4.14 per million
Nearest Workplace
Risk: 8.43
Model: AERMOD Version 19191
X: 684559.34 [m]
Y: 4157999.81 [m]
Plotfile List: KAMIR.AD\01H1GALL.PLT
Output Type: Concentration

Emissions Inventory HARP Model

Emission Inventory

Add Import Export Delete All Options Filter: All All

SrcID	StkID	ProID	PolID	PolAbbrev	Multiplier	Annual Ems (lbs/yr)	Max Hr Ems (lbs/hr)	MWAF
PAREA1	0	0	9901	DieselExhPM	1	13.44	0.00153	1
SLINE1	0	0	9901	DieselExhPM	1	4.82	0.00055	1
SLINE2	0	0	9901	DieselExhPM	1	4.82	0.00055	1
PAREA1	0	0	1150	PAHs-w/	1	6.92	0.00158	1
SLINE1	0	0	106990	1,3-Butadiene	1	0.78	8.87E-05	1
SLINE1	0	0	75070	Acetaldehyde	1	0.64	7.31E-05	1
SLINE1	0	0	71432	Benzene	1	10.47	0.00119	1
SLINE1	0	0	50000	Formaldehyde	1	297	0.00034	1
SLINE2	0	0	106990	1,3-Butadiene	1	0.78	8.87E-05	1
SLINE2	0	0	75070	Acetaldehyde	1	0.64	7.31E-05	1
SLINE2	0	0	71432	Benzene	1	10.47	0.00119	1
SLINE2	0	0	50000	Formaldehyde	1	2.97	0.00034	1
PAREA1	0	0	71432	Benzene	1	14.42	0.00165	1
PAREA1	0	0	100414	Ethyl Benzene	1	39.28	0.00448	1
PAREA1	0	0	108883	Toluene	1	196.42	0.0224	1
PAREA1	0	0	1330207	Xylenes	1	58.92	0.00673	1

Screenshot of HARP Model Showing 70 Year Cancer Risk

	A	B	C	D	E	F	G	H
1	*HARP - HRACalc v19044 4/21/2020 3:13:25 AM - Cancer Risk - Input File: C:\Users\C							
2	REC	GRP	NETID	X	Y	RISK_SUM	SCENARIC	INH_RISK
2496	2494	ALL	UCART1	685762.5	4158413	3.45E-07	70YrCance	3.45E-07
2497	2495	ALL	UCART1	685787.5	4158413	3.36E-07	70YrCance	3.36E-07
2498	2496	ALL	UCART1	685812.5	4158413	3.28E-07	70YrCance	3.28E-07
2499	2497	ALL	UCART1	685837.5	4158413	3.20E-07	70YrCance	3.20E-07
2500	2498	ALL	UCART1	685862.5	4158413	3.12E-07	70YrCance	3.12E-07
2501	2499	ALL	UCART1	685887.5	4158413	3.04E-07	70YrCance	3.04E-07
2502	2500	ALL	UCART1	685912.5	4158413	2.97E-07	70YrCance	2.97E-07
2503	2501	ALL	Homes	685339	4158056	2.20E-06	70YrCance	2.20E-06
2504	2502	ALL		685279	4158116	2.10E-06	70YrCance	2.10E-06
2505	2503	ALL		685353	4158121	1.56E-06	70YrCance	1.56E-06
2506	2504	ALL		685148	4158114	4.14E-06	70YrCance	4.14E-06
2507	2505	ALL	Workplaces	685061	4157536	4.33E-06	70YrCance	4.33E-06
2508	2506	ALL		685345	4157721	8.43E-06	70YrCance	8.43E-06
2509	2507	ALL		685545	4157659	2.22E-06	70YrCance	2.22E-06
2510	2508	ALL	Schools	684805	4158114	4.64E-06	70YrCance	4.64E-06
2511	2509	ALL		684770	4158159	4.63E-06	70YrCance	4.63E-06

25 Year Cancer Risk Applicable to Workplaces and Schools

	A	B	C	D	E	F	G	H
1	*HARP - HRACalc v19044 4/21/2020 3:40:51 AM - Cancer Risk - Input File: C:\Users\O							
2	REC	GRP	NETID	X	Y	RISK_SUM	SCENARIC	INH_RISK
2497	2495	ALL	UCART1	685787.5	4158413	2.11E-08	25YrCance	2.11E-08
2498	2496	ALL	UCART1	685812.5	4158413	2.06E-08	25YrCance	2.06E-08
2499	2497	ALL	UCART1	685837.5	4158413	2.01E-08	25YrCance	2.01E-08
2500	2498	ALL	UCART1	685862.5	4158413	1.96E-08	25YrCance	1.96E-08
2501	2499	ALL	UCART1	685887.5	4158413	1.91E-08	25YrCance	1.91E-08
2502	2500	ALL	UCART1	685912.5	4158413	1.86E-08	25YrCance	1.86E-08
2503	2501	ALL		685339	4158056	1.38E-07	25YrCance	1.38E-07
2504	2502	ALL		685279	4158116	1.32E-07	25YrCance	1.32E-07
2505	2503	ALL		685353	4158121	9.81E-08	25YrCance	9.81E-08
2506	2504	ALL		685148	4158114	2.60E-07	25YrCance	2.60E-07
2507	2505	ALL	Workplaces	685061	4157536	2.72E-07	25YrCance	2.72E-07
2508	2506	ALL		685345	4157721	5.29E-07	25YrCance	5.29E-07
2509	2507	ALL		685545	4157659	1.39E-07	25YrCance	1.39E-07
2510	2508	ALL	Schools	684805	4158114	2.91E-07	25YrCance	2.91E-07
2511	2509	ALL		684770	4158159	2.91E-07	25YrCance	2.91E-07
2512								

Acute Hazard Index

	A	B	C	D	E	F	O	P	Q	R	S	T	U
2496	2494	ALL	UCART1	685762.5	4158413	NonCance	2.38E-04	0.00E+00	0.00E+00	2.96E-03	0.00E+00	0.00E+00	2.98E-03
2497	2495	ALL	UCART1	685787.5	4158413	NonCance	2.35E-04	0.00E+00	0.00E+00	2.95E-03	0.00E+00	0.00E+00	2.97E-03
2498	2496	ALL	UCART1	685812.5	4158413	NonCance	2.34E-04	0.00E+00	0.00E+00	2.92E-03	0.00E+00	0.00E+00	2.94E-03
2499	2497	ALL	UCART1	685837.5	4158413	NonCance	2.33E-04	0.00E+00	0.00E+00	2.91E-03	0.00E+00	0.00E+00	2.93E-03
2500	2498	ALL	UCART1	685862.5	4158413	NonCance	2.32E-04	0.00E+00	0.00E+00	2.94E-03	0.00E+00	0.00E+00	2.96E-03
2501	2499	ALL	UCART1	685887.5	4158413	NonCance	2.30E-04	0.00E+00	0.00E+00	2.94E-03	0.00E+00	0.00E+00	2.96E-03
2502	2500	ALL	UCART1	685912.5	4158413	NonCance	2.25E-04	0.00E+00	0.00E+00	2.90E-03	0.00E+00	0.00E+00	2.92E-03
2503	2501	ALL	Residence	685339	4158056	NonCance	7.86E-04	0.00E+00	0.00E+00	1.06E-02	0.00E+00	0.00E+00	1.06E-02
2504	2502	ALL	Residence	685279	4158116	NonCance	6.72E-04	0.00E+00	0.00E+00	1.01E-02	0.00E+00	0.00E+00	1.02E-02
2505	2503	ALL	Residence	685353	4158121	NonCance	5.65E-04	0.00E+00	0.00E+00	8.06E-03	0.00E+00	0.00E+00	8.12E-03
2506	2504	ALL	Residence	685148	4158114	NonCance	1.02E-03	0.00E+00	0.00E+00	1.40E-02	0.00E+00	0.00E+00	1.41E-02
2507	2505	ALL	Workplace	685061	4157536	NonCance	5.44E-04	0.00E+00	0.00E+00	7.58E-03	0.00E+00	0.00E+00	7.64E-03
2508	2506	ALL	Workplace	685345	4157721	NonCance	1.47E-03	0.00E+00	0.00E+00	1.81E-02	0.00E+00	0.00E+00	1.83E-02
2509	2507	ALL	Workplace	685545	4157659	NonCance	9.11E-04	0.00E+00	0.00E+00	1.15E-02	0.00E+00	0.00E+00	1.16E-02
2510	2508	ALL	School	684805	4158114	NonCance	1.39E-03	0.00E+00	0.00E+00	1.49E-02	0.00E+00	0.00E+00	1.50E-02
2511	2509	ALL	School	684770	4158159	NonCance	1.14E-03	0.00E+00	0.00E+00	1.23E-02	0.00E+00	0.00E+00	1.24E-02

Chronic Hazard Index

	A	B	C	D	E	F	O	P	Q	R	S	T	U
2495	2493	ALL	UCART1	685737.5	4158413	NonCance	1.22E-07	0.00E+00	2.84E-08	1.47E-04	0.00E+00	0.00E+00	5.63E-04
2496	2494	ALL	UCART1	685762.5	4158413	NonCance	1.19E-07	0.00E+00	2.77E-08	1.43E-04	0.00E+00	0.00E+00	5.49E-04
2497	2495	ALL	UCART1	685787.5	4158413	NonCance	1.15E-07	0.00E+00	2.69E-08	1.39E-04	0.00E+00	0.00E+00	5.37E-04
2498	2496	ALL	UCART1	685812.5	4158413	NonCance	1.12E-07	0.00E+00	2.61E-08	1.35E-04	0.00E+00	0.00E+00	5.26E-04
2499	2497	ALL	UCART1	685837.5	4158413	NonCance	1.08E-07	0.00E+00	2.53E-08	1.32E-04	0.00E+00	0.00E+00	5.17E-04
2500	2498	ALL	UCART1	685862.5	4158413	NonCance	1.05E-07	0.00E+00	2.44E-08	1.28E-04	0.00E+00	0.00E+00	5.07E-04
2501	2499	ALL	UCART1	685887.5	4158413	NonCance	1.01E-07	0.00E+00	2.36E-08	1.25E-04	0.00E+00	0.00E+00	4.98E-04
2502	2500	ALL	UCART1	685912.5	4158413	NonCance	9.75E-08	0.00E+00	2.27E-08	1.21E-04	0.00E+00	0.00E+00	4.89E-04
2503	2501	ALL	Residences	685339	4158056	NonCance	8.79E-07	0.00E+00	2.05E-07	9.91E-04	0.00E+00	0.00E+00	2.64E-03
2504	2502	ALL	Residences	685279	4158116	NonCance	7.59E-07	0.00E+00	1.77E-07	9.63E-04	0.00E+00	0.00E+00	2.37E-03
2505	2503	ALL	Residences	685353	4158121	NonCance	5.62E-07	0.00E+00	1.31E-07	6.98E-04	0.00E+00	0.00E+00	1.96E-03
2506	2504	ALL	Residences	685148	4158114	NonCance	1.49E-06	0.00E+00	3.49E-07	2.03E-03	0.00E+00	0.00E+00	3.32E-03
2507	2505	ALL	Workplace	685061	4157536	NonCance	4.95E-07	0.00E+00	1.15E-07	1.43E-03	0.00E+00	0.00E+00	1.10E-02
2508	2506	ALL	Workplace	685345	4157721	NonCance	1.01E-05	0.00E+00	2.35E-06	3.01E-03	0.00E+00	0.00E+00	1.51E-02
2509	2507	ALL	Workplace	685545	4157659	NonCance	1.72E-06	0.00E+00	4.01E-07	8.56E-04	0.00E+00	0.00E+00	3.75E-03
2510	2508	ALL	School	684805	4158114	NonCance	1.88E-06	0.00E+00	4.38E-07	2.20E-03	0.00E+00	0.00E+00	4.41E-03
2511	2509	ALL	School	684770	4158159	NonCance	1.43E-06	0.00E+00	3.34E-07	2.28E-03	0.00E+00	0.00E+00	3.77E-03

Emission Tables

June 26, 2015

Mr. Rod Hawkins
Hawkins & Associates Engineering
436 Mitchell Road
Modesto, California 95354

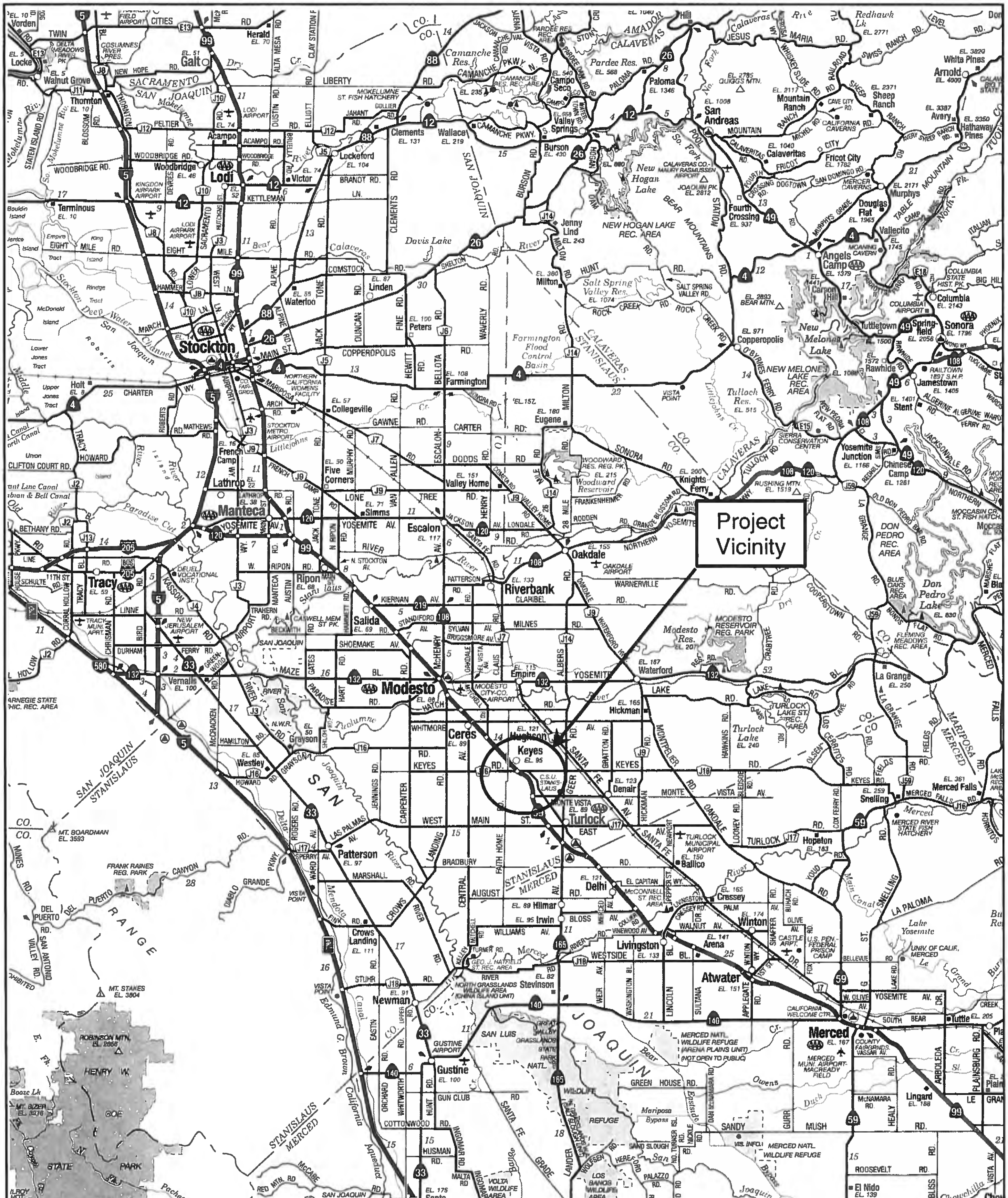
Subject: "BELKORP AG PROJECT", STANISLAUS COUNTY, CALIFORNIA: BIOLOGICAL ASSESSMENT

Dear Rod:

Thank you for asking Moore Biological Consultants to prepare this biological assessment for the Belkorp AG site in Keyes (Figures 1 and 2). The focus of our work was to document existing biological resources in the site, conduct a survey to determine presence or absence of potentially jurisdictional waters or wetlands, and search for suitable habitat for or presence of special-status species within the site. This report details the methodology and results of our investigation.

Project Overview

The proposed commercial project is an agricultural tractor and supply center in the northeast quadrant of the intersection of Highway 99 and Keyes Road. The project will include an approximately 57,000 ft^2 building with landscaping and parking. There will be equipment display areas to the west of the store along Highway 99 and to the east of the store along North Golden State Boulevard (see site plan in Attachment A). An approximately 1-acre detention basin will be constructed to the south of the store. The primary access to the site will be from North Golden State Boulevard.



Source: Calif. State Automobile Association

Moore Biological Consultants

0 — 18 Miles

N S E W

FIGURE 1

PROJECT VICINITY

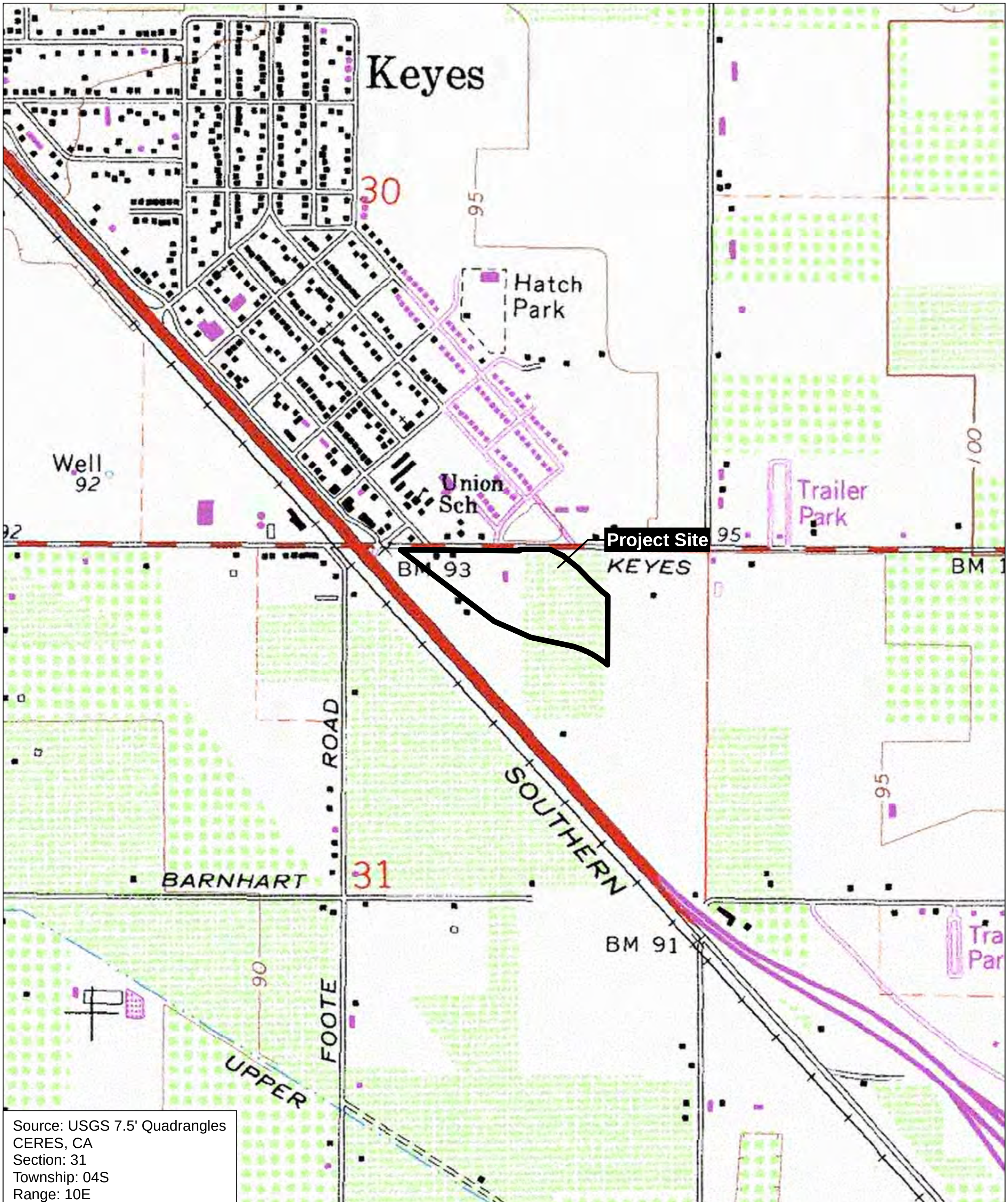


Figure 2

Moore Biological Consultants

0 500 1,000

1 inch = 1,000 feet

N W E S

Map Date: June 2015

PROJECT LOCATION

Belkorp AG

Stanislaus County, CA

C:\Users\Matt\Documents\Fremont Environmental Consulting\Projects\Moore Biological\Belkorp AG\MXD\belkorp ag_Figure 2 usgs.mxd

Methods

Prior to the field survey, we conducted a search of California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB, 2015). The CNDDB search encompassed the USGS 7.5-minute Ceres and Denair topographic quadrangles, which encompasses approximately 120 square miles surrounding the project site. The United States Fish and Wildlife Service (USFWS) list of Federally Threatened and Endangered species that may occur in or be affected by projects in the same topographic quadrangles was also reviewed (Attachment B). This information was used to identify wildlife and plant species that have been previously documented in the project vicinity or have the potential to occur based on suitable habitat and geographical distribution. The USFWS on-line-maps of designated critical habitat were also downloaded and plotted with respect to the site.

A field survey of the site was conducted on June 10, 2015. The survey consisted of walking throughout the project site making observations of current habitat conditions and noting surrounding land use, general habitat types, and plant and wildlife species. The survey included an assessment of the project site for presence or absence of potentially jurisdictional Waters of the U.S. (a term that includes wetlands) as defined by the U.S. Army Corps of Engineers (ACOE, 1987; 2008), special-status species, and suitable habitat for special-status species (e.g., blue elderberry shrubs, vernal pools). Additionally, trees within and near the project site were assessed for the potential use by nesting raptors, especially Swainson's hawk (*Buteo swainsoni*). The project site was also searched for burrowing owls (*Athene cunicularia*) or ground squirrel burrows that could be utilized by burrowing owls.

Results

GENERAL SETTING: The project site is located south of Keyes, in Stanislaus County, California (Figure 1). The site is in Section 31, Township 4 South, Range 10 East of the USGS 7.5-minute Ceres topographic quadrangle (Figure 2). The site is nearly level and is at an elevation of approximately 90 feet above mean sea level. The west part of the site was previously developed and there are old foundations and roads remaining. The east part of the site was leveled cropland, but has been fallow for years. The entire site is disturbed weedy grassland (Figure 3 and photographs in Attachment C).

Surrounding land uses in this portion of Stanislaus County are primarily agricultural. North Golden State Boulevard bounds the site on the northeast and Highway 99 bounds the site on the southwest. The town of Keyes is located just north of the site, across Nunes Road and there is a vineyard west of the site, across Highway 99. There are open fields to the east of the site, across North Golden State Boulevard (Figure 3 and photographs in Attachment C).

VEGETATION: Due to the amount of disturbance from agriculture, development, and periodic mowing and/or disking for weed abatement, vegetation in the project site is primarily annual grass and weed species. California annual grassland series (Sawyer and Keeler-Wolf, 1995) best describes the disturbed grassland vegetation. Grasses including oats (*Avena* sp.), soft chess brome (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), red brome (*Bromus madritensis*), foxtail barley (*Hordeum murinum*), and perennial ryegrass (*Lolium perenne*) are dominant grass species. Other grassland species such as black mustard (*Brassica nigra*), hairy fleabane (*Conyza bonariensis*), prickly lettuce (*Lactuca serriola*), yellow star-thistle (*Centaurea solstitialis*), filaree (*Erodium* spp.), and common mallow (*Malva neglecta*) are intermixed with the grasses. Table1 is a list of plant species observed in the site.

C:\Users\Matt\Documents\Fremont Environmental Consulting\Projects\Moore Biological\Belkorp AG\MXD\belkorp ag_Figure 3 aerial.mxd

Figure 3

Moore Biological Consultants

0 100 200

1 inch = 200 feet

N W E S

Map Date: June 2015

AERIAL

Belkorp AG

Stanislaus County, CA

TABLE 1

PLANT SPECIES OBSERVED IN THE PROJECT SITE

Ailanthus altissima	tree-of-heaven
Amsinckia menziesii	rancher’s fireweed
Avena fatua	wild oat
Brassica nigra	black mustard
Bromus diandrus	ripgut brome
Bromus hordeaceus	soft chess brome
Bromus madritensis	red brome
Carya sp.	pecan
Centaurea solstitialis	yellow star-thistle
Chamomilla suaveolens	pineapple weed
Convolvulus arvensis	morning glory
Conyza bonariensis	hairy fleabane
Conyza canadensis	horseweed
Cynodon dactylon	Bermuda grass
Datura innoxia	datura
Eremocarpus setigerus	dove weed
Erodium botrys	filaree
Erodium circutarium	red-stem filaree
Grindelia camporum	common gumweed
Helianthus annuus	common sunflower
Heterotheca grandiflorum	telegraph weed
Hordeum murinum	foxtail barley
Lactuca serriola	prickly lettuce
Lepidium latifolium	perennial pepperweed
Lolium perenne	perennial ryegrass
Malva neglecta	common mallow
Morus alba	mulberry
Nerium sp.	oleander

TABLE 1 (continued)

PLANT SPECIES OBSERVED IN THE PROJECT SITE

Pinus sp.	ornamental pine
Populus fremontii	Fremont cottonwood
Raphanus sativus	wild radish
Salix sp.	willow
Salsola iberica	Russian thistle
Sambucus mexicana	blue elderberry
Senecio vulgaris	common groundsel
Sorghum halepense	Johnsongrass
Tribulus terrestris	puncture vine
Trichostema lanceolatum	vinegar weed
Washingtonia filifera	California fan palm
Vicia sp.	vetch

The only trees in the site are in the north part of the site near Nunes Road (see photographs in Attachment C). The trees in the north part of the site include several relatively small tree-of-heaven (*Ailanthus altissima*), a Fremont cottonwood (*Populus fremontii*), a few mulberry (*Morus alba*) and pines (*Pinus* sp.), and two fan palms (*Washingtonia filifera*). There are also some ornamental trees along the Highway 99 frontage, intermixed with oleanders (*Nerium* sp.) This ornamental strip appears to be off-site, but may span the site boundary.

There are two small blue elderberry (*Sambucus mexicana*) shrubs in the northeast corner of the site, near the intersection of Highway 99 and North Golden State Boulevard (Figure 3 photograph in Attachment C). No other blue elderberry shrubs were observed in the project site. There are several blue elderberry shrubs in the parcel just southeast of the site, including a very large shrub approximately 30 feet east of the site.

WILDLIFE: A variety of bird species were observed during the field survey; all of these are common species found in agricultural and riparian areas of Stanislaus County (Table 2). Red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), American kestrel (*Falco sparverius*), American crow (*Corvus brachyrhynchos*), mourning dove (*Zenaida macroura*), northern mockingbird (*Mimus polyglottos*), western kingbird (*Tyrannus verticalis*), red-winged blackbird (*Agelaius phoeniceus*), Brewer's blackbird (*Euphagus cyanocephalus*), and house finch (*Carpodacus mexicanus*) are representative of the avian species observed in the site.

Only a few of the trees in the site are large enough to support nesting raptors. The cottonwood contains a large raptor stick nest that was not occupied during the recent survey and is tattered and appears to have been from last year's nesting season. It is possible that songbirds nest in the smaller trees, shrubs, and grasslands in the site.

A limited variety of mammals common to agricultural areas likely occur in the project site. Black-tailed hare (*Lepus californicus*) was the only mammal observed during the recent survey; sign of raccoon (*Procyon lotor*) was also observed. Coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*), desert cottontail (*Sylvilagus audubonii*), and Virginia opossum (*Didelphis virginiana*) are expected to occur in the project site on occasion. California ground squirrels (*Spermophilus beecheyi*) are common in the area and may occur on-site. No California ground squirrels were observed during the recent survey, although a few old ground squirrels were observed in parts of the site.

Due to lack of suitable habitat, few amphibians and reptiles are expected to use habitats in the site. Western fence lizard (*Sceloporus occidentalis*) was the only reptile observed in the site; no amphibians were observed. Common species such as Pacific chorus frog (*Pseudacris regilla*) and western terrestrial garter snake (*Thamnophis elegans*) may occur in the site on occasion.

TABLE 2

WILDLIFE SPECIES DOCUMENTED IN THE PROJECT SITE

Birds	
Turkey vulture	*Cathartes aura*
Red-tailed hawk	*Buteo jamaicensis*
American kestrel	*Falco sparverius*
Mourning dove	*Zenaida macroura*
Western scrub jay	*Aphelocoma coerulescens*
Western kingbird	*Tyrannus verticalis*
American crow	*Corvus brachyrhynchos*
Northern mockingbird	*Mimus polyglottos*
White-crowned sparrow	*Zonotrichia leucophrys*
Red-winged blackbird	*Agelaius phoeniceus*
Brewer's blackbird	*Euphagus cyanocephalus*
House finch	*Carpodacus mexicanus*
House sparrow	*Passer domesticus*
Mammals	
Black-tailed hare	*Lepus californicus*
Raccoon	*Procyon lotor*
California ground squirrel	*Spermophilus beecheyi*
Reptiles	
Western fence lizard	*Sceloporus occidentalis*

WATERS OF THE U.S. AND WETLANDS: Waters of the U.S., including wetlands, are broadly defined under 33 Code of Federal Regulations (CFR) 328 to include navigable waterways, their tributaries, and adjacent wetlands. State and federal agencies regulate these habitats and Section 404 of the Clean Water Act requires that a permit be secured prior to the discharge of dredged or fill materials into any waters of the U.S., including wetlands. Both CDFW and ACOE have jurisdiction over modifications to riverbanks, lakes, stream channels and other wetland features.

"Waters of the U.S.", as defined in 33 CFR 328.4, encompasses Territorial Seas, Tidal Waters, and Non-Tidal Waters; Non-Tidal Waters includes interstate and intrastate rivers and streams, as well as their tributaries. The limit of federal jurisdiction of Non-Tidal Waters of the U.S. extends to the "ordinary high water mark". The ordinary high water mark is established by physical characteristics such as a natural water line impressed on the bank, presence of shelves, destruction of terrestrial vegetation, or the presence of litter and debris. Jurisdictional wetlands and Waters of the U.S. include, but are not limited to, perennial and intermittent creeks and drainages, lakes, seeps, and springs; emergent marshes; riparian wetlands; and seasonal wetlands. Wetlands and Waters of the U.S. provide critical habitat components, such as nest sites and a reliable source of water, for a wide variety of wildlife species.

There are no rivers, streams, lakes, ponds, vernal pools, seasonal wetlands, or marshes in the site. The only area in the project site supporting wetland vegetation is a small (0.01+/- acre) rectangular detention basin in the northeast part of the site, associated with the old foundations (see photographs in Attachment C). This 5+/- feet deep basin was dry and does not appear to hold water other than during rain events. Portions of a small willow in this basin are dead, presumably due to lack of water. This basin was constructed in uplands, is isolated from creeks and other potentially jurisdictional wetlands or Waters of the U.S. and does not meet the technical and/or regulatory criteria of jurisdictional wetlands or Waters of the U.S.

No other potentially jurisdictional wetlands or Waters of the U.S. were observed within the site. The body of the site vegetated with upland grasses and weeds.

SPECIAL-STATUS SPECIES: Special-status species are plants and animals that are legally protected under the state and/or federal Endangered Species Act or other regulations. The Federal Endangered Species Act (FESA) of 1973 declares that all federal departments and agencies shall utilize their authority to conserve endangered and threatened plant and animal species. The California Endangered Species Act (CESA) of 1984 parallels the policies of FESA and pertains to native California species.

Special-status species also include other species that are considered rare enough by the scientific community and trustee agencies to warrant special consideration, particularly with regard to protection of isolated populations, nesting or denning locations, communal roosts, and other essential habitat. The presence of species with legal protection under the Endangered Species Act often represents a major constraint to development, particularly when the species are wide-ranging or highly sensitive to habitat disturbance and where proposed development would result in a take of these species.

Special-status plants are those which are designated rare, threatened, or endangered and candidate species for listing by the USFWS. Special-status plants also include species considered rare or endangered under the conditions of Section 15380 of the California Environmental Quality Act Guidelines, such as those plant species identified on Lists 1A, 1B and 2 in the Inventory of Rare and Endangered Vascular Plants of California by the California Native Plant Society (CNPS, 2010). Finally, special-status plants may include other species that are considered sensitive or of special concern due to limited distribution or lack of adequate information to permit listing or rejection for state or federal status, such as those included on List 3 in the CNPS Inventory.

The likelihood of occurrence of listed, candidate, and other special-status species in the work areas is generally low. Table 3 provides a summary of the listing status and habitat requirements of special-status species that have been documented in the greater project vicinity or for which there is potentially suitable

TABLE 3

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED IN THE GREATER PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[1]	CNPS List[2]	Habitat	Likeliness of Occurrence in the Project Site
PLANTS						
Heartscale	*Atriplex cordulata*	None	None	1B	Valley and foothill grassland, chenopod scrub	Unlikely: the disturbed grassland in the site does not provide suitable habitat for heartscale. The nearest occurrence of this species in the CNDDB (2015) search area is approximately 1.5 miles southeast of the site.
Subtle oracle	*Atriplex subtilis*	None	None	1B	Valley and foothill grassland; usually in alkaline soils.	Unlikely: the disturbed grassland in the site does not provide suitable habitat for subtle oracle. The site is below the elevation range of this species (CNPS, 2010). The nearest occurrence of subtle oracle in the CNDDB (2015) search area is approximately 1.5 miles south of the site.
San Joaquin Valley Orcutt grass	*Orcuttia inaequalis*	T	E	1B	Vernal pools.	Unlikely: there are no vernal pools or seasonal wetlands in the site. The nearest occurrence of San Joaquin Valley Orcutt grass in the CNDDB (2015) search area is approximately 8 miles northeast of the site. The site is not in designated critical habitat this species (USFWS 2005a)
WILDLIFE						
BIRDS						
Swainson's hawk	*Buteo swainsoni*	None	T	N/A	Nesting: large trees, usually within riparian corridors. Foraging: agricultural fields and annual grasslands.	Low: the disturbed grassland in the site provides marginal foraging habitat; only a few trees in the site are large enough for nesting raptors. It is unlikely Swainson's hawks utilize this small patch of land for a significant amount of foraging when there are expansive alfalfa and hay fields nearby providing better habitat. The nearest occurrence of nesting Swainson's hawks in the CNDDB (2015) search area is approximately 2.5 miles southeast of the site.

TABLE 3

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED IN THE GREATER PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[1]	CNPS List[2]	Habitat	Likeliness of Occurrence in the Project Site
Tricolored blackbird	*Agelaius tricolor*	None	SC	N/A	Nests in dense brambles and emergent wetland vegetation associated with open water habitat.	Unlikely: there is no suitable emergent wetland vegetation in the site for nesting. This species may occasionally fly over or forage in the area. The nearest occurrence of tricolored blackbird in the CNDDB (2015) search area is approximately 6 miles southwest of the site.
Burrowing owl	*Athene cunicularia*	None	None	N/A	Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation.	Unlikely: the formerly paved and graveled areas and disturbed grassland in the site provide marginal foraging habitat for burrowing owl, but very little suitable burrow habitat was observed in the site. There are no occurrences of this species in the CNDDB (2015) search area.
MAMMALS						
Townsend's big-eared bat	*Corynorhinus townsendii townsendii*	None	T	N/A	Requires caves, mines, buildings, or other human-made structures for roosting.	Unlikely: the site does not provide suitable habitat for this species. Townsend's big-eared bat may fly over or forage above the site. The nearest occurrence of this species in the CNDDB (2015) search area is along the Tuolumne River, approximately 5 miles north of the site.
REPTILES & AMPHIBIANS						
California tiger salamander	*Ambystoma californiense*	T	T	N/A	Breeds in seasonal water bodies such as deep vernal pools or stock ponds. Requires small mammal burrows for summer refugia.	Unlikely: there are no areas within or near the site that could provide breeding habitat for California tiger salamander and the site is not suitable for aestivation. There are no occurrences of this species in the CNDDB (2015) search area. The site is not within an area designated critical habitat for California tiger salamander (USFWS, 2005b). .

TABLE 3

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED IN THE GREATER PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[1]	CNPS List[2]	Habitat	Likeliness of Occurrence in the Project Site
California red-legged frog	*Rana aurora draytonii*	T	SC	N/A	Lowlands and foothills in or near permanent sources of water with vegetation.	Unlikely: there is no suitable aquatic habitat for California red-legged frog in or near the site. California red-legged frog is not known from the area and there are no recorded occurrences of this species in the CNDDB (2015) search area. The site is not in designated for California red-legged frog critical habitat (USFWS, 2006).
Giant garter snake	*Thamnophis gigas*	T	T	N/A	Freshwater marsh and low gradient streams; adapted to drainage canals and irrigation ditches, primarily for dispersal or migration.	Unlikely: there is no suitable habitat in or near the site for giant garter snake. Giant garter snake is not known from the area and there are no recorded occurrences of this species in the CNDDB (2015) search area.
FISH						
Delta smelt	*Hypomesus transpacificus*	T	T	N/A	Shallow lower delta waterways with submersed aquatic plants and other suitable refugia.	Unlikely: there is no aquatic habitat in the site. There are no occurrences of delta smelt recorded in the CNDDB (2015) in the search area. There is no designated critical habitat for delta smelt (USFWS, 1994) in or near the site.
Central Valley steelhead	*Oncorhynchus mykiss*	T	None	N/A	Riffle and pool complexes with adequate spawning substrates within Central Valley drainages.	Unlikely: there is no aquatic habitat in the site. Central Valley steelhead is recorded in the CNDDB (2015) in the Tuolumne River approximately 5 miles north of the site. The site is not within designated critical habitat for Central Valley steelhead (NOAA, 2005).
Hardhead	*Mylopharodon concephalus*	None	SC	N/A	Major tributaries to Central Valley drainages.	Unlikely: there is no suitable perennial or near-perennial aquatic habitat in or near the site for hardhead. This species is recorded in the CNDDB (2015) in the Tuolumne River approximately 5 miles north of the site.

TABLE 3

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES DOCUMENTED IN THE GREATER PROJECT VICINITY

Common Name	Scientific Name	Federal Status[1]	State Status[1]	CNPS List[2]	Habitat	Likeliness of Occurrence in the Project Site
INVERTEBRATES						
Vernal pool tadpole shrimp	*Lepidurus packardi*	E	None	N/A	Vernal pools and seasonally wet depressions within the Central Valley.	Unlikely: there are no vernal pools or seasonal wetlands in the site. There are no occurrences of vernal pool tadpole shrimp recorded in the CNDDB (2015) within the search area. The site is not within designated critical habitat for vernal pool tadpole shrimp (USFWS, 2005a).
Vernal pool fairy shrimp	*Branchinecta lynchi*	T	None	N/A	Vernal pools and seasonally inundated depressions in the Central Valley.	Unlikely: there are no vernal pools or seasonal wetlands in the site. There are no occurrences of vernal pool fairy shrimp recorded in the CNDDB (2015) within the search area. The site is not within designated critical habitat for any vernal pool shrimp species (USFWS, 2005a).
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	T	None	N/A	Elderberry shrubs in the Central Valley and surrounding foothills	Unlikely: the blue elderberry shrubs in the site are small and show no evidence of occupancy. The nearest occurrence of valley elderberry longhorn beetle in the CNDDB (2015) search area steelhead is along the Tuolumne River, approximately 5 miles north of the site.

Notes:

1 T= Threatened; E = Endangered; SC = Species of Special Concern per California Department of Fish and Wildlife.

2 CNPS List 1B includes species that are rare, threatened, or endangered in California and elsewhere.

habitat in the greater project vicinity. This table also includes an assessment of the likelihood of occurrence of each of these species in the site. The evaluation of the potential for occurrence of each species is based on the distribution of regional occurrences (if any), habitat suitability, and field observations.

SPECIAL-STATUS PLANTS: Three species of special-status plants were identified in the CNDDB (2015) search area (Table 3 and Attachment A). These include heartscale (*Atriplex cordulata*), subtle oracle (*Atriplex subtilis*), and San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*). The USFWS species list (Attachment A) does not contain any special-status plants.

Special-status plants generally occur in relatively undisturbed areas in vegetation communities such as vernal pools, marshes and swamps, seasonal wetlands, riparian scrub, and areas with unusual soils. The leveled ruderal grassland in the site is highly disturbed and does not provide suitable habitat for any of these plants in Table 3 or other special-status plants. Due to lack of suitable habitat, no special-status plant species are expected to occur in the site.

SPECIAL-STATUS WILDLIFE: The potential for intensive use of habitats within the project site by special-status wildlife species is very low. Special-status wildlife identified in the CNDDB (2015) search are Swainson's hawk, tricolored blackbird (*Agelaius tricolor*), Central Valley steelhead (*Oncorhynchus mykiss*), hardhead (*Mylopharodon conocepehalus*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (Table 3 and Attachment A). Although not recorded in the CNDDB (2015) within the search area, giant garter snake (*Thamnophis gigas*), California red-legged frog (*Rana aurora draytonii*), delta smelt (*Hypomesus transpacificus*), vernal pool tadpole shrimp (*Lepidurus packardi*), and vernal pool fairy shrimp (*Branchinecta lynchi*) were added to Table 3 as they are on the USFWS Species List (Attachment B). Burrowing owl was added to Table 3 as it is widespread throughout the Central Valley and could occur in the project site.

While the project site may have provided habitat for special-status wildlife species at some time in the past, farming and development have substantially modified natural habitats in the greater project vicinity. Of the wildlife species identified in the CNDDB, Swainson’s hawk is the only species that has potential to occur in the site on more than a transitory or very occasional basis. Other special-status birds including tricolor blackbird, and burrowing owl, may fly over the area on occasion, but would not be expected to nest in or immediately adjacent to the project site.

SWAINSON’S HAWK: The Swainson’s hawk is a migratory hawk listed by the State of California as a Threatened species. The Migratory Bird Treaty Act and Fish and Game Code of California protect Swainson’s hawks year-round, as well as their nests during the nesting season (March 1 through September 15). Swainson’s hawk are found in the Central Valley primarily during their breeding season, a population is known to winter in the San Joaquin Valley.

Swainson's hawks prefer nesting sites that provide sweeping views of nearby foraging grounds consisting of grasslands, irrigated pasture, hay, and wheat crops. Most Swainson's hawks are migratory, wintering in Mexico and breeding in California and elsewhere in the western United States. This raptor generally arrives in the Central Valley in mid-March, and begins courtship and nest construction immediately upon arrival at the breeding sites. The young fledge in early July, and most Swainson's hawks leave their breeding territories by late August.

The site is within the nesting range of Swainson’s hawks and the CNDDB (2015) contains a few records of nesting Swainson’s hawks in the greater project vicinity (Attachment B). The nearest occurrence of nesting Swainson’s hawks in the CNDDB (2015) search area is approximately 2.5 miles southeast of the site. This species has also been documented nesting along the Tuolumne River approximately 5 miles north of the site.

Swainson's hawks were not observed in or near the site during the recent survey, which was conducted during the heart of the Swainson's hawk nesting season. The formerly paved areas and weedy grassland in the site provide marginal Swainson's hawk foraging habitat. It is unlikely Swainson's hawks utilize this small patch of land adjacent to a major highway for more than very occasional foraging when there are expansive alfalfa and hay fields in the region providing higher quality foraging habitat

BURROWING OWL: The Migratory Bird Treaty Act and Fish and Game Code of California protect burrowing owls year-round, as well as their nests during the nesting season (February 1 through August 31). Burrowing owls are a year-long resident in a variety of grasslands as well as scrub lands that have a low density of trees and shrubs with low growing vegetation; burrowing owls that nest in the Central Valley may winter elsewhere.

The primary habitat requirement of the burrowing owl is small mammal burrows for nesting. The owl usually nests in abandoned ground squirrel burrows, although they have been known to dig their own burrows in softer soils. In urban areas, burrowing owls often utilize artificial burrows including pipes, culverts, and piles of concrete pieces. This semi-colonial owl breeds from March through August, and is most active while hunting during dawn and dusk. There are no occurrences of burrowing owls in the CNDDB (2015) search area.

No burrowing owls or ground squirrels were observed in the site. The grassland in the site is tall and weedy and provides marginal foraging habitat for burrowing owl. While a few old ground squirrel burrows were observed within the site, none had evidence of burrowing owl occupancy (i.e. whitewash, feathers and/or pellets). The site is well within the species range and burrowing owls may fly over or forage in the site on an occasional basis. It is possible that burrowing owls could nest in the site in the future, if burrow habitat is available.

VALLEY ELDERBERRY LONGHORN BEETLE: The valley elderberry longhorn beetle is listed as a federally threatened species and its host plant is the blue elderberry shrub. The United States Fish and Wildlife Service (USFWS, 1999) *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* identifies stems in excess of 1 inch diameter at ground level as potential habitat for the beetle. These guidelines direct that, if possible, elderberry shrubs should be avoided by a ground disturbance set back of at least twenty feet from the drip line of each shrub. The guidelines further direct that buffer areas between 20 and 100 feet from the driplines of the shrubs that are subject to temporary ground disturbance should be restored or re-vegetated.

As mentioned above, there are two small blue elderberry shrubs in the northeast corner of the site, near the intersection of Highway 99 and North Golden State Boulevard (Figure 3 and photograph in Attachment C). There are also several blue elderberry shrubs in the parcel just southeast of the site, including a very large shrub approximately 30 feet east of the east edge of the site. The elderberry shrubs in the site each have a few stems between 1 and 3 inches in diameter at ground level and both shrubs are only about 5 to 6 feet tall. None of the shrub's stems have bore holes that appear suggestive of past occupancy by valley elderberry longhorn beetle. These small elderberry shrubs in the site likely established in the past decade when seeds from the shrubs to the east were dropped by birds.

OTHER SPECIAL-STATUS SPECIES: Special-status birds may fly over the area on occasion, but would not be expected to nest in or immediately adjacent to the project site. The site does not provide suitable aquatic habitat for any type of fish, giant garter snake, California tiger salamander, or California red-legged frog. There are no vernal pools or seasonal wetlands in the site for vernal pool branchiopods (i.e., fairy and tadpole shrimp).

CRITICAL HABITAT: The site is not within designated critical habitat for delta smelt (USFWS, 1994), California red-legged frog (USFWS, 2006), California tiger salamander (USFWS, 2005a), federally listed vernal pool shrimp or plants (USFWS, 2005b), valley elderberry longhorn beetle (USFWS, 1980), or Central Valley steelhead (NOAA, 2005).

Conclusions and Recommendations

- The site is disturbed grassland vegetated with ruderal grasses and weeds. The west part of the site was developed in the past and old foundations and pavement remain. On-site habitats are biologically unremarkable.

- No potentially jurisdictional Waters of the U.S. or wetlands were observed in the project site. A small detention basin along the north edge of the site does not meet the technical and/or regulatory criteria of jurisdictional wetlands or Waters of the U.S.

- Due to high levels of disturbance and a lack of suitable habitat, it is unlikely that special-status plants occur in the site.

- No special-status wildlife species are expected to occur in or near the site on more than a very occasional or transitory basis. Swainson's hawk and burrowing owl could potentially nest in the site and may use the site for occasional foraging. However, the weedy grassland in the site provides marginal foraging habitat and use of the site by either Swainson's hawk or burrowing owl is expected to be limited.

- Although considered unlikely, valley elderberry longhorn beetle could potentially occur in the small blue elderberry shrubs in the northeast part of the site. These small shrubs show no evidence of occupancy by valley elderberry longhorn beetle and removal of the shrubs is expected to have no effect on this species. Prior to removing the shrubs, it is recommended the applicant obtain concurrence from USFWS regarding removing the shrubs.

- Prior to securing concurrence to remove the blue elderberry shrubs, the shrubs should be protected with a no-disturbance buffer extending 10 feet from the driplines of the shrubs. Construction in the vicinity of the blue elderberry shrubs should also occur between June 15 and April 15. During this time period, valley elderberry longhorn beetle (if present) would be within the interior portion of the stems of the shrubs and would not move (i.e., fly or walk) into the construction area

- Pre-construction surveys for nesting Swainson's hawks within 0.25 miles of the project site are recommended if construction commences between March 1 and September 15. If active nests are found, a qualified biologist should determine the need (if any) for temporal restrictions on construction. The determination should utilize criteria set forth by CDFW (CDFG, 1994).

- Pre-construction surveys for burrowing owls in the site should be conducted if construction commences between February 1 and August 31. If occupied burrows are found, a qualified biologist should determine the need (if any) for temporal restrictions on construction. The determination should be pursuant to criteria set forth by CDFW (CDFG, 2012).

- Trees, shrubs, and grasslands in the site could be used by other birds protected by the Migratory Bird Treaty Act of 1918. If vegetation removal or construction commences during the general avian nesting season (March 1 through July 31), a pre-construction survey for nesting birds is recommended. If active nests are found, work in the vicinity of the nest should be delayed until the young fledge.

We hope this information is useful. Please call me at (209) 745-1159 with any questions.

Sincerely,

Diane S. Moore, M.S.
Principal Biologist

References and Literature Consulted

ACOE (U.S. Army Corps of Engineers). 1987. Technical Report Y87-1. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MI.

ACOE. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. U.S. Army Engineer Research and Development Center, Vicksburg, MS. September.

CDFG (California Department of Fish and Game). 1994. Staff Report regarding Mitigation for Impacts to Swainson's Hawks (*Buteo Swainsoni*) in the Central Valley of California. November.

CDFG (California Department of Fish and Game). 2012. Staff Report on Burrowing Owl Mitigation. California Department of Fish and Wildlife, Sacramento, California. March 7.

CNDDB (California Natural Diversity Database). 2015. California Department of Fish and Wildlife's Natural Heritage Program, Sacramento, California.

CNPS (California Native Plant Society). 2010. On-line Inventory of Rare and Endangered Vascular Plants of California, 8th Edition. California Native Plant Society, Sacramento, California. www.rareplants.cnps.org

Jennings, M.R. and M.P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California. Prepared for California Department of Fish and Game, Rancho Cordova, California. November.

National Oceanic and Atmospheric Administration (NOAA). 2005. Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California; Final Rule. Federal Register 70 (170): 52488-52585. September 2, 2005.

Sawyer & Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society, Sacramento. California.

USFWS (United States Fish and Wildlife Service). Final Critical Habitat for the Delta Smelt (*Hypomesus transpacificus*). Federal Register Vol. 59, No. 242, December 19, 1994, pp. 65256 – 65279.

USFWS. 1999. Conservation Guidelines for the Valley Elderberry Longhorn Beetle. July 9.

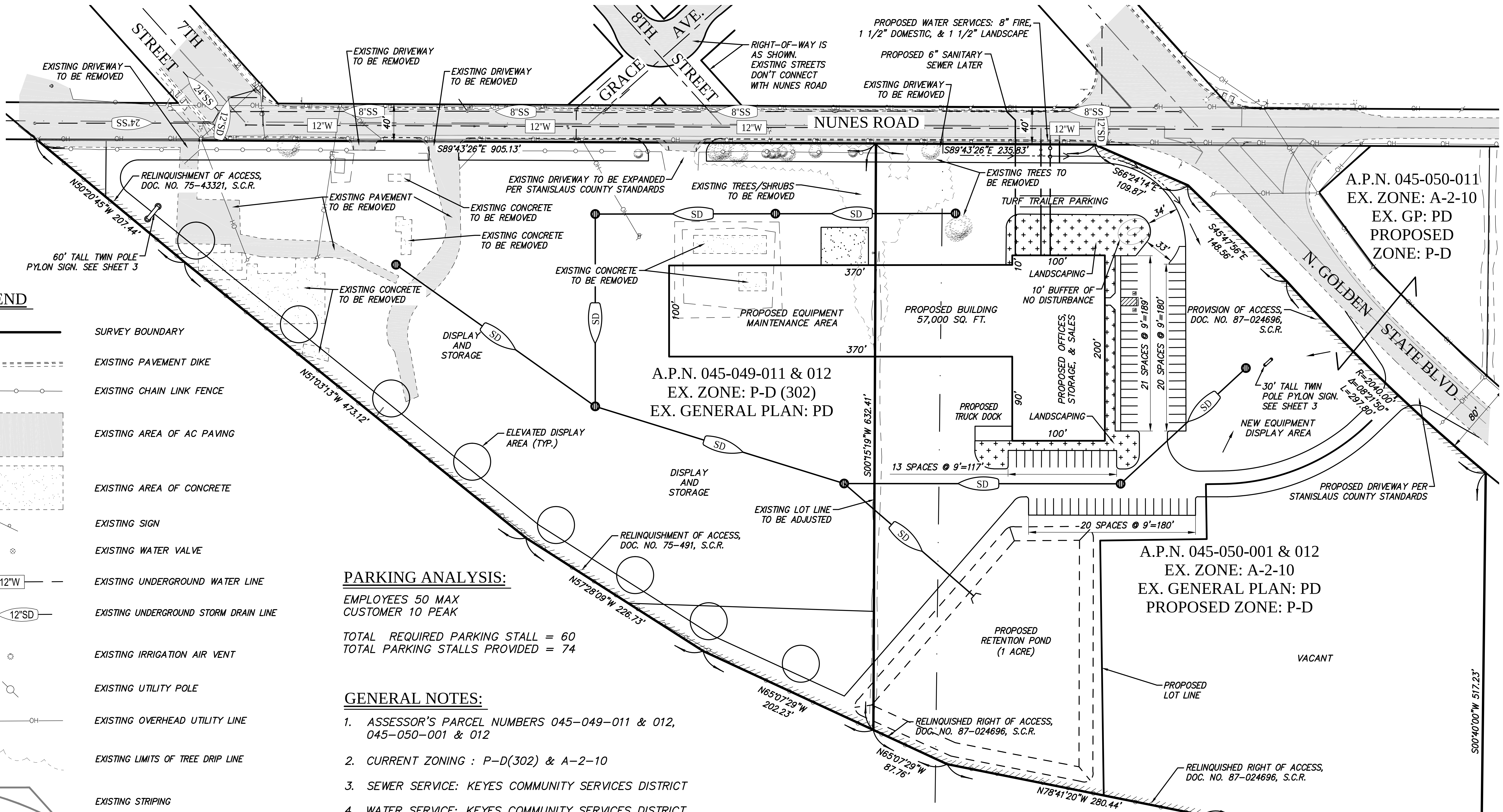
USFWS. 2005a. Part II, Department of the Interior, Fish and Wildlife Service. 50 CFR Part 17: Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon; Evaluation and Economic Exclusions from August 2003 Final Designation, Final Rule. Federal Register Vol. 70, No. 154, August 11.

USFWS. 2005b. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Tiger Salamander, Central Population; Final Rule. Federal Register Vol. 70, No. 162, August 23, 2005, pp. 49390 – 49458.

USFWS. 2006. Part II, Department of the Interior, Fish and Wildlife Service. 50 CFR Part 17: Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for California Red-Legged Frog, and Special Rule Exemption Associated with Final Listing for Existing Routine Ranching Activities, Final Rule. Federal Register Vol. 71, No. 71, April 13.

Attachment A

Site Plan



LEGEND

- SURVEY BOUNDARY
- EXISTING PAVEMENT DIKE
- EXISTING CHAIN LINK FENCE
- EXISTING AREA OF AC PAVING
- EXISTING AREA OF CONCRETE
- EXISTING SIGN
- EXISTING WATER VALVE
- 12"W — EXISTING UNDERGROUND WATER LINE
- 12"SD — EXISTING UNDERGROUND STORM DRAIN LINE
- EXISTING IRRIGATION AIR VENT
- EXISTING UTILITY POLE
- OH — EXISTING OVERHEAD UTILITY LINE
- EXISTING LIMITS OF TREE DRIP LINE
- EXISTING STRIPING
- EXISTING TREE, SPREAD TO SCALE
- EXISTING RELINQUISHED RIGHTS OF ACCESS, UNLESS OTHERWISE NOTED.
- PROPOSED AREA OF AC PAVING
- PROPOSED AREA OF CONCRETE
- PROPOSED AREA OF DROUGHT TOLERANT LANDSCAPING

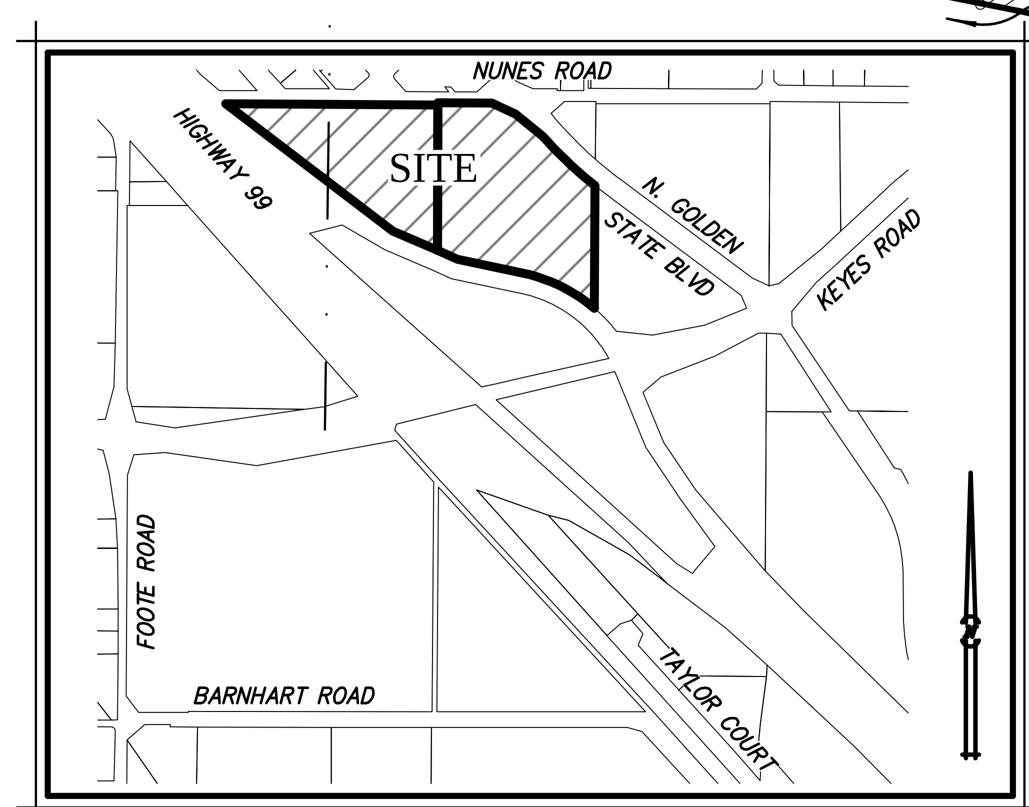
PARKING ANALYSIS:

EMPLOYEES 50 MAX
CUSTOMER 10 PEAK

TOTAL REQUIRED PARKING STALL = 60
TOTAL PARKING STALLS PROVIDED = 74

GENERAL NOTES:

1. ASSESSOR'S PARCEL NUMBERS 045-049-011 & 012, 045-050-001 & 012
2. CURRENT ZONING : P-D(302) & A-2-10
3. SEWER SERVICE: KEYES COMMUNITY SERVICES DISTRICT
4. WATER SERVICE: KEYES COMMUNITY SERVICES DISTRICT
5. STORM DRAINAGE: POSITIVE DRAINAGE SYSTEM TO DRAINAGE BASIN
6. ALL NEW PUBLIC UTILITIES ARE TO BE INSTALLED IN EASEMENTS. 10 FOOT WIDE PUBLIC UTILITY EASEMENTS SHALL BE DEDICATED ALONG ALL ROAD FRONTAGES.
7. ALL DIMENSIONS, DISTANCES, AREAS, ETC. ARE TAKEN FROM ASSESSOR'S DATA, RECORD INFORMATION, AND FIELD OBSERVATIONS BY OFFICE PERSONNEL AND DO NOT REFLECT AN ACTUAL SURVEY.
8. ALL IMPROVEMENTS SHALL BE CONSTRUCTED PER STANISLAUS COUNTY AND KEYES COMMUNITY SERVICES DISTRICT STANDARDS.
9. STREET LIGHTING SHALL BE INSTALLED AS PER STANISLAUS COUNTY REQUIREMENTS.
10. LANDSCAPING TO BE DROUGHT TOLERANT AND COMPLYING WITH MOST RECENT STANDARDS.



VICINITY MAP
NO SCALE

SCALE : 1"= 80'

RODRICK H. HAWKINS: R.C.E. 50188
CROLIE E. LINDSAY: R.C.E. 31900 L.S. 4709
KEVIN GENASCI: L.S. 8660

SYM.	DATE	DESCRIPTION	APPD.

BY: RCS
CHK: RHH
DATE: 3/2015
SCALE: 1"=80'
JOB #: 3233

PLOT PLAN EXHIBIT
REZONE

4618 NUNES ROAD, KEYES
STANISLAUS COUNTY, CALIFORNIA

HAWKINS & ASSOCIATES ENGINEERING, INC.
436 MITCHELL RD.
MODESTO, CA. 95354
PH: (209) 575 - 4295 FX: (209) 578 - 4295

SHEET 1. OF 3.

Attachment B

CNDDB Summary Report and Exhibits

& USFWS Species List

Selected Elements by Scientific Name

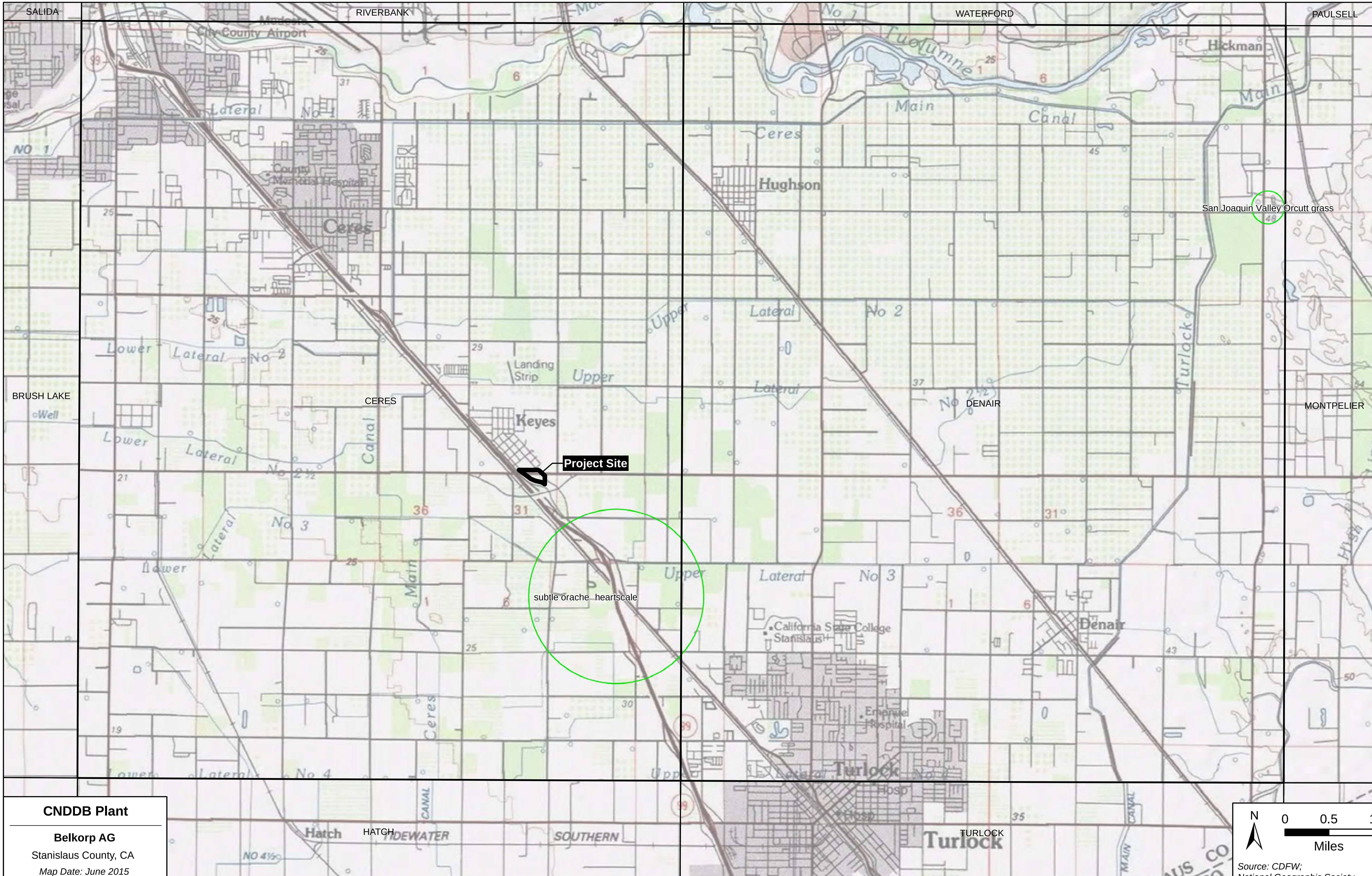
California Department of Fish and Wildlife

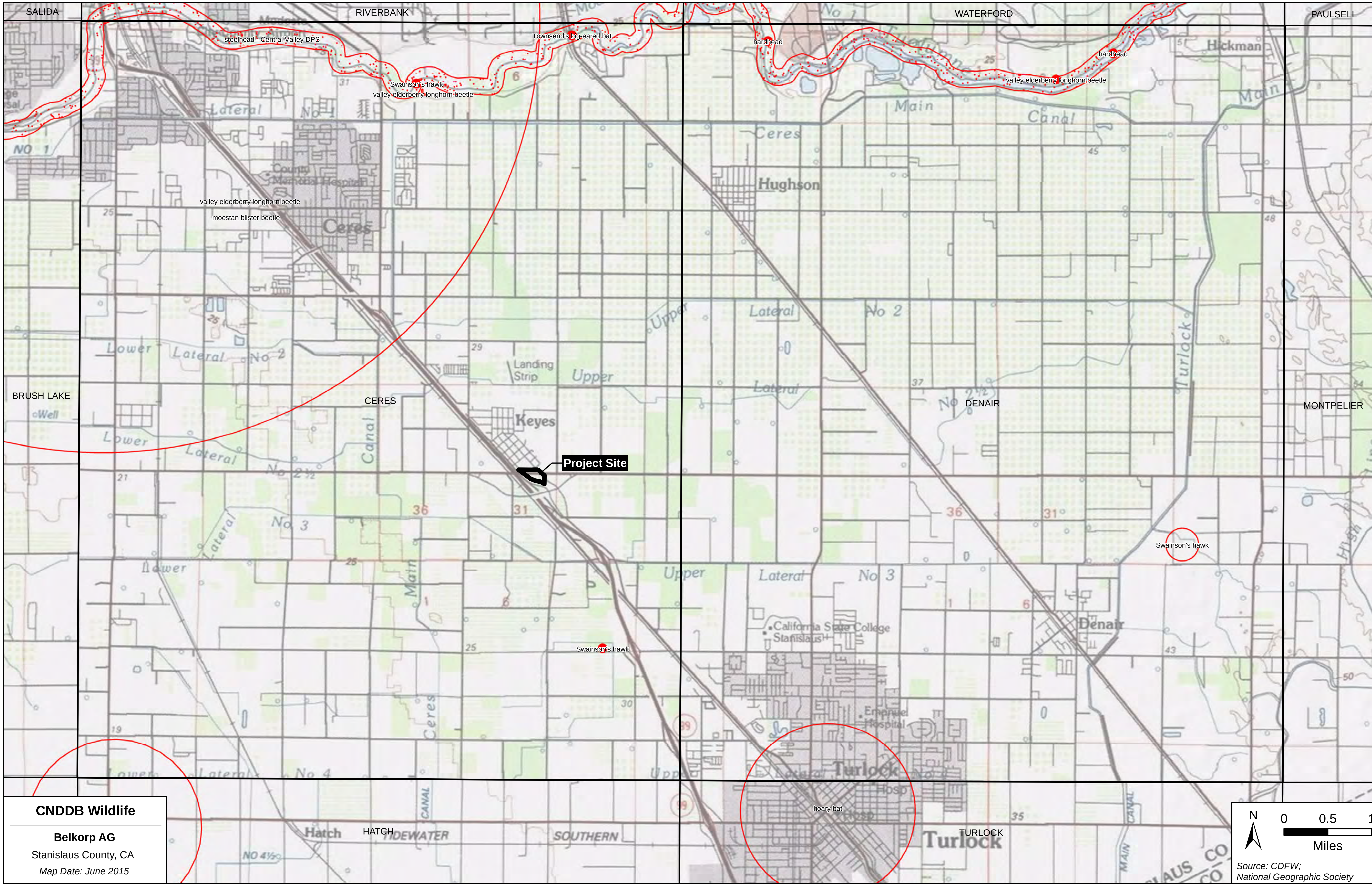
California Natural Diversity Database

Query Criteria: Quad is (Ceres (3712058) or Denair (3712057))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Endangered	G2G3	S1S2	SSC
Atriplex cordulata var. cordulata heartscale	PDCHE040B0	None	None	G3T2	S2	1B.2
Atriplex subtilis subtle orache	PDCHE042T0	None	None	G1	S1	1B.2
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	Candidate Threatened	G3G4	S2	SSC
Desmocerus californicus dimorphus valley elderberry longhorn beetle	IICOL48011	Threatened	None	G3T2	S2	
Lasiurus cinereus hoary bat	AMACC05030	None	None	G5	S4	
Lytta moesta moestan blister beetle	IICOL4C020	None	None	G2	S2	
Mylopharodon conocephalus hardhead	AFCJB25010	None	None	G3	S3	SSC
Oncorhynchus mykiss irideus steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	G5T2Q	S2	
Orcuttia inaequalis San Joaquin Valley Orcutt grass	PMPOA4G060	Threatened	Endangered	G1	S1	1B.1

Record Count: 11


SALIDA
RIVERBANK
WATERFORD
PAULSELL
BRUSH LAKE
CERES
DENAIR
MONTPELIER
HATCH
TURLOCK
Project Site
San Joaquin Valley Orcutt grass
subtle orache
heartscale
CNDDB Plant
Belkorp AG
Stanislaus County, CA
Map Date: June 2015
N
0
0.5
1
Miles
Source: CDFW;
National Geographic Society



SALIDA
RIVERBANK
WATERFORD
PAULSELL
steelhead - Central Valley DPS
Townsend's big-eared bat
hardhead
hardhead
Swainson's hawk
valley elderberry longhorn beetle
valley elderberry longhorn beetle
valley elderberry longhorn beetle
moestan blister beetle
Hughson
Ceres
Hickman
BRUSH LAKE
CERES
DENAIR
MONTPELIER
Keyes
Project Site
Landing Strip
Swainson's hawk
Swainson's hawk
Denair
California State College Stanislaus
Emanuel Hospital
Turlock
hoary bat
Hatch
HATCH
TIDEWATER
SOUTHERN
TURLOCK
CNDDB Wildlife
Belkorp AG
Stanislaus County, CA
Map Date: June 2015
N
0
0.5
1
Miles
Source: CDFW; National Geographic Society

US Fish & Wildlife Service

IPaC Trust Resource Report

Project Description

NAME

Belkorp AG

PROJECT CODE

NY5M3-FJE4R-GUTLA-BIQTE-LKUULM

LOCATION

Stanislaus County, California

DESCRIPTION

No description provided

U.S. Fish & Wildlife Contact Information

Species in this report are managed by:

Sacramento Fish And Wildlife Office
Federal Building
2800 COTTAGE WAY, ROOM W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Endangered Species

Proposed, candidate, threatened, and endangered species that are managed by the Endangered Species Program and should be considered as part of an effect analysis for this project.

This unofficial species list is for informational purposes only and does not fulfill the requirements under Section 7 of the Endangered Species Act, which states that Federal agencies are required to "request of the Secretary of Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action." This requirement applies to projects which are conducted, permitted or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can be obtained by returning to this project on the IPaC website and requesting an Official Species List from the regulatory documents section.

Amphibians

California Red-legged Frog Rana draytonii — Threatened

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=D02D

California Tiger Salamander Ambystoma californiense — Threatened

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=D01T

Crustaceans

Vernal Pool Fairy Shrimp Branchinecta lynchi — Threatened

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=K03G

Vernal Pool Tadpole Shrimp Lepidurus packardi — Endangered

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=K048

Fishes

Delta Smelt Hypomesus transpacificus Threatened

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E070

Steelhead Oncorhynchus (=Salmo) mykiss Threatened

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E08D

Insects

Valley Elderberry Longhorn Beetle Desmocerus californicus dimorphus Threatened

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=I01L

Reptiles

Giant Garter Snake Thamnophis gigas Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=C057

Critical Habitats

Potential effects to critical habitat(s) within the project area must be analyzed along with the endangered species themselves.

There is no critical habitat within this project area

Attachment C

Photographs


Paved area in the northwest tip of the site, looking southeast; 06/10/15.


Weedy grassland in the southeast part of the site, looking northwest; 06/10/15.

Nunes Road along the north edge of the site, looking east from 7th Street; 06/10/15.

Landscaped strip along Highway 99, looking southeast from the northwest corner of the site; 06/10/15.

Cottonwood in the north-central part of the site, looking west; 06/10/15. A large raptor stick nest in this tree is tattered and appears to be from the 2014 nesting season.

Old foundations, palms and a pecan tree in the northwest part of the site, looking northwest; 06/10/15. Aerial photographs from the early 2000s' show development in this part of the site.

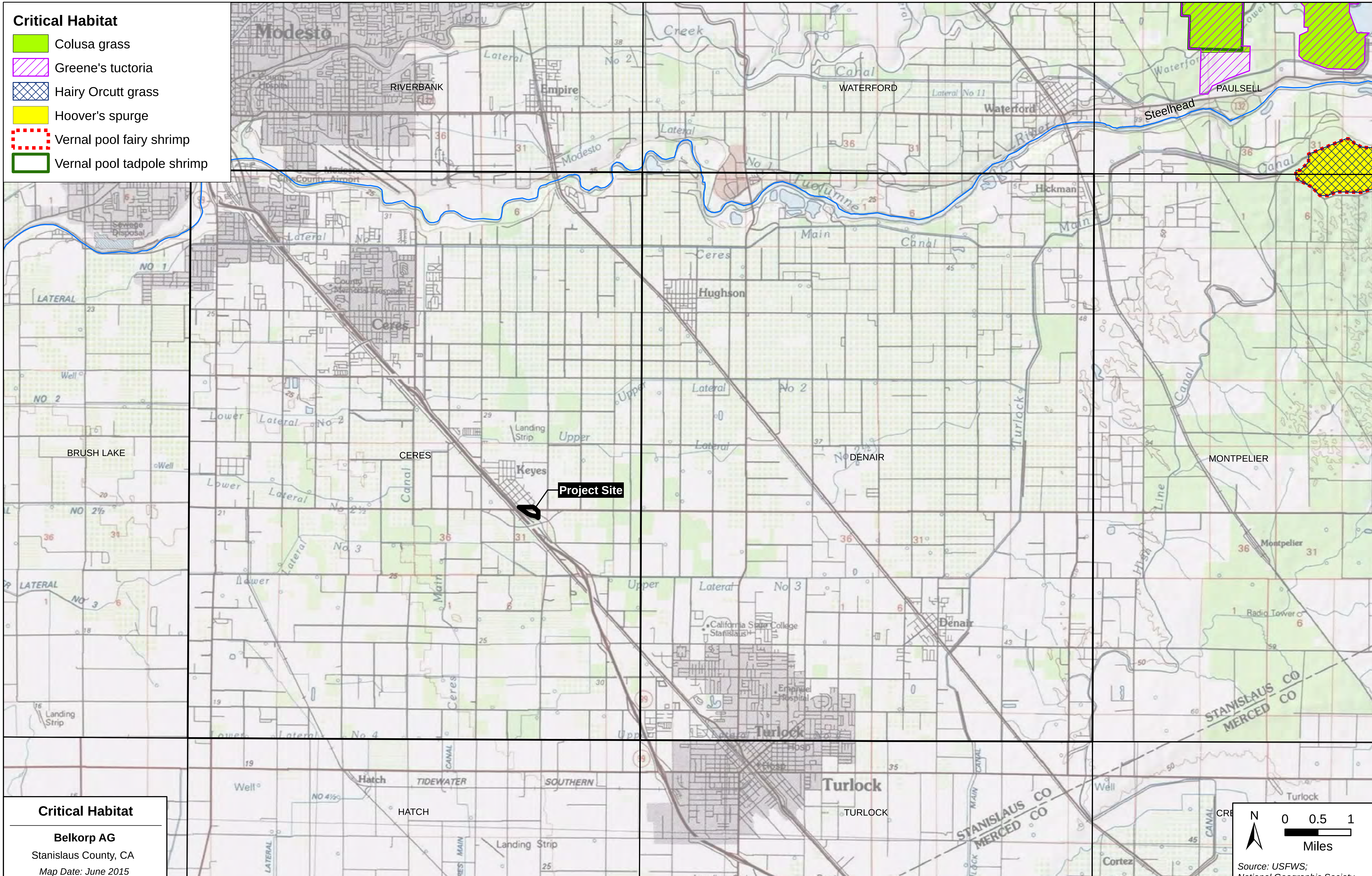
Two small blue elderberry shrubs in the northeast part of the site, looking northwest; 06/10/15.

One of several large blue elderberry shrubs in the parcel just east of the site; 06/10/15. The shrub is approximately 30 feet east of the east edge of the site.

Old detention basin along Nunes Road, looking west; 06/10/15. This small basin is in the vicinity of the old foundations and was likely constructed when the site was previously developed.

Attachment D

Designated Critical Habitat



Critical Habitat

Belkorp AG

Stanislaus County, CA

Map Date: June 2015

ARCHAEOLOGICAL INVENTORY SURVEY

Belkorp Development Project,
circa 14 acres, Stanislaus County, California.

Prepared for

Hawkins & Associates Engineering, Inc.
436 Mitchell Road
Modesto, CA 95354

Author

Sean Michael Jensen, M.A.

Keywords *for Information Center Use:*
Archaeological Inventory Survey, circa 14-acres, Stanislaus County, CEQA, USGS Keyes, Ca. 7.5' Quad., No Significant Historical Resources, No Unique Archaeological Resources.

April 30, 2015

CONTENTS

ATTACHMENTS

1. INTRODUCTION

Project Background

This report details the results of an archaeological inventory of the proposed Belkorp Development Project which involves approximately 14-acres, bound by Nunes Road on the north, South Golden State Boulevard to the east, and State Route 99 to the south-southwest, within the community of Keyes, in Stanislaus County, California. The proposed project involves construction of a new commercial facility, including construction of new structures, parking areas, access roads, placement of utilities, etc.

Since the project could involve physical disturbance to ground surface and sub-surface components in conjunction with proposed commercial development, it has the potential to impact cultural resources that may be located within the APE. In this case, the APE consists of the circa 14-acre property. Evaluation of the project's potential to impact cultural resources must be undertaken in conformity with Stanislaus County rules and regulations, and in compliance with requirements of the California Environmental Quality Act of 1970, Public Resources Code, Section 21000, et seq. (CEQA), and The California CEQA Environmental Quality Act Guidelines, California Administrative Code, Section 15000 et seq. (Guidelines as amended).

Scope of Work

At the most general level, compliance with CEQA requires completion of projects in conformity with the standards contained in Section 15064.5 of the CEQA Guidelines, as amended. Based on this and other relevant Sections of the Guidelines, the following specific tasks were considered an adequate and appropriate Scope of Work for the present project:

- Conduct a records search at the Central California Information Center of the California Historical Resources Information System at CSU-Stanislaus, and review state data bases and other relevant background information. The goals of the records search and data base review are to determine (a) the extent and distribution of previous archaeological surveys, (b) the locations of known archaeological sites and any previously recorded archaeological districts, and (c) the relationships between known sites and environmental variables. This step is designed to ensure that, during subsequent field survey work, all archaeological and historical sites considered significant per CEQA are discovered, correctly identified, fully documented, and properly interpreted.

- Conduct a pedestrian field survey of the project area. Based on map review, a complete coverage intensive survey was considered appropriate, given the presence of potentially high archaeological sensitivity throughout the project area. The purpose of the pedestrian survey is to ensure that any previously recorded sites identified during the records search are re-located and existing evaluations updated based on current site and field conditions. For previously undocumented sites identified which might qualify as "cultural resources" per CEQA, the field survey would involve formally recording these on DPR-523 Forms.

- Upon completion of the records search and pedestrian survey, prepare an archaeological inventory survey report that identifies project effects and recommends appropriate mitigation measures for any prehistoric or historic sites recommended significant under CEQA and which might be affected by the project.

The remainder of the present document constitutes the Final Report for this project, detailing the results of the records search and field survey and containing recommendations for treatment of significant sites that could be impacted by the project. All field survey procedures followed guidelines provided by the State Historic Preservation Office (Sacramento) and conform to accepted professional standards.

Location

The Belkorp Development Project area involves approximately 14-acres, bound by Nunes Road on the north, South Golden State Boulevard to the east, and State Route 99 to the south-southwest, within the community of Keyes, in Stanislaus County, California. Lands affected are located within a portion of Section 31 of T4S, R10E, as shown on the USGS Keyes, California, 7.5' quadrangle (see attached ***Project Location Map***).

The most important natural surface water source within the project area is the Tuolumne River which flows roughly east-west approximately 5 miles north of the project area. No permanent sources of surface water are located within the project property.

Based on a review of topographic and other maps, and notwithstanding prior impacts to surface and subsurface soil components resulting from intensive agricultural, residential and commercial development, the study area appeared to contain lands ranging from low to moderate in sensitivity for historic-era resources, and generally low in sensitivity for prehistoric resources.

2. RECORDS SEARCH and SOURCES CONSULTED

Several sources of information were considered relevant to evaluating the types of archaeological sites and site distribution that might be encountered within the project area. The information evaluated prior to conducting pedestrian field survey includes soil types and geomorphological features, data maintained by the Central California Information Center at CSU-Stanislaus, and review of available published and unpublished documents relevant to regional prehistory, ethnography, and early historic developments.

Records at Central California Information Center

Prior to conducting the intensive-level field survey, a search of archaeological records maintained by the Central California Information Center at CSU-Stanislaus was conducted (CCIC File # 9275N, dated March 23, 2015). This search included the APE, and lands immediately adjacent to the APE, the findings of which included:

- ***Previous Archaeological Survey:*** According to the information center, none of the present APE has been subjected to formal archaeological survey. Chavez (1976) conducted a survey adjacent to the north side of the APE (CCAIC Report # ST-859).

- ***Recorded Cultural Resources:*** According to the Information Center, no prehistoric or historic archaeological resources have been recorded within, or immediately adjacent to, the APE.

Other Sources Consulted

In addition to the archaeological records of Stanislaus County as maintained by the Central California Information Center, the following sources were also consulted:

- The National Register of Historic Places (1986, Supplements to 2014).
- The California Register of Historical Resources (2014).
- The California Inventory of Historic Resources (1976).
- California State Historical Landmarks (1996).
- California Points of Historical Interest (1992).
- OHP Historic Property Data File (3/20/14).
- OHP Archaeological Determination of Eligibility (4/5/12).
- The Survey of Surveys (1989).
- Caltrans State and Local Bridges Inventory.
- GLO Plat T4S, R10E, Sheet # 44-245, dated 1853-54.
- 1953 USGS Keyes, CA 7.5' quadrangle.
- 1969 USGS Keyes, CA 7.5' quadrangle (Photorevised 1987).
- Published and unpublished documents relevant to environment, ethnography, prehistory and early historic developments in the vicinity, providing context for assessing site types and distribution patterns for the project area (summarized below under ***Environmental and Cultural Context***).

Native American Consultation

In addition to examining the records of Stanislaus County at the CCIC and reviewing published and other sources of information, consultation was undertaken with the Native American Heritage Commission (NAHC) re. sacred land listings for the property. An information request letter was delivered to the NAHC on April 28, 2015. To date, the NAHC has yet to respond.

3. Environmental and Cultural Context

Environmental Context

Situated within the central San Joaquin Valley, the APE occupies relatively flat terrain which was likely subjected to agricultural development during the latter portion of the 19th century, and which has been subjected to intensive agricultural, residential and commercial activities over the past century. Elevation within the APE averages approximately 93 feet above mean sea level. The most important natural surface water source within the project area is the Tuolumne River which flows roughly east-west approximately 5 miles north of the project area. No permanent sources of surface water are located within the project property.

Generally, environmental conditions within the Central Valley have remained stable throughout the past 8-10,000 years, although minor fluctuations in overall precipitation and temperature regime have been documented, and these undoubtedly influenced prehistoric patterns of land use and settlement.

Cultural Context

Prehistory: The earliest residents of the study area are represented by the Fluted Point and Western Pluvial Lakes Traditions, which date from about 11,500 to 7,500 years ago (Moratto 2004). Within portions of the Central Valley, fluted projectile points have been found at Tracy Lake (Heizer 1938) and around the margins of Buena Vista Lake in Kern County. Similar materials have been found to the north, at Samwel Cave near Shasta Lake and near McCloud and Big Springs in Siskiyou County. These early peoples are thought to have subsisted using a combination of generalized hunting and lacustrine exploitation (Moratto 2004).

These early cultural assemblages were followed by an increase in Native population density after about 7,500 years ago. One of the most securely dated of these assemblages in north-central California is from the Squaw Creek Site located north of Redding. Here, a charcoal-based C-14 date suggests extensive Native American presence around 6,500 years ago, or 4,500 B.C. Most of the artifactual material dating to this time period has counterparts further south, around Borax (Clear) Lake and the Farmington Area a short distance east of Sacramento. Important artifact types from this time period include large wide-stemmed projectile points and manos and metates.

In the Central Valley of California in the general vicinity of the project area, aboriginal populations continued to expand between 6,500 and 4,500 years ago. Penutian-speaking Native American peoples are thought to have arrived in the area during this period, eventually displacing the earlier Hokan-speaking populations in both upland and valley zones. Presumably introduced by these later Penutian-speaking arrivals were more extensive use of bulbs and other plant foods, animal and fishing products more intensively processed with mortars and pestles, and perhaps the bow and arrow and associated small stemmed- and corner-notched projectile points. The Penutian-speaking peoples occupying the project area at the time of initial contact with European American populations were the Yokuts.

Ethnography: As noted above, the project area is located within land claimed by the Penutian-speaking Yokuts at the time of initial contact with European American populations *circa*. A.D. 1850 (Kroeber 1925:474-573; Wallace 1978: Figure 1). The Yokuts occupied an area extending from the crest of the Coast "Diablo" Range easterly into the foothills of the Sierra Nevada, north to the American River, and south to the upper San Joaquin River.

The basic social unit for the Yokuts was the family, although the village may also be considered a social, as well as a political and economic, unit. Villages were often located on flats adjoining streams, and were inhabited mainly in the winter as it was necessary to go out into the hills and higher elevation zones to establish temporary camps during food gathering seasons (i.e., spring, summer and fall). Villages typically consisted of a scattering of small structures, numbering from four or five to several dozen in larger villages, each house containing a single family of from three to seven people. Larger villages, with from twelve to fifteen or more houses, might also contain an earth lodge.

As with most California Indian groups, economic life for the Yokuts revolved around hunting, fishing and the collecting of plant foods, with deer, acorns, avian, and aquatic resources representing primary staples. The collection and processing of these various food resources was accomplished with the use of a wide variety of wooden, bone and stone artifacts. The Yokuts were very sophisticated in terms of their knowledge of the uses of local animals and plants, and of the availability of raw material sources which could be used in manufacturing an immense array of primary and secondary tools and implements. However, only fragmentary evidence of their material culture remains, due in part to perishability, and in part to the impacts to archaeological sites resulting from later (historic) land uses.

Historic Context: Interior California was initially visited by Anglo-American fur trappers, Russian scientists, and Spanish-Mexican expeditions during the early part of the 19th Century. These early explorations were followed by a rapid escalation of European-American activities, which culminated in the massive influx fostered by the discovery of gold at Coloma in 1848.

Early Spanish expeditions arrived from Bay Area missions as early as 1804, penetrating the northwestern San Joaquin Valley (Cook 1976). By the mid-1820s, hundreds of fur trappers were annually traversing the Valley on behalf of the Hudson's Bay Company (Maloney 1945). By the late 1830s and early 1840s, several small permanent European-American settlements had emerged in the Central Valley and adjacent foothill lands, including Ranchos in the interior Coast Range, and of course the settlement at New Helvetia (Sutter's Fort) at the confluence of the Sacramento and American Rivers (Sacramento).

With the discovery of gold in the Sierra Nevada, large numbers of European-Americans, Hispanics, and Chinese arrived in and traveled through the Valley. The Valley's east-side mining communities' demands for hard commodities led quickly to the expansion of ranching and agriculture throughout the Great Central Valley and the interior valleys of the Coast Range. Stable, larger populations arose and permanent communities slowly emerged in the Central Valley, particularly along major transportation corridors. Of particular importance in this regard was the transformation brought about by the railroads.

The Southern Pacific and Central Pacific Railroads and a host of smaller interurban lines to the north and east around the cities of Sacramento, Stockton and Modesto began intensive projects in the late 1860s. By the turn of the century, nearly 3,000 miles of lines connected the cities of Modesto and Stockton with points south and north. Many of the valley's cities, including many in Stanislaus and adjacent Counties, were laid out as isolated railroad towns in the 1870s and 1880s by the Southern and Central Pacific, which not only built and settled, but continued to nurture the infant cities until settlement could be independently sustained.

One community that originated, at least in part, separate from the railroad was Ceres, which is located a short distance north of the community of Keyes and the present APE. Named after the Roman goddess of agriculture, Ceres was founded by Daniel Whitmore in 1870 with the construction of a residence/post office in 1870. In that same year, Ephraim Hatch donated land to the Central Pacific Railroad when they constructed a right-of-way through his land (Hohenthal, et al. 1972).

In 1875, Whitmore filed a map, which was prepared by his brother R. K. Whitmore, for the planned community of Ceres. Residential lots were subsequently sold, and agricultural activities intensified within the area. In order to serve the burgeoning population, as well as the increased agricultural commodities from the area, the San Francisco & San Joaquin Valley Railroad (SF&SJV) was constructed in the region in 1895. In 1898, the Atchison Topeka & Santa Fe Railroad bought the SF&SJV (Brotherton 1981).

In order to accommodate the expanding agricultural land use in the area, water conveyance became a critical issue for the region. The Turlock Irrigation District (TID) was formed in 1887, with construction of the La Grange Dam on the Tuolumne River in 1893 reflecting a substantial effort to this end. Over the next decade, a system of canals was constructed to serve the region.

Agricultural development intensified through the end of the 19th and into the 20th Centuries, spurred initially and then supported by the railroads that provided the means for bulk product to be transported to a much larger market. By the end of the 19th Century, a very substantial portion of the Valley was being intensively cultivated, with increasing mechanization occurring throughout all of the 20th Century and substantial expansion of cultivated acreage occurring with the arrival of water from the CVP.

4. ARCHAEOLOGICAL SURVEY and CULTURAL INVENTORY

Survey Coverage

All of the circa 14-acre APE was subjected to intensive pedestrian survey by means of walking systematic transects, spaced at 20 meter intervals.

In searching for cultural resources, the surveyor took into account the results of background research and was alert for any unusual contours, soil changes, distinctive vegetation patterns, exotic materials, artifacts, feature or feature remnants and other possible markers of cultural sites.

Field work was undertaken on April 26, 2015 by Sean Michael Jensen. Mr. Jensen is a professional archaeologist, with 28 years experience in archaeology and history, who meets the Secretary of Interior's Standards for Professional Qualification, as demonstrated in his listing on the California Historical Resources Information System list of qualified archaeologists and historians. No special problems were encountered and all survey objectives were satisfactorily achieved.

General Observations

According to documentation obtained by Fisco (2014a, 2014b) the western half of the present APE consisted of agricultural land and residential property from at least 1916. Between 1957 and 1967, that same portion of the property was home to a commercial sales facility, and between 1998 and 2005 had been converted to residential development. By 2012, the portion of the property was vacant. The remaining portion of the property appears to have been utilized for agriculture until around 1984. According to the property owner, a residence and barn which occupied the property were subjected to a controlled training fire undertaken by the local fire department.

Several concrete slabs, paved parking areas, and paved drives were observed throughout the property, especially concentrated within the northwestern portion of the APE. These features are the remnants of the aforementioned activities and subsequent wholesale demolition.

All of these activities (farming, ranching, commercial development, residential development, subsequent razing of all structures) have severely impacted the surface and subsurface soils within the APE. Additional disturbances include placement of buried and overhead utilities, and adjacent road construction and maintenance.

Prehistoric Resources

No prehistoric resources were identified during the present pedestrian survey. The absence of such resources may best be explained by the absence of a permanent source of surface water within, or nearby the project area, and to the degree of disturbance to which the entire property has been subjected.

Historic-Era Resources

No evidence of historic-era resources was observed within the APE during the present pedestrian survey. As noted above, several concrete slabs, paved parking areas, and paved drives were observed throughout the property, especially concentrated within the northwestern portion of the APE. These features are the remnants of the aforementioned activities and subsequent wholesale demolition. Consistent with contemporary standards and practices (*sec*. Caltrans), these features represent a “property type” exempt from evaluation. Consequently, these features do not achieve the threshold to qualify as a significant historical resource, and warrant no further consideration.

5. PROJECT EFFECTS

A project may have a significant impact or adverse effect on significant historical resources/unique archaeological resources/historic properties if the project will or could result in the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance or values of the historic resource would be materially impaired. Actions that would materially impair a cultural resource or historic property are actions that would alter or diminish those attributes of a site that qualify the site for inclusion in State site registers or the National Register of Historic Places.

Based on the specific findings detailed above under ***Pedestrian Survey and Inventory***, no significant historical resources/unique archaeological resources are present within the project area and no historical resources/unique archaeological resources will be affected by the undertaking, as presently proposed.

6. PROJECT SUMMARY

This report details the results of an archaeological inventory of the proposed Belkorp Development Project which involves approximately 14-acres, bound by Nunes Road on the north, South Golden State Boulevard to the east, and State Route 99 to the south-southwest, within the community of Keyes, in Stanislaus County, California. The proposed project involves construction of a new commercial facility, including construction of new structures, parking areas, access roads, placement of utilities, etc.

A search of State data bases, including all records and documents available at the Central California Information Center, and intensive pedestrian survey, failed to identify significant historical resources/unique archaeological resources within the 14-acre APE.

Based on the findings of the present archaeological inventory, no significant historical resources and no unique archaeological resources will be affected within the 14-acre APE. Despite these negative findings, the following general provisions are considered appropriate:

1) ***Consultation in the event of inadvertent discovery of human remains***: Evidence of human burial or scattered human remains related to prehistoric occupation of the area could be inadvertently encountered anywhere within the project area during future construction activity or other actions involving disturbance to the ground surface and subsurface components. In the event of such an inadvertent discovery, the County Coroner would have to be informed and consulted, per State law. Ultimately, the goal of consultation is to establish an agreement between the most likely lineal descendant designated by the Native American Heritage Commission and the project proponent(s) with regard to a plan for treatment and disposition of any human remains and artifacts which might be found in association. Such treatment and disposition may require reburial of any identified human remains/burials within a “preserve” or other designated portion of the development property not subject to ground disturbing impacts.

2) ***Consultation in the event of inadvertent discovery of cultural material***: The present evaluation and recommendations are based on the findings of an inventory-level surface survey only. There is always the possibility that significant unidentified cultural materials could be encountered on or below the surface during the course of future development or construction activities. This caveat is particularly relevant considering the constraints generally to archaeological field survey, and particularly where past ground disturbance has occurred, as in the present case. In the event of an inadvertent discovery of previously unidentified cultural material, archaeological consultation should be sought immediately.

7. REFERENCES CITED and/or UTILIZED

Advisory Council on Historic Preservation
1980 *Advisory Council's Treatment of Archaeological Properties: A Handbook, Draft Guidelines 1980/1985*. Washington.

Baumhoff, Martin A.
1963 Ecological Determinants of Aboriginal California Populations. *University of California Publications in American Archaeology and Ethnology* 49(2):155-236. Berkeley and Los Angeles.

Brotherton, I. N. "Jack"
1981 "Central Pacific Dominated Stanislaus County Railroading." *Stanislaus Stepping Stones, vol. 5, No. 2*. Modesto, CA: Stanislaus County Historical Society.

1982 *Annals of Stanislaus County, Volume 1: River Towns and Ferries*. Santa Cruz: Western Tanager Press.

Burcham, L.T.
1957 *California Range Land: An Historico-Ecological Study of the Range Resources of California*. California Division of Forestry, Department of Natural Resources. Sacramento.

California, State of
1970 *Public Resources Code, Section 21000, et seq. (CEQA), and The California Environmental Quality Act Guidelines, California Administrative Code, Section 15000 et seq. (Guidelines, as Amended)*. Prepared by the Office of Planning and Research.

1976 *The California Inventory of Historic Resources*. State of California.

1990 *The California Historical Landmarks*. State of California.

1992 *California Points of Historical Interest*. State of California.

Chavez, D.
1976 *An Archaeological Reconnaissance of the Robert's Ferry Reservoir and Water Extraction and Conveyance Systems, Stanislaus County, California: Phase II*. Report on File, Central California Information Center, CSU-Stanislaus, File # ST-859.

Clark, William B.
1970 Gold Districts of California. *California Division of Mines, Bulletin 193*. San Francisco, California.

Code of Federal Regulations (CFR)

36 CFR Part 60: *National Register of Historic Places*. Washington, D.C.: Department of the Interior, National Park Service.

36 CFR Part 66: *Proposed Guidelines – Recovery of Scientific, Prehistoric, Historic, and Archaeological Data: Methods, Standards, and Reporting Requirements*. Washington, D.C.: Department of the Interior, National Park Service.

Cook, S. F.

1955 The Aboriginal Population of the San Joaquin Valley, California. *University of California Publications, Anthropological Records*, Vol. 16:31-80. Berkeley and Los Angeles.

Fisco, G.

2014a *Phase I Environmental Site Assessment Report, Suckow Property, Stanislaus County Tax Parcel Nos. 045-050-001, 045-050-011, 045-050-012, Keyes, California*.

2014b *Phase I Environmental Site Assessment Report, Cochran Property, 4612 Nunes Road, Keyes, California*.

Fredrickson, D. A.

1974 Cultural Diversity in Early Central California: A View from the North Coast Ranges. *Journal of California Anthropology* 1(1):41-53. Davis, California.

Gudde, Erwin G.

1969 *California Place Names: The Origin and Etymology of Current Geographical Names*. University of California Press. Berkeley.

1975 *California Gold Camps*. University of California Press. Berkeley.

Heizer, R. F.

1938 A Folsom-type point from the Sacramento Valley. Los Angeles: *The Masterkey* 12(5):180-182.

Hohenthal, H. A., and others (J. Caswell, Editor)

1972 *Streams in a Thirsty Land, A History of the Turlock Region*. City of Turlock, California.

Holland, R. F.

1986 *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game.

Hoover, M. B., D. E., Kyle, and E. G. Rensch

2002 *Historic Spots in California: Fifth Edition*. Stanford University Press. Palo Alto.

Jensen, Peter
1996 *Archaeological Inventory Survey, Tracy to Fresno Longhaul Fiberoptics Data Transmission Line, Portions of Fresno, Madera, Merced, Stanislaus, and San Joaquin Counties, California*. Report on File, Central California Information Center, CSU-Stanislaus, File # ST-2930.

Kroeber, Alfred L.
1925 Handbook of the Indians of California. *Bureau of American Ethnology Bulletin 78*. Smithsonian Institution. Washington, D.C.

Kuchler, A. W.
1977 "Map of the natural vegetation of California," In M.G. Barbour and J. Major, Eds., *Terrestrial Vegetation of California*. Wiley: New York.

Kyle, Douglas E. (ed.)
1990 *Historic Spots in California*. Stanford University Press. Stanford.

Maloney, A. B.
1943 *Fur Brigade to the Bonaventura*. California Historical Society. San Francisco.

McGowan, J.
1961 *History of the Sacramento Valley*. New York: Lewis Historical Publication Company.

Moratto, Michael J.
2004 *California Archaeology*. Academic Press. Orlando, Florida.

Office of Historic Preservation (OHP)
2012 *Archaeological Determinations of Eligibility: Stanislaus County*. Office of Historic Preservation, California Department of Parks and Recreation. Sacramento.

Orndduff, R.
1974 *Introduction to California Plant Life*. University of California Press. Berkeley and Los Angeles.

Ragir, Sonia
1972 The Early Horizon in Central California Prehistory. *Contributions of the University of California Archaeological Research Facility*. University of California, Berkeley.

True, Delbert L., Paul Bouey, Mark Basgall
1981 *Archaeological Survey of the Proposed San Luis Drain Project: Kesterson Reservoir to the Sacramento-San Joaquin Delta, California*. Report on File, Central California Information Center, CSU-Stanislaus, File # 1733.

United States Department of the Interior

1983 Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines, *Federal Register* 48:190 (29 Sept. 1983), pp. 44716-44742.

1986 *National Register of Historic Places*. *Federal Register* 1986, Supplements through December 2005. Washington, D.C.

Wallace, William J.

1954 "The Little Sycamore Site and Early Milling Stone Cultures in Southern California." *American Antiquity* 20(2):112-123.

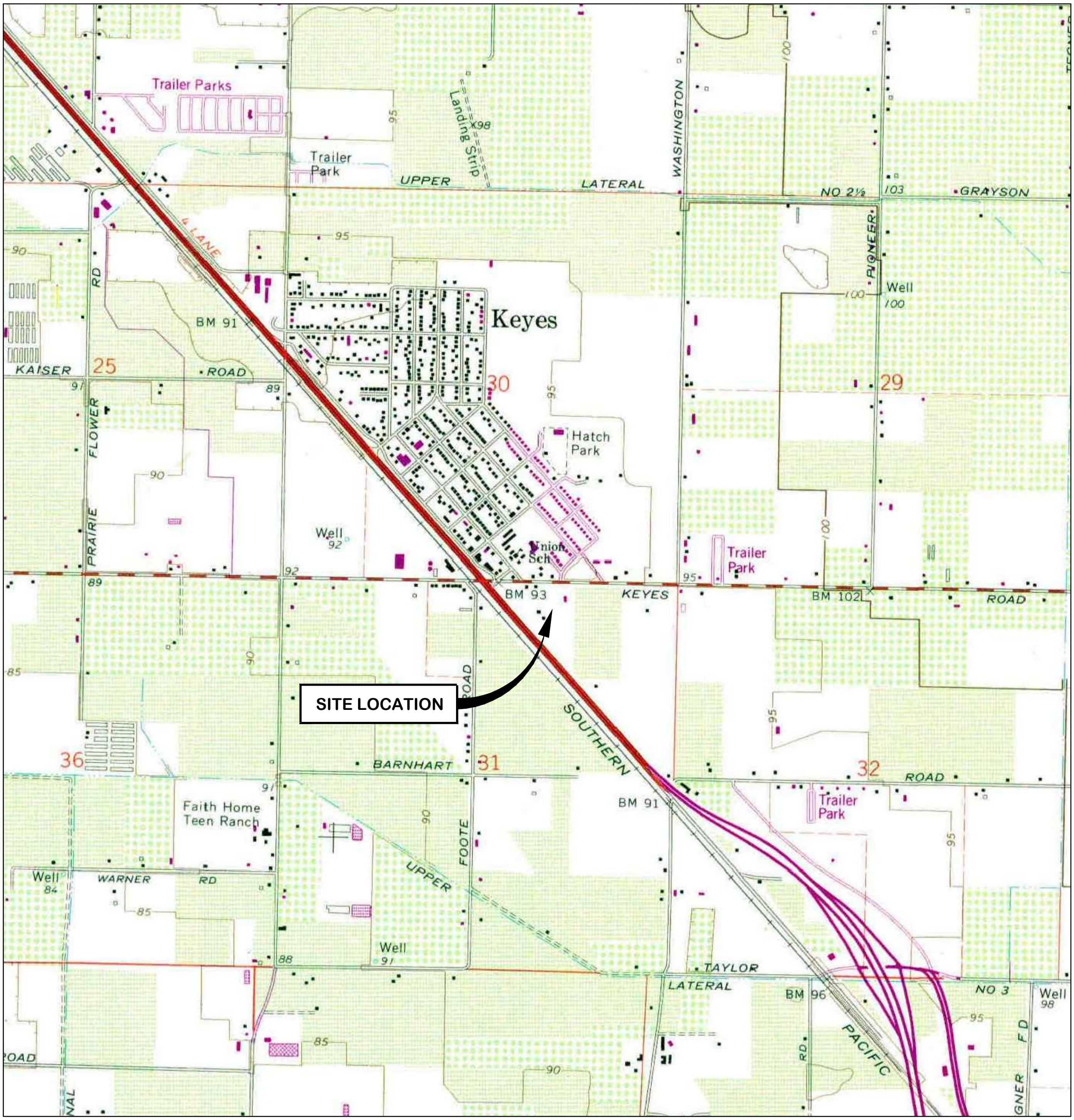
1978a "Southern Valley Yokuts," IN, *Handbook of North American Indians, Volume 8: California*, Robert F. Heizer, Editor, pp. 448-461. Smithsonian Institution, Washington, D.C.

1978b "Northern Valley Yokuts," IN, *Handbook of North American Indians, Volume 8: California*, Robert F. Heizer, Editor, pp. 462-470. Smithsonian Institution, Washington, D.C.

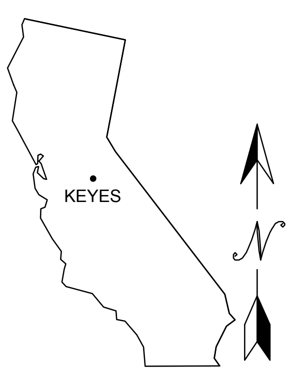
1978c "Post-Pleistocene Archaeology," IN, *Handbook of North American Indians, Volume 8: California*, Robert F. Heizer, Editor, pp. 25-36. Smithsonian Institution, Washington, D.C.

Work, John

1945 "Fur Brigade to the Bonaventura: John Work's California Expedition, 1832-1833, for the Hudson's Bay Company," *The Journal of John Work*, Alice B. Maloney, Editor. California Historical Society, San Francisco.



REFERENCE: 7.5 MINUTE USGS QUADRANGLE KEYES, CALIFORNIA. DATED 1987 AND PHOTOREVISED FROM 1969



FARALLON CONSULTING
Quality Service for Environmental Solutions | farallonconsulting.com

Washington
Issaquah | Bellingham | Seattle

Oregon
Portland

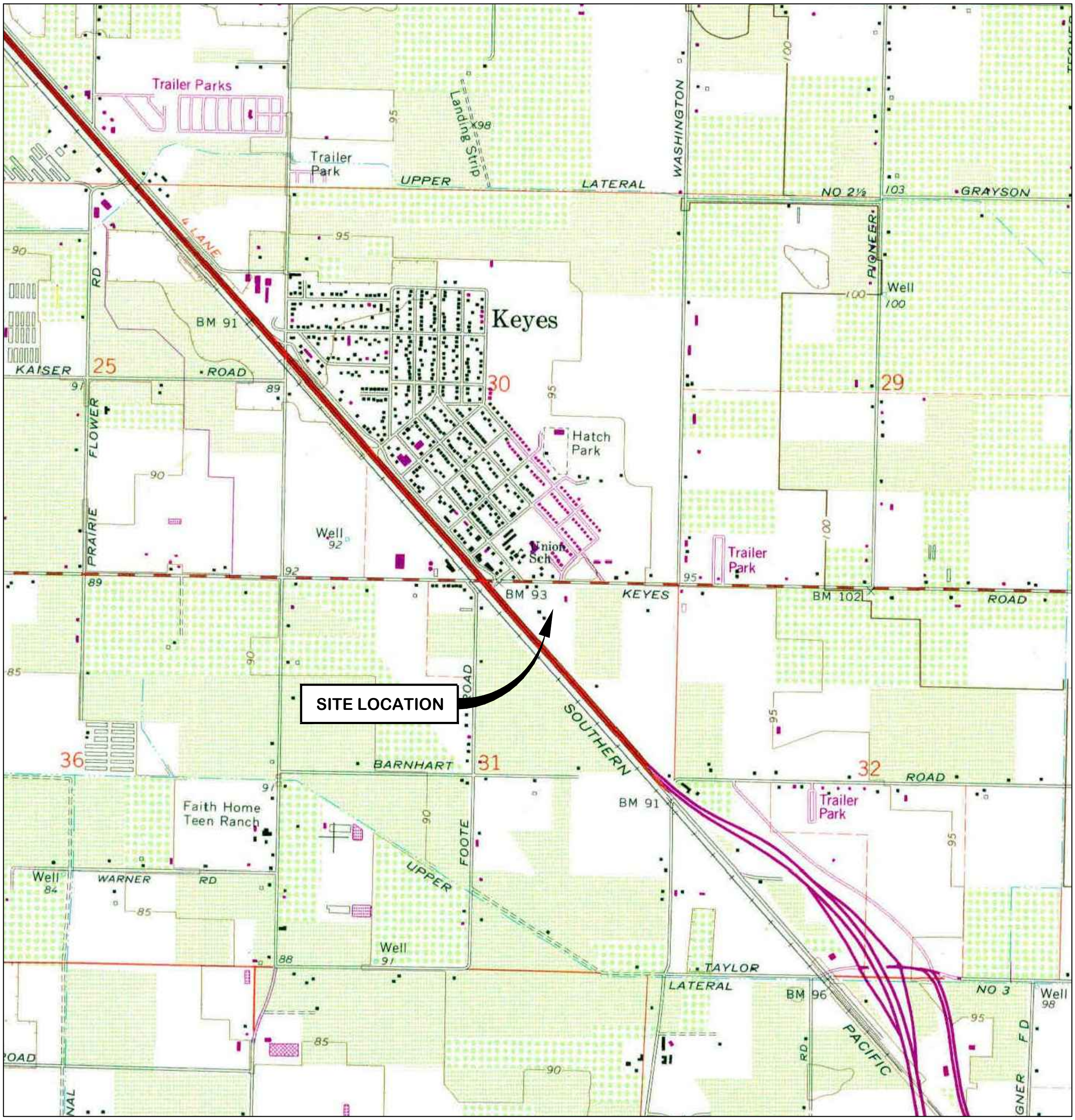
California
Oakland | Sacramento

FIGURE 1

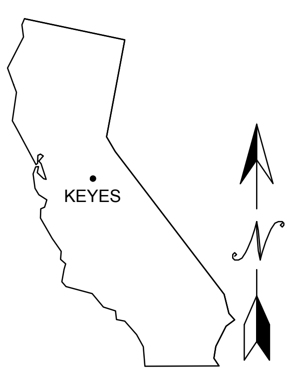
SITE VICINITY MAP
COCHRAN PROPERTY
4612 NUNES ROAD
KEYES, CALIFORNIA

FARALLON PN: 527-017

Drawn By: GPF Checked By: TH Date: 11/25/2014 Disk Reference: 527-017c



REFERENCE: 7.5 MINUTE USGS QUADRANGLE KEYES, CALIFORNIA. DATED 1987 AND PHOTOREVISED FROM 1969



FARALLON CONSULTING

Quality Service for Environmental Solutions | farallonconsulting.com

Washington
Issaquah | Bellingham | Seattle

Oregon
Portland

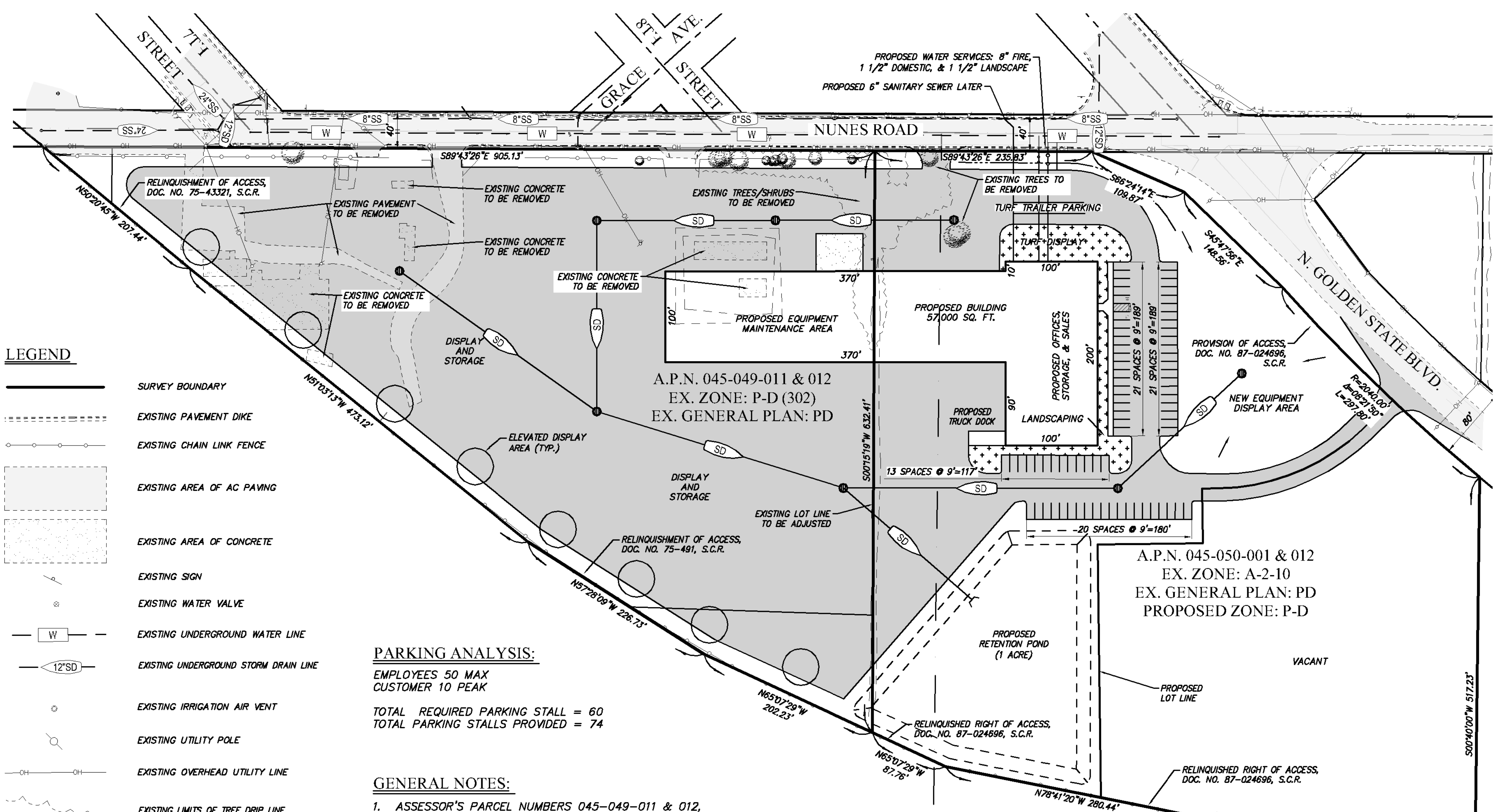
California
Oakland | Sacramento

FIGURE 1

SITE VICINITY MAP
SUCKOW PROPERTY
STANISLAUS COUNTY APNs 045-050-001, -011, -012
KEYES, CALIFORNIA

FARALLON PN: 527-017

Drawn By: GPF | Checked By: TH | Date: 11/25/2014 | Disk Reference: 527-017s



LEGEND

- SURVEY BOUNDARY
- EXISTING PAVEMENT DIKE
- EXISTING CHAIN LINK FENCE
- EXISTING AREA OF AC PAVING
- EXISTING AREA OF CONCRETE
- EXISTING SIGN
- EXISTING WATER VALVE
- EXISTING UNDERGROUND WATER LINE
- EXISTING UNDERGROUND STORM DRAIN LINE
- EXISTING IRRIGATION AIR VENT
- EXISTING UTILITY POLE
- EXISTING OVERHEAD UTILITY LINE
- EXISTING LIMITS OF TREE DRIP LINE
- EXISTING STRIPING
- EXISTING TREE, SPREAD TO SCALE
- EXISTING RELINQUISHED RIGHTS OF ACCESS, UNLESS OTHERWISE NOTED.
- PROPOSED AREA OF AC PAVING
- PROPOSED AREA OF CONCRETE

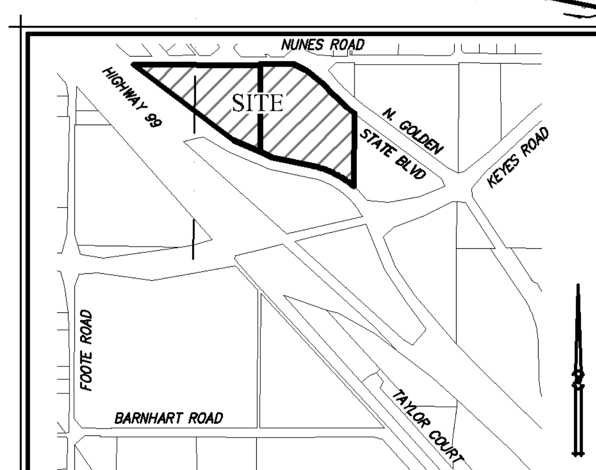
PARKING ANALYSIS:

EMPLOYEES 50 MAX
CUSTOMER 10 PEAK

TOTAL REQUIRED PARKING STALL = 60
TOTAL PARKING STALLS PROVIDED = 74

GENERAL NOTES:

1. ASSESSOR'S PARCEL NUMBERS 045-049-011 & 012, 045-050-001 & 012
2. CURRENT ZONING : P-D(302) & A-2-10
3. SEWER SERVICE: KEYES COMMUNITY SERVICES DISTRICT
4. WATER SERVICE: KEYES COMMUNITY SERVICES DISTRICT
5. STORM DRAINAGE: POSITIVE DRAINAGE SYSTEM TO DRAINAGE BASIN
6. ALL NEW PUBLIC UTILITIES ARE TO BE INSTALLED IN EASEMENTS. 10 FOOT WIDE PUBLIC UTILITY EASEMENTS SHALL BE DEDICATED ALONG ALL ROAD FRONTAGES.
7. ALL DIMENSIONS, DISTANCES, AREAS, ETC. ARE TAKEN FROM ASSESSOR'S DATA, RECORD INFORMATION, AND FIELD OBSERVATIONS BY OFFICE PERSONNEL AND DO NOT REFLECT AN ACTUAL SURVEY.
8. ALL IMPROVEMENTS SHALL BE CONSTRUCTED PER STANISLAUS COUNTY AND KEYES COMMUNITY SERVICES DISTRICT STANDARDS.
9. STREET LIGHTING SHALL BE INSTALLED AS PER STANISLAUS COUNTY REQUIREMENTS.



VICINITY MAP
NO SCALE

80 0 40 80 160
SCALE : 1"= 80'

SHEET 1. OF 2.

HAWKINS & ASSOCIATES ENGINEERING, INC.
436 MITCHELL RD.
MODESTO, CA. 95354
PH: (209) 575 - 4295 FX: (209) 578 - 4295

PLOT PLAN EXHIBIT
REZONE/ PLAN AMENDMENT
4618 NUNES ROAD, KEYES
STANISLAUS COUNTY, CALIFORNIA

BY: RCS
CHK: RHH
DATE: 3/2015
SCALE: 1"=80'
JOB #: 3233

RODRICK H. HAWKINS: R.C.E. 50188
CROLIE E. LINDSAY: R.C.E. 31900 L.S. 4709
KEVIN GENASCI: L.S. 8660

SYM.	DATE	DESCRIPTION	APPD.

CENTRAL CALIFORNIA INFORMATION CENTER
California Historical Resources Information System
Department of Anthropology – California State University, Stanislaus
One University Circle, Turlock, California 95382
(209) 667-3307 - FAX (209) 667-3324

Alpine, Calaveras, Mariposa, Merced, San Joaquin, Stanislaus & Tuolumne Counties

Date: 3/23/2015

Records Search File #: 9275N
Project: Subdivision Map, APN 045-049-0011 and 012; and 045-050-001 and 012

lhalstead@hawkins-eng.com

Louretta Halstead, Office Manager
Hawkins & Associates Engineering, Inc.
436 Mitchell Road
Modesto, CA 95354

Dear Ms. Halstead:

We have conducted a records search as per your request for the above-referenced project area located on the Ceres USGS 7.5-minute quadrangle map in Stanislaus County.

Search of our files includes review of our maps for the specific project area and the immediate vicinity of the project area, and review of the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), the *California Inventory of Historic Resources* (1976), the *California Historical Landmarks* (1990), and the California Points of Historical Interest listing (May 1992 and updates), the Directory of Properties in the Historic Property Data File (HPDF) and the Archaeological Determinations of Eligibility (ADOE) (Office of Historic Preservation current electronic files dated 03-20-2014), the *Survey of Surveys* (1989), the Caltrans State and Local Bridges Inventory, GLO Plats (T4S R10E, Sheet #44-245, dated 1853-54) and other pertinent historic data available at the CCIC for each specific county.

The following details the results of the records search:

Prehistoric or historic resources within the project area: None have been formally reported to the Information Center. For your information the 1953 edition of the Ceres USGS 7.5' quadrangle shows several buildings that would be 62 years in age (or older), considered as possible historic resources within the project area. In viewing the current Google Earth map for the project area, it is evident that the buildings have been demolished and only foundations remain.

Prehistoric or historic resources within the immediate vicinity of the project area: None have been formally reported to the Information Center.

Resources that are known to have value to local cultural groups: None have been formally reported to the Information Center.

Previous investigations within the project area: None have been formally reported to the Information Center.

Previous investigations within the immediate vicinity of the project area: Only one investigation has been conducted along the northern edge of the project area, referenced as follows:

CCIC Report #ST-00859
Chavez, D., 1976. An Archaeological Reconnaissance of the Robert's Ferry Reservoir and Water Extraction and Conveyance Systems, Stanislaus County, California: Phase II

Recommendations/Comments: Based on existing data in our files the project area has a moderate-high sensitivity for the possible discovery of historical resources—the 1953 map shows buildings that would be 62 years in age and considered as possible historical resources. Google Earth satellite imagery shows that only foundations remained at some point in time. Even if the foundations have been removed, there could be buried historical remains within the project area. It is recommended that survey by a qualified historical resources consultant be completed to record any potential historical remains prior to implementation of the project or issuance of any discretionary permit.

The Statewide Referral List for Historical Resources Consultants is posted for your use on the internet at http://chrisinfo.org

Please be advised that a historical resource is defined as a building, structure, object, prehistoric or historic archaeological site, or district possessing physical evidence of human activities over 45 years old. The project area has not been subject to previous investigations and there are previously unrecorded historical features involved in your project that are 45 years or older and considered as historical resources requiring further study and evaluation by a qualified professional of the appropriate discipline.

We advise you that in accordance with State law, if any historical resources are discovered during project-related activities, all work is to stop and the lead agency and a qualified professional are to be consulted to determine the importance and appropriate treatment of the find. If Native American remains are found the County Coroner and the Native American Heritage Commission, Sacramento (916-373-3710) are to be notified immediately for recommended procedures.

We further advise you that if you retain the services of a historical resources consultant, the firm or individual you retain is responsible for submitting any report of findings prepared for you to the Central California Information Center, including one copy of the narrative report and two copies of any records that document historical resources found as a result of field work. If the consultant wishes to obtain copies of materials not included with this records search reply, additional copy or records search fees may apply.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the State Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

The California Office of Historic Preservation (OHP) contracts with the California Historical Resources Information System's (CHRIS) regional Information Centers (ICs) to maintain information in the CHRIS inventory and make it available to local, state, and federal agencies, cultural resource professionals, Native American tribes, researchers, and the public. Recommendations made by IC coordinators or their staff regarding the interpretation and application of this information are advisory only. Such recommendations do not necessarily represent the evaluation or opinion of the State Historic Preservation Officer in carrying out the OHP's regulatory authority under federal and state law.

We thank you for contacting this office regarding historical resource preservation. Please let us know when we can be of further service. Please sign and return the attached **Access Agreement Short Form.**

Note: Billing will be transmitted separately via email (msr270@csustan.edu) by our Financial Services office ($150.00), payable within 60 days of receipt of the invoice.

Sincerely,

E. A. Greathouse, Coordinator
Central California Information Center
California Historical Resources Information System

GENESIS SOCIETY

a Corporation Sole

7053 MOLOKAI DRIVE
PARADISE, CALIFORNIA 95969
(530) 680-6170 VOX
(530) 876-8650 FAX
seanjensen@comcast.net

April 28, 2015

Native American Heritage Commission
1550 Harbor Boulevard,
West Sacramento, California 95691

Subject: ***Lemos Parcel Project, circa 144-acres, Stanislaus County, California.***

Dear Commission:

We have been requested to conduct the archaeological survey, for the above-cited project, and are requesting any information you may have concerning archaeological sites or traditional use areas for this area. Any information you might supply will be used to supplement the archaeological and historical study being prepared for this project.

<u>Project Name:</u>	Lemos Parcel Split Project, circa 144-acres
<u>County</u>:	Stanislaus
<u>Map:</u>	USGS Paulsell, 7.5'
<u>Location</u>:	Portion of Section 13 of T3S, R11E.

Thanks in advance for your assistance.

Regards,

Sean Michael Jensen, Administrator

CENTRAL CALIFORNIA INFORMATION CENTER
California Historical Resources Information System
Department of Anthropology – California State University, Stanislaus
One University Circle, Turlock, California 95382
(209) 667-3307

Alpine, Calaveras, Mariposa, Merced, San Joaquin, Stanislaus & Tuolumne Counties

Date: 5/29/2018

Records Search File #: 10718N
Project: Rezone Application, Stanislaus County, North of Keyes Road, West of N. Golden State Blvd., Keyes, APN 045-050-007

Kumil Kayhani, Landowner
Kamir Incorporated
5196 Grayhawk Lane
Dublin, CA 94568

kbpetroleum@att.net

Dear Mr. Kayhani:

We have conducted a records search as per your request for the above-referenced project area located on the Ceres USGS 7.5-minute quadrangle map in Stanislaus County.

Search of our files includes review of our maps for the specific project area and the immediate vicinity of the project area, and review of the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), the *California Inventory of Historic Resources* (1976), the *California Historical Landmarks* (1990), and the California Points of Historical Interest listing (May 1992 and updates), the Directory of Properties in the Historic Property Data File (HPDF) and the Archaeological Determinations of Eligibility (ADOE) (Office of Historic Preservation current electronic files dated 03-20-2014), the *Survey of Surveys* (1989), the Caltrans State and Local Bridges Inventory, GLO Plats, and other pertinent historic data available at the CCaIC for each specific county.

The following details the results of the records search:

Prehistoric or historic resources within the project area: There are no formally recorded prehistoric or historic archaeological resources or formally recorded historic buildings or structures within the project area. The General Land Office Survey Plat for T4S R10E, Sheet No. 44-245, dated 1853-1854 shows the NE ¼ of Section 31 as a 160-acre parcel.

Prehistoric or historic resources within the immediate vicinity of the project area: There are no formally recorded prehistoric or historic archaeological resources or historic buildings or structures within the immediate vicinity of the project area.

Resources that are known to have value to local cultural groups: None have been formally reported to the Information Center.

Previous investigations within the project area: There have been no previous investigations within the project area.

Recommendations/Comments: Based on existing data in our files the project area has a low sensitivity for the possible discovery of prehistoric or historic archaeological resources.

Please be advised that a historical resource is defined as a building, structure, object, prehistoric or historic archaeological site, or district possessing physical evidence of human activities over 45 years old. Since the project area has not been subject to previous investigations, there may be unidentified features involved in your project that are 45 years or older and considered as historical resources requiring further study and evaluation by a qualified professional of the appropriate discipline. If at any time you might require the services of a qualified professional the Statewide Referral List for Historical Resources Consultants is posted for your use on the internet at http://chrisinfo.org

We advise you that in accordance with State law, if any historical resources are discovered during project-related activities, all work is to stop and the lead agency and a qualified professional are to be consulted to determine the importance and appropriate treatment of the find. If Native American remains are found the County Coroner and the Native American Heritage Commission, West Sacramento (916-373-3710) are to be notified immediately for recommended procedures.

We further advise you that if you retain the services of a historical resources consultant, the firm or individual you retain is responsible for submitting any report of findings prepared for you to the Central California Information Center, including one copy of the narrative report and copies of any records that document historical resources found as a result of field work, preferably in PDF format. If the consultant wishes to obtain copies of materials not included with this records search reply, additional copy or records search fees may apply.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the State Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

The California Office of Historic Preservation (OHP) contracts with the California Historical Resources Information System's (CHRIS) regional Information Centers (ICs) to maintain information in the CHRIS inventory and make it available to local, state, and federal agencies, cultural resource professionals, Native American tribes, researchers, and the public. Recommendations made by IC coordinators or their staff regarding the interpretation and application of this information are advisory only. Such recommendations do not necessarily represent the evaluation or opinion of the State Historic Preservation Officer in carrying out the OHP's regulatory authority under federal and state law.

We thank you for contacting this office regarding historical resource preservation. Please let us know when we can be of further service. Please sign and return the attached **Access Agreement Short Form.**

Note: Billing will be transmitted separately via email from the Financial Services office ($150.00), payable within 60 days of receipt of the invoice.

Sincerely,

E. A. Greathouse, Coordinator
Central California Information Center
California Historical Resources Information System

Copy of invoice to Laurie Marroquin, Financial Services (lamarroquin@csustan.edu)

Keyes Community Plan Area

Transportation Impact Assessment

Prepared for:
Stanislaus County Department of Public Works
First Carbon Solutions

February 2020

WC19-3625

FEHR & PEERS

ATTACHMENT VII

Table of Contents

Appendices

List of Figures

List of Tables

EXECUTIVE SUMMARY

This study presents the analysis and findings of the Transportation Impact Assessment (TIA) conducted for three proposed projects within the Keyes Community Plan (KCP) Area in unincorporated Stanislaus County, California. Descriptions of each of the proposed projects are provided below:

ITC Enterprises (ITC) - 30,000 square-foot semi-truck lease, rental and service facility, and 5,000 square-foot office located at southwest corner of Keyes Road at North Golden State Boulevard.

Nunes Road Travel Plaza (NRTP) - 7,000 square-foot convenience market, 4,278 square-foot potential restaurant, 16-pump fuel station, 14,100 square-foot truck wash and repair, 43 truck parking spaces, and a secondary fueling area with 5 diesel fueling stations at northeast corner of Keyes Road at North Golden State Boulevard.

Kamir Incorporated (KI) - 4,800 square-foot convenience market, two 3,000 square-foot fast food restaurants with drive-thru, 2,000 square-foot fast-food restaurant, 12-pump fuel station, and 30 truck parking spaces at northwest corner of Keyes Road at North Golden State Boulevard.

Transportation impacts at 14 study intersections and 6 freeway mainline segments were evaluated consistent with the Stanislaus County General Plan and Caltrans guidelines under the following study scenarios:

- Existing Conditions
- Existing with Project Conditions
- Cumulative (Year 2040) without Project Conditions
- Cumulative (Year 2040) with Project Conditions

This analysis identifies potentially significant adverse impacts of the proposed project on the surrounding transportation system and recommends measures to mitigate significant impacts. Recommendations for improvements to the project site plan are also provided.

Project Trip Generation

ITC Enterprise is anticipated to add 40 new AM and 43 new PM peak hour vehicle trips to the roadway network.

Nunes Road Travel Plaza is anticipated to add 161 new AM and 82 new PM peak hour vehicle trips to the roadway network.

Kamir Incorporated is anticipated to add 138 new AM and 90 new PM peak hour vehicle trips to the roadway network.

Transportation Impacts

Intersection and freeway impacts were evaluated using impact criteria from the Stanislaus County General Plan and Caltrans guidelines.

Existing with Project Mitigations

The addition of ITC Enterprises project traffic under Existing with Project Conditions would not cause any impacts based on the significance criteria.

The addition of Nunes Road Travel Plaza project traffic and Kamir Incorporated project traffic is anticipated to cause significant impacts at three intersections under Existing with Project Conditions. The mitigation measures for these impacts include the following:

- SR 99 Southbound Ramps at Keyes Road (Intersection 3) and SR 99 Northbound Ramps at Keyes Road (Intersection 4):
    - Modifications to the SR 99/Keyes Road Interchange to include an eastbound right-turn pocket and a southbound right-turn pocket at the intersection of SR 99 Southbound Ramps at Keyes Road, and to include a westbound right-turn lane and a northbound right-turn pocket at the intersection of SR 99 Northbound Ramps at Keyes Road.

- Golden State Boulevard at Keyes Road (Intersection 6):
    - Modifications to the intersection of Golden State Boulevard at Keyes Road to include a second eastbound left-turn pocket and receiving lane, and a channelized free southbound right-turn pocket and receiving lane. Keyes Road between SR 99 Northbound Ramps and Golden State Boulevard must be widened to two lanes in the westbound direction.

Implementation of these improvements would result in reducing the impacts to less-than-significant levels. Therefore, the intersection impacts these three locations are ***less-than-significant with mitigation***.

Cumulative with Project Mitigations

The addition of ITC Enterprise project traffic, Nunes Road Travel Plaza project traffic, and Kamir Incorporated project traffic is anticipated to cause significant impacts at six intersections under Cumulative with Project Conditions. The mitigation measures for these impacts include the following:

- Faith Home Road at Keyes Road (Intersection 1)
    - Widen Keyes Road from two to four lanes between Faith Home Road and Golden State Boulevard. Modify the intersection of Faith Home Road at Keyes Road to include a northbound right-turn pocket.

- SR 99 Southbound Ramps at Keyes Road (Intersection 3) and SR 99 Northbound Ramps at Keyes Road (Intersection 4):

    Widen Keyes Road from two to four lanes between Faith Home Road and Golden State Boulevard. Modifications to the SR 99/Keyes Road Interchange to include a second westbound left-turn pocket and the southbound approach to include one right-turn pocket, one left-turn pocket, and one shared left/through lane at the intersection of SR 99 Southbound Ramps at Keyes Road, and to include a westbound right-turn lane and the northbound approach to include one right-turn pocket and one shared left/through lane at the intersection of SR 99 Northbound Ramps at Keyes Road.

- 9th St/Golden State Blvd at Nunes Road (Intersection 5)
    - Widen Golden State Boulevard from two to four lanes between Nunes Road and the ITC Enterprises Project Driveway and construct a one-lane roundabout at the intersection of 9th Street/Golden State Boulevard at Nunes Road. This improvement shall include Class II bicycle lanes along Golden State Boulevard south of Nunes Road and along Nunes Road west of Golden State Boulevard.

- Golden State Boulevard at Keyes Road (Intersection 6):
    - Widen Keyes Road from two to four lanes between Faith Home Road and Golden State Boulevard. Widen Golden State Boulevard from two to four lanes between Nunes Road and the ITC Enterprises Project Driveway. Modify the intersection of Golden State Boulevard at Keyes Road to have

two left-turn pockets and one right-turn pocket on all approaches; the southbound approach should have a channelized free southbound right-turn pocket and receiving lane. Keyes Road between SR 99 Northbound Ramps and Golden State Boulevard should be widened to three lanes in the westbound direction to accommodate the free southbound right-turn. This improvement shall include Class II bicycle lanes along Golden State Boulevard.

- Nunes Road at Keyes Road (Intersection 8)
    - Construct a receiving lane/acceleration lane for the southbound left-turn movement at the intersection of Nunes Road at Keyes Road.

Project applicants are expected to pay their fair share towards cumulative mitigations through the Keyes Community Plan Area Traffic Impact Fee program. Implementation of these improvements would result in reducing the impacts to less-than-significant levels. Therefore, the intersection impacts for these six locations are ***less-than-significant with mitigation***.

Vehicle Miles of Travel

In response to Senate Bill 743 (SB 743), the Office of Planning and Research (OPR) has updated California Environmental Quality Act (CEQA) guidelines to include new transportation-related evaluation metrics. The final proposed Guidelines include a new Section 15064.3 on Vehicle Miles of Travel (VMT) analysis and thresholds for land use developments. OPR also released a Technical Advisory on Evaluating Transportation Impacts in CEQA. New Guidelines section 15064.3 states that they do not take effect until July 1, 2020 unless the lead agency adopts them earlier.

Stanislaus County has not established any standards or thresholds related to VMT, therefore the new guidelines have not yet been adopted and are not in effect at this time. Since there are no standards in effect on VMT analysis, a preliminary assessment of the vehicle miles of travel (VMT) generated by the proposed projects was prepared for information and disclosure purposes only. No determination on the significance of VMT impacts is made in this document since none is legally required.

The addition of project land uses is expected to increase Total VMT generated by the Keyes Community Plan Area by approximately 17,800 miles under existing conditions and 16,500 miles under cumulative conditions.

Additionally, Total VMT would increase overall in Stanislaus County, but decrease in the adjacent cities of Modesto and Ceres. Results of the VMT analysis indicate the project would contribute to an increase in vehicle miles of travel.

Site Access and Circulation Recommendations

The following recommendations have been provided to improve site access and circulation at **ITC Enterprise**:

1. As a part of the final site plan indicate locations where traffic control devices would be installed. Consider stripping stop bars on the northbound and southbound approach at the intersection west of the main driveway entry off Golden State Boulevard, and on the westbound approach at the intersection west of the internal driveway connecting to the adjacent Peterbilt Development.

2. Ensure that accessible parking is located as close as possible to the main entrance of the proposed office.

3. As a part of the final site plan show an accessible pedestrian path compliant with ADA regulations from Golden State Boulevard to the proposed office.

4. Identify five additional parking spaces to accommodate the projected peak parking demand.

5. Consult with Stanislaus County to ensure that the proposed project design does not conflict with the ultimate provision of bicycle facilities along the project frontage.

6. Identify areas where short-term bicycle parking would be accommodated on the final site plan.

The following recommendations have been provided to improve site access and circulation at **Nunes Road Travel Plaza**:

1. Work with County staff to determine if the project driveway on Nunes Road will be closed or restricted to emergency vehicle traffic only. Install signage if necessary.

2. As a part of the final site plan indicate locations where traffic control devices would be installed. Consider striping stop bars on the northbound approach at the intersection providing access to the drive-thru restaurant and other minor approaches at intersections throughout the site.

3. Reconfigure the site plan to include an internal drive aisle between the north side of the property and the south side of the property. Given the close proximity of the project driveways on Golden State Boulevard to Keyes Road, the southern driveway should be restricted to right-in/right-out access, resulting in all vehicles using the NRTP North Driveway to make left turns into and out of the site. To restrict left-turn access into and out of the NRTP South Driveway, construct a raised median on Golden State Boulevard. Install wayfinding signage as necessary.

   Install a traffic signal at the intersection of NRTP North Driveway/KI Middle Driveway at Golden State Boulevard; align both driveways. The westbound approach should have one left-turn pocket and one shared left/through/right lane. The left-turn pocket should be at least 200 feet in length to accommodate typical vehicle queues.

4. Golden State Boulevard along the project frontage should be constructed to accommodate four travel lanes with turn pockets (five vehicle lanes total), a raised median, and two bicycle lanes in each direction.

5. Provide information on the number of seats proposed in the fast-food restaurant. Should the number of seats proposed in the fast-food restaurant exceed 260 (65 x 4), additional parking must be provided at a rate of 1 space per 4 additional seats.

6. As a part of the final site plan show an accessible pedestrian path compliant with ADA regulations from Golden State Boulevard to the fast-food restaurant located adjacent to the southern property line.

7. Consult with Stanislaus County to ensure that the proposed project design does not conflict with the ultimate provision of bicycle facilities along the project frontage.

8. Identify areas where short-term bicycle parking would be accommodated on the final site plan.

The following recommendations have been provided to improve site access and circulation at **Kamir Incorporated**:

1. As a part of the final site plan indicate locations where traffic control devices would be installed. Consider stripping stop bars on minor approaches at intersections throughout the site.

2. Reconfigure the site plan to include a two-way internal drive aisle between the north side of the property and the south side of the property. Vehicles will use the KI Middle Driveway to make left turns into and out of the site. Restrict left-turn access into and out of the KI South Driveway by constructing a raised median on Golden State Boulevard. Install wayfinding signage as necessary.

   Install a traffic signal at the intersection of NRTP North Driveway/KI Middle Driveway at Golden State Boulevard; align both driveways. The eastbound approach operates at acceptable levels with one shared left/through/right lane, however, should the site plan changes increase the volume of right-turns out of the KI Middle Drive, reconfigure the eastbound approach to include one shared left/through lane and one right-turn pocket.

3. Golden State Boulevard along the project frontage should be constructed to accommodate four travel lanes with turn pockets (five vehicle lanes total), a raised median, and two bicycle lanes in each direction.

4. As the restaurant portion of the site is leased, conduct parking surveys to determine if the proposed tenant mix is effectively sharing the available parking supply, and implement additional parking demand management strategies, if necessary.

5. Consult with Stanislaus County to ensure that the proposed project design does not conflict with the ultimate provision of bicycle facilities along the project frontage.

6. Identify areas where short-term bicycle parking would be accommodated on the final site plan.

INTRODUCTION

This study presents the analysis and findings of the Transportation Impact Assessment (TIA) conducted for three proposed projects within the Keyes Community Plan (KCP) Area in unincorporated Stanislaus County, California. The TIA evaluates the projects' potential impacts to the roadway system under existing and cumulative scenarios.

The three proposed projects are all located near the intersection of Keyes Road at North Golden State Boulevard, as shown on **Figure 1**. Descriptions of each of the proposed projects are provided below:

ITC Enterprises (ITC) - 30,000 square-foot semi-truck lease, rental and service facility, and 5,000 square-foot office located at southwest corner of Keyes Road at North Golden State Boulevard.

Nunes Road Travel Plaza (NRTP) - 7,000 square-foot convenience market, 4,278 square-foot potential restaurant, 16-pump fuel station, 14,100 square-foot truck wash and repair, 43 truck parking spaces, and a secondary fueling area with 5 diesel fueling stations at northeast corner of Keyes Road at North Golden State Boulevard.

Kamir Incorporated (KI) - 4,800 square-foot convenience market, two 3,000 square-foot fast food restaurants with drive-thru, 2,000 square-foot fast-food restaurant, 12-pump fuel station, and 30 truck parking spaces at northwest corner of Keyes Road at North Golden State Boulevard.

Site plans for each of the proposed projects are provided on **Figures 2A-C**.

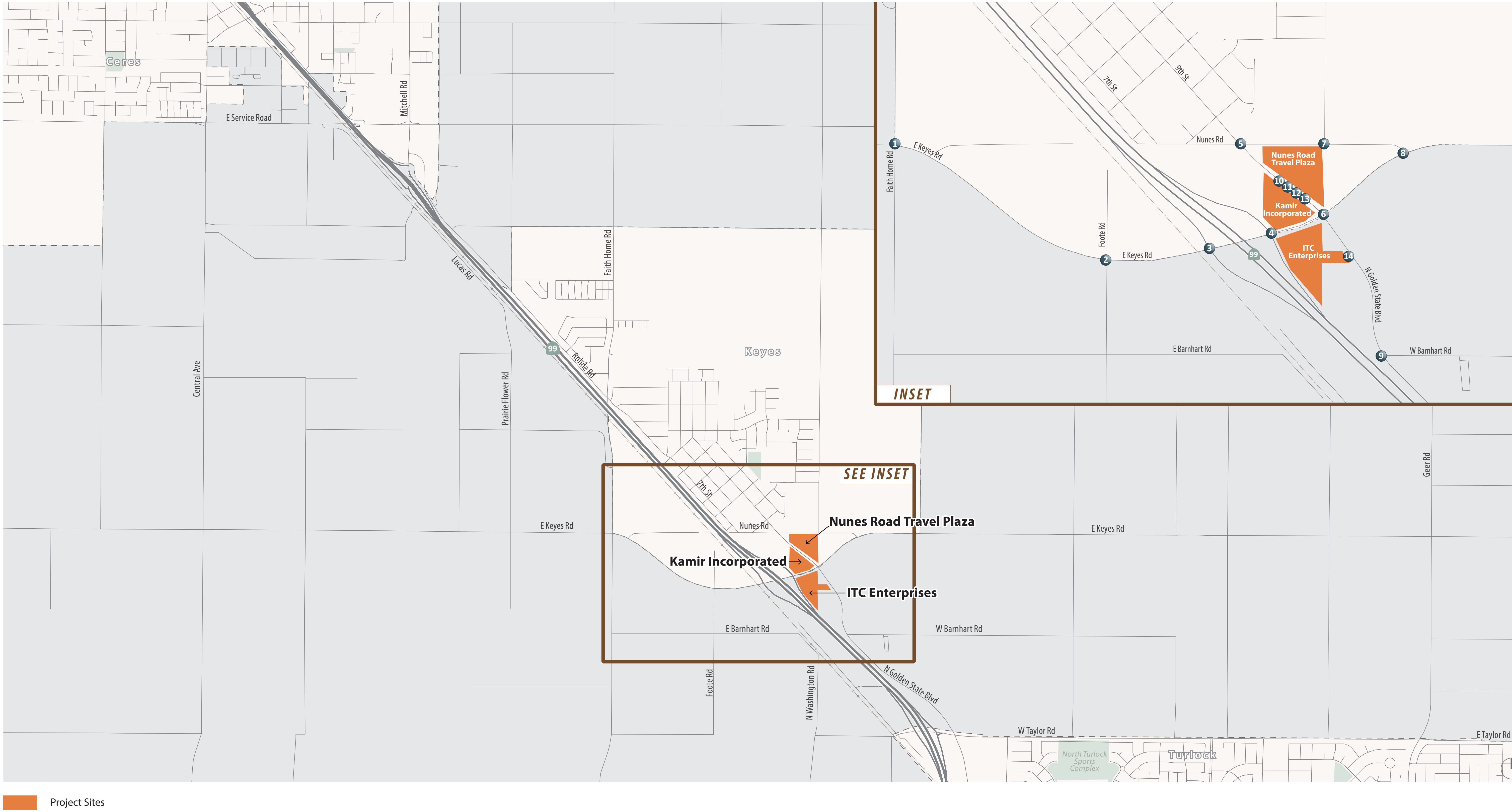


Figure 1

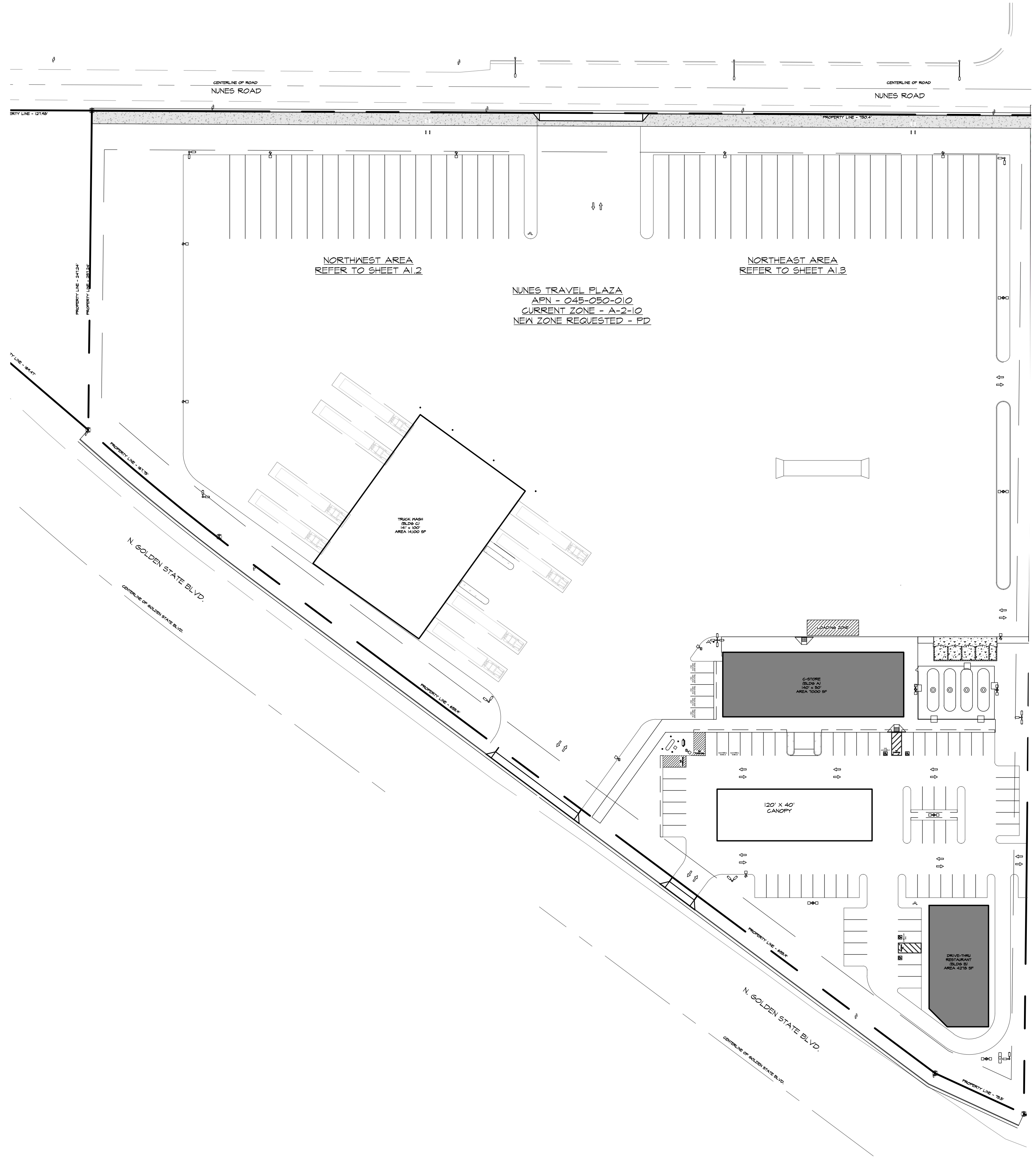
Project Site Vicinity and Study Intersection Locations

WC19-3625_1_SiteVic

Site Plan Source: North Star Engineering Group, 2018.

Figure 2A

Conceptual Project Site Plan — ITC Enterprises



Site Plan Source: Central Valley Engineering & Surveying, Inc., 1/22/18.

Figure 2B

Conceptual Project Site Plan — Nunes Road Travel Plaza

Site Plan Source: Magallon Construction Co., Inc., 10/4/18.

Figure 2C

Conceptual Project Site Plan — Kamir Incorporated

Project Study Area

The study area for this assessment includes the area immediately adjacent to the project site, along with roadways that provide primary access to the regional transportation network. Project impacts to study area roadway facilities were determined by measuring the effect project traffic would have on intersection operations during the weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak periods to coincide with the time-periods when adjacent street traffic demands are greatest and when the projects are expected to generate the most traffic.

The following intersections were selected for evaluation in consultation with Stanislaus County staff. Intersections 10 through 14 are new intersections that would be constructed with the proposed projects:

1. Faith Home Road at Keyes Road
2. Foote Road at Keyes Road
3. State Route 99 (SR 99) Southbound Ramps at Keyes Road
4. SR 99 Northbound Ramps at Keyes Road
5. 9th Street/Golden State Boulevard at Nunes Road
6. Golden State Boulevard at Keyes Road
7. South Washington at Nunes Road
8. Nunes Road at Keyes Road
9. Golden State Boulevard at Barnhart Road
10. KI (North) Driveway at Golden State Boulevard
11. KI (Middle)/NRTP (North) Driveways at Golden State Boulevard
12. NRTP (South) Driveway at Golden State Boulevard
13. KI (South) Driveway at Golden State Boulevard
14. ITC Driveway at Golden State Boulevard

The SR 99 freeway mainline segments and ramp junctions north and south of the SR 99/Keyes Road interchange were also selected for evaluation:

<u>SR 99 Mainline</u>

1. Northbound SR 99 Off Ramp to Keyes Road (Diverge)
2. Northbound SR 99 between Off Ramp and On Ramp at Keyes Road (Basic)
3. Northbound SR 99 On Ramp from Keyes Road (Merge)
4. Southbound SR 99 Off Ramp to Keyes Road (Diverge)

5. Southbound SR 99 between Off Ramp and On Ramp at Keyes Road (Basic)
6. Southbound SR 99 On Ramp from Keyes Road (Merge)

Analysis Scenarios

The study area was evaluated for the following scenarios:

Scenario 1: *Existing Conditions* – Existing traffic volumes collected in August 2019. Existing roadway geometries confirmed through field reconnaissance.

Scenario 2: *Existing with ITC Enterprises* – Existing traffic volumes plus traffic expected to be generated by the ITC Enterprises project. This scenario assumes the signalization of the SR 99/Keyes Road Interchange with no road or ramp modifications.

Scenario 3: *Existing with Nunes Travel Plaza* – Existing traffic volumes plus traffic expected to be generated by the Nunes Travel Plaza project. This scenario assumes the signalization of the SR 99/Keyes Road Interchange with no road or ramp modifications.

Scenario 4: *Existing with Kamir Incorporated* – Existing traffic volumes plus traffic expected to be generated by the Kamir Incorporated project. This scenario assumes the signalization of the SR 99/Keyes Road Interchange with no road or ramp modifications.

Scenario 5: *Existing with ITC Enterprises, Nunes Travel Plaza, and Kamir Incorporated (Existing with Project Trips Combined)* – Existing traffic volumes plus traffic expected to be generated by all three development proposals in the area. This scenario assumes the signalization of the SR 99/Keyes Road Interchange with no road or ramp modifications.

Scenario 6: *Cumulative (Year 2040) without Project Conditions* – Projected cumulative traffic volumes based on land-use growth in Three-County Travel Demand Model, recently updated to reflect the Ceres General Plan update

Scenario 7: *Cumulative (Year 2040) with Project Conditions* – Projected cumulative traffic volumes plus traffic expected to be generated by all three development proposals.

Analysis Methodology

The operations of roadway facilities are described with the term "level of service" (LOS). LOS is a qualitative description of traffic flow from a vehicle driver's perspective based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels of service are defined ranging from LOS A (free-flow conditions) to LOS F (over capacity conditions).

Intersections

Intersection operations were conducted using Synchro 10 traffic analysis program which contains methodologies consistent with Transportation Research Board's *Highway Capacity Manual, 6th Edition* (HCM). The HCM methodology for signalized intersections estimates the average control delay for vehicles at the intersection while the methodology for unsignalized intersections estimates the worst-case movement control delay and the average control delay.

Table 1: Intersection LOS Criteria

Level of Service	Description	Signalized Intersection	Unsignalized Intersection
		Delay (seconds/vehicle)	
A	Operations with very low delay occurring with favorable progression and/or short cycle length.	< 10.0	< 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0	> 10.0 to 15.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0	> 15.0 to 25.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0	> 25.0 to 35.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0	> 35.0 to 50.0
F	Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80.0	> 50.0

Source: *Highway Capacity Manual*, 6th Edition. (Transportation Research Board, 2016)

After the quantitative delay estimates are complete, the methodology assigns a qualitative letter grade that represents the operations of the intersection. Descriptions of the LOS letter grades for both signalized and unsignalized intersections are provided in **Table 1**. This method evaluates each intersection in isolation and the effects of vehicle queue spillback are not considered in the analysis results.

Freeway Facilities

Freeway segments were evaluated using the Highway Capacity Software 7 (HCS) using the HCM 6th Edition methodology. The freeway LOS is calculated for each study facility based on vehicle density (the number of vehicles per hour per lane). **Table 2** summarizes the relationship between vehicle density and LOS different freeway segment types.

Table 2: Freeway Mainline and Ramp Junction LOS Criteria

Level of Service	Description	Density (pc/mi/ln)[1]		
		Basic	Weaving	Merge/ Diverge
A	Free-flow speeds prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.	≤ 11	≤ 10	≤ 10
B	Free-flow speeds are maintained. The ability to maneuver with the traffic stream is only slightly restricted.	> 11 to 18	> 10 to 20	> 10 to 20
C	Flow with speeds at or near free-flow speeds. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver.	> 18 to 26	> 20 to 28	> 20 to 28
D	Speeds decline slightly with increasing flows. Freedom to maneuver with the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort.	> 26 to 35	> 28 to 35	> 28 to 35
E	Operation at capacity. There are virtually no usable gaps within the traffic stream, leaving little room to maneuver. Any disruption can be expected to produce a breakdown with queuing.	> 35 to 45	> 35 to 43	> 35
F	Represents a breakdown in flow.	> 45	> 43	Demand Exceeds Capacity

Note:
1. Density is presented in passenger cars per mile per lane (pc/mi/ln).
Source: *Highway Capacity Manual, 6th Edition* (Transportation Research Board, 2016)

Significance Criteria

The determination of significance for project impacts is based on applicable policies, regulations, goals, and guidelines defined by Stanislaus County and the California Department of Transportation.

The impacts of the project are evaluated by comparing the results of the technical analysis under With Project conditions to the results under Existing and Cumulative without Project conditions. The following criteria were used to identify significant off-site intersection impacts of the proposed projects under the various criteria.

According to CEQA guidelines, a traffic increase from a project is considered a significant impact if the associated change to the transportation system with the project would:

- Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit roadway, bicycle and pedestrian facilities;
- Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b) [1];
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); or
- Result in inadequate emergency access.

To evaluate potential impacts under Criteria A, the following specific impact criteria were developed based on information from the Stanislaus County General Plan and the Guide for the Preparation of Traffic Studies (Caltrans, 2002).

Stanislaus County

Based on guidance contained in the County of Stanislaus General Plan and recently prepared environmental documents for other projects in the County, a significant transportation-related impact could occur if:

[1] This section of the CEQA Guidelines relates to the evaluation of vehicle miles of travel (VMT). As Stanislaus County has not yet adopted VMT guidelines and compliance with this section of the CEQA guidelines is not required until July 2020, an assessment of VMT was conducted for informational purposes only as presented in Chapter 6.

- Project traffic would result in operations below the acceptable thresholds. For a roadway intersection in Stanislaus County, the project would cause the LOS to degrade to LOS D or worse;
- Project would add traffic to existing roadways/intersections that already exceed the acceptable threshold;

If the intersection is unsignalized, a significant transportation-related impact would occur only if the peak hour signal warrant is met.

California Department of Transportation

Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on State Highway facilities (Guide for the Preparation of Traffic Studies, Caltrans, December 2002); however, Caltrans recognizes that achieving LOS C/LOS D may not always be feasible. A standard of LOS D or better on a peak hour basis was used as the planning objective for the evaluation of potential impacts to Caltrans facilities of this development as that is the standard set for Caltrans facilities in the study area by Stanislaus County. The following criteria were used to evaluate potential impacts to Caltrans facilities:

- If a Caltrans facility is projected to operate at LOS D or better without project and the project is expected to cause the facility to operate at LOS E or worse, the impact may be considered significant.
- If a Caltrans facility is projected to operate at LOS E or F without project and the project increases the traffic volume on the mainline by 5 percent or more, the impact may be considered significant.

Vehicle Miles of Travel

In response to Senate Bill 743 (SB 743), the Office of Planning and Research (OPR) updated the California Environmental Quality Act (CEQA) guidelines to include new transportation-related evaluation metrics. In December 2018 the California Natural Resources Agency certified and adopted the CEQA Guidelines update package along with an updated Technical Advisory related to Evaluating Transportation Impacts in CEQA (December 2018). Full compliance with the guidelines is expected by July 2020.

Stanislaus County has not yet adopted significance thresholds related to VMT and VMT analyses are not yet required. Information related to VMT generated by the project is provided for informational purposes only.

EXISTING CONDITIONS

This chapter describes the existing transportation conditions in the study area, including the roadway network and the transit, pedestrian, and bicycle facilities in the vicinity of the project site.

Roadway System

Regional access to the study area is provided by State Route 99 (SR 99), Keyes Road, and Faith Home Road. Local access to the project sites is provided by Golden State Boulevard, 9th Street, and Nunes Road.

SR 99 is a north-south freeway that traverses the central valley of California. SR 99 is classified as a freeway facility in the Stanislaus County General Plan. SR 99 originates south of Bakersfield, branching from Interstate 5, and terminates north of Sacramento prior to the City of Red Bluff. Three mixed-flow lanes are provided in each direction on SR 99 in the vicinity of the project site. The speed limit on the facility is 65 mph.

Keyes Road is an east-west roadway that forms the northern boundary of the ITC Enterprises project site and the southern boundary of the Nunes Road Travel Plaza and Kamir Incorporated project sites. Keyes Road is classified as a principal arterial east of Faith Home Road and as a minor arterial west of Faith Home Road by the Stanislaus County General Plan. Keyes Road is two-lanes in the vicinity of the project site, with a de facto speed limit of 50 mph.

Faith Home Road is a north-south roadway that originates in Merced County and terminates in Ceres prior to the Tuolumne River. Faith Home Road is classified as a principal arterial north of Keyes Road and as a major collector south of Keyes Road by the Stanislaus County General plan. Faith Home Road is two-lanes in the study area, with a de facto speed limit of 50 mph. An extension of Faith Home Road from its current terminus in Ceres to Garner Road across the Tuolumne River is planned.

Golden State Boulevard is a north-south roadway that originates south of Turlock and terminates at Nunes Road just north of the proposed projects; north of Nunes Road, Golden State Boulevard becomes 9th Street. Golden State Boulevard is classified as a minor arterial by the Stanislaus County General Plan. Golden State Boulevard is two-lanes north of Keyes Road and is three-lanes, with one lane in each direction and a two-way-left-turn lane, south of Keyes Road. Golden State Boulevard provides direct site access to all three proposed projects.

9th Street is a north-south roadway that extends from Nunes Road to Anna Avenue; south of Nunes Road, 9th Street becomes Golden State Boulevard. 9th Street is classified as a local roadway by the Stanislaus County General Plan. 9th Street is two-lanes and has a posted speed limit of 25 mph.

Nunes Road is an east-west two-lane roadway that extends from Keyes Road to Frontage Road. Nunes Road is classified as a major collector by the Stanislaus County General Plan.

Transit Service

Local bus service for the KCP Area is provided by Stanislaus Regional Transit (StaRT). The nearest bus stations to the study area are located on 9th Street/Golden State Boulevard at Nunes Road (bus travels northbound) and at Maud Avenue (bus travels southbound); both stations are served by **Route 15** which travels between Modesto and Turlock. Modesto and Turlock both have airports and regional train stations (Amtrak).

On weekdays Route 15 provides service from 5:50 AM to 9:12 PM with headways ranging from one to two hours. On weekend service is provided from 6:52 AM to 8:20 PM with 105-minute headways. **Figure 3** shows local and regional transit service.

Pedestrian and Bicycle Facilities

Pedestrian facilities include crosswalks, sidewalks, and controlled crossings. In the immediate project vicinity, sidewalks are provided on Golden State Boulevard and 9th Street adjacent to developed parcels. Although there are no sidewalks on Golden State Boulevard at Keyes Road, the intersection features crosswalks on all four approaches and push-activated pedestrian signals.

Bicycle facilities are categorized under four categories:

> *Class I: Shared Use Path* – These facilities are designated for the exclusive use of bicycles and pedestrians with vehicle cross-flow minimized.
>
> *Class II: Bicycle Lane* – Bicycle lanes provide a restricted right-of-way and are designated for the use of bicycles for one-way travel with a striped lane on a street or highway. Bicycle lanes are generally a minimum of five feet wide. Vehicle/pedestrian cross-flow are permitted.

Project Sites — Stanislaus Regional Transit (StaRT) Route — StaRT Stop

Figure 3

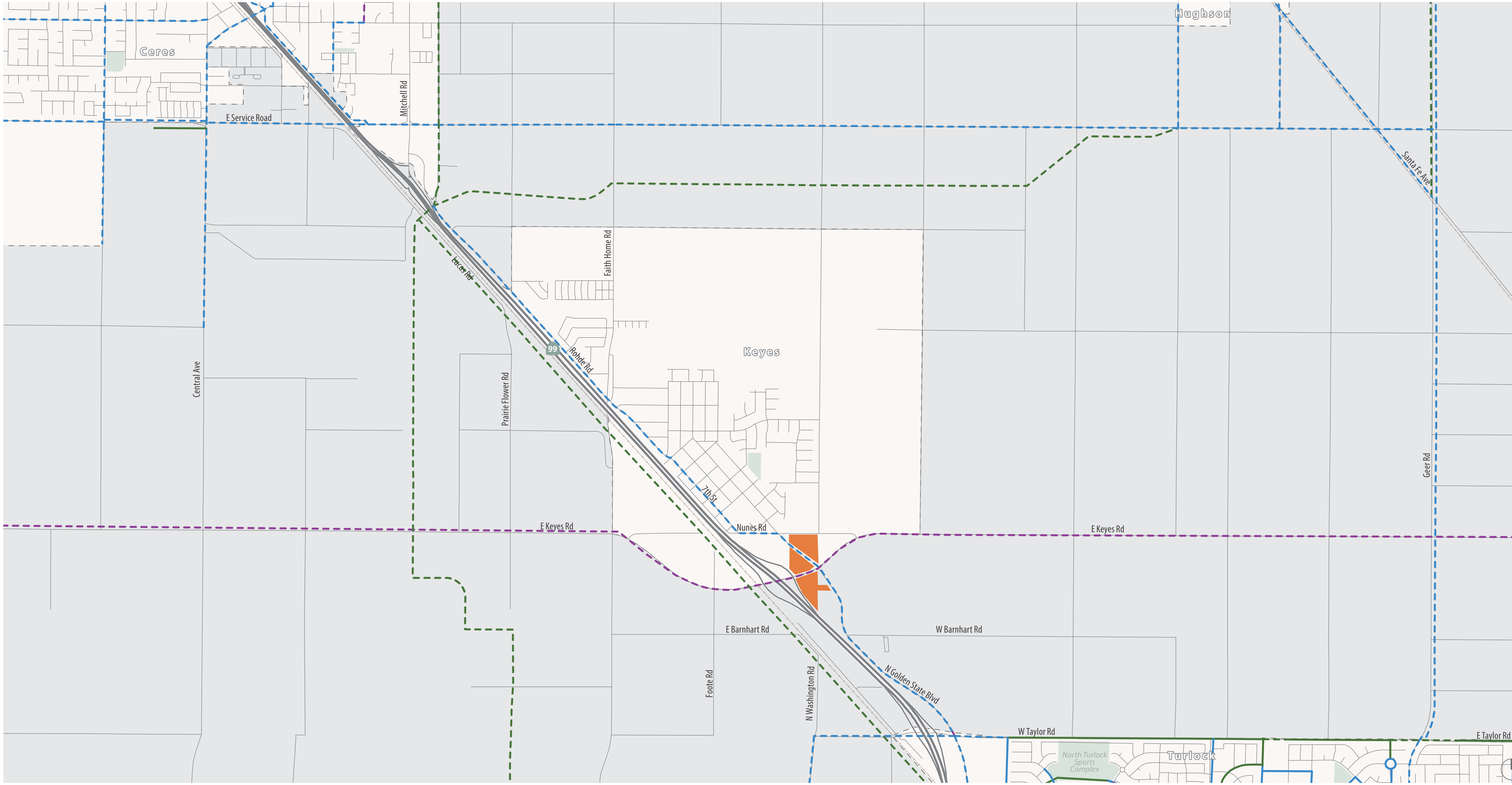
Local and Regional Transit Service

WC19-3625_3_Transit

Class III: Bicycle Route with Sharrows – These bikeways provide right-of-way designated by signs or pavement markings for shared use with motor vehicles. These include sharrows or "shared-lane markings" to highlight the presence of bicyclists.

Class IV: Buffered Bicycle Lanes – Bicycle lanes that include a physically separated lane for increased comfort and protection of cyclists. Can be physically separated by a barrier, such as planters or on-street parking, grade-separated from the roadway, or a painted buffer area.

There are no formal bicycle facilities in the immediate project vicinity, however the Non-Motorized Transportation Master Plan (StanCOG, 2013) proposes a Class I shared-use path parallel to SR 99 along Golden State Boulevard south of Nunes Road and along the Frontage Road north of Nunes Road, and Class II bicycle lanes on Keyes Road. **Figure 4** shows the existing and proposed bicycle facilities in the study area.



Project Sites

Existing

Class 1 Bike Path

Class 2 Bike Lane

Class 3 Bike Route

Proposed

Class 1 Bike Path

Class 2 Bike Lane

Class 3 Bike Route

WC19-3625_4_BikeNet

Figure 4

Bicycle Facilities

Existing Operations

Weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak period intersection turning movement counts were collected at the nine study intersections in August 2019, including a separate count of vehicles, trucks, pedestrians and bicyclists.

For each study intersection, the sixty-minute period with the highest traffic volumes during the two count periods were identified as the morning (AM) and evening (PM) peak hours of traffic. The peak hour volumes are presented on **Figure 5**, along with the existing lane configuration and traffic control. Existing bicycle and pedestrian volumes are shown on **Figure 6**. Traffic count worksheets are provided in **Appendix A**.

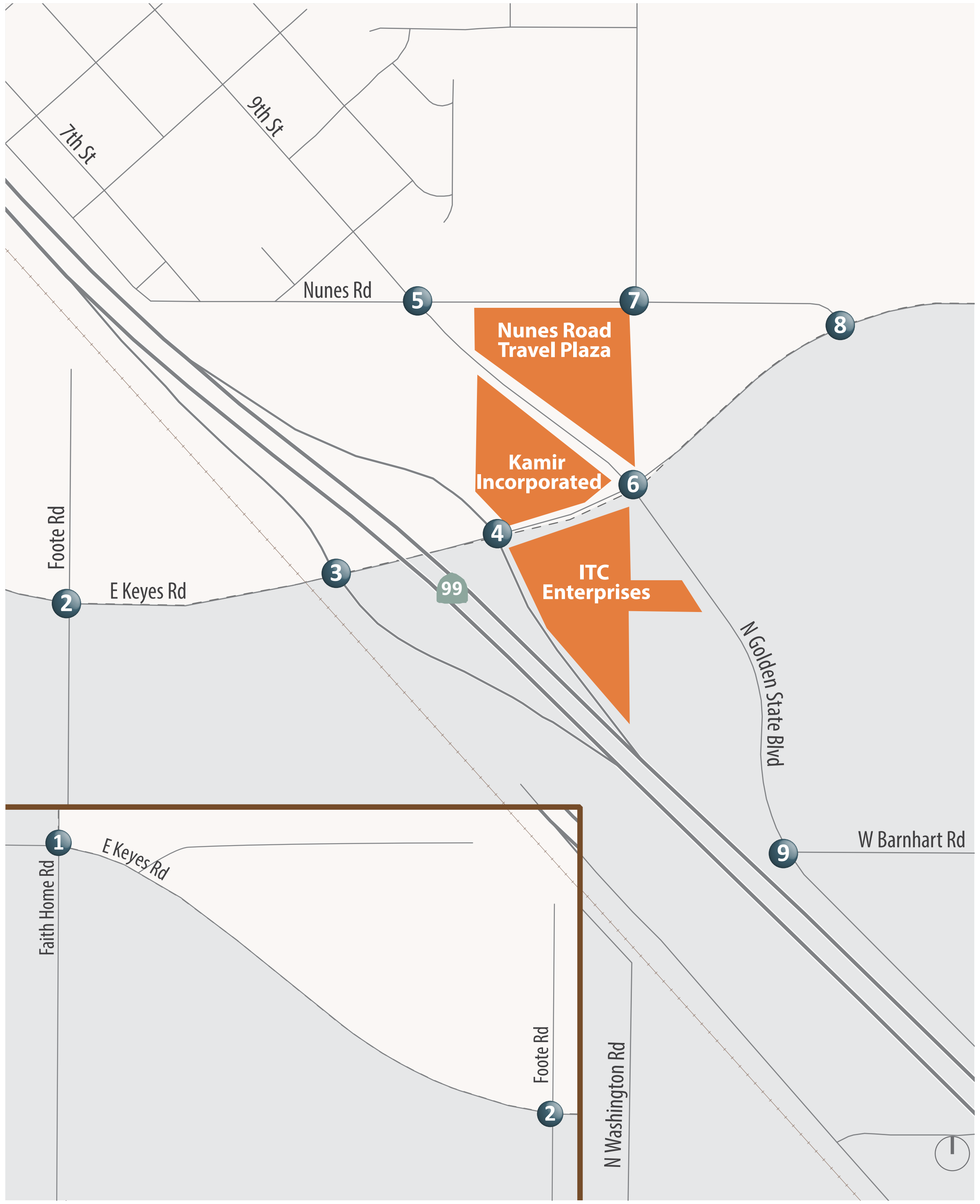
Intersection Operations

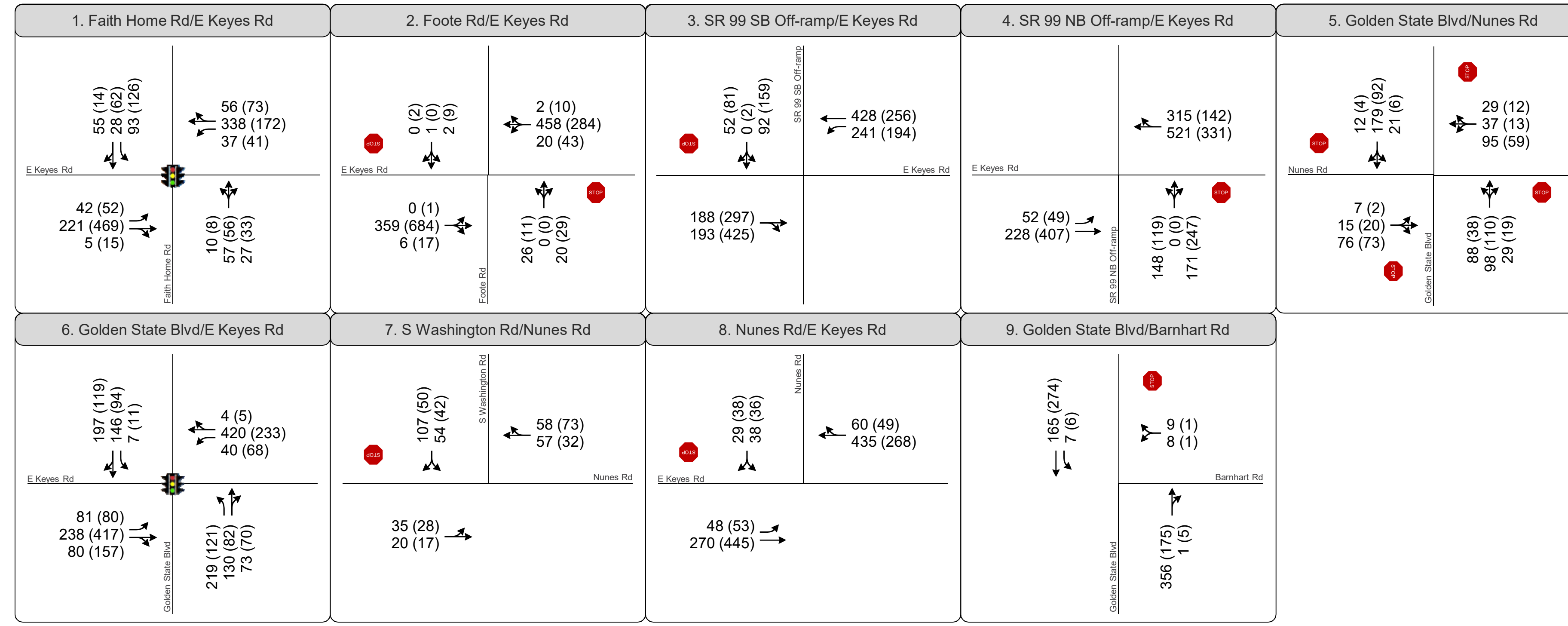
Existing intersection operations were evaluated using the HCM 6th Edition methodology with the results summarized in **Table 3**. Observed peak hour factors were used at all intersections, and truck, pedestrian and bicycle activity were factored into the analysis.

Most study intersections operate at overall acceptable service levels in accordance with benchmarks set by Stanislaus County during both the weekday morning and evening peak hours, which was confirmed during field observations. The following intersections operate below the LOS standard:

- The southbound approach at the intersections of Keyes Road at Foote Road (Intersection 2) experiences LOS D operations during the morning and evening peak hours but *does not meet peak hour signal warrants* due to low minor street roadway volumes.
- The southbound approach at the intersections of Keyes Road at SR 99 Southbound Off-ramp (Intersection 3) experiences LOS F operations during the morning and evening peak hours and *meets peak hour signal warrants*.
- The northbound approach at the intersections of Keyes Road at SR 99 Northbound Off-ramp (Intersection 4) experiences LOS F operations during the morning and evening peak hours and *meets peak hour signal warrants*.

Intersection LOS worksheets from Synchro 10 are provided in **Appendix B**. Peak hour signal warrants are provided in **Appendix C**.





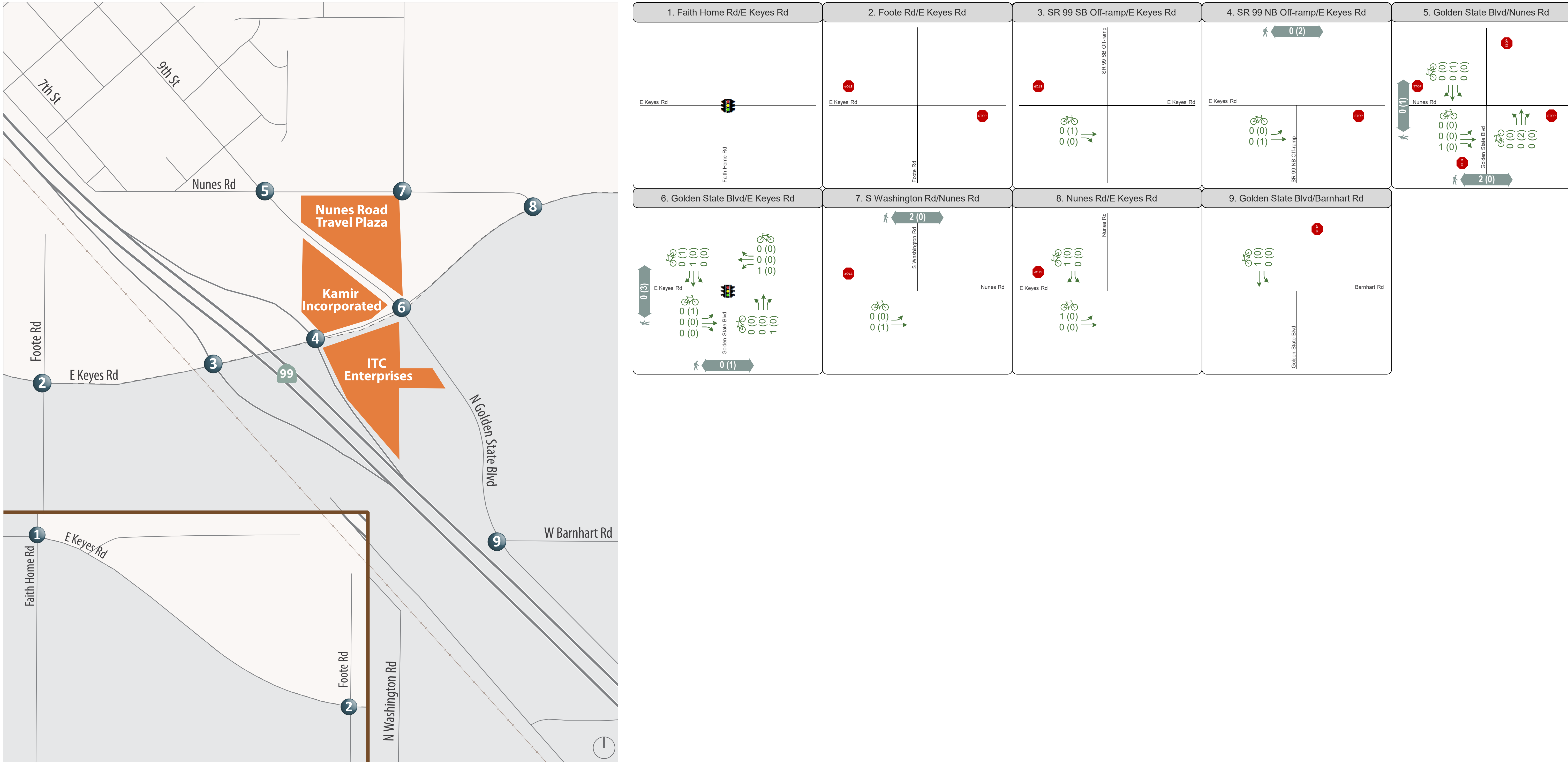
XX (YY) AM (PM) Peak Hour Traffic Volumes | Signalized Intersection | Stop Sign

Project Sites | # Study Intersection

WC19-3625_X_Volumes

Figure 5

Existing Conditions Peak Hour Traffic Volumes



0 (0) AM (PM) Peak Hour Pedestrian Volumes

0 (0) AM (PM) Peak Hour Bicycle Volumes

Signalized Intersection

Stop Sign

Project Sites

Study Intersection

WC19-3625_6_Vol-BikePed

Figure 6

Existing Conditions Peak Hour Bicycle and Pedestrian Volumes

	Table 3: Existing Conditions - Intersection Levels of Service					
	Intersection	Control[1]	Peak Hour	Existing Conditions		
				Delay[2]	LOS	Meets Signal Warrant?
1	Faith Home Road at Keyes Road	Signalized	AM PM	12 13	B B	--
2	Foote Road at Keyes Road	SSSC	AM PM	1 **(27)** 1 **(26)**	A **(D)** A **(D)**	No
3	State Route 99 Southbound Ramps at Keyes Road	SSSC	AM PM	14 **(>99)** **46 (>99)**	B **(F)** **E (F)**	**Yes**
4	State Route 99 Northbound Ramps at Keyes Road	SSSC	AM PM	16 **(70)** 15 **(52)**	C **(F)** C **(F)**	**Yes**
5	9th Street/Golden State Boulevard at Nunes Road	AWSC	AM PM	11 8	B A	No
6	Golden State Boulevard at Keyes Road	Signalized	AM PM	25 20	C C	--
7	South Washington at Nunes Road	SSSC	AM PM	6 (11) 5 (10)	A (B) A (A)	No
8	Nunes Road at Keyes Road	SSSC	AM PM	2 (12) 2 (12)	A (B) A (B)	No
9	Golden State Boulevard at Barnhart Road	SSSC	AM PM	1 (12) 1 (11)	A (B) A (B)	No

Notes:
1. AWSC = All-way Stop Control; SSSC = Side-street Stop Control
2. Average control delay expressed in seconds per vehicle. For side-street stop-controlled intersections, delay for the worst movement is expressed in parenthesis, with average intersection delay and LOS presented outside the parenthesis.

Bold indicates unacceptable intersection operations.
Source: Fehr & Peers, 2019.

Freeway Operations

Existing freeway volumes were obtained through traffic counts collected on March 2017 and adjusted assuming a two percent growth rate per year for the year 2019 based on a comparison of traffic counts at other locations in the area between 2017 and 2019. Existing freeway operations were evaluated using the HCM 6th Edition methodology with the results summarized in **Table 4**. Detailed calculation sheets are presented in **Appendix D.**

During the weekday morning, Northbound SR 99 at Keyes Road Off-ramp operates at LOS E. During the weekday evening peak hour, Southbound SR 99 segments within the study area operate at LOS E or F. All other freeway segments operate at acceptable service levels.

Table 4: Existing Conditions – Freeway Segment Levels of Service

	Segment	Type	Peak Hour	Existing Conditions	
				Density[1] (pc/mi/ln)	LOS
Northbound SR 99					
1	Keyes Rd Off-ramp	Diverge	AM PM	**35.3** 31.7	**E** D
2	Between Keyes Rd Off-ramp and On-ramp	Basic	AM PM	30.5 24.5	D C
3	Keyes Rd On-ramp	Merge	AM PM	31.5 25.6	D C
Southbound SR 99					
1	Keyes Rd Off-ramp	Diverge	AM PM	30.6 **38.9**	D **E**
2	Between Keyes Rd Off-ramp and On-ramp	Basic	AM PM	25.3 **38.8**	C **E**
3	Keyes Rd On-ramp	Merge	AM PM	28.4 **37.2**	D **F**

Notes:
1. Density is presented in passenger cars per mile per lane (pc/mi/ln).
Bold indicates unacceptable freeway segment operations.
Source: Fehr & Peers, 2019.

PROJECT CHARACTERISTICS

This chapter provides an overview of the proposed project components and addresses the proposed project trip generation, trip distribution, and trip assignment characteristics. These items allow for an evaluation of project impacts on the surrounding roadway network. The amount of project traffic estimated to be added to the transportation system after completion of the project was estimated using a three-step process:

1. **Trip Generation** – The *amount* of vehicle traffic entering/exiting the site was estimated.
2. **Trip Distribution** – The *direction* trips would use to approach and depart the area was projected.
3. **Trip Assignment** – Trips were then *assigned* to specific roadway segments and intersection turning movements based on likely paths of travel.

Trip Generation

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. For this project, estimates of weekday morning and evening peak hour trip generation were developed to coincide with the morning and evenings levels of peak activity when traffic flows on SR 99 are the highest, in addition to an estimate of daily weekday traffic volumes.

For the ITC Enterprises development, trip generation was estimated using local driveway counts at the existing Peterbilt development, located directly adjacent to the proposed ITC Enterprises development. A local trip rate specific to truck leasing/rental/service facilities was developed using the driveway counts. When compared to standard rates from the *Trip Generation Manual*, *10th Edition* (Institute of Transportation Engineers (ITE), 2017) for General Light Industrial, the local trip rate is higher for both the AM and PM peak hours.

For the Nunes Road Travel Plaza and Kamir Incorporated developments, trip generation was estimated using standard rates from the *Trip Generation Manual*, *10th Edition* for the various project components. The resulting vehicle trip generation estimates, which consider internalized, pass-by, and diverted trips, are presented in **Table 5**.

Table 5: Trip Generation								
Land-Use	Size	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
ITC Enterprises								
Truck Lease/ Rental Facility[1]	35,000 sq. ft.	430	27	13	40	10	33	43
Total Net New Trips		**430**	**27**	**13**	**40**	**10**	**33**	**43**
Nunes Road Travel Plaza								
Convenience Market/ Gas Station[2]	21 vehicle fueling stations	4,800	295	295	590	241	241	482
Pass-by Trips (60%)		(-2,880)	(-177)	(-177)	(-354)	(-145)	(-145)	(-290)
Diverted Trips (20% AM/30% PM & Daily)		(-1,440)	(-59)	(-59)	(-118)	(-72)	(-72)	(-144)
Fast Food Restaurant with Drive Thru[3]	4,278 sq. ft.	2,000	88	84	172	73	67	140
Pass-by Trips (50%)		(-1,000)	(-44)	(-42)	(-86)	(-37)	(-34)	(-71)
Diverted Trips (25%)		(-500)	(-22)	(-21)	(-43)	(-18)	(-17)	(-35)
Total Net New Trips		**980**	**81**	**80**	**161**	**42**	**40**	**82**
Kamir Incorporated								
Convenience Market/ Gas Station[2]	12 vehicle fueling stations	2,800	168	169	337	138	138	276
Pass-by Trips (60%)		(-1680)	(-101)	(-101)	(-202)	(-83)	(-83)	(-166)
Diverted Trips (20% AM/30% PM & Daily)		(-840)	(-34)	(-34)	(-68)	(-41)	(-41)	(-82)
Fast Food Restaurant with Drive Thru[3]	6,000 sq. ft.	2,800	123	118	241	102	94	196
Pass-by Trips (50%)		(-1400)	(-62)	(-59)	(-121)	(-51)	(-47)	(-98)
Diverted Trips (25%)		(-700)	(-31)	(-30)	(-61)	(-26)	(-24)	(-50)
Fast Food Restaurant without Drive Thru[4]	2,000 sq. ft.	700	30	20	50	28	29	57
Pass-by Trips (50%)		(-350)	(-15)	(-10)	(-25)	(-14)	(-15)	(-29)
Diverted Trips (25%)		(-180)	(-8)	(-5)	(-13)	(-7)	(-7)	(-14)
Total Net New Trips		**1,150**	**70**	**68**	**138**	**46**	**44**	**90**

Notes:
1. Based on trip generation rate observed at Peterbilt Development:
   AM = 1.14 * X (68% In, 32% Out); PM = 1.24 * X (24% In, 76% Out); Daily = 10 * PM; X = 1,000 square feet
2. Based on trip generation rates for land use 960, Super Convenience Market/Gas Station
3. Based on trip generation rates for land use 934, Fast Food Restaurant with Drive Thru
4. Based on trip generation rates for land use 933, Fast Food Restaurant without Drive Thru

Source: *Trip Generation Manual, 10th Edition* (Institute of Transportation Engineers, 2017); Fehr & Peers, 2019.

Internalized Trips

Internalized trips are a subcategory of trips where both the trip origin and trip destination are contained within the same development; these are trips that have multiple destinations within the same development. For example, at the Nunes Road Travel Plaza a patron might stop for fuel at the gas station and then wash their truck at the truck wash. Since ITE trip generation data generally represents trip generation at a single land-use, an internalization factor should be considered at developments with multiple land-uses.

For this assessment it was assumed that trips to or from the truck wash and repair area at the Nunes Road Travel Plaza would be internalized trips from the gas/service station and/or convenience market; under this assumption trip generation for the truck wash and repair area was not calculated. No internalized trips between the gas station/convenience market and the fast food restaurant(s) were assumed.

Pass-By and Diverted Trips

Driveway traffic at the proposed developments is comprised of: (1) new traffic generated by the project, (2) traffic that would otherwise already be on the adjacent roadways but the driver decides to stop at the site (e.g., to purchase an item on their way home from work), and (3) traffic on other nearby roadways, but the driver decides to take a short detour to stop at the site (e.g., to exit off the freeway for gas). The trips in Item 2 are referred to as "pass-by" trips and the trips in Item 3 are referred to as "diverted-link" trips.

Information contained in the *Trip Generation Handbook, 3rd Edition* (ITE, 2017) and surveys of similar uses was used to estimate pass-by trips.

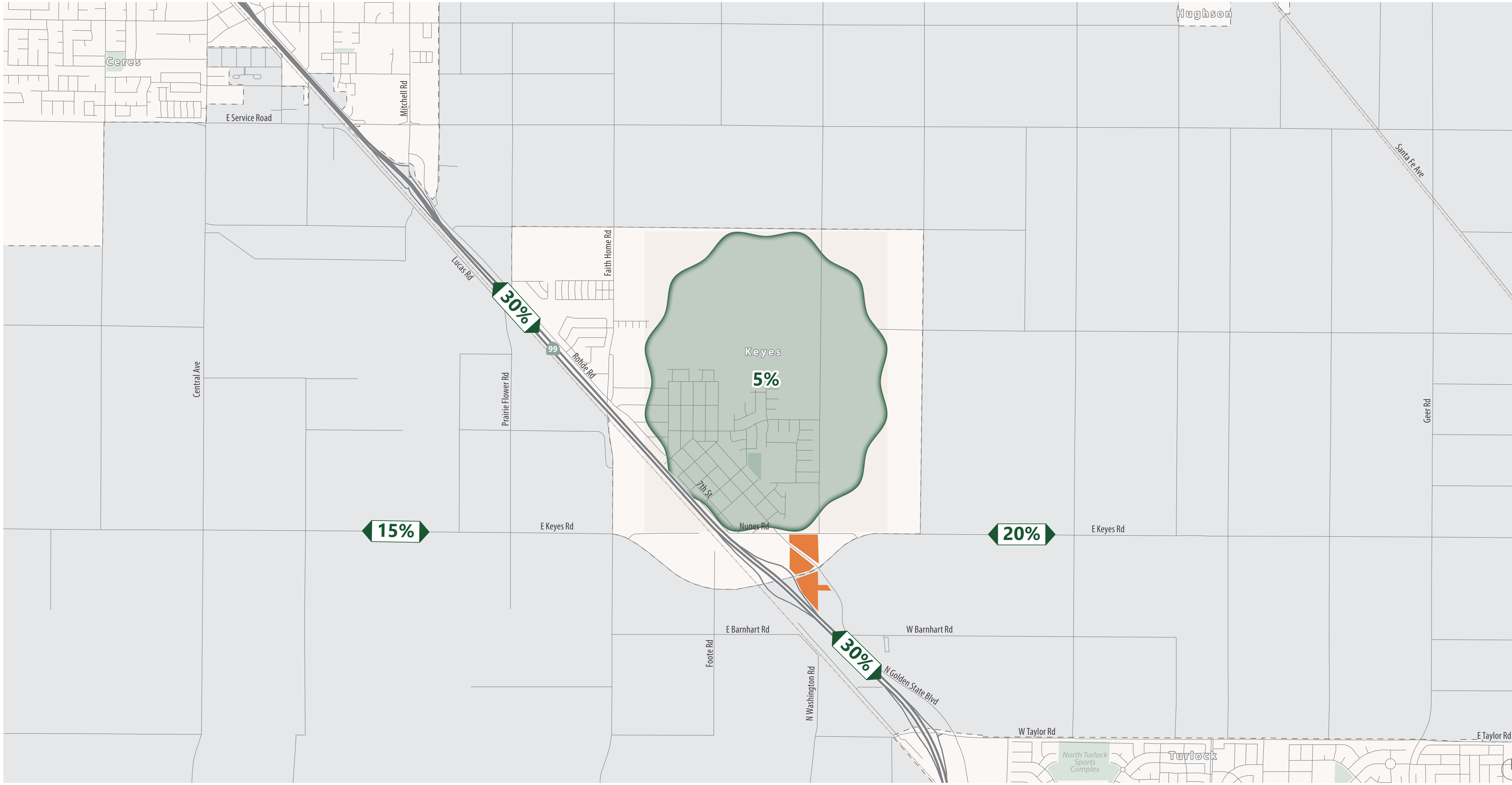
- Fast-food restaurants with drive thru windows have an average pass-by trip rate of approximately 50 percent, and an average diverted trip rate of approximately 25 percent during both the morning (AM) and evening (PM) peak hours;
- Gas/service stations with convenience markets have an average pass-by trip rate of approximately 60 percent during the AM and PM peak hours, and an average diverted trip rate of approximately 20 percent during the AM peak hour and 30 percent during the PM peak hour.

In other words, at a typical gas station, up to 90 percent of the traffic entering and exiting the site during the PM peak hour is already on the surrounding roadway system. For this assessment, it was assumed that pass-by/diverted trips for the fast-food restaurants (with or without a drive thru window) would comprise 75 percent of the trip generation, and that pass-by/diverted trips for the gas/service stations with convenience markets would comprise 80 to 90 percent of the trip generation. While pass-by and diverted trips are not new vehicle trips to the overall roadway system, they are accounted for in the analysis of driveway operations. Diverted trips are accounted for along the route of diversion. For example, a trip from SR 99 would be a new trip through the interchange and on surface streets for both the trip to and from the freeway, but the trip would not be a new trip on SR 99.

Trip Distribution & Assignment

Trip distribution refers to the directions of approach and departure that vehicles would take to access and leave the site. Due to the high percentage of pass-by and diverging trips, the project trip distribution of the proposed projects was estimated using existing travel patterns on the roadway network based on the area traffic counts. The trip distribution for the proposed projects are presented on **Figure 7**.

Trip assignment refers to the specific route and roadway segments vehicles would take to access and leave the site. Trips to project sites were assigned to the roadway network using the trip distribution percentages on Figure 7. Pass-by/diverted trip percentages were further refined using pass-by rates found in the Trip Generation Manual. Since the project driveways are located on a minor street (Golden State Boulevard), as opposed to one with more pass-by traffic, survey data from the Trip Generation Handbook overestimated the percentage of pass-by trips; overestimated pass-by trips were converted to diverted trips. The final project trip assignment for ITC Enterprises, Nunes Road Travel Plaza, Kamir Incorporated, and all three developments combined are presented on **Figures 8A-D**.

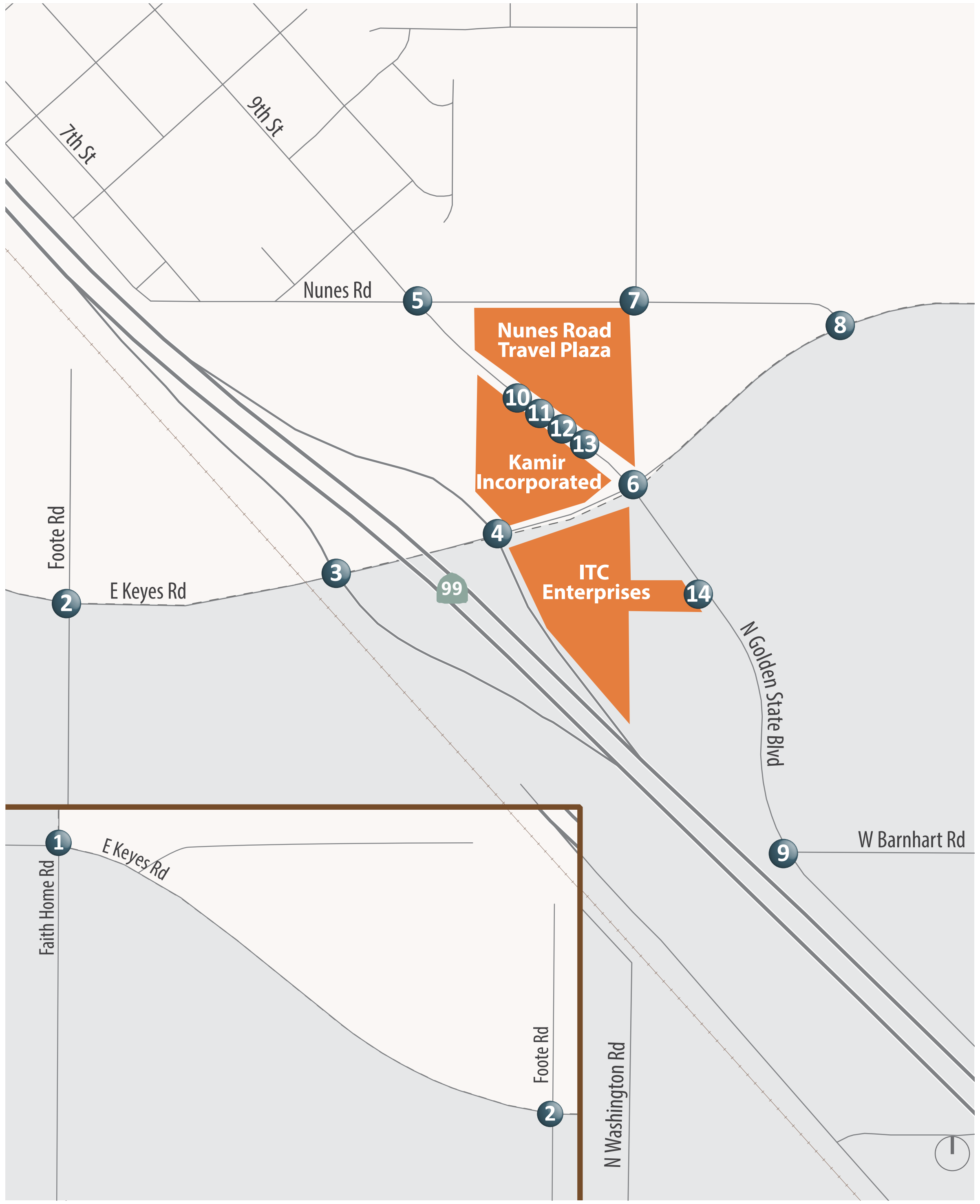


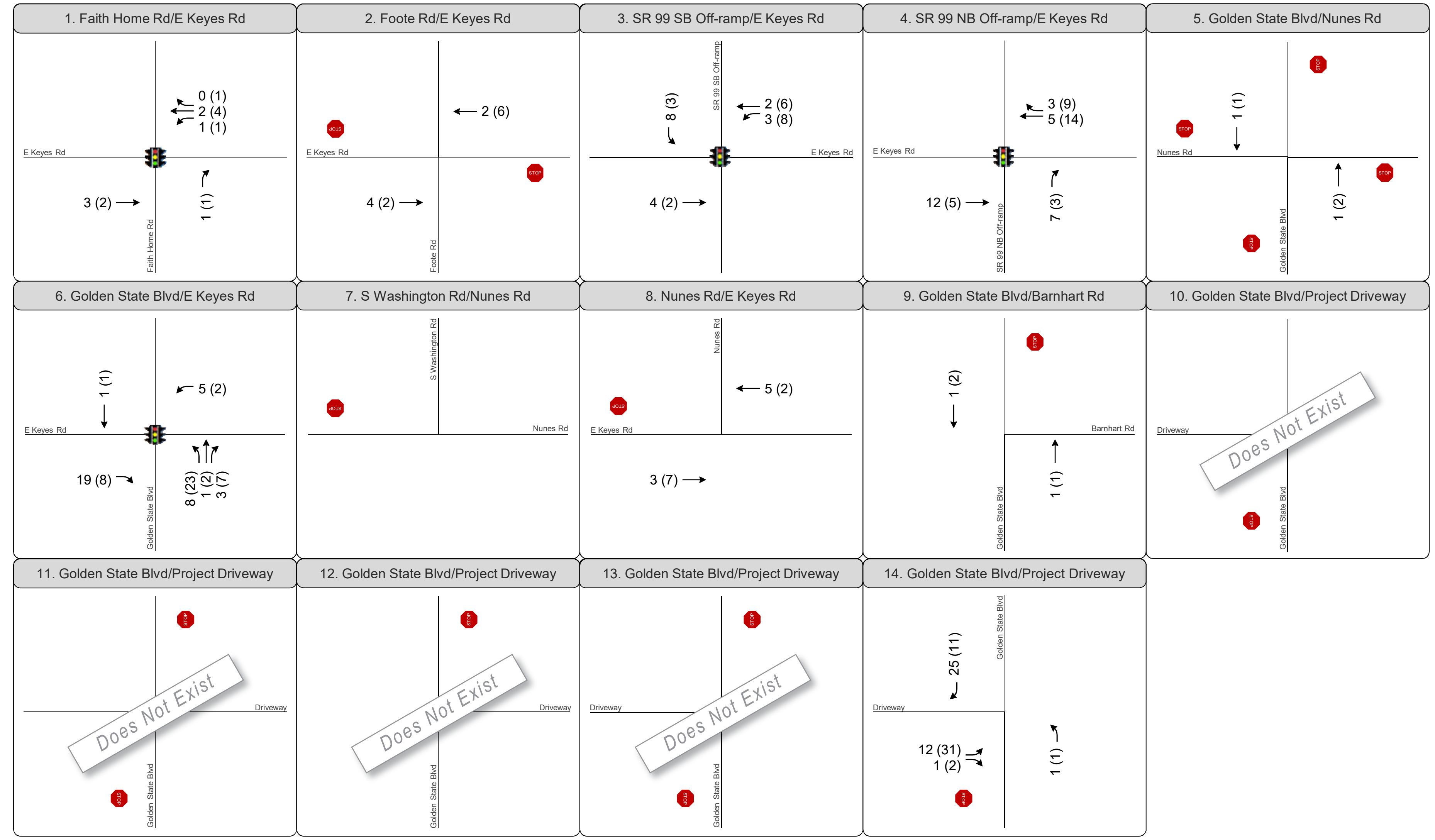
Project Sites
XX% Project Trip Distribution

WC19-3625_7_TTripDistro

Figure 7

Project Trip Distribution





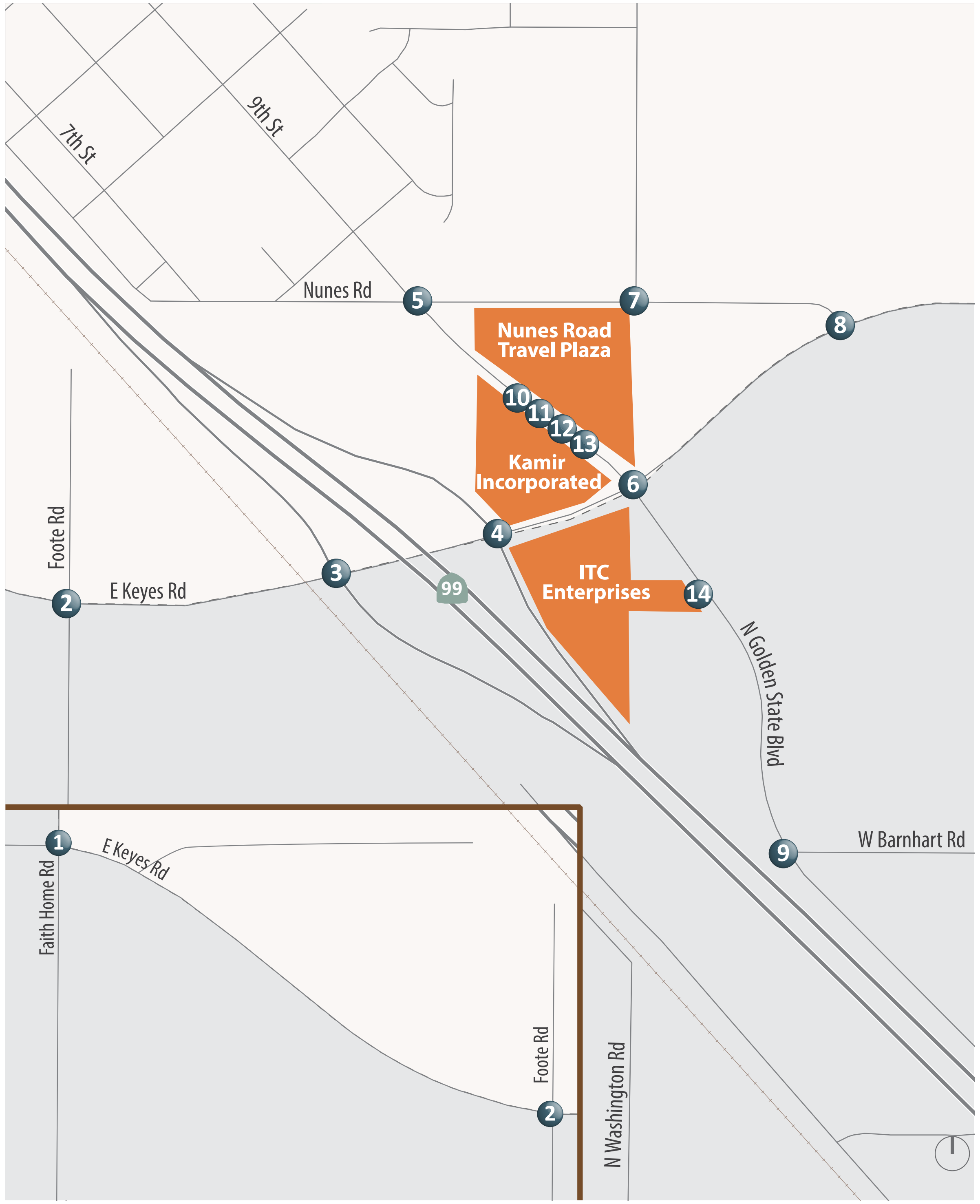
XX (YY) AM (PM) Peak Hour Traffic Volumes — Signalized Intersection — Stop Sign

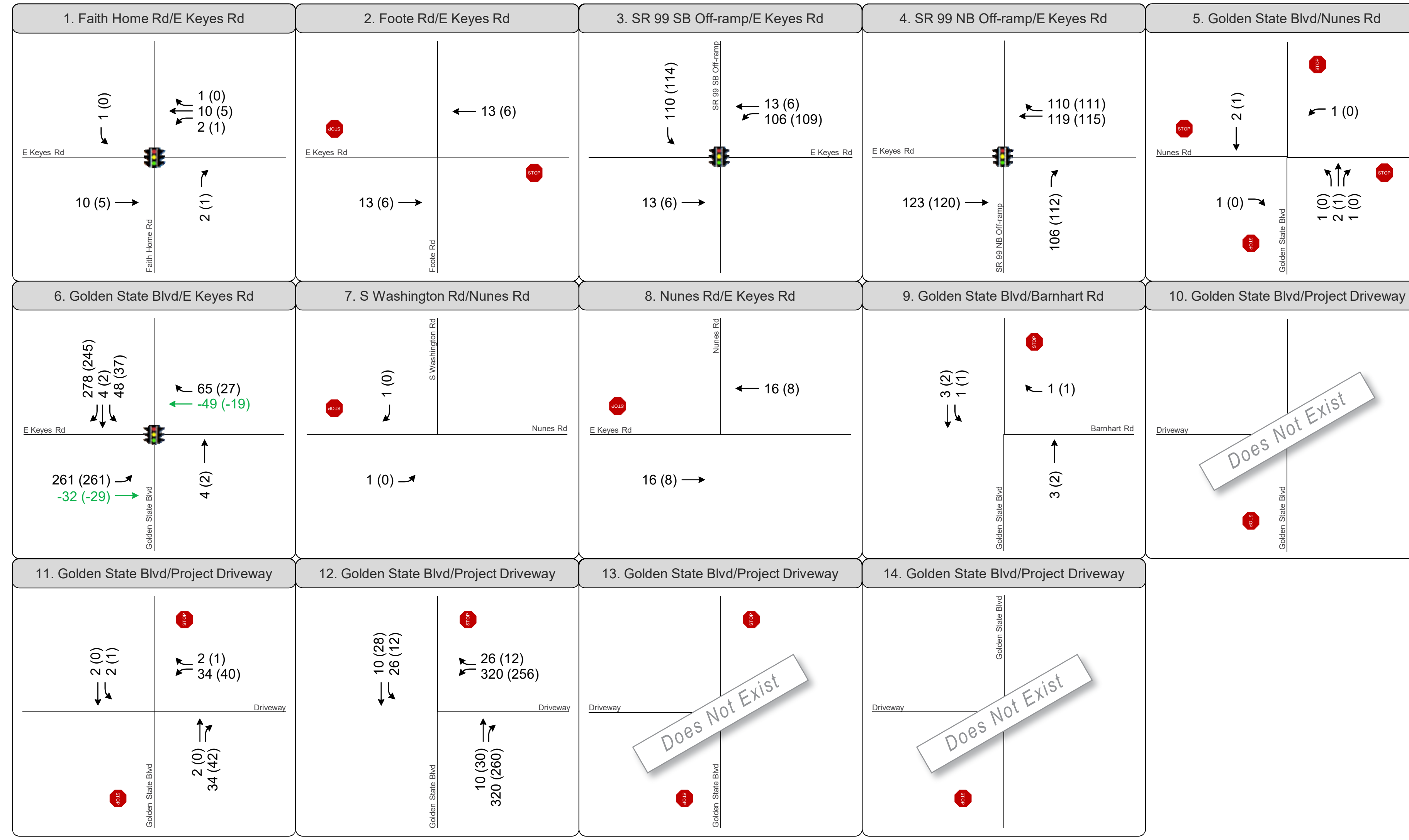
Project Sites — # Study Intersection

Figure 8A

WC19-3625_X_Volumes

Project Trip Assignment — ITC Enterprises





XX (YY) AM (PM) Peak Hour Traffic Volumes — Signalized Intersection — Stop Sign

Project Sites — # Study Intersection

Figure 8B

Project Trip Assignment — Nunes Road Travel Plaza

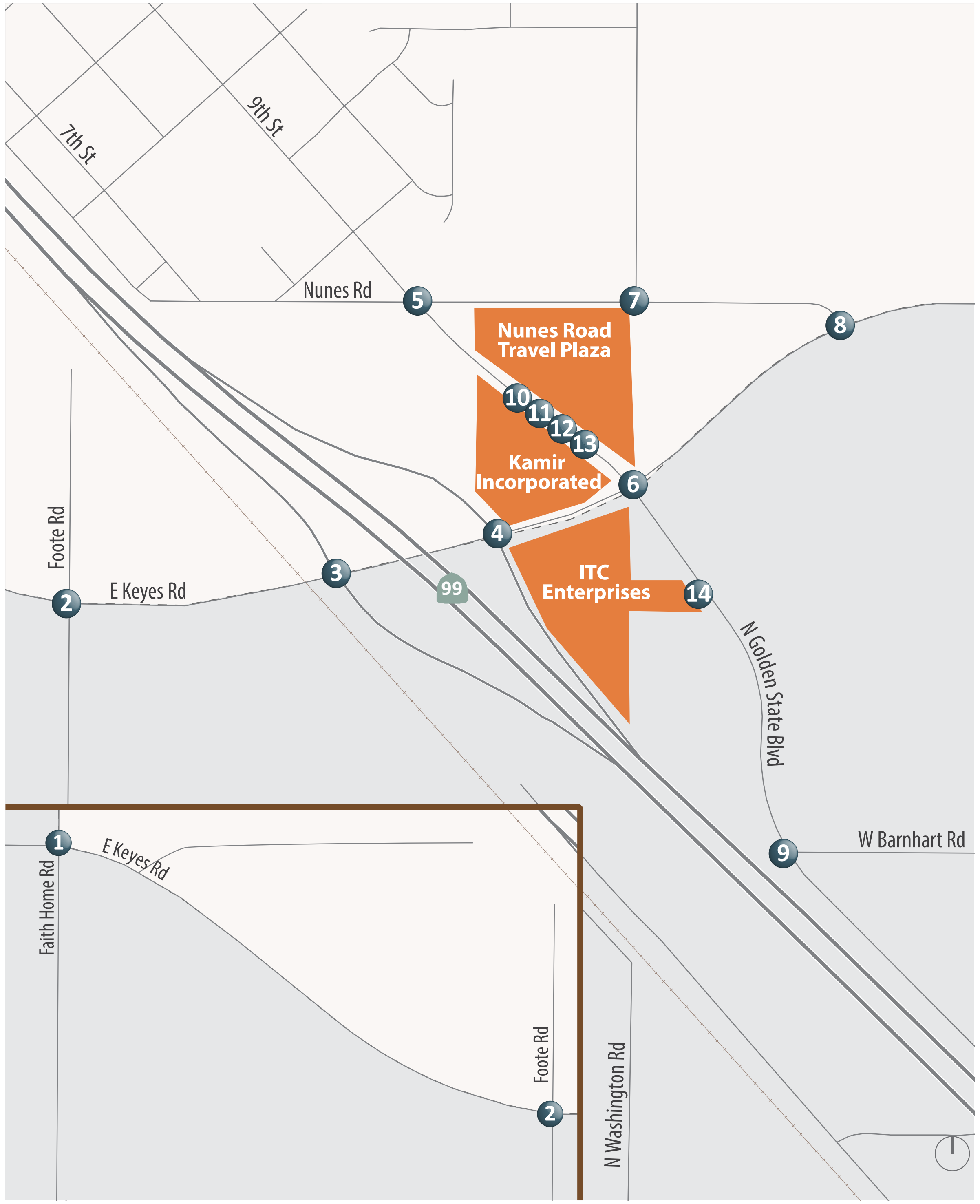
XX (YY) AM (PM) Peak Hour Traffic Volumes | Signalized Intersection | Stop Sign

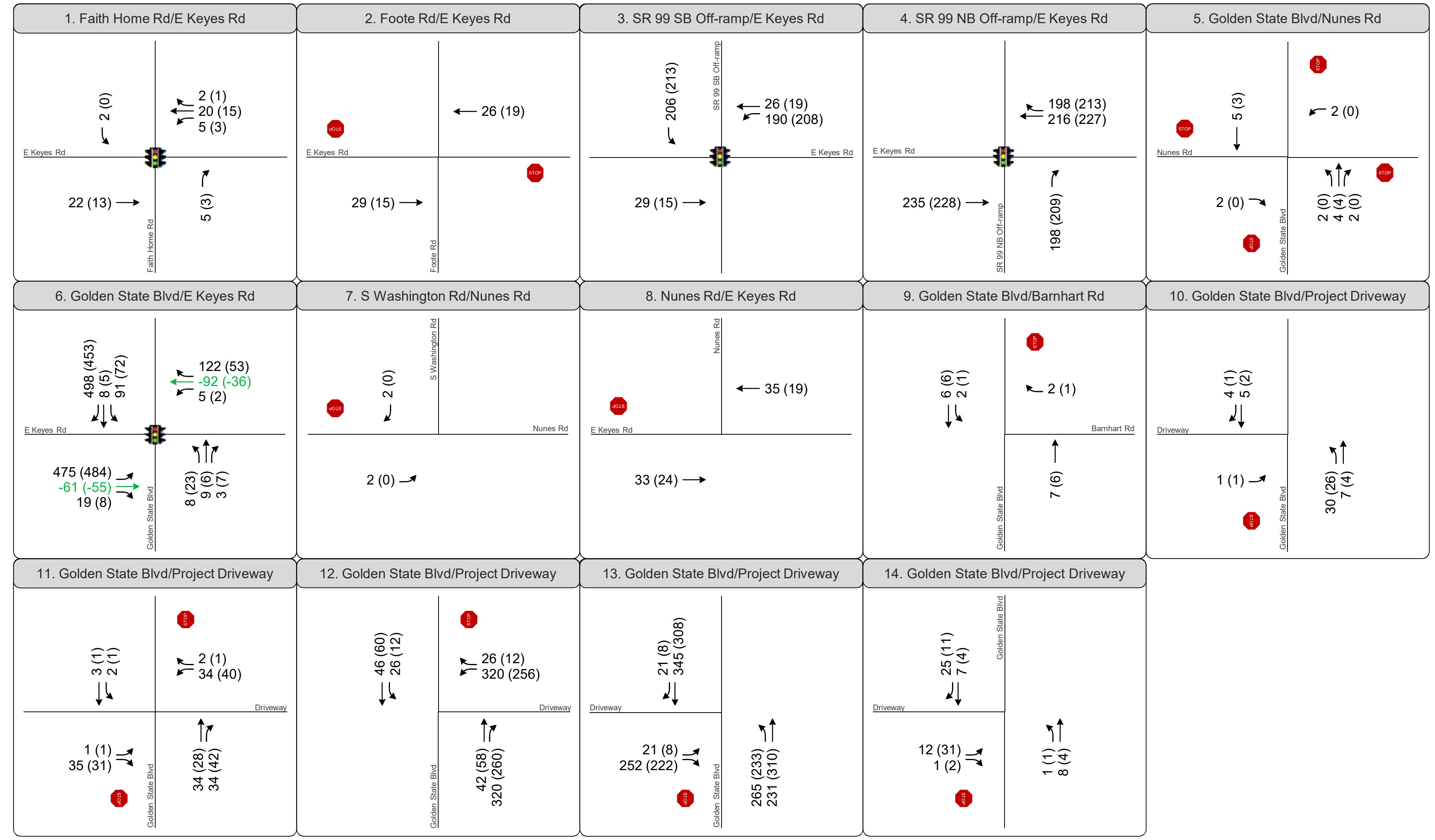
Project Sites | # Study Intersection

WC19-3625_X_Volumes

Figure 8C

Project Trip Assignment — Kamir Incorporated





XX (YY) AM (PM) Peak Hour Traffic Volumes | Signalized Intersection | Stop Sign

Project Sites | # Study Intersection

WC19-3625_X_Volumes

Figure 8D

Project Trip Assignment — Project Trips Combined

EXISTING WITH PROJECT CONDITIONS

This chapter evaluates potential off-site traffic impacts under Existing with Project Conditions. Project-only traffic volumes (Figures 8A-D) were added to the existing peak hour traffic volumes (Figure 5) to estimate Existing with Project peak hour intersection turning movement volumes, as shown on **Figures 9A-D**.

Stanislaus County plans to signalize the SR 99/Keyes Road Interchange prior to the completion of the projects, therefore the existing with project scenarios assume that the intersections of Keyes Road at the Northbound SR 99 Off-ramp and at the Southbound SR 99 Off-ramp are coordinated signals with protected left-turn movements; no geometric improvements were assumed. Peak hour factors and all other parameters at the study intersections were left unchanged from existing conditions. No other roadway improvements where assumed.

Existing with Project Intersection Operations

Intersection operations were evaluated using the HCM 6th Edition methodology with Existing with Project results summarized in **Table 6**. Intersection LOS worksheets from Synchro 10 are provided in **Appendix B**. Peak hour signal warrants are provided in **Appendix C**.

Project impacts were determined by comparing with Project intersection operations to without Project intersection operations. To determine impacts of project traffic at the SR 99/Keyes Road Interchange (Intersections 3 and 4), which will be signalized in the Existing with Project scenarios, signalized intersection operations at the SR 99/Keyes Road Interchange were evaluated with Existing without Project traffic volumes as a point of direct comparison.

The addition of ITC Enterprises project traffic to existing roadway volumes would not degrade any intersections to LOS D or worse.

The addition of Nunes Road Travel Plaza project traffic to existing roadway volumes would degrade the following intersection(s) to LOS D or worse:

- Intersection 3: SR 99 Southbound Ramps at Keyes Road (LOS E, PM peak hour);

- Intersection 4: SR 99 Northbound Ramps at Keyes Road (LOS E and D, AM and PM peak hours);
- Intersection 6: Golden State Boulevard at Keyes Road (LOS F, AM peak hour); and
- Intersection 12: NRTP (South) Project Driveway at Golden State Boulevard (LOS F and D with peak hour signal warrant met, AM and PM peak hours).

The addition of Kamir Incorporated project traffic to existing roadway volumes would degrade the following intersection(s) to LOS D or worse:

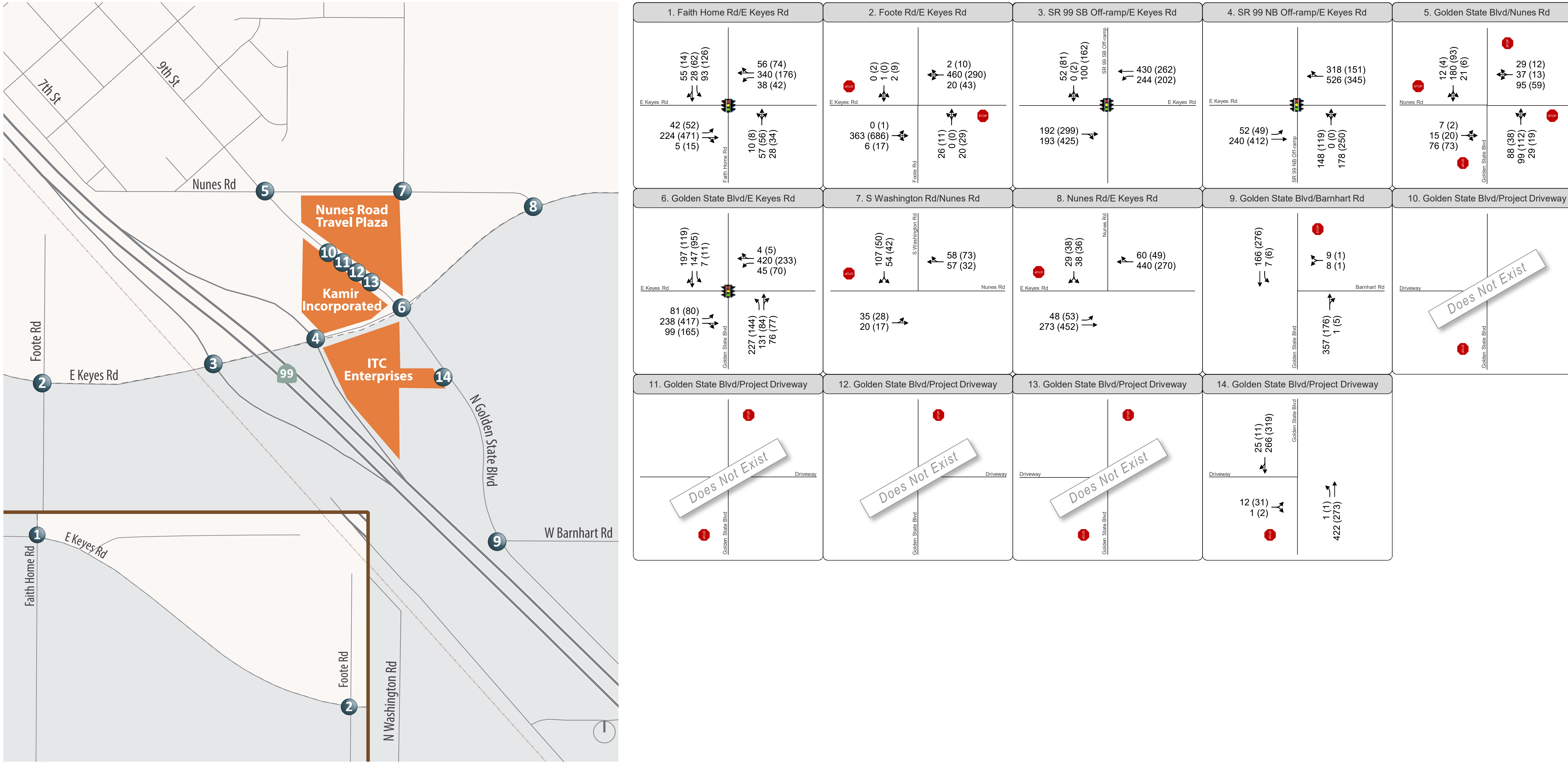
- Intersection 3: SR 99 Southbound Ramps at Keyes Road (LOS E, PM peak hour);
- Intersection 4: SR 99 Northbound Ramps at Keyes Road (LOS E, AM peak hour); and
- Intersection 6: Golden State Boulevard at Keyes Road (LOS F, AM peak hour).

The addition of project traffic from ITC Enterprises, Nunes Road Travel Plaza, and Kamir Incorporated (Project Trips Combined) to existing roadway volumes would degrade the following intersection(s) to LOS D or worse:

- Intersection 3: SR 99 Southbound Ramps at Keyes Road (LOS E, PM peak hour);
- Intersection 4: SR 99 Northbound Ramps at Keyes Road (LOS F and E, AM and PM peak hours);
- Intersection 6: Golden State Boulevard at Keyes Road (LOS F and F, AM and PM peak hours);
- Intersection 12: NRTP (South) Project Driveway at Golden State Boulevard (LOS F and E with peak hour signal warrant met, AM and PM peak hours); and
- Intersection 13: KI (South) Project Driveway at Golden State Boulevard (LOS F peak hour signal warrant met, AM peak hour).

Operations of the side-street movement on Foote Road at Keyes Road (Intersection 2) in the AM and PM peak hours would remain at LOS D with the addition of project traffic in all the Existing with Project scenarios. This intersection does <u>not</u> meet peak hour signal warrants under any of the Existing with Project scenarios.

All other study intersections would continue to operate at LOS C or better with the addition of project traffic in all Existing with Project scenarios.



XX (YY) AM (PM) Peak Hour Traffic Volumes — Signalized Intersection — Stop Sign

Project Sites — # Study Intersection

Figure 9A

Existing with ITC Enterprises Peak Hour Traffic Volumes

WC19-3625_X_Volumes

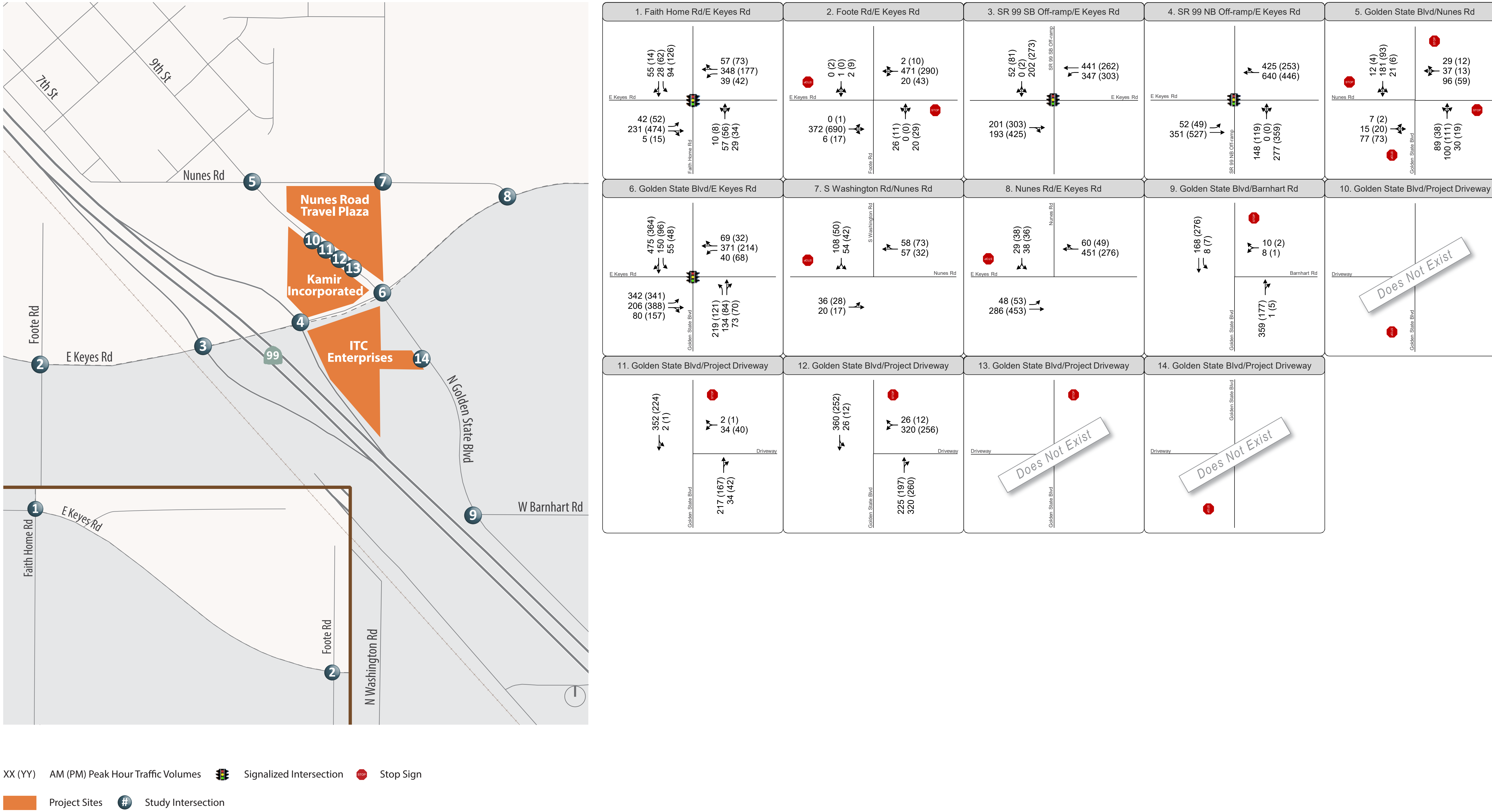
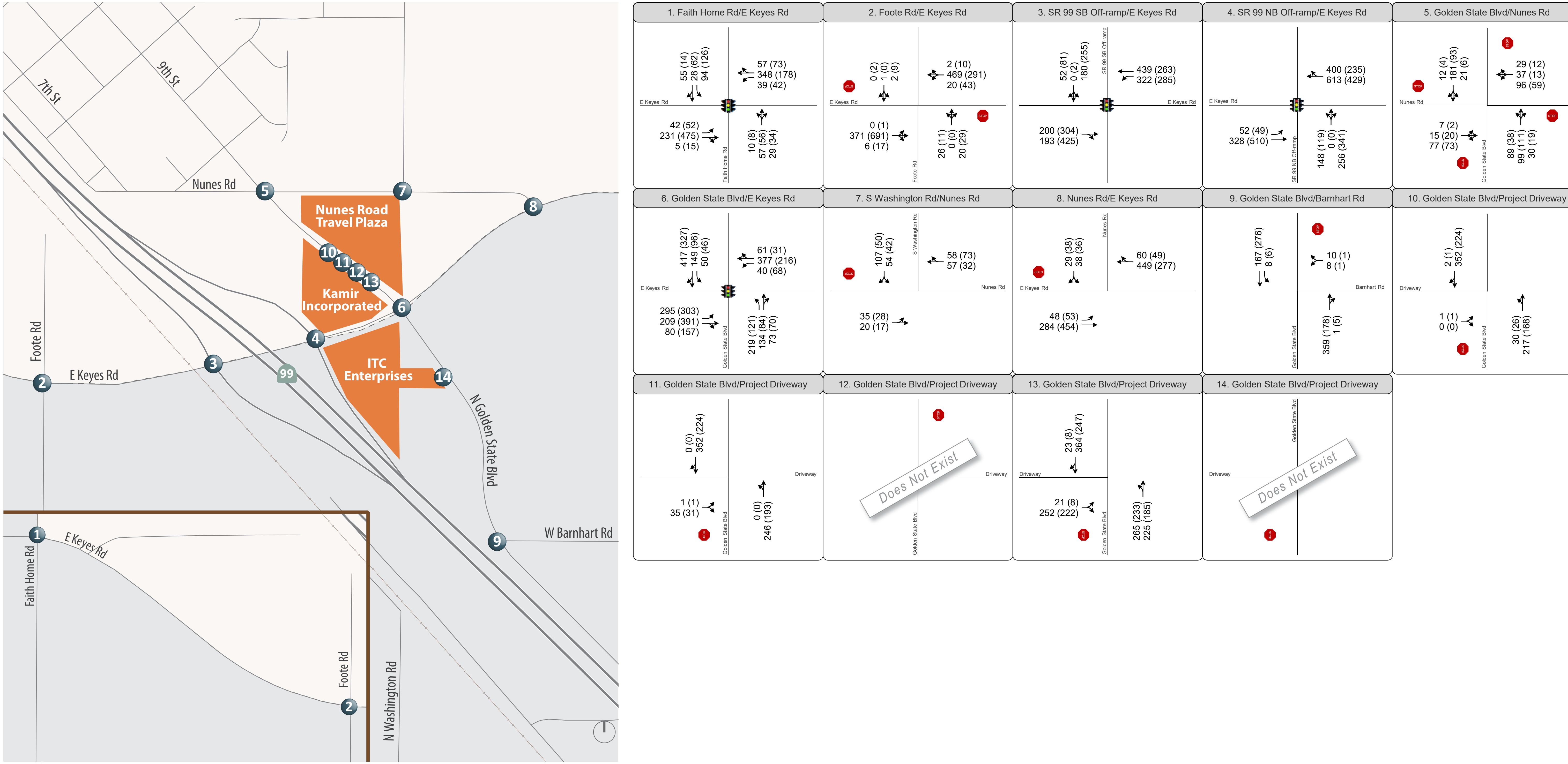


Figure 9B

Existing with Nunes Road Travel Plaza Peak Hour Traffic Volumes

WC19-3625_X_Volumes



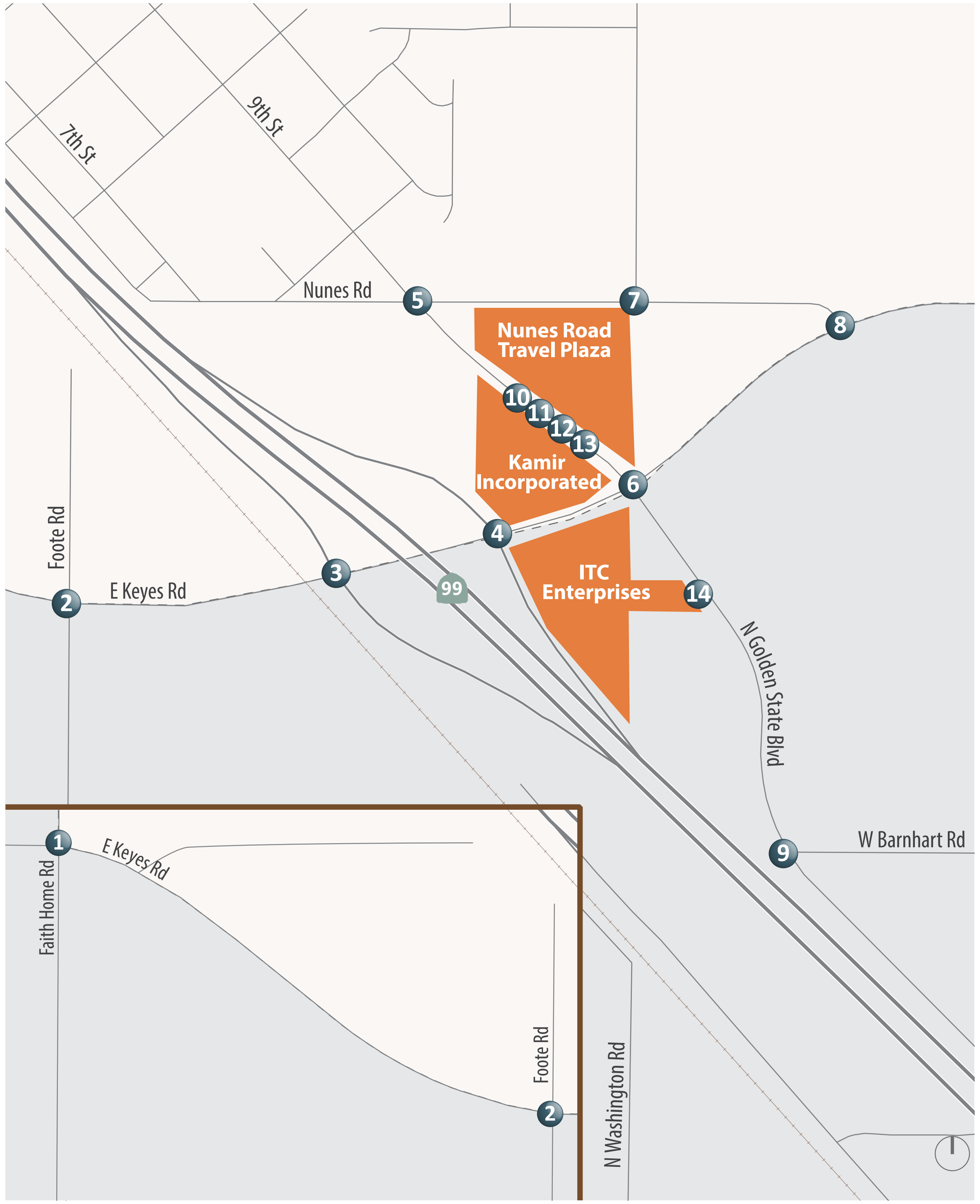
XX (YY) AM (PM) Peak Hour Traffic Volumes — Signalized Intersection — Stop Sign

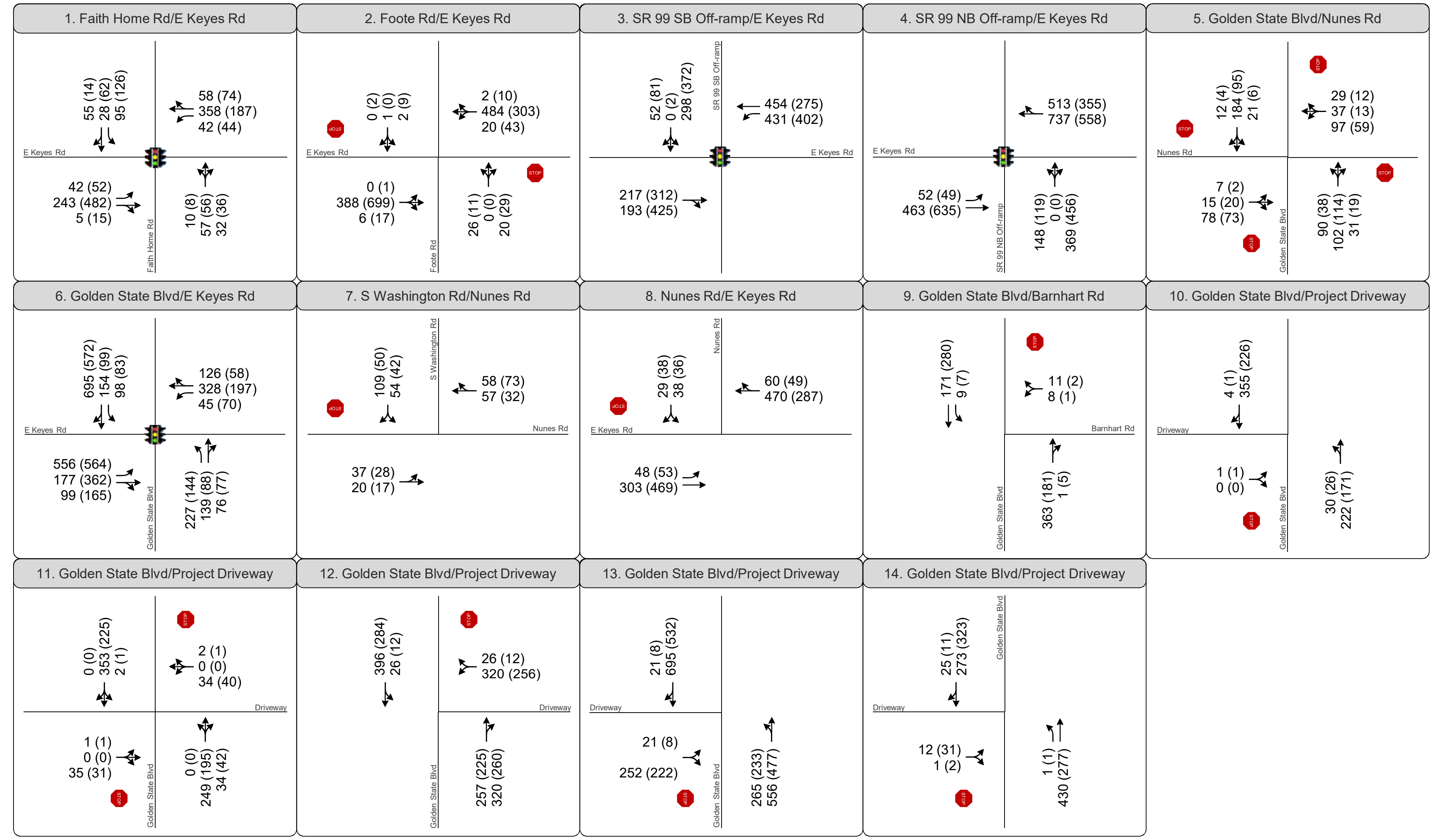
Project Sites — # Study Intersection

Figure 9C

Existing with Kamir Incorporated Peak Hour Traffic Volumes

WC19-3625_X_Volumes





XX (YY) AM (PM) Peak Hour Traffic Volumes
Signalized Intersection
Stop Sign
Project Sites
Study Intersection

Figure 9D

WC19-3625_X_Volumes

Existing with Project Trips Combined Peak Hour Traffic Volumes

Table 6: Existing with Project Conditions - Intersection Levels of Service													
	Intersection	Control[1]	Peak Hour	Existing Conditions		Existing with ITC Enterprises		Existing with Nunes Road Travel Plaza		Existing with Kamir Incorporated		Existing with Project Trips Combined	
				Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS
1	Faith Home Road at Keyes Road	Signalized	AM PM	12 13	B B	12 13	B B	12 13	B B	12 13	B B	13 13	B B
2	Foote Road at Keyes Road	SSSC	AM PM	1 **(27)** 1 **(26)**	A **(D)** A **(D)**	1 **(27)** 1 **(27)**	A **(D)** A **(D)**	1 **(28)** 1 **(27)**	A **(D)** A **(D)**	1 **(28)** 1 **(27)**	A **(D)** A **(D)**	1 **(29)** 1 **(28)**	A **(D)** A **(D)**
3	State Route 99 Southbound Ramps at Keyes Road	Signalized[3]	AM PM	20 30	C C	21 31	C C	27 **62**	C **E**	25 **62**	C **E**	46 **104**	D **E**
4	State Route 99 Northbound Ramps at Keyes Road	Signalized[3]	AM PM	31 15	C B	34 15	C B	**72** **36**	**E** **D**	**58** 26	**E** C	**138** **62**	**F** **E**
5	9th Street/Golden State Boulevard at Nunes Road	AWSC	AM PM	11 8	B A	11 8	B A	11 8	B A	11 8	B A	11 9	B A
6	Golden State Boulevard at Keyes Road	Signalized	AM PM	25 20	C C	24 21	C C	**107** 32	**F** C	**88** 29	**F** C	**232** **88**	**F** **F**
7	South Washington at Nunes Road	SSSC	AM PM	6 (11) 5 (10)	A (B) A (A)	6 (11) 5 (10)	A (B) A (A)	6 (11) 5 (10)	A (B) A (A)	6 (11) 5 (10)	A (B) A (A)	6 (11) 5 (10)	A (B) A (A)
8	Nunes Road at Keyes Road	SSSC	AM PM	2 (12) 2 (12)	A (B) A (B)	2 (12) 2 (12)	A (B) A (B)	2 (13) 2 (12)	A (B) A (B)	2 (13) 2 (12)	A (B) A (B)	2 (13) 2 (12)	A (B) A (B)
9	Golden State Boulevard at Barnhart Road	SSSC	AM PM	1 (12) 1 (11)	A (B) A (B)	1 (12) 1 (11)	A (B) A (B)	1 (13) 1 (10)	A (B) A (B)	1 (12) 1 (10)	A (B) A (B)	1 (13) 1 (10)	A (B) A (B)
10	KI (North) Driveway at Golden State Boulevard	SSSC	AM PM	-- --	-- --	-- --	-- --	-- --	-- --	1 (14) 1 (12)	A (B) A (B)	1 (14) 1 (12)	A (B) A (B)
11	KI (Middle)/NRTP (North) Driveways at Golden State Boulevard	SSSC	AM PM	-- --	-- --	-- --	-- --	1 (14) 1 (12)	A (B) A (B)	1 (11) 1 (10)	A (B) A (A)	1 (17) 2 (14)	A (C) A (B)
12	NRTP (South) Driveway at Golden State Boulevard	SSSC	AM PM	-- --	-- --	-- --	-- --	**37 (>99)** 8 **(29)**	**E (F)** A **(D)**	-- --	-- --	**48 (>99)** 9 **(36)**	**E (F)** A **(E)**

	Intersection	Control[1]	Peak Hour	Existing Conditions		Existing with ITC Enterprises		Existing with Nunes Road Travel Plaza		Existing with Kamir Incorporated		Existing with Project Trips Combined	
				Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS
13	KI (South) Driveway at Golden State Boulevard	SSSC	AM PM	-- --	-- --	-- --	-- --	-- --	-- --	7 (22) 6 (13)	A (C) A (B)	**36 (>99)** 5 (25)	**E (F)** A (C)
14	ITE Driveway at Golden State Boulevard	SSSC	AM PM	-- --	-- --	1 (15) 1 (14)	A (B) A (B)	-- --	-- --	-- --	-- --	1 (15) 1 (14)	A (B) A (B)

Notes:
1. AWSC = All-way Stop Control; SSSC = Side-street Stop Control
2. Average control delay expressed in seconds per vehicle. For side-street stop-controlled intersections, delay for the worst movement is expressed in parenthesis, with average intersection delay and LOS presented outside the parenthesis.
3. Intersection 3, State Route 99 Southbound Ramps at Keyes Road would operate at LOS D (37 seconds of delay per vehicle on average) under Existing Conditions even if signalized during the PM peak hour.

Bold indicates unacceptable intersection operations. **Bold and highlighted** indicates significant impacts.
Source: Fehr & Peers, 2019.

Existing with Project Freeway Operations

Freeway operations were evaluated using the HCM 6th Edition methodology with Existing with Project results summarized in Error! Reference source not found.. Projects that increase the traffic volume on the mainline segments that already exceed the acceptable threshold by 5 percent or more will cause a significant impact. Detailed calculation sheets are presented in **Appendix D.**

Table 7: Existing with Project Conditions – Freeway Segment Levels of Service

	Segment	Type	Peak Hour	Existing Conditions		Existing with Project Trips Combined		
				Density[1] (pc/mi/ln)	LOS	Density[1] (pc/mi/ln)	LOS	Percentage of Mainline Traffic from Project
Northbound SR 99								
1	Keyes Rd Off-ramp	Diverge	AM PM	**35.3** 31.7	**E** D	**35.8** 32.1	**E** D	0.9% -
2	Between Keyes Rd Off-ramp and On-ramp[2]	Basic	AM PM	30.5 24.5	D C	29.1 23.3	D C	- -
3	Keyes Rd On-ramp	Merge	AM PM	31.5 25.6	D C	32.6 26.6	D C	- -
Southbound SR 99								
1	Keyes Rd Off-ramp	Diverge	AM PM	30.6 **38.9**	D **E**	31.3 **39.3**	D **E**	- 0.6%
2	Between Keyes Rd Off-ramp and On-ramp[2]	Basic	AM PM	25.3 **38.8**	C **E**	24.0 **36.1**	C **E**	- -3.8%
3	Keyes Rd On-ramp	Merge	AM PM	28.4 **37.2**	D **F**	29.2 **37.7**	D **F**	- 0.5%

Notes:
1. Density is presented in passenger cars per mile per lane (pc/mi/ln).
2. Nunes Road Travel Plaza and Kamir Incorporated would divert trips from this freeway segment; density improves with the addition of project traffic.

Bold indicates unacceptable freeway segment operations. **Bold and highlighted** indicates significant impacts.
Source: Fehr & Peers, 2019.

Northbound SR 99 at Keyes Road Off-ramp during the AM peak hour and Southbound SR 99 segments during the PM peak hour will remain at LOS at LOS E or F with the addition of project traffic. All other segments will continue to operate at acceptable service levels.

Existing with Project Transportation Impacts

The following transportation impacts would occur with the project(s) under Existing Conditions based on significance criteria from the Stanislaus County General Plan. Recommendations to improve site access are discussed in the Site Plan and Circulation section.

ITC Enterprises

The addition of ITC Enterprises project traffic under Existing with Project Conditions would not cause any impacts based on the significance criteria.

Nunes Road Travel Plaza

Impact TRANS-B1: SR 99 Southbound Ramps at Keyes Road (Intersection 3)

The addition of Nunes Road Travel Plaza project traffic under Existing with Project Conditions would add traffic to existing roadways that already exceeds the acceptable threshold (LOS C or better). SR 99 Southbound Ramps at Keyes Road would operate at LOS D during the PM peak hour under Existing without Project conditions even if signalized. This is considered a *significant impact*.

Mitigation Measure TRANS-1: Modifications to the SR 99/Keyes Road Interchange to include an eastbound right-turn pocket and a southbound right-turn pocket at the intersection of SR 99 Southbound Ramps at Keyes Road, and to include a westbound right-turn lane and a northbound right-turn pocket at the intersection of SR 99 Northbound Ramps at Keyes Road would mitigate the impact.

Constructing the improvement would result in a delay value of 32 seconds (LOS C) at the intersection of SR 99 Southbound Ramps at Keyes Road (under Existing with Project Trips Combined), reducing the impact to a ***less-than significant*** level. The Project Applicant shall contribute a fair share towards the mitigation.

Impact TRANS-B2: SR 99 Northbound Ramps at Keyes Road (Intersection 4)

The addition of Nunes Road Travel Plaza project traffic under Existing with Project Conditions would cause the LOS to degrade to LOS E during the AM peak hour. This is considered a *significant impact*.

Mitigation Measure TRANS-2: Implement Mitigation Measure TRANS-1.

Constructing the improvement would result in a delay value of 12 seconds (LOS B) at the intersection of SR 99 Northbound Ramps at Keyes Road (under Existing with Project Trips Combined), reducing the impact to a ***less-than significant*** level. The Project Applicant shall contribute a fair share towards the mitigation.

Impact TRANS-B3: Golden State Boulevard at Keyes Road (Intersection 6)

The addition of Nunes Road Travel Plaza project traffic under Existing with Project Conditions would cause the LOS to degrade to LOS F during the AM peak hour. This is considered a *significant impact*.

Mitigation Measure TRANS-3: Modifications to the intersection of Golden State Boulevard at Keyes Road to include a second eastbound left-turn pocket and receiving lane, and a channelized free southbound right-turn pocket and receiving lane. Keyes Road between SR 99 Northbound Ramps and Golden State Boulevard must be widened to two lanes in the westbound direction. Construction of these modifications would mitigate the impact.

Constructing the improvement would result in a delay value of 32 seconds (LOS C) at the intersection of Golden State Boulevard at Keyes Road (under Existing with Project Trips Combined), reducing the impact to a ***less-than significant*** level. The Project Applicant shall contribute a fair share towards the mitigation.

Kamir Incorporated

Impact TRANS-C1: SR 99 Southbound Ramps at Keyes Road (Intersection 3)

The addition of Kamir Incorporated project traffic under Existing with Project Conditions would add traffic to existing roadways that already exceeds the acceptable threshold (LOS C or better). SR 99 Southbound Ramps at Keyes Road would operate at LOS D during the PM peak hour under Existing without Project conditions even if signalized. This is considered a *significant impact*.

Mitigation Measure TRANS-4: Implement Mitigation Measure TRANS-1.

Constructing the improvement would result in a delay value of 32 seconds (LOS C) at the intersection of SR 99 Southbound Ramps at Keyes Road (under Existing with

Project Trips Combined), reducing the impact to a ***less-than significant*** level. The Project Applicant shall contribute a fair share towards the mitigation.

Impact TRANS-C2: SR 99 Northbound Ramps at Keyes Road (Intersection 4)

The addition of Kamir Incorporated project traffic under Existing with Project Conditions would cause the LOS to degrade to LOS E during the AM peak hour. This is considered a *significant impact*.

Mitigation Measure TRANS-5: Implement Mitigation Measure TRANS-1.

Constructing the improvement would result in a delay value of 12 seconds (LOS B) at the intersection of SR 99 Northbound Ramps at Keyes Road (under Existing with Project Trips Combined), reducing the impact to a ***less-than significant*** level. The Project Applicant shall contribute a fair share towards the mitigation.

Impact TRANS-C3: Golden State Boulevard at Keyes Road (Intersection 6)

The addition of Kamir Incorporated project traffic under Existing with Project Conditions would cause the LOS to degrade to LOS F during the AM peak hour. This is considered a *significant impact*.

Mitigation Measure TRANS-6: Implement Mitigation Measure TRANS-4.

Constructing the improvement would result in a delay value of 32 seconds (LOS C) at the intersection of Golden State Boulevard at Keyes Road (under Existing with Project Trips Combined), reducing the impact to a ***less-than significant*** level. The Project Applicant shall contribute a fair share towards the mitigation.

CUMULATIVE CONDITIONS

This chapter evaluates potential off-site traffic impacts under Cumulative without Project(s) and Cumulative with Project(s) Conditions. Cumulative without Project(s) Conditions are defined as existing volumes plus traffic generated by planned regional growth to occur by 2040 that would affect the transportation system in the study area.

No local roadway improvements are assumed under Cumulative Conditions. Mitigations that address impacts in the Cumulative scenarios will be used to develop a list of transportation projects for the Keyes Community Area Transportation Impact Fee Program. There are no freeway improvements listed in the *Regional Transportation Plan* (StanCOG, 2018) within the study area.

Cumulative Forecasts

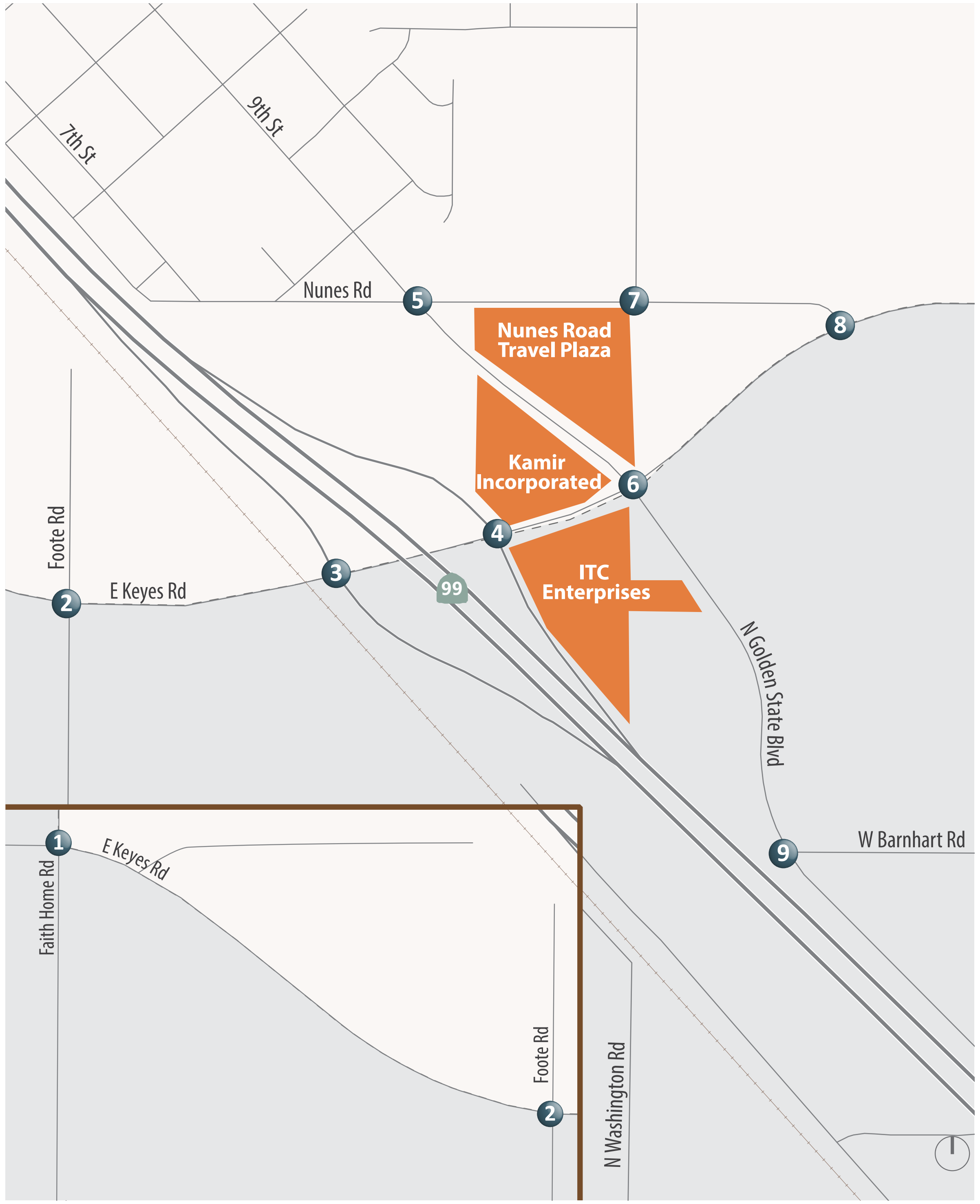
Cumulative forecasts are derived from year 2040 employment and housing projections from the Three-County (San Joaquin, Stanislaus, and Merced) regional travel demand model and the *Regional Transportation Plan*.

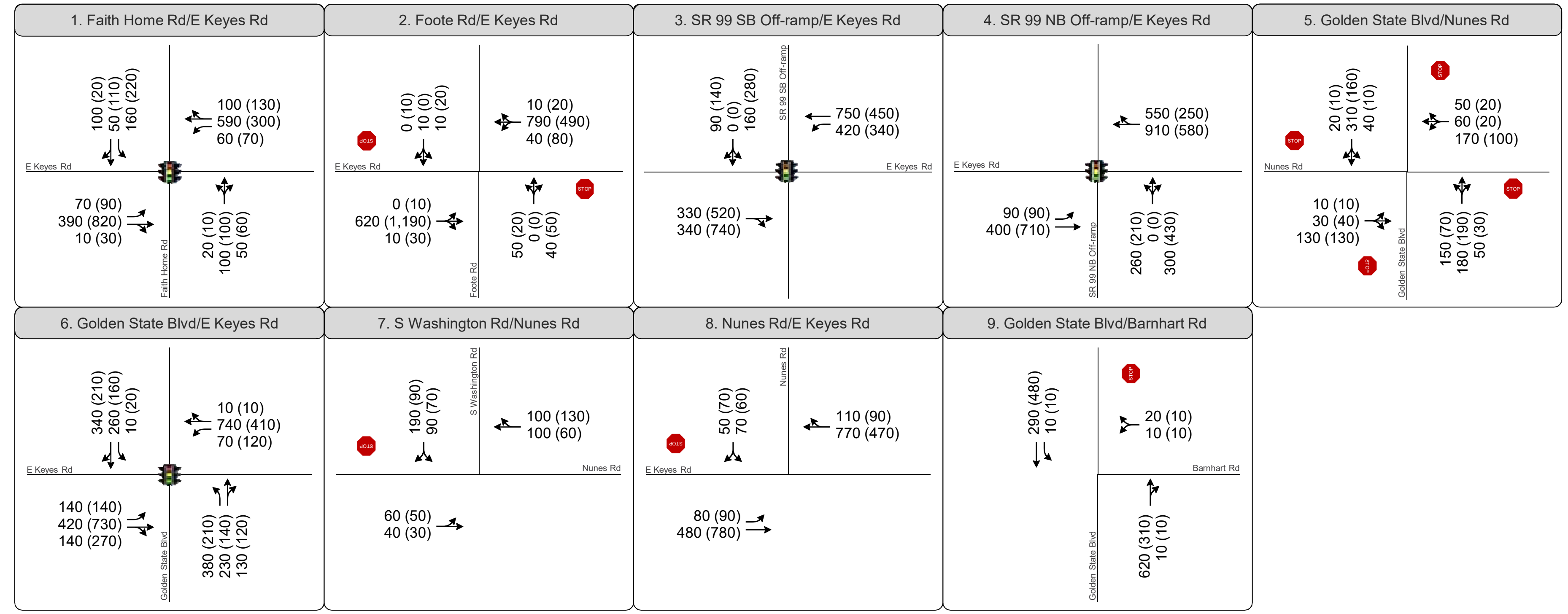
Household and employment projections within the census-designated place of Keyes were used to calculate an annual linear growth rate for intersection turning movement forecasts. The base year (2014) Three-County model assumes 1,536 households, 4,651 people, and 425 jobs within Keyes. The cumulative year (2040) model assumes 2,710 households, 8,144 people, and 754 jobs within Keyes. A technical memorandum detailing the study assumptions can be found in **Appendix E**.

An annual linear growth rate was calculated based on the net growth within Keyes - 1,174 households, 3,494 people, and 329 jobs; or approximately 3% growth per year locally. Cumulative without Project Conditions peak hour intersection turning movement volumes are shown on **Figure 10**. Cumulative with Project Conditions peak hour intersection turning movement volumes are shown on **Figure 11**.

Regional growth projections from the *Regional Transportation Plan* were used to calculate an annual linear growth rate for freeway forecasts. Appendix O from the Congestion Management Plan reflect a 2% growth per year locally.

The forecasting described above does not take into consideration some foreseeable travel changes, including increased use of transportation network companies, such as Uber and Lyft, nor the potential for autonomous vehicles. Although the technology for autonomous vehicles is expected to be available over the planning horizon, the Federal and State legal and policy frameworks are uncertain. Initial modeling of an autonomous future indicates that with automated and connected vehicles, the capacity of the existing transportation system would increase as vehicles can travel closer together; however, these efficiencies are only realized when a high percentage of vehicles on the roadway are automated and connected. There is also the potential for vehicle travel to increase with zero-occupant vehicles on the roadway, off-setting any potential capacity benefits. Although the future baseline is uncertain, the projects incremental effect on that future baseline is expected to be similar to the analysis results presented below.





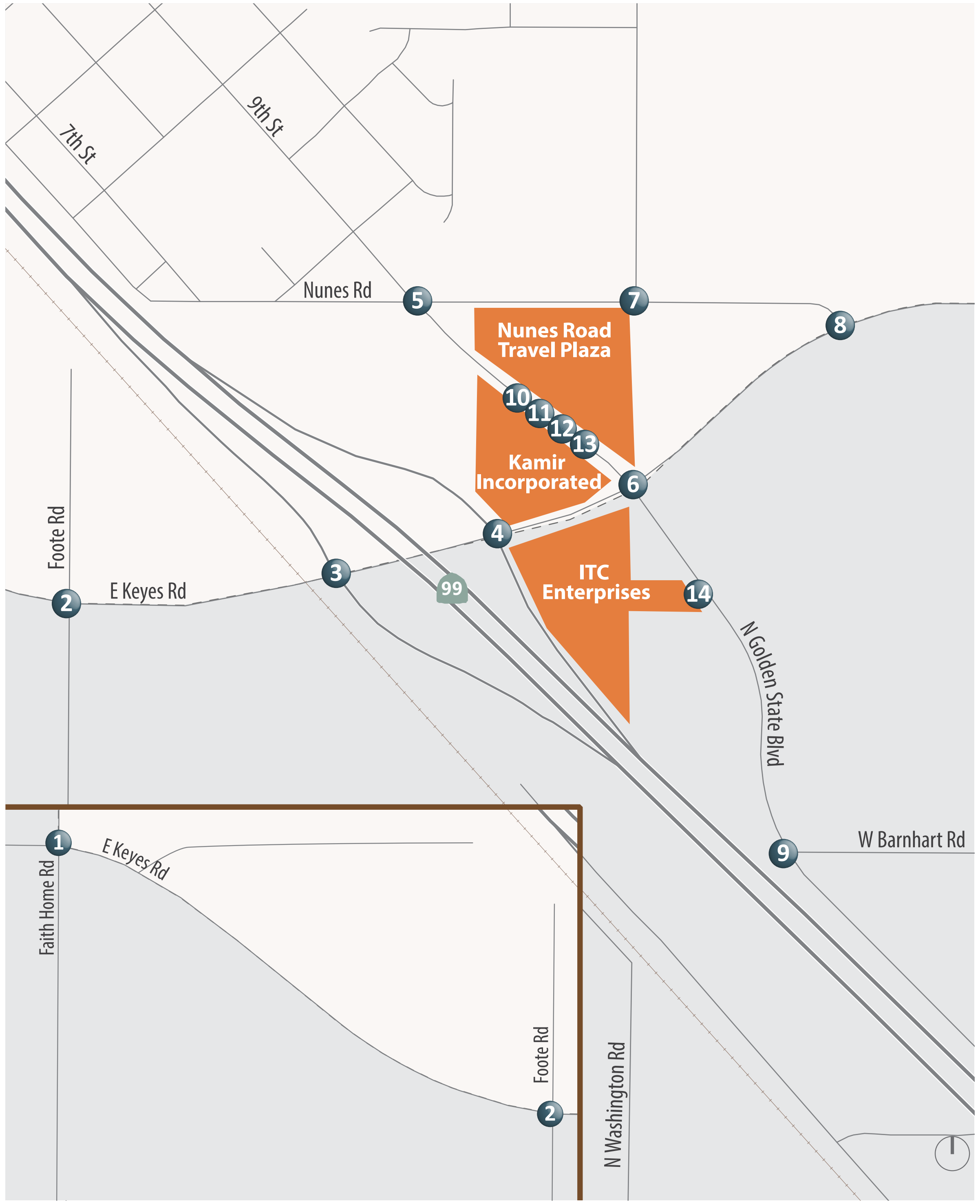
XX (YY) AM (PM) Peak Hour Traffic Volumes | Signalized Intersection | Stop Sign

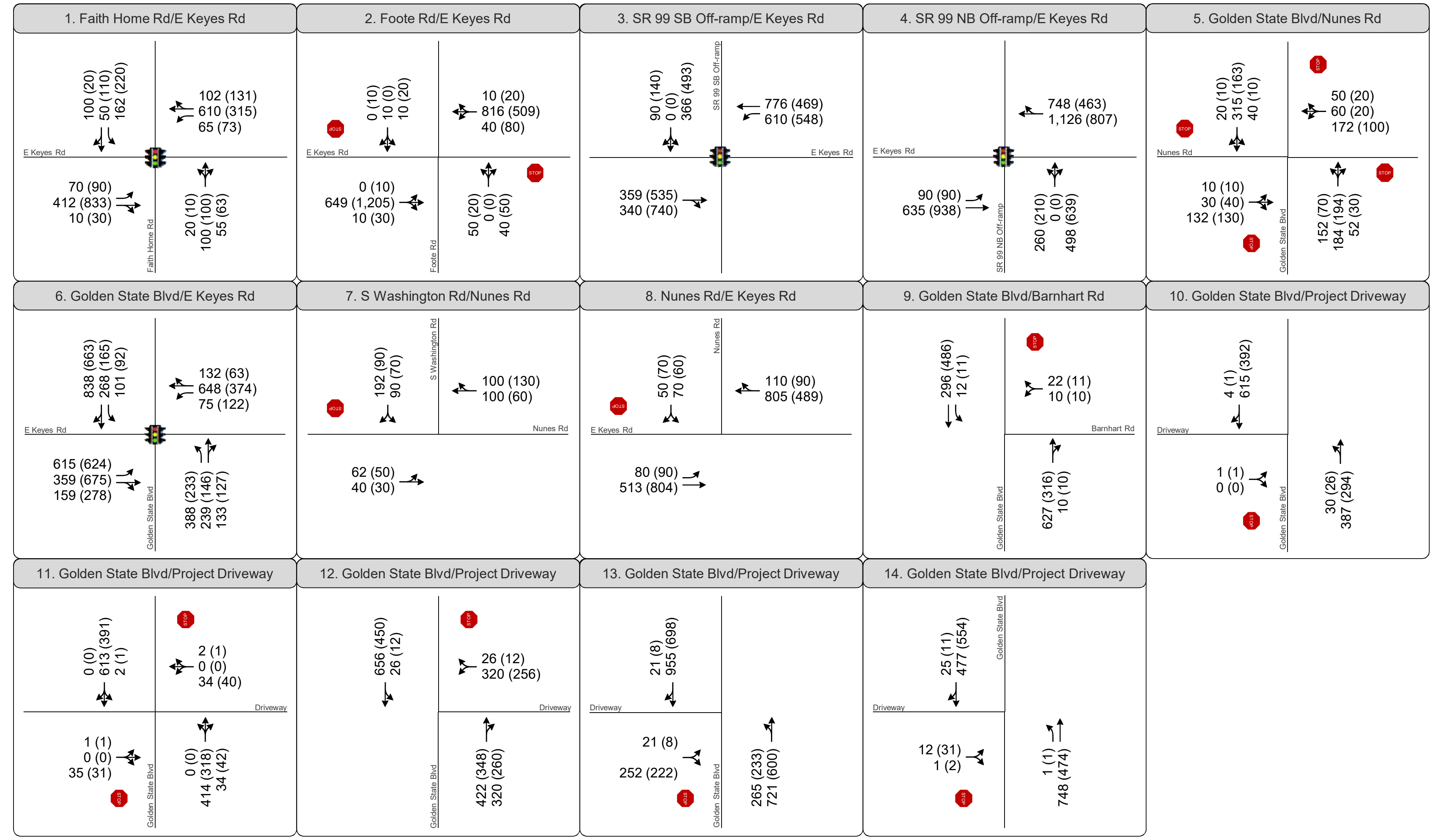
Project Sites | # Study Intersection

Figure 10

Cumulative without Project Peak Hour Traffic Volumes

WC19-3625_X_Volumes





XX (YY) AM (PM) Peak Hour Traffic Volumes — Signalized Intersection — Stop Sign

Project Sites — # Study Intersection

Figure 11

Cumulative with Project Trips Combined Peak Hour Traffic Volumes

WC19-3625_X_Volumes

Cumulative Intersection Operations

Intersection operations were evaluated using the HCM 6th Edition methodology with Cumulative with Project results summarized in **Table 8**. Intersection LOS worksheets from Synchro 10 are provided in **Appendix B**. Peak hour signal warrants are provided in **Appendix C**.

Cumulative without Project(s)

Under Cumulative without Project(s) condition the following intersections are projected to operate below acceptable service levels in accordance with benchmarks set by Stanislaus County:

- Intersection 1: Faith Home Road at Keyes Road (LOS D and D, AM and PM peak hours);
- Intersection 2: Foote Road at Keyes Road (LOS F and F, AM and PM peak hours);
- Intersection 3: SR 99 Southbound Ramps at Keyes Road (LOS D and F, AM and PM peak hours);
- Intersection 4: SR 99 Northbound Ramps at Keyes Road (LOS F and E, AM and PM peak hours);
- Intersection 5: 9th St/Golden State Blvd at Nunes Road (LOS E, AM peak hour);
- Intersection 6: Golden State Boulevard at Keyes Road (LOS F and F, AM and PM peak hour); and
- Intersection 8: Nunes Road at Keyes Road (LOS E and D, AM and PM peak hours).

Cumulative with Project(s)

The addition of project traffic from ITC Enterprises, Nunes Road Travel Plaza, and Kamir Incorporated (Project Trips Combined) to existing roadway volumes would degrade the following intersection(s) to LOS D or worse or add traffic to existing intersections that already exceed the acceptable threshold:

- Intersection 1: Faith Home Road at Keyes Road (LOS D and D, AM and PM peak hours);
- Intersection 2: Foote Road at Keyes Road (LOS F and F with peak hour signal warrants not met, AM and PM peak hours);

- Intersection 3: SR 99 Southbound Ramps at Keyes Road (LOS F and F, AM and PM peak hours);
- Intersection 4: SR 99 Northbound Ramps at Keyes Road (LOS F and F, AM and PM peak hours);
- Intersection 5: 9th St/Golden State Blvd at Nunes Road (LOS E with peak hour signal warrant met, AM peak hour);
- Intersection 6: Golden State Boulevard at Keyes Road (LOS F and F, AM and PM peak hour);
- Intersection 8: Nunes Road at Keyes Road (LOS F and E with peak hour signal warrants met, AM and PM peak hours);
- Intersection 11: KI (Middle)/NRTP (North) Project Driveway at Golden State Boulevard (LOS D with peak hour signal warrant not met, AM peak hour);
- Intersection 12: NRTP (South) Project Driveway at Golden State Boulevard (LOS F and F with peak hour signal warrants met, AM and PM peak hours); and
- Intersection 13: KI (South) Project Driveway at Golden State Boulevard (LOS F and F with peak hour signal warrants met, AM and PM peak hours).

All other study intersections would continue to operate at LOS C or better with the addition of project traffic in all Cumulative with Project scenarios.

Table 8: Cumulative with Project Conditions - Intersection Levels of Service

	Intersection	Control[1]	Peak Hour	Cumulative without Project Conditions		Cumulative with Project Trips Combined	
				Delay[2]	LOS	Delay[2]	LOS
1	Faith Home Road at Keyes Road	Signalized	AM PM	**39** **37**	**D** **D**	**43** **46**	**D** **D**
2	Foote Road at Keyes Road	SSSC	AM PM	14 **(>99)** 9 **(>99)**	A **(F)** A **(F)**	18 **(>99)** 10 **(>99)**	C **(F)** B **(F)**
3	State Route 99 Southbound Ramps at Keyes Road	Signalized	AM PM	**53** **193**	**D** **F**	**150** **316**	**F** **F**
4	State Route 99 Northbound Ramps at Keyes Road	Signalized	AM PM	**217** **69**	**F** **E**	**384** **198**	**F** **F**
5	9th Street/Golden State Boulevard at Nunes Road	AWSC	AM PM	**37** 11	**E** B	**40** 11	**E** B
6	Golden State Boulevard at Keyes Road	Signalized	AM PM	**170** **118**	**F** **F**	**478** **299**	**F** **F**
7	South Washington at Nunes Road	SSSC	AM PM	7 (14) 5 (11)	A (B) A (B)	8 (14) 5 (11)	A (B) A (B)
8	Nunes Road at Keyes Road	SSSC	AM PM	4 **(42)** 4 **(34)**	A **(E)** A **(D)**	5 **(52)** 4 **(38)**	A **(F)** A **(E)**
9	Golden State Boulevard at Barnhart Road	SSSC	AM PM	1 (18) 1 (15)	A (C) A (B)	1 (18) 1 (15)	A (C) A (B)
10	KI (North) Driveway at Golden State Boulevard	SSSC	AM PM	-- --	-- --	1 (23) 1 (16)	A (C) A (C)
11	KI (Middle)/NRTP (North) Driveways at Golden State Boulevard	SSSC	AM PM	-- --	-- --	2 **(34)** 1 (20)	A **(D)** A (C)
12	NRTP (South) Driveway at Golden State Boulevard	SSSC	AM PM	-- --	-- --	**>99 (>99)** **28 (>99)**	**B (F)** **E (F)**
13	KI (South) Driveway at Golden State Boulevard	SSSC	AM PM	-- --	-- --	**>99 (>99)** 8 **(54)**	**F (F)** A **(F)**
14	ITE Driveway at Golden State Boulevard	SSSC	AM PM	-- --	-- --	1 (17) 1 (16)	A (C) A (C)

Notes:

1. AWSC = All-way Stop Control; SSSC = Side-street Stop Control
2. Average control delay expressed in seconds per vehicle. For side-street stop-controlled intersections, delay for the worst movement is expressed in parenthesis, with average intersection delay and LOS presented outside the parenthesis.

Bold indicates unacceptable intersection operations. **Bold and highlighted** indicates significant impacts.
Source: Fehr & Peers, 2019.

Cumulative Freeway Operations

Freeway operations were evaluated using the HCM 6th Edition methodology with Cumulative without Project(s) and Cumulative with Project Trips Combined results summarized in **Table 9**. Projects that increase the traffic volume on the mainline segments that already exceed the acceptable threshold by 5 percent or more will cause a significant impact. Detailed calculation sheets are presented in **Appendix D.**

Cumulative without Project(s)

Under Cumulative without Project(s) conditions all freeway segments operate below acceptable service levels in accordance with benchmarks set by Caltrans.

Cumulative with Project(s)

The addition of project traffic from ITC Enterprises, Nunes Road Travel Plaza, and Kamir Incorporated (Project Trips Combined) would add traffic to the following freeway segments that already exceed the acceptable threshold:

- Northbound SR 99 at Keyes Rd Off-Ramp;
- Northbound SR 99 at Keyes Rd On-Ramp;
- Southbound SR 99 at Keyes Rd Off-Ramp; and
- Southbound SR 99 at Keyes Rd On-Ramp.

The combined project traffic does not exceed 5 percent of the Cumulative mainline traffic on any of the study segments.

Table 9: Cumulative with Project Conditions – Freeway Segment Levels of Service

	Segment	Type	Peak Hour	Cumulative without Project		Cumulative with Project Trips Combined		
				Density[1] (pc/mi/ln)	LOS	Density[1] (pc/mi/ln)	LOS	Percentage of Mainline Traffic from Project
Northbound SR 99								
1	Keyes Rd Off-ramp	Diverge	AM PM	**54.4** **44.2**	**F** **F**	**54.9** **44.5**	**F** **F**	0.6% 0.5%
2	Between Keyes Rd Off-ramp and On-ramp[2]	Basic	AM PM	**DEC[3]** **41.1**	**F** **E**	**DEC[3]** **38.8**	**F** **E**	-2.4% -2.9%
3	Keyes Rd On-ramp	Merge	AM PM	**48.9** **36.5**	**F** **F**	**49.3** **36.9**	**F** **F**	0.6% 0.4%
Southbound SR 99								
1	Keyes Rd Off-ramp	Diverge	AM PM	**43.0** **63.5**	**F** **F**	**43.6** **63.9**	**F** **F**	1.0% 0.4%
2	Between Keyes Rd Off-ramp and On-ramp[2]	Basic	AM PM	**44.7** **DEC[3]**	**F** **F**	**41.9** **DEC[3]**	**F** **F**	-2.9% -2.7%
3	Keyes Rd On-ramp	Merge	AM PM	**42.5** **61.2**	**F** **F**	**42.6** **60.9**	**F** **F**	0.6% 0.3%

Notes:
1. Density is presented in passenger cars per mile per lane (pc/mi/ln).
2. Nunes Road Travel Plaza and Kamir Incorporated would divert trips from this freeway segment; density improves with the addition of project traffic.
3. DEC = Demand exceeds capacity.

Bold indicates unacceptable freeway segment operations. **Bold and highlighted** indicates significant impacts.
Source: Fehr & Peers, 2019.

Cumulative Transportation Impacts

The following transportation impacts are projected to occur with the project(s) under Cumulative Conditions based on significance criteria from the Stanislaus County General Plan. Cumulative intersection operations with mitigations are summarized in **Table 10**. Intersection Recommendations to improve site access are discussed in the Site Plan and Circulation section.

Impact TRANS-A1/B4/C4: Faith Home Road at Keyes Road (Intersection 1)

The addition of ITC Enterprises, Nunes Road Travel Plaza, and Kamir Incorporated project traffic under Cumulative with Project Conditions would add traffic to roadways that already exceed the acceptable threshold (LOS C or better). Faith Home Road at Keyes Road operates at LOS D and D during the AM and PM peak hours under Cumulative without Project conditions. This is considered a *significant impact*.

Mitigation Measure TRANS-7: Widen Keyes Road from two to four lanes between Faith Home Road and Golden State Boulevard.

Mitigation Measure TRANS-8: Modify the intersection of Faith Home Road at Keyes Road to include a northbound right-turn pocket.

Constructing the improvements would result in a delay value of 34 and 31 seconds (LOS C and C during the AM and PM peak hours) at the intersection of Faith Home Road at Keyes Road, reducing the impact to a ***less-than significant*** level. The Project Applicants shall contribute a fair share towards the mitigation by paying into the Keyes Community Plan Area Transportation Impact Fee Program.

Impact TRANS-A2/B5/C5: SR 99 Southbound Ramps at Keyes Road (Intersection 3)

The addition of ITC Enterprises, Nunes Road Travel Plaza, and Kamir Incorporated project traffic under Cumulative with Project Conditions would add traffic to roadways that already exceed the acceptable threshold (LOS C or better). SR 99 Southbound Ramps at Keyes Road operates at LOS D and F during the AM and PM peak hours under Cumulative without Project conditions. This is considered a *significant impact*.

Mitigation Measure TRANS-9: Implement Mitigation Measure TRANS-7. Modifications to the SR 99/Keyes Road Interchange to include a second westbound left-turn pocket and the southbound approach to include one right-turn pocket, one left-turn pocket, and one shared left/through lane at the intersection of SR 99 Southbound Ramps at Keyes Road, and to include a westbound right-turn lane and the northbound approach to include one right-turn pocket and one shared left/through lane at the intersection of SR 99 Northbound Ramps at Keyes Road would mitigate the impact.

Constructing the improvement would result in a delay value of 27 and 34 seconds (LOS C and C during the AM and PM peak hours) at the intersection of SR 99 Southbound Ramps at Keyes Road), reducing the impact to a ***less-than significant*** level. The Project Applicants shall contribute fair share towards the mitigation by paying into the Keyes Community Plan Area Transportation Impact Fee Program.

Impact TRANS-A3/B6/C6: SR 99 Northbound Ramps at Keyes Road (Intersection 4)

The addition of ITC Enterprises, Nunes Road Travel Plaza, and Kamir Incorporated project traffic under Cumulative with Project Conditions would add traffic to roadways that already exceed the acceptable threshold (LOS C or better). SR 99 Northbound Ramps at Keyes Road operates at LOS F and E during the AM and PM peak hours under Cumulative without Project conditions. This is considered a *significant impact*.

Mitigation Measure TRANS-10: Implement Mitigation Measure TRANS-9.

Constructing the improvement would result in a delay value of 31 and 27 seconds (LOS C and C during the AM and PM peak hours) at the intersection of SR 99 Northbound Ramps at Keyes Road), reducing the impact to a ***less-than significant*** level. The Project Applicants shall contribute fair share towards the mitigation by paying into the Keyes Community Plan Area Transportation Impact Fee Program.

Impact TRANS-A4/B7/C7: 9th St/Golden State Blvd at Nunes Road (Intersection 5)

The addition of ITC Enterprises, Nunes Road Travel Plaza, and Kamir Incorporated project traffic under Cumulative with Project Conditions would add traffic to roadways that already exceed the acceptable threshold (LOS C or better). 9th St/Golden State Blvd at Nunes Road operates at LOS E during the AM peak hour under Cumulative without Project conditions. This is considered a *significant impact*.

Mitigation Measure TRANS-11: Widen Golden State Boulevard from two to four lanes between Nunes Road and the ITC Enterprises Project Driveway and construct a one-lane roundabout at the intersection of 9th Street/Golden State Boulevard at Nunes Road. This improvement shall include Class II bicycle lanes along Golden State Boulevard south of Nunes Road and along Nunes Road west of Golden State Boulevard.

Constructing the improvement would result in a delay value of 18 seconds (LOS C) at the intersection of 9th Street at Golden State Boulevard at Nunes Road, reducing the impact to a ***less-than significant*** level. The Project Applicants shall contribute a fair share towards the mitigation by paying into the Keyes Community Plan Area Transportation Impact Fee Program.

Impact TRANS-A5/B8/C8: Golden State Boulevard at Keyes Road (Intersection 6)

The addition of ITC Enterprises, Nunes Road Travel Plaza, and Kamir Incorporated project traffic under Cumulative with Project Conditions would add traffic to roadways that already exceed the acceptable threshold (LOS C or better). Golden State Boulevard at Keyes Road operates at LOS F and F during the AM and PM peak hours under Cumulative without Project conditions. This is considered a *significant impact*.

Mitigation Measure TRANS-12: Implement Mitigation Measure TRANS-7 and Mitigation Measure TRANS-11. Modify the intersection of Golden State Boulevard at Keyes Road to have two left-turn pockets and one right-turn pocket on all approaches; the southbound approach should have a channelized free southbound right-turn pocket and receiving lane. Keyes Road between SR 99 Northbound Ramps and Golden State Boulevard should be widened to three lanes in the westbound direction to accommodate the free southbound right-turn. This improvement shall include Class II bicycle lanes along Golden State Boulevard.

Constructing the improvement would result in a delay value of 42 and 34 seconds (LOS D and C during the AM and PM peak hours) at the intersection of Golden State Blvd at Keyes Road excluding the unsignalized delay for the free southbound right-turn movement. If the unsignalized delay for the free southbound right-turn movement is included, constructing the improvements would result in a delay value of 33 and 27 seconds (LOS C and C during the AM and PM peak hours). Construction of the improvements reduces the impact to a ***less-than significant*** level. The Project Applicants shall contribute a fair share towards the mitigation by paying into the Keyes Community Plan Area Transportation Impact Fee Program.

Impact TRANS-A6/B9/C9: Nunes Road at Keyes Road (Intersection 8)

The addition of ITC Enterprises, Nunes Road Travel Plaza, and Kamir Incorporated project traffic under Cumulative with Project Conditions would add traffic to roadways that already exceed the acceptable threshold (LOS C or better). Nunes Road at Keyes Road operates at LOS E and D during the AM and PM peak hours under Cumulative without Project conditions. This is considered a *significant impact*.

Mitigation Measure TRANS-13: Construct a receiving lane/acceleration lane for the southbound left-turn movement at the intersection of Nunes Road at Keyes Road.

Constructing the improvement would result in a delay value of 17 and 15 seconds (LOS B and C during the AM and PM peak hours) at the intersection of Nunes Road at Keyes Road, reducing the impact to a ***less-than significant*** level. The Project Applicants shall contribute a fair share towards the mitigation by paying into the Keyes Community Plan Area Transportation Impact Fee Program

	Intersection	Control[1]	Peak Hour	Cumulative without Project Conditions		Cumulative with Project Trips Combined		Cumulative with Project Trips Combined with Mitigation	
				Delay[2]	LOS	Delay[2]	LOS	Delay[2]	LOS
1	Faith Home Road at Keyes Road	Signalized	AM PM	**39** **37**	**D** **D**	**43** **46**	**D** **D**	34 31	C C
3	State Route 99 Southbound Ramps at Keyes Road	Signalized	AM PM	**53** **193**	**D** **F**	**150** **316**	**F** **F**	27 34	C C
4	State Route 99 Northbound Ramps at Keyes Road	Signalized	AM PM	**217** **69**	**F** **E**	**384** **198**	**F** **F**	31 27	C C
5	9th Street/Golden State Boulevard at Nunes Road	AWSC/ Round-about[3]	AM PM	**37** 11	**E** B	**40** 11	**E** B	7 11	A B
6	Golden State Boulevard at Keyes Road	Signalized	AM PM	**170** **118**	**F** **F**	**478** **299**	**F** **F**	33 27	C C
8	Nunes Road at Keyes Road	SSSC	AM PM	4 **(42)** 4 **(34)**	A **(E)** A **(D)**	5 **(52)** 4 **(38)**	A **(F)** A **(E)**	2 (17) 2 (15)	A (C) A (B)

Table 10: Cumulative with Project Conditions - Intersection Levels of Service with Mitigations

Notes:
1. AWSC = All-way Stop Control; SSSC = Side-street Stop Control
2. Average control delay expressed in seconds per vehicle. For side-street stop-controlled intersections, delay for the worst movement is expressed in parenthesis, with average intersection delay and LOS presented outside the parenthesis.
3. Intersection 5 is currently all-way stop controlled. Construction of the mitigation would alter the intersection to become a roundabout.

Bold indicates unacceptable intersection operations. **Bold and highlighted** indicates significant impacts.
Source: Fehr & Peers, 2019.

VEHICLE MILES OF TRAVEL

In response to Senate Bill 743 (SB 743), the Office of Planning and Research (OPR) has updated California Environmental Quality Act (CEQA) guidelines to include new transportation-related evaluation metrics. The final proposed Guidelines include a new Section 15064.3 on Vehicle Miles of Travel (VMT) analysis and thresholds for land use developments. OPR also released a Technical Advisory on Evaluating Transportation Impacts in CEQA. New Guidelines section 15064.3 states that they do not take effect until July 1, 2020 unless the lead agency adopts them earlier.

Stanislaus County has not established any standards or thresholds related to VMT, therefore the new guidelines have not yet been adopted and are not in effect at this time. Since there are no standards in effect on VMT analysis, a preliminary assessment of the vehicle miles of travel (VMT) generated by the proposed projects was prepared for information and disclosure purposes only. No determination on the significance of VMT impacts is made in this document since none is legally required.

To assess the project's effect on VMT, the Three-County Regional Travel Demand Model was used to estimate Total VMT within the Keyes Community Plan Area, Stanislaus County, and surrounding Cities for the existing and cumulative scenarios. Total VMT and Total VMT per Service Population both without and with the proposed projects are summarized in **Table 11**. All the following metrics are measured for 'weekday' conditions and that label may be appended to any of the metrics.

The addition of project land uses is expected to increase Total VMT generated by the Keyes Community Plan Area by approximately 17,800 miles under existing conditions and 16,500 miles under cumulative conditions.

Additionally, Total VMT would increase overall in Stanislaus County, but decrease in the adjacent cities of Modesto and Ceres. Results of the VMT analysis indicate the project would contribute to an increase in vehicle miles of travel.

Table 11: VMT Summary						
Area	Total VMT		Service Population[1]		Total VMT per Service Population	
	No Project	With Project	No Project	With Project	No Project	With Project
Existing Year Conditions						
Keyes	153,700	171,500	5,290	5,440	29.05	31.53
Ceres	1,463,000	1,462,200	60,290	60,290	24.27	24.25
Modesto	8,011,900	8,009,300	337,610	337,610	23.73	23.72
Stanislaus County	20,070,200	20,080,300	718,790	718,940	27.92	27.93
Cumulative Year Conditions						
Keyes	226,700	243,200	9,150	9,300	24.78	26.15
Ceres	2,054,200	2,053,200	72,720	72,720	28.25	28.23
Modesto	12,299,000	12,297,700	475,160	475,160	25.88	25.88
Stanislaus County	35,151,600	35,162,800	1,216,090	1,216,240	28.91	28.91

Notes:
1. Service population is the population plus employment of the area of study.
Source: Fehr & Peers, 2019.

SITE ACCESS AND CIRCULATION

Site access and internal circulation for vehicles, pedestrians, bicycles, and emergency vehicles was analyzed based on the site plans presented on Figures 2A-C. A parking assessment was also conducted.

Vehicular Access and Circulation

Vehicular access and circulation were evaluated at each of the three project sites. Site plan revisions are required to accommodate the traffic projected at Nunes Road Travel Plaza and Kamir Incorporated.

ITC Enterprises

Vehicular access to the project site would be provided by an unsignalized driveway on Golden State Boulevard. The project would also construct an internal driveway connecting to the adjacent Peterbilt Development. The main driveway entry from Golden State Boulevard features roughly 350 feet or storage for vehicles exiting the site.

Circulation within the site is provided by drive aisles surrounding the office and warehouse/shop. The site plan does not show any detail of traffic control devices, such as stripping and signage, on site.

> ***Site Recommendation A1:*** As a part of the final site plan indicate locations where traffic control devices would be installed. Consider stripping stop bars on the northbound and southbound approach at the intersection west of the main driveway entry off Golden State Boulevard, and on the westbound approach at the intersection west of the internal driveway connecting to the adjacent Peterbilt Development.

As shown in the previous sections, the site access intersection would operate at overall acceptable service levels with minimal delay for vehicles entering or exiting the site under Existing with Projects and Cumulative with Projects conditions. Left-turns into the project site can made from the two-way-left-turn lane in the median. Left-turns out of the project site can be made into the two-way-left-turn lane; vehicles may subsequently merge onto Golden State Boulevard.

Nunes Road Travel Plaza

Vehicular access to the project would be provided by two unsignalized driveways on Golden State Boulevard – one for trucks (North Driveway) and one for passenger vehicles (South Driveway), and one unsignalized driveway on Nunes Road into the area for trucks. Conversations with County staff indicated that the driveway on Nunes Road would be closed or restricted to emergency vehicles only in order to restrict the amount of truck traffic on Nunes Road. The project would also construct three internal driveways that could connect to adjacent development in the future.

> ***Site Recommendation B1:*** Work with County staff to determine if the project driveway on Nunes Road will be closed or restricted to emergency vehicle traffic only. Install signage if necessary.

Circulation within the site is separated by modes. The north side of the property is reserved for trucks has an open layout with no drive aisles. The south side of the property is reserved for passenger vehicles and features two-way drive aisles around the entire site.

> ***Site Recommendation B2:*** As a part of the final site plan indicate locations where traffic control devices would be installed. Consider striping stop bars on the northbound approach at the intersection providing access to the drive-thru restaurant and other minor approaches at intersections throughout the site.

Site Access Improvements

Relative to the proposed Kamir Incorporated (KI) Development, the Nunes Road Travel Plaza (NRTP) North Driveway is located across from KI Middle Driveway. The NRTP South Driveway is located between the KI Middle Driveway and the KI South Driveway.

The NRTP North Driveway/KI Middle Driveway at Golden State Boulevard would operate acceptably in the Existing with Projects scenario during the AM and PM peak periods. However, in the Cumulative with Projects scenario, the intersection of NRTP North Driveway/KI Middle Driveway at Golden State Boulevard delay increases to LOS D during the AM peak hour; the intersection would not meet peak hour signal warrants.

The NRTP South Driveway at Golden State Boulevard would operate at LOS F and E under Existing with Projects scenario during the AM and PM peak hours and LOS F and F under the Cumulative with Projects scenario during the AM and PM Peak hours. The intersection of NRTP South Driveway at Golden State Boulevard would meet peak hours signal warrants due to the high volume of left-turning vehicles out of the project site. The traffic signal should be at a location that provides access to both NRTP and KI.

> ***Site Recommendation B3:*** Reconfigure the site plan to include an internal drive aisle between the north side of the property and the south side of the property. Given the close proximity of the project driveways on Golden State Boulevard to Keyes Road, the southern driveway should be restricted to right-in/right-out access, resulting in all vehicles using the NRTP North Driveway to make left turns into and out of the site. To restrict left-turn access into and out of the NRTP South Driveway, construct a raised median on Golden State Boulevard. Install wayfinding signage as necessary.
>
> Install a traffic signal at the intersection of NRTP North Driveway/KI Middle Driveway at Golden State Boulevard; align both driveways. The westbound approach should have one left-turn pocket and one shared left/through/right lane. The left-turn pocket should be at least 200 feet in length to accommodate typical vehicle queues.
>
> ***Site Recommendation B4:*** Golden State Boulevard along the project frontage should be constructed to accommodate four travel lanes with turn pockets (five vehicle lanes total), a raised median, and two bicycle lanes in each direction.

Kamir Incorporated

Vehicular access to the project would be provided by three unsignalized driveways on Golden State Boulevard – two for trucks (North and Middle Driveways) and one for all vehicles (South Driveway). The project would also construct one internal driveway that could connect to adjacent development in the future.

Circulation within the site is separated by modes. The north side of the property is reserved for trucks has an open layout with drive aisles between the truck fueling area and truck parking and between the truck fueling area and convenience store. The south side of the property features two-way drive aisles around the entire site except where the drive thru locations are. Additionally, there is a one-way drive aisle for trucks to access the north side of the property from the south side of the property.

> ***Site Recommendation C1:*** As a part of the final site plan indicate locations where traffic control devices would be installed. Consider stripping stop bars on minor approaches at intersections throughout the site.

Relative to the proposed NRTP Development, the KI North Driveway is located north of the NRTP North Driveway. The KI Middle Driveway is located across from the NRTP North Driveway. The KI South Driveway is located south of the NRTP South Driveway along Golden State Boulevard.

The KI North Driveway at Golden State Boulevard would operate acceptably in the Existing with Projects and Cumulative with Projects scenario during the AM and PM peak periods.

The NRTP North Driveway/KI Middle Driveway at Golden State Boulevard would operate acceptably in the Existing with Projects scenario during the AM and PM peak periods. However, in the Cumulative with Projects scenario, the intersection of NRTP North Driveway/KI Middle Driveway at Golden State Boulevard delay increases to LOS D during the AM peak hour; the intersection would not meet peak hour signal warrants.

The KI South Driveway at Golden State Boulevard would operate at LOS F and C under Existing with Projects scenario during the AM and PM peak hours and LOS F and F under the Cumulative with Projects scenario during the AM and PM Peak hours. The intersection of KI South Driveway at Golden State Boulevard would meet peak hours signal warrants.

> ***Site Recommendation C2:*** Reconfigure the site plan to include a two-way internal drive aisle between the north side of the property and the south side of the property. Vehicles will use the KI Middle Driveway to make left turns into and out of the site. Restrict left-turn access into and out of the KI South Driveway by constructing a raised median on Golden State Boulevard. Install wayfinding signage as necessary.
>
> Install a traffic signal at the intersection of NRTP North Driveway/KI Middle Driveway at Golden State Boulevard; align both driveways. The eastbound approach operates at acceptable levels with one shared left/through/right lane, however, should the site plan changes increase the volume of right-turns out of the KI Middle Drive, reconfigure the eastbound approach to include one shared left/through lane and one right-turn pocket.

Site Recommendation C3: Golden State Boulevard along the project frontage should be constructed to accommodate four travel lanes with turn pockets (five vehicle lanes total), a raised median, and two bicycle lanes in each direction.

Vehicular Parking

Vehicular parking supply and demand were reviewed against the Stanislaus County Municipal Code and the Parking Generation Manual, 5th Edition (*ITE, 2019*). Off-street parking requirements are outlined in Section 21.76 of the Stanislaus County Municipal Code and summarized in **Table 12**. Peak period parking demand estimates from the Parking Generation Manual, 5th Edition are summarized in **Table 13**.

Table 12: Off-Street Parking Requirements

Land Use	Size	Requirement	Required Supply	Proposed Supply
ITC Enterprises				
Truck Leasing/Rental	N/A	1 space per employee on a maximum shift and 1 space per every twenty vehicles for sale	N/A	23 car spaces
		Total Off-Street Parking:	N/A	23
		Deficit/Surplus:	N/A	
Nunes Road Travel Plaza				
Convenience Store	7,000 sq. ft.	1 space per 300 sf	23	89 car spaces 46 truck spaces
Restaurant	Not Specified	1 space per 4 seats	--	
Truck Wash/Repair[1]	14,100 sq. ft.	1 space per 300 sf	47[2]	
		Total Off-Street Parking:	70+	135
		Deficit/Surplus:	+69 or fewer	
Kamir Incorporated				
Convenience Store	4,800 sq. ft.	1 space per 300 sf	16	64 car spaces 37 truck spaces
Restaurant	120 seats total	1 space per 4 seats	30	
		Total Off-Street Parking:	46	101
		Deficit/Surplus:	+55	

Notes:

1. Service establishments and garages/repair shops are both required to provide one space for each three hundred square feet of gross area.
2. Spaces inside a garage may be counted towards meeting of the requirement.

Bold indicates that the proposed parking supply is less than the required parking supply.
Source: Stanislaus County Municipal Code; Fehr & Peers, 2019

Table 13: Estimated Peak Parking Demand			
Land Use	**Size**	**Weekday Demand (Weekend Demand)**	**Supply**
ITC Enterprises			
Truck Leasing/ Rental/Service[1]	35,000 sq. ft.	27 (N/A)	23
	Total Peak Period Demand:	**27 (N/A)**	
Nunes Road Travel Plaza			
Convenience Market/ Gas Station[2]	7,000 sq. ft.	57 (35)	135
Fast Food Restaurant with Drive Thru[3]	4.278 sq. ft.	53 (39)	
	Total Peak Period Demand:	110 (74)	
Kamir Incorporated			
Convenience Market/ Gas Station[2]	4,800 sq. ft.	39 (24)	101
Fast Food Restaurant with Drive Thru[3]	6,000 sq. ft.	74 (55)	
Fast Food Restaurant without Drive Thru[4]	2,000 sq. ft.	38 (n/a)	
	Total Peak Period Demand:	**151 (79+)**	

Notes:
1. Based on peak period parking demand rates for land use 842, Recreational Vehicle Sales. Parking demand peaks on weekday from 2:00 PM – 3:00 PM. Weekend data not available.
2. Based on peak period parking demand rates for land use 960, Super Convenience Market/Gas Station. Parking demand peaks on weekdays and weekends from 11:00 AM – 12:00 PM.
3. Based on peak period parking demand rates for land use 934, Fast Food Restaurant with Drive Thru. Parking demand peaks on weekdays and weekends from 12:00 – 1:00 PM.
4. Based on peak period parking demand rates for land use 933, Fast Food Restaurant without Drive Thru. Weekend data not available. Parking demand estimated to peak similarly to land use 934.

Bold indicates parking demand potentially exceeds supply for some portion of the day.
Source: *Parking Generation Manual, 5th Edition*. (Institute of Transportation Engineers, 2019); Fehr & Peers, 2019

ITC Enterprises

ITC Enterprises propose to provide a total of 23 parking spaces for passenger vehicles. Based on the Municipal Code, ITC Enterprises is required to provide at least one parking spaces for each employee on a maximum shift and one customer parking space per every twenty vehicles for sale. ADA requirements will be determined based on the number of parking spots required.

> ***Site Recommendation A2:*** Ensure that accessible parking is located as close as possible to the main entrance of the proposed office.

Parking demand at the proposed truck lease/rental/service location was estimated using ITE land use 842, Recreational Vehicle Sales. Based on the analysis, the site may not provide enough parking to accommodate typical peak parking demand on a weekday.

> ***Site Recommendation A3:*** Identify five additional parking spaces to accommodate the projected peak parking demand.

Nunes Road Travel Plaza

Nunes Road Travel Plaza propose to provide a total of 73 parking spaces for passenger vehicles - four van accessible spaces, two electric vehicle charging spaces, five employee spaces, and 62 spaces with no restrictions – and 41 parking spaces for trucks. There are an additional 16 spaces for passenger vehicle and 5 spaces for trucks at the gas pumps. In total NRTP would provide 89 spaces for passenger vehicle spaces and an estimated 46 spaces for trucks.

Based on the Municipal Code, NRTP is required to provide *at least* 70 parking spaces (the number of seats in the restaurant portion of the site was not specified and is not included in this value). Based on ADA requirements, 4 of the 114 off-street parking spaces proposed (does not include spaces at gas pumps) must be accessible, and 1 of the 4 accessible spaces must be van accessible; the project proposes 4 van accessible spaces which satisfies the requirement.

> ***Site Recommendation B5:*** Provide information on the number of seats proposed in the fast-food restaurant. Should the number of seats proposed in the fast-food restaurant exceed 260 (65 x 4), additional parking must be provided at a rate of 1 space per 4 additional seats.

Parking demand at Nunes Road Travel Plaza is estimated to peak at approximately 12:00 PM. For the parking demand assessment, it was assumed that trips to or from the truck wash and repair area at the Nunes Road Travel Plaza would be internalized trips from the gas/service station and/or convenience market. The site generally provides enough parking to accommodate typical peak parking demand on a weekday and weekend.

Kamir Incorporated

Kamir Incorporated propose to provide a total of 52 parking spaces for passenger vehicles - six van accessible spaces and 46 spaces with no restrictions – and 30 parking spaces for trucks. There are an additional 12 spaces for passenger vehicle and 7 spaces for trucks at the gas pumps. In total KI would provide 64 spaces for passenger vehicle spaces and 37 spaces for trucks.

Based on the Municipal Code, KI is required to provide 46 parking spaces, resulting in a surplus of 55 spaces. Based on ADA requirements, 4 of the 82 spaces off-street parking spaces proposed (does not include spaces at gas pumps) must be accessible, and 1 of the 4 accessible spaces must be van accessible; the project proposes 6 van accessible spaces which satisfies the requirement.

Parking demand at Kamir Incorporated is estimated to peak at approximately 12:00 PM. The site would not provide enough parking to accommodate typical peak parking demand on a weekday. No internalized trips between the gas station/convenience market and the fast food restaurant(s) were assumed.

> ***Recommendation C4:*** As the restaurant portion of the site is leased, conduct parking surveys to determine if the proposed tenant mix is effectively sharing the available parking supply, and implement additional parking demand management strategies, if necessary.

Pedestrian Access and Circulation

Pedestrians access to the project sites would be provided by sidewalks proposed along the project frontages. In the immediate project vicinity, sidewalks are provided on Golden State Boulevard and 9th Street adjacent to developed parcels. Although there are no sidewalks on Golden State Boulevard at Keyes Road, the intersection features crosswalks on all four approaches and push-activated pedestrian signals.

> ***Site Recommendation A4:*** As a part of the final site plan show an accessible pedestrian path compliant with ADA regulations from Golden State Boulevard to the proposed office.

> ***Site Recommendation B6:*** As a part of the final site plan show an accessible pedestrian path compliant with ADA regulations from Golden State Boulevard to the fast-food restaurant located adjacent to the southern property line.

Bicycle Access and Circulation

Bicycle facilities are proposed by Stanislaus County on Golden State Boulevard along the project frontages. Class II bicycle lanes are planned beginning south of Nunes Road. It is not clear how the proposed project accommodates the ultimately planned bicycle facilities in the project vicinity.

> ***Recommendation A5/B7/C5:*** Consult with Stanislaus County to ensure that the proposed project design does not conflict with the ultimate provision of bicycle facilities along the project frontage.

None of the proposed projects provide short-term or long-term bicycle parking.

> ***Recommendation A6/B8/C6:*** Identify areas where short-term bicycle parking would be accommodated on the final site plan.

Transit Access

Existing bus stops are located on 9th Street/Golden State Boulevard at Nunes Road (bus travels northbound) and at Maud Avenue (bus travels southbound); both stations are served by **Route 15** which travels between Modesto and Turlock. Modesto and Turlock both have airports and regional train stations (Amtrak). To access the bus stops pedestrians must travel along 9th Street/Golden State Boulevard.

Even with the construction of the proposed projects, sidewalk gaps to and from the bus stops will remain at the following locations:

- The west side of 9th Street between Grace Avenue and Nunes Road;
- The intersection of 9th Street/Golden State Boulevard at Nunes Road;
- The east side of Golden State Boulevard between Nunes Road and the Nunes Road Travel Plaza project frontage (approved development will construct sidewalks on the west side); and
- The intersection of Golden State Boulevard at Keyes Road.

Emergency Vehicle Access

Factors such as the number of access points, roadway width, and proximity to fire stations determine whether a project provides enough emergency access. Emergency vehicle access is provided by the project driveways and the internal roadways.

Emergency Vehicle Access to the project sites is provided by Golden State Boulevard. The fire station most likely to serve the site is Keyes Fire Department located on Maud Avenue at 7th Street, about 0.6 miles northwest of the project sites. Emergency vehicles would travel southbound on 7th Street, eastbound on Nunes Road, and then southbound on Golden State Boulevard to access the project site.

Appendix A:
Traffic Counts

Appendix B:
Intersection Operation Worksheets

Appendix C:
Peak Hour Signal Warrants

Appendix D:
Freeway Mainline & Ramp Junction Operation Worksheets

Appendix E:
Study Assumptions Memorandum

Appendix A:
Traffic Counts

ALL TRAFFIC DATA

City of Keyes
Totals and Uturns on Unshifted Tab
Bikes and Pedestrians on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

(916) 771-8700
orders@atdtraffic.com

File Name : 19-07266-001
Date : 08/14/2019

Unshifted Count = All Vehicles & Uturns

	Faith Home Rd Southbound					Keyes Rd Westbound					Faith Home Rd Northbound					Keyes Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	15	2	14	0	31	11	76	10	0	97	6	12	7	0	25	4	39	2	0	45	198	0
7:15	16	10	14	0	40	9	101	9	0	119	3	16	5	0	24	8	57	1	0	66	249	0
7:30	30	7	14	0	51	10	76	17	0	103	4	18	6	0	28	7	60	2	0	69	251	0
7:45	24	8	16	0	48	7	89	19	0	115	3	13	9	0	25	15	60	0	0	75	263	0
Total	85	27	58	0	170	37	342	55	0	434	16	59	27	0	102	34	216	5	0	255	961	0
8:00	23	3	11	0	37	11	72	11	0	94	0	10	7	0	17	12	44	2	0	58	206	0
8:15	16	5	18	0	39	6	58	7	0	71	1	10	11	0	22	7	51	3	0	61	193	0
8:30	14	9	6	0	29	11	61	9	0	81	2	7	8	0	17	7	51	2	0	60	187	0
8:45	17	9	6	0	32	7	52	16	0	75	4	4	16	0	24	6	55	4	0	65	196	0
Total	70	26	41	0	137	35	243	43	0	321	7	31	42	0	80	32	201	11	0	244	782	0
16:00	18	13	7	0	38	8	36	15	0	59	3	13	6	0	22	11	119	5	0	135	254	0
16:15	23	14	3	0	40	13	32	22	0	67	5	8	10	0	23	11	134	3	0	148	278	0
16:30	50	10	2	0	62	8	28	18	0	54	2	14	9	0	25	20	109	1	0	130	271	0
16:45	25	16	3	0	44	12	45	21	0	78	1	17	3	0	21	12	105	3	0	120	263	0
Total	116	53	15	0	184	41	141	76	0	258	11	52	28	0	91	54	467	12	0	533	1066	0
17:00	23	19	4	0	46	10	42	15	0	67	2	12	12	0	26	8	149	6	0	163	302	0
17:15	28	17	5	0	50	11	57	19	0	87	3	13	9	0	25	12	106	5	0	123	285	0
17:30	22	11	3	0	36	10	37	15	0	62	2	10	3	0	15	11	125	3	0	139	252	0
17:45	20	11	4	0	35	7	36	16	0	59	4	12	8	0	24	4	110	4	0	118	236	0
Total	93	58	16	0	167	38	172	65	0	275	11	47	32	0	90	35	490	18	0	543	1075	0
Grand Total	364	164	130	0	658	151	898	239	0	1288	45	189	129	0	363	155	1374	46	0	1575	3884	0
Apprch %	55.3%	24.9%	19.8%	0.0%		11.7%	69.7%	18.6%	0.0%		12.4%	52.1%	35.5%	0.0%		9.8%	87.2%	2.9%	0.0%			
Total %	9.4%	4.2%	3.3%	0.0%	16.9%	3.9%	23.1%	6.2%	0.0%	33.2%	1.2%	4.9%	3.3%	0.0%	9.3%	4.0%	35.4%	1.2%	0.0%	40.6%	100.0%	

AM PEAK HOUR	Faith Home Rd Southbound					Keyes Rd Westbound					Faith Home Rd Northbound					Keyes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 07:15 to 08:15																					
Peak Hour For Entire Intersection Begins at 07:15																					
7:15	16	10	14	0	40	9	101	9	0	119	3	16	5	0	24	8	57	1	0	66	249
7:30	30	7	14	0	51	10	76	17	0	103	4	18	6	0	28	7	60	2	0	69	251
7:45	24	8	16	0	48	7	89	19	0	115	3	13	9	0	25	15	60	0	0	75	263
8:00	23	3	11	0	37	11	72	11	0	94	0	10	7	0	17	12	44	2	0	58	206
Total Volume	93	28	55	0	176	37	338	56	0	431	10	57	27	0	94	42	221	5	0	268	969
% App Total	52.8%	15.9%	31.3%	0.0%		8.6%	78.4%	13.0%	0.0%		10.6%	60.6%	28.7%	0.0%		15.7%	82.5%	1.9%	0.0%		
PHF	.775	.700	.859	.000	.863	.841	.837	.737	.000	.905	.625	.792	.750	.000	.839	.700	.921	.625	.000	.893	.921

PM PEAK HOUR	Faith Home Rd Southbound					Keyes Rd Westbound					Faith Home Rd Northbound					Keyes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:30 to 17:30																					
Peak Hour For Entire Intersection Begins at 16:30																					
16:30	50	10	2	0	62	8	28	18	0	54	2	14	9	0	25	20	109	1	0	130	271
16:45	25	16	3	0	44	12	45	21	0	78	1	17	3	0	21	12	105	3	0	120	263
17:00	23	19	4	0	46	10	42	15	0	67	2	12	12	0	26	8	149	6	0	163	302
17:15	28	17	5	0	50	11	57	19	0	87	3	13	9	0	25	12	106	5	0	123	285
Total Volume	126	62	14	0	202	41	172	73	0	286	8	56	33	0	97	52	469	15	0	536	1121
% App Total	62.4%	30.7%	6.9%	0.0%		14.3%	60.1%	25.5%	0.0%		8.2%	57.7%	34.0%	0.0%		9.7%	87.5%	2.8%	0.0%		
PHF	.630	.816	.700	.000	.815	.854	.754	.869	.000	.822	.667	.824	.688	.000	.933	.650	.787	.625	.000	.822	.928

ALL TRAFFIC DATA

City of Keyes
Totals and Uturns on Unshifted Tab
Bikes and Pedestrians on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

(916) 771-8700
orders@atdtraffic.com

File Name : 19-07266-002
Date : 08/14/2019

Unshifted Count = All Vehicles & Uturns

	Foote Rd Southbound					Keyes Rd Westbound					Foote Rd Northbound					Keyes Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	1	1	0	0	2	2	104	0	0	106	3	0	4	0	7	0	59	1	0	60	175	0
7:15	1	0	0	0	1	3	123	1	0	127	4	0	5	0	9	0	78	0	0	78	215	0
7:30	0	0	0	0	0	2	108	0	1	111	6	0	4	0	10	0	96	1	0	97	218	1
7:45	1	1	0	0	2	10	118	1	0	129	11	0	7	0	18	0	103	3	0	106	255	0
Total	3	2	0	0	5	17	453	2	1	473	24	0	20	0	44	0	336	5	0	341	863	1
8:00	0	0	0	0	0	4	105	0	0	109	5	0	4	0	9	0	82	2	0	84	202	0
8:15	0	0	0	0	0	3	83	0	0	86	5	0	4	0	9	0	73	2	0	75	170	0
8:30	0	0	0	0	0	3	89	0	0	92	3	0	6	0	9	0	79	3	0	82	183	0
8:45	0	0	0	0	0	5	77	0	1	83	3	0	8	0	11	0	79	2	0	81	175	1
Total	0	0	0	0	0	15	354	0	1	370	16	0	22	0	38	0	313	9	0	322	730	1
16:00	2	0	0	0	2	8	52	0	0	60	6	1	7	0	14	0	164	3	0	167	243	0
16:15	2	0	0	0	2	6	66	0	1	73	5	0	3	0	8	0	155	4	0	159	242	1
16:30	4	0	0	0	4	10	54	4	5	73	2	0	4	0	6	0	181	3	0	184	267	5
16:45	1	0	0	0	1	4	73	1	1	79	1	0	7	0	8	0	153	8	0	161	249	1
Total	9	0	0	0	9	28	245	5	7	285	14	1	21	0	36	0	653	18	0	671	1001	7
17:00	2	0	0	0	2	5	69	3	0	77	3	0	7	0	10	1	170	3	0	174	263	0
17:15	2	0	2	0	4	12	77	2	6	97	5	0	11	0	16	0	169	3	0	172	289	6
17:30	0	0	0	0	0	5	62	1	0	68	3	0	6	0	9	0	142	3	0	145	222	0
17:45	0	0	0	0	0	1	62	0	0	63	0	0	4	0	4	0	144	2	0	146	213	0
Total	4	0	2	0	6	23	270	6	6	305	11	0	28	0	39	1	625	11	0	637	987	6
Grand Total	16	2	2	0	20	83	1322	13	15	1433	65	1	91	0	157	1	1927	43	0	1971	3581	15
Apprch %	80.0%	10.0%	10.0%	0.0%		5.8%	92.3%	0.9%	1.0%		41.4%	0.6%	58.0%	0.0%		0.1%	97.8%	2.2%	0.0%			
Total %	0.4%	0.1%	0.1%	0.0%	0.6%	2.3%	36.9%	0.4%	0.4%	40.0%	1.8%	0.0%	2.5%	0.0%	4.4%	0.0%	53.8%	1.2%	0.0%	55.0%	100.0%	

AM PEAK HOUR	Foote Rd Southbound					Keyes Rd Westbound					Foote Rd Northbound					Keyes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 07:15 to 08:15																					
Peak Hour For Entire Intersection Begins at 07:15																					
7:15	1	0	0	0	1	3	123	1	0	127	4	0	5	0	9	0	78	0	0	78	215
7:30	0	0	0	0	0	2	108	0	1	111	6	0	4	0	10	0	96	1	0	97	218
7:45	1	1	0	0	2	10	118	1	0	129	11	0	7	0	18	0	103	3	0	106	255
8:00	0	0	0	0	0	4	105	0	0	109	5	0	4	0	9	0	82	2	0	84	202
Total Volume	2	1	0	0	3	19	454	2	1	476	26	0	20	0	46	0	359	6	0	365	890
% App Total	66.7%	33.3%	0.0%	0.0%		4.0%	95.4%	0.4%	0.2%		56.5%	0.0%	43.5%	0.0%		0.0%	98.4%	1.6%	0.0%		
PHF	.500	.250	.000	.000	.375	.475	.923	.500	.250	.922	.591	.000	.714	.000	.639	.000	.871	.500	.000	.861	.873

PM PEAK HOUR	Foote Rd Southbound					Keyes Rd Westbound					Foote Rd Northbound					Keyes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:30 to 17:30																					
Peak Hour For Entire Intersection Begins at 16:30																					
16:30	4	0	0	0	4	10	54	4	5	73	2	0	4	0	6	0	181	3	0	184	267
16:45	1	0	0	0	1	4	73	1	1	79	1	0	7	0	8	0	153	8	0	161	249
17:00	2	0	0	0	2	5	69	3	0	77	3	0	7	0	10	1	170	3	0	174	263
17:15	2	0	2	0	4	12	77	2	6	97	5	0	11	0	16	0	169	3	0	172	289
Total Volume	9	0	2	0	11	31	273	10	12	326	11	0	29	0	40	1	673	17	0	691	1068
% App Total	81.8%	0.0%	18.2%	0.0%		9.5%	83.7%	3.1%	3.7%		27.5%	0.0%	72.5%	0.0%		0.1%	97.4%	2.5%	0.0%		
PHF	.563	.000	.250	.000	.688	.646	.886	.625	.500	.840	.550	.000	.659	.000	.625	.250	.930	.531	.000	.939	.924

ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

City of Keyes
Totals and Uturns on Unshifted Tab
Bikes and Pedestrians on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

File Name : 19-07266-003
Date : 08/14/2019

Unshifted Count = All Vehicles & Uturns

	SR 99 SB Ramps Southbound					Keyes Rd Westbound					SR 99 SB Ramps Northbound					Keyes Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	21	0	14	0	35	47	92	0	0	139	0	0	0	0	0	0	36	30	0	66	240	0
7:15	25	0	16	0	41	63	111	0	0	174	0	0	0	0	0	0	45	37	0	82	297	0
7:30	24	0	10	0	34	58	101	0	0	159	0	0	0	0	0	0	48	54	0	102	295	0
7:45	20	0	13	0	33	63	116	0	0	179	0	0	0	0	0	0	57	53	0	110	322	0
Total	90	0	53	0	143	231	420	0	0	651	0	0	0	0	0	0	186	174	0	360	1154	0
8:00	23	0	13	0	36	57	100	0	0	157	0	0	0	0	0	0	35	49	0	84	277	0
8:15	24	1	14	0	39	72	68	0	0	140	0	0	0	0	0	0	39	40	0	79	258	0
8:30	30	0	16	0	46	44	73	0	0	117	0	0	0	0	0	0	43	38	0	81	244	0
8:45	24	1	15	0	40	61	71	0	0	132	0	0	0	0	0	0	52	38	0	90	262	0
Total	101	2	58	0	161	234	312	0	0	546	0	0	0	0	0	0	169	165	0	334	1041	0
16:00	33	1	10	0	44	40	49	0	0	89	0	0	0	0	0	0	75	98	0	173	306	0
16:15	42	0	20	0	62	45	54	0	0	99	0	0	0	0	0	0	74	88	0	162	323	0
16:30	39	0	25	0	64	56	47	0	0	103	0	0	0	0	0	0	82	110	0	192	359	0
16:45	48	1	13	0	62	41	66	0	0	107	0	0	0	0	0	0	52	111	0	163	332	0
Total	162	2	68	0	232	182	216	0	0	398	0	0	0	0	0	0	283	407	0	690	1320	0
17:00	35	1	14	0	50	45	64	0	0	109	0	0	0	0	0	0	72	102	0	174	333	0
17:15	37	0	29	0	66	51	72	0	0	123	0	0	0	0	0	0	91	102	0	193	382	0
17:30	53	1	9	0	63	37	54	0	0	91	0	0	0	0	0	0	65	82	0	147	301	0
17:45	40	3	6	0	49	52	59	0	0	111	0	0	0	0	0	0	71	78	0	149	309	0
Total	165	5	58	0	228	185	249	0	0	434	0	0	0	0	0	0	299	364	0	663	1325	0
Grand Total	518	9	237	0	764	832	1197	0	0	2029	0	0	0	0	0	0	937	1110	0	2047	4840	0
Apprch %	67.8%	1.2%	31.0%	0.0%		41.0%	59.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	45.8%	54.2%	0.0%			
Total %	10.7%	0.2%	4.9%	0.0%	15.8%	17.2%	24.7%	0.0%	0.0%	41.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	19.4%	22.9%	0.0%	42.3%	100.0%	

AM PEAK HOUR	SR 99 SB Ramps Southbound					Keyes Rd Westbound					SR 99 SB Ramps Northbound					Keyes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 07:15 to 08:15																					
Peak Hour For Entire Intersection Begins at 07:15																					
7:15	25	0	16	0	41	63	111	0	0	174	0	0	0	0	0	0	45	37	0	82	297
7:30	24	0	10	0	34	58	101	0	0	159	0	0	0	0	0	0	48	54	0	102	295
7:45	20	0	13	0	33	63	116	0	0	179	0	0	0	0	0	0	57	53	0	110	322
8:00	23	0	13	0	36	57	100	0	0	157	0	0	0	0	0	0	35	49	0	84	277
Total Volume	92	0	52	0	144	241	428	0	0	669	0	0	0	0	0	0	185	193	0	378	1191
% App Total	63.9%	0.0%	36.1%	0.0%		36.0%	64.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	48.9%	51.1%	0.0%		
PHF	.920	.000	.813	.000	.878	.956	.922	.000	.000	.934	.000	.000	.000	.000	.000	.000	.811	.894	.000	.859	.925

PM PEAK HOUR	SR 99 SB Ramps Southbound					Keyes Rd Westbound					SR 99 SB Ramps Northbound					Keyes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:30 to 17:30																					
Peak Hour For Entire Intersection Begins at 16:30																					
16:30	39	0	25	0	64	56	47	0	0	103	0	0	0	0	0	0	82	110	0	192	359
16:45	48	1	13	0	62	41	66	0	0	107	0	0	0	0	0	0	52	111	0	163	332
17:00	35	1	14	0	50	45	64	0	0	109	0	0	0	0	0	0	72	102	0	174	333
17:15	37	0	29	0	66	51	72	0	0	123	0	0	0	0	0	0	91	102	0	193	382
Total Volume	159	2	81	0	242	193	249	0	0	442	0	0	0	0	0	0	297	425	0	722	1406
% App Total	65.7%	0.8%	33.5%	0.0%		43.7%	56.3%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	41.1%	58.9%	0.0%		
PHF	.828	.500	.698	.000	.917	.862	.865	.000	.000	.898	.000	.000	.000	.000	.000	.000	.816	.957	.000	.935	.920

ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

City of Keyes
Totals and Uturns on Unshifted Tab
Bikes and Pedestrians on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

File Name : 19-07266-004
Date : 08/14/2019

Unshifted Count = All Vehicles & Uturns

	SR 99 NB Ramps Southbound					Keyes Rd Westbound					SR 99 NB Ramps Northbound					Keyes Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	0	0	0	0	0	0	97	46	0	143	42	0	37	0	79	11	45	0	0	56	278	0
7:15	0	0	0	0	0	0	136	87	0	223	38	0	33	0	71	13	57	0	0	70	364	0
7:30	0	0	0	0	0	0	122	102	0	224	35	0	31	0	66	9	63	0	0	72	362	0
7:45	0	0	0	0	0	0	136	70	0	206	41	0	46	0	87	16	61	0	0	77	370	0
Total	0	0	0	0	0	0	491	305	0	796	156	0	147	0	303	49	226	0	0	275	1374	0
8:00	0	0	0	0	0	0	121	56	0	177	34	0	61	0	95	14	45	0	0	59	331	0
8:15	0	0	0	0	0	0	117	41	0	158	31	0	40	0	71	15	47	0	0	62	291	0
8:30	0	0	0	0	0	0	78	41	0	119	38	0	44	0	82	14	61	0	0	75	276	0
8:45	0	0	0	0	0	0	105	31	0	136	26	0	28	0	54	22	50	0	0	72	262	0
Total	0	0	0	0	0	0	421	169	0	590	129	0	173	0	302	65	203	0	0	268	1160	0
16:00	0	0	0	0	0	0	66	35	0	101	23	0	79	0	102	16	93	0	0	109	312	0
16:15	0	0	0	0	0	0	73	30	0	103	24	0	68	0	92	17	98	0	0	115	310	0
16:30	0	0	0	0	0	0	81	37	0	118	24	0	60	0	84	19	102	0	0	121	323	0
16:45	0	0	0	0	0	0	75	37	0	112	31	0	65	0	96	6	91	0	0	97	305	0
Total	0	0	0	0	0	0	295	139	0	434	102	0	272	0	374	58	384	0	0	442	1250	0
17:00	0	0	0	0	0	0	83	40	0	123	29	0	58	0	87	14	96	0	0	110	320	0
17:15	0	0	0	0	0	0	86	28	0	114	35	0	64	0	99	10	118	0	0	128	341	0
17:30	0	0	0	0	0	0	63	47	0	110	21	0	82	0	103	7	112	0	0	119	332	0
17:45	0	0	0	0	0	0	88	28	0	116	26	0	49	0	75	12	95	0	0	107	298	0
Total	0	0	0	0	0	0	320	143	0	463	111	0	253	0	364	43	421	0	0	464	1291	0
Grand Total	0	0	0	0	0	0	1527	756	0	2283	498	0	845	0	1343	215	1234	0	0	1449	5075	0
Apprch %	0.0%	0.0%	0.0%	0.0%		0.0%	66.9%	33.1%	0.0%		37.1%	0.0%	62.9%	0.0%		14.8%	85.2%	0.0%	0.0%			
Total %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	30.1%	14.9%	0.0%	45.0%	9.8%	0.0%	16.7%	0.0%	26.5%	4.2%	24.3%	0.0%	0.0%	28.6%	100.0%	

AM PEAK HOUR	SR 99 NB Ramps Southbound					Keyes Rd Westbound					SR 99 NB Ramps Northbound					Keyes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 07:15 to 08:15																					
Peak Hour For Entire Intersection Begins at 07:15																					
7:15	0	0	0	0	0	0	136	87	0	223	38	0	33	0	71	13	57	0	0	70	364
7:30	0	0	0	0	0	0	122	102	0	224	35	0	31	0	66	9	63	0	0	72	362
7:45	0	0	0	0	0	0	136	70	0	206	41	0	46	0	87	16	61	0	0	77	370
8:00	0	0	0	0	0	0	121	56	0	177	34	0	61	0	95	14	45	0	0	59	331
Total Volume	0	0	0	0	0	0	515	315	0	830	148	0	171	0	319	52	226	0	0	278	1427
% App Total	0.0%	0.0%	0.0%	0.0%		0.0%	62.0%	38.0%	0.0%		46.4%	0.0%	53.6%	0.0%		18.7%	81.3%	0.0%	0.0%		
PHF	.000	.000	.000	.000	.000	.000	.947	.772	.000	.926	.902	.000	.701	.000	.839	.813	.897	.000	.000	.903	.964

PM PEAK HOUR	SR 99 NB Ramps Southbound					Keyes Rd Westbound					SR 99 NB Ramps Northbound					Keyes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	0	0	0	0	0	0	75	37	0	112	31	0	65	0	96	6	91	0	0	97	305
17:00	0	0	0	0	0	0	83	40	0	123	29	0	58	0	87	14	96	0	0	110	320
17:15	0	0	0	0	0	0	86	28	0	114	35	0	64	0	99	10	118	0	0	128	341
17:30	0	0	0	0	0	0	63	47	0	110	21	0	82	0	103	7	112	0	0	119	332
Total Volume	0	0	0	0	0	0	307	152	0	459	116	0	269	0	385	37	417	0	0	454	1298
% App Total	0.0%	0.0%	0.0%	0.0%		0.0%	66.9%	33.1%	0.0%		30.1%	0.0%	69.9%	0.0%		8.1%	91.9%	0.0%	0.0%		
PHF	.000	.000	.000	.000	.000	.000	.892	.809	.000	.933	.829	.000	.820	.000	.934	.661	.883	.000	.000	.887	.952

ALL TRAFFIC DATA

City of Keyes
Totals and Uturns on Unshifted Tab
Bikes and Pedestrians on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

(916) 771-8700
orders@atdtraffic.com

File Name : 19-07266-005
Date : 08/14/2019

Unshifted Count = All Vehicles & Uturns

	9th St/Golden State Blvd Southbound					Nunes Rd Westbound					9th St/Golden State Blvd Northbound					Nunes Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	3	29	0	0	32	22	7	6	0	35	16	7	5	0	28	0	1	8	0	9	104	0
7:15	3	49	1	0	53	31	9	8	0	48	24	14	4	0	42	0	2	13	0	15	158	0
7:30	6	61	3	0	70	34	10	6	0	50	18	21	6	1	46	0	0	18	0	18	184	1
7:45	4	36	7	0	47	17	15	10	0	42	35	43	5	0	83	2	4	15	0	21	193	0
Total	16	175	11	0	202	104	41	30	0	175	93	85	20	1	199	2	7	54	0	63	639	1
8:00	8	33	1	0	42	13	3	5	0	21	10	20	5	0	35	5	5	30	0	40	138	0
8:15	8	42	3	0	53	12	1	10	0	23	8	26	5	0	39	0	2	15	0	17	132	0
8:30	11	53	2	0	66	16	3	15	0	34	8	26	2	0	36	0	3	12	0	15	151	0
8:45	3	29	0	0	32	11	2	2	0	15	11	14	2	0	27	0	1	15	0	16	90	0
Total	30	157	6	0	193	52	9	32	0	93	37	86	14	0	137	5	11	72	0	88	511	0
16:00	4	20	0	0	24	7	4	6	0	17	18	31	8	0	57	3	6	22	0	31	129	0
16:15	3	19	0	0	22	11	3	4	0	18	11	22	5	0	38	1	8	22	0	31	109	0
16:30	1	20	0	0	21	14	2	3	0	19	6	27	4	0	37	0	5	15	0	20	97	0
16:45	1	16	0	0	17	15	3	2	0	20	18	21	5	0	44	0	6	27	0	33	114	0
Total	9	75	0	0	84	47	12	15	0	74	53	101	22	0	176	4	25	86	0	115	449	0
17:00	2	27	2	0	31	14	4	4	0	22	7	25	3	0	35	2	7	19	0	28	116	0
17:15	2	21	2	0	25	16	4	3	0	23	7	37	7	0	51	0	2	12	0	14	113	0
17:30	4	28	0	0	32	11	3	5	0	19	14	36	7	0	57	2	1	15	0	18	126	0
17:45	2	23	0	0	25	11	4	5	0	20	10	21	1	0	32	2	0	23	0	25	102	0
Total	10	99	4	0	113	52	15	17	0	84	38	119	18	0	175	6	10	69	0	85	457	0
Grand Total	65	506	21	0	592	255	77	94	0	426	221	391	74	1	687	17	53	281	0	351	2056	1
Apprch %	11.0%	85.5%	3.5%	0.0%		59.9%	18.1%	22.1%	0.0%		32.2%	56.9%	10.8%	0.1%		4.8%	15.1%	80.1%	0.0%			
Total %	3.2%	24.6%	1.0%	0.0%	28.8%	12.4%	3.7%	4.6%	0.0%	20.7%	10.7%	19.0%	3.6%	0.0%	33.4%	0.8%	2.6%	13.7%	0.0%	17.1%	100.0%	

AM PEAK HOUR	9th St/Golden State Blvd Southbound					Nunes Rd Westbound					9th St/Golden State Blvd Northbound					Nunes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 07:15 to 08:15																					
Peak Hour For Entire Intersection Begins at 07:15																					
7:15	3	49	1	0	53	31	9	8	0	48	24	14	4	0	42	0	2	13	0	15	158
7:30	6	61	3	0	70	34	10	6	0	50	18	21	6	1	46	0	0	18	0	18	184
7:45	4	36	7	0	47	17	15	10	0	42	35	43	5	0	83	2	4	15	0	21	193
8:00	8	33	1	0	42	13	3	5	0	21	10	20	5	0	35	5	5	30	0	40	138
Total Volume	21	179	12	0	212	95	37	29	0	161	87	98	20	1	206	7	11	76	0	94	673
% App Total	9.9%	84.4%	5.7%	0.0%		59.0%	23.0%	18.0%	0.0%		42.2%	47.6%	9.7%	0.5%		7.4%	11.7%	80.9%	0.0%		
PHF	.656	.734	.429	.000	.757	.699	.617	.725	.000	.805	.621	.570	.833	.250	.620	.350	.550	.633	.000	.588	.872

PM PEAK HOUR	9th St/Golden State Blvd Southbound					Nunes Rd Westbound					9th St/Golden State Blvd Northbound					Nunes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	1	16	0	0	17	15	3	2	0	20	18	21	5	0	44	0	6	27	0	33	114
17:00	2	27	2	0	31	14	4	4	0	22	7	25	3	0	35	2	7	19	0	28	116
17:15	2	21	2	0	25	16	4	3	0	23	7	37	7	0	51	0	2	12	0	14	113
17:30	4	28	0	0	32	11	3	5	0	19	14	36	7	0	57	2	1	15	0	18	126
Total Volume	9	92	4	0	105	56	14	14	0	84	46	119	22	0	187	4	16	73	0	93	469
% App Total	8.6%	87.6%	3.8%	0.0%		66.7%	16.7%	16.7%	0.0%		24.6%	63.6%	11.8%	0.0%		4.3%	17.2%	78.5%	0.0%		
PHF	.563	.821	.500	.000	.820	.875	.875	.700	.000	.913	.639	.804	.786	.000	.820	.500	.571	.676	.000	.705	.931

ALL TRAFFIC DATA

City of Keyes
Totals and Uturns on Unshifted Tab
Bikes and Pedestrians on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

(916) 771-8700
orders@atdtraffic.com

File Name : 19-07266-006
Date : 08/14/2019

Unshifted Count = All Vehicles & Uturns

	Golden State Blvd Southbound					Keyes Rd Westbound					Golden State Blvd Northbound					Keyes Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	1	29	32	0	62	15	87	0	0	102	28	10	8	0	46	16	49	19	0	84	294	0
7:15	2	45	43	0	90	9	110	0	0	119	64	23	16	0	103	17	54	20	0	91	403	0
7:30	2	41	61	0	104	8	111	0	0	119	53	34	23	0	110	16	48	25	0	89	422	0
7:45	1	27	50	0	78	15	95	3	0	113	60	42	19	0	121	26	65	19	0	110	422	0
Total	6	142	186	0	334	47	403	3	0	453	205	109	66	0	380	75	216	83	0	374	1541	0
8:00	2	27	43	0	72	8	94	1	0	103	42	25	15	0	82	22	71	16	0	109	366	0
8:15	3	25	45	0	73	6	77	2	0	85	33	23	15	0	71	12	51	20	0	83	312	0
8:30	2	31	40	0	73	10	57	0	0	67	25	14	7	0	46	27	60	21	0	108	294	0
8:45	2	17	41	0	60	12	75	0	0	87	23	14	13	0	50	11	36	27	0	74	271	0
Total	9	100	169	0	278	36	303	3	0	342	123	76	50	0	249	72	218	84	0	374	1243	0
16:00	2	28	22	0	52	13	50	0	0	63	30	28	23	0	81	19	114	36	0	169	365	0
16:15	4	15	27	0	46	11	46	0	0	57	29	16	17	0	62	34	105	29	0	168	333	0
16:30	2	21	29	0	52	13	58	2	0	73	30	13	19	0	62	20	97	48	0	165	352	0
16:45	5	25	24	0	54	21	59	1	0	81	26	19	17	0	62	24	99	31	0	154	351	0
Total	13	89	102	0	204	58	213	3	0	274	115	76	76	0	267	97	415	144	0	656	1401	0
17:00	2	26	34	0	62	11	53	1	0	65	37	24	17	0	78	15	114	34	0	163	368	0
17:15	2	22	32	0	56	23	62	1	0	86	28	24	17	0	69	21	99	44	0	164	375	0
17:30	1	19	26	1	47	12	42	1	0	55	36	18	24	0	78	37	127	39	0	203	383	1
17:45	0	21	33	0	54	8	56	0	0	64	30	18	12	0	60	18	84	40	0	142	320	0
Total	5	88	125	1	219	54	213	3	0	270	131	84	70	0	285	91	424	157	0	672	1446	1
Grand Total	33	419	582	1	1035	195	1132	12	0	1339	574	345	262	0	1181	335	1273	468	0	2076	5631	1
Apprch %	3.2%	40.5%	56.2%	0.1%		14.6%	84.5%	0.9%	0.0%		48.6%	29.2%	22.2%	0.0%		16.1%	61.3%	22.5%	0.0%			
Total %	0.6%	7.4%	10.3%	0.0%	18.4%	3.5%	20.1%	0.2%	0.0%	23.8%	10.2%	6.1%	4.7%	0.0%	21.0%	5.9%	22.6%	8.3%	0.0%	36.9%	100.0%	

AM PEAK HOUR	Golden State Blvd Southbound					Keyes Rd Westbound					Golden State Blvd Northbound					Keyes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 07:15 to 08:15																					
Peak Hour For Entire Intersection Begins at 07:15																					
7:15	2	45	43	0	90	9	110	0	0	119	64	23	16	0	103	17	54	20	0	91	403
7:30	2	41	61	0	104	8	111	0	0	119	53	34	23	0	110	16	48	25	0	89	422
7:45	1	27	50	0	78	15	95	3	0	113	60	42	19	0	121	26	65	19	0	110	422
8:00	2	27	43	0	72	8	94	1	0	103	42	25	15	0	82	22	71	16	0	109	366
Total Volume	7	140	197	0	344	40	410	4	0	454	219	124	73	0	416	81	238	80	0	399	1613
% App Total	2.0%	40.7%	57.3%	0.0%		8.8%	90.3%	0.9%	0.0%		52.6%	29.8%	17.5%	0.0%		20.3%	59.6%	20.1%	0.0%		
PHF	.875	.778	.807	.000	.827	.667	.923	.333	.000	.954	.855	.738	.793	.000	.860	.779	.838	.800	.000	.907	.956

PM PEAK HOUR	Golden State Blvd Southbound					Keyes Rd Westbound					Golden State Blvd Northbound					Keyes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	5	25	24	0	54	21	59	1	0	81	26	19	17	0	62	24	99	31	0	154	351
17:00	2	26	34	0	62	11	53	1	0	65	37	24	17	0	78	15	114	34	0	163	368
17:15	2	22	32	0	56	23	62	1	0	86	28	24	17	0	69	21	99	44	0	164	375
17:30	1	19	26	1	47	12	42	1	0	55	36	18	24	0	78	37	127	39	0	203	383
Total Volume	10	92	116	1	219	67	216	4	0	287	127	85	75	0	287	97	439	148	0	684	1477
% App Total	4.6%	42.0%	53.0%	0.5%		23.3%	75.3%	1.4%	0.0%		44.3%	29.6%	26.1%	0.0%		14.2%	64.2%	21.6%	0.0%		
PHF	.500	.885	.853	.250	.883	.728	.871	1.000	.000	.834	.858	.885	.781	.000	.920	.655	.864	.841	.000	.842	.964

ALL TRAFFIC DATA

City of Keyes
Totals and Uturns on Unshifted Tab
Bikes and Pedestrians on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

(916) 771-8700
orders@atdtraffic.com

File Name : 19-07266-007
Date : 08/14/2019

Unshifted Count = All Vehicles & Uturns

	S Washington Rd Southbound					Nunes Rd Westbound					S Washington Rd Northbound					Nunes Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	10	0	21	0	31	0	15	10	0	25	0	0	0	0	0	2	4	0	0	6	62	0
7:15	16	0	35	0	51	0	13	14	0	27	0	0	0	0	0	12	0	0	0	12	90	0
7:30	18	0	38	0	56	0	11	15	0	26	0	0	0	0	0	9	9	0	0	18	100	0
7:45	8	0	21	0	29	0	21	12	0	33	0	0	0	0	0	6	1	0	0	7	69	0
Total	52	0	115	0	167	0	60	51	0	111	0	0	0	0	0	29	14	0	0	43	321	0
8:00	12	0	13	0	25	0	12	17	0	29	0	0	0	0	0	8	10	0	0	18	72	0
8:15	16	0	11	0	27	0	8	29	0	37	0	0	0	0	0	6	9	0	0	15	79	0
8:30	9	0	11	0	20	0	22	17	0	39	0	0	0	0	0	4	7	0	0	11	70	0
8:45	9	0	13	0	22	0	3	12	0	15	0	0	0	0	0	7	4	0	0	11	48	0
Total	46	0	48	0	94	0	45	75	0	120	0	0	0	0	0	25	30	0	0	55	269	0
16:00	9	0	8	0	17	0	10	24	0	34	0	0	0	0	0	14	2	0	0	16	67	0
16:15	15	0	11	0	26	0	6	26	0	32	0	0	0	0	0	11	7	0	0	18	76	0
16:30	6	0	10	0	16	0	9	17	0	26	0	0	0	0	0	7	3	0	0	10	52	0
16:45	15	0	15	0	30	0	5	23	0	28	0	0	0	0	0	10	2	0	0	12	70	0
Total	45	0	44	0	89	0	30	90	0	120	0	0	0	0	0	42	14	0	0	56	265	0
17:00	11	0	13	0	24	0	9	17	0	26	0	0	0	0	0	4	8	0	0	12	62	0
17:15	10	0	12	0	22	0	9	16	0	25	0	0	0	0	0	7	4	0	0	11	58	0
17:30	11	0	15	0	26	0	8	32	0	40	0	0	0	0	0	8	3	0	0	11	77	0
17:45	8	0	9	0	17	0	9	20	0	29	0	0	0	0	0	4	0	0	0	4	50	0
Total	40	0	49	0	89	0	35	85	0	120	0	0	0	0	0	23	15	0	0	38	247	0
Grand Total	183	0	256	0	439	0	170	301	0	471	0	0	0	0	0	119	73	0	0	192	1102	0
Apprch %	41.7%	0.0%	58.3%	0.0%		0.0%	36.1%	63.9%	0.0%		0.0%	0.0%	0.0%	0.0%		62.0%	38.0%	0.0%	0.0%			
Total %	16.6%	0.0%	23.2%	0.0%	39.8%	0.0%	15.4%	27.3%	0.0%	42.7%	0.0%	0.0%	0.0%	0.0%	0.0%	10.8%	6.6%	0.0%	0.0%	17.4%	100.0%	

AM PEAK HOUR	S Washington Rd Southbound					Nunes Rd Westbound					S Washington Rd Northbound					Nunes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 07:15 to 08:15																					
Peak Hour For Entire Intersection Begins at 07:15																					
7:15	16	0	35	0	51	0	13	14	0	27	0	0	0	0	0	12	0	0	0	12	90
7:30	18	0	38	0	56	0	11	15	0	26	0	0	0	0	0	9	9	0	0	18	100
7:45	8	0	21	0	29	0	21	12	0	33	0	0	0	0	0	6	1	0	0	7	69
8:00	12	0	13	0	25	0	12	17	0	29	0	0	0	0	0	8	10	0	0	18	72
Total Volume	54	0	107	0	161	0	57	58	0	115	0	0	0	0	0	35	20	0	0	55	331
% App Total	33.5%	0.0%	66.5%	0.0%		0.0%	49.6%	50.4%	0.0%		0.0%	0.0%	0.0%	0.0%		63.6%	36.4%	0.0%	0.0%		
PHF	.750	.000	.704	.000	.719	.000	.679	.853	.000	.871	.000	.000	.000	.000	.000	.729	.500	.000	.000	.764	.828

PM PEAK HOUR	S Washington Rd Southbound					Nunes Rd Westbound					S Washington Rd Northbound					Nunes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	15	0	15	0	30	0	5	23	0	28	0	0	0	0	0	10	2	0	0	12	70
17:00	11	0	13	0	24	0	9	17	0	26	0	0	0	0	0	4	8	0	0	12	62
17:15	10	0	12	0	22	0	9	16	0	25	0	0	0	0	0	7	4	0	0	11	58
17:30	11	0	15	0	26	0	8	32	0	40	0	0	0	0	0	8	3	0	0	11	77
Total Volume	47	0	55	0	102	0	31	88	0	119	0	0	0	0	0	29	17	0	0	46	267
% App Total	46.1%	0.0%	53.9%	0.0%		0.0%	26.1%	73.9%	0.0%		0.0%	0.0%	0.0%	0.0%		63.0%	37.0%	0.0%	0.0%		
PHF	.783	.000	.917	.000	.850	.000	.861	.688	.000	.744	.000	.000	.000	.000	.000	.725	.531	.000	.000	.958	.867

ALL TRAFFIC DATA

City of Keyes
Totals and Uturns on Unshifted Tab
Bikes and Pedestrians on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

(916) 771-8700
orders@atdtraffic.com

File Name : 19-07266-008
Date : 08/14/2019

Unshifted Count = All Vehicles & Uturns

	Nunes Rd Southbound					Keyes Rd Westbound					Nunes Rd Northbound					Keyes Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	6	0	10	0	16	0	90	10	0	100	0	0	0	0	0	10	48	0	0	58	174	0
7:15	6	0	7	0	13	0	117	15	0	132	0	0	0	0	0	11	62	0	0	73	218	0
7:30	10	0	12	1	23	0	104	9	0	113	0	0	0	0	0	8	63	0	0	71	207	1
7:45	9	0	7	0	16	0	106	19	0	125	0	0	0	0	0	13	73	0	0	86	227	0
Total	31	0	36	1	68	0	417	53	0	470	0	0	0	0	0	42	246	0	0	288	826	1
8:00	12	0	3	0	15	0	100	17	0	117	0	0	0	0	0	16	70	0	0	86	218	0
8:15	14	0	13	0	27	0	70	18	0	88	0	0	0	0	0	20	51	0	0	71	186	0
8:30	12	0	4	0	16	0	69	23	0	92	0	0	0	0	0	12	57	0	0	69	177	0
8:45	13	0	6	0	19	0	79	9	0	88	0	0	0	0	0	6	43	0	0	49	156	0
Total	51	0	26	0	77	0	318	67	0	385	0	0	0	0	0	54	221	0	0	275	737	0
16:00	6	1	6	0	13	0	58	13	0	71	0	0	0	0	0	23	110	0	0	133	217	0
16:15	11	0	9	0	20	0	46	7	0	53	0	0	0	0	0	29	103	0	0	132	205	0
16:30	7	1	6	0	14	0	70	12	0	82	0	0	0	0	0	13	107	0	0	120	216	0
16:45	9	1	13	0	23	0	66	9	0	75	0	0	0	0	0	19	118	0	0	137	235	0
Total	33	3	34	0	70	0	240	41	0	281	0	0	0	0	0	84	438	0	0	522	873	0
17:00	10	0	5	0	15	0	62	14	0	76	0	0	0	0	0	10	102	0	0	112	203	0
17:15	10	0	14	0	24	0	70	14	0	84	0	0	0	0	0	11	110	0	0	121	229	0
17:30	8	0	6	0	14	0	59	14	0	73	0	0	0	0	0	26	122	0	0	148	235	0
17:45	6	0	7	0	13	0	50	10	0	60	0	0	0	0	0	19	83	0	0	102	175	0
Total	34	0	32	0	66	0	241	52	0	293	0	0	0	0	0	66	417	0	0	483	842	0
Grand Total	149	3	128	1	281	0	1216	213	0	1429	0	0	0	0	0	246	1322	0	0	1568	3278	1
Apprch %	53.0%	1.1%	45.6%	0.4%		0.0%	85.1%	14.9%	0.0%		0.0%	0.0%	0.0%	0.0%		15.7%	84.3%	0.0%	0.0%			
Total %	4.5%	0.1%	3.9%	0.0%	8.6%	0.0%	37.1%	6.5%	0.0%	43.6%	0.0%	0.0%	0.0%	0.0%	0.0%	7.5%	40.3%	0.0%	0.0%	47.8%	100.0%	

AM PEAK HOUR	Nunes Rd Southbound					Keyes Rd Westbound					Nunes Rd Northbound					Keyes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 07:15 to 08:15																					
Peak Hour For Entire Intersection Begins at 07:15																					
7:15	6	0	7	0	13	0	117	15	0	132	0	0	0	0	0	11	62	0	0	73	218
7:30	10	0	12	1	23	0	104	9	0	113	0	0	0	0	0	8	63	0	0	71	207
7:45	9	0	7	0	16	0	106	19	0	125	0	0	0	0	0	13	73	0	0	86	227
8:00	12	0	3	0	15	0	100	17	0	117	0	0	0	0	0	16	70	0	0	86	218
Total Volume	37	0	29	1	67	0	427	60	0	487	0	0	0	0	0	48	268	0	0	316	870
% App Total	55.2%	0.0%	43.3%	1.5%		0.0%	87.7%	12.3%	0.0%		0.0%	0.0%	0.0%	0.0%		15.2%	84.8%	0.0%	0.0%		
PHF	.771	.000	.604	.250	.728	.000	.912	.789	.000	.922	.000	.000	.000	.000	.000	.750	.918	.000	.000	.919	.958

PM PEAK HOUR	Nunes Rd Southbound					Keyes Rd Westbound					Nunes Rd Northbound					Keyes Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	9	1	13	0	23	0	66	9	0	75	0	0	0	0	0	19	118	0	0	137	235
17:00	10	0	5	0	15	0	62	14	0	76	0	0	0	0	0	10	102	0	0	112	203
17:15	10	0	14	0	24	0	70	14	0	84	0	0	0	0	0	11	110	0	0	121	229
17:30	8	0	6	0	14	0	59	14	0	73	0	0	0	0	0	26	122	0	0	148	235
Total Volume	37	1	38	0	76	0	257	51	0	308	0	0	0	0	0	66	452	0	0	518	902
% App Total	48.7%	1.3%	50.0%	0.0%		0.0%	83.4%	16.6%	0.0%		0.0%	0.0%	0.0%	0.0%		12.7%	87.3%	0.0%	0.0%		
PHF	.925	.250	.679	.000	.792	.000	.918	.911	.000	.917	.000	.000	.000	.000	.000	.635	.926	.000	.000	.875	.960

ALL TRAFFIC DATA

(916) 771-8700
orders@atdtraffic.com

City of Keyes
Totals and Uturns on Unshifted Tab
Bikes and Pedestrians on Bank 1 Tab
Heavy Trucks on Bank 2 Tab

File Name : 19-07266-009
Date : 08/14/2019

Unshifted Count = All Vehicles & Uturns

	Golden State Blvd Southbound					Barnhart Rd Westbound					Golden State Blvd Northbound					Barnhart Rd Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	0	23	0	0	23	1	0	4	0	5	0	54	1	0	55	0	0	0	0	0	83	0
7:15	1	41	0	0	42	1	0	1	0	2	0	81	0	0	81	0	0	0	0	0	125	0
7:30	1	58	0	1	60	0	0	3	0	3	0	95	1	0	96	0	0	0	0	0	159	1
7:45	1	32	0	0	33	5	0	3	0	8	0	121	0	1	122	0	0	0	0	0	163	1
Total	3	154	0	1	158	7	0	11	0	18	0	351	2	1	354	0	0	0	0	0	530	2
8:00	3	34	0	0	37	2	0	2	0	4	0	57	0	0	57	0	0	0	0	0	98	0
8:15	1	32	0	0	33	4	0	1	0	5	0	46	3	0	49	0	0	0	0	0	87	0
8:30	0	45	0	0	45	0	0	3	0	3	0	33	2	0	35	0	0	0	0	0	83	0
8:45	0	39	0	0	39	1	0	1	0	2	0	36	2	0	38	0	0	0	0	0	79	0
Total	4	150	0	0	154	7	0	7	0	14	0	172	7	0	179	0	0	0	0	0	347	0
16:00	3	52	0	0	55	1	0	4	0	5	0	46	2	0	48	0	0	0	0	0	108	0
16:15	2	41	0	0	43	0	0	2	0	2	0	42	1	0	43	0	0	0	0	0	88	0
16:30	2	64	0	0	66	0	0	1	0	1	0	31	0	0	31	0	0	0	0	0	98	0
16:45	0	57	0	0	57	1	0	0	0	1	0	45	1	0	46	0	0	0	0	0	104	0
Total	7	214	0	0	221	2	0	7	0	9	0	164	4	0	168	0	0	0	0	0	398	0
17:00	2	73	0	0	75	0	0	0	0	0	0	45	3	0	48	0	0	0	0	0	123	0
17:15	2	80	0	0	82	0	0	0	0	0	0	54	1	0	55	0	0	0	0	0	137	0
17:30	1	50	0	0	51	2	0	2	0	4	0	48	2	0	50	0	0	0	0	0	105	0
17:45	5	54	0	0	59	3	0	0	0	3	0	32	2	0	34	0	0	0	0	0	96	0
Total	10	257	0	0	267	5	0	2	0	7	0	179	8	0	187	0	0	0	0	0	461	0
Grand Total	24	775	0	1	800	21	0	27	0	48	0	866	21	1	888	0	0	0	0	0	1736	2
Apprch %	3.0%	96.9%	0.0%	0.1%		43.8%	0.0%	56.3%	0.0%		0.0%	97.5%	2.4%	0.1%		0.0%	0.0%	0.0%	0.0%			
Total %	1.4%	44.6%	0.0%	0.1%	46.1%	1.2%	0.0%	1.6%	0.0%	2.8%	0.0%	49.9%	1.2%	0.1%	51.2%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	

AM PEAK HOUR	Golden State Blvd Southbound					Barnhart Rd Westbound					Golden State Blvd Northbound					Barnhart Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 07:15 to 08:15																					
Peak Hour For Entire Intersection Begins at 07:15																					
7:15	1	41	0	0	42	1	0	1	0	2	0	81	0	0	81	0	0	0	0	0	125
7:30	1	58	0	1	60	0	0	3	0	3	0	95	1	0	96	0	0	0	0	0	159
7:45	1	32	0	0	33	5	0	3	0	8	0	121	0	1	122	0	0	0	0	0	163
8:00	3	34	0	0	37	2	0	2	0	4	0	57	0	0	57	0	0	0	0	0	98
Total Volume	6	165	0	1	172	8	0	9	0	17	0	354	1	1	356	0	0	0	0	0	545
% App Total	3.5%	95.9%	0.0%	0.6%		47.1%	0.0%	52.9%	0.0%		0.0%	99.4%	0.3%	0.3%		0.0%	0.0%	0.0%	0.0%		
PHF	.500	.711	.000	.250	.717	.400	.000	.750	.000	.531	.000	.731	.250	.250	.730	.000	.000	.000	.000	.000	.836

PM PEAK HOUR	Golden State Blvd Southbound					Barnhart Rd Westbound					Golden State Blvd Northbound					Barnhart Rd Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	0	57	0	0	57	1	0	0	0	1	0	45	1	0	46	0	0	0	0	0	104
17:00	2	73	0	0	75	0	0	0	0	0	0	45	3	0	48	0	0	0	0	0	123
17:15	2	80	0	0	82	0	0	0	0	0	0	54	1	0	55	0	0	0	0	0	137
17:30	1	50	0	0	51	2	0	2	0	4	0	48	2	0	50	0	0	0	0	0	105
Total Volume	5	260	0	0	265	3	0	2	0	5	0	192	7	0	199	0	0	0	0	0	469
% App Total	1.9%	98.1%	0.0%	0.0%		60.0%	0.0%	40.0%	0.0%		0.0%	96.5%	3.5%	0.0%		0.0%	0.0%	0.0%	0.0%		
PHF	.625	.813	.000	.000	.808	.375	.000	.250	.000	.313	.000	.889	.583	.000	.905	.000	.000	.000	.000	.000	.856

Prepared by National Data & Surveying Services

In & Out Study

Location: Golden State Blvd @ Interstate Truck Center N Dwy **Date:** 8/14/2019

City: Turlock **Day:** Wednesday

15-Minute Summary			
TIME	Inbound	Outbound	TOTAL
7:00 AM	10	1	11
7:15 AM	3	1	4
7:30 AM	3	2	5
7:45 AM	7	2	9
8:00 AM	3	1	4
8:15 AM	1	1	2
8:30 AM	5	0	5
8:45 AM	8	4	12
Totals	40	12	52
4:00 PM	2	5	7
4:15 PM	0	3	3
4:30 PM	2	5	7
4:45 PM	0	8	8
5:00 PM	1	7	8
5:15 PM	0	4	4
5:30 PM	0	2	2
5:45 PM	0	6	6
Totals	5	40	45
Grand Total	45	52	97

Hourly Summary			
TIME	Inbound	Outbound	TOTAL
7:00 AM	23	6	29
8:00 AM	17	6	23
Totals	40	12	52
4:00 PM	4	21	25
5:00 PM	1	19	20
Totals	5	40	45
Grand Total	45	52	97

Prepared by National Data & Surveying Services

In & Out Study

Location: Golden State Blvd @ Interstate Truck Center S Dwy
City: Turlock

Date: 8/14/2019
Day: Wednesday

15-Minute Summary			
TIME	**Inbound**	**Outbound**	**TOTAL**
7:00 AM	3	0	***3***
7:15 AM	3	2	***5***
7:30 AM	7	1	***8***
7:45 AM	5	4	***9***
8:00 AM	1	2	***3***
8:15 AM	3	2	***5***
8:30 AM	3	1	***4***
8:45 AM	1	6	***7***
Totals	***26***	***18***	***44***
4:00 PM	0	7	***7***
4:15 PM	4	0	***4***
4:30 PM	1	4	***5***
4:45 PM	4	3	***7***
5:00 PM	4	4	***8***
5:15 PM	0	4	***4***
5:30 PM	0	1	***1***
5:45 PM	0	0	***0***
Totals	***13***	***23***	***36***
Grand Total	***39***	***41***	***80***

Hourly Summary			
TIME	**Inbound**	**Outbound**	**TOTAL**
7:00 AM	18	7	***25***
8:00 AM	8	11	***19***
Totals	***26***	***18***	***44***
4:00 PM	9	14	***23***
5:00 PM	4	9	***13***
Totals	***13***	***23***	***36***
Grand Total	***39***	***41***	***80***

National Data and Surveying Services

City of Modesto
All Vehicles & Uturns On Unshifted
Heavy Trucks On Bank 1
Nothing On Bank 2

(323) 782-0090
info@ndsdata.com

File Name : 17-7125-001 Faith Home Rd & SR 99 SB
Date : 3/1/2017

Unshifted Count = All Vehicles & Uturns

	Faith Home Rd Southbound					SR 99 SB Westbound					Faith Home Rd Northbound					SR 99 SB Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	0	722	0	0	722	0	0	0	0	0	0	1020	0	0	1020	0	0	0	0	0	1742	0
7:15	0	902	0	0	902	0	0	0	0	0	0	1379	0	0	1379	0	0	0	0	0	2281	0
7:30	0	1121	0	0	1121	0	0	0	0	0	0	1254	0	0	1254	0	0	0	0	0	2375	0
7:45	0	952	0	0	952	0	0	0	0	0	0	1155	0	0	1155	0	0	0	0	0	2107	0
Total	0	3697	0	0	3697	0	0	0	0	0	0	4808	0	0	4808	0	0	0	0	0	8505	0
8:00	0	760	0	0	760	0	0	0	0	0	0	986	0	0	986	0	0	0	0	0	1746	0
8:15	0	871	0	0	871	0	0	0	0	0	0	954	0	0	954	0	0	0	0	0	1825	0
8:30	0	910	0	0	910	0	0	0	0	0	0	851	0	0	851	0	0	0	0	0	1761	0
8:45	0	855	0	0	855	0	0	0	0	0	0	805	0	0	805	0	0	0	0	0	1660	0
Total	0	3396	0	0	3396	0	0	0	0	0	0	3596	0	0	3596	0	0	0	0	0	6992	0
16:00	0	1206	0	0	1206	0	0	0	0	0	0	1009	0	0	1009	0	0	0	0	0	2215	0
16:15	0	1244	0	0	1244	0	0	0	0	0	0	1123	0	0	1123	0	0	0	0	0	2367	0
16:30	0	1145	0	0	1145	0	0	0	0	0	0	1074	0	0	1074	0	0	0	0	0	2219	0
16:45	0	1231	0	0	1231	0	0	0	0	0	0	1143	0	0	1143	0	0	0	0	0	2374	0
Total	0	4826	0	0	4826	0	0	0	0	0	0	4349	0	0	4349	0	0	0	0	0	9175	0
17:00	0	1216	0	0	1216	0	0	0	0	0	0	1135	0	0	1135	0	0	0	0	0	2351	0
17:15	0	1179	0	0	1179	0	0	0	0	0	0	1059	0	0	1059	0	0	0	0	0	2238	0
17:30	0	1173	0	0	1173	0	0	0	0	0	0	998	0	0	998	0	0	0	0	0	2171	0
17:45	0	1177	0	0	1177	0	0	0	0	0	0	870	0	0	870	0	0	0	0	0	2047	0
Total	0	4745	0	0	4745	0	0	0	0	0	0	4062	0	0	4062	0	0	0	0	0	8807	0
Grand Total	0	16664	0	0	16664	0	0	0	0	0	0	16815	0	0	16815	0	0	0	0	0	33479	0
Apprch %	0.0%	100.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%			
Total %	0.0%	49.8%	0.0%	0.0%	49.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.2%	0.0%	0.0%	50.2%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	

AM PEAK HOUR	Faith Home Rd Southbound					SR 99 SB Westbound					Faith Home Rd Northbound					SR 99 SB Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 07:00 to 08:00																					
Peak Hour For Entire Intersection Begins at 07:00																					
7:00	0	722	0	0	722	0	0	0	0	0	0	1020	0	0	1020	0	0	0	0	0	1742
7:15	0	902	0	0	902	0	0	0	0	0	0	1379	0	0	1379	0	0	0	0	0	2281
7:30	0	1121	0	0	1121	0	0	0	0	0	0	1254	0	0	1254	0	0	0	0	0	2375
7:45	0	952	0	0	952	0	0	0	0	0	0	1155	0	0	1155	0	0	0	0	0	2107
Total Volume	0	3697	0	0	3697	0	0	0	0	0	0	4808	0	0	4808	0	0	0	0	0	8505
% App Total	0.0%	100.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		
PHF	.000	.824	.000	.000	.824	.000	.000	.000	.000	.000	.000	.872	.000	.000	.872	.000	.000	.000	.000	.000	.895

PM PEAK HOUR	Faith Home Rd Southbound					SR 99 SB Westbound					Faith Home Rd Northbound					SR 99 SB Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:15 to 17:15																					
Peak Hour For Entire Intersection Begins at 16:15																					
16:15	0	1244	0	0	1244	0	0	0	0	0	0	1123	0	0	1123	0	0	0	0	0	2367
16:30	0	1145	0	0	1145	0	0	0	0	0	0	1074	0	0	1074	0	0	0	0	0	2219
16:45	0	1231	0	0	1231	0	0	0	0	0	0	1143	0	0	1143	0	0	0	0	0	2374
17:00	0	1216	0	0	1216	0	0	0	0	0	0	1135	0	0	1135	0	0	0	0	0	2351
Total Volume	0	4836	0	0	4836	0	0	0	0	0	0	4475	0	0	4475	0	0	0	0	0	9311
% App Total	0.0%	100.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		
PHF	.000	.972	.000	.000	.972	.000	.000	.000	.000	.000	.000	.979	.000	.000	.979	.000	.000	.000	.000	.000	.981

National Data and Surveying Services

City of Modesto
All Vehicles & Uturns On Unshifted
Heavy Trucks On Bank 1
Nothing On Bank 2

(323) 782-0090
info@ndsdata.com

File Name : 17-7125-001 Faith Home Rd & SR 99 SB
Date : 3/1/2017

Bank 1 Count = Heavy Trucks

	Faith Home Rd Southbound					SR 99 SB Westbound					Faith Home Rd Northbound					SR 99 SB Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Peds Total
7:00	0	112	0	0	112	0	0	0	0	0	0	90	0	0	90	0	0	0	0	0	202	0
7:15	0	100	0	0	100	0	0	0	0	0	0	107	0	0	107	0	0	0	0	0	207	0
7:30	0	102	0	0	102	0	0	0	0	0	0	79	0	0	79	0	0	0	0	0	181	0
7:45	0	109	0	0	109	0	0	0	0	0	0	112	0	0	112	0	0	0	0	0	221	0
Total	0	423	0	0	423	0	0	0	0	0	0	388	0	0	388	0	0	0	0	0	811	0
8:00	0	105	0	0	105	0	0	0	0	0	0	89	0	0	89	0	0	0	0	0	194	0
8:15	0	128	0	0	128	0	0	0	0	0	0	112	0	0	112	0	0	0	0	0	240	0
8:30	0	143	0	0	143	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	243	0
8:45	0	125	0	0	125	0	0	0	0	0	0	90	0	0	90	0	0	0	0	0	215	0
Total	0	501	0	0	501	0	0	0	0	0	0	391	0	0	391	0	0	0	0	0	892	0
16:00	0	86	0	0	86	0	0	0	0	0	0	71	0	0	71	0	0	0	0	0	157	0
16:15	0	85	0	0	85	0	0	0	0	0	0	80	0	0	80	0	0	0	0	0	165	0
16:30	0	96	0	0	96	0	0	0	0	0	0	82	0	0	82	0	0	0	0	0	178	0
16:45	0	67	0	0	67	0	0	0	0	0	0	66	0	0	66	0	0	0	0	0	133	0
Total	0	334	0	0	334	0	0	0	0	0	0	299	0	0	299	0	0	0	0	0	633	0
17:00	0	116	0	0	116	0	0	0	0	0	0	75	0	0	75	0	0	0	0	0	191	0
17:15	0	68	0	0	68	0	0	0	0	0	0	56	0	0	56	0	0	0	0	0	124	0
17:30	0	71	0	0	71	0	0	0	0	0	0	61	0	0	61	0	0	0	0	0	132	0
17:45	0	82	0	0	82	0	0	0	0	0	0	67	0	0	67	0	0	0	0	0	149	0
Total	0	337	0	0	337	0	0	0	0	0	0	259	0	0	259	0	0	0	0	0	596	0
Grand Total	0	1595	0	0	1595	0	0	0	0	0	0	1337	0	0	1337	0	0	0	0	0	2932	0
Apprch %	0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%				
Total %	0.0%	54.4%	0.0%		54.4%	0.0%	0.0%	0.0%		0.0%	0.0%	45.6%	0.0%		45.6%	0.0%	0.0%	0.0%		0.0%	100.0%	

AM PEAK HOUR	Faith Home Rd Southbound					SR 99 SB Westbound					Faith Home Rd Northbound					SR 99 SB Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 07:00 to 08:00																					
Peak Hour For Entire Intersection Begins at 07:00																					
7:00	0	112	0	0	112	0	0	0	0	0	0	90	0	0	90	0	0	0	0	0	202
7:15	0	100	0	0	100	0	0	0	0	0	0	107	0	0	107	0	0	0	0	0	207
7:30	0	102	0	0	102	0	0	0	0	0	0	79	0	0	79	0	0	0	0	0	181
7:45	0	109	0	0	109	0	0	0	0	0	0	112	0	0	112	0	0	0	0	0	221
Total Volume	0	423	0	0	423	0	0	0	0	0	0	388	0	0	388	0	0	0	0	0	811
% App Total	0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			
PHF	.000	.944	.000		.944	.000	.000	.000		.000	.000	.866	.000		.866	.000	.000	.000		.000	.917

PM PEAK HOUR	Faith Home Rd Southbound					SR 99 SB Westbound					Faith Home Rd Northbound					SR 99 SB Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 16:15 to 17:15																					
Peak Hour For Entire Intersection Begins at 16:15																					
16:15	0	85	0	0	85	0	0	0	0	0	0	80	0	0	80	0	0	0	0	0	165
16:30	0	96	0	0	96	0	0	0	0	0	0	82	0	0	82	0	0	0	0	0	178
16:45	0	67	0	0	67	0	0	0	0	0	0	66	0	0	66	0	0	0	0	0	133
17:00	0	116	0	0	116	0	0	0	0	0	0	75	0	0	75	0	0	0	0	0	191
Total Volume	0	364	0	0	364	0	0	0	0	0	0	303	0	0	303	0	0	0	0	0	667
% App Total	0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			
PHF	.000	.784	.000		.784	.000	.000	.000		.000	.000	.924	.000		.924	.000	.000	.000		.000	.873

Appendix B:
Intersection Operation Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	221	5	37	338	56	10	57	27	93	28	55
Future Volume (veh/h)	42	221	5	37	338	56	10	57	27	93	28	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1752	1752	1752	1811	1811	1811
Adj Flow Rate, veh/h	46	240	4	40	367	58	11	62	29	101	30	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	19	19	19	11	11	11	10	10	10	6	6	6
Cap, veh/h	65	580	10	62	528	83	17	95	45	195	152	45
Arrive On Green	0.04	0.37	0.37	0.04	0.36	0.36	0.09	0.09	0.09	0.11	0.11	0.11
Sat Flow, veh/h	1541	1587	26	1654	1464	231	179	1008	471	1725	1338	401
Grp Volume(v), veh/h	46	0	244	40	0	425	102	0	0	101	0	39
Grp Sat Flow(s),veh/h/ln	1541	0	1614	1654	0	1695	1658	0	0	1725	0	1739
Q Serve(g_s), s	0.9	0.0	3.5	0.7	0.0	6.6	1.8	0.0	0.0	1.7	0.0	0.6
Cycle Q Clear(g_c), s	0.9	0.0	3.5	0.7	0.0	6.6	1.8	0.0	0.0	1.7	0.0	0.6
Prop In Lane	1.00		0.02	1.00		0.14	0.11		0.28	1.00		0.23
Lane Grp Cap(c), veh/h	65	0	590	62	0	612	157	0	0	195	0	197
V/C Ratio(X)	0.71	0.00	0.41	0.64	0.00	0.69	0.65	0.00	0.00	0.52	0.00	0.20
Avail Cap(c_a), veh/h	850	0	1675	912	0	1760	1721	0	0	1790	0	1805
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.6	0.0	7.3	14.6	0.0	8.4	13.5	0.0	0.0	12.9	0.0	12.4
Incr Delay (d2), s/veh	13.1	0.0	0.5	10.5	0.0	1.4	4.5	0.0	0.0	2.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.7	0.4	0.0	1.5	0.7	0.0	0.0	0.6	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.7	0.0	7.8	25.2	0.0	9.8	18.0	0.0	0.0	15.0	0.0	12.9
LnGrp LOS	C	A	A	C	A	A	B	A	A	B	A	B
Approach Vol, veh/h		290			465			102			140	
Approach Delay, s/veh		10.9			11.2			18.0			14.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.3	14.1		5.9	4.2	14.3		6.5
Change Period (Y+Rc), s	3.0	3.0		3.0	3.0	3.0		3.0
Max Green Setting (Gmax), s	17.0	32.0		32.0	17.0	32.0		32.0
Max Q Clear Time (g_c+I1), s	2.9	8.6		3.8	2.7	5.5		3.7
Green Ext Time (p_c), s	0.1	2.5		0.5	0.0	1.3		0.4

Intersection Summary	
HCM 6th Ctrl Delay	12.2
HCM 6th LOS	B

Intersection												
Int Delay, s/veh	1.1											
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations												
Traffic Vol, veh/h	0	359	6	20	458	2	26	0	20	2	1	0
Future Vol, veh/h	0	359	6	20	458	2	26	0	20	2	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	21	21	21	12	12	12	2	2	2	67	67	67
Mvmt Flow	0	413	7	23	526	2	30	0	23	2	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	526	0	0	413	0	0	990	989	417	986	986	527
Stage 1	-	-	-	-	-	-	417	417	-	573	573	-
Stage 2	-	-	-	-	-	-	573	572	-	413	413	-
Critical Hdwy	4.31	-	-	4.22	-	-	7.12	6.52	6.22	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Follow-up Hdwy	2.389	-	-	2.308	-	-	3.518	4.018	3.318	4.103	4.603	3.903
Pot Cap-1 Maneuver	951	-	-	1094	-	-	225	247	636	174	193	443
Stage 1	-	-	-	-	-	-	613	591	-	407	413	-
Stage 2	-	-	-	-	-	-	505	504	-	506	496	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	951	-	-	1094	-	-	219	240	636	164	187	443
Mov Cap-2 Maneuver	-	-	-	-	-	-	219	240	-	164	187	-
Stage 1	-	-	-	-	-	-	613	591	-	407	401	-
Stage 2	-	-	-	-	-	-	488	489	-	488	496	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	15.8	26.5
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	387	951	-	-	1094	-	-	171
HCM Lane V/C Ratio	0.137	-	-	-	0.021	-	-	0.02
HCM Control Delay (s)	15.8	0	-	-	8.4	0	-	26.5
HCM Lane LOS	C	A	-	-	A	A	-	D
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	14.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	188	193	241	428	0	0	0	0	92	0	52
Future Vol, veh/h	0	188	193	241	428	0	0	0	0	92	0	52
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	21	21	21	12	12	12	2	2	2	22	22	22
Mvmt Flow	0	204	210	262	465	0	0	0	0	100	0	57

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	414	0	0				1298	1403	465
Stage 1	-	-	-	-	-	-				989	989	-
Stage 2	-	-	-	-	-	-				309	414	-
Critical Hdwy	-	-	-	4.22	-	-				6.62	6.72	6.42
Critical Hdwy Stg 1	-	-	-	-	-	-				5.62	5.72	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.62	5.72	-
Follow-up Hdwy	-	-	-	2.308	-	-				3.698	4.198	3.498
Pot Cap-1 Maneuver	0	-	-	1093	-	0				162	127	558
Stage 1	0	-	-	-	-	0				331	300	-
Stage 2	0	-	-	-	-	0				701	560	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1093	-	-				123	0	558
Mov Cap-2 Maneuver	-	-	-	-	-	-				123	0	-
Stage 1	-	-	-	-	-	-				252	0	-
Stage 2	-	-	-	-	-	-				701	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	3.4	102.1
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1093	-	171
HCM Lane V/C Ratio	-	-	0.24	-	0.915
HCM Control Delay (s)	-	-	9.3	-	102.1
HCM Lane LOS	-	-	A	-	F
HCM 95th %tile Q(veh)	-	-	0.9	-	6.8

Intersection												
Int Delay, s/veh	16											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	228	0	0	521	315	148	0	171	0	0	0
Future Vol, veh/h	52	228	0	0	521	315	148	0	171	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	22	22	22	9	9	9	18	18	18	2	2	2
Mvmt Flow	54	238	0	0	543	328	154	0	178	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	871	0	-	-	-	0	1053	1217	238
Stage 1	-	-	-	-	-	-	346	346	-
Stage 2	-	-	-	-	-	-	707	871	-
Critical Hdwy	4.32	-	-	-	-	-	6.58	6.68	6.38
Critical Hdwy Stg 1	-	-	-	-	-	-	5.58	5.68	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.58	5.68	-
Follow-up Hdwy	2.398	-	-	-	-	-	3.662	4.162	3.462
Pot Cap-1 Maneuver	696	-	0	0	-	-	234	168	763
Stage 1	-	-	0	0	-	-	682	608	-
Stage 2	-	-	0	0	-	-	461	347	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	696	-	-	-	-	-	216	0	763
Mov Cap-2 Maneuver	-	-	-	-	-	-	216	0	-
Stage 1	-	-	-	-	-	-	629	0	-
Stage 2	-	-	-	-	-	-	461	0	-

Approach	EB	WB	NB
HCM Control Delay, s	2	0	70.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	351	696	-	-	-
HCM Lane V/C Ratio	0.947	0.078	-	-	-
HCM Control Delay (s)	70.4	10.6	-	-	-
HCM Lane LOS	F	B	-	-	-
HCM 95th %tile Q(veh)	10.1	0.3	-	-	-

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	7	15	76	95	37	29	88	98	29	21	179	12
Future Vol, veh/h	7	15	76	95	37	29	88	98	29	21	179	12
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	10	10	10	2	2	2	6	6	6	2	2	2
Mvmt Flow	8	17	87	109	43	33	101	113	33	24	206	14
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	10.5	11.1	10.8
HCM LOS	A	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	41%	7%	59%	10%
Vol Thru, %	46%	15%	23%	84%
Vol Right, %	13%	78%	18%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	215	98	161	212
LT Vol	88	7	95	21
Through Vol	98	15	37	179
RT Vol	29	76	29	12
Lane Flow Rate	247	113	185	244
Geometry Grp	1	1	1	1
Degree of Util (X)	0.356	0.163	0.278	0.346
Departure Headway (Hd)	5.181	5.221	5.411	5.108
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	694	687	664	704
Service Time	3.207	3.255	3.44	3.134
HCM Lane V/C Ratio	0.356	0.164	0.279	0.347
HCM Control Delay	11.1	9.3	10.5	10.8
HCM Lane LOS	B	A	B	B
HCM 95th-tile Q	1.6	0.6	1.1	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	238	80	40	420	4	219	130	73	7	146	197
Future Volume (veh/h)	81	238	80	40	420	4	219	130	73	7	146	197
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1781	1781	1781	1841	1841	1841
Adj Flow Rate, veh/h	84	248	76	42	438	4	228	135	62	7	152	174
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	19	19	19	11	11	11	8	8	8	4	4	4
Cap, veh/h	104	409	125	55	532	5	316	215	99	434	191	219
Arrive On Green	0.07	0.34	0.34	0.03	0.31	0.31	0.19	0.19	0.19	0.25	0.25	0.25
Sat Flow, veh/h	1541	1189	364	1654	1718	16	1697	1155	531	1753	773	885
Grp Volume(v), veh/h	84	0	324	42	0	442	228	0	197	7	0	326
Grp Sat Flow(s),veh/h/ln	1541	0	1553	1654	0	1734	1697	0	1686	1753	0	1658
Q Serve(g_s), s	3.4	0.0	11.0	1.6	0.0	15.0	8.0	0.0	6.8	0.2	0.0	11.7
Cycle Q Clear(g_c), s	3.4	0.0	11.0	1.6	0.0	15.0	8.0	0.0	6.8	0.2	0.0	11.7
Prop In Lane	1.00		0.23	1.00		0.01	1.00		0.31	1.00		0.53
Lane Grp Cap(c), veh/h	104	0	534	55	0	537	316	0	314	434	0	410
V/C Ratio(X)	0.81	0.00	0.61	0.77	0.00	0.82	0.72	0.00	0.63	0.02	0.00	0.79
Avail Cap(c_a), veh/h	414	0	1030	444	0	1150	1125	0	1118	1163	0	1100
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.1	0.0	17.2	30.4	0.0	20.3	24.2	0.0	23.7	18.0	0.0	22.3
Incr Delay (d2), s/veh	13.7	0.0	1.1	19.9	0.0	3.2	3.1	0.0	2.1	0.0	0.0	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	3.5	0.9	0.0	5.7	3.2	0.0	2.6	0.1	0.0	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.8	0.0	18.3	50.3	0.0	23.5	27.3	0.0	25.8	18.0	0.0	25.9
LnGrp LOS	D	A	B	D	A	C	C	A	C	B	A	C
Approach Vol, veh/h		408			484			425			333	
Approach Delay, s/veh		23.4			25.8			26.6			25.7	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.3	22.6		14.8	5.1	24.8		18.7
Change Period (Y+Rc), s	3.0	3.0		3.0	3.0	3.0		3.0
Max Green Setting (Gmax), s	17.0	42.0		42.0	17.0	42.0		42.0
Max Q Clear Time (g_c+I1), s	5.4	17.0		10.0	3.6	13.0		13.7
Green Ext Time (p_c), s	0.1	2.7		1.8	0.0	2.0		2.0

Intersection Summary		
HCM 6th Ctrl Delay		25.4
HCM 6th LOS		C

Intersection						
Int Delay, s/veh	5.8					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	35	20	57	58	54	107
Future Vol, veh/h	35	20	57	58	54	107
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	5	5	4	4	1	1
Mvmt Flow	42	24	69	70	65	129

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	142	0	-	0	215	107
Stage 1	-	-	-	-	107	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	4.15	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.245	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1423	-	-	-	775	950
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	919	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1419	-	-	-	747	947
Mov Cap-2 Maneuver	-	-	-	-	747	-
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	916	-

Approach	EB	WB	SB
HCM Control Delay, s	4.8	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1419	-	-	-	869
HCM Lane V/C Ratio	0.03	-	-	-	0.223
HCM Control Delay (s)	7.6	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

Intersection						
Int Delay, s/veh	1.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	48	270	435	60	38	29
Future Vol, veh/h	48	270	435	60	38	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	22	22	11	11	0	0
Mvmt Flow	50	281	453	63	40	30

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	453	0	-	0	834	453
Stage 1	-	-	-	-	453	-
Stage 2	-	-	-	-	381	-
Critical Hdwy	4.32	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.398	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1010	-	-	0	341	611
Stage 1	-	-	-	0	645	-
Stage 2	-	-	-	0	695	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1010	-	-	-	324	611
Mov Cap-2 Maneuver	-	-	-	-	324	-
Stage 1	-	-	-	-	613	-
Stage 2	-	-	-	-	695	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	12.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	1010	-	-	571
HCM Lane V/C Ratio	0.05	-	-	0.122
HCM Control Delay (s)	8.8	-	-	12.2
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	0.4

Intersection						
Int Delay, s/veh	0.5					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	9	356	1	7	165
Future Vol, veh/h	8	9	356	1	7	165
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	12	12	6	6	5	5
Mvmt Flow	10	11	424	1	8	196

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	636	424	0	-	424	0
Stage 1	424	-	-	-	-	-
Stage 2	212	-	-	-	-	-
Critical Hdwy	6.52	6.32	-	-	4.15	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.408	-	-	2.245	-
Pot Cap-1 Maneuver	426	609	-	0	1119	-
Stage 1	639	-	-	0	-	-
Stage 2	800	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	423	609	-	-	1119	-
Mov Cap-2 Maneuver	423	-	-	-	-	-
Stage 1	635	-	-	-	-	-
Stage 2	800	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.4	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	505	1119	-
HCM Lane V/C Ratio	-	0.04	0.007	-
HCM Control Delay (s)	-	12.4	8.2	-
HCM Lane LOS	-	B	A	-
HCM 95th %tile Q(veh)	-	0.1	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	469	15	41	172	73	8	56	33	126	62	14
Future Volume (veh/h)	52	469	15	41	172	73	8	56	33	126	62	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1781	1781	1781	1885	1885	1885	1841	1841	1841
Adj Flow Rate, veh/h	56	504	15	44	185	69	9	60	35	135	67	6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	8	8	8	1	1	1	4	4	4
Cap, veh/h	84	688	20	68	472	176	14	93	54	229	218	19
Arrive On Green	0.05	0.39	0.39	0.04	0.38	0.38	0.09	0.09	0.09	0.13	0.13	0.13
Sat Flow, veh/h	1739	1764	52	1697	1237	461	153	1021	596	1753	1665	149
Grp Volume(v), veh/h	56	0	519	44	0	254	104	0	0	135	0	73
Grp Sat Flow(s),veh/h/ln	1739	0	1816	1697	0	1698	1770	0	0	1753	0	1814
Q Serve(g_s), s	1.1	0.0	8.4	0.9	0.0	3.7	2.0	0.0	0.0	2.5	0.0	1.3
Cycle Q Clear(g_c), s	1.1	0.0	8.4	0.9	0.0	3.7	2.0	0.0	0.0	2.5	0.0	1.3
Prop In Lane	1.00		0.03	1.00		0.27	0.09		0.34	1.00		0.08
Lane Grp Cap(c), veh/h	84	0	708	68	0	648	162	0	0	229	0	237
V/C Ratio(X)	0.67	0.00	0.73	0.65	0.00	0.39	0.64	0.00	0.00	0.59	0.00	0.31
Avail Cap(c_a), veh/h	858	0	1687	837	0	1577	1644	0	0	1628	0	1684
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.1	0.0	9.0	16.3	0.0	7.8	15.1	0.0	0.0	14.1	0.0	13.6
Incr Delay (d2), s/veh	8.8	0.0	1.5	10.0	0.0	0.4	4.2	0.0	0.0	2.4	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	2.1	0.5	0.0	0.8	0.8	0.0	0.0	0.9	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.0	0.0	10.5	26.3	0.0	8.1	19.3	0.0	0.0	16.5	0.0	14.3
LnGrp LOS	C	A	B	C	A	A	B	A	A	B	A	B
Approach Vol, veh/h		575			298			104			208	
Approach Delay, s/veh		11.9			10.8			19.3			15.7	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		7.5	4.7	16.1		6.2	4.4	16.4				
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0				
Max Green Setting (Gmax), s		32.0	17.0	32.0		32.0	17.0	32.0				
Max Q Clear Time (g_c+I1), s		4.5	3.1	5.7		4.0	2.9	10.4				
Green Ext Time (p_c), s		0.7	0.1	1.4		0.5	0.1	3.1				
Intersection Summary												
HCM 6th Ctrl Delay			12.9									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	684	17	43	284	10	11	0	29	9	0	2
Future Vol, veh/h	1	684	17	43	284	10	11	0	29	9	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	10	10	10	5	5	5	9	9	9
Mvmt Flow	1	743	18	47	309	11	12	0	32	10	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	309	0	0	743	0	0	1157	1157	752	1154	1154	315
Stage 1	-	-	-	-	-	-	754	754	-	409	409	-
Stage 2	-	-	-	-	-	-	403	403	-	745	745	-
Critical Hdwy	4.14	-	-	4.2	-	-	7.15	6.55	6.25	7.19	6.59	6.29
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Follow-up Hdwy	2.236	-	-	2.29	-	-	3.545	4.045	3.345	3.581	4.081	3.381
Pot Cap-1 Maneuver	1240	-	-	829	-	-	171	194	405	169	191	709
Stage 1	-	-	-	-	-	-	397	413	-	606	584	-
Stage 2	-	-	-	-	-	-	618	595	-	395	411	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1240	-	-	829	-	-	161	180	405	148	178	709
Mov Cap-2 Maneuver	-	-	-	-	-	-	161	180	-	148	178	-
Stage 1	-	-	-	-	-	-	397	413	-	605	544	-
Stage 2	-	-	-	-	-	-	574	554	-	364	411	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.2	12	26.3
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	559	1240	-	-	829	-	-	181
HCM Lane V/C Ratio	0.078	0.001	-	-	0.056	-	-	0.066
HCM Control Delay (s)	12	7.9	0	-	9.6	0	-	26.3
HCM Lane LOS	B	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	0.3	0	-	-	0.2	-	-	0.2

Intersection												
Int Delay, s/veh	45.9											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	297	425	194	256	0	0	0	0	159	2	81
Future Vol, veh/h	0	297	425	194	256	0	0	0	0	159	2	81
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	9	9	9	2	2	2	9	9	9
Mvmt Flow	0	323	462	211	278	0	0	0	0	173	2	88

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	785	0	0				1254	1485	278
Stage 1	-	-	-	-	-	-				700	700	-
Stage 2	-	-	-	-	-	-				554	785	-
Critical Hdwy	-	-	-	4.19	-	-				6.49	6.59	6.29
Critical Hdwy Stg 1	-	-	-	-	-	-				5.49	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.49	5.59	-
Follow-up Hdwy	-	-	-	2.281	-	-				3.581	4.081	3.381
Pot Cap-1 Maneuver	0	-	-	803	-	0				183	120	744
Stage 1	0	-	-	-	-	0				480	431	-
Stage 2	0	-	-	-	-	0				562	394	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	803	-	-				~ 135	0	744
Mov Cap-2 Maneuver	-	-	-	-	-	-				~ 135	0	-
Stage 1	-	-	-	-	-	-				354	0	-
Stage 2	-	-	-	-	-	-				562	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	4.8	259.1
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	803	-	187
HCM Lane V/C Ratio	-	-	0.263	-	1.407
HCM Control Delay (s)	-	-	11.1	-	259.1
HCM Lane LOS	-	-	B	-	F
HCM 95th %tile Q(veh)	-	-	1.1	-	15.8

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	297	425	194	256	0	0	0	0	159	2	81
Future Volume (veh/h)	0	297	425	194	256	0	0	0	0	159	2	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1767	1767	0				1900	1767	1900
Adj Flow Rate, veh/h	0	323	422	211	278	0				173	2	73
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	9	9	0				0	9	0
Cap, veh/h	0	409	534	238	1334	0				192	2	81
Arrive On Green	0.00	0.58	0.58	0.14	0.76	0.00				0.17	0.17	0.17
Sat Flow, veh/h	0	709	927	1682	1767	0				1133	13	478
Grp Volume(v), veh/h	0	0	745	211	278	0				248	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1636	1682	1767	0				1624	0	0
Q Serve(g_s), s	0.0	0.0	42.5	14.8	5.5	0.0				18.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	42.5	14.8	5.5	0.0				18.0	0.0	0.0
Prop In Lane	0.00		0.57	1.00		0.00				0.70		0.29
Lane Grp Cap(c), veh/h	0	0	943	238	1334	0				275	0	0
V/C Ratio(X)	0.00	0.00	0.79	0.89	0.21	0.00				0.90	0.00	0.00
Avail Cap(c_a), veh/h	0	0	943	287	1334	0				315	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.84	0.84	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	19.8	50.6	4.3	0.0				48.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	6.7	20.7	0.3	0.0				25.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	16.5	7.5	1.7	0.0				9.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	26.5	71.3	4.6	0.0				74.0	0.0	0.0
LnGrp LOS	A	A	C	E	A	A				E	A	A
Approach Vol, veh/h		745			489						248	
Approach Delay, s/veh		26.5			33.4						74.0	
Approach LOS		C			C						E	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		95.1		24.9	21.5	73.7						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		87.7		23.3	20.5	62.7						
Max Q Clear Time (g_c+I1), s		7.5		20.0	16.8	44.5						
Green Ext Time (p_c), s		1.7		0.4	0.2	5.2						

Intersection Summary			
HCM 6th Ctrl Delay			36.7
HCM 6th LOS			D

Intersection	
Int Delay, s/veh	15.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	49	407	0	0	331	142	119	0	247	0	0	0
Future Vol, veh/h	49	407	0	0	331	142	119	0	247	0	0	0
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	7	7	7	9	9	9	8	8	8	2	2	2
Mvmt Flow	52	428	0	0	348	149	125	0	260	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	499	0	-	-	-	0	955	1031	428
Stage 1	-	-	-	-	-	-	532	532	-
Stage 2	-	-	-	-	-	-	423	499	-
Critical Hdwy	4.17	-	-	-	-	-	6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.48	5.58	-
Follow-up Hdwy	2.263	-	-	-	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	1040	-	0	0	-	-	280	228	614
Stage 1	-	-	0	0	-	-	577	516	-
Stage 2	-	-	0	0	-	-	648	534	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1040	-	-	-	-	-	266	0	614
Mov Cap-2 Maneuver	-	-	-	-	-	-	266	0	-
Stage 1	-	-	-	-	-	-	548	0	-
Stage 2	-	-	-	-	-	-	648	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.9	0	52.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	431	1040	-	-	-
HCM Lane V/C Ratio	0.894	0.05	-	-	-
HCM Control Delay (s)	52.2	8.6	-	-	-
HCM Lane LOS	F	A	-	-	-
HCM 95th %tile Q(veh)	9.5	0.2	-	-	-

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	2	20	73	59	13	12	38	110	19	6	92	4
Future Vol, veh/h	2	20	73	59	13	12	38	110	19	6	92	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	2	2	2
Mvmt Flow	2	21	77	62	14	13	40	116	20	6	97	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	8.5	8.8	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	2%	70%	6%
Vol Thru, %	66%	21%	15%	90%
Vol Right, %	11%	77%	14%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	167	95	84	102
LT Vol	38	2	59	6
Through Vol	110	20	13	92
RT Vol	19	73	12	4
Lane Flow Rate	176	100	88	107
Geometry Grp	1	1	1	1
Degree of Util (X)	0.219	0.12	0.118	0.136
Departure Headway (Hd)	4.488	4.31	4.792	4.558
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	800	831	748	786
Service Time	2.514	2.338	2.821	2.587
HCM Lane V/C Ratio	0.22	0.12	0.118	0.136
HCM Control Delay	8.8	7.9	8.5	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.4	0.4	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	417	157	68	233	5	121	82	70	11	94	119
Future Volume (veh/h)	80	417	157	68	233	5	121	82	70	11	94	119
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1811	1811	1811	1841	1841	1841
Adj Flow Rate, veh/h	83	434	158	71	243	4	126	85	50	11	98	92
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	7	7	7	6	6	6	4	4	4
Cap, veh/h	106	526	191	90	721	12	241	149	87	290	144	135
Arrive On Green	0.06	0.42	0.42	0.05	0.41	0.41	0.14	0.14	0.14	0.17	0.17	0.17
Sat Flow, veh/h	1711	1256	457	1711	1762	29	1725	1064	626	1753	869	816
Grp Volume(v), veh/h	83	0	592	71	0	247	126	0	135	11	0	190
Grp Sat Flow(s),veh/h/ln	1711	0	1713	1711	0	1791	1725	0	1690	1753	0	1685
Q Serve(g_s), s	2.6	0.0	16.4	2.2	0.0	5.1	3.6	0.0	4.0	0.3	0.0	5.7
Cycle Q Clear(g_c), s	2.6	0.0	16.4	2.2	0.0	5.1	3.6	0.0	4.0	0.3	0.0	5.7
Prop In Lane	1.00		0.27	1.00		0.02	1.00		0.37	1.00		0.48
Lane Grp Cap(c), veh/h	106	0	717	90	0	733	241	0	236	290	0	279
V/C Ratio(X)	0.78	0.00	0.83	0.79	0.00	0.34	0.52	0.00	0.57	0.04	0.00	0.68
Avail Cap(c_a), veh/h	543	0	1343	543	0	1404	1352	0	1325	1374	0	1321
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.8	0.0	13.8	25.1	0.0	10.9	21.4	0.0	21.6	18.8	0.0	21.0
Incr Delay (d2), s/veh	11.7	0.0	2.5	14.4	0.0	0.3	1.8	0.0	2.2	0.1	0.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	5.3	1.2	0.0	1.6	1.4	0.0	1.5	0.1	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.5	0.0	16.3	39.5	0.0	11.1	23.2	0.0	23.7	18.8	0.0	24.0
LnGrp LOS	D	A	B	D	A	B	C	A	C	B	A	C
Approach Vol, veh/h		675			318			261			201	
Approach Delay, s/veh		18.8			17.5			23.5			23.7	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		11.9	6.3	24.9		10.5	5.8	25.4
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0
Max Green Setting (Gmax), s		42.0	17.0	42.0		42.0	17.0	42.0
Max Q Clear Time (g_c+I1), s		7.7	4.6	7.1		6.0	4.2	18.4
Green Ext Time (p_c), s		1.1	0.1	1.4		1.1	0.1	3.9

Intersection Summary	
HCM 6th Ctrl Delay	20.0
HCM 6th LOS	C

Intersection						
Int Delay, s/veh	4.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	17	32	73	42	50
Future Vol, veh/h	28	17	32	73	42	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	3	3	1	1
Mvmt Flow	33	20	37	85	49	58

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	122	0	-	0	166	80
Stage 1	-	-	-	-	80	-
Stage 2	-	-	-	-	86	-
Critical Hdwy	4.1	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.2	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1478	-	-	-	827	983
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	940	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1478	-	-	-	808	983
Mov Cap-2 Maneuver	-	-	-	-	808	-
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	940	-

Approach	EB	WB	SB
HCM Control Delay, s	4.7	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1478	-	-	-	895
HCM Lane V/C Ratio	0.022	-	-	-	0.12
HCM Control Delay (s)	7.5	0	-	-	9.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	445	268	49	36	38
Future Vol, veh/h	53	445	268	49	36	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	8	1	1
Mvmt Flow	56	473	285	52	38	40

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	285	0	-	0	870	285
Stage 1	-	-	-	-	285	-
Stage 2	-	-	-	-	585	-
Critical Hdwy	4.18	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.272	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1244	-	-	0	323	756
Stage 1	-	-	-	0	766	-
Stage 2	-	-	-	0	559	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1244	-	-	-	308	756
Mov Cap-2 Maneuver	-	-	-	-	308	-
Stage 1	-	-	-	-	732	-
Stage 2	-	-	-	-	559	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	1244	-	-	633
HCM Lane V/C Ratio	0.045	-	-	0.124
HCM Control Delay (s)	8	-	-	11.5
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	0.4

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	1	175	5	6	274
Future Vol, veh/h	1	1	175	5	6	274
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	7	7	2	2
Mvmt Flow	1	1	208	6	7	326

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	548	208	0	-	208	0
Stage 1	208	-	-	-	-	-
Stage 2	340	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.12	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.218	-
Pot Cap-1 Maneuver	501	837	-	0	1363	-
Stage 1	832	-	-	0	-	-
Stage 2	725	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	498	837	-	-	1363	-
Mov Cap-2 Maneuver	498	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	725	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	624	1363	-
HCM Lane V/C Ratio	-	0.004	0.005	-
HCM Control Delay (s)	-	10.8	7.7	-
HCM Lane LOS	-	B	A	-
HCM 95th %tile Q(veh)	-	0	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	188	193	241	428	0	0	0	0	92	0	52
Future Volume (veh/h)	0	188	193	241	428	0	0	0	0	92	0	52
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1589	1589	1722	1722	0				1900	1574	1900
Adj Flow Rate, veh/h	0	204	186	262	465	0				100	0	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	21	21	12	12	0				0	22	0
Cap, veh/h	0	478	436	286	1441	0				121	0	10
Arrive On Green	0.00	0.62	0.62	0.35	1.00	0.00				0.09	0.00	0.09
Sat Flow, veh/h	0	765	698	1640	1722	0				1375	0	110
Grp Volume(v), veh/h	0	0	390	262	465	0				108	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1463	1640	1722	0				1485	0	0
Q Serve(g_s), s	0.0	0.0	16.4	18.3	0.0	0.0				8.6	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	16.4	18.3	0.0	0.0				8.6	0.0	0.0
Prop In Lane	0.00		0.48	1.00		0.00				0.93		0.07
Lane Grp Cap(c), veh/h	0	0	914	286	1441	0				131	0	0
V/C Ratio(X)	0.00	0.00	0.43	0.92	0.32	0.00				0.82	0.00	0.00
Avail Cap(c_a), veh/h	0	0	914	458	1441	0				254	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.46	0.46	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	11.5	38.2	0.0	0.0				53.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.5	8.4	0.3	0.0				12.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	5.3	6.5	0.1	0.0				3.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	13.0	46.6	0.3	0.0				65.9	0.0	0.0
LnGrp LOS	A	A	B	D	A	A				E	A	A
Approach Vol, veh/h		390			727						108	
Approach Delay, s/veh		13.0			17.0						65.9	
Approach LOS		B			B						E	

Timer - Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		104.9		15.1	25.4	79.5		
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		
Max Green Setting (Gmax), s		90.5		20.5	33.5	52.5		
Max Q Clear Time (g_c+I1), s		2.0		10.6	20.3	18.4		
Green Ext Time (p_c), s		3.1		0.3	0.6	2.6		

Intersection Summary		
HCM 6th Ctrl Delay		20.0
HCM 6th LOS		C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	228	0	0	521	315	148	0	171	0	0	0
Future Volume (veh/h)	52	228	0	0	521	315	148	0	171	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1574	1574	0	0	1767	1767	1900	1633	1900			
Adj Flow Rate, veh/h	54	238	0	0	543	311	154	0	135			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	22	22	0	0	9	9	0	18	0			
Cap, veh/h	65	1119	0	0	664	380	168	0	147			
Arrive On Green	0.09	1.00	0.00	0.00	0.63	0.63	0.21	0.00	0.21			
Sat Flow, veh/h	1499	1574	0	0	1054	604	784	0	687			
Grp Volume(v), veh/h	54	238	0	0	0	854	289	0	0			
Grp Sat Flow(s),veh/h/ln	1499	1574	0	0	0	1658	1470	0	0			
Q Serve(g_s), s	4.3	0.0	0.0	0.0	0.0	47.2	23.1	0.0	0.0			
Cycle Q Clear(g_c), s	4.3	0.0	0.0	0.0	0.0	47.2	23.1	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.36	0.53		0.47			
Lane Grp Cap(c), veh/h	65	1119	0	0	0	1044	315	0	0			
V/C Ratio(X)	0.83	0.21	0.00	0.00	0.00	0.82	0.92	0.00	0.00			
Avail Cap(c_a), veh/h	81	1119	0	0	0	1044	361	0	0			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.00	0.61	1.00	0.00	0.00			
Uniform Delay (d), s/veh	54.3	0.0	0.0	0.0	0.0	17.0	46.1	0.0	0.0			
Incr Delay (d2), s/veh	37.1	0.4	0.0	0.0	0.0	4.5	25.7	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.2	0.1	0.0	0.0	0.0	17.2	10.5	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	91.4	0.4	0.0	0.0	0.0	21.4	71.8	0.0	0.0			
LnGrp LOS	F	A	A	A	A	C	E	A	A			
Approach Vol, veh/h		292			854			289				
Approach Delay, s/veh		17.2			21.4			71.8				
Approach LOS		B			C			E				

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.7	80.1		30.2		89.8
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s	6.5	70.5		29.5		81.5
Max Q Clear Time (g_c+I1), s	6.3	49.2		25.1		2.0
Green Ext Time (p_c), s	0.0	6.5		0.6		1.4

Intersection Summary			
HCM 6th Ctrl Delay			30.7
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	297	425	194	256	0	0	0	0	159	2	81
Future Volume (veh/h)	0	297	425	194	256	0	0	0	0	159	2	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1767	1767	0				1900	1767	1900
Adj Flow Rate, veh/h	0	323	398	211	278	0				173	2	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	9	9	0				0	9	0
Cap, veh/h	0	381	470	242	1270	0				197	2	75
Arrive On Green	0.00	0.52	0.52	0.29	1.00	0.00				0.17	0.17	0.17
Sat Flow, veh/h	0	735	905	1682	1767	0				1169	14	446
Grp Volume(v), veh/h	0	0	721	211	278	0				241	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1640	1682	1767	0				1628	0	0
Q Serve(g_s), s	0.0	0.0	30.2	9.5	0.0	0.0				11.6	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	30.2	9.5	0.0	0.0				11.6	0.0	0.0
Prop In Lane	0.00		0.55	1.00		0.00				0.72		0.27
Lane Grp Cap(c), veh/h	0	0	851	242	1270	0				275	0	0
V/C Ratio(X)	0.00	0.00	0.85	0.87	0.22	0.00				0.88	0.00	0.00
Avail Cap(c_a), veh/h	0	0	851	263	1270	0				275	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.83	0.83	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	16.5	27.8	0.0	0.0				32.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	10.2	21.3	0.3	0.0				25.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	11.9	4.5	0.1	0.0				6.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	26.7	49.1	0.3	0.0				58.3	0.0	0.0
LnGrp LOS	A	A	C	D	A	A				E	A	A
Approach Vol, veh/h		721			489						241	
Approach Delay, s/veh		26.7			21.4						58.3	
Approach LOS		C			C						E	

Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		62.0		18.0	16.0	46.0						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		57.5		13.5	12.5	40.5						
Max Q Clear Time (g_c+I1), s		2.0		13.6	11.5	32.2						
Green Ext Time (p_c), s		1.7		0.0	0.1	3.2						

Intersection Summary			
HCM 6th Ctrl Delay			30.2
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	412	0	0	345	151	119	0	250	0	0	0
Future Volume (veh/h)	49	412	0	0	345	151	119	0	250	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1796	1796	0	0	1767	1767	1900	1781	1900			
Adj Flow Rate, veh/h	52	434	0	0	363	143	125	0	158			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	7	7	0	0	9	9	0	8	0			
Cap, veh/h	73	1219	0	0	698	275	147	0	185			
Arrive On Green	0.09	1.00	0.00	0.00	0.58	0.58	0.21	0.00	0.21			
Sat Flow, veh/h	1711	1796	0	0	1205	475	701	0	886			
Grp Volume(v), veh/h	52	434	0	0	0	506	283	0	0			
Grp Sat Flow(s),veh/h/ln	1711	1796	0	0	0	1680	1587	0	0			
Q Serve(g_s), s	2.4	0.0	0.0	0.0	0.0	14.5	13.7	0.0	0.0			
Cycle Q Clear(g_c), s	2.4	0.0	0.0	0.0	0.0	14.5	13.7	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.28	0.44		0.56			
Lane Grp Cap(c), veh/h	73	1219	0	0	0	973	332	0	0			
V/C Ratio(X)	0.71	0.36	0.00	0.00	0.00	0.52	0.85	0.00	0.00			
Avail Cap(c_a), veh/h	118	1219	0	0	0	973	486	0	0			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.38	0.38	0.00	0.00	0.00	0.92	1.00	0.00	0.00			
Uniform Delay (d), s/veh	36.1	0.0	0.0	0.0	0.0	10.1	30.4	0.0	0.0			
Incr Delay (d2), s/veh	4.8	0.3	0.0	0.0	0.0	1.8	9.5	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.0	0.1	0.0	0.0	0.0	4.8	5.8	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.9	0.3	0.0	0.0	0.0	12.0	39.9	0.0	0.0			
LnGrp LOS	D	A	A	A	A	B	D	A	A			
Approach Vol, veh/h		486			506			283				
Approach Delay, s/veh		4.6			12.0			39.9				
Approach LOS		A			B			D				
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	7.9	50.8		21.2		58.8						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	5.5	36.5		24.5		46.5						
Max Q Clear Time (g_c+I1), s	4.4	16.5		15.7		2.0						
Green Ext Time (p_c), s	0.0	3.1		1.0		2.8						
Intersection Summary												
HCM 6th Ctrl Delay			15.4									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	224	5	38	340	56	10	57	28	93	28	55
Future Volume (veh/h)	42	224	5	38	340	56	10	57	28	93	28	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1752	1752	1752	1811	1811	1811
Adj Flow Rate, veh/h	46	243	4	41	370	54	11	62	30	101	30	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	19	19	19	11	11	11	10	10	10	6	6	6
Cap, veh/h	66	583	10	64	538	79	0	100	48	165	292	194
Arrive On Green	0.04	0.37	0.37	0.04	0.36	0.36	0.00	0.09	0.09	0.10	0.29	0.29
Sat Flow, veh/h	1541	1588	26	1654	1482	216	0	1115	540	1725	1014	676
Grp Volume(v), veh/h	46	0	247	41	0	424	0	0	92	101	0	50
Grp Sat Flow(s),veh/h/ln	1541	0	1614	1654	0	1698	0	0	1655	1725	0	1689
Q Serve(g_s), s	0.9	0.0	3.4	0.7	0.0	6.2	0.0	0.0	1.6	1.7	0.0	0.6
Cycle Q Clear(g_c), s	0.9	0.0	3.4	0.7	0.0	6.2	0.0	0.0	1.6	1.7	0.0	0.6
Prop In Lane	1.00		0.02	1.00		0.13	0.00		0.33	1.00		0.40
Lane Grp Cap(c), veh/h	66	0	592	64	0	617	0	0	149	165	0	486
V/C Ratio(X)	0.70	0.00	0.42	0.64	0.00	0.69	0.00	0.00	0.62	0.61	0.00	0.10
Avail Cap(c_a), veh/h	840	0	4012	620	0	3933	0	0	338	1351	0	1381
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.9	0.0	6.9	13.9	0.0	7.9	0.0	0.0	12.9	12.8	0.0	7.7
Incr Delay (d2), s/veh	12.6	0.0	0.5	10.2	0.0	1.4	0.0	0.0	4.1	3.7	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.6	0.4	0.0	1.3	0.0	0.0	0.6	0.6	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.5	0.0	7.4	24.1	0.0	9.3	0.0	0.0	17.0	16.4	0.0	7.8
LnGrp LOS	C	A	A	C	A	A	A	A	B	B	A	A
Approach Vol, veh/h		293			465			92			151	
Approach Delay, s/veh		10.4			10.6			17.0			13.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	0.0	11.4	4.3	13.7	5.8	5.6	4.1	13.8
Change Period (Y+Rc), s	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Max Green Setting (Gmax), s	5.0	24.0	16.0	68.0	23.0	6.0	11.0	73.0
Max Q Clear Time (g_c+I1), s	0.0	2.6	2.9	8.2	3.7	3.6	2.7	5.4
Green Ext Time (p_c), s	0.0	0.2	0.1	2.8	0.2	0.1	0.0	1.5

Intersection Summary			
HCM 6th Ctrl Delay			11.6
HCM 6th LOS			B

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	363	6	20	460	2	26	0	20	2	1	0
Future Vol, veh/h	0	363	6	20	460	2	26	0	20	2	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	21	21	21	12	12	12	2	2	2	67	67	67
Mvmt Flow	0	417	7	23	529	2	30	0	23	2	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	529	0	0	417	0	0	997	996	421	993	993	530
Stage 1	-	-	-	-	-	-	421	421	-	576	576	-
Stage 2	-	-	-	-	-	-	576	575	-	417	417	-
Critical Hdwy	4.31	-	-	4.22	-	-	7.12	6.52	6.22	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Follow-up Hdwy	2.389	-	-	2.308	-	-	3.518	4.018	3.318	4.103	4.603	3.903
Pot Cap-1 Maneuver	948	-	-	1090	-	-	223	244	632	172	191	441
Stage 1	-	-	-	-	-	-	610	589	-	405	412	-
Stage 2	-	-	-	-	-	-	503	503	-	503	494	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	948	-	-	1090	-	-	217	237	632	162	185	441
Mov Cap-2 Maneuver	-	-	-	-	-	-	217	237	-	162	185	-
Stage 1	-	-	-	-	-	-	610	589	-	405	400	-
Stage 2	-	-	-	-	-	-	487	488	-	485	494	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	15.9	26.7
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	384	948	-	-	1090	-	-	169
HCM Lane V/C Ratio	0.138	-	-	-	0.021	-	-	0.02
HCM Control Delay (s)	15.9	0	-	-	8.4	0	-	26.7
HCM Lane LOS	C	A	-	-	A	A	-	D
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	192	193	244	430	0	0	0	0	100	0	52
Future Volume (veh/h)	0	192	193	244	430	0	0	0	0	100	0	52
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1589	1589	1722	1722	0				1900	1574	1900
Adj Flow Rate, veh/h	0	209	186	265	467	0				109	0	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	21	21	12	12	0				0	22	0
Cap, veh/h	0	476	423	289	1425	0				134	0	11
Arrive On Green	0.00	0.61	0.61	0.35	1.00	0.00				0.10	0.00	0.10
Sat Flow, veh/h	0	775	690	1640	1722	0				1372	0	113
Grp Volume(v), veh/h	0	0	395	265	467	0				118	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1465	1640	1722	0				1485	0	0
Q Serve(g_s), s	0.0	0.0	17.1	18.6	0.0	0.0				9.3	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	17.1	18.6	0.0	0.0				9.3	0.0	0.0
Prop In Lane	0.00		0.47	1.00		0.00				0.92		0.08
Lane Grp Cap(c), veh/h	0	0	899	289	1425	0				145	0	0
V/C Ratio(X)	0.00	0.00	0.44	0.92	0.33	0.00				0.82	0.00	0.00
Avail Cap(c_a), veh/h	0	0	899	444	1425	0				266	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.44	0.44	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	12.2	38.0	0.0	0.0				53.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.6	9.0	0.3	0.0				10.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	5.5	6.6	0.1	0.0				3.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	13.8	47.0	0.3	0.0				63.6	0.0	0.0
LnGrp LOS	A	A	B	D	A	A				E	A	A
Approach Vol, veh/h		395			732						118	
Approach Delay, s/veh		13.8			17.2						63.6	
Approach LOS		B			B						E	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		103.8		16.2	25.6	78.2						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		89.5		21.5	32.5	52.5						
Max Q Clear Time (g_c+I1), s		2.0		11.3	20.6	19.1						
Green Ext Time (p_c), s		3.1		0.3	0.6	2.6						
Intersection Summary												
HCM 6th Ctrl Delay			20.5									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	240	0	0	526	318	148	0	178	0	0	0
Future Volume (veh/h)	52	240	0	0	526	318	148	0	178	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1574	1574	0	0	1767	1767	1900	1633	1900			
Adj Flow Rate, veh/h	54	250	0	0	548	314	154	0	142			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	22	22	0	0	9	9	0	18	0			
Cap, veh/h	66	1112	0	0	659	377	167	0	154			
Arrive On Green	0.03	0.47	0.00	0.00	0.62	0.62	0.22	0.00	0.22			
Sat Flow, veh/h	1499	1574	0	0	1054	604	764	0	704			
Grp Volume(v), veh/h	54	250	0	0	0	862	296	0	0			
Grp Sat Flow(s),veh/h/ln	1499	1574	0	0	0	1658	1468	0	0			
Q Serve(g_s), s	4.3	11.2	0.0	0.0	0.0	48.8	23.7	0.0	0.0			
Cycle Q Clear(g_c), s	4.3	11.2	0.0	0.0	0.0	48.8	23.7	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.36	0.52		0.48			
Lane Grp Cap(c), veh/h	66	1112	0	0	0	1036	321	0	0			
V/C Ratio(X)	0.82	0.22	0.00	0.00	0.00	0.83	0.92	0.00	0.00			
Avail Cap(c_a), veh/h	81	1112	0	0	0	1036	361	0	0			
HCM Platoon Ratio	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.86	0.86	0.00	0.00	0.00	0.58	1.00	0.00	0.00			
Uniform Delay (d), s/veh	57.8	12.2	0.0	0.0	0.0	17.6	45.9	0.0	0.0			
Incr Delay (d2), s/veh	35.7	0.4	0.0	0.0	0.0	4.7	26.8	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.3	4.2	0.0	0.0	0.0	17.9	10.8	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	93.5	12.7	0.0	0.0	0.0	22.3	72.7	0.0	0.0			
LnGrp LOS	F	B	A	A	A	C	E	A	A			
Approach Vol, veh/h		304			862			296				
Approach Delay, s/veh		27.0			22.3			72.7				
Approach LOS		C			C			E				

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	9.8	79.5		30.8		89.2						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	6.5	70.5		29.5		81.5						
Max Q Clear Time (g_c+I1), s	6.3	50.8		25.7		13.2						
Green Ext Time (p_c), s	0.0	6.4		0.6		1.5						

Intersection Summary			
HCM 6th Ctrl Delay			33.5
HCM 6th LOS			C

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	7	15	76	95	37	29	88	99	29	21	180	12
Future Vol, veh/h	7	15	76	95	37	29	88	99	29	21	180	12
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	10	10	10	2	2	2	6	6	6	2	2	2
Mvmt Flow	8	17	87	109	43	33	101	114	33	24	207	14
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	10.5	11.1	10.9
HCM LOS	A	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	41%	7%	59%	10%
Vol Thru, %	46%	15%	23%	85%
Vol Right, %	13%	78%	18%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	216	98	161	213
LT Vol	88	7	95	21
Through Vol	99	15	37	180
RT Vol	29	76	29	12
Lane Flow Rate	248	113	185	245
Geometry Grp	1	1	1	1
Degree of Util (X)	0.358	0.164	0.279	0.348
Departure Headway (Hd)	5.185	5.23	5.418	5.112
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	695	686	664	705
Service Time	3.213	3.264	3.449	3.14
HCM Lane V/C Ratio	0.357	0.165	0.279	0.348
HCM Control Delay	11.1	9.3	10.5	10.9
HCM Lane LOS	B	A	B	B
HCM 95th-tile Q	1.6	0.6	1.1	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	238	99	45	420	4	227	131	76	7	147	197
Future Volume (veh/h)	81	238	99	45	420	4	227	131	76	7	147	197
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1781	1781	1781	1841	1841	1841
Adj Flow Rate, veh/h	84	248	93	47	438	4	236	136	69	7	153	174
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	19	19	19	11	11	11	8	8	8	4	4	4
Cap, veh/h	103	387	145	60	539	5	294	461	234	16	194	220
Arrive On Green	0.07	0.34	0.34	0.04	0.31	0.31	0.17	0.41	0.41	0.01	0.25	0.25
Sat Flow, veh/h	1541	1122	421	1654	1718	16	1697	1114	565	1753	776	883
Grp Volume(v), veh/h	84	0	341	47	0	442	236	0	205	7	0	327
Grp Sat Flow(s),veh/h/ln	1541	0	1543	1654	0	1734	1697	0	1680	1753	0	1659
Q Serve(g_s), s	3.3	0.0	11.4	1.7	0.0	14.4	8.2	0.0	5.0	0.2	0.0	11.3
Cycle Q Clear(g_c), s	3.3	0.0	11.4	1.7	0.0	14.4	8.2	0.0	5.0	0.2	0.0	11.3
Prop In Lane	1.00		0.27	1.00		0.01	1.00		0.34	1.00		0.53
Lane Grp Cap(c), veh/h	103	0	531	60	0	543	294	0	695	16	0	414
V/C Ratio(X)	0.81	0.00	0.64	0.79	0.00	0.81	0.80	0.00	0.29	0.44	0.00	0.79
Avail Cap(c_a), veh/h	378	0	1438	271	0	1475	888	0	1264	860	0	1194
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.1	0.0	16.9	29.2	0.0	19.3	24.3	0.0	12.0	30.1	0.0	21.4
Incr Delay (d2), s/veh	14.0	0.0	1.3	20.2	0.0	3.0	5.1	0.0	0.2	17.5	0.0	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	3.6	1.0	0.0	5.4	3.3	0.0	1.6	0.2	0.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.1	0.0	18.2	49.4	0.0	22.3	29.3	0.0	12.2	47.6	0.0	24.8
LnGrp LOS	D	A	B	D	A	C	C	A	B	D	A	C
Approach Vol, veh/h		425			489			441			334	
Approach Delay, s/veh		22.9			25.0			21.4			25.3	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.6	18.3	7.1	22.2	3.6	28.3	5.2	24.1
Change Period (Y+Rc), s	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Max Green Setting (Gmax), s	32.0	44.0	15.0	52.0	30.0	46.0	10.0	57.0
Max Q Clear Time (g_c+I1), s	10.2	13.3	5.3	16.4	2.2	7.0	3.7	13.4
Green Ext Time (p_c), s	0.6	2.1	0.1	2.8	0.0	1.2	0.0	2.2

Intersection Summary	
HCM 6th Ctrl Delay	23.6
HCM 6th LOS	C

Intersection						
Int Delay, s/veh	5.8					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	35	20	57	58	54	107
Future Vol, veh/h	35	20	57	58	54	107
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	5	5	4	4	1	1
Mvmt Flow	42	24	69	70	65	129

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	142	0	-	0	215	107
Stage 1	-	-	-	-	107	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	4.15	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.245	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1423	-	-	-	775	950
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	919	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1419	-	-	-	747	947
Mov Cap-2 Maneuver	-	-	-	-	747	-
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	916	-

Approach	EB	WB	SB
HCM Control Delay, s	4.8	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1419	-	-	-	869
HCM Lane V/C Ratio	0.03	-	-	-	0.223
HCM Control Delay (s)	7.6	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

Intersection						
Int Delay, s/veh	1.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	48	273	440	60	38	29
Future Vol, veh/h	48	273	440	60	38	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	22	22	11	11	0	0
Mvmt Flow	50	284	458	63	40	30

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	458	0	-	0	842	458
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	384	-
Critical Hdwy	4.32	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.398	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1005	-	-	0	337	607
Stage 1	-	-	-	0	641	-
Stage 2	-	-	-	0	693	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1005	-	-	-	320	607
Mov Cap-2 Maneuver	-	-	-	-	320	-
Stage 1	-	-	-	-	609	-
Stage 2	-	-	-	-	693	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	1005	-	-	564
HCM Lane V/C Ratio	0.05	-	-	0.124
HCM Control Delay (s)	8.8	-	-	12.3
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	0.4

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	9	357	1	7	166
Future Vol, veh/h	8	9	357	1	7	166
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	12	12	6	6	5	5
Mvmt Flow	10	11	425	1	8	198

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	639	425	0	-	425	0
Stage 1	425	-	-	-	-	-
Stage 2	214	-	-	-	-	-
Critical Hdwy	6.52	6.32	-	-	4.15	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.408	-	-	2.245	-
Pot Cap-1 Maneuver	425	608	-	0	1118	-
Stage 1	639	-	-	0	-	-
Stage 2	798	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	422	608	-	-	1118	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	635	-	-	-	-	-
Stage 2	798	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.4	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	504	1118	-
HCM Lane V/C Ratio	-	0.04	0.007	-
HCM Control Delay (s)	-	12.4	8.2	-
HCM Lane LOS	-	B	A	-
HCM 95th %tile Q(veh)	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	1	1	422	266	25
Future Vol, veh/h	12	1	1	422	266	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	1	1	459	289	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	764	303	316	0	-	0
Stage 1	303	-	-	-	-	-
Stage 2	461	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	372	737	1244	-	-	-
Stage 1	749	-	-	-	-	-
Stage 2	635	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	372	737	1244	-	-	-
Mov Cap-2 Maneuver	372	-	-	-	-	-
Stage 1	748	-	-	-	-	-
Stage 2	635	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	14.7		0		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1244	-	387	-	-
HCM Lane V/C Ratio	0.001	-	0.037	-	-
HCM Control Delay (s)	7.9	-	14.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	471	15	42	176	74	8	56	34	126	62	14
Future Volume (veh/h)	52	471	15	42	176	74	8	56	34	126	62	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1781	1781	1781	1885	1885	1885	1841	1841	1841
Adj Flow Rate, veh/h	56	506	15	45	189	67	9	60	37	135	67	9
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	8	8	8	1	1	1	4	4	4
Cap, veh/h	83	700	21	69	489	173	14	92	57	227	206	28
Arrive On Green	0.05	0.40	0.40	0.04	0.39	0.39	0.09	0.09	0.09	0.13	0.13	0.13
Sat Flow, veh/h	1739	1764	52	1697	1256	445	150	1000	617	1753	1589	213
Grp Volume(v), veh/h	56	0	521	45	0	256	106	0	0	135	0	76
Grp Sat Flow(s),veh/h/ln	1739	0	1816	1697	0	1701	1767	0	0	1753	0	1802
Q Serve(g_s), s	1.1	0.0	8.5	0.9	0.0	3.8	2.0	0.0	0.0	2.6	0.0	1.3
Cycle Q Clear(g_c), s	1.1	0.0	8.5	0.9	0.0	3.8	2.0	0.0	0.0	2.6	0.0	1.3
Prop In Lane	1.00		0.03	1.00		0.26	0.08		0.35	1.00		0.12
Lane Grp Cap(c), veh/h	83	0	721	69	0	663	162	0	0	227	0	234
V/C Ratio(X)	0.67	0.00	0.72	0.66	0.00	0.39	0.65	0.00	0.00	0.59	0.00	0.33
Avail Cap(c_a), veh/h	544	0	3099	531	0	2903	904	0	0	1196	0	1230
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.5	0.0	9.0	16.6	0.0	7.7	15.4	0.0	0.0	14.4	0.0	13.9
Incr Delay (d2), s/veh	9.0	0.0	1.4	10.1	0.0	0.4	4.4	0.0	0.0	2.5	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	2.2	0.5	0.0	0.9	0.8	0.0	0.0	0.9	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.5	0.0	10.4	26.8	0.0	8.1	19.9	0.0	0.0	16.9	0.0	14.7
LnGrp LOS	C	A	B	C	A	A	B	A	A	B	A	B
Approach Vol, veh/h		577			301			106			211	
Approach Delay, s/veh		11.8			10.9			19.9			16.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		7.6	4.7	16.7		6.2	4.4	17.0				
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0				
Max Green Setting (Gmax), s		24.0	11.0	60.0		18.0	11.0	60.0				
Max Q Clear Time (g_c+I1), s		4.6	3.1	5.8		4.0	2.9	10.5				
Green Ext Time (p_c), s		0.7	0.0	1.6		0.4	0.0	3.5				

Intersection Summary			
HCM 6th Ctrl Delay			13.1
HCM 6th LOS			B

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	686	17	43	290	10	11	0	29	9	0	2
Future Vol, veh/h	1	686	17	43	290	10	11	0	29	9	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	10	10	10	5	5	5	9	9	9
Mvmt Flow	1	746	18	47	315	11	12	0	32	10	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	315	0	0	746	0	0	1166	1166	755	1163	1163	321
Stage 1	-	-	-	-	-	-	757	757	-	415	415	-
Stage 2	-	-	-	-	-	-	409	409	-	748	748	-
Critical Hdwy	4.14	-	-	4.2	-	-	7.15	6.55	6.25	7.19	6.59	6.29
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Follow-up Hdwy	2.236	-	-	2.29	-	-	3.545	4.045	3.345	3.581	4.081	3.381
Pot Cap-1 Maneuver	1234	-	-	827	-	-	169	191	404	166	189	704
Stage 1	-	-	-	-	-	-	395	411	-	601	581	-
Stage 2	-	-	-	-	-	-	613	591	-	394	410	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1234	-	-	827	-	-	159	177	404	145	176	704
Mov Cap-2 Maneuver	-	-	-	-	-	-	159	177	-	145	176	-
Stage 1	-	-	-	-	-	-	395	411	-	600	540	-
Stage 2	-	-	-	-	-	-	568	550	-	363	410	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.2	12	26.8
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	557	1234	-	-	827	-	-	177
HCM Lane V/C Ratio	0.078	0.001	-	-	0.057	-	-	0.068
HCM Control Delay (s)	12	7.9	0	-	9.6	0	-	26.8
HCM Lane LOS	B	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	0.3	0	-	-	0.2	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	299	425	202	262	0	0	0	0	162	2	81
Future Volume (veh/h)	0	299	425	202	262	0	0	0	0	162	2	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1767	1767	0				1900	1767	1900
Adj Flow Rate, veh/h	0	325	398	220	285	0				176	2	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	9	9	0				0	9	0
Cap, veh/h	0	379	464	250	1270	0				198	2	74
Arrive On Green	0.00	0.51	0.51	0.30	1.00	0.00				0.17	0.17	0.17
Sat Flow, veh/h	0	738	903	1682	1767	0				1175	13	441
Grp Volume(v), veh/h	0	0	723	220	285	0				244	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1641	1682	1767	0				1629	0	0
Q Serve(g_s), s	0.0	0.0	30.6	10.0	0.0	0.0				11.7	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	30.6	10.0	0.0	0.0				11.7	0.0	0.0
Prop In Lane	0.00		0.55	1.00		0.00				0.72		0.27
Lane Grp Cap(c), veh/h	0	0	843	250	1270	0				275	0	0
V/C Ratio(X)	0.00	0.00	0.86	0.88	0.22	0.00				0.89	0.00	0.00
Avail Cap(c_a), veh/h	0	0	843	263	1270	0				275	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.83	0.83	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	16.9	27.4	0.0	0.0				32.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	11.0	22.8	0.3	0.0				27.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	12.2	4.8	0.1	0.0				6.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	27.9	50.2	0.3	0.0				60.1	0.0	0.0
LnGrp LOS	A	A	C	D	A	A				E	A	A
Approach Vol, veh/h		723			505						244	
Approach Delay, s/veh		27.9			22.1						60.1	
Approach LOS		C			C						E	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		62.0		18.0	16.4	45.6						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		57.5		13.5	12.5	40.5						
Max Q Clear Time (g_c+I1), s		2.0		13.7	12.0	32.6						
Green Ext Time (p_c), s		1.7		0.0	0.0	3.1						
Intersection Summary												
HCM 6th Ctrl Delay			31.2									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	412	0	0	345	151	119	0	250	0	0	0
Future Volume (veh/h)	49	412	0	0	345	151	119	0	250	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1796	1796	0	0	1767	1767	1900	1781	1900			
Adj Flow Rate, veh/h	52	434	0	0	363	143	125	0	158			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	7	7	0	0	9	9	0	8	0			
Cap, veh/h	73	1219	0	0	698	275	147	0	185			
Arrive On Green	0.09	1.00	0.00	0.00	0.58	0.58	0.21	0.00	0.21			
Sat Flow, veh/h	1711	1796	0	0	1205	475	701	0	886			
Grp Volume(v), veh/h	52	434	0	0	0	506	283	0	0			
Grp Sat Flow(s),veh/h/ln	1711	1796	0	0	0	1680	1587	0	0			
Q Serve(g_s), s	2.4	0.0	0.0	0.0	0.0	14.5	13.7	0.0	0.0			
Cycle Q Clear(g_c), s	2.4	0.0	0.0	0.0	0.0	14.5	13.7	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.28	0.44		0.56			
Lane Grp Cap(c), veh/h	73	1219	0	0	0	973	332	0	0			
V/C Ratio(X)	0.71	0.36	0.00	0.00	0.00	0.52	0.85	0.00	0.00			
Avail Cap(c_a), veh/h	118	1219	0	0	0	973	486	0	0			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.37	0.37	0.00	0.00	0.00	0.92	1.00	0.00	0.00			
Uniform Delay (d), s/veh	36.1	0.0	0.0	0.0	0.0	10.1	30.4	0.0	0.0			
Incr Delay (d2), s/veh	4.6	0.3	0.0	0.0	0.0	1.8	9.5	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.0	0.1	0.0	0.0	0.0	4.8	5.8	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.7	0.3	0.0	0.0	0.0	12.0	39.9	0.0	0.0			
LnGrp LOS	D	A	A	A	A	B	D	A	A			
Approach Vol, veh/h		486			506			283				
Approach Delay, s/veh		4.6			12.0			39.9				
Approach LOS		A			B			D				
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	7.9	50.8		21.2		58.8						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	5.5	36.5		24.5		46.5						
Max Q Clear Time (g_c+I1), s	4.4	16.5		15.7		2.0						
Green Ext Time (p_c), s	0.0	3.1		1.0		2.8						
Intersection Summary												
HCM 6th Ctrl Delay			15.4									
HCM 6th LOS			B									

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	2	20	73	59	13	12	38	112	19	6	93	4
Future Vol, veh/h	2	20	73	59	13	12	38	112	19	6	93	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	2	2	2
Mvmt Flow	2	21	77	62	14	13	40	118	20	6	98	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	8.5	8.8	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	22%	2%	70%	6%
Vol Thru, %	66%	21%	15%	90%
Vol Right, %	11%	77%	14%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	169	95	84	103
LT Vol	38	2	59	6
Through Vol	112	20	13	93
RT Vol	19	73	12	4
Lane Flow Rate	178	100	88	108
Geometry Grp	1	1	1	1
Degree of Util (X)	0.222	0.12	0.118	0.137
Departure Headway (Hd)	4.489	4.317	4.799	4.561
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	801	830	747	786
Service Time	2.516	2.345	2.829	2.59
HCM Lane V/C Ratio	0.222	0.12	0.118	0.137
HCM Control Delay	8.8	7.9	8.5	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.4	0.4	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	417	165	70	233	5	144	84	77	11	95	119
Future Volume (veh/h)	80	417	165	70	233	5	144	84	77	11	95	119
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1811	1811	1811	1841	1841	1841
Adj Flow Rate, veh/h	83	434	163	73	243	4	150	88	58	11	99	95
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	7	7	7	6	6	6	4	4	4
Cap, veh/h	106	527	198	92	731	12	251	148	97	290	142	136
Arrive On Green	0.06	0.42	0.42	0.05	0.42	0.42	0.15	0.15	0.15	0.17	0.17	0.17
Sat Flow, veh/h	1711	1244	467	1711	1762	29	1725	1014	668	1753	859	824
Grp Volume(v), veh/h	83	0	597	73	0	247	150	0	146	11	0	194
Grp Sat Flow(s),veh/h/ln	1711	0	1711	1711	0	1791	1725	0	1683	1753	0	1683
Q Serve(g_s), s	2.7	0.0	17.5	2.4	0.0	5.3	4.6	0.0	4.6	0.3	0.0	6.2
Cycle Q Clear(g_c), s	2.7	0.0	17.5	2.4	0.0	5.3	4.6	0.0	4.6	0.3	0.0	6.2
Prop In Lane	1.00		0.27	1.00		0.02	1.00		0.40	1.00		0.49
Lane Grp Cap(c), veh/h	106	0	725	92	0	743	251	0	245	290	0	278
V/C Ratio(X)	0.78	0.00	0.82	0.79	0.00	0.33	0.60	0.00	0.60	0.04	0.00	0.70
Avail Cap(c_a), veh/h	454	0	2118	333	0	2090	915	0	892	992	0	952
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.2	0.0	14.4	26.5	0.0	11.2	22.6	0.0	22.6	19.8	0.0	22.3
Incr Delay (d2), s/veh	11.8	0.0	2.4	14.2	0.0	0.3	2.3	0.0	2.3	0.1	0.0	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	5.7	1.2	0.0	1.7	1.8	0.0	1.8	0.1	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.9	0.0	16.9	40.7	0.0	11.5	24.9	0.0	24.9	19.9	0.0	25.4
LnGrp LOS	D	A	B	D	A	B	C	A	C	B	A	C
Approach Vol, veh/h		680			320			296			205	
Approach Delay, s/veh		19.4			18.1			24.9			25.1	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		12.3	6.5	26.5		11.2	6.0	27.0				
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0				
Max Green Setting (Gmax), s		32.0	15.0	66.0		30.0	11.0	70.0				
Max Q Clear Time (g_c+I1), s		8.2	4.7	7.3		6.6	4.4	19.5				
Green Ext Time (p_c), s		1.1	0.1	1.5		1.2	0.1	4.4				

Intersection Summary			
HCM 6th Ctrl Delay			21.0
HCM 6th LOS			C

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	17	32	73	42	50
Future Vol, veh/h	28	17	32	73	42	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	3	3	1	1
Mvmt Flow	33	20	37	85	49	58

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	122	0	-	0	166	80
Stage 1	-	-	-	-	80	-
Stage 2	-	-	-	-	86	-
Critical Hdwy	4.1	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.2	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1478	-	-	-	827	983
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	940	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1478	-	-	-	808	983
Mov Cap-2 Maneuver	-	-	-	-	808	-
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	940	-

Approach	EB	WB	SB
HCM Control Delay, s	4.7	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1478	-	-	-	895
HCM Lane V/C Ratio	0.022	-	-	-	0.12
HCM Control Delay (s)	7.5	0	-	-	9.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	452	270	49	36	38
Future Vol, veh/h	53	452	270	49	36	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	8	1	1
Mvmt Flow	56	481	287	52	38	40

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	287	0	-	0	880	287
Stage 1	-	-	-	-	287	-
Stage 2	-	-	-	-	593	-
Critical Hdwy	4.18	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.272	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1241	-	-	0	319	754
Stage 1	-	-	-	0	764	-
Stage 2	-	-	-	0	554	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1241	-	-	-	305	754
Mov Cap-2 Maneuver	-	-	-	-	305	-
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	554	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	1241	-	-	627
HCM Lane V/C Ratio	0.045	-	-	0.126
HCM Control Delay (s)	8	-	-	11.6
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	0.4

Intersection						
Int Delay, s/veh	0.2					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	1	176	5	6	276
Future Vol, veh/h	1	1	176	5	6	276
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	7	7	2	2
Mvmt Flow	1	1	210	6	7	329

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	553	210	0	-	210	0
Stage 1	210	-	-	-	-	-
Stage 2	343	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.12	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.218	-
Pot Cap-1 Maneuver	498	835	-	0	1361	-
Stage 1	830	-	-	0	-	-
Stage 2	723	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	496	835	-	-	1361	-
Mov Cap-2 Maneuver	496	-	-	-	-	-
Stage 1	826	-	-	-	-	-
Stage 2	723	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	622	1361	-
HCM Lane V/C Ratio	-	0.004	0.005	-
HCM Control Delay (s)	-	10.8	7.7	-
HCM Lane LOS	-	B	A	-
HCM 95th %tile Q(veh)	-	0	0	-

Intersection						
Int Delay, s/veh	0.7					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	2	1	273	319	11
Future Vol, veh/h	31	2	1	273	319	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	2	1	297	347	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	652	353	359	0	-	0
Stage 1	353	-	-	-	-	-
Stage 2	299	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	433	691	1200	-	-	-
Stage 1	711	-	-	-	-	-
Stage 2	752	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	433	691	1200	-	-	-
Mov Cap-2 Maneuver	433	-	-	-	-	-
Stage 1	710	-	-	-	-	-
Stage 2	752	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	13.8		0		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1200	-	443	-	-
HCM Lane V/C Ratio	0.001	-	0.081	-	-
HCM Control Delay (s)	8	-	13.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	231	5	39	348	57	10	57	29	94	28	55
Future Volume (veh/h)	42	231	5	39	348	57	10	57	29	94	28	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1752	1752	1752	1811	1811	1811
Adj Flow Rate, veh/h	46	251	4	42	378	57	11	62	32	102	30	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	19	19	19	11	11	11	10	10	10	6	6	6
Cap, veh/h	65	586	9	65	539	81	17	93	48	195	151	45
Arrive On Green	0.04	0.37	0.37	0.04	0.37	0.37	0.10	0.10	0.10	0.11	0.11	0.11
Sat Flow, veh/h	1541	1589	25	1654	1475	222	173	976	504	1725	1338	401
Grp Volume(v), veh/h	46	0	255	42	0	435	105	0	0	102	0	39
Grp Sat Flow(s),veh/h/ln	1541	0	1614	1654	0	1697	1652	0	0	1725	0	1739
Q Serve(g_s), s	0.9	0.0	3.7	0.8	0.0	6.8	1.9	0.0	0.0	1.7	0.0	0.6
Cycle Q Clear(g_c), s	0.9	0.0	3.7	0.8	0.0	6.8	1.9	0.0	0.0	1.7	0.0	0.6
Prop In Lane	1.00		0.02	1.00		0.13	0.10		0.30	1.00		0.23
Lane Grp Cap(c), veh/h	65	0	595	65	0	621	158	0	0	195	0	196
V/C Ratio(X)	0.71	0.00	0.43	0.65	0.00	0.70	0.66	0.00	0.00	0.52	0.00	0.20
Avail Cap(c_a), veh/h	591	0	3147	476	0	3147	1268	0	0	1048	0	1056
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.8	0.0	7.4	14.8	0.0	8.5	13.7	0.0	0.0	13.1	0.0	12.6
Incr Delay (d2), s/veh	13.2	0.0	0.5	10.4	0.0	1.5	4.7	0.0	0.0	2.2	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.7	0.4	0.0	1.5	0.7	0.0	0.0	0.6	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.0	0.0	7.9	25.3	0.0	9.9	18.4	0.0	0.0	15.3	0.0	13.1
LnGrp LOS	C	A	A	C	A	A	B	A	A	B	A	B
Approach Vol, veh/h		301			477			105			141	
Approach Delay, s/veh		11.0			11.3			18.4			14.7	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		6.5	4.3	14.4		6.0	4.2	14.5				
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0				
Max Green Setting (Gmax), s		19.0	12.0	58.0		24.0	9.0	61.0				
Max Q Clear Time (g_c+I1), s		3.7	2.9	8.8		3.9	2.8	5.7				
Green Ext Time (p_c), s		0.3	0.0	2.9		0.4	0.0	1.5				
Intersection Summary												
HCM 6th Ctrl Delay			12.4									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	372	6	20	471	2	26	0	20	2	1	0
Future Vol, veh/h	0	372	6	20	471	2	26	0	20	2	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	21	21	21	12	12	12	2	2	2	67	67	67
Mvmt Flow	0	428	7	23	541	2	30	0	23	2	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	541	0	0	428	0	0	1020	1019	432	1016	1016	542
Stage 1	-	-	-	-	-	-	432	432	-	588	588	-
Stage 2	-	-	-	-	-	-	588	587	-	428	428	-
Critical Hdwy	4.31	-	-	4.22	-	-	7.12	6.52	6.22	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Follow-up Hdwy	2.389	-	-	2.308	-	-	3.518	4.018	3.318	4.103	4.603	3.903
Pot Cap-1 Maneuver	938	-	-	1080	-	-	215	237	624	165	185	434
Stage 1	-	-	-	-	-	-	602	582	-	398	406	-
Stage 2	-	-	-	-	-	-	495	497	-	496	488	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	938	-	-	1080	-	-	209	230	624	155	179	434
Mov Cap-2 Maneuver	-	-	-	-	-	-	209	230	-	155	179	-
Stage 1	-	-	-	-	-	-	602	582	-	398	393	-
Stage 2	-	-	-	-	-	-	478	482	-	478	488	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	16.3	27.7
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	370	938	-	-	1080	-	-	162
HCM Lane V/C Ratio	0.143	-	-	-	0.021	-	-	0.021
HCM Control Delay (s)	16.3	0	-	-	8.4	0	-	27.7
HCM Lane LOS	C	A	-	-	A	A	-	D
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	201	193	347	441	0	0	0	0	202	0	52
Future Volume (veh/h)	0	201	193	347	441	0	0	0	0	202	0	52
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1589	1589	1722	1722	0				1900	1574	1900
Adj Flow Rate, veh/h	0	218	184	377	479	0				220	0	12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	21	21	12	12	0				0	22	0
Cap, veh/h	0	375	317	397	1294	0				245	0	13
Arrive On Green	0.00	0.47	0.47	0.48	1.00	0.00				0.17	0.00	0.17
Sat Flow, veh/h	0	796	672	1640	1722	0				1412	0	77
Grp Volume(v), veh/h	0	0	402	377	479	0				232	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1468	1640	1722	0				1489	0	0
Q Serve(g_s), s	0.0	0.0	23.9	26.3	0.0	0.0				18.3	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	23.9	26.3	0.0	0.0				18.3	0.0	0.0
Prop In Lane	0.00		0.46	1.00		0.00				0.95		0.05
Lane Grp Cap(c), veh/h	0	0	692	397	1294	0				258	0	0
V/C Ratio(X)	0.00	0.00	0.58	0.95	0.37	0.00				0.90	0.00	0.00
Avail Cap(c_a), veh/h	0	0	692	499	1294	0				317	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.09	0.09	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	23.1	30.2	0.0	0.0				48.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	3.5	4.0	0.1	0.0				23.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	8.6	7.8	0.0	0.0				8.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	26.6	34.2	0.1	0.0				72.1	0.0	0.0
LnGrp LOS	A	A	C	C	A	A				E	A	A
Approach Vol, veh/h		402			856						232	
Approach Delay, s/veh		26.6			15.1						72.1	
Approach LOS		C			B						E	

Timer - Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		94.7		25.3	33.6	61.1		
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		
Max Green Setting (Gmax), s		85.5		25.5	36.5	44.5		
Max Q Clear Time (g_c+I1), s		2.0		20.3	28.3	25.9		
Green Ext Time (p_c), s		3.2		0.5	0.8	2.3		

Intersection Summary	
HCM 6th Ctrl Delay	27.1
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	351	0	0	640	425	148	0	277	0	0	0
Future Volume (veh/h)	52	351	0	0	640	425	148	0	277	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1574	1574	0	0	1767	1767	1900	1633	1900			
Adj Flow Rate, veh/h	54	366	0	0	667	424	154	0	233			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	22	22	0	0	9	9	0	18	0			
Cap, veh/h	62	1082	0	0	614	390	137	0	207			
Arrive On Green	0.01	0.23	0.00	0.00	0.61	0.61	0.24	0.00	0.24			
Sat Flow, veh/h	1499	1574	0	0	1009	642	576	0	872			
Grp Volume(v), veh/h	54	366	0	0	0	1091	387	0	0			
Grp Sat Flow(s),veh/h/ln	1499	1574	0	0	0	1651	1448	0	0			
Q Serve(g_s), s	4.3	23.4	0.0	0.0	0.0	73.0	28.5	0.0	0.0			
Cycle Q Clear(g_c), s	4.3	23.4	0.0	0.0	0.0	73.0	28.5	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.39	0.40		0.60			
Lane Grp Cap(c), veh/h	62	1082	0	0	0	1004	344	0	0			
V/C Ratio(X)	0.86	0.34	0.00	0.00	0.00	1.09	1.13	0.00	0.00			
Avail Cap(c_a), veh/h	62	1082	0	0	0	1004	344	0	0			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.72	0.72	0.00	0.00	0.00	0.09	1.00	0.00	0.00			
Uniform Delay (d), s/veh	58.8	23.5	0.0	0.0	0.0	23.5	45.8	0.0	0.0			
Incr Delay (d2), s/veh	54.9	0.6	0.0	0.0	0.0	40.7	87.0	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.6	10.0	0.0	0.0	0.0	36.2	18.3	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	113.7	24.1	0.0	0.0	0.0	64.2	132.8	0.0	0.0			
LnGrp LOS	F	C	A	A	A	F	F	A	A			
Approach Vol, veh/h		420			1091			387				
Approach Delay, s/veh		35.7			64.2			132.8				
Approach LOS		D			E			F				

Timer - Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	9.5	77.5		33.0		87.0		
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5		
Max Green Setting (Gmax), s	5.0	73.0		28.5		82.5		
Max Q Clear Time (g_c+I1), s	6.3	75.0		30.5		25.4		
Green Ext Time (p_c), s	0.0	0.0		0.0		2.3		

Intersection Summary			
HCM 6th Ctrl Delay			71.9
HCM 6th LOS			E

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	7	15	77	96	37	29	89	100	30	21	181	12
Future Vol, veh/h	7	15	77	96	37	29	89	100	30	21	181	12
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	10	10	10	2	2	2	6	6	6	2	2	2
Mvmt Flow	8	17	89	110	43	33	102	115	34	24	208	14
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	10.6	11.2	10.9
HCM LOS	A	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	41%	7%	59%	10%
Vol Thru, %	46%	15%	23%	85%
Vol Right, %	14%	78%	18%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	219	99	162	214
LT Vol	89	7	96	21
Through Vol	100	15	37	181
RT Vol	30	77	29	12
Lane Flow Rate	252	114	186	246
Geometry Grp	1	1	1	1
Degree of Util (X)	0.363	0.166	0.281	0.35
Departure Headway (Hd)	5.194	5.244	5.435	5.125
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	692	684	661	703
Service Time	3.222	3.278	3.466	3.153
HCM Lane V/C Ratio	0.364	0.167	0.281	0.35
HCM Control Delay	11.2	9.3	10.6	10.9
HCM Lane LOS	B	A	B	B
HCM 95th-tile Q	1.7	0.6	1.2	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	342	206	80	40	371	69	219	134	73	55	150	475
Future Volume (veh/h)	342	206	80	40	371	69	219	134	73	55	150	475
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1781	1781	1781	1841	1841	1841
Adj Flow Rate, veh/h	356	215	75	42	386	67	228	140	64	57	156	423
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	19	19	19	11	11	11	8	8	8	4	4	4
Cap, veh/h	310	472	165	53	350	61	263	179	82	559	137	373
Arrive On Green	0.20	0.41	0.41	0.03	0.24	0.24	0.15	0.15	0.15	0.32	0.32	0.32
Sat Flow, veh/h	1541	1146	400	1654	1442	250	1697	1157	529	1753	431	1169
Grp Volume(v), veh/h	356	0	290	42	0	453	228	0	204	57	0	579
Grp Sat Flow(s),veh/h/ln	1541	0	1546	1654	0	1692	1697	0	1686	1753	0	1600
Q Serve(g_s), s	29.0	0.0	19.6	3.6	0.0	35.0	18.9	0.0	16.8	3.3	0.0	46.0
Cycle Q Clear(g_c), s	29.0	0.0	19.6	3.6	0.0	35.0	18.9	0.0	16.8	3.3	0.0	46.0
Prop In Lane	1.00		0.26	1.00		0.15	1.00		0.31	1.00		0.73
Lane Grp Cap(c), veh/h	310	0	636	53	0	410	263	0	261	559	0	510
V/C Ratio(X)	1.15	0.00	0.46	0.80	0.00	1.10	0.87	0.00	0.78	0.10	0.00	1.14
Avail Cap(c_a), veh/h	310	0	636	115	0	410	388	0	385	559	0	510
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.7	0.0	30.8	69.4	0.0	54.7	59.6	0.0	58.6	34.6	0.0	49.2
Incr Delay (d2), s/veh	98.1	0.0	0.5	22.9	0.0	75.7	13.0	0.0	6.1	0.1	0.0	82.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	19.6	0.0	7.3	1.9	0.0	23.3	9.0	0.0	7.5	1.4	0.0	29.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	155.8	0.0	31.3	92.3	0.0	130.4	72.6	0.0	64.7	34.7	0.0	131.9
LnGrp LOS	F	A	C	F	A	F	E	A	E	C	A	F
Approach Vol, veh/h		646			495			432			636	
Approach Delay, s/veh		99.9			127.2			68.9			123.2	
Approach LOS		F			F			E			F	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		49.0	32.0	38.0		25.4	7.6	62.4				
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0				
Max Green Setting (Gmax), s		46.0	29.0	35.0		33.0	10.0	54.0				
Max Q Clear Time (g_c+I1), s		48.0	31.0	37.0		20.9	5.6	21.6				
Green Ext Time (p_c), s		0.0	0.0	0.0		1.4	0.0	1.8				

Intersection Summary			
HCM 6th Ctrl Delay			106.6
HCM 6th LOS			F

Intersection						
Int Delay, s/veh	5.8					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	36	20	57	58	54	108
Future Vol, veh/h	36	20	57	58	54	108
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	5	5	4	4	1	1
Mvmt Flow	43	24	69	70	65	130

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	142	0	-	0	217	107
Stage 1	-	-	-	-	107	-
Stage 2	-	-	-	-	110	-
Critical Hdwy	4.15	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.245	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1423	-	-	-	773	950
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	917	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1419	-	-	-	744	947
Mov Cap-2 Maneuver	-	-	-	-	744	-
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	914	-

Approach	EB	WB	SB
HCM Control Delay, s	4.9	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1419	-	-	-	868
HCM Lane V/C Ratio	0.031	-	-	-	0.225
HCM Control Delay (s)	7.6	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

Intersection						
Int Delay, s/veh	1.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	48	286	451	60	38	29
Future Vol, veh/h	48	286	451	60	38	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	22	22	11	11	0	0
Mvmt Flow	50	298	470	63	40	30

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	470	0	-	0	868	470
Stage 1	-	-	-	-	470	-
Stage 2	-	-	-	-	398	-
Critical Hdwy	4.32	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.398	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	995	-	-	0	325	598
Stage 1	-	-	-	0	633	-
Stage 2	-	-	-	0	683	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	995	-	-	-	309	598
Mov Cap-2 Maneuver	-	-	-	-	309	-
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	683	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	995	-	-	545
HCM Lane V/C Ratio	0.05	-	-	0.128
HCM Control Delay (s)	8.8	-	-	12.6
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	0.4

Intersection						
Int Delay, s/veh	0.5					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	10	359	1	8	168
Future Vol, veh/h	8	10	359	1	8	168
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	12	12	6	6	5	5
Mvmt Flow	10	12	427	1	10	200

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	647	427	0	-	427	0
Stage 1	427	-	-	-	-	-
Stage 2	220	-	-	-	-	-
Critical Hdwy	6.52	6.32	-	-	4.15	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.408	-	-	2.245	-
Pot Cap-1 Maneuver	420	607	-	0	1116	-
Stage 1	637	-	-	0	-	-
Stage 2	793	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	416	607	-	-	1116	-
Mov Cap-2 Maneuver	416	-	-	-	-	-
Stage 1	631	-	-	-	-	-
Stage 2	793	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	504	1116	-
HCM Lane V/C Ratio	-	0.043	0.009	-
HCM Control Delay (s)	-	12.5	8.3	-
HCM Lane LOS	-	B	A	-
HCM 95th %tile Q(veh)	-	0.1	0	-

Intersection						
Int Delay, s/veh	0.8					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	34	2	217	34	2	352
Future Vol, veh/h	34	2	217	34	2	352
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	2	236	37	2	383

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	642	255	0	0	273	0
Stage 1	255	-	-	-	-	-
Stage 2	387	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	438	784	-	-	1290	-
Stage 1	788	-	-	-	-	-
Stage 2	686	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	437	784	-	-	1290	-
Mov Cap-2 Maneuver	437	-	-	-	-	-
Stage 1	786	-	-	-	-	-
Stage 2	686	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	448	1290	-
HCM Lane V/C Ratio	-	-	0.087	0.002	-
HCM Control Delay (s)	-	-	13.8	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	37.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	320	26	225	320	26	360
Future Vol, veh/h	320	26	225	320	26	360
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	348	28	245	348	28	391

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	866	419	0	0	593	0
Stage 1	419	-	-	-	-	-
Stage 2	447	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 324	634	-	-	983	-
Stage 1	664	-	-	-	-	-
Stage 2	644	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 312	634	-	-	983	-
Mov Cap-2 Maneuver	~ 312	-	-	-	-	-
Stage 1	664	-	-	-	-	-
Stage 2	621	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	136.6	0	0.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	324	983	-
HCM Lane V/C Ratio	-	-	1.161	0.029	-
HCM Control Delay (s)	-	-	136.6	8.8	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	15.6	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	474	15	42	177	73	8	56	34	126	62	14
Future Volume (veh/h)	52	474	15	42	177	73	8	56	34	126	62	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1781	1781	1781	1885	1885	1885	1841	1841	1841
Adj Flow Rate, veh/h	56	510	15	45	190	65	9	60	37	135	67	9
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	8	8	8	1	1	1	4	4	4
Cap, veh/h	83	705	21	69	498	170	14	92	56	225	204	27
Arrive On Green	0.05	0.40	0.40	0.04	0.39	0.39	0.09	0.09	0.09	0.13	0.13	0.13
Sat Flow, veh/h	1739	1765	52	1697	1269	434	150	1000	617	1753	1589	213
Grp Volume(v), veh/h	56	0	525	45	0	255	106	0	0	135	0	76
Grp Sat Flow(s),veh/h/ln	1739	0	1817	1697	0	1703	1767	0	0	1753	0	1802
Q Serve(g_s), s	1.1	0.0	8.6	0.9	0.0	3.8	2.0	0.0	0.0	2.6	0.0	1.4
Cycle Q Clear(g_c), s	1.1	0.0	8.6	0.9	0.0	3.8	2.0	0.0	0.0	2.6	0.0	1.4
Prop In Lane	1.00		0.03	1.00		0.25	0.08		0.35	1.00		0.12
Lane Grp Cap(c), veh/h	83	0	726	69	0	668	162	0	0	225	0	231
V/C Ratio(X)	0.67	0.00	0.72	0.66	0.00	0.38	0.66	0.00	0.00	0.60	0.00	0.33
Avail Cap(c_a), veh/h	542	0	3245	433	0	2946	1052	0	0	994	0	1022
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.5	0.0	8.9	16.7	0.0	7.7	15.5	0.0	0.0	14.5	0.0	14.0
Incr Delay (d2), s/veh	9.0	0.0	1.4	10.1	0.0	0.4	4.4	0.0	0.0	2.6	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	2.2	0.5	0.0	0.9	0.8	0.0	0.0	0.9	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.5	0.0	10.3	26.8	0.0	8.0	19.9	0.0	0.0	17.1	0.0	14.8
LnGrp LOS	C	A	B	C	A	A	B	A	A	B	A	B
Approach Vol, veh/h		581			300			106			211	
Approach Delay, s/veh		11.8			10.8			19.9			16.3	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		7.5	4.7	16.8		6.2	4.4	17.1				
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0				
Max Green Setting (Gmax), s		20.0	11.0	61.0		21.0	9.0	63.0				
Max Q Clear Time (g_c+I1), s		4.6	3.1	5.8		4.0	2.9	10.6				
Green Ext Time (p_c), s		0.6	0.0	1.6		0.4	0.0	3.6				
Intersection Summary												
HCM 6th Ctrl Delay			13.1									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	690	17	43	290	10	11	0	29	9	0	2
Future Vol, veh/h	1	690	17	43	290	10	11	0	29	9	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	10	10	10	5	5	5	9	9	9
Mvmt Flow	1	750	18	47	315	11	12	0	32	10	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	315	0	0	750	0	0	1170	1170	759	1167	1167	321
Stage 1	-	-	-	-	-	-	761	761	-	415	415	-
Stage 2	-	-	-	-	-	-	409	409	-	752	752	-
Critical Hdwy	4.14	-	-	4.2	-	-	7.15	6.55	6.25	7.19	6.59	6.29
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Follow-up Hdwy	2.236	-	-	2.29	-	-	3.545	4.045	3.345	3.581	4.081	3.381
Pot Cap-1 Maneuver	1234	-	-	824	-	-	167	190	402	165	188	704
Stage 1	-	-	-	-	-	-	393	410	-	601	581	-
Stage 2	-	-	-	-	-	-	613	591	-	392	408	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1234	-	-	824	-	-	157	177	402	144	175	704
Mov Cap-2 Maneuver	-	-	-	-	-	-	157	177	-	144	175	-
Stage 1	-	-	-	-	-	-	393	410	-	600	540	-
Stage 2	-	-	-	-	-	-	568	550	-	361	408	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.2	12.1	26.9
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	554	1234	-	-	824	-	-	176
HCM Lane V/C Ratio	0.078	0.001	-	-	0.057	-	-	0.068
HCM Control Delay (s)	12.1	7.9	0	-	9.6	0	-	26.9
HCM Lane LOS	B	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	0.3	0	-	-	0.2	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	303	425	303	262	0	0	0	0	273	2	81
Future Volume (veh/h)	0	303	425	303	262	0	0	0	0	273	2	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1767	1767	0				1900	1767	1900
Adj Flow Rate, veh/h	0	329	420	329	285	0				297	2	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	9	9	0				0	9	0
Cap, veh/h	0	339	432	315	1229	0				295	2	79
Arrive On Green	0.00	0.47	0.47	0.31	1.00	0.00				0.23	0.23	0.23
Sat Flow, veh/h	0	719	918	1682	1767	0				1285	9	346
Grp Volume(v), veh/h	0	0	749	329	285	0				379	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1638	1682	1767	0				1640	0	0
Q Serve(g_s), s	0.0	0.0	53.5	22.5	0.0	0.0				27.5	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	53.5	22.5	0.0	0.0				27.5	0.0	0.0
Prop In Lane	0.00		0.56	1.00		0.00				0.78		0.21
Lane Grp Cap(c), veh/h	0	0	771	315	1229	0				376	0	0
V/C Ratio(X)	0.00	0.00	0.97	1.04	0.23	0.00				1.01	0.00	0.00
Avail Cap(c_a), veh/h	0	0	771	315	1229	0				376	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.53	0.53	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	31.0	41.2	0.0	0.0				46.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	26.2	48.5	0.2	0.0				48.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	25.3	12.2	0.1	0.0				16.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	57.1	89.8	0.2	0.0				94.8	0.0	0.0
LnGrp LOS	A	A	E	F	A	A				F	A	A
Approach Vol, veh/h		749			614						379	
Approach Delay, s/veh		57.1			48.2						94.8	
Approach LOS		E			D						F	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		88.0		32.0	27.0	61.0						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		83.5		27.5	22.5	56.5						
Max Q Clear Time (g_c+I1), s		2.0		29.5	24.5	55.5						
Green Ext Time (p_c), s		1.7		0.0	0.0	0.5						
Intersection Summary												
HCM 6th Ctrl Delay			62.2									
HCM 6th LOS			E									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	527	0	0	446	253	119	0	359	0	0	0
Future Volume (veh/h)	49	527	0	0	446	253	119	0	359	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1796	1796	0	0	1767	1767	1900	1781	1900			
Adj Flow Rate, veh/h	52	555	0	0	469	250	125	0	283			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	7	7	0	0	9	9	0	8	0			
Cap, veh/h	66	1155	0	0	614	327	135	0	306			
Arrive On Green	0.01	0.21	0.00	0.00	0.57	0.57	0.28	0.00	0.28			
Sat Flow, veh/h	1711	1796	0	0	1084	578	479	0	1084			
Grp Volume(v), veh/h	52	555	0	0	0	719	408	0	0			
Grp Sat Flow(s),veh/h/ln	1711	1796	0	0	0	1661	1562	0	0			
Q Serve(g_s), s	3.6	32.5	0.0	0.0	0.0	39.7	30.4	0.0	0.0			
Cycle Q Clear(g_c), s	3.6	32.5	0.0	0.0	0.0	39.7	30.4	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.35	0.31		0.69			
Lane Grp Cap(c), veh/h	66	1155	0	0	0	941	441	0	0			
V/C Ratio(X)	0.79	0.48	0.00	0.00	0.00	0.76	0.93	0.00	0.00			
Avail Cap(c_a), veh/h	93	1155	0	0	0	941	514	0	0			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.14	0.14	0.00	0.00	0.00	0.68	1.00	0.00	0.00			
Uniform Delay (d), s/veh	58.7	29.7	0.0	0.0	0.0	19.9	41.8	0.0	0.0			
Incr Delay (d2), s/veh	4.2	0.2	0.0	0.0	0.0	4.1	21.0	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.7	15.6	0.0	0.0	0.0	15.1	14.0	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.9	29.9	0.0	0.0	0.0	23.9	62.8	0.0	0.0			
LnGrp LOS	E	C	A	A	A	C	E	A	A			
Approach Vol, veh/h		607			719			408				
Approach Delay, s/veh		32.7			23.9			62.8				
Approach LOS		C			C			E				
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	9.1	72.5		38.4		81.6						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	6.5	60.5		39.5		71.5						
Max Q Clear Time (g_c+I1), s	5.6	41.7		32.4		34.5						
Green Ext Time (p_c), s	0.0	4.8		1.4		3.8						
Intersection Summary												
HCM 6th Ctrl Delay			36.2									
HCM 6th LOS			D									

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	2	20	73	59	13	12	38	111	19	6	93	4
Future Vol, veh/h	2	20	73	59	13	12	38	111	19	6	93	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	2	2	2
Mvmt Flow	2	21	77	62	14	13	40	117	20	6	98	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	8.5	8.8	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	2%	70%	6%
Vol Thru, %	66%	21%	15%	90%
Vol Right, %	11%	77%	14%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	168	95	84	103
LT Vol	38	2	59	6
Through Vol	111	20	13	93
RT Vol	19	73	12	4
Lane Flow Rate	177	100	88	108
Geometry Grp	1	1	1	1
Degree of Util (X)	0.221	0.12	0.118	0.137
Departure Headway (Hd)	4.489	4.314	4.796	4.56
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	799	830	747	786
Service Time	2.515	2.343	2.827	2.589
HCM Lane V/C Ratio	0.222	0.12	0.118	0.137
HCM Control Delay	8.8	7.9	8.5	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.4	0.4	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	341	388	157	68	214	32	121	84	70	48	96	364
Future Volume (veh/h)	341	388	157	68	214	32	121	84	70	48	96	364
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1811	1811	1811	1841	1841	1841
Adj Flow Rate, veh/h	355	404	155	71	223	30	126	88	52	50	100	294
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	7	7	7	6	6	6	4	4	4
Cap, veh/h	407	467	179	90	298	40	218	134	79	509	119	350
Arrive On Green	0.24	0.38	0.38	0.05	0.19	0.19	0.13	0.13	0.13	0.29	0.29	0.29
Sat Flow, veh/h	1711	1236	474	1711	1550	208	1725	1062	627	1753	410	1206
Grp Volume(v), veh/h	355	0	559	71	0	253	126	0	140	50	0	394
Grp Sat Flow(s),veh/h/ln	1711	0	1710	1711	0	1758	1725	0	1689	1753	0	1616
Q Serve(g_s), s	15.7	0.0	23.7	3.2	0.0	10.7	5.4	0.0	6.2	1.6	0.0	18.0
Cycle Q Clear(g_c), s	15.7	0.0	23.7	3.2	0.0	10.7	5.4	0.0	6.2	1.6	0.0	18.0
Prop In Lane	1.00		0.28	1.00		0.12	1.00		0.37	1.00		0.75
Lane Grp Cap(c), veh/h	407	0	646	90	0	339	218	0	213	509	0	469
V/C Ratio(X)	0.87	0.00	0.86	0.79	0.00	0.75	0.58	0.00	0.66	0.10	0.00	0.84
Avail Cap(c_a), veh/h	872	0	1350	174	0	672	681	0	667	938	0	865
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.8	0.0	22.6	36.8	0.0	29.9	32.3	0.0	32.7	20.4	0.0	26.1
Incr Delay (d2), s/veh	5.9	0.0	3.6	14.0	0.0	3.3	2.4	0.0	3.4	0.1	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.0	9.1	1.6	0.0	4.5	2.3	0.0	2.6	0.6	0.0	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.6	0.0	26.2	50.8	0.0	33.2	34.8	0.0	36.1	20.4	0.0	30.3
LnGrp LOS	C	A	C	D	A	C	C	A	D	C	A	C
Approach Vol, veh/h		914			324			266			444	
Approach Delay, s/veh		29.5			37.0			35.5			29.1	
Approach LOS		C			D			D			C	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		25.8	21.7	18.1		12.9	7.1	32.7				
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0				
Max Green Setting (Gmax), s		42.0	40.0	30.0		31.0	8.0	62.0				
Max Q Clear Time (g_c+I1), s		20.0	17.7	12.7		8.2	5.2	25.7				
Green Ext Time (p_c), s		2.6	1.0	1.2		1.1	0.0	4.0				
Intersection Summary												
HCM 6th Ctrl Delay			31.5									
HCM 6th LOS			C									

Intersection						
Int Delay, s/veh	4.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	17	32	73	42	50
Future Vol, veh/h	28	17	32	73	42	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	3	3	1	1
Mvmt Flow	33	20	37	85	49	58

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	122	0	-	0	166	80
Stage 1	-	-	-	-	80	-
Stage 2	-	-	-	-	86	-
Critical Hdwy	4.1	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.2	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1478	-	-	-	827	983
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	940	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1478	-	-	-	808	983
Mov Cap-2 Maneuver	-	-	-	-	808	-
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	940	-

Approach	EB	WB	SB
HCM Control Delay, s	4.7	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1478	-	-	-	895
HCM Lane V/C Ratio	0.022	-	-	-	0.12
HCM Control Delay (s)	7.5	0	-	-	9.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	453	276	49	36	38
Future Vol, veh/h	53	453	276	49	36	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	8	1	1
Mvmt Flow	56	482	294	52	38	40

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	294	0	-	0	888	294
Stage 1	-	-	-	-	294	-
Stage 2	-	-	-	-	594	-
Critical Hdwy	4.18	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.272	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1234	-	-	0	315	748
Stage 1	-	-	-	0	759	-
Stage 2	-	-	-	0	554	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1234	-	-	-	301	748
Mov Cap-2 Maneuver	-	-	-	-	301	-
Stage 1	-	-	-	-	725	-
Stage 2	-	-	-	-	554	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	1234	-	-	619
HCM Lane V/C Ratio	0.046	-	-	0.127
HCM Control Delay (s)	8.1	-	-	11.7
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	0.4

Intersection						
Int Delay, s/veh	0.2					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	2	177	5	7	276
Future Vol, veh/h	1	2	177	5	7	276
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	7	7	2	2
Mvmt Flow	1	2	211	6	8	329

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	556	211	0	-	211	0
Stage 1	211	-	-	-	-	-
Stage 2	345	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.12	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.218	-
Pot Cap-1 Maneuver	496	834	-	0	1360	-
Stage 1	829	-	-	0	-	-
Stage 2	722	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	493	834	-	-	1360	-
Mov Cap-2 Maneuver	493	-	-	-	-	-
Stage 1	824	-	-	-	-	-
Stage 2	722	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	678	1360	-
HCM Lane V/C Ratio	-	0.005	0.006	-
HCM Control Delay (s)	-	10.3	7.7	-
HCM Lane LOS	-	B	A	-
HCM 95th %tile Q(veh)	-	0	0	-

Intersection						
Int Delay, s/veh	1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	40	1	167	40	1	224
Future Vol, veh/h	40	1	167	40	1	224
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	1	182	43	1	243

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	449	204	0	0	225	0
Stage 1	204	-	-	-	-	-
Stage 2	245	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	568	837	-	-	1344	-
Stage 1	830	-	-	-	-	-
Stage 2	796	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	567	837	-	-	1344	-
Mov Cap-2 Maneuver	567	-	-	-	-	-
Stage 1	829	-	-	-	-	-
Stage 2	796	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	571	1344	-
HCM Lane V/C Ratio	-	-	0.078	0.001	-
HCM Control Delay (s)	-	-	11.8	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection						
Int Delay, s/veh	7.9					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	256	12	195	262	12	252
Future Vol, veh/h	256	12	195	262	12	252
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	278	13	212	285	13	274

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	655	355	0	0	497	0
Stage 1	355	-	-	-	-	-
Stage 2	300	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	431	689	-	-	1067	-
Stage 1	710	-	-	-	-	-
Stage 2	752	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	425	689	-	-	1067	-
Mov Cap-2 Maneuver	425	-	-	-	-	-
Stage 1	710	-	-	-	-	-
Stage 2	741	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.9	0	0.4
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	432	1067	-
HCM Lane V/C Ratio	-	-	0.674	0.012	-
HCM Control Delay (s)	-	-	28.9	8.4	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	4.9	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	231	5	39	348	57	10	57	29	94	28	55
Future Volume (veh/h)	42	231	5	39	348	57	10	57	29	94	28	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1752	1752	1752	1811	1811	1811
Adj Flow Rate, veh/h	46	251	4	42	378	57	11	62	32	102	30	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	19	19	19	11	11	11	10	10	10	6	6	6
Cap, veh/h	65	586	9	65	539	81	17	93	48	195	151	45
Arrive On Green	0.04	0.37	0.37	0.04	0.37	0.37	0.10	0.10	0.10	0.11	0.11	0.11
Sat Flow, veh/h	1541	1589	25	1654	1475	222	173	976	504	1725	1338	401
Grp Volume(v), veh/h	46	0	255	42	0	435	105	0	0	102	0	39
Grp Sat Flow(s),veh/h/ln	1541	0	1614	1654	0	1697	1652	0	0	1725	0	1739
Q Serve(g_s), s	0.9	0.0	3.7	0.8	0.0	6.8	1.9	0.0	0.0	1.7	0.0	0.6
Cycle Q Clear(g_c), s	0.9	0.0	3.7	0.8	0.0	6.8	1.9	0.0	0.0	1.7	0.0	0.6
Prop In Lane	1.00		0.02	1.00		0.13	0.10		0.30	1.00		0.23
Lane Grp Cap(c), veh/h	65	0	595	65	0	621	158	0	0	195	0	196
V/C Ratio(X)	0.71	0.00	0.43	0.65	0.00	0.70	0.66	0.00	0.00	0.52	0.00	0.20
Avail Cap(c_a), veh/h	591	0	3147	476	0	3147	1268	0	0	1048	0	1056
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.8	0.0	7.4	14.8	0.0	8.5	13.7	0.0	0.0	13.1	0.0	12.6
Incr Delay (d2), s/veh	13.2	0.0	0.5	10.4	0.0	1.5	4.7	0.0	0.0	2.2	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.7	0.4	0.0	1.5	0.7	0.0	0.0	0.6	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.0	0.0	7.9	25.3	0.0	9.9	18.4	0.0	0.0	15.3	0.0	13.1
LnGrp LOS	C	A	A	C	A	A	B	A	A	B	A	B
Approach Vol, veh/h		301			477			105			141	
Approach Delay, s/veh		11.0			11.3			18.4			14.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		6.5	4.3	14.4		6.0	4.2	14.5
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0
Max Green Setting (Gmax), s		19.0	12.0	58.0		24.0	9.0	61.0
Max Q Clear Time (g_c+I1), s		3.7	2.9	8.8		3.9	2.8	5.7
Green Ext Time (p_c), s		0.3	0.0	2.9		0.4	0.0	1.5

Intersection Summary		
HCM 6th Ctrl Delay		12.4
HCM 6th LOS		B

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	0	371	6	20	469	2	26	0	20	2	1	0
Future Vol, veh/h	0	371	6	20	469	2	26	0	20	2	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	21	21	21	12	12	12	2	2	2	67	67	67
Mvmt Flow	0	426	7	23	539	2	30	0	23	2	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	539	0	0	426	0	0	1016	1015	430	1012	1012	540
Stage 1	-	-	-	-	-	-	430	430	-	586	586	-
Stage 2	-	-	-	-	-	-	586	585	-	426	426	-
Critical Hdwy	4.31	-	-	4.22	-	-	7.12	6.52	6.22	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Follow-up Hdwy	2.389	-	-	2.308	-	-	3.518	4.018	3.318	4.103	4.603	3.903
Pot Cap-1 Maneuver	940	-	-	1082	-	-	216	238	625	166	186	435
Stage 1	-	-	-	-	-	-	603	583	-	400	407	-
Stage 2	-	-	-	-	-	-	496	498	-	497	489	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	940	-	-	1082	-	-	210	231	625	156	180	435
Mov Cap-2 Maneuver	-	-	-	-	-	-	210	231	-	156	180	-
Stage 1	-	-	-	-	-	-	603	583	-	400	395	-
Stage 2	-	-	-	-	-	-	480	483	-	479	489	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	16.3	27.6
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	372	940	-	-	1082	-	-	163
HCM Lane V/C Ratio	0.142	-	-	-	0.021	-	-	0.021
HCM Control Delay (s)	16.3	0	-	-	8.4	0	-	27.6
HCM Lane LOS	C	A	-	-	A	A	-	D
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	200	193	322	439	0	0	0	0	180	0	52
Future Volume (veh/h)	0	200	193	322	439	0	0	0	0	180	0	52
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1589	1589	1722	1722	0				1900	1574	1900
Adj Flow Rate, veh/h	0	217	185	350	477	0				196	0	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	21	21	12	12	0				0	22	0
Cap, veh/h	0	400	341	371	1325	0				222	0	10
Arrive On Green	0.00	0.51	0.51	0.45	1.00	0.00				0.16	0.00	0.16
Sat Flow, veh/h	0	792	675	1640	1722	0				1425	0	65
Grp Volume(v), veh/h	0	0	402	350	477	0				205	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1467	1640	1722	0				1491	0	0
Q Serve(g_s), s	0.0	0.0	22.4	24.4	0.0	0.0				16.2	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	22.4	24.4	0.0	0.0				16.2	0.0	0.0
Prop In Lane	0.00		0.46	1.00		0.00				0.96		0.04
Lane Grp Cap(c), veh/h	0	0	742	371	1325	0				232	0	0
V/C Ratio(X)	0.00	0.00	0.54	0.94	0.36	0.00				0.88	0.00	0.00
Avail Cap(c_a), veh/h	0	0	742	485	1325	0				304	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.09	0.09	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	20.2	32.1	0.0	0.0				49.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	2.8	3.5	0.1	0.0				20.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.9	7.4	0.0	0.0				7.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	23.0	35.6	0.1	0.0				70.4	0.0	0.0
LnGrp LOS	A	A	C	D	A	A				E	A	A
Approach Vol, veh/h		402			827						205	
Approach Delay, s/veh		23.0			15.1						70.4	
Approach LOS		C			B						E	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		96.8		23.2	31.7	65.2						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		86.5		24.5	35.5	46.5						
Max Q Clear Time (g_c+I1), s		2.0		18.2	26.4	24.4						
Green Ext Time (p_c), s		3.2		0.5	0.7	2.5						
Intersection Summary												
HCM 6th Ctrl Delay			25.2									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	328	0	0	613	400	148	0	256	0	0	0
Future Volume (veh/h)	52	328	0	0	613	400	148	0	256	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1574	1574	0	0	1767	1767	1900	1633	1900			
Adj Flow Rate, veh/h	54	342	0	0	639	399	154	0	215			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	22	22	0	0	9	9	0	18	0			
Cap, veh/h	66	1069	0	0	608	380	149	0	208			
Arrive On Green	0.01	0.22	0.00	0.00	0.60	0.60	0.25	0.00	0.25			
Sat Flow, veh/h	1499	1574	0	0	1017	635	605	0	845			
Grp Volume(v), veh/h	54	342	0	0	0	1038	369	0	0			
Grp Sat Flow(s),veh/h/ln	1499	1574	0	0	0	1652	1451	0	0			
Q Serve(g_s), s	4.3	21.8	0.0	0.0	0.0	71.7	29.5	0.0	0.0			
Cycle Q Clear(g_c), s	4.3	21.8	0.0	0.0	0.0	71.7	29.5	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.38	0.42		0.58			
Lane Grp Cap(c), veh/h	66	1069	0	0	0	988	357	0	0			
V/C Ratio(X)	0.82	0.32	0.00	0.00	0.00	1.05	1.03	0.00	0.00			
Avail Cap(c_a), veh/h	69	1069	0	0	0	988	357	0	0			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.76	0.76	0.00	0.00	0.00	0.11	1.00	0.00	0.00			
Uniform Delay (d), s/veh	58.7	23.4	0.0	0.0	0.0	24.1	45.3	0.0	0.0			
Incr Delay (d2), s/veh	41.7	0.6	0.0	0.0	0.0	26.5	56.9	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.4	9.3	0.0	0.0	0.0	32.0	15.9	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	100.3	24.0	0.0	0.0	0.0	50.6	102.1	0.0	0.0			
LnGrp LOS	F	C	A	A	A	F	F	A	A			
Approach Vol, veh/h		396			1038			369				
Approach Delay, s/veh		34.4			50.6			102.1				
Approach LOS		C			D			F				
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	9.8	76.2		34.0		86.0						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	5.5	71.5		29.5		81.5						
Max Q Clear Time (g_c+I1), s	6.3	73.7		31.5		23.8						
Green Ext Time (p_c), s	0.0	0.0		0.0		2.1						
Intersection Summary												
HCM 6th Ctrl Delay			57.6									
HCM 6th LOS			E									

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	15	77	96	37	29	89	99	30	21	181	12
Future Vol, veh/h	7	15	77	96	37	29	89	99	30	21	181	12
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	10	10	10	2	2	2	6	6	6	2	2	2
Mvmt Flow	8	17	89	110	43	33	102	114	34	24	208	14
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	10.6	11.2	10.9
HCM LOS	A	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	41%	7%	59%	10%
Vol Thru, %	45%	15%	23%	85%
Vol Right, %	14%	78%	18%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	218	99	162	214
LT Vol	89	7	96	21
Through Vol	99	15	37	181
RT Vol	30	77	29	12
Lane Flow Rate	251	114	186	246
Geometry Grp	1	1	1	1
Degree of Util (X)	0.362	0.166	0.281	0.35
Departure Headway (Hd)	5.194	5.24	5.431	5.123
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	694	684	661	703
Service Time	3.222	3.277	3.464	3.152
HCM Lane V/C Ratio	0.362	0.167	0.281	0.35
HCM Control Delay	11.2	9.3	10.6	10.9
HCM Lane LOS	B	A	B	B
HCM 95th-tile Q	1.7	0.6	1.2	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	209	80	40	377	61	219	134	73	50	149	417
Future Volume (veh/h)	295	209	80	40	377	61	219	134	73	50	149	417
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1781	1781	1781	1841	1841	1841
Adj Flow Rate, veh/h	307	218	75	42	393	60	228	140	64	52	155	369
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	19	19	19	11	11	11	8	8	8	4	4	4
Cap, veh/h	307	486	167	53	374	57	262	179	82	542	147	350
Arrive On Green	0.20	0.42	0.42	0.03	0.25	0.25	0.15	0.15	0.15	0.31	0.31	0.31
Sat Flow, veh/h	1541	1151	396	1654	1472	225	1697	1157	529	1753	476	1132
Grp Volume(v), veh/h	307	0	293	42	0	453	228	0	204	52	0	524
Grp Sat Flow(s),veh/h/ln	1541	0	1547	1654	0	1697	1697	0	1686	1753	0	1608
Q Serve(g_s), s	29.0	0.0	19.6	3.7	0.0	37.0	19.1	0.0	16.9	3.1	0.0	45.0
Cycle Q Clear(g_c), s	29.0	0.0	19.6	3.7	0.0	37.0	19.1	0.0	16.9	3.1	0.0	45.0
Prop In Lane	1.00		0.26	1.00		0.13	1.00		0.31	1.00		0.70
Lane Grp Cap(c), veh/h	307	0	653	53	0	432	262	0	260	542	0	497
V/C Ratio(X)	1.00	0.00	0.45	0.80	0.00	1.05	0.87	0.00	0.78	0.10	0.00	1.05
Avail Cap(c_a), veh/h	307	0	653	114	0	432	373	0	371	542	0	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.2	0.0	30.0	69.9	0.0	54.2	60.1	0.0	59.2	35.7	0.0	50.2
Incr Delay (d2), s/veh	51.0	0.0	0.5	22.9	0.0	57.0	14.4	0.0	6.9	0.1	0.0	55.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.5	0.0	7.3	1.9	0.0	22.3	9.2	0.0	7.6	1.3	0.0	25.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	109.3	0.0	30.5	92.8	0.0	111.2	74.5	0.0	66.1	35.8	0.0	105.3
LnGrp LOS	F	A	C	F	A	F	E	A	E	D	A	F
Approach Vol, veh/h		600			495			432			576	
Approach Delay, s/veh		70.8			109.6			70.5			99.1	
Approach LOS		E			F			E			F	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		48.0	32.0	40.0		25.5	7.6	64.4
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0
Max Green Setting (Gmax), s		45.0	29.0	37.0		32.0	10.0	56.0
Max Q Clear Time (g_c+I1), s		47.0	31.0	39.0		21.1	5.7	21.6
Green Ext Time (p_c), s		0.0	0.0	0.0		1.4	0.0	1.8

Intersection Summary			
HCM 6th Ctrl Delay			87.6
HCM 6th LOS			F

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	35	20	57	58	54	107
Future Vol, veh/h	35	20	57	58	54	107
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	5	5	4	4	1	1
Mvmt Flow	42	24	69	70	65	129

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	142	0	-	0	215	107
Stage 1	-	-	-	-	107	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	4.15	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.245	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1423	-	-	-	775	950
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	919	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1419	-	-	-	747	947
Mov Cap-2 Maneuver	-	-	-	-	747	-
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	916	-

Approach	EB	WB	SB
HCM Control Delay, s	4.8	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1419	-	-	-	869
HCM Lane V/C Ratio	0.03	-	-	-	0.223
HCM Control Delay (s)	7.6	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	48	284	449	60	38	29
Future Vol, veh/h	48	284	449	60	38	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	22	22	11	11	0	0
Mvmt Flow	50	296	468	63	40	30

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	468	0	-	0	864	468
Stage 1	-	-	-	-	468	-
Stage 2	-	-	-	-	396	-
Critical Hdwy	4.32	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.398	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	997	-	-	0	327	599
Stage 1	-	-	-	0	634	-
Stage 2	-	-	-	0	684	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	997	-	-	-	311	599
Mov Cap-2 Maneuver	-	-	-	-	311	-
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	684	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	997	-	-	548
HCM Lane V/C Ratio	0.05	-	-	0.127
HCM Control Delay (s)	8.8	-	-	12.5
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	0.4

Intersection						
Int Delay, s/veh	0.5					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	10	359	1	8	167
Future Vol, veh/h	8	10	359	1	8	167
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	12	12	6	6	5	5
Mvmt Flow	10	12	427	1	10	199

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	646	427	0	-	427	0
Stage 1	427	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.52	6.32	-	-	4.15	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.408	-	-	2.245	-
Pot Cap-1 Maneuver	421	607	-	0	1116	-
Stage 1	637	-	-	0	-	-
Stage 2	794	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	417	607	-	-	1116	-
Mov Cap-2 Maneuver	417	-	-	-	-	-
Stage 1	631	-	-	-	-	-
Stage 2	794	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.4	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	505	1116	-
HCM Lane V/C Ratio	-	0.042	0.009	-
HCM Control Delay (s)	-	12.4	8.3	-
HCM Lane LOS	-	B	A	-
HCM 95th %tile Q(veh)	-	0.1	0	-

Intersection						
Int Delay, s/veh	0.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	0	30	217	352	2
Future Vol, veh/h	1	0	30	217	352	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	0	33	236	383	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	686	384	385	0	-	0
Stage 1	384	-	-	-	-	-
Stage 2	302	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	413	664	1173	-	-	-
Stage 1	688	-	-	-	-	-
Stage 2	750	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	400	664	1173	-	-	-
Mov Cap-2 Maneuver	400	-	-	-	-	-
Stage 1	666	-	-	-	-	-
Stage 2	750	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1173	-	400	-	-
HCM Lane V/C Ratio	0.028	-	0.003	-	-
HCM Control Delay (s)	8.2	0	14	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Intersection						
Int Delay, s/veh	0.6					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	35	0	246	352	0
Future Vol, veh/h	1	35	0	246	352	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	38	0	267	383	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	650	383	383	0	-	0
Stage 1	383	-	-	-	-	-
Stage 2	267	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	434	664	1175	-	-	-
Stage 1	689	-	-	-	-	-
Stage 2	778	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	434	664	1175	-	-	-
Mov Cap-2 Maneuver	434	-	-	-	-	-
Stage 1	689	-	-	-	-	-
Stage 2	778	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1175	-	654	-	-
HCM Lane V/C Ratio	-	-	0.06	-	-
HCM Control Delay (s)	0	-	10.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection						
Int Delay, s/veh	7.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	252	265	225	364	23
Future Vol, veh/h	21	252	265	225	364	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	274	288	245	396	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1230	409	421	0	-	0
Stage 1	409	-	-	-	-	-
Stage 2	821	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	196	642	1138	-	-	-
Stage 1	671	-	-	-	-	-
Stage 2	432	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	139	642	1138	-	-	-
Mov Cap-2 Maneuver	139	-	-	-	-	-
Stage 1	474	-	-	-	-	-
Stage 2	432	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22	5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1138	-	502	-	-
HCM Lane V/C Ratio	0.253	-	0.591	-	-
HCM Control Delay (s)	9.2	0	22	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	1	-	3.8	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	475	15	42	178	73	8	56	34	126	62	14
Future Volume (veh/h)	52	475	15	42	178	73	8	56	34	126	62	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1781	1781	1781	1885	1885	1885	1841	1841	1841
Adj Flow Rate, veh/h	56	511	15	45	191	65	9	60	37	135	67	9
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	8	8	8	1	1	1	4	4	4
Cap, veh/h	83	706	21	69	499	170	14	92	56	225	204	27
Arrive On Green	0.05	0.40	0.40	0.04	0.39	0.39	0.09	0.09	0.09	0.13	0.13	0.13
Sat Flow, veh/h	1739	1765	52	1697	1271	433	150	1000	617	1753	1589	213
Grp Volume(v), veh/h	56	0	526	45	0	256	106	0	0	135	0	76
Grp Sat Flow(s),veh/h/ln	1739	0	1817	1697	0	1704	1767	0	0	1753	0	1802
Q Serve(g_s), s	1.1	0.0	8.6	0.9	0.0	3.8	2.0	0.0	0.0	2.6	0.0	1.4
Cycle Q Clear(g_c), s	1.1	0.0	8.6	0.9	0.0	3.8	2.0	0.0	0.0	2.6	0.0	1.4
Prop In Lane	1.00		0.03	1.00		0.25	0.08		0.35	1.00		0.12
Lane Grp Cap(c), veh/h	83	0	727	69	0	669	162	0	0	225	0	231
V/C Ratio(X)	0.67	0.00	0.72	0.66	0.00	0.38	0.66	0.00	0.00	0.60	0.00	0.33
Avail Cap(c_a), veh/h	542	0	3241	432	0	2943	1051	0	0	993	0	1021
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.5	0.0	8.9	16.7	0.0	7.7	15.5	0.0	0.0	14.5	0.0	14.0
Incr Delay (d2), s/veh	9.0	0.0	1.4	10.2	0.0	0.4	4.4	0.0	0.0	2.6	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	2.2	0.5	0.0	0.8	0.8	0.0	0.0	0.9	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.6	0.0	10.3	26.9	0.0	8.0	19.9	0.0	0.0	17.1	0.0	14.8
LnGrp LOS	C	A	B	C	A	A	B	A	A	B	A	B
Approach Vol, veh/h		582			301			106			211	
Approach Delay, s/veh		11.8			10.8			19.9			16.3	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		7.5	4.7	16.9		6.2	4.4	17.1				
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0				
Max Green Setting (Gmax), s		20.0	11.0	61.0		21.0	9.0	63.0				
Max Q Clear Time (g_c+I1), s		4.6	3.1	5.8		4.0	2.9	10.6				
Green Ext Time (p_c), s		0.6	0.0	1.6		0.4	0.0	3.6				
Intersection Summary												
HCM 6th Ctrl Delay			13.1									
HCM 6th LOS			B									

Intersection												
Int Delay, s/veh	1.1											
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations												
Traffic Vol, veh/h	1	691	17	43	291	10	11	0	29	9	0	2
Future Vol, veh/h	1	691	17	43	291	10	11	0	29	9	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	10	10	10	5	5	5	9	9	9
Mvmt Flow	1	751	18	47	316	11	12	0	32	10	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	316	0	0	751	0	0	1172	1172	760	1169	1169	322
Stage 1	-	-	-	-	-	-	762	762	-	416	416	-
Stage 2	-	-	-	-	-	-	410	410	-	753	753	-
Critical Hdwy	4.14	-	-	4.2	-	-	7.15	6.55	6.25	7.19	6.59	6.29
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Follow-up Hdwy	2.236	-	-	2.29	-	-	3.545	4.045	3.345	3.581	4.081	3.381
Pot Cap-1 Maneuver	1233	-	-	823	-	-	167	190	401	165	187	703
Stage 1	-	-	-	-	-	-	393	409	-	600	580	-
Stage 2	-	-	-	-	-	-	613	590	-	391	407	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1233	-	-	823	-	-	157	177	401	144	174	703
Mov Cap-2 Maneuver	-	-	-	-	-	-	157	177	-	144	174	-
Stage 1	-	-	-	-	-	-	393	409	-	599	539	-
Stage 2	-	-	-	-	-	-	568	549	-	360	407	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.2	12.1	26.9
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	553	1233	-	-	823	-	-	176
HCM Lane V/C Ratio	0.079	0.001	-	-	0.057	-	-	0.068
HCM Control Delay (s)	12.1	7.9	0	-	9.6	0	-	26.9
HCM Lane LOS	B	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	0.3	0	-	-	0.2	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	304	425	285	263	0	0	0	0	255	2	81
Future Volume (veh/h)	0	304	425	285	263	0	0	0	0	255	2	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1767	1767	0				1900	1767	1900
Adj Flow Rate, veh/h	0	330	421	310	286	0				277	2	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	9	9	0				0	9	0
Cap, veh/h	0	340	434	315	1232	0				289	2	81
Arrive On Green	0.00	0.47	0.47	0.06	0.23	0.00				0.23	0.23	0.23
Sat Flow, veh/h	0	720	918	1682	1767	0				1271	9	358
Grp Volume(v), veh/h	0	0	751	310	286	0				357	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1638	1682	1767	0				1639	0	0
Q Serve(g_s), s	0.0	0.0	53.6	22.1	15.8	0.0				25.8	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	53.6	22.1	15.8	0.0				25.8	0.0	0.0
Prop In Lane	0.00		0.56	1.00		0.00				0.78		0.22
Lane Grp Cap(c), veh/h	0	0	774	315	1232	0				373	0	0
V/C Ratio(X)	0.00	0.00	0.97	0.98	0.23	0.00				0.96	0.00	0.00
Avail Cap(c_a), veh/h	0	0	774	315	1232	0				373	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.58	0.58	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	30.8	56.1	20.1	0.0				45.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	25.9	34.0	0.3	0.0				35.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	25.3	12.9	7.5	0.0				13.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	56.8	90.1	20.3	0.0				81.3	0.0	0.0
LnGrp LOS	A	A	E	F	C	A				F	A	A
Approach Vol, veh/h		751			596						357	
Approach Delay, s/veh		56.8			56.6						81.3	
Approach LOS		E			E						F	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		88.2		31.8	27.0	61.2						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		83.7		27.3	22.5	56.7						
Max Q Clear Time (g_c+I1), s		17.8		27.8	24.1	55.6						
Green Ext Time (p_c), s		1.7		0.0	0.0	0.6						
Intersection Summary												
HCM 6th Ctrl Delay			61.9									
HCM 6th LOS			E									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	510	0	0	429	235	119	0	341	0	0	0
Future Volume (veh/h)	49	510	0	0	429	235	119	0	341	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1796	1796	0	0	1767	1767	1900	1781	1900			
Adj Flow Rate, veh/h	52	537	0	0	452	232	125	0	267			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	7	7	0	0	9	9	0	8	0			
Cap, veh/h	66	1170	0	0	633	325	136	0	291			
Arrive On Green	0.05	0.87	0.00	0.00	0.58	0.58	0.27	0.00	0.27			
Sat Flow, veh/h	1711	1796	0	0	1100	564	499	0	1066			
Grp Volume(v), veh/h	52	537	0	0	0	684	392	0	0			
Grp Sat Flow(s),veh/h/ln	1711	1796	0	0	0	1664	1565	0	0			
Q Serve(g_s), s	3.6	7.9	0.0	0.0	0.0	35.6	29.1	0.0	0.0			
Cycle Q Clear(g_c), s	3.6	7.9	0.0	0.0	0.0	35.6	29.1	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.34	0.32		0.68			
Lane Grp Cap(c), veh/h	66	1170	0	0	0	958	428	0	0			
V/C Ratio(X)	0.79	0.46	0.00	0.00	0.00	0.71	0.92	0.00	0.00			
Avail Cap(c_a), veh/h	110	1170	0	0	0	958	531	0	0			
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.17	0.17	0.00	0.00	0.00	0.74	1.00	0.00	0.00			
Uniform Delay (d), s/veh	56.4	3.3	0.0	0.0	0.0	18.4	42.3	0.0	0.0			
Incr Delay (d2), s/veh	3.6	0.2	0.0	0.0	0.0	3.4	18.3	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.6	2.0	0.0	0.0	0.0	13.5	13.1	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.0	3.5	0.0	0.0	0.0	21.7	60.6	0.0	0.0			
LnGrp LOS	E	A	A	A	A	C	E	A	A			
Approach Vol, veh/h		589			684			392				
Approach Delay, s/veh		8.5			21.7			60.6				
Approach LOS		A			C			E				

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.1	73.6		37.3		82.7
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s	7.7	58.1		40.7		70.3
Max Q Clear Time (g_c+I1), s	5.6	37.6		31.1		9.9
Green Ext Time (p_c), s	0.0	4.7		1.7		3.7

Intersection Summary		
HCM 6th Ctrl Delay		26.2
HCM 6th LOS		C

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	2	20	73	59	13	12	38	111	19	6	93	4
Future Vol, veh/h	2	20	73	59	13	12	38	111	19	6	93	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	2	2	2
Mvmt Flow	2	21	77	62	14	13	40	117	20	6	98	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	8.5	8.8	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	2%	70%	6%
Vol Thru, %	66%	21%	15%	90%
Vol Right, %	11%	77%	14%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	168	95	84	103
LT Vol	38	2	59	6
Through Vol	111	20	13	93
RT Vol	19	73	12	4
Lane Flow Rate	177	100	88	108
Geometry Grp	1	1	1	1
Degree of Util (X)	0.221	0.12	0.118	0.137
Departure Headway (Hd)	4.489	4.314	4.796	4.56
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	799	830	747	786
Service Time	2.515	2.343	2.827	2.589
HCM Lane V/C Ratio	0.222	0.12	0.118	0.137
HCM Control Delay	8.8	7.9	8.5	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.4	0.4	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	303	391	157	68	216	31	121	84	70	46	96	327
Future Volume (veh/h)	303	391	157	68	216	31	121	84	70	46	96	327
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1811	1811	1811	1841	1841	1841
Adj Flow Rate, veh/h	316	407	155	71	225	29	126	88	52	48	100	265
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	7	7	7	6	6	6	4	4	4
Cap, veh/h	370	475	181	90	342	44	222	137	81	480	122	322
Arrive On Green	0.22	0.38	0.38	0.05	0.22	0.22	0.13	0.13	0.13	0.27	0.27	0.27
Sat Flow, veh/h	1711	1239	472	1711	1559	201	1725	1062	627	1753	444	1177
Grp Volume(v), veh/h	316	0	562	71	0	254	126	0	140	48	0	365
Grp Sat Flow(s),veh/h/ln	1711	0	1711	1711	0	1760	1725	0	1689	1753	0	1621
Q Serve(g_s), s	13.2	0.0	22.4	3.0	0.0	9.8	5.1	0.0	5.8	1.5	0.0	15.6
Cycle Q Clear(g_c), s	13.2	0.0	22.4	3.0	0.0	9.8	5.1	0.0	5.8	1.5	0.0	15.6
Prop In Lane	1.00		0.28	1.00		0.11	1.00		0.37	1.00		0.73
Lane Grp Cap(c), veh/h	370	0	655	90	0	386	222	0	217	480	0	444
V/C Ratio(X)	0.85	0.00	0.86	0.79	0.00	0.66	0.57	0.00	0.64	0.10	0.00	0.82
Avail Cap(c_a), veh/h	877	0	1454	185	0	784	768	0	752	923	0	853
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.9	0.0	21.0	34.7	0.0	26.4	30.3	0.0	30.7	20.1	0.0	25.2
Incr Delay (d2), s/veh	5.6	0.0	3.4	14.1	0.0	1.9	2.3	0.0	3.2	0.1	0.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	8.5	1.6	0.0	4.0	2.1	0.0	2.4	0.6	0.0	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	0.0	24.4	48.8	0.0	28.3	32.6	0.0	33.9	20.2	0.0	29.1
LnGrp LOS	C	A	C	D	A	C	C	A	C	C	A	C
Approach Vol, veh/h		878			325			266			413	
Approach Delay, s/veh		27.7			32.8			33.3			28.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		23.3	19.0	19.3		12.5	6.9	31.4
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0
Max Green Setting (Gmax), s		39.0	38.0	33.0		33.0	8.0	63.0
Max Q Clear Time (g_c+I1), s		17.6	15.2	11.8		7.8	5.0	24.4
Green Ext Time (p_c), s		2.3	0.9	1.3		1.1	0.0	4.0

Intersection Summary		
HCM 6th Ctrl Delay		29.4
HCM 6th LOS		C

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	17	32	73	42	50
Future Vol, veh/h	28	17	32	73	42	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	3	3	1	1
Mvmt Flow	33	20	37	85	49	58

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	122	0	-	0	166	80
Stage 1	-	-	-	-	80	-
Stage 2	-	-	-	-	86	-
Critical Hdwy	4.1	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.2	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1478	-	-	-	827	983
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	940	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1478	-	-	-	808	983
Mov Cap-2 Maneuver	-	-	-	-	808	-
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	940	-

Approach	EB	WB	SB
HCM Control Delay, s	4.7	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1478	-	-	-	895
HCM Lane V/C Ratio	0.022	-	-	-	0.12
HCM Control Delay (s)	7.5	0	-	-	9.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑	↱		Y	
Traffic Vol, veh/h	53	454	277	49	36	38
Future Vol, veh/h	53	454	277	49	36	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	8	1	1
Mvmt Flow	56	483	295	52	38	40

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	295	0	-	0	890	295
Stage 1	-	-	-	-	295	-
Stage 2	-	-	-	-	595	-
Critical Hdwy	4.18	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.272	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1233	-	-	0	315	747
Stage 1	-	-	-	0	758	-
Stage 2	-	-	-	0	553	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1233	-	-	-	301	747
Mov Cap-2 Maneuver	-	-	-	-	301	-
Stage 1	-	-	-	-	724	-
Stage 2	-	-	-	-	553	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	1233	-	-	619
HCM Lane V/C Ratio	0.046	-	-	0.127
HCM Control Delay (s)	8.1	-	-	11.7
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	0.4

Intersection						
Int Delay, s/veh	0.2					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	1	178	5	6	276
Future Vol, veh/h	1	1	178	5	6	276
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	7	7	2	2
Mvmt Flow	1	1	212	6	7	329

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	555	212	0	-	212	0
Stage 1	212	-	-	-	-	-
Stage 2	343	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.12	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.218	-
Pot Cap-1 Maneuver	496	833	-	0	1358	-
Stage 1	828	-	-	0	-	-
Stage 2	723	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	494	833	-	-	1358	-
Mov Cap-2 Maneuver	494	-	-	-	-	-
Stage 1	824	-	-	-	-	-
Stage 2	723	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	620	1358	-
HCM Lane V/C Ratio	-	0.004	0.005	-
HCM Control Delay (s)	-	10.8	7.7	-
HCM Lane LOS	-	B	A	-
HCM 95th %tile Q(veh)	-	0	0	-

Intersection						
Int Delay, s/veh	0.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	0	26	168	224	1
Future Vol, veh/h	1	0	26	168	224	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	0	28	183	243	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	483	244	244	0	-	0
Stage 1	244	-	-	-	-	-
Stage 2	239	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	542	795	1322	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	801	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	529	795	1322	-	-	-
Mov Cap-2 Maneuver	529	-	-	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	801	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.8	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1322	-	529	-	-
HCM Lane V/C Ratio	0.021	-	0.002	-	-
HCM Control Delay (s)	7.8	0	11.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Intersection						
Int Delay, s/veh	0.7					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	31	0	193	224	0
Future Vol, veh/h	1	31	0	193	224	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	34	0	210	243	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	453	243	243	0	-	0
Stage 1	243	-	-	-	-	-
Stage 2	210	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	565	796	1323	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	825	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	565	796	1323	-	-	-
Mov Cap-2 Maneuver	565	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	825	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.8	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1323	-	786	-	-
HCM Lane V/C Ratio	-	-	0.044	-	-
HCM Control Delay (s)	0	-	9.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	222	233	185	247	8
Future Vol, veh/h	8	222	233	185	247	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	241	253	201	268	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	980	273	277	0	-	0
Stage 1	273	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	277	766	1286	-	-	-
Stage 1	773	-	-	-	-	-
Stage 2	489	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	216	766	1286	-	-	-
Mov Cap-2 Maneuver	216	-	-	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	489	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	12.9		4.7		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1286	-	704	-	-
HCM Lane V/C Ratio	0.197	-	0.355	-	-
HCM Control Delay (s)	8.5	0	12.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.7	-	1.6	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	243	5	42	358	58	10	57	32	95	28	55
Future Volume (veh/h)	42	243	5	42	358	58	10	57	32	95	28	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1752	1752	1752	1811	1811	1811
Adj Flow Rate, veh/h	46	264	4	46	389	58	11	62	35	103	30	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	19	19	19	11	11	11	10	10	10	6	6	6
Cap, veh/h	65	600	9	69	557	83	16	91	51	193	149	45
Arrive On Green	0.04	0.38	0.38	0.04	0.38	0.38	0.10	0.10	0.10	0.11	0.11	0.11
Sat Flow, veh/h	1541	1590	24	1654	1477	220	168	946	534	1725	1338	401
Grp Volume(v), veh/h	46	0	268	46	0	447	108	0	0	103	0	39
Grp Sat Flow(s),veh/h/ln	1541	0	1614	1654	0	1697	1647	0	0	1725	0	1739
Q Serve(g_s), s	0.9	0.0	4.0	0.9	0.0	7.2	2.0	0.0	0.0	1.8	0.0	0.7
Cycle Q Clear(g_c), s	0.9	0.0	4.0	0.9	0.0	7.2	2.0	0.0	0.0	1.8	0.0	0.7
Prop In Lane	1.00		0.01	1.00		0.13	0.10		0.32	1.00		0.23
Lane Grp Cap(c), veh/h	65	0	609	69	0	640	158	0	0	193	0	194
V/C Ratio(X)	0.71	0.00	0.44	0.66	0.00	0.70	0.68	0.00	0.00	0.53	0.00	0.20
Avail Cap(c_a), veh/h	575	0	3161	566	0	3271	1024	0	0	1019	0	1027
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.2	0.0	7.5	15.2	0.0	8.5	14.1	0.0	0.0	13.5	0.0	13.0
Incr Delay (d2), s/veh	13.5	0.0	0.5	10.4	0.0	1.4	5.1	0.0	0.0	2.3	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.8	0.4	0.0	1.6	0.8	0.0	0.0	0.6	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.7	0.0	8.0	25.5	0.0	9.9	19.1	0.0	0.0	15.8	0.0	13.5
LnGrp LOS	C	A	A	C	A	A	B	A	A	B	A	B
Approach Vol, veh/h		314			493			108			142	
Approach Delay, s/veh		11.0			11.3			19.1			15.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.3	15.1		6.1	4.3	15.1		6.6				
Change Period (Y+Rc), s	3.0	3.0		3.0	3.0	3.0		3.0				
Max Green Setting (Gmax), s	12.0	62.0		20.0	11.0	63.0		19.0				
Max Q Clear Time (g_c+I1), s	2.9	9.2		4.0	2.9	6.0		3.8				
Green Ext Time (p_c), s	0.0	3.0		0.4	0.0	1.6		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			12.5
HCM 6th LOS			B

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	0	388	6	20	484	2	26	0	20	2	1	0
Future Vol, veh/h	0	388	6	20	484	2	26	0	20	2	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	21	21	21	12	12	12	2	2	2	67	67	67
Mvmt Flow	0	446	7	23	556	2	30	0	23	2	1	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	556	0	0	446	0	0	1053	1052	450	1049	1049	557
Stage 1	-	-	-	-	-	-	450	450	-	603	603	-
Stage 2	-	-	-	-	-	-	603	602	-	446	446	-
Critical Hdwy	4.31	-	-	4.22	-	-	7.12	6.52	6.22	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Follow-up Hdwy	2.389	-	-	2.308	-	-	3.518	4.018	3.318	4.103	4.603	3.903
Pot Cap-1 Maneuver	926	-	-	1063	-	-	204	227	609	156	176	424
Stage 1	-	-	-	-	-	-	589	572	-	390	399	-
Stage 2	-	-	-	-	-	-	486	489	-	484	478	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	926	-	-	1063	-	-	198	220	609	146	171	424
Mov Cap-2 Maneuver	-	-	-	-	-	-	198	220	-	146	171	-
Stage 1	-	-	-	-	-	-	589	572	-	390	387	-
Stage 2	-	-	-	-	-	-	470	474	-	466	478	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	17.1	29.1
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	350	926	-	-	1063	-	-	153
HCM Lane V/C Ratio	0.151	-	-	-	0.022	-	-	0.023
HCM Control Delay (s)	17.1	0	-	-	8.5	0	-	29.1
HCM Lane LOS	C	A	-	-	A	A	-	D
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	217	193	431	454	0	0	0	0	298	0	52
Future Volume (veh/h)	0	217	193	431	454	0	0	0	0	298	0	52
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1589	1589	1722	1722	0				1900	1574	1900
Adj Flow Rate, veh/h	0	236	184	468	493	0				324	0	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	21	21	12	12	0				0	22	0
Cap, veh/h	0	285	222	494	1177	0				343	0	17
Arrive On Green	0.00	0.34	0.34	0.20	0.46	0.00				0.24	0.00	0.24
Sat Flow, veh/h	0	827	645	1640	1722	0				1420	0	70
Grp Volume(v), veh/h	0	0	420	468	493	0				340	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1473	1640	1722	0				1490	0	0
Q Serve(g_s), s	0.0	0.0	31.4	33.8	23.0	0.0				26.9	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	31.4	33.8	23.0	0.0				26.9	0.0	0.0
Prop In Lane	0.00		0.44	1.00		0.00				0.95		0.05
Lane Grp Cap(c), veh/h	0	0	508	494	1177	0				360	0	0
V/C Ratio(X)	0.00	0.00	0.83	0.95	0.42	0.00				0.94	0.00	0.00
Avail Cap(c_a), veh/h	0	0	508	513	1177	0				366	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.09	0.09	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	36.0	47.0	16.6	0.0				44.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	14.3	4.4	0.1	0.0				32.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	12.9	14.7	9.7	0.0				12.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	50.4	51.4	16.7	0.0				77.2	0.0	0.0
LnGrp LOS	A	A	D	D	B	A				E	A	A
Approach Vol, veh/h		420			961						340	
Approach Delay, s/veh		50.4			33.6						77.2	
Approach LOS		D			C						E	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		86.5		33.5	40.6	45.9						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		81.5		29.5	37.5	39.5						
Max Q Clear Time (g_c+I1), s		25.0		28.9	35.8	33.4						
Green Ext Time (p_c), s		3.3		0.1	0.3	1.3						
Intersection Summary												
HCM 6th Ctrl Delay			46.3									
HCM 6th LOS			D									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	463	0	0	737	513	148	0	369	0	0	0
Future Volume (veh/h)	52	463	0	0	737	513	148	0	369	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1574	1574	0	0	1767	1767	1900	1633	1900			
Adj Flow Rate, veh/h	54	482	0	0	768	513	154	0	309			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	22	22	0	0	9	9	0	18	0			
Cap, veh/h	62	1069	0	0	593	396	117	0	236			
Arrive On Green	0.01	0.22	0.00	0.00	0.60	0.60	0.25	0.00	0.25			
Sat Flow, veh/h	1499	1574	0	0	988	660	478	0	959			
Grp Volume(v), veh/h	54	482	0	0	0	1281	463	0	0			
Grp Sat Flow(s),veh/h/ln	1499	1574	0	0	0	1648	1437	0	0			
Q Serve(g_s), s	4.3	31.7	0.0	0.0	0.0	72.0	29.5	0.0	0.0			
Cycle Q Clear(g_c), s	4.3	31.7	0.0	0.0	0.0	72.0	29.5	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.40	0.33		0.67			
Lane Grp Cap(c), veh/h	62	1069	0	0	0	989	353	0	0			
V/C Ratio(X)	0.86	0.45	0.00	0.00	0.00	1.30	1.31	0.00	0.00			
Avail Cap(c_a), veh/h	62	1069	0	0	0	989	353	0	0			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.42	0.42	0.00	0.00	0.00	0.09	1.00	0.00	0.00			
Uniform Delay (d), s/veh	58.8	27.2	0.0	0.0	0.0	24.0	45.3	0.0	0.0			
Incr Delay (d2), s/veh	37.6	0.6	0.0	0.0	0.0	133.8	158.8	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.3	13.4	0.0	0.0	0.0	61.5	25.8	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	96.5	27.8	0.0	0.0	0.0	157.8	204.1	0.0	0.0			
LnGrp LOS	F	C	A	A	A	F	F	A	A			
Approach Vol, veh/h		536			1281			463				
Approach Delay, s/veh		34.7			157.8			204.1				
Approach LOS		C			F			F				

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.5	76.5		34.0		86.0
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s	5.0	72.0		29.5		81.5
Max Q Clear Time (g_c+I1), s	6.3	74.0		31.5		33.7
Green Ext Time (p_c), s	0.0	0.0		0.0		3.2

Intersection Summary	
HCM 6th Ctrl Delay	138.2
HCM 6th LOS	F

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	7	15	78	97	37	29	90	102	31	21	184	12
Future Vol, veh/h	7	15	78	97	37	29	90	102	31	21	184	12
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	10	10	10	2	2	2	6	6	6	2	2	2
Mvmt Flow	8	17	90	111	43	33	103	117	36	24	211	14
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.4	10.7	11.3	11
HCM LOS	A	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	40%	7%	60%	10%
Vol Thru, %	46%	15%	23%	85%
Vol Right, %	14%	78%	18%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	223	100	163	217
LT Vol	90	7	97	21
Through Vol	102	15	37	184
RT Vol	31	78	29	12
Lane Flow Rate	256	115	187	249
Geometry Grp	1	1	1	1
Degree of Util (X)	0.371	0.168	0.284	0.356
Departure Headway (Hd)	5.208	5.271	5.462	5.143
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	692	680	658	701
Service Time	3.236	3.308	3.495	3.172
HCM Lane V/C Ratio	0.37	0.169	0.284	0.355
HCM Control Delay	11.3	9.4	10.7	11
HCM Lane LOS	B	A	B	B
HCM 95th-tile Q	1.7	0.6	1.2	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	556	177	99	45	328	126	227	139	76	98	154	695
Future Volume (veh/h)	556	177	99	45	328	126	227	139	76	98	154	695
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1781	1781	1781	1841	1841	1841
Adj Flow Rate, veh/h	579	184	91	47	342	123	236	145	65	102	160	621
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	19	19	19	11	11	11	8	8	8	4	4	4
Cap, veh/h	308	407	201	59	286	103	271	186	83	568	105	407
Arrive On Green	0.20	0.40	0.40	0.04	0.23	0.23	0.16	0.16	0.16	0.32	0.32	0.32
Sat Flow, veh/h	1541	1022	505	1654	1219	439	1697	1165	522	1753	324	1258
Grp Volume(v), veh/h	579	0	275	47	0	465	236	0	210	102	0	781
Grp Sat Flow(s),veh/h/ln	1541	0	1527	1654	0	1658	1697	0	1687	1753	0	1582
Q Serve(g_s), s	29.0	0.0	19.2	4.1	0.0	34.0	19.7	0.0	17.3	6.1	0.0	47.0
Cycle Q Clear(g_c), s	29.0	0.0	19.2	4.1	0.0	34.0	19.7	0.0	17.3	6.1	0.0	47.0
Prop In Lane	1.00		0.33	1.00		0.26	1.00		0.31	1.00		0.80
Lane Grp Cap(c), veh/h	308	0	608	59	0	388	271	0	269	568	0	512
V/C Ratio(X)	1.88	0.00	0.45	0.79	0.00	1.20	0.87	0.00	0.78	0.18	0.00	1.52
Avail Cap(c_a), veh/h	308	0	608	114	0	388	386	0	384	568	0	512
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.1	0.0	32.0	69.4	0.0	55.6	59.6	0.0	58.6	35.2	0.0	49.1
Incr Delay (d2), s/veh	408.2	0.0	0.5	20.7	0.0	111.2	14.3	0.0	6.5	0.1	0.0	245.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	46.0	0.0	7.1	2.1	0.0	26.0	9.4	0.0	7.8	2.6	0.0	53.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	466.2	0.0	32.6	90.1	0.0	166.8	73.8	0.0	65.0	35.4	0.0	294.9
LnGrp LOS	F	A	C	F	A	F	E	A	E	D	A	F
Approach Vol, veh/h		854			512			446			883	
Approach Delay, s/veh		326.6			159.7			69.7			264.9	
Approach LOS		F			F			E			F	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		50.0	32.0	37.0		26.1	8.2	60.8
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0
Max Green Setting (Gmax), s		47.0	29.0	34.0		33.0	10.0	53.0
Max Q Clear Time (g_c+I1), s		49.0	31.0	36.0		21.7	6.1	21.2
Green Ext Time (p_c), s		0.0	0.0	0.0		1.4	0.0	1.7

Intersection Summary			
HCM 6th Ctrl Delay			232.2
HCM 6th LOS			F

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	37	20	57	58	54	109
Future Vol, veh/h	37	20	57	58	54	109
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	5	5	4	4	1	1
Mvmt Flow	45	24	69	70	65	131

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	142	0	-	0	221	107
Stage 1	-	-	-	-	107	-
Stage 2	-	-	-	-	114	-
Critical Hdwy	4.15	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.245	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1423	-	-	-	769	950
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	913	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1419	-	-	-	740	947
Mov Cap-2 Maneuver	-	-	-	-	740	-
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	910	-

Approach	EB	WB	SB
HCM Control Delay, s	4.9	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1419	-	-	-	867
HCM Lane V/C Ratio	0.031	-	-	-	0.227
HCM Control Delay (s)	7.6	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	48	303	470	60	38	29
Future Vol, veh/h	48	303	470	60	38	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	22	22	11	11	0	0
Mvmt Flow	50	316	490	63	40	30

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	490	0	-	0	906	490
Stage 1	-	-	-	-	490	-
Stage 2	-	-	-	-	416	-
Critical Hdwy	4.32	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.398	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	977	-	-	0	309	582
Stage 1	-	-	-	0	620	-
Stage 2	-	-	-	0	670	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	977	-	-	-	293	582
Mov Cap-2 Maneuver	-	-	-	-	293	-
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	670	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	13
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	977	-	-	517
HCM Lane V/C Ratio	0.051	-	-	0.135
HCM Control Delay (s)	8.9	-	-	13
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	0.5

Intersection						
Int Delay, s/veh	0.6					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	11	363	1	9	171
Future Vol, veh/h	8	11	363	1	9	171
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	12	12	6	6	5	5
Mvmt Flow	10	13	432	1	11	204

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	658	432	0	-	432	0
Stage 1	432	-	-	-	-	-
Stage 2	226	-	-	-	-	-
Critical Hdwy	6.52	6.32	-	-	4.15	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.408	-	-	2.245	-
Pot Cap-1 Maneuver	414	603	-	0	1112	-
Stage 1	634	-	-	0	-	-
Stage 2	788	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	410	603	-	-	1112	-
Mov Cap-2 Maneuver	410	-	-	-	-	-
Stage 1	628	-	-	-	-	-
Stage 2	788	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.5	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	503	1112	-
HCM Lane V/C Ratio	-	0.045	0.01	-
HCM Control Delay (s)	-	12.5	8.3	-
HCM Lane LOS	-	B	A	-
HCM 95th %tile Q(veh)	-	0.1	0	-

Intersection						
Int Delay, s/veh	0.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	0	30	222	355	4
Future Vol, veh/h	1	0	30	222	355	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	0	33	241	386	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	695	388	390	0	-	0
Stage 1	388	-	-	-	-	-
Stage 2	307	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	408	660	1169	-	-	-
Stage 1	686	-	-	-	-	-
Stage 2	746	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	395	660	1169	-	-	-
Mov Cap-2 Maneuver	395	-	-	-	-	-
Stage 1	663	-	-	-	-	-
Stage 2	746	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.1	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1169	-	395	-	-
HCM Lane V/C Ratio	0.028	-	0.003	-	-
HCM Control Delay (s)	8.2	0	14.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	1	0	35	34	0	2	0	249	34	2	353	0
Future Vol, veh/h	1	0	35	34	0	2	0	249	34	2	353	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	38	37	0	2	0	271	37	2	384	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	679	696	384	697	678	290	384	0	0	308	0	0
Stage 1	388	388	-	290	290	-	-	-	-	-	-	-
Stage 2	291	308	-	407	388	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	366	365	664	356	374	749	1174	-	-	1253	-	-
Stage 1	636	609	-	718	672	-	-	-	-	-	-	-
Stage 2	717	660	-	621	609	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	365	364	664	335	373	749	1174	-	-	1253	-	-
Mov Cap-2 Maneuver	365	364	-	335	373	-	-	-	-	-	-	-
Stage 1	636	608	-	718	672	-	-	-	-	-	-	-
Stage 2	715	660	-	584	608	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	16.7	0	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1174	-	-	649	346	1253	-	-
HCM Lane V/C Ratio	-	-	-	0.06	0.113	0.002	-	-
HCM Control Delay (s)	0	-	-	10.9	16.7	7.9	0	-
HCM Lane LOS	A	-	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.4	0	-	-

Intersection						
Int Delay, s/veh	47.7					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	320	26	257	320	26	396
Future Vol, veh/h	320	26	257	320	26	396
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	348	28	279	348	28	430

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	939	453	0	0	627	0
Stage 1	453	-	-	-	-	-
Stage 2	486	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 293	607	-	-	955	-
Stage 1	640	-	-	-	-	-
Stage 2	618	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 282	607	-	-	955	-
Mov Cap-2 Maneuver	~ 282	-	-	-	-	-
Stage 1	640	-	-	-	-	-
Stage 2	594	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	184.9	0	0.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	294	955	-
HCM Lane V/C Ratio	-	-	1.279	0.03	-
HCM Control Delay (s)	-	-	184.9	8.9	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	18.1	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	36.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	252	265	556	695	21
Future Vol, veh/h	21	252	265	556	695	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	274	288	604	755	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1947	767	778	0	-	0
Stage 1	767	-	-	-	-	-
Stage 2	1180	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	71	402	839	-	-	-
Stage 1	458	-	-	-	-	-
Stage 2	292	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	34	402	839	-	-	-
Mov Cap-2 Maneuver	34	-	-	-	-	-
Stage 1	221	-	-	-	-	-
Stage 2	292	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	229.4	3.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	839	-	219	-	-
HCM Lane V/C Ratio	0.343	-	1.355	-	-
HCM Control Delay (s)	11.5	0	229.4	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	1.5	-	16.5	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	1	1	430	273	25
Future Vol, veh/h	12	1	1	430	273	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	1	1	467	297	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	780	311	324	0	-	0
Stage 1	311	-	-	-	-	-
Stage 2	469	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	364	729	1236	-	-	-
Stage 1	743	-	-	-	-	-
Stage 2	630	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	364	729	1236	-	-	-
Mov Cap-2 Maneuver	364	-	-	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	630	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	14.9		0		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1236	-	379	-	-
HCM Lane V/C Ratio	0.001	-	0.037	-	-
HCM Control Delay (s)	7.9	-	14.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	482	15	44	187	74	8	56	36	126	62	14
Future Volume (veh/h)	52	482	15	44	187	74	8	56	36	126	62	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1781	1781	1781	1885	1885	1885	1841	1841	1841
Adj Flow Rate, veh/h	56	518	15	47	201	71	9	60	39	135	67	6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	8	8	8	1	1	1	4	4	4
Cap, veh/h	83	712	21	71	500	176	14	90	59	223	211	19
Arrive On Green	0.05	0.40	0.40	0.04	0.40	0.40	0.09	0.09	0.09	0.13	0.13	0.13
Sat Flow, veh/h	1739	1766	51	1697	1257	444	147	980	637	1753	1665	149
Grp Volume(v), veh/h	56	0	533	47	0	272	108	0	0	135	0	73
Grp Sat Flow(s),veh/h/ln	1739	0	1817	1697	0	1701	1763	0	0	1753	0	1814
Q Serve(g_s), s	1.1	0.0	8.9	1.0	0.0	4.1	2.1	0.0	0.0	2.6	0.0	1.3
Cycle Q Clear(g_c), s	1.1	0.0	8.9	1.0	0.0	4.1	2.1	0.0	0.0	2.6	0.0	1.3
Prop In Lane	1.00		0.03	1.00		0.26	0.08		0.36	1.00		0.08
Lane Grp Cap(c), veh/h	83	0	733	71	0	676	162	0	0	223	0	230
V/C Ratio(X)	0.67	0.00	0.73	0.66	0.00	0.40	0.67	0.00	0.00	0.61	0.00	0.32
Avail Cap(c_a), veh/h	535	0	3203	427	0	2905	1036	0	0	981	0	1015
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.7	0.0	9.0	16.9	0.0	7.7	15.7	0.0	0.0	14.8	0.0	14.2
Incr Delay (d2), s/veh	9.1	0.0	1.4	10.2	0.0	0.4	4.6	0.0	0.0	2.7	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	2.2	0.5	0.0	0.9	0.9	0.0	0.0	0.9	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.9	0.0	10.4	27.0	0.0	8.1	20.3	0.0	0.0	17.4	0.0	15.0
LnGrp LOS	C	A	B	C	A	A	C	A	A	B	A	B
Approach Vol, veh/h		589			319			108			208	
Approach Delay, s/veh		11.9			10.9			20.3			16.5	
Approach LOS		B			B			C			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		6.3	4.7	17.2		7.5	4.5	17.4				
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0				
Max Green Setting (Gmax), s		21.0	11.0	61.0		20.0	9.0	63.0				
Max Q Clear Time (g_c+I1), s		4.1	3.1	6.1		4.6	3.0	10.9				
Green Ext Time (p_c), s		0.4	0.0	1.7		0.6	0.0	3.6				
Intersection Summary												
HCM 6th Ctrl Delay			13.2									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	1	699	17	43	303	10	11	0	29	9	0	2
Future Vol, veh/h	1	699	17	43	303	10	11	0	29	9	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	10	10	10	5	5	5	9	9	9
Mvmt Flow	1	760	18	47	329	11	12	0	32	10	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	329	0	0	760	0	0	1194	1194	769	1191	1191	335
Stage 1	-	-	-	-	-	-	771	771	-	429	429	-
Stage 2	-	-	-	-	-	-	423	423	-	762	762	-
Critical Hdwy	4.14	-	-	4.2	-	-	7.15	6.55	6.25	7.19	6.59	6.29
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Follow-up Hdwy	2.236	-	-	2.29	-	-	3.545	4.045	3.345	3.581	4.081	3.381
Pot Cap-1 Maneuver	1219	-	-	817	-	-	161	184	396	159	182	691
Stage 1	-	-	-	-	-	-	388	405	-	591	572	-
Stage 2	-	-	-	-	-	-	603	583	-	387	403	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1219	-	-	817	-	-	152	171	396	138	169	691
Mov Cap-2 Maneuver	-	-	-	-	-	-	152	171	-	138	169	-
Stage 1	-	-	-	-	-	-	388	405	-	590	531	-
Stage 2	-	-	-	-	-	-	558	542	-	356	403	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.2	12.2	27.9
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	546	1219	-	-	817	-	-	169
HCM Lane V/C Ratio	0.08	0.001	-	-	0.057	-	-	0.071
HCM Control Delay (s)	12.2	8	0	-	9.7	0	-	27.9
HCM Lane LOS	B	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	0.3	0	-	-	0.2	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	312	425	402	275	0	0	0	0	372	2	81
Future Volume (veh/h)	0	312	425	402	275	0	0	0	0	372	2	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1767	1767	0				1900	1767	1900
Adj Flow Rate, veh/h	0	339	422	437	299	0				404	2	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	9	9	0				0	9	0
Cap, veh/h	0	307	383	358	1185	0				348	2	69
Arrive On Green	0.00	0.42	0.42	0.35	1.00	0.00				0.25	0.25	0.25
Sat Flow, veh/h	0	730	909	1682	1767	0				1371	7	271
Grp Volume(v), veh/h	0	0	761	437	299	0				486	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1639	1682	1767	0				1649	0	0
Q Serve(g_s), s	0.0	0.0	50.5	25.5	0.0	0.0				30.5	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	50.5	25.5	0.0	0.0				30.5	0.0	0.0
Prop In Lane	0.00		0.55	1.00		0.00				0.83		0.16
Lane Grp Cap(c), veh/h	0	0	690	358	1185	0				419	0	0
V/C Ratio(X)	0.00	0.00	1.10	1.22	0.25	0.00				1.16	0.00	0.00
Avail Cap(c_a), veh/h	0	0	690	358	1185	0				419	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.09	0.09	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	34.8	38.7	0.0	0.0				44.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	66.0	102.5	0.0	0.0				95.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	31.7	19.0	0.0	0.0				23.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	100.7	141.2	0.0	0.0				140.0	0.0	0.0
LnGrp LOS	A	A	F	F	A	A				F	A	A
Approach Vol, veh/h		761			736						486	
Approach Delay, s/veh		100.7			83.8						140.0	
Approach LOS		F			F						F	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		85.0		35.0	30.0	55.0						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		80.5		30.5	25.5	50.5						
Max Q Clear Time (g_c+I1), s		2.0		32.5	27.5	52.5						
Green Ext Time (p_c), s		1.8		0.0	0.0	0.0						
Intersection Summary												
HCM 6th Ctrl Delay			104.1									
HCM 6th LOS			F									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	635	0	0	558	355	119	0	456	0	0	0
Future Volume (veh/h)	49	635	0	0	558	355	119	0	456	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1796	1796	0	0	1767	1767	1900	1781	1900			
Adj Flow Rate, veh/h	52	668	0	0	587	355	125	0	364			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	7	7	0	0	9	9	0	8	0			
Cap, veh/h	66	1100	0	0	552	334	124	0	361			
Arrive On Green	0.01	0.20	0.00	0.00	0.54	0.54	0.31	0.00	0.31			
Sat Flow, veh/h	1711	1796	0	0	1030	623	397	0	1156			
Grp Volume(v), veh/h	52	668	0	0	0	942	489	0	0			
Grp Sat Flow(s),veh/h/ln	1711	1796	0	0	0	1653	1553	0	0			
Q Serve(g_s), s	3.6	40.6	0.0	0.0	0.0	64.4	37.5	0.0	0.0			
Cycle Q Clear(g_c), s	3.6	40.6	0.0	0.0	0.0	64.4	37.5	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.38	0.26		0.74			
Lane Grp Cap(c), veh/h	66	1100	0	0	0	887	485	0	0			
V/C Ratio(X)	0.79	0.61	0.00	0.00	0.00	1.06	1.01	0.00	0.00			
Avail Cap(c_a), veh/h	76	1100	0	0	0	887	485	0	0			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.00	0.00	0.00	0.53	1.00	0.00	0.00			
Uniform Delay (d), s/veh	58.7	34.7	0.0	0.0	0.0	27.8	41.3	0.0	0.0			
Incr Delay (d2), s/veh	4.4	0.2	0.0	0.0	0.0	40.7	42.7	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.7	19.4	0.0	0.0	0.0	33.2	19.6	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.1	35.0	0.0	0.0	0.0	68.6	83.9	0.0	0.0			
LnGrp LOS	E	C	A	A	A	F	F	A	A			
Approach Vol, veh/h		720			942			489				
Approach Delay, s/veh		37.0			68.6			83.9				
Approach LOS		D			E			F				

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	9.1	68.9		42.0		78.0						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	5.3	63.7		37.5		73.5						
Max Q Clear Time (g_c+I1), s	5.6	66.4		39.5		42.6						
Green Ext Time (p_c), s	0.0	0.0		0.0		4.8						

Intersection Summary			
HCM 6th Ctrl Delay			61.5
HCM 6th LOS			E

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	2	20	73	59	13	12	38	114	19	6	95	4
Future Vol, veh/h	2	20	73	59	13	12	38	114	19	6	95	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	2	2	2
Mvmt Flow	2	21	77	62	14	13	40	120	20	6	100	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8	8.5	8.8	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	22%	2%	70%	6%
Vol Thru, %	67%	21%	15%	90%
Vol Right, %	11%	77%	14%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	171	95	84	105
LT Vol	38	2	59	6
Through Vol	114	20	13	95
RT Vol	19	73	12	4
Lane Flow Rate	180	100	88	111
Geometry Grp	1	1	1	1
Degree of Util (X)	0.225	0.12	0.118	0.14
Departure Headway (Hd)	4.492	4.327	4.809	4.564
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	799	828	745	786
Service Time	2.519	2.357	2.84	2.593
HCM Lane V/C Ratio	0.225	0.121	0.118	0.141
HCM Control Delay	8.8	8	8.5	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.9	0.4	0.4	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	564	362	165	70	197	58	144	88	77	83	99	572
Future Volume (veh/h)	564	362	165	70	197	58	144	88	77	83	99	572
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1811	1811	1811	1841	1841	1841
Adj Flow Rate, veh/h	588	377	162	73	205	54	150	92	56	86	103	476
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	7	7	7	6	6	6	4	4	4
Cap, veh/h	534	510	219	92	232	61	199	121	73	547	89	410
Arrive On Green	0.31	0.43	0.43	0.05	0.17	0.17	0.12	0.12	0.12	0.31	0.31	0.31
Sat Flow, veh/h	1711	1191	512	1711	1369	361	1725	1048	638	1753	284	1313
Grp Volume(v), veh/h	588	0	539	73	0	259	150	0	148	86	0	579
Grp Sat Flow(s),veh/h/ln	1711	0	1703	1711	0	1730	1725	0	1686	1753	0	1597
Q Serve(g_s), s	41.0	0.0	34.8	5.5	0.0	19.2	11.1	0.0	11.2	4.7	0.0	41.0
Cycle Q Clear(g_c), s	41.0	0.0	34.8	5.5	0.0	19.2	11.1	0.0	11.2	4.7	0.0	41.0
Prop In Lane	1.00		0.30	1.00		0.21	1.00		0.38	1.00		0.82
Lane Grp Cap(c), veh/h	534	0	729	92	0	293	199	0	194	547	0	498
V/C Ratio(X)	1.10	0.00	0.74	0.80	0.00	0.88	0.76	0.00	0.76	0.16	0.00	1.16
Avail Cap(c_a), veh/h	534	0	804	117	0	395	407	0	398	547	0	498
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.2	0.0	31.5	61.5	0.0	53.3	56.3	0.0	56.4	32.7	0.0	45.2
Incr Delay (d2), s/veh	69.6	0.0	3.3	24.8	0.0	16.5	5.7	0.0	6.1	0.1	0.0	93.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	27.2	0.0	14.5	3.0	0.0	9.6	5.1	0.0	5.0	2.0	0.0	28.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	114.7	0.0	34.8	86.3	0.0	69.8	62.1	0.0	62.4	32.8	0.0	138.2
LnGrp LOS	F	A	C	F	A	E	E	A	E	C	A	F
Approach Vol, veh/h		1127			332			298			665	
Approach Delay, s/veh		76.5			73.4			62.2			124.6	
Approach LOS		E			E			E			F	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	44.0	44.0	25.2	18.1	10.0	59.2
Change Period (Y+Rc), s	3.0	3.0	3.0	3.0	3.0	3.0
Max Green Setting (Gmax), s	41.0	41.0	30.0	31.0	9.0	62.0
Max Q Clear Time (g_c+I1), s	43.0	43.0	21.2	13.2	7.5	36.8
Green Ext Time (p_c), s	0.0	0.0	0.9	1.1	0.0	3.6

Intersection Summary	
HCM 6th Ctrl Delay	87.5
HCM 6th LOS	F

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	17	32	73	42	50
Future Vol, veh/h	28	17	32	73	42	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	3	3	1	1
Mvmt Flow	33	20	37	85	49	58

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	122	0	-	0	166	80
Stage 1	-	-	-	-	80	-
Stage 2	-	-	-	-	86	-
Critical Hdwy	4.1	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.2	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1478	-	-	-	827	983
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	940	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1478	-	-	-	808	983
Mov Cap-2 Maneuver	-	-	-	-	808	-
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	940	-

Approach	EB	WB	SB
HCM Control Delay, s	4.7	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1478	-	-	-	895
HCM Lane V/C Ratio	0.022	-	-	-	0.12
HCM Control Delay (s)	7.5	0	-	-	9.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	469	287	49	36	38
Future Vol, veh/h	53	469	287	49	36	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	8	1	1
Mvmt Flow	56	499	305	52	38	40

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	305	0	-	0	916	305
Stage 1	-	-	-	-	305	-
Stage 2	-	-	-	-	611	-
Critical Hdwy	4.18	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.272	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1222	-	-	0	304	737
Stage 1	-	-	-	0	750	-
Stage 2	-	-	-	0	544	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1222	-	-	-	290	737
Mov Cap-2 Maneuver	-	-	-	-	290	-
Stage 1	-	-	-	-	716	-
Stage 2	-	-	-	-	544	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	12
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	1222	-	-	596
HCM Lane V/C Ratio	0.046	-	-	0.132
HCM Control Delay (s)	8.1	-	-	12
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	0.5

Intersection						
Int Delay, s/veh	0.2					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	2	181	5	7	280
Future Vol, veh/h	1	2	181	5	7	280
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	7	7	2	2
Mvmt Flow	1	2	215	6	8	333

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	564	215	0	-	215	0
Stage 1	215	-	-	-	-	-
Stage 2	349	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.12	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.218	-
Pot Cap-1 Maneuver	490	830	-	0	1355	-
Stage 1	826	-	-	0	-	-
Stage 2	719	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	487	830	-	-	1355	-
Mov Cap-2 Maneuver	487	-	-	-	-	-
Stage 1	821	-	-	-	-	-
Stage 2	719	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	672	1355	-
HCM Lane V/C Ratio	-	0.005	0.006	-
HCM Control Delay (s)	-	10.4	7.7	-
HCM Lane LOS	-	B	A	-
HCM 95th %tile Q(veh)	-	0	0	-

Intersection						
Int Delay, s/veh	0.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	0	26	171	226	1
Future Vol, veh/h	1	0	26	171	226	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	0	28	186	246	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	489	247	247	0	-	0
Stage 1	247	-	-	-	-	-
Stage 2	242	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	538	792	1319	-	-	-
Stage 1	794	-	-	-	-	-
Stage 2	798	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	525	792	1319	-	-	-
Mov Cap-2 Maneuver	525	-	-	-	-	-
Stage 1	775	-	-	-	-	-
Stage 2	798	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.9	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1319	-	525	-	-
HCM Lane V/C Ratio	0.021	-	0.002	-	-
HCM Control Delay (s)	7.8	0	11.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	31	40	0	1	0	195	42	1	225	0
Future Vol, veh/h	1	0	31	40	0	1	0	195	42	1	225	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	34	43	0	1	0	212	46	1	245	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	483	505	245	499	482	235	245	0	0	258	0	0
Stage 1	247	247	-	235	235	-	-	-	-	-	-	-
Stage 2	236	258	-	264	247	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	494	470	794	482	484	804	1321	-	-	1307	-	-
Stage 1	757	702	-	768	710	-	-	-	-	-	-	-
Stage 2	767	694	-	741	702	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	493	470	794	461	484	804	1321	-	-	1307	-	-
Mov Cap-2 Maneuver	493	470	-	461	484	-	-	-	-	-	-	-
Stage 1	757	701	-	768	710	-	-	-	-	-	-	-
Stage 2	766	694	-	709	701	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	13.5	0	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1321	-	-	779	466	1307	-	-
HCM Lane V/C Ratio	-	-	-	0.045	0.096	0.001	-	-
HCM Control Delay (s)	0	-	-	9.8	13.5	7.8	0	-
HCM Lane LOS	A	-	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

Intersection						
Int Delay, s/veh	9.2					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	256	12	225	260	12	284
Future Vol, veh/h	256	12	225	260	12	284
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	278	13	245	283	13	309

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	722	387	0	0	528	0
Stage 1	387	-	-	-	-	-
Stage 2	335	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	394	661	-	-	1039	-
Stage 1	686	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	388	661	-	-	1039	-
Mov Cap-2 Maneuver	388	-	-	-	-	-
Stage 1	686	-	-	-	-	-
Stage 2	714	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	35.8	0	0.3
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	395	1039	-
HCM Lane V/C Ratio	-	-	0.737	0.013	-
HCM Control Delay (s)	-	-	35.8	8.5	0
HCM Lane LOS	-	-	E	A	A
HCM 95th %tile Q(veh)	-	-	5.8	0	-

Intersection						
Int Delay, s/veh	5.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	222	233	477	532	8
Future Vol, veh/h	8	222	233	477	532	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	241	253	518	578	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1607	583	587	0	-	0
Stage 1	583	-	-	-	-	-
Stage 2	1024	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	116	512	988	-	-	-
Stage 1	558	-	-	-	-	-
Stage 2	347	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	74	512	988	-	-	-
Mov Cap-2 Maneuver	74	-	-	-	-	-
Stage 1	357	-	-	-	-	-
Stage 2	347	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	24.9		3.2		0	
HCM LOS	C					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	988	-	425	-	-
HCM Lane V/C Ratio	0.256	-	0.588	-	-
HCM Control Delay (s)	9.9	0	24.9	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	1	-	3.7	-	-

Intersection						
Int Delay, s/veh	0.7					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	2	1	277	323	11
Future Vol, veh/h	31	2	1	277	323	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	2	1	301	351	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	660	357	363	0	-	0
Stage 1	357	-	-	-	-	-
Stage 2	303	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	428	687	1196	-	-	-
Stage 1	708	-	-	-	-	-
Stage 2	749	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	428	687	1196	-	-	-
Mov Cap-2 Maneuver	428	-	-	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	749	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1196	-	438	-	-
HCM Lane V/C Ratio	0.001	-	0.082	-	-
HCM Control Delay (s)	8	-	14	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	217	193	431	454	0	0	0	0	298	0	52
Future Volume (veh/h)	0	217	193	431	454	0	0	0	0	298	0	52
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1589	1589	1722	1722	0				1574	1574	1574
Adj Flow Rate, veh/h	0	236	53	468	493	0				324	0	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	21	21	12	12	0				22	22	22
Cap, veh/h	0	463	392	491	1114	0				361	0	321
Arrive On Green	0.00	0.29	0.29	0.60	1.00	0.00				0.24	0.00	0.24
Sat Flow, veh/h	0	1589	1346	1640	1722	0				1499	0	1334
Grp Volume(v), veh/h	0	236	53	468	493	0				324	0	14
Grp Sat Flow(s),veh/h/ln	0	1589	1346	1640	1722	0				1499	0	1334
Q Serve(g_s), s	0.0	9.9	2.3	21.3	0.0	0.0				16.8	0.0	0.6
Cycle Q Clear(g_c), s	0.0	9.9	2.3	21.3	0.0	0.0				16.8	0.0	0.6
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	463	392	491	1114	0				361	0	321
V/C Ratio(X)	0.00	0.51	0.14	0.95	0.44	0.00				0.90	0.00	0.04
Avail Cap(c_a), veh/h	0	463	392	564	1114	0				403	0	358
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.68	0.68	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	23.6	20.9	15.5	0.0	0.0				29.4	0.0	23.3
Incr Delay (d2), s/veh	0.0	4.0	0.7	19.3	0.9	0.0				21.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.0	0.8	6.5	0.3	0.0				7.7	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	27.6	21.6	34.8	0.9	0.0				50.4	0.0	23.4
LnGrp LOS	A	C	C	C	A	A				D	A	C
Approach Vol, veh/h		289			961						338	
Approach Delay, s/veh		26.5			17.4						49.3	
Approach LOS		C			B						D	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		56.3		23.7	28.5	27.8						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		49.5		21.5	27.5	17.5						
Max Q Clear Time (g_c+I1), s		2.0		18.8	23.3	11.9						
Green Ext Time (p_c), s		3.3		0.5	0.7	0.7						
Intersection Summary												
HCM 6th Ctrl Delay			25.8									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	463	0	0	737	513	148	0	369	0	0	0
Future Volume (veh/h)	52	463	0	0	737	513	148	0	369	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1574	1574	0	0	1767	1767	1633	1633	1633			
Adj Flow Rate, veh/h	54	482	0	0	768	336	154	0	61			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	22	22	0	0	9	9	18	18	18			
Cap, veh/h	65	1199	0	0	1169	991	195	0	174			
Arrive On Green	0.09	1.00	0.00	0.00	0.66	0.66	0.13	0.00	0.13			
Sat Flow, veh/h	1499	1574	0	0	1767	1497	1555	0	1384			
Grp Volume(v), veh/h	54	482	0	0	768	336	154	0	61			
Grp Sat Flow(s),veh/h/ln	1499	1574	0	0	1767	1497	1555	0	1384			
Q Serve(g_s), s	2.8	0.0	0.0	0.0	20.8	7.8	7.7	0.0	3.2			
Cycle Q Clear(g_c), s	2.8	0.0	0.0	0.0	20.8	7.8	7.7	0.0	3.2			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	65	1199	0	0	1169	991	195	0	174			
V/C Ratio(X)	0.82	0.40	0.00	0.00	0.66	0.34	0.79	0.00	0.35			
Avail Cap(c_a), veh/h	103	1199	0	0	1169	991	301	0	268			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.78	0.78	0.00	0.00	0.72	0.72	1.00	0.00	1.00			
Uniform Delay (d), s/veh	36.2	0.0	0.0	0.0	8.1	5.9	33.9	0.0	32.0			
Incr Delay (d2), s/veh	20.4	0.8	0.0	0.0	2.1	0.7	7.4	0.0	1.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	0.3	0.0	0.0	6.4	2.0	3.1	0.0	1.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.6	0.8	0.0	0.0	10.2	6.6	41.4	0.0	33.2			
LnGrp LOS	E	A	A	A	B	A	D	A	C			
Approach Vol, veh/h		536			1104			215				
Approach Delay, s/veh		6.4			9.1			39.0				
Approach LOS		A			A			D				
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	8.0	57.5		14.6		65.4						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	5.5	45.5		15.5		55.5						
Max Q Clear Time (g_c+I1), s	4.8	22.8		9.7		2.0						
Green Ext Time (p_c), s	0.0	6.8		0.5		3.3						
Intersection Summary												
HCM 6th Ctrl Delay			11.8									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	556	177	99	45	328	126	227	139	76	98	154	695
Future Volume (veh/h)	556	177	99	45	328	126	227	139	76	98	154	695
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1781	1781	1781	1841	1841	1841
Adj Flow Rate, veh/h	579	184	91	47	342	122	236	145	63	102	160	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	19	19	19	11	11	11	8	8	8	4	4	4
Cap, veh/h	683	523	258	57	388	138	305	211	92	214	224	
Arrive On Green	0.23	0.51	0.51	0.03	0.32	0.32	0.18	0.18	0.18	0.12	0.12	0.00
Sat Flow, veh/h	2990	1022	505	1654	1222	436	1697	1178	512	1753	1841	1560
Grp Volume(v), veh/h	579	0	275	47	0	464	236	0	208	102	160	0
Grp Sat Flow(s),veh/h/ln	1495	0	1527	1654	0	1658	1697	0	1689	1753	1841	1560
Q Serve(g_s), s	14.6	0.0	8.4	2.2	0.0	20.8	10.4	0.0	9.1	4.3	6.6	0.0
Cycle Q Clear(g_c), s	14.6	0.0	8.4	2.2	0.0	20.8	10.4	0.0	9.1	4.3	6.6	0.0
Prop In Lane	1.00		0.33	1.00		0.26	1.00		0.30	1.00		1.00
Lane Grp Cap(c), veh/h	683	0	781	57	0	527	305	0	303	214	224	
V/C Ratio(X)	0.85	0.00	0.35	0.82	0.00	0.88	0.77	0.00	0.69	0.48	0.71	
Avail Cap(c_a), veh/h	913	0	952	189	0	717	648	0	645	669	703	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.0	0.0	11.4	37.7	0.0	25.4	30.7	0.0	30.2	32.2	33.2	0.0
Incr Delay (d2), s/veh	5.8	0.0	0.3	23.9	0.0	9.6	4.2	0.0	2.7	1.7	4.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	2.5	1.2	0.0	8.8	4.3	0.0	3.7	1.8	3.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.8	0.0	11.7	61.6	0.0	35.0	35.0	0.0	32.9	33.8	37.4	0.0
LnGrp LOS	C	A	B	E	A	C	C	A	C	C	D	
Approach Vol, veh/h		854			511			444			262	A
Approach Delay, s/veh		27.4			37.4			34.0			36.0	
Approach LOS		C			D			C			D	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		12.6	21.0	28.0		17.1	5.7	43.2				
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0				
Max Green Setting (Gmax), s		30.0	24.0	34.0		30.0	9.0	49.0				
Max Q Clear Time (g_c+I1), s		8.6	16.6	22.8		12.4	4.2	10.4				
Green Ext Time (p_c), s		1.0	1.4	2.1		1.7	0.0	1.7				

Intersection Summary			
HCM 6th Ctrl Delay			32.4
HCM 6th LOS			C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	312	425	402	275	0	0	0	0	372	2	81
Future Volume (veh/h)	0	312	425	402	275	0	0	0	0	372	2	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1767	1767	0				1767	1767	1767
Adj Flow Rate, veh/h	0	339	124	437	299	0				404	2	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	9	9	0				9	9	9
Cap, veh/h	0	529	439	466	1101	0				443	2	396
Arrive On Green	0.00	0.29	0.29	0.46	1.00	0.00				0.26	0.26	0.26
Sat Flow, veh/h	0	1826	1514	1682	1767	0				1675	8	1497
Grp Volume(v), veh/h	0	339	124	437	299	0				406	0	24
Grp Sat Flow(s),veh/h/ln	0	1826	1514	1682	1767	0				1683	0	1497
Q Serve(g_s), s	0.0	13.0	5.1	19.7	0.0	0.0				18.7	0.0	1.0
Cycle Q Clear(g_c), s	0.0	13.0	5.1	19.7	0.0	0.0				18.7	0.0	1.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	529	439	466	1101	0				445	0	396
V/C Ratio(X)	0.00	0.64	0.28	0.94	0.27	0.00				0.91	0.00	0.06
Avail Cap(c_a), veh/h	0	529	439	515	1101	0				473	0	421
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.78	0.78	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	24.8	22.0	20.8	0.0	0.0				28.5	0.0	22.0
Incr Delay (d2), s/veh	0.0	5.9	1.6	20.1	0.5	0.0				21.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.0	1.9	7.7	0.1	0.0				9.6	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	30.6	23.6	41.0	0.5	0.0				49.7	0.0	22.1
LnGrp LOS	A	C	C	D	A	A				D	A	C
Approach Vol, veh/h		463			736						430	
Approach Delay, s/veh		28.7			24.5						48.2	
Approach LOS		C			C						D	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		54.3		25.7	26.7	27.7						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		48.5		22.5	24.5	19.5						
Max Q Clear Time (g_c+I1), s		2.0		20.7	21.7	15.0						
Green Ext Time (p_c), s		1.8		0.5	0.4	1.0						
Intersection Summary												
HCM 6th Ctrl Delay			32.0									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	635	0	0	558	355	119	0	456	0	0	0
Future Volume (veh/h)	49	635	0	0	558	355	119	0	456	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1796	1796	0	0	1767	1767	1781	1781	1781			
Adj Flow Rate, veh/h	52	668	0	0	587	206	125	0	295			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	7	7	0	0	9	9	8	8	8			
Cap, veh/h	73	1188	0	0	994	841	383	0	341			
Arrive On Green	0.09	1.00	0.00	0.00	0.56	0.56	0.23	0.00	0.23			
Sat Flow, veh/h	1711	1796	0	0	1767	1494	1697	0	1510			
Grp Volume(v), veh/h	52	668	0	0	587	206	125	0	295			
Grp Sat Flow(s),veh/h/ln	1711	1796	0	0	1767	1494	1697	0	1510			
Q Serve(g_s), s	2.4	0.0	0.0	0.0	17.4	5.6	4.9	0.0	15.0			
Cycle Q Clear(g_c), s	2.4	0.0	0.0	0.0	17.4	5.6	4.9	0.0	15.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	73	1188	0	0	994	841	383	0	341			
V/C Ratio(X)	0.71	0.56	0.00	0.00	0.59	0.25	0.33	0.00	0.86			
Avail Cap(c_a), veh/h	118	1188	0	0	994	841	520	0	462			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.65	0.65	0.00	0.00	0.64	0.64	1.00	0.00	1.00			
Uniform Delay (d), s/veh	36.1	0.0	0.0	0.0	11.5	8.9	25.9	0.0	29.8			
Incr Delay (d2), s/veh	8.0	1.3	0.0	0.0	1.7	0.4	0.5	0.0	12.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.1	0.4	0.0	0.0	6.1	1.6	1.9	0.0	6.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.0	1.3	0.0	0.0	13.1	9.3	26.4	0.0	42.0			
LnGrp LOS	D	A	A	A	B	A	C	A	D			
Approach Vol, veh/h		720			793			420				
Approach Delay, s/veh		4.3			12.1			37.3				
Approach LOS		A			B			D				
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	7.9	49.5		22.6		57.4						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	5.5	36.5		24.5		46.5						
Max Q Clear Time (g_c+I1), s	4.4	19.4		17.0		2.0						
Green Ext Time (p_c), s	0.0	4.1		1.0		5.0						

Intersection Summary		
HCM 6th Ctrl Delay		14.7
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	564	362	165	70	197	58	144	88	77	83	99	572
Future Volume (veh/h)	564	362	165	70	197	58	144	88	77	83	99	572
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1811	1811	1811	1841	1841	1841
Adj Flow Rate, veh/h	588	377	161	73	205	54	150	92	59	86	103	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	7	7	7	6	6	6	4	4	4
Cap, veh/h	841	488	208	91	285	75	276	164	105	199	209	
Arrive On Green	0.25	0.41	0.41	0.05	0.21	0.21	0.16	0.16	0.16	0.11	0.11	0.00
Sat Flow, veh/h	3319	1194	510	1711	1370	361	1725	1027	658	1753	1841	1560
Grp Volume(v), veh/h	588	0	538	73	0	259	150	0	151	86	103	0
Grp Sat Flow(s),veh/h/ln	1659	0	1704	1711	0	1731	1725	0	1685	1753	1841	1560
Q Serve(g_s), s	7.3	0.0	12.4	1.9	0.0	6.3	3.6	0.0	3.7	2.1	2.4	0.0
Cycle Q Clear(g_c), s	7.3	0.0	12.4	1.9	0.0	6.3	3.6	0.0	3.7	2.1	2.4	0.0
Prop In Lane	1.00		0.30	1.00		0.21	1.00		0.39	1.00		1.00
Lane Grp Cap(c), veh/h	841	0	696	91	0	360	276	0	270	199	209	
V/C Ratio(X)	0.70	0.00	0.77	0.80	0.00	0.72	0.54	0.00	0.56	0.43	0.49	
Avail Cap(c_a), veh/h	3002	0	2331	340	0	1146	1180	0	1153	1586	1665	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.4	0.0	11.6	21.2	0.0	16.7	17.5	0.0	17.6	18.7	18.9	0.0
Incr Delay (d2), s/veh	1.1	0.0	1.9	15.0	0.0	2.7	1.7	0.0	1.8	1.5	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	3.6	1.0	0.0	2.3	1.3	0.0	1.3	0.8	1.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	0.0	13.5	36.3	0.0	19.4	19.2	0.0	19.4	20.2	20.6	0.0
LnGrp LOS	B	A	B	D	A	B	B	A	B	C	C	
Approach Vol, veh/h		1126			332			301			189	A
Approach Delay, s/veh		15.0			23.1			19.3			20.4	
Approach LOS		B			C			B			C	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		8.2	14.5	12.4		10.3	5.4	21.5				
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0				
Max Green Setting (Gmax), s		41.0	41.0	30.0		31.0	9.0	62.0				
Max Q Clear Time (g_c+I1), s		4.4	9.3	8.3		5.7	3.9	14.4				
Green Ext Time (p_c), s		0.8	2.2	1.4		1.2	0.1	3.8				
Intersection Summary												
HCM 6th Ctrl Delay			17.6									
HCM 6th LOS			B									

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	390	10	60	590	100	20	100	50	160	50	100
Future Volume (vph)	70	390	10	60	590	100	20	100	50	160	50	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98			0.96		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1517	1591		1626	1674			1649		1703	1613	
Flt Permitted	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (perm)	1517	1591		1626	1674			1649		1703	1613	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	424	11	65	641	109	22	109	54	174	54	109
RTOR Reduction (vph)	0	1	0	0	5	0	0	0	0	0	58	0
Lane Group Flow (vph)	76	434	0	65	745	0	0	185	0	174	105	0
Heavy Vehicles (%)	19%	19%	19%	11%	11%	11%	10%	10%	10%	6%	6%	6%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases												
Actuated Green, G (s)	7.2	53.2		7.5	53.5			16.6		15.4	15.4	
Effective Green, g (s)	6.2	52.2		6.5	52.5			15.6		14.4	14.4	
Actuated g/C Ratio	0.06	0.50		0.06	0.50			0.15		0.14	0.14	
Clearance Time (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	89	793		100	839			245		234	221	
v/s Ratio Prot	c0.05	0.27		0.04	c0.44			c0.11		c0.10	0.07	
v/s Ratio Perm												
v/c Ratio	0.85	0.55		0.65	0.89			0.76		0.74	0.48	
Uniform Delay, d1	48.8	18.1		48.0	23.5			42.7		43.4	41.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	50.7	0.8		14.1	11.2			12.4		12.0	1.6	
Delay (s)	99.5	18.9		62.1	34.7			55.1		55.4	43.3	
Level of Service	F	B		E	C			E		E	D	
Approach Delay (s)		30.9			36.9			55.1			49.5	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	104.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	14.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	0	620	10	40	790	10	50	0	40	10	10	0
Future Vol, veh/h	0	620	10	40	790	10	50	0	40	10	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	21	21	21	12	12	12	2	2	2	67	67	67
Mvmt Flow	0	713	11	46	908	11	57	0	46	11	11	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	908	0	0	713	0	0	1725	1719	719	1719	1719	914
Stage 1	-	-	-	-	-	-	719	719	-	1006	1006	-
Stage 2	-	-	-	-	-	-	1006	1000	-	713	713	-
Critical Hdwy	4.31	-	-	4.22	-	-	7.12	6.52	6.22	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Follow-up Hdwy	2.389	-	-	2.308	-	-	3.518	4.018	3.318	4.103	4.603	3.903
Pot Cap-1 Maneuver	677	-	-	843	-	-	70	90	428	49	63	254
Stage 1	-	-	-	-	-	-	420	433	-	222	248	-
Stage 2	-	-	-	-	-	-	291	321	-	335	351	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	677	-	-	843	-	-	~ 54	80	428	40	56	254
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 54	80	-	40	56	-
Stage 1	-	-	-	-	-	-	420	433	-	222	220	-
Stage 2	-	-	-	-	-	-	245	285	-	299	351	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	215.6	140.1
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	92	677	-	-	843	-	-	47
HCM Lane V/C Ratio	1.124	-	-	-	0.055	-	-	0.489
HCM Control Delay (s)	215.6	0	-	-	9.5	0	-	140.1
HCM Lane LOS	F	A	-	-	A	A	-	F
HCM 95th %tile Q(veh)	7	0	-	-	0.2	-	-	1.8

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	330	340	420	750	0	0	0	0	160	0	90
Future Volume (veh/h)	0	330	340	420	750	0	0	0	0	160	0	90
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1589	1589	1722	1722	0				1900	1574	1900
Adj Flow Rate, veh/h	0	359	338	457	815	0				174	0	51
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	21	21	12	12	0				0	22	0
Cap, veh/h	0	351	331	451	1335	0				179	0	52
Arrive On Green	0.00	0.47	0.46	0.18	0.52	0.00				0.16	0.00	0.15
Sat Flow, veh/h	0	753	709	1640	1722	0				1128	0	331
Grp Volume(v), veh/h	0	0	697	457	815	0				225	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1461	1640	1722	0				1458	0	0
Q Serve(g_s), s	0.0	0.0	56.0	33.0	40.0	0.0				18.4	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	56.0	33.0	40.0	0.0				18.4	0.0	0.0
Prop In Lane	0.00		0.48	1.00		0.00				0.77		0.23
Lane Grp Cap(c), veh/h	0	0	682	451	1335	0				231	0	0
V/C Ratio(X)	0.00	0.00	1.02	1.01	0.61	0.00				0.97	0.00	0.00
Avail Cap(c_a), veh/h	0	0	682	451	1335	0				231	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.09	0.09	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	32.1	48.9	16.1	0.0				50.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	40.2	16.1	0.2	0.0				51.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	26.1	15.8	16.5	0.0				9.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	72.3	65.1	16.3	0.0				102.2	0.0	0.0
LnGrp LOS	A	A	F	F	B	A				F	A	A
Approach Vol, veh/h		697			1272						225	
Approach Delay, s/veh		72.3			33.8						102.2	
Approach LOS		E			C						F	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		97.0		23.0	37.0	60.0
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		92.5		18.5	32.5	55.5
Max Q Clear Time (g_c+I1), s		42.0		20.4	35.0	58.0
Green Ext Time (p_c), s		7.0		0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	53.0
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	400	0	0	910	550	260	0	300	0	0	0
Future Volume (veh/h)	90	400	0	0	910	550	260	0	300	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1574	1574	0	0	1767	1767	1900	1633	1900			
Adj Flow Rate, veh/h	94	417	0	0	948	555	271	0	270			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	22	22	0	0	9	9	0	18	0			
Cap, veh/h	87	1089	0	0	627	367	177	0	177			
Arrive On Green	0.12	1.00	0.00	0.00	0.60	0.60	0.24	0.00	0.24			
Sat Flow, veh/h	1499	1574	0	0	1045	612	734	0	731			
Grp Volume(v), veh/h	94	417	0	0	0	1503	541	0	0			
Grp Sat Flow(s),veh/h/ln	1499	1574	0	0	0	1657	1465	0	0			
Q Serve(g_s), s	7.0	0.0	0.0	0.0	0.0	72.0	29.0	0.0	0.0			
Cycle Q Clear(g_c), s	7.0	0.0	0.0	0.0	0.0	72.0	29.0	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.37	0.50		0.50			
Lane Grp Cap(c), veh/h	87	1089	0	0	0	994	354	0	0			
V/C Ratio(X)	1.07	0.38	0.00	0.00	0.00	1.51	1.53	0.00	0.00			
Avail Cap(c_a), veh/h	87	1089	0	0	0	994	354	0	0			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.00	0.00	0.00	0.09	1.00	0.00	0.00			
Uniform Delay (d), s/veh	53.0	0.0	0.0	0.0	0.0	24.1	45.6	0.0	0.0			
Incr Delay (d2), s/veh	51.2	0.1	0.0	0.0	0.0	231.0	251.6	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.7	0.0	0.0	0.0	0.0	88.7	35.0	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	104.2	0.1	0.0	0.0	0.0	255.1	297.2	0.0	0.0			
LnGrp LOS	F	A	A	A	A	F	F	A	A			
Approach Vol, veh/h		511			1503			541				
Approach Delay, s/veh		19.3			255.1			297.2				
Approach LOS		B			F			F				

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	11.0	76.0		33.0		87.0
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s	6.5	71.5		28.5		82.5
Max Q Clear Time (g_c+I1), s	9.0	74.0		31.0		2.0
Green Ext Time (p_c), s	0.0	0.0		0.0		2.7

Intersection Summary	
HCM 6th Ctrl Delay	216.8
HCM 6th LOS	F

Intersection	
Intersection Delay, s/veh	36.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	10	30	130	170	60	50	150	180	50	40	310	20
Future Vol, veh/h	10	30	130	170	60	50	150	180	50	40	310	20
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	10	10	10	2	2	2	6	6	6	2	2	2
Mvmt Flow	11	34	149	195	69	57	172	207	57	46	356	23
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	17.4	27.3	46.4	42
HCM LOS	C	D	E	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	39%	6%	61%	11%
Vol Thru, %	47%	18%	21%	84%
Vol Right, %	13%	76%	18%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	380	170	280	370
LT Vol	150	10	170	40
Through Vol	180	30	60	310
RT Vol	50	130	50	20
Lane Flow Rate	437	195	322	425
Geometry Grp	1	1	1	1
Degree of Util (X)	0.895	0.439	0.7	0.867
Departure Headway (Hd)	7.376	8.096	7.835	7.339
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	489	444	460	493
Service Time	5.434	6.171	5.897	5.398
HCM Lane V/C Ratio	0.894	0.439	0.7	0.862
HCM Control Delay	46.4	17.4	27.3	42
HCM Lane LOS	E	C	D	E
HCM 95th-tile Q	10	2.2	5.3	9.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	420	140	70	740	10	380	230	130	10	260	340
Future Volume (veh/h)	140	420	140	70	740	10	380	230	130	10	260	340
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1781	1781	1781	1841	1841	1841
Adj Flow Rate, veh/h	146	438	139	73	771	10	396	240	125	10	271	324
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	19	19	19	11	11	11	8	8	8	4	4	4
Cap, veh/h	103	416	132	77	570	7	351	228	119	503	216	258
Arrive On Green	0.07	0.35	0.36	0.05	0.33	0.34	0.21	0.21	0.21	0.29	0.29	0.29
Sat Flow, veh/h	1541	1177	374	1654	1711	22	1697	1103	575	1753	754	901
Grp Volume(v), veh/h	146	0	577	73	0	781	396	0	365	10	0	595
Grp Sat Flow(s),veh/h/ln	1541	0	1551	1654	0	1733	1697	0	1678	1753	0	1655
Q Serve(g_s), s	10.0	0.0	53.0	6.6	0.0	50.0	31.0	0.0	31.0	0.6	0.0	43.0
Cycle Q Clear(g_c), s	10.0	0.0	53.0	6.6	0.0	50.0	31.0	0.0	31.0	0.6	0.0	43.0
Prop In Lane	1.00		0.24	1.00		0.01	1.00		0.34	1.00		0.54
Lane Grp Cap(c), veh/h	103	0	548	77	0	578	351	0	347	503	0	475
V/C Ratio(X)	1.42	0.00	1.05	0.95	0.00	1.35	1.13	0.00	1.05	0.02	0.00	1.25
Avail Cap(c_a), veh/h	103	0	548	77	0	578	351	0	347	503	0	475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	70.0	0.0	48.4	71.3	0.0	50.0	59.5	0.0	59.3	38.4	0.0	53.2
Incr Delay (d2), s/veh	236.7	0.0	53.1	83.8	0.0	169.6	87.9	0.0	62.8	0.0	0.0	130.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.7	0.0	28.0	4.6	0.0	48.4	21.7	0.0	19.0	0.3	0.0	34.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	306.7	0.0	101.4	155.1	0.0	219.6	147.4	0.0	122.1	38.4	0.0	183.8
LnGrp LOS	F	A	F	F	A	F	F	A	F	D	A	F
Approach Vol, veh/h		723			854			761			605	
Approach Delay, s/veh		142.9			214.1			135.3			181.4	
Approach LOS		F			F			F			F	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		47.0	14.0	54.0		35.0	11.0	57.0
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0
Max Green Setting (Gmax), s		44.0	11.0	51.0		32.0	8.0	54.0
Max Q Clear Time (g_c+I1), s		45.0	12.0	52.0		33.0	8.6	55.0
Green Ext Time (p_c), s		0.0	0.0	0.0		0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	169.5
HCM 6th LOS	F

Intersection						
Int Delay, s/veh	7.4					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	60	40	100	100	90	190
Future Vol, veh/h	60	40	100	100	90	190
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	5	5	4	4	1	1
Mvmt Flow	72	48	120	120	108	229

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	243	0	-	0	375	183
Stage 1	-	-	-	-	183	-
Stage 2	-	-	-	-	192	-
Critical Hdwy	4.15	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.245	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1306	-	-	-	628	862
Stage 1	-	-	-	-	851	-
Stage 2	-	-	-	-	843	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1302	-	-	-	588	860
Mov Cap-2 Maneuver	-	-	-	-	588	-
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	840	-

Approach	EB	WB	SB
HCM Control Delay, s	4.8	0	13.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1302	-	-	-	749
HCM Lane V/C Ratio	0.056	-	-	-	0.45
HCM Control Delay (s)	7.9	0	-	-	13.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	2.4

Intersection						
Int Delay, s/veh	4.1					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	80	480	770	110	70	50
Future Vol, veh/h	80	480	770	110	70	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	22	22	11	11	0	0
Mvmt Flow	83	500	802	115	73	52

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	802	0	-	0	1468	802
Stage 1	-	-	-	-	802	-
Stage 2	-	-	-	-	666	-
Critical Hdwy	4.32	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.398	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	740	-	-	0	142	387
Stage 1	-	-	-	0	445	-
Stage 2	-	-	-	0	515	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	740	-	-	-	126	387
Mov Cap-2 Maneuver	-	-	-	-	126	-
Stage 1	-	-	-	-	395	-
Stage 2	-	-	-	-	515	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	42.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	740	-	-	216
HCM Lane V/C Ratio	0.113	-	-	0.579
HCM Control Delay (s)	10.5	-	-	42.3
HCM Lane LOS	B	-	-	E
HCM 95th %tile Q(veh)	0.4	-	-	3.2

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	20	620	10	10	290
Future Vol, veh/h	10	20	620	10	10	290
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	12	12	6	6	5	5
Mvmt Flow	12	24	738	12	12	345

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1107	738	0	-	738	0
Stage 1	738	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Critical Hdwy	6.52	6.32	-	-	4.15	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.408	-	-	2.245	-
Pot Cap-1 Maneuver	222	402	-	0	855	-
Stage 1	455	-	-	0	-	-
Stage 2	678	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	219	402	-	-	855	-
Mov Cap-2 Maneuver	219	-	-	-	-	-
Stage 1	455	-	-	-	-	-
Stage 2	669	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.9	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	314	855	-
HCM Lane V/C Ratio	-	0.114	0.014	-
HCM Control Delay (s)	-	17.9	9.3	-
HCM Lane LOS	-	C	A	-
HCM 95th %tile Q(veh)	-	0.4	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	820	30	70	300	130	10	100	60	220	110	20
Future Volume (vph)	90	820	30	70	300	130	10	100	60	220	110	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.95			0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1719	1800		1671	1679			1786		1736	1784	
Flt Permitted	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (perm)	1719	1800		1671	1679			1786		1736	1784	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	97	882	32	75	323	140	11	108	65	237	118	22
RTOR Reduction (vph)	0	1	0	0	13	0	0	0	0	0	5	0
Lane Group Flow (vph)	97	913	0	75	450	0	0	184	0	237	135	0
Heavy Vehicles (%)	5%	5%	5%	8%	8%	8%	1%	1%	1%	4%	4%	4%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases												
Actuated Green, G (s)	10.9	62.1		7.1	58.3			14.4		18.6	18.6	
Effective Green, g (s)	10.9	62.1		7.1	58.3			14.4		18.6	18.6	
Actuated g/C Ratio	0.10	0.54		0.06	0.51			0.13		0.16	0.16	
Clearance Time (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	164	978		103	857			225		282	290	
v/s Ratio Prot	c0.06	c0.51		c0.04	0.27			c0.10		c0.14	0.08	
v/s Ratio Perm												
v/c Ratio	0.59	0.93		0.73	0.53			0.82		0.84	0.47	
Uniform Delay, d1	49.5	24.1		52.6	18.7			48.6		46.4	43.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	5.6	15.2		22.5	0.6			20.1		19.6	1.2	
Delay (s)	55.1	39.4		75.1	19.3			68.7		66.0	44.5	
Level of Service	E	D		E	B			E		E	D	
Approach Delay (s)		40.9			27.1			68.7			58.0	
Approach LOS		D			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	42.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	114.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	1190	30	80	490	20	20	0	50	20	0	10
Future Vol, veh/h	10	1190	30	80	490	20	20	0	50	20	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	10	10	10	5	5	5	9	9	9
Mvmt Flow	11	1293	33	87	533	22	22	0	54	22	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	533	0	0	1293	0	0	2039	2039	1310	2033	2033	544
Stage 1	-	-	-	-	-	-	1332	1332	-	718	718	-
Stage 2	-	-	-	-	-	-	707	707	-	1315	1315	-
Critical Hdwy	4.14	-	-	4.2	-	-	7.15	6.55	6.25	7.19	6.59	6.29
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Follow-up Hdwy	2.236	-	-	2.29	-	-	3.545	4.045	3.345	3.581	4.081	3.381
Pot Cap-1 Maneuver	1025	-	-	510	-	-	41	56	191	40	55	526
Stage 1	-	-	-	-	-	-	187	220	-	409	423	-
Stage 2	-	-	-	-	-	-	421	434	-	188	220	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1025	-	-	510	-	-	32	40	191	22	40	526
Mov Cap-2 Maneuver	-	-	-	-	-	-	32	40	-	22	40	-
Stage 1	-	-	-	-	-	-	179	211	-	392	319	-
Stage 2	-	-	-	-	-	-	310	327	-	129	211	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.8	87.6	$ 331.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	112	1025	-	-	510	-	-	33
HCM Lane V/C Ratio	0.679	0.011	-	-	0.171	-	-	0.988
HCM Control Delay (s)	87.6	8.6	0	-	13.5	0	-	$ 331.7
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	3.5	0	-	-	0.6	-	-	3.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	520	740	340	450	0	0	0	0	280	0	140
Future Volume (veh/h)	0	520	740	340	450	0	0	0	0	280	0	140
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1767	1767	0				1900	1767	1900
Adj Flow Rate, veh/h	0	565	762	370	489	0				304	0	106
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	9	9	0				0	9	0
Cap, veh/h	0	396	535	275	1349	0				214	0	74
Arrive On Green	0.00	0.57	0.57	0.16	0.76	0.00				0.18	0.00	0.18
Sat Flow, veh/h	0	696	938	1682	1767	0				1209	0	421
Grp Volume(v), veh/h	0	0	1327	370	489	0				410	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1634	1682	1767	0				1630	0	0
Q Serve(g_s), s	0.0	0.0	85.5	24.5	13.6	0.0				26.5	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	85.5	24.5	13.6	0.0				26.5	0.0	0.0
Prop In Lane	0.00		0.57	1.00		0.00				0.74		0.26
Lane Grp Cap(c), veh/h	0	0	931	275	1349	0				288	0	0
V/C Ratio(X)	0.00	0.00	1.43	1.35	0.36	0.00				1.42	0.00	0.00
Avail Cap(c_a), veh/h	0	0	931	275	1349	0				288	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.09	0.09	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	32.3	62.7	5.8	0.0				61.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	197.5	158.1	0.1	0.0				209.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	82.7	22.4	4.4	0.0				27.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	229.8	220.9	5.9	0.0				271.4	0.0	0.0
LnGrp LOS	A	A	F	F	A	A				F	A	A
Approach Vol, veh/h		1327			859						410	
Approach Delay, s/veh		229.8			98.5						271.4	
Approach LOS		F			F						F	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		119.0		31.0	29.0	90.0						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		114.5		26.5	24.5	85.5						
Max Q Clear Time (g_c+I1), s		15.6		28.5	26.5	87.5						
Green Ext Time (p_c), s		3.3		0.0	0.0	0.0						
Intersection Summary												
HCM 6th Ctrl Delay			192.9									
HCM 6th LOS			F									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	710	0	0	580	250	210	0	430	0	0	0
Future Volume (veh/h)	90	710	0	0	580	250	210	0	430	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1796	1796	0	0	1767	1767	1900	1781	1900			
Adj Flow Rate, veh/h	95	747	0	0	611	250	221	0	391			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	7	7	0	0	9	9	0	8	0			
Cap, veh/h	107	1025	0	0	561	229	201	0	356			
Arrive On Green	0.06	0.57	0.00	0.00	0.47	0.47	0.35	0.00	0.35			
Sat Flow, veh/h	1711	1796	0	0	1191	487	568	0	1004			
Grp Volume(v), veh/h	95	747	0	0	0	861	612	0	0			
Grp Sat Flow(s),veh/h/ln	1711	1796	0	0	0	1678	1572	0	0			
Q Serve(g_s), s	6.6	36.7	0.0	0.0	0.0	56.5	42.5	0.0	0.0			
Cycle Q Clear(g_c), s	6.6	36.7	0.0	0.0	0.0	56.5	42.5	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.29	0.36		0.64			
Lane Grp Cap(c), veh/h	107	1025	0	0	0	790	557	0	0			
V/C Ratio(X)	0.89	0.73	0.00	0.00	0.00	1.09	1.10	0.00	0.00			
Avail Cap(c_a), veh/h	107	1025	0	0	0	790	557	0	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.00	0.00	0.00	0.72	1.00	0.00	0.00			
Uniform Delay (d), s/veh	55.8	18.9	0.0	0.0	0.0	31.8	38.8	0.0	0.0			
Incr Delay (d2), s/veh	8.5	0.4	0.0	0.0	0.0	55.1	68.1	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.1	14.1	0.0	0.0	0.0	33.4	26.2	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	19.3	0.0	0.0	0.0	86.8	106.8	0.0	0.0			
LnGrp LOS	E	B	A	A	A	F	F	A	A			
Approach Vol, veh/h		842			861			612				
Approach Delay, s/veh		24.4			86.8			106.8				
Approach LOS		C			F			F				
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	12.0	61.0		47.0		73.0						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	7.5	56.5		42.5		68.5						
Max Q Clear Time (g_c+I1), s	8.6	58.5		44.5		38.7						
Green Ext Time (p_c), s	0.0	0.0		0.0		5.6						
Intersection Summary												
HCM 6th Ctrl Delay			69.4									
HCM 6th LOS			E									

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	40	130	100	20	20	70	190	30	10	160	10
Future Vol, veh/h	10	40	130	100	20	20	70	190	30	10	160	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	2	2	2
Mvmt Flow	11	42	137	105	21	21	74	200	32	11	168	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.1	10.4	12.2	10.4
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	24%	6%	71%	6%
Vol Thru, %	66%	22%	14%	89%
Vol Right, %	10%	72%	14%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	290	180	140	180
LT Vol	70	10	100	10
Through Vol	190	40	20	160
RT Vol	30	130	20	10
Lane Flow Rate	305	189	147	189
Geometry Grp	1	1	1	1
Degree of Util (X)	0.437	0.271	0.231	0.279
Departure Headway (Hd)	5.157	5.149	5.649	5.304
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	699	697	635	676
Service Time	3.189	3.186	3.688	3.338
HCM Lane V/C Ratio	0.436	0.271	0.231	0.28
HCM Control Delay	12.2	10.1	10.4	10.4
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	2.2	1.1	0.9	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	730	270	120	410	10	210	140	120	20	160	210
Future Volume (veh/h)	140	730	270	120	410	10	210	140	120	20	160	210
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1811	1811	1811	1841	1841	1841
Adj Flow Rate, veh/h	146	760	273	125	427	9	219	146	109	21	167	190
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	7	7	7	6	6	6	4	4	4
Cap, veh/h	169	591	212	106	757	16	298	166	124	375	167	190
Arrive On Green	0.10	0.47	0.47	0.06	0.43	0.43	0.17	0.17	0.17	0.21	0.21	0.21
Sat Flow, veh/h	1711	1261	453	1711	1753	37	1725	959	716	1753	783	890
Grp Volume(v), veh/h	146	0	1033	125	0	436	219	0	255	21	0	357
Grp Sat Flow(s),veh/h/ln	1711	0	1714	1711	0	1790	1725	0	1675	1753	0	1673
Q Serve(g_s), s	12.2	0.0	68.0	9.0	0.0	26.5	17.5	0.0	21.6	1.4	0.0	30.9
Cycle Q Clear(g_c), s	12.2	0.0	68.0	9.0	0.0	26.5	17.5	0.0	21.6	1.4	0.0	30.9
Prop In Lane	1.00		0.26	1.00		0.02	1.00		0.43	1.00		0.53
Lane Grp Cap(c), veh/h	169	0	804	106	0	773	298	0	289	375	0	358
V/C Ratio(X)	0.86	0.00	1.29	1.18	0.00	0.56	0.74	0.00	0.88	0.06	0.00	1.00
Avail Cap(c_a), veh/h	259	0	804	106	0	773	357	0	346	375	0	358
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	64.4	0.0	38.5	68.0	0.0	30.9	56.9	0.0	58.6	45.4	0.0	57.0
Incr Delay (d2), s/veh	16.5	0.0	137.8	142.8	0.0	0.9	6.3	0.0	19.9	0.1	0.0	47.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	0.0	58.1	8.1	0.0	11.5	8.0	0.0	10.6	0.6	0.0	17.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	80.9	0.0	176.3	210.8	0.0	31.9	63.2	0.0	78.4	45.4	0.0	104.1
LnGrp LOS	F	A	F	F	A	C	E	A	E	D	A	F
Approach Vol, veh/h		1179			561			474			378	
Approach Delay, s/veh		164.5			71.8			71.4			100.9	
Approach LOS		F			E			E			F	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		34.0	17.4	65.6		28.0	12.0	71.0				
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0				
Max Green Setting (Gmax), s		31.0	22.0	55.0		30.0	9.0	68.0				
Max Q Clear Time (g_c+I1), s		32.9	14.2	28.5		23.6	11.0	70.0				
Green Ext Time (p_c), s		0.0	0.2	2.6		1.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			118.1									
HCM 6th LOS			F									

Intersection						
Int Delay, s/veh	5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	30	60	130	70	90
Future Vol, veh/h	50	30	60	130	70	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	3	3	1	1
Mvmt Flow	58	35	70	151	81	105

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	221	0	-	0	297	146
Stage 1	-	-	-	-	146	-
Stage 2	-	-	-	-	151	-
Critical Hdwy	4.1	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.2	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1360	-	-	-	696	904
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	879	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1360	-	-	-	666	904
Mov Cap-2 Maneuver	-	-	-	-	666	-
Stage 1	-	-	-	-	846	-
Stage 2	-	-	-	-	879	-

Approach	EB	WB	SB
HCM Control Delay, s	4.9	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1360	-	-	-	782
HCM Lane V/C Ratio	0.043	-	-	-	0.238
HCM Control Delay (s)	7.8	0	-	-	11
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

Intersection						
Int Delay, s/veh	3.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	90	780	470	90	60	70
Future Vol, veh/h	90	780	470	90	60	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	8	1	1
Mvmt Flow	96	830	500	96	64	74

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	500	0	-	0	1522	500
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	1022	-
Critical Hdwy	4.18	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.272	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1034	-	-	0	131	573
Stage 1	-	-	-	0	611	-
Stage 2	-	-	-	0	349	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1034	-	-	-	119	573
Mov Cap-2 Maneuver	-	-	-	-	119	-
Stage 1	-	-	-	-	554	-
Stage 2	-	-	-	-	349	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	34
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	1034	-	-	258
HCM Lane V/C Ratio	0.093	-	-	0.536
HCM Control Delay (s)	8.8	-	-	34
HCM Lane LOS	A	-	-	D
HCM 95th %tile Q(veh)	0.3	-	-	2.9

Intersection						
Int Delay, s/veh	0.5					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	10	310	10	10	480
Future Vol, veh/h	10	10	310	10	10	480
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	7	7	2	2
Mvmt Flow	12	12	369	12	12	571

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	964	369	0	-	369	0
Stage 1	369	-	-	-	-	-
Stage 2	595	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.12	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.218	-
Pot Cap-1 Maneuver	286	681	-	0	1190	-
Stage 1	704	-	-	0	-	-
Stage 2	555	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	283	681	-	-	1190	-
Mov Cap-2 Maneuver	283	-	-	-	-	-
Stage 1	704	-	-	-	-	-
Stage 2	549	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.6	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	400	1190	-
HCM Lane V/C Ratio	-	0.06	0.01	-
HCM Control Delay (s)	-	14.6	8.1	-
HCM Lane LOS	-	B	A	-
HCM 95th %tile Q(veh)	-	0.2	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	412	10	65	610	102	20	100	55	162	50	100
Future Volume (veh/h)	70	412	10	65	610	102	20	100	55	162	50	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1752	1752	1752	1811	1811	1811
Adj Flow Rate, veh/h	76	448	10	71	663	102	22	109	60	176	54	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	19	19	19	11	11	11	10	10	10	6	6	6
Cap, veh/h	71	799	18	64	735	113	25	124	68	205	148	57
Arrive On Green	0.05	0.51	0.52	0.04	0.50	0.51	0.13	0.13	0.14	0.12	0.12	0.13
Sat Flow, veh/h	1541	1577	35	1654	1470	226	190	941	518	1725	1241	483
Grp Volume(v), veh/h	76	0	458	71	0	765	191	0	0	176	0	75
Grp Sat Flow(s),veh/h/ln	1541	0	1612	1654	0	1696	1649	0	0	1725	0	1724
Q Serve(g_s), s	3.6	0.0	15.4	3.1	0.0	32.3	8.9	0.0	0.0	7.9	0.0	3.1
Cycle Q Clear(g_c), s	3.6	0.0	15.4	3.1	0.0	32.3	8.9	0.0	0.0	7.9	0.0	3.1
Prop In Lane	1.00		0.02	1.00		0.13	0.12		0.31	1.00		0.28
Lane Grp Cap(c), veh/h	71	0	817	64	0	848	218	0	0	205	0	205
V/C Ratio(X)	1.08	0.00	0.56	1.10	0.00	0.90	0.88	0.00	0.00	0.86	0.00	0.37
Avail Cap(c_a), veh/h	176	0	1271	231	0	1380	398	0	0	373	0	373
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.5	0.0	13.4	37.8	0.0	17.9	33.4	0.0	0.0	34.0	0.0	31.8
Incr Delay (d2), s/veh	72.1	0.0	0.6	83.0	0.0	5.3	10.8	0.0	0.0	9.8	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	4.9	2.7	0.0	11.8	4.0	0.0	0.0	3.7	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	109.6	0.0	14.0	120.8	0.0	23.1	44.1	0.0	0.0	43.8	0.0	32.9
LnGrp LOS	F	A	B	F	A	C	D	A	A	D	A	C
Approach Vol, veh/h		534			836			191			251	
Approach Delay, s/veh		27.6			31.4			44.1			40.6	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	43.3		14.4	7.0	43.8		13.4				
Change Period (Y+Rc), s	3.0	3.0		3.0	3.0	3.0		3.0				
Max Green Setting (Gmax), s	10.0	65.0		20.0	12.0	63.0		18.0				
Max Q Clear Time (g_c+I1), s	5.6	34.3		10.9	5.1	17.4		9.9				
Green Ext Time (p_c), s	0.0	6.0		0.6	0.1	3.0		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			32.9									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	18.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	649	10	40	816	10	50	0	40	10	10	0
Future Vol, veh/h	0	649	10	40	816	10	50	0	40	10	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	21	21	21	12	12	12	2	2	2	67	67	67
Mvmt Flow	0	746	11	46	938	11	57	0	46	11	11	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	938	0	0	746	0	0	1788	1782	752	1782	1782	944
Stage 1	-	-	-	-	-	-	752	752	-	1036	1036	-
Stage 2	-	-	-	-	-	-	1036	1030	-	746	746	-
Critical Hdwy	4.31	-	-	4.22	-	-	7.12	6.52	6.22	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Follow-up Hdwy	2.389	-	-	2.308	-	-	3.518	4.018	3.318	4.103	4.603	3.903
Pot Cap-1 Maneuver	658	-	-	818	-	-	63	82	410	44	57	243
Stage 1	-	-	-	-	-	-	402	418	-	213	239	-
Stage 2	-	-	-	-	-	-	280	311	-	320	338	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	658	-	-	818	-	-	~ 47	72	410	36	50	243
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 47	72	-	36	50	-
Stage 1	-	-	-	-	-	-	402	418	-	213	211	-
Stage 2	-	-	-	-	-	-	233	274	-	284	338	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	290.7	166.3
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	80	658	-	-	818	-	-	42
HCM Lane V/C Ratio	1.293	-	-	-	0.056	-	-	0.547
HCM Control Delay (s)	290.7	0	-	-	9.7	0	-	166.3
HCM Lane LOS	F	A	-	-	A	A	-	F
HCM 95th %tile Q(veh)	7.9	0	-	-	0.2	-	-	2

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	359	340	610	776	0	0	0	0	366	0	90
Future Volume (veh/h)	0	359	340	610	776	0	0	0	0	366	0	90
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1589	1589	1722	1722	0				1900	1574	1900
Adj Flow Rate, veh/h	0	390	341	663	843	0				398	0	56
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	21	21	12	12	0				0	22	0
Cap, veh/h	0	300	262	492	1234	0				280	0	39
Arrive On Green	0.00	0.38	0.38	0.20	0.48	0.00				0.22	0.00	0.21
Sat Flow, veh/h	0	782	684	1640	1722	0				1294	0	182
Grp Volume(v), veh/h	0	0	731	663	843	0				454	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1466	1640	1722	0				1476	0	0
Q Serve(g_s), s	0.0	0.0	46.0	36.0	45.4	0.0				26.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	46.0	36.0	45.4	0.0				26.0	0.0	0.0
Prop In Lane	0.00		0.47	1.00		0.00				0.88		0.12
Lane Grp Cap(c), veh/h	0	0	562	492	1234	0				320	0	0
V/C Ratio(X)	0.00	0.00	1.30	1.35	0.68	0.00				1.42	0.00	0.00
Avail Cap(c_a), veh/h	0	0	562	492	1234	0				320	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.09	0.09	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	37.1	47.9	20.6	0.0				47.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	148.1	157.6	0.3	0.0				206.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	38.8	36.5	19.0	0.0				27.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	185.2	205.6	20.9	0.0				253.1	0.0	0.0
LnGrp LOS	A	A	F	F	C	A				F	A	A
Approach Vol, veh/h		731			1506						454	
Approach Delay, s/veh		185.2			102.2						253.1	
Approach LOS		F			F						F	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		90.0		30.0	40.0	50.0						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		85.5		25.5	35.5	45.5						
Max Q Clear Time (g_c+I1), s		47.4		28.0	38.0	48.0						
Green Ext Time (p_c), s		7.2		0.0	0.0	0.0						
Intersection Summary												
HCM 6th Ctrl Delay			150.2									
HCM 6th LOS			F									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	635	0	0	1126	748	260	0	498	0	0	0
Future Volume (veh/h)	90	635	0	0	1126	748	260	0	498	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1574	1574	0	0	1767	1767	1900	1633	1900			
Adj Flow Rate, veh/h	94	661	0	0	1173	759	271	0	461			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	22	22	0	0	9	9	0	18	0			
Cap, veh/h	87	1049	0	0	576	373	142	0	242			
Arrive On Green	0.04	0.45	0.00	0.00	0.57	0.57	0.27	0.00	0.26			
Sat Flow, veh/h	1499	1574	0	0	1002	648	534	0	909			
Grp Volume(v), veh/h	94	661	0	0	0	1932	732	0	0			
Grp Sat Flow(s),veh/h/ln	1499	1574	0	0	0	1650	1443	0	0			
Q Serve(g_s), s	7.0	38.8	0.0	0.0	0.0	69.0	32.0	0.0	0.0			
Cycle Q Clear(g_c), s	7.0	38.8	0.0	0.0	0.0	69.0	32.0	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.39	0.37		0.63			
Lane Grp Cap(c), veh/h	87	1049	0	0	0	949	385	0	0			
V/C Ratio(X)	1.07	0.63	0.00	0.00	0.00	2.04	1.90	0.00	0.00			
Avail Cap(c_a), veh/h	87	1049	0	0	0	949	385	0	0			
HCM Platoon Ratio	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.00	0.00	0.00	0.09	1.00	0.00	0.00			
Uniform Delay (d), s/veh	57.7	21.8	0.0	0.0	0.0	25.6	44.2	0.0	0.0			
Incr Delay (d2), s/veh	51.2	0.3	0.0	0.0	0.0	466.7	415.7	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.9	15.0	0.0	0.0	0.0	147.2	55.5	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	108.9	22.1	0.0	0.0	0.0	492.3	459.8	0.0	0.0			
LnGrp LOS	F	C	A	A	A	F	F	A	A			
Approach Vol, veh/h		755			1932			732				
Approach Delay, s/veh		32.9			492.3			459.8				
Approach LOS		C			F			F				
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	11.0	73.0		36.0		84.0						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	6.5	68.5		31.5		79.5						
Max Q Clear Time (g_c+I1), s	9.0	71.0		34.0		40.8						
Green Ext Time (p_c), s	0.0	0.0		0.0		4.9						

Intersection Summary	
HCM 6th Ctrl Delay	383.9
HCM 6th LOS	F

Intersection	
Intersection Delay, s/veh	40.4
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	10	30	132	172	60	50	152	184	52	40	315	20
Future Vol, veh/h	10	30	132	172	60	50	152	184	52	40	315	20
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	10	10	10	2	2	2	6	6	6	2	2	2
Mvmt Flow	11	34	152	198	69	57	175	211	60	46	362	23
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	18.1	29	52.6	46.5
HCM LOS	C	D	F	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	39%	6%	61%	11%
Vol Thru, %	47%	17%	21%	84%
Vol Right, %	13%	77%	18%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	388	172	282	375
LT Vol	152	10	172	40
Through Vol	184	30	60	315
RT Vol	52	132	50	20
Lane Flow Rate	446	198	324	431
Geometry Grp	1	1	1	1
Degree of Util (X)	0.927	0.453	0.718	0.893
Departure Headway (Hd)	7.484	8.255	7.972	7.459
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	482	435	454	483
Service Time	5.552	6.342	6.043	5.529
HCM Lane V/C Ratio	0.925	0.455	0.714	0.892
HCM Control Delay	52.6	18.1	29	46.5
HCM Lane LOS	F	C	D	E
HCM 95th-tile Q	10.9	2.3	5.6	9.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	615	359	159	75	648	132	388	239	133	101	268	838
Future Volume (veh/h)	615	359	159	75	648	132	388	239	133	101	268	838
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1781	1781	1781	1841	1841	1841
Adj Flow Rate, veh/h	641	374	156	78	675	133	404	249	127	105	279	796
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	19	19	19	11	11	11	8	8	8	4	4	4
Cap, veh/h	185	362	151	77	366	72	328	215	110	561	133	379
Arrive On Green	0.12	0.33	0.34	0.05	0.26	0.27	0.19	0.19	0.20	0.32	0.32	0.33
Sat Flow, veh/h	1541	1085	452	1654	1409	278	1697	1112	567	1753	415	1183
Grp Volume(v), veh/h	641	0	530	78	0	808	404	0	376	105	0	1075
Grp Sat Flow(s),veh/h/ln	1541	0	1537	1654	0	1687	1697	0	1679	1753	0	1598
Q Serve(g_s), s	18.0	0.0	50.0	7.0	0.0	39.0	29.0	0.0	29.0	6.5	0.0	48.0
Cycle Q Clear(g_c), s	18.0	0.0	50.0	7.0	0.0	39.0	29.0	0.0	29.0	6.5	0.0	48.0
Prop In Lane	1.00		0.29	1.00		0.16	1.00		0.34	1.00		0.74
Lane Grp Cap(c), veh/h	185	0	512	77	0	439	328	0	325	561	0	511
V/C Ratio(X)	3.47	0.00	1.03	1.01	0.00	1.84	1.23	0.00	1.16	0.19	0.00	2.10
Avail Cap(c_a), veh/h	185	0	512	77	0	439	328	0	325	561	0	511
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	66.0	0.0	49.9	71.5	0.0	55.4	60.5	0.0	60.3	36.9	0.0	50.6
Incr Delay (d2), s/veh	1123.0	0.0	48.9	105.3	0.0	387.7	128.0	0.0	100.0	0.2	0.0	502.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	64.7	0.0	25.7	5.2	0.0	63.5	24.0	0.0	21.2	2.8	0.0	90.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	1189.0	0.0	98.8	176.8	0.0	443.2	188.5	0.0	160.4	37.0	0.0	553.5
LnGrp LOS	F	A	F	F	A	F	F	A	F	D	A	F
Approach Vol, veh/h		1171			886			780			1180	
Approach Delay, s/veh		695.6			419.7			174.9			507.5	
Approach LOS		F			F			F			F	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		52.0	22.0	43.0		33.0	11.0	54.0				
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0				
Max Green Setting (Gmax), s		49.0	19.0	40.0		30.0	8.0	51.0				
Max Q Clear Time (g_c+I1), s		50.0	20.0	41.0		31.0	9.0	52.0				
Green Ext Time (p_c), s		0.0	0.0	0.0		0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			478.4									
HCM 6th LOS			F									

Intersection						
Int Delay, s/veh	7.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	62	40	100	100	90	192
Future Vol, veh/h	62	40	100	100	90	192
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	5	5	4	4	1	1
Mvmt Flow	75	48	120	120	108	231

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	243	0	-	0	381	183
Stage 1	-	-	-	-	183	-
Stage 2	-	-	-	-	198	-
Critical Hdwy	4.15	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.245	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1306	-	-	-	623	862
Stage 1	-	-	-	-	851	-
Stage 2	-	-	-	-	838	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1302	-	-	-	583	860
Mov Cap-2 Maneuver	-	-	-	-	583	-
Stage 1	-	-	-	-	798	-
Stage 2	-	-	-	-	835	-

Approach	EB	WB	SB
HCM Control Delay, s	4.8	0	13.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1302	-	-	-	747
HCM Lane V/C Ratio	0.057	-	-	-	0.455
HCM Control Delay (s)	7.9	0	-	-	13.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	2.4

Intersection						
Int Delay, s/veh	4.6					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	80	513	805	110	70	50
Future Vol, veh/h	80	513	805	110	70	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	22	22	11	11	0	0
Mvmt Flow	83	534	839	115	73	52

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	839	0	-	0	1539	839
Stage 1	-	-	-	-	839	-
Stage 2	-	-	-	-	700	-
Critical Hdwy	4.32	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.398	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	716	-	-	0	129	369
Stage 1	-	-	-	0	427	-
Stage 2	-	-	-	0	496	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	716	-	-	-	114	369
Mov Cap-2 Maneuver	-	-	-	-	114	-
Stage 1	-	-	-	-	377	-
Stage 2	-	-	-	-	496	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	51.5
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	716	-	-	195
HCM Lane V/C Ratio	0.116	-	-	0.641
HCM Control Delay (s)	10.7	-	-	51.5
HCM Lane LOS	B	-	-	F
HCM 95th %tile Q(veh)	0.4	-	-	3.8

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	22	627	10	12	296
Future Vol, veh/h	10	22	627	10	12	296
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	12	12	6	6	5	5
Mvmt Flow	12	26	746	12	14	352

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1126	746	0	-	746	0
Stage 1	746	-	-	-	-	-
Stage 2	380	-	-	-	-	-
Critical Hdwy	6.52	6.32	-	-	4.15	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.408	-	-	2.245	-
Pot Cap-1 Maneuver	217	398	-	0	849	-
Stage 1	451	-	-	0	-	-
Stage 2	670	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	214	398	-	-	849	-
Mov Cap-2 Maneuver	214	-	-	-	-	-
Stage 1	451	-	-	-	-	-
Stage 2	659	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	314	849	-
HCM Lane V/C Ratio	-	0.121	0.017	-
HCM Control Delay (s)	-	18	9.3	-
HCM Lane LOS	-	C	A	-
HCM 95th %tile Q(veh)	-	0.4	0.1	-

Intersection						
Int Delay, s/veh	0.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	0	30	387	615	4
Future Vol, veh/h	1	0	30	387	615	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	0	33	421	668	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1157	670	672	0	-	0
Stage 1	670	-	-	-	-	-
Stage 2	487	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	217	457	919	-	-	-
Stage 1	509	-	-	-	-	-
Stage 2	618	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	207	457	919	-	-	-
Mov Cap-2 Maneuver	207	-	-	-	-	-
Stage 1	485	-	-	-	-	-
Stage 2	618	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.5	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	919	-	207	-	-
HCM Lane V/C Ratio	0.035	-	0.005	-	-
HCM Control Delay (s)	9.1	0	22.5	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	35	34	0	2	0	414	34	2	613	0
Future Vol, veh/h	1	0	35	34	0	2	0	414	34	2	613	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	38	37	0	2	0	450	37	2	666	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1140	1157	666	1158	1139	469	666	0	0	487	0	0
Stage 1	670	670	-	469	469	-	-	-	-	-	-	-
Stage 2	470	487	-	689	670	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	178	196	459	173	201	594	923	-	-	1076	-	-
Stage 1	446	455	-	575	561	-	-	-	-	-	-	-
Stage 2	574	550	-	436	455	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	177	195	459	158	200	594	923	-	-	1076	-	-
Mov Cap-2 Maneuver	177	195	-	158	200	-	-	-	-	-	-	-
Stage 1	446	454	-	575	561	-	-	-	-	-	-	-
Stage 2	572	550	-	399	454	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14	33.5	0	0
HCM LOS	B	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	923	-	-	440	165	1076	-	-
HCM Lane V/C Ratio	-	-	-	0.089	0.237	0.002	-	-
HCM Control Delay (s)	0	-	-	14	33.5	8.4	0	-
HCM Lane LOS	A	-	-	B	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.9	0	-	-

Intersection	
Int Delay, s/veh	141.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	320	26	422	320	26	656
Future Vol, veh/h	320	26	422	320	26	656
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	348	28	459	348	28	713

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1402	633	0	0	807	0
Stage 1	633	-	-	-	-	-
Stage 2	769	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 154	480	-	-	818	-
Stage 1	529	-	-	-	-	-
Stage 2	457	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 145	480	-	-	818	-
Mov Cap-2 Maneuver	~ 145	-	-	-	-	-
Stage 1	529	-	-	-	-	-
Stage 2	431	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 722.2	0	0.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	153	818	-
HCM Lane V/C Ratio	-	-	2.458	0.035	-
HCM Control Delay (s)	-	-	$ 722.2	9.6	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	32.3	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	172.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	252	265	721	955	21
Future Vol, veh/h	21	252	265	721	955	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	274	288	784	1038	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2410	1050	1061	0	-	0
Stage 1	1050	-	-	-	-	-
Stage 2	1360	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	36	276	657	-	-	-
Stage 1	337	-	-	-	-	-
Stage 2	239	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 8	276	657	-	-	-
Mov Cap-2 Maneuver	~ 8	-	-	-	-	-
Stage 1	75	-	-	-	-	-
Stage 2	239	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 1396.2	3.9	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	657	-	77	-	-
HCM Lane V/C Ratio	0.438	-	3.854	-	-
HCM Control Delay (s)	14.7	0	$ 1396.2	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	2.2	-	31.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	1	1	748	477	25
Future Vol, veh/h	12	1	1	748	477	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	1	1	813	518	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1347	532	545	0	-	0
Stage 1	532	-	-	-	-	-
Stage 2	815	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	167	547	1024	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	435	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	167	547	1024	-	-	-
Mov Cap-2 Maneuver	302	-	-	-	-	-
Stage 1	588	-	-	-	-	-
Stage 2	435	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1024	-	313	-	-
HCM Lane V/C Ratio	0.001	-	0.045	-	-
HCM Control Delay (s)	8.5	-	17	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	833	30	73	315	131	10	100	63	220	110	20
Future Volume (veh/h)	90	833	30	73	315	131	10	100	63	220	110	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1781	1781	1781	1885	1885	1885	1841	1841	1841
Adj Flow Rate, veh/h	97	896	31	78	339	124	11	108	68	237	118	13
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	8	8	8	1	1	1	4	4	4
Cap, veh/h	107	951	33	83	659	241	12	118	74	258	239	26
Arrive On Green	0.06	0.54	0.55	0.05	0.53	0.54	0.12	0.12	0.12	0.15	0.15	0.16
Sat Flow, veh/h	1739	1754	61	1697	1244	455	104	1019	642	1753	1629	179
Grp Volume(v), veh/h	97	0	927	78	0	463	187	0	0	237	0	131
Grp Sat Flow(s),veh/h/ln	1739	0	1815	1697	0	1700	1764	0	0	1753	0	1808
Q Serve(g_s), s	6.0	0.0	52.2	5.0	0.0	19.1	11.4	0.0	0.0	14.5	0.0	7.3
Cycle Q Clear(g_c), s	6.0	0.0	52.2	5.0	0.0	19.1	11.4	0.0	0.0	14.5	0.0	7.3
Prop In Lane	1.00		0.03	1.00		0.27	0.06		0.36	1.00		0.10
Lane Grp Cap(c), veh/h	107	0	983	83	0	900	204	0	0	258	0	266
V/C Ratio(X)	0.91	0.00	0.94	0.94	0.00	0.51	0.92	0.00	0.00	0.92	0.00	0.49
Avail Cap(c_a), veh/h	207	0	1132	109	0	966	243	0	0	305	0	315
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.9	0.0	23.4	51.7	0.0	16.5	47.5	0.0	0.0	45.9	0.0	42.7
Incr Delay (d2), s/veh	22.9	0.0	14.0	58.4	0.0	0.5	33.2	0.0	0.0	29.0	0.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	23.8	3.4	0.0	7.0	6.8	0.0	0.0	8.2	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.8	0.0	37.3	110.1	0.0	17.0	80.8	0.0	0.0	74.9	0.0	44.2
LnGrp LOS	E	A	D	F	A	B	F	A	A	E	A	D
Approach Vol, veh/h		1024			541			187			368	
Approach Delay, s/veh		40.8			30.4			80.8			63.9	
Approach LOS		D			C			F			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.7	61.7		16.6	9.4	63.1		20.0				
Change Period (Y+Rc), s	3.0	3.0		3.0	3.0	3.0		3.0				
Max Green Setting (Gmax), s	14.0	63.0		16.0	8.0	69.0		20.0				
Max Q Clear Time (g_c+I1), s	8.0	21.1		13.4	7.0	54.2		16.5				
Green Ext Time (p_c), s	0.1	3.1		0.2	0.0	5.9		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			45.7									
HCM 6th LOS			D									

Intersection	
Int Delay, s/veh	10.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	10	1205	30	80	509	20	20	0	50	20	0	10
Future Vol, veh/h	10	1205	30	80	509	20	20	0	50	20	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	Yield	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	10	10	10	5	5	5	9	9	9
Mvmt Flow	11	1310	33	87	553	22	22	0	54	22	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	553	0	0	1310	0	0	2076	2076	1327	2070	2070	564
Stage 1	-	-	-	-	-	-	1349	1349	-	738	738	-
Stage 2	-	-	-	-	-	-	727	727	-	1332	1332	-
Critical Hdwy	4.14	-	-	4.2	-	-	7.15	6.55	6.25	7.19	6.59	6.29
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.19	5.59	-
Follow-up Hdwy	2.236	-	-	2.29	-	-	3.545	4.045	3.345	3.581	4.081	3.381
Pot Cap-1 Maneuver	1007	-	-	503	-	-	39	53	187	38	52	512
Stage 1	-	-	-	-	-	-	183	216	-	399	414	-
Stage 2	-	-	-	-	-	-	411	425	-	184	216	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1007	-	-	503	-	-	30	38	187	~ 21	37	512
Mov Cap-2 Maneuver	-	-	-	-	-	-	30	38	-	~ 21	37	-
Stage 1	-	-	-	-	-	-	175	206	-	381	308	-
Stage 2	-	-	-	-	-	-	300	317	-	125	206	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.8	123.3	$ 349
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	95	1007	-	-	503	-	-	32
HCM Lane V/C Ratio	0.801	0.011	-	-	0.173	-	-	1.019
HCM Control Delay (s)	123.3	8.6	0	-	13.6	0	-	$ 349
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	4.3	0	-	-	0.6	-	-	3.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	535	740	548	469	0	0	0	0	493	0	140
Future Volume (veh/h)	0	535	740	548	469	0	0	0	0	493	0	140
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1767	1767	0				1900	1767	1900
Adj Flow Rate, veh/h	0	582	763	596	510	0				536	0	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	9	9	0				0	9	0
Cap, veh/h	0	330	433	365	1266	0				296	0	61
Arrive On Green	0.00	0.47	0.46	0.36	1.00	0.00				0.22	0.00	0.21
Sat Flow, veh/h	0	708	928	1682	1767	0				1367	0	281
Grp Volume(v), veh/h	0	0	1345	596	510	0				646	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1636	1682	1767	0				1648	0	0
Q Serve(g_s), s	0.0	0.0	56.0	26.0	0.0	0.0				26.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	56.0	26.0	0.0	0.0				26.0	0.0	0.0
Prop In Lane	0.00		0.57	1.00		0.00				0.83		0.17
Lane Grp Cap(c), veh/h	0	0	763	365	1266	0				357	0	0
V/C Ratio(X)	0.00	0.00	1.76	1.63	0.40	0.00				1.81	0.00	0.00
Avail Cap(c_a), veh/h	0	0	763	365	1266	0				357	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.09	0.09	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	32.1	38.3	0.0	0.0				47.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	348.3	286.9	0.1	0.0				375.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	94.5	38.0	0.0	0.0				47.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	380.5	325.1	0.1	0.0				422.2	0.0	0.0
LnGrp LOS	A	A	F	F	A	A				F	A	A
Approach Vol, veh/h		1345			1106						646	
Approach Delay, s/veh		380.5			175.3						422.2	
Approach LOS		F			F						F	

Timer - Assigned Phs		2		4	5	6			
Phs Duration (G+Y+Rc), s		90.0		30.0	30.0	60.0			
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5			
Max Green Setting (Gmax), s		85.5		25.5	25.5	55.5			
Max Q Clear Time (g_c+I1), s		2.0		28.0	28.0	58.0			
Green Ext Time (p_c), s		3.5		0.0	0.0	0.0			

Intersection Summary		
HCM 6th Ctrl Delay		315.9
HCM 6th LOS		F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	938	0	0	807	463	210	0	639	0	0	0
Future Volume (veh/h)	90	938	0	0	807	463	210	0	639	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1796	1796	0	0	1767	1767	1900	1781	1900			
Adj Flow Rate, veh/h	95	987	0	0	849	470	221	0	589			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	7	7	0	0	9	9	0	8	0			
Cap, veh/h	86	1093	0	0	561	310	138	0	368			
Arrive On Green	0.05	0.61	0.00	0.00	0.52	0.52	0.32	0.00	0.32			
Sat Flow, veh/h	1711	1796	0	0	1068	591	425	0	1132			
Grp Volume(v), veh/h	95	987	0	0	0	1319	810	0	0			
Grp Sat Flow(s),veh/h/ln	1711	1796	0	0	0	1659	1556	0	0			
Q Serve(g_s), s	6.0	57.3	0.0	0.0	0.0	63.0	39.0	0.0	0.0			
Cycle Q Clear(g_c), s	6.0	57.3	0.0	0.0	0.0	63.0	39.0	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.36	0.27		0.73			
Lane Grp Cap(c), veh/h	86	1093	0	0	0	871	506	0	0			
V/C Ratio(X)	1.11	0.90	0.00	0.00	0.00	1.51	1.60	0.00	0.00			
Avail Cap(c_a), veh/h	86	1093	0	0	0	871	506	0	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.09	0.09	0.00	0.00	0.00	0.09	1.00	0.00	0.00			
Uniform Delay (d), s/veh	57.0	20.4	0.0	0.0	0.0	28.6	40.7	0.0	0.0			
Incr Delay (d2), s/veh	64.5	1.3	0.0	0.0	0.0	232.1	279.7	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	4.1	21.7	0.0	0.0	0.0	79.1	53.7	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	121.5	21.8	0.0	0.0	0.0	260.7	320.4	0.0	0.0			
LnGrp LOS	F	C	A	A	A	F	F	A	A			
Approach Vol, veh/h		1082			1319			810				
Approach Delay, s/veh		30.5			260.7			320.4				
Approach LOS		C			F			F				

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	67.0		43.0		77.0		
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5		
Max Green Setting (Gmax), s	5.5	62.5		38.5		72.5		
Max Q Clear Time (g_c+I1), s	8.0	65.0		41.0		59.3		
Green Ext Time (p_c), s	0.0	0.0		0.0		6.0		

Intersection Summary		
HCM 6th Ctrl Delay		198.2
HCM 6th LOS		F

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	10	40	130	100	20	20	70	194	30	10	163	10
Future Vol, veh/h	10	40	130	100	20	20	70	194	30	10	163	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	2	2	2
Mvmt Flow	11	42	137	105	21	21	74	204	32	11	172	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.1	10.4	12.3	10.5
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	24%	6%	71%	5%
Vol Thru, %	66%	22%	14%	89%
Vol Right, %	10%	72%	14%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	294	180	140	183
LT Vol	70	10	100	10
Through Vol	194	40	20	163
RT Vol	30	130	20	10
Lane Flow Rate	309	189	147	193
Geometry Grp	1	1	1	1
Degree of Util (X)	0.444	0.272	0.232	0.284
Departure Headway (Hd)	5.167	5.171	5.671	5.315
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	696	693	632	676
Service Time	3.198	3.21	3.713	3.351
HCM Lane V/C Ratio	0.444	0.273	0.233	0.286
HCM Control Delay	12.3	10.1	10.4	10.5
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	2.3	1.1	0.9	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	624	675	278	122	374	63	233	146	127	92	165	663
Future Volume (veh/h)	624	675	278	122	374	63	233	146	127	92	165	663
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1811	1811	1811	1841	1841	1841
Adj Flow Rate, veh/h	650	703	281	127	390	62	243	152	114	96	172	596
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	7	7	7	6	6	6	4	4	4
Cap, veh/h	316	442	177	70	331	53	297	165	124	552	113	393
Arrive On Green	0.18	0.36	0.37	0.04	0.22	0.23	0.17	0.17	0.18	0.31	0.31	0.32
Sat Flow, veh/h	1711	1220	488	1711	1512	240	1725	957	718	1753	360	1249
Grp Volume(v), veh/h	650	0	984	127	0	452	243	0	266	96	0	768
Grp Sat Flow(s),veh/h/ln	1711	0	1708	1711	0	1752	1725	0	1675	1753	0	1609
Q Serve(g_s), s	27.0	0.0	53.0	6.0	0.0	32.0	19.8	0.0	22.8	5.8	0.0	46.0
Cycle Q Clear(g_c), s	27.0	0.0	53.0	6.0	0.0	32.0	19.8	0.0	22.8	5.8	0.0	46.0
Prop In Lane	1.00		0.29	1.00		0.14	1.00		0.43	1.00		0.78
Lane Grp Cap(c), veh/h	316	0	619	70	0	384	297	0	288	552	0	506
V/C Ratio(X)	2.06	0.00	1.59	1.81	0.00	1.18	0.82	0.00	0.92	0.17	0.00	1.52
Avail Cap(c_a), veh/h	316	0	619	70	0	384	342	0	332	552	0	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	59.6	0.0	46.4	70.1	0.0	57.0	58.3	0.0	59.3	36.3	0.0	49.7
Incr Delay (d2), s/veh	486.4	0.0	272.7	414.2	0.0	104.1	12.9	0.0	28.2	0.1	0.0	242.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	54.2	0.0	68.8	10.7	0.0	25.0	9.6	0.0	11.8	2.5	0.0	52.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	546.0	0.0	319.2	484.3	0.0	161.1	71.2	0.0	87.6	36.5	0.0	292.2
LnGrp LOS	F	A	F	F	A	F	E	A	F	D	A	F
Approach Vol, veh/h		1634			579			509			864	
Approach Delay, s/veh		409.4			232.0			79.7			263.8	
Approach LOS		F			F			E			F	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		50.0	31.0	36.0		29.2	10.0	57.0
Change Period (Y+Rc), s		3.0	3.0	3.0		3.0	3.0	3.0
Max Green Setting (Gmax), s		47.0	28.0	33.0		30.0	7.0	54.0
Max Q Clear Time (g_c+I1), s		48.0	29.0	34.0		24.8	8.0	55.0
Green Ext Time (p_c), s		0.0	0.0	0.0		1.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	298.9
HCM 6th LOS	F

Intersection						
Int Delay, s/veh	5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	30	60	130	70	90
Future Vol, veh/h	50	30	60	130	70	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	3	3	1	1
Mvmt Flow	58	35	70	151	81	105

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	221	0	-	0	297	146
Stage 1	-	-	-	-	146	-
Stage 2	-	-	-	-	151	-
Critical Hdwy	4.1	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.2	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1360	-	-	-	696	904
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	879	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1360	-	-	-	666	904
Mov Cap-2 Maneuver	-	-	-	-	666	-
Stage 1	-	-	-	-	846	-
Stage 2	-	-	-	-	879	-

Approach	EB	WB	SB
HCM Control Delay, s	4.9	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1360	-	-	-	782
HCM Lane V/C Ratio	0.043	-	-	-	0.238
HCM Control Delay (s)	7.8	0	-	-	11
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

Intersection						
Int Delay, s/veh	3.8					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	90	804	489	90	60	70
Future Vol, veh/h	90	804	489	90	60	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	8	1	1
Mvmt Flow	96	855	520	96	64	74

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	520	0	-	0	1567	520
Stage 1	-	-	-	-	520	-
Stage 2	-	-	-	-	1047	-
Critical Hdwy	4.18	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.272	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1016	-	-	0	123	558
Stage 1	-	-	-	0	599	-
Stage 2	-	-	-	0	339	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1016	-	-	-	111	558
Mov Cap-2 Maneuver	-	-	-	-	111	-
Stage 1	-	-	-	-	543	-
Stage 2	-	-	-	-	339	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	38.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	1016	-	-	241
HCM Lane V/C Ratio	0.094	-	-	0.574
HCM Control Delay (s)	8.9	-	-	38.3
HCM Lane LOS	A	-	-	E
HCM 95th %tile Q(veh)	0.3	-	-	3.2

Intersection						
Int Delay, s/veh	0.5					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	11	316	10	11	486
Future Vol, veh/h	10	11	316	10	11	486
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	None
Storage Length	0	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	7	7	2	2
Mvmt Flow	12	13	376	12	13	579

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	981	376	0	-	376	0
Stage 1	376	-	-	-	-	-
Stage 2	605	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.12	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.218	-
Pot Cap-1 Maneuver	279	675	-	0	1182	-
Stage 1	699	-	-	0	-	-
Stage 2	549	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	276	675	-	-	1182	-
Mov Cap-2 Maneuver	276	-	-	-	-	-
Stage 1	699	-	-	-	-	-
Stage 2	543	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.6	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	400	1182	-
HCM Lane V/C Ratio	-	0.063	0.011	-
HCM Control Delay (s)	-	14.6	8.1	-
HCM Lane LOS	-	B	A	-
HCM 95th %tile Q(veh)	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	0	26	294	392	1
Future Vol, veh/h	1	0	26	294	392	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	0	28	320	426	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	803	427	427	0	-	0
Stage 1	427	-	-	-	-	-
Stage 2	376	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	353	628	1132	-	-	-
Stage 1	658	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	342	628	1132	-	-	-
Mov Cap-2 Maneuver	342	-	-	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	694	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.6	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1132	-	342	-	-
HCM Lane V/C Ratio	0.025	-	0.003	-	-
HCM Control Delay (s)	8.3	0	15.6	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	1	0	31	40	0	1	0	318	42	1	391	0
Future Vol, veh/h	1	0	31	40	0	1	0	318	42	1	391	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	34	43	0	1	0	346	46	1	425	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	797	819	425	813	796	369	425	0	0	392	0	0
Stage 1	427	427	-	369	369	-	-	-	-	-	-	-
Stage 2	370	392	-	444	427	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	305	310	629	297	320	677	1134	-	-	1167	-	-
Stage 1	606	585	-	651	621	-	-	-	-	-	-	-
Stage 2	650	606	-	593	585	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	304	310	629	281	320	677	1134	-	-	1167	-	-
Mov Cap-2 Maneuver	304	310	-	281	320	-	-	-	-	-	-	-
Stage 1	606	584	-	651	621	-	-	-	-	-	-	-
Stage 2	649	606	-	561	584	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.3	20	0	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1134	-	-	609	285	1167	-	-
HCM Lane V/C Ratio	-	-	-	0.057	0.156	0.001	-	-
HCM Control Delay (s)	0	-	-	11.3	20	8.1	0	-
HCM Lane LOS	A	-	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.5	0	-	-

Intersection						
Int Delay, s/veh	27.5					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	256	12	348	260	12	450
Future Vol, veh/h	256	12	348	260	12	450
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	278	13	378	283	13	489

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1035	520	0	0	661	0
Stage 1	520	-	-	-	-	-
Stage 2	515	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 257	556	-	-	927	-
Stage 1	597	-	-	-	-	-
Stage 2	600	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 252	556	-	-	927	-
Mov Cap-2 Maneuver	~ 252	-	-	-	-	-
Stage 1	597	-	-	-	-	-
Stage 2	589	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	137.1	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	258	927	-
HCM Lane V/C Ratio	-	-	1.129	0.014	-
HCM Control Delay (s)	-	-	137.1	8.9	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	12.7	0	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	8.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	222	233	600	698	8
Future Vol, veh/h	8	222	233	600	698	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	241	253	652	759	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1922	764	768	0	-	0
Stage 1	764	-	-	-	-	-
Stage 2	1158	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	74	404	846	-	-	-
Stage 1	460	-	-	-	-	-
Stage 2	299	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	39	404	846	-	-	-
Mov Cap-2 Maneuver	39	-	-	-	-	-
Stage 1	244	-	-	-	-	-
Stage 2	299	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	53.7	3.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	846	-	305	-	-
HCM Lane V/C Ratio	0.299	-	0.82	-	-
HCM Control Delay (s)	11.1	0	53.7	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	1.3	-	6.8	-	-

Intersection						
Int Delay, s/veh	0.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	2	1	474	554	11
Future Vol, veh/h	31	2	1	474	554	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	2	1	515	602	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1125	608	614	0	-	0
Stage 1	608	-	-	-	-	-
Stage 2	517	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	227	496	965	-	-	-
Stage 1	543	-	-	-	-	-
Stage 2	598	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	227	496	965	-	-	-
Mov Cap-2 Maneuver	363	-	-	-	-	-
Stage 1	542	-	-	-	-	-
Stage 2	598	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	965	-	369	-	-
HCM Lane V/C Ratio	0.001	-	0.097	-	-
HCM Control Delay (s)	8.7	-	15.8	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	412	10	65	610	102	20	100	55	162	50	100
Future Volume (veh/h)	70	412	10	65	610	102	20	100	55	162	50	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1752	1752	1752	1811	1811	1811
Adj Flow Rate, veh/h	76	448	10	71	663	99	22	109	60	176	54	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	19	19	19	11	11	11	10	10	10	6	6	6
Cap, veh/h	50	1062	24	49	988	147	29	145	185	237	120	109
Arrive On Green	0.03	0.35	0.37	0.03	0.34	0.37	0.10	0.10	0.12	0.14	0.14	0.16
Sat Flow, veh/h	1541	3075	69	1654	2880	430	292	1445	1485	1725	875	794
Grp Volume(v), veh/h	76	224	234	71	380	382	131	0	60	176	0	103
Grp Sat Flow(s),veh/h/ln	1541	1537	1606	1654	1650	1660	1737	0	1485	1725	0	1668
Q Serve(g_s), s	1.3	4.6	4.6	1.2	8.1	8.1	3.0	0.0	1.5	4.1	0.0	2.3
Cycle Q Clear(g_c), s	1.3	4.6	4.6	1.2	8.1	8.1	3.0	0.0	1.5	4.1	0.0	2.3
Prop In Lane	1.00		0.04	1.00		0.26	0.17		1.00	1.00		0.48
Lane Grp Cap(c), veh/h	50	531	555	49	566	569	174	0	185	237	0	229
V/C Ratio(X)	1.53	0.42	0.42	1.44	0.67	0.67	0.75	0.00	0.32	0.74	0.00	0.45
Avail Cap(c_a), veh/h	485	1748	1826	440	1796	1806	1008	0	898	918	0	888
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.0	10.4	10.4	20.1	11.6	11.5	18.1	0.0	16.5	17.1	0.0	16.2
Incr Delay (d2), s/veh	261.0	0.5	0.5	222.2	1.4	1.4	6.4	0.0	1.0	4.5	0.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	1.2	1.2	3.4	2.3	2.3	1.3	0.0	0.5	1.6	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	281.1	10.9	10.9	242.2	13.0	12.9	24.5	0.0	17.5	21.7	0.0	17.5
LnGrp LOS	F	B	B	F	B	B	C	A	B	C	A	B
Approach Vol, veh/h		534			833			191			279	
Approach Delay, s/veh		49.3			32.5			22.3			20.1	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.3	18.2		8.2	5.2	18.3		9.7
Change Period (Y+Rc), s	3.0	3.0		3.0	3.0	3.0		3.0
Max Green Setting (Gmax), s	14.0	46.0		25.0	12.0	48.0		23.0
Max Q Clear Time (g_c+I1), s	3.3	10.1		5.0	3.2	6.6		6.1
Green Ext Time (p_c), s	0.1	5.1		0.8	0.1	2.8		0.9

Intersection Summary	
HCM 6th Ctrl Delay	34.4
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	359	340	610	776	0	0	0	0	366	0	90
Future Volume (veh/h)	0	359	340	610	776	0	0	0	0	366	0	90
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1589	1589	1722	1722	0				1574	0	1574
Adj Flow Rate, veh/h	0	390	170	663	843	0				398	0	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	21	21	12	12	0				22	0	22
Cap, veh/h	0	801	673	747	2527	0				468	0	209
Arrive On Green	0.00	0.50	0.50	0.31	1.00	0.00				0.16	0.00	0.16
Sat Flow, veh/h	0	1589	1346	3182	3358	0				2908	0	1334
Grp Volume(v), veh/h	0	390	170	663	843	0				398	0	16
Grp Sat Flow(s),veh/h/ln	0	1589	1346	1591	1636	0				1454	0	1334
Q Serve(g_s), s	0.0	19.4	8.7	23.8	0.0	0.0				16.0	0.0	1.2
Cycle Q Clear(g_c), s	0.0	19.4	8.7	23.8	0.0	0.0				16.0	0.0	1.2
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	801	673	747	2527	0				468	0	209
V/C Ratio(X)	0.00	0.49	0.25	0.89	0.33	0.00				0.85	0.00	0.08
Avail Cap(c_a), veh/h	0	801	673	955	2527	0				606	0	272
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.67	0.67	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	19.5	17.2	39.8	0.0	0.0				48.9	0.0	43.2
Incr Delay (d2), s/veh	0.0	2.1	0.9	6.0	0.2	0.0				8.9	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	7.3	2.8	9.1	0.1	0.0				6.3	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	21.6	18.1	45.7	0.2	0.0				57.8	0.0	43.3
LnGrp LOS	A	C	B	D	A	A				E	A	D
Approach Vol, veh/h		560			1506						414	
Approach Delay, s/veh		20.6			20.3						57.3	
Approach LOS		C			C						E	
Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		96.7		23.3	32.2	64.5						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		86.5		24.5	35.5	46.5						
Max Q Clear Time (g_c+I1), s		2.0		18.0	25.8	21.4						
Green Ext Time (p_c), s		6.8		0.9	1.9	2.9						

Intersection Summary			
HCM 6th Ctrl Delay			26.5
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	635	0	0	1126	748	260	0	498	0	0	0
Future Volume (veh/h)	90	635	0	0	1126	748	260	0	498	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1574	1574	0	0	1767	1767	1633	0	1633			
Adj Flow Rate, veh/h	94	661	0	0	1173	412	271	0	380			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	22	22	0	0	9	9	18	0	18			
Cap, veh/h	120	1890	0	0	1741	770	469	0	411			
Arrive On Green	0.03	0.21	0.00	0.00	0.52	0.51	0.30	0.00	0.30			
Sat Flow, veh/h	1499	3069	0	0	3445	1497	1555	0	1384			
Grp Volume(v), veh/h	94	661	0	0	1173	412	271	0	380			
Grp Sat Flow(s),veh/h/ln	1499	1495	0	0	1678	1497	1555	0	1384			
Q Serve(g_s), s	7.5	22.6	0.0	0.0	31.0	22.1	17.7	0.0	31.9			
Cycle Q Clear(g_c), s	7.5	22.6	0.0	0.0	31.0	22.1	17.7	0.0	31.9			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	120	1890	0	0	1741	770	469	0	411			
V/C Ratio(X)	0.78	0.35	0.00	0.00	0.67	0.53	0.58	0.00	0.92			
Avail Cap(c_a), veh/h	150	1890	0	0	1741	770	583	0	513			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.71	0.71	0.00	0.00	0.74	0.74	1.00	0.00	1.00			
Uniform Delay (d), s/veh	57.4	26.4	0.0	0.0	21.4	19.5	35.5	0.0	40.8			
Incr Delay (d2), s/veh	14.0	0.4	0.0	0.0	1.6	2.0	1.1	0.0	19.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.4	9.1	0.0	0.0	11.8	7.7	6.7	0.0	12.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	71.4	26.8	0.0	0.0	22.9	21.5	36.6	0.0	60.7			
LnGrp LOS	E	C	A	A	C	C	D	A	E			
Approach Vol, veh/h		755			1585			651				
Approach Delay, s/veh		32.4			22.6			50.7				
Approach LOS		C			C			D				
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	13.6	66.2		40.2		79.8						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	11.5	50.5		44.5		66.5						
Max Q Clear Time (g_c+I1), s	9.5	33.0		33.9		24.6						
Green Ext Time (p_c), s	0.0	9.2		1.8		4.9						
Intersection Summary												
HCM 6th Ctrl Delay			31.2									
HCM 6th LOS			C									

MOVEMENT SUMMARY

Site: 5 [9th St/Golden State Blvd at Nunes Rd - AM Peak]

Cumulative plus Project Trips Combined with Mitigations
AM Peak Hour
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Golden State Blvd											
1	L2	34	3.0	0.324	6.7	LOS A	1.5	10.9	0.21	0.10	49.7
2	T1	223	3.0	0.324	6.7	LOS A	1.5	10.9	0.21	0.10	50.8
3	R2	80	3.0	0.324	6.7	LOS A	1.5	10.9	0.21	0.10	50.8
Approach		338	3.0	0.324	6.7	LOS A	1.5	10.9	0.21	0.10	50.7
East: Nunes Rd											
4	L2	115	4.0	0.209	6.9	LOS A	0.8	5.6	0.46	0.40	49.8
5	T1	23	4.0	0.209	6.9	LOS A	0.8	5.6	0.46	0.40	51.0
6	R2	23	4.0	0.209	6.9	LOS A	0.8	5.6	0.46	0.40	50.9
Approach		161	4.0	0.209	6.9	LOS A	0.8	5.6	0.46	0.40	50.1
North: 9th St											
7	L2	11	2.0	0.251	7.0	LOS A	1.0	7.1	0.43	0.35	50.1
8	T1	187	2.0	0.251	7.0	LOS A	1.0	7.1	0.43	0.35	51.2
9	R2	11	2.0	0.251	7.0	LOS A	1.0	7.1	0.43	0.35	51.2
Approach		210	2.0	0.251	7.0	LOS A	1.0	7.1	0.43	0.35	51.2
West: Nunes Rd											
10	L2	11	6.0	0.265	7.6	LOS A	1.0	7.6	0.46	0.41	47.7
11	T1	46	6.0	0.265	7.6	LOS A	1.0	7.6	0.46	0.41	48.8
12	R2	149	6.0	0.265	7.6	LOS A	1.0	7.6	0.46	0.41	48.7
Approach		207	6.0	0.265	7.6	LOS A	1.0	7.6	0.46	0.41	48.7
All Vehicles		916	3.6	0.324	7.0	LOS A	1.5	10.9	0.36	0.28	50.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	615	359	159	75	648	132	388	239	133	101	268	838
Future Volume (veh/h)	615	359	159	75	648	132	388	239	133	101	268	838
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1618	1618	1618	1737	1737	1737	1781	1781	1781	1841	1841	1841
Adj Flow Rate, veh/h	641	374	118	78	675	89	404	249	37	105	279	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	19	19	19	11	11	11	8	8	8	4	4	4
Cap, veh/h	670	1863	842	97	1360	619	434	652	303	130	346	
Arrive On Green	0.37	1.00	1.00	0.03	0.41	0.42	0.13	0.19	0.20	0.04	0.10	0.00
Sat Flow, veh/h	2990	3075	1372	3209	3300	1472	3291	3385	1510	3401	3497	1560
Grp Volume(v), veh/h	641	374	118	78	675	89	404	249	37	105	279	0
Grp Sat Flow(s),veh/h/ln	1495	1537	1372	1605	1650	1472	1646	1692	1510	1700	1749	1560
Q Serve(g_s), s	25.1	0.0	0.0	2.9	18.1	4.5	14.6	7.7	2.4	3.7	9.4	0.0
Cycle Q Clear(g_c), s	25.1	0.0	0.0	2.9	18.1	4.5	14.6	7.7	2.4	3.7	9.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	670	1863	842	97	1360	619	434	652	303	130	346	
V/C Ratio(X)	0.96	0.20	0.14	0.80	0.50	0.14	0.93	0.38	0.12	0.81	0.81	
Avail Cap(c_a), veh/h	723	1863	842	187	1360	619	466	1072	491	227	845	
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.76	0.76	0.76	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.0	0.0	0.0	57.8	26.1	21.5	51.6	42.2	39.3	57.3	52.9	0.0
Incr Delay (d2), s/veh	18.9	0.2	0.3	14.1	1.3	0.5	24.7	0.4	0.2	11.3	4.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	0.0	0.1	1.3	7.1	1.6	7.4	3.2	0.9	1.8	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.9	0.2	0.3	72.0	27.4	22.0	76.3	42.6	39.5	68.5	57.4	0.0
LnGrp LOS	E	A	A	E	C	C	E	D	D	E	E	
Approach Vol, veh/h		1133			842			690			384	A
Approach Delay, s/veh		31.7			30.9			62.1			60.4	
Approach LOS		C			C			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.9	53.4	8.6	27.1	7.6	76.7	19.8	15.9
Change Period (Y+Rc), s	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Max Green Setting (Gmax), s	30.0	30.0	9.0	39.0	8.0	52.0	18.0	30.0
Max Q Clear Time (g_c+I1), s	27.1	20.1	5.7	9.7	4.9	2.0	16.6	11.4
Green Ext Time (p_c), s	0.8	3.3	0.1	1.6	0.0	3.0	0.2	1.5

Intersection Summary	
HCM 6th Ctrl Delay	42.0
HCM 6th LOS	D

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	80	513	805	110	70	50
Future Vol, veh/h	80	513	805	110	70	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	22	22	11	11	0	0
Mvmt Flow	83	534	839	115	73	52

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	839	0	-	0	1539	839
Stage 1	-	-	-	-	839	-
Stage 2	-	-	-	-	700	-
Critical Hdwy	4.32	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.398	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	716	-	-	0	129	369
Stage 1	-	-	-	0	427	-
Stage 2	-	-	-	0	496	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	716	-	-	-	114	369
Mov Cap-2 Maneuver	-	-	-	-	246	-
Stage 1	-	-	-	-	377	-
Stage 2	-	-	-	-	496	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	17.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	716	-	-	422
HCM Lane V/C Ratio	0.116	-	-	0.296
HCM Control Delay (s)	10.7	-	-	17.1
HCM Lane LOS	B	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	833	30	73	315	131	10	100	63	220	110	20
Future Volume (veh/h)	90	833	30	73	315	131	10	100	63	220	110	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1781	1781	1781	1885	1885	1885	1841	1841	1841
Adj Flow Rate, veh/h	97	896	30	78	339	103	11	108	68	237	118	16
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	8	8	8	1	1	1	4	4	4
Cap, veh/h	74	1280	43	56	935	280	15	148	172	307	277	38
Arrive On Green	0.04	0.37	0.39	0.03	0.36	0.38	0.09	0.09	0.11	0.17	0.17	0.20
Sat Flow, veh/h	1739	3425	115	1697	2567	768	173	1703	1598	1753	1587	215
Grp Volume(v), veh/h	97	454	472	78	222	220	119	0	68	237	0	134
Grp Sat Flow(s),veh/h/ln	1739	1735	1805	1697	1692	1643	1877	0	1598	1753	0	1802
Q Serve(g_s), s	2.1	10.7	10.7	1.6	4.6	4.7	3.0	0.0	1.9	6.2	0.0	3.2
Cycle Q Clear(g_c), s	2.1	10.7	10.7	1.6	4.6	4.7	3.0	0.0	1.9	6.2	0.0	3.2
Prop In Lane	1.00		0.06	1.00		0.47	0.09		1.00	1.00		0.12
Lane Grp Cap(c), veh/h	74	648	675	56	616	598	163	0	172	307	0	315
V/C Ratio(X)	1.31	0.70	0.70	1.39	0.36	0.37	0.73	0.00	0.40	0.77	0.00	0.43
Avail Cap(c_a), veh/h	468	1617	1683	422	1542	1498	816	0	728	944	0	970
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.1	12.8	12.8	23.3	11.2	11.1	21.5	0.0	20.1	19.0	0.0	17.7
Incr Delay (d2), s/veh	157.2	1.4	1.3	198.2	0.4	0.4	6.1	0.0	1.5	4.2	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	3.4	3.5	3.6	1.4	1.4	1.4	0.0	0.7	2.5	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	180.3	14.2	14.1	221.6	11.6	11.5	27.6	0.0	21.6	23.2	0.0	18.6
LnGrp LOS	F	B	B	F	B	B	C	A	C	C	A	B
Approach Vol, veh/h		1023			520			187			371	
Approach Delay, s/veh		29.9			43.0			25.4			21.5	
Approach LOS		C			D			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	21.6		8.2	5.6	22.0		12.4				
Change Period (Y+Rc), s	3.0	3.0		3.0	3.0	3.0		3.0				
Max Green Setting (Gmax), s	14.0	45.0		22.0	13.0	46.0		27.0				
Max Q Clear Time (g_c+I1), s	4.1	6.7		5.0	3.6	12.7		8.2				
Green Ext Time (p_c), s	0.1	2.7		0.7	0.1	6.3		1.3				
Intersection Summary												
HCM 6th Ctrl Delay			31.3									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	535	740	548	469	0	0	0	0	493	0	140
Future Volume (veh/h)	0	535	740	548	469	0	0	0	0	493	0	140
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1767	1767	0				1767	0	1767
Adj Flow Rate, veh/h	0	582	600	596	510	0				536	0	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	9	9	0				9	0	9
Cap, veh/h	0	833	727	762	2506	0				609	0	273
Arrive On Green	0.00	0.48	0.48	0.39	1.00	0.00				0.19	0.00	0.18
Sat Flow, veh/h	0	1826	1515	3264	3445	0				3264	0	1497
Grp Volume(v), veh/h	0	582	600	596	510	0				536	0	7
Grp Sat Flow(s),veh/h/ln	0	1735	1515	1632	1678	0				1632	0	1497
Q Serve(g_s), s	0.0	31.5	41.0	19.2	0.0	0.0				19.2	0.0	0.5
Cycle Q Clear(g_c), s	0.0	31.5	41.0	19.2	0.0	0.0				19.2	0.0	0.5
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	833	727	762	2506	0				609	0	273
V/C Ratio(X)	0.00	0.70	0.82	0.78	0.20	0.00				0.88	0.00	0.03
Avail Cap(c_a), veh/h	0	833	727	762	2506	0				680	0	306
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.73	0.73	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	24.4	27.1	33.9	0.0	0.0				47.5	0.0	40.3
Incr Delay (d2), s/veh	0.0	4.8	10.3	5.9	0.1	0.0				11.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	13.4	16.1	6.9	0.0	0.0				8.6	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	29.3	37.4	39.8	0.1	0.0				59.4	0.0	40.3
LnGrp LOS	A	C	D	D	A	A				E	A	D
Approach Vol, veh/h		1182			1106						543	
Approach Delay, s/veh		33.4			21.5						59.1	
Approach LOS		C			C						E	

Timer - Assigned Phs		2		4	5	6						
Phs Duration (G+Y+Rc), s		93.6		26.4	32.0	61.6						
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5						
Max Green Setting (Gmax), s		86.5		24.5	27.5	54.5						
Max Q Clear Time (g_c+I1), s		2.0		21.2	21.2	43.0						
Green Ext Time (p_c), s		3.6		0.7	1.3	5.9						

Intersection Summary			
HCM 6th Ctrl Delay			33.7
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	938	0	0	807	463	210	0	639	0	0	0
Future Volume (veh/h)	90	938	0	0	807	463	210	0	639	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1796	1796	0	0	1767	1767	1781	0	1781			
Adj Flow Rate, veh/h	95	987	0	0	849	169	221	0	642			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	7	7	0	0	9	9	8	0	8			
Cap, veh/h	127	1653	0	0	1265	556	762	0	671			
Arrive On Green	0.15	0.97	0.00	0.00	0.38	0.37	0.45	0.00	0.44			
Sat Flow, veh/h	1711	3503	0	0	3445	1493	1697	0	1510			
Grp Volume(v), veh/h	95	987	0	0	849	169	221	0	642			
Grp Sat Flow(s),veh/h/ln	1711	1706	0	0	1678	1493	1697	0	1510			
Q Serve(g_s), s	6.4	2.6	0.0	0.0	25.3	9.6	9.9	0.0	49.3			
Cycle Q Clear(g_c), s	6.4	2.6	0.0	0.0	25.3	9.6	9.9	0.0	49.3			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	127	1653	0	0	1265	556	762	0	671			
V/C Ratio(X)	0.75	0.60	0.00	0.00	0.67	0.30	0.29	0.00	0.96			
Avail Cap(c_a), veh/h	150	1653	0	0	1265	556	834	0	736			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.44	0.44	0.00	0.00	0.89	0.89	1.00	0.00	1.00			
Uniform Delay (d), s/veh	50.0	1.0	0.0	0.0	31.2	26.6	21.0	0.0	32.2			
Incr Delay (d2), s/veh	7.4	0.7	0.0	0.0	2.5	1.3	0.2	0.0	22.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.8	0.6	0.0	0.0	10.3	3.5	3.9	0.0	21.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.4	1.7	0.0	0.0	33.7	27.9	21.2	0.0	54.3			
LnGrp LOS	E	A	A	A	C	C	C	A	D			
Approach Vol, veh/h		1082			1018			863				
Approach Delay, s/veh		6.6			32.8			45.8				
Approach LOS		A			C			D				

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	12.9	49.2		57.9		62.1						
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5						
Max Green Setting (Gmax), s	10.0	38.0		58.5		52.5						
Max Q Clear Time (g_c+I1), s	8.4	27.3		51.3		4.6						
Green Ext Time (p_c), s	0.0	4.5		2.1		8.3						

Intersection Summary			
HCM 6th Ctrl Delay			27.0
HCM 6th LOS			C

MOVEMENT SUMMARY

Site: 5 [9th St/Golden State Blvd at Nunes Rd - PM Peak]

Cumulative plus Project Trips Combined with Mitigations
PM Peak Hour
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Golden State Blvd											
1	L2	175	6.0	0.476	9.7	LOS A	2.5	18.6	0.41	0.29	48.0
2	T1	211	6.0	0.476	9.7	LOS A	2.5	18.6	0.41	0.29	49.1
3	R2	60	6.0	0.476	9.7	LOS A	2.5	18.6	0.41	0.29	49.0
Approach		446	6.0	0.476	9.7	LOS A	2.5	18.6	0.41	0.29	48.6
East: Nunes Rd											
4	L2	198	2.0	0.505	13.8	LOS B	2.6	18.5	0.67	0.72	45.6
5	T1	69	2.0	0.505	13.8	LOS B	2.6	18.5	0.67	0.72	46.5
6	R2	57	2.0	0.505	13.8	LOS B	2.6	18.5	0.67	0.72	46.5
Approach		324	2.0	0.505	13.8	LOS B	2.6	18.5	0.67	0.72	45.9
North: 9th St											
7	L2	46	2.0	0.502	10.9	LOS B	2.7	19.5	0.54	0.47	47.6
8	T1	362	2.0	0.502	10.9	LOS B	2.7	19.5	0.54	0.47	48.6
9	R2	23	2.0	0.502	10.9	LOS B	2.7	19.5	0.54	0.47	48.6
Approach		431	2.0	0.502	10.9	LOS B	2.7	19.5	0.54	0.47	48.5
West: Nunes Rd											
10	L2	11	10.0	0.259	7.7	LOS A	1.0	7.4	0.46	0.41	47.5
11	T1	34	10.0	0.259	7.7	LOS A	1.0	7.4	0.46	0.41	48.5
12	R2	152	10.0	0.259	7.7	LOS A	1.0	7.4	0.46	0.41	48.4
Approach		198	10.0	0.259	7.7	LOS A	1.0	7.4	0.46	0.41	48.4
All Vehicles		1399	4.4	0.505	10.7	LOS B	2.7	19.5	0.52	0.46	47.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	624	675	278	122	374	63	233	146	127	92	165	663
Future Volume (veh/h)	624	675	278	122	374	63	233	146	127	92	165	663
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1811	1811	1811	1841	1841	1841
Adj Flow Rate, veh/h	650	703	211	127	390	36	243	152	38	96	172	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	7	7	7	7	7	7	6	6	6	4	4	4
Cap, veh/h	688	2274	1026	154	1724	781	272	410	194	119	255	
Arrive On Green	0.35	1.00	1.00	0.05	0.51	0.51	0.08	0.12	0.13	0.03	0.07	0.00
Sat Flow, veh/h	3319	3413	1522	3319	3413	1521	3346	3441	1524	3401	3497	1560
Grp Volume(v), veh/h	650	703	211	127	390	36	243	152	38	96	172	0
Grp Sat Flow(s),veh/h/ln	1659	1706	1522	1659	1706	1521	1673	1721	1524	1700	1749	1560
Q Serve(g_s), s	22.8	0.0	0.0	4.6	7.7	1.4	8.6	4.9	2.7	3.4	5.8	0.0
Cycle Q Clear(g_c), s	22.8	0.0	0.0	4.6	7.7	1.4	8.6	4.9	2.7	3.4	5.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	688	2274	1026	154	1724	781	272	410	194	119	255	
V/C Ratio(X)	0.94	0.31	0.21	0.83	0.23	0.05	0.89	0.37	0.20	0.81	0.67	
Avail Cap(c_a), veh/h	774	2274	1026	249	1724	781	307	1090	495	198	991	
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.58	0.58	0.58	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.5	0.0	0.0	56.7	16.6	14.5	54.6	48.7	46.8	57.5	54.2	0.0
Incr Delay (d2), s/veh	12.8	0.2	0.3	11.3	0.3	0.1	24.8	0.6	0.5	12.1	3.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	0.1	0.1	2.1	3.0	0.5	4.5	2.1	1.0	1.6	2.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.3	0.2	0.3	68.0	16.9	14.7	79.4	49.3	47.3	69.6	57.3	0.0
LnGrp LOS	D	A	A	E	B	B	E	D	D	E	E	
Approach Vol, veh/h		1564			553			433			268	A
Approach Delay, s/veh		21.4			28.5			66.0			61.7	
Approach LOS		C			C			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.9	64.6	8.2	18.3	9.6	83.9	13.7	12.8
Change Period (Y+Rc), s	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Max Green Setting (Gmax), s	29.0	32.0	8.0	39.0	10.0	51.0	12.0	35.0
Max Q Clear Time (g_c+I1), s	24.8	9.7	5.4	6.9	6.6	2.0	10.6	7.8
Green Ext Time (p_c), s	1.1	2.5	0.1	1.0	0.1	6.1	0.1	1.0

Intersection Summary	
HCM 6th Ctrl Delay	33.5
HCM 6th LOS	C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	90	804	489	90	60	70
Future Vol, veh/h	90	804	489	90	60	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	Stop
Storage Length	95	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	8	1	1
Mvmt Flow	96	855	520	96	64	74

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	520	0	-	0	1567	520
Stage 1	-	-	-	-	520	-
Stage 2	-	-	-	-	1047	-
Critical Hdwy	4.18	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.272	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1016	-	-	0	123	558
Stage 1	-	-	-	0	599	-
Stage 2	-	-	-	0	339	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1016	-	-	-	111	558
Mov Cap-2 Maneuver	-	-	-	-	238	-
Stage 1	-	-	-	-	543	-
Stage 2	-	-	-	-	339	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	14.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1
Capacity (veh/h)	1016	-	-	516
HCM Lane V/C Ratio	0.094	-	-	0.268
HCM Control Delay (s)	8.9	-	-	14.5
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	1.1

Appendix C:
Peak Hour Signal Warrants

FEHR PEERS

			Project	Keyes Community Plan Area TIA
Major Street	Keyes Road		Scenario	Existing
Minor Street	SR 99 SB Off-ramp		Peak Hour	AM

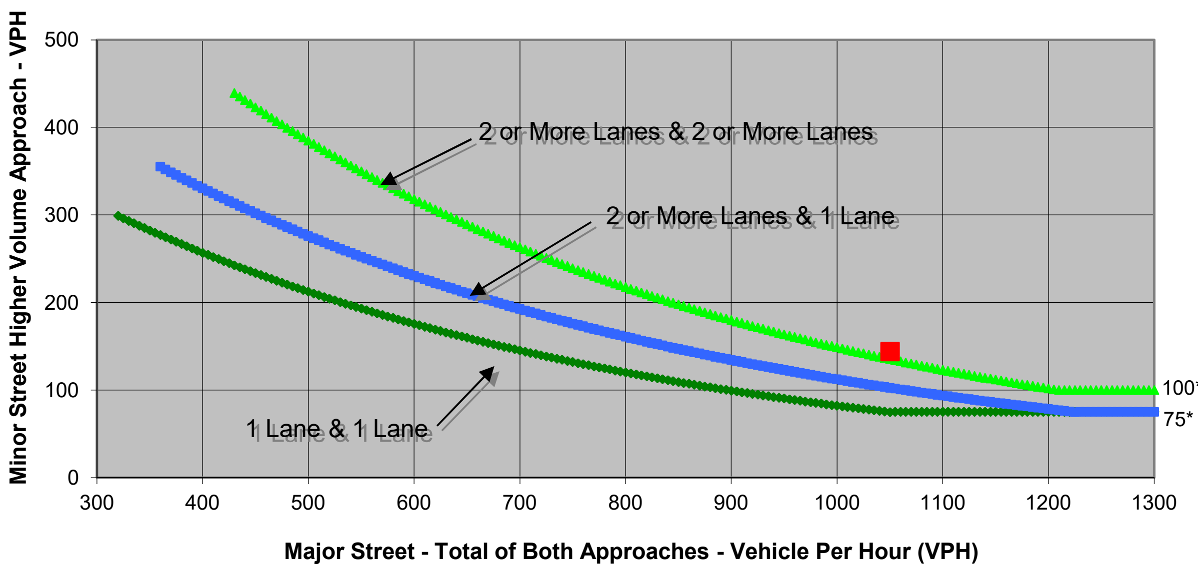
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	92	0	241
Through	0	0	188	428
Right	0	52	193	0
Total	0	144	381	669

Major Street Direction

	North/South
x	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR
ABOVE 40 MPH ON MAJOR STREET



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Keyes Road	Minor Street SR 99 SB Off-ramp	Warrant Met
Number of Approach Lanes	**1**	**1**	**YES**
Traffic Volume (VPH) *	**1,050**	**144**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

			Project	Keyes Community Plan Area TIA
Major Street	Keyes Road		Scenario	Existing
Minor Street	SR 99 SB Off-ramp		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	92	0	241
Through	0	0	188	428
Right	0	52	193	0
Total	0	144	381	669

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	102.1
Approach with Worst Case Delay	SB
Total Vehicles on Approach	144

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced (vph)
Existing	**4.1**	**144**	**1,194**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Met**	**Met**	**Met**
Warrant Met	**YES**		

FEHR PEERS

Major Street	Keyes Road	Project	Keyes Community Plan Area TIA
Minor Street	SR 99 SB Off-ramp	Scenario	Existing
		Peak Hour	PM

Turn Movement Volumes

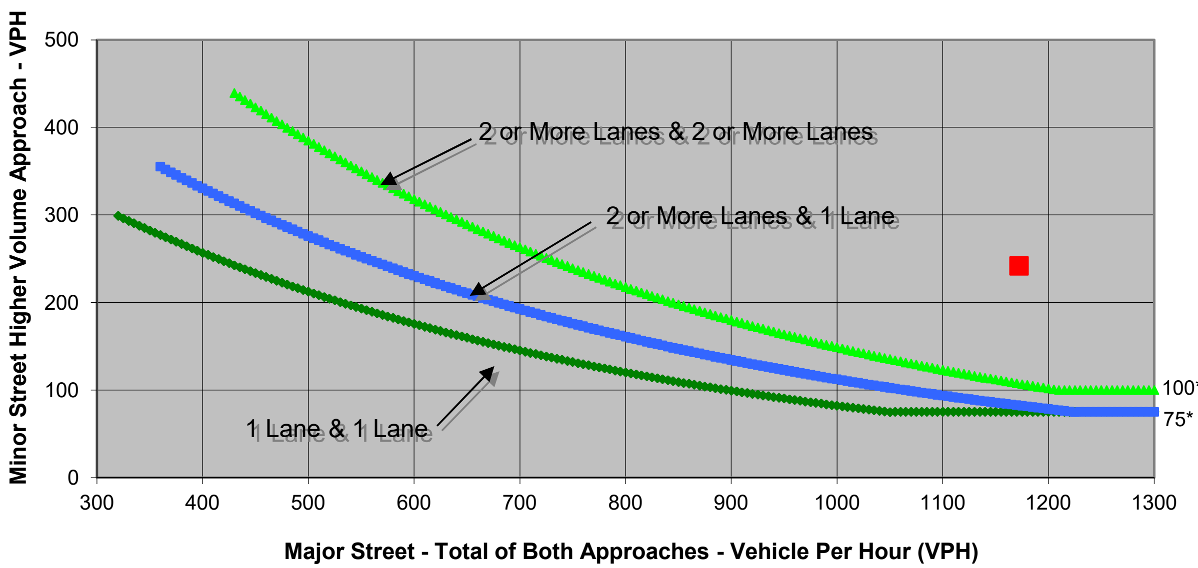
	NB	SB	EB	WB
Left	0	159	0	194
Through	0	2	297	256
Right	0	81	425	0
Total	0	242	722	450

Major Street Direction

	North/South
x	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR

ABOVE 40 MPH ON MAJOR STREET



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Keyes Road	SR 99 SB Off-ramp	
Number of Approach Lanes	**1**	**1**	**YES**
Traffic Volume (VPH) *	**1,172**	**242**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street	Keyes Road
Minor Street	SR 99 SB Off-ramp

Project	Keyes Community Plan Area TIA
Scenario	Existing
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	159	0	194
Through	0	2	297	256
Right	0	81	425	0
Total	0	242	722	450

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	259.1
Approach with Worst Case Delay	SB
Total Vehicles on Approach	242

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Existing	**17.4**	**242**	**1,414**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Met**	**Met**	**Met**
Warrant Met	**YES**		

Major Street	Keyes Road	Project	Keyes Community Plan Area TIA
Minor Street	SR 99 NB Off-ramp	Scenario	Existing
		Peak Hour	AM

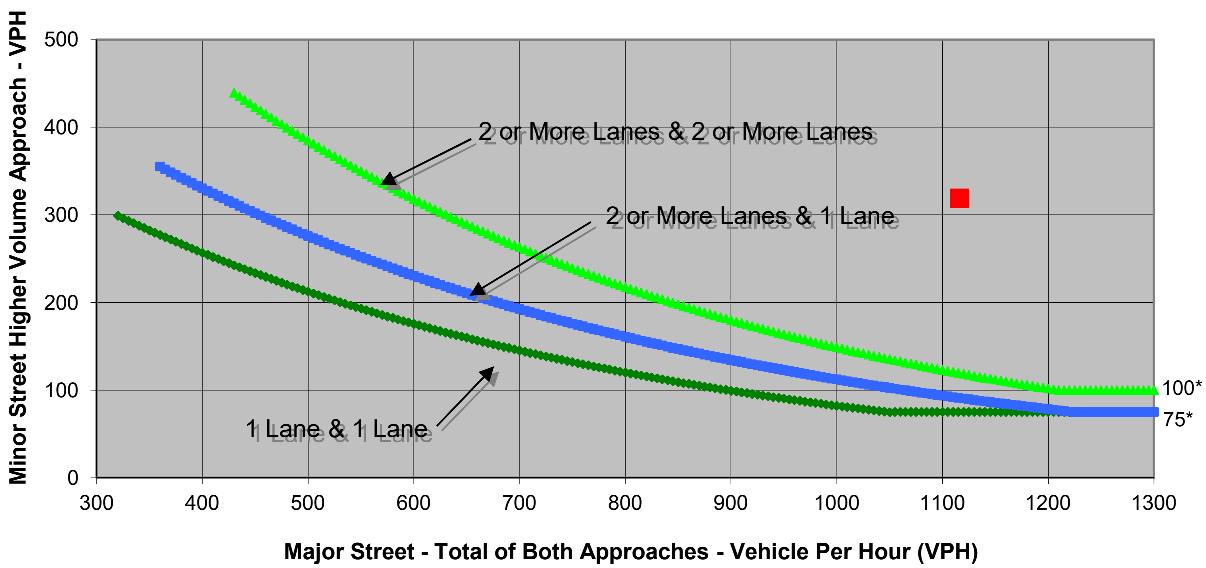
Turn Movement Volumes

	NB	SB	EB	WB
Left	148	0	52	0
Through	0	0	228	521
Right	171	0	0	315
Total	319	0	280	836

Major Street Direction

	North/South
x	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR
ABOVE 40 MPH ON MAJOR STREET



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Keyes Road	Minor Street SR 99 NB Off-ramp	Warrant Met
Number of Approach Lanes	**1**	**1**	**YES**
Traffic Volume (VPH) *	**1,116**	**319**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

Major Street	Keyes Road	Project	Keyes Community Plan Area TIA
Minor Street	SR 99 NB Off-ramp	Scenario	Existing
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	148	0	52	0
Through	0	0	228	521
Right	171	0	0	315
Total	319	0	280	836

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	70.4
Approach with Worst Case Delay	NB
Total Vehicles on Approach	319

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced (vph)
Existing	**6.2**	**319**	**1,435**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Met**	**Met**	**Met**
Warrant Met	**YES**		

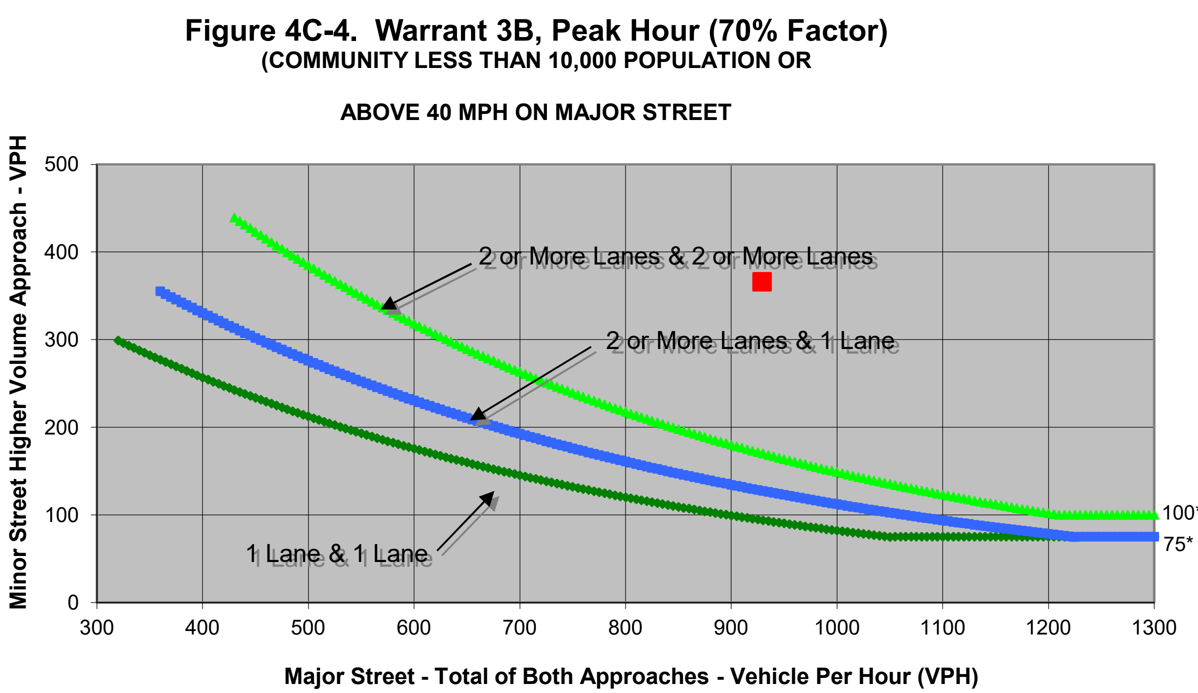
Major Street	Keyes Road		Project	Keyes Community Plan Area TIA
Minor Street	SR 99 NB Off-ramp		Scenario	Existing
			Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	119	0	49	0
Through	0	0	407	331
Right	247	0	0	142
Total	366	0	456	473

Major Street Direction

	North/South
x	East/West



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Keyes Road	Minor Street SR 99 NB Off-ramp	Warrant Met
Number of Approach Lanes	**1**	**1**	**YES**
Traffic Volume (VPH) *	**929**	**366**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

Project	Keyes Community Plan Area TIA
Major Street	Keyes Road
Minor Street	SR 99 NB Off-ramp
Scenario	Existing
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	119	0	49	0
Through	0	0	407	331
Right	247	0	0	142
Total	366	0	456	473

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	52.2
Approach with Worst Case Delay	NB
Total Vehicles on Approach	366

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced (vph)
Existing	**5.3**	**366**	**1,295**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Met**	**Met**	**Met**
Warrant Met	**YES**		

Major Street	Golden State Blvd	Project	Keyes Community Plan Area TIA
Minor Street	NRTP (South) Driveway	Scenario	EX with Nunes Rd. Travel Plaza
		Peak Hour	AM

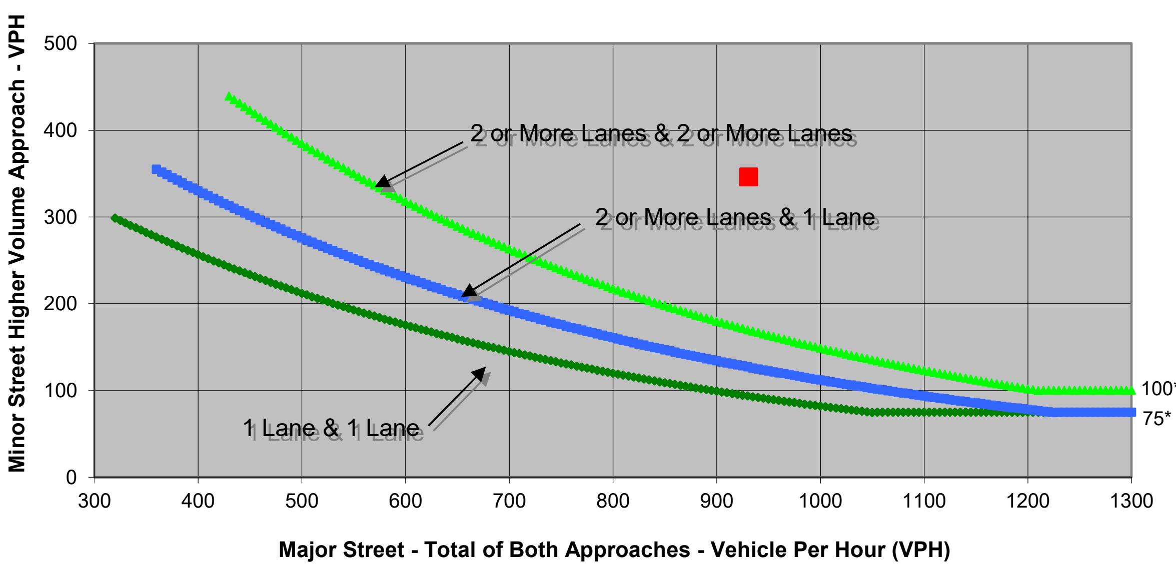
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	0	320
Through	225	360	0	0
Right	320	26	0	26
Total	545	386	0	346

Major Street Direction

x	North/South
	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Golden State Blvd	**Minor Street** NRTP (South) Driveway	**Warrant Met**
Number of Approach Lanes	**1**	**1**	**YES**
Traffic Volume (VPH) *	**931**	**346**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	Golden State Blvd	Project	Keyes Community Plan Area TIA
Minor Street	NRTP (South) Driveway	Scenario	EX with Nunes Rd. Travel Plaza
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	0	320
Through	225	360	0	0
Right	320	26	0	26
Total	545	386	0	346

Major Street Direction

x	North/South
	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	136.6
Approach with Worst Case Delay	WB
Total Vehicles on Approach	346

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
EX with Nunes Rd. Travel Plaza	**13.1**	**346**	**1,277**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Met**	**Met**	**Met**
Warrant Met	**YES**		

Major Street	Keyes Road	Project	Keyes Community Plan Area TIA
Minor Street	Foote Road	Scenario	EX with Project Trips Combined
		Peak Hour	AM

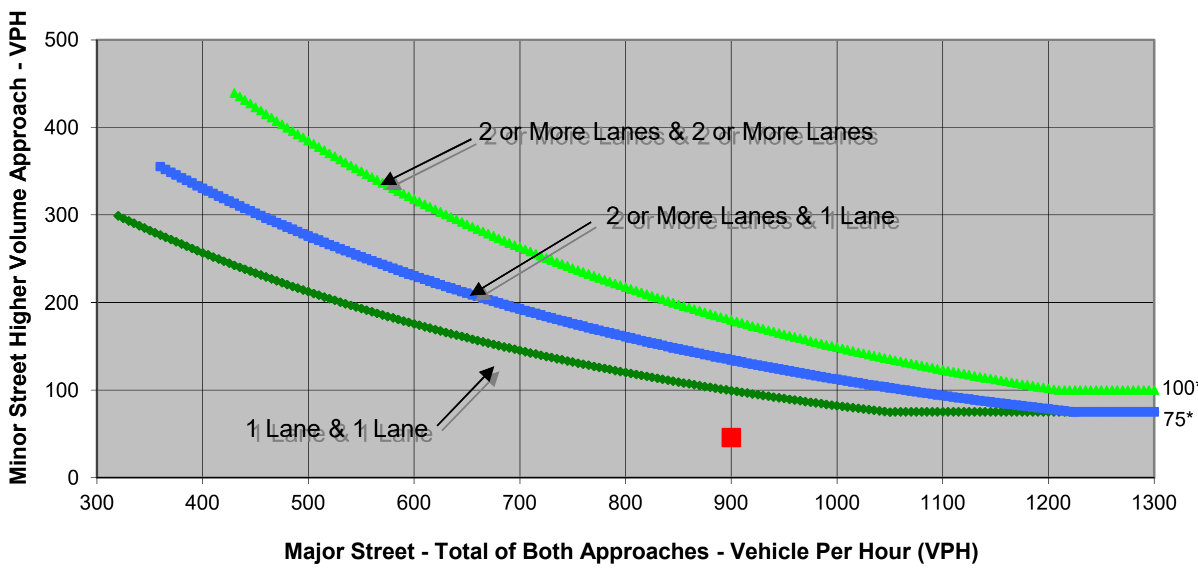
Turn Movement Volumes

	NB	SB	EB	WB
Left	26	2	0	20
Through	0	1	388	484
Right	20	0	6	2
Total	46	3	394	506

Major Street Direction

	North/South
x	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR
ABOVE 40 MPH ON MAJOR STREET



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Keyes Road	Minor Street Foote Road	Warrant Met
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**900**	**46**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Major Street	Keyes Road	Project	Keyes Community Plan Area TIA
Minor Street	Foote Road	Scenario	EX with Project Trips Combined
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	26	2	0	20
Through	0	1	388	484
Right	20	0	6	2
Total	46	3	394	506

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	29.1
Approach with Worst Case Delay	SB
Total Vehicles on Approach	3

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced (vph)
EX with Project Trips Combined	**0**	**46**	**949**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Not Met**	**Not Met**	**Met**
Warrant Met	**NO**		

Major Street	Keyes Road		Project	Keyes Community Plan Area TIA
Minor Street	Foote Road		Scenario	EX with Project Trips Combined
			Peak Hour	PM

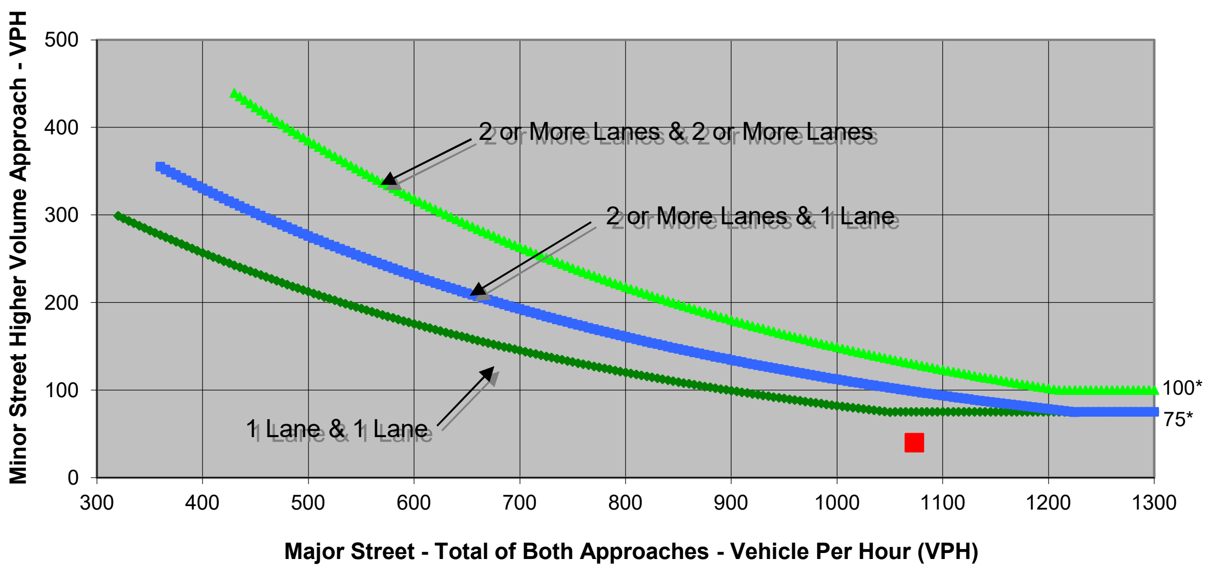
Turn Movement Volumes

	NB	SB	EB	WB
Left	11	9	1	43
Through	0	0	699	303
Right	29	2	17	10
Total	40	11	717	356

Major Street Direction

	North/South
x	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR
ABOVE 40 MPH ON MAJOR STREET



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Keyes Road	Minor Street Foote Road	Warrant Met
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**1,073**	**40**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

Project	Keyes Community Plan Area TIA
Major Street	Keyes Road
Minor Street	Foote Road
Scenario	EX with Project Trips Combined
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	11	9	1	43
Through	0	0	699	303
Right	29	2	17	10
Total	40	11	717	356

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	27.9
Approach with Worst Case Delay	SB
Total Vehicles on Approach	11

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced (vph)
EX with Project Trips Combined	**0.1**	**40**	**1,124**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Not Met**	**Not Met**	**Met**
Warrant Met	**NO**		

FEHR PEERS

		Project	Keyes Community Plan Area TIA
Major Street	Golden State Blvd	Scenario	EX with Project Trips Combined
Minor Street	KI (South) Driveway	Peak Hour	AM

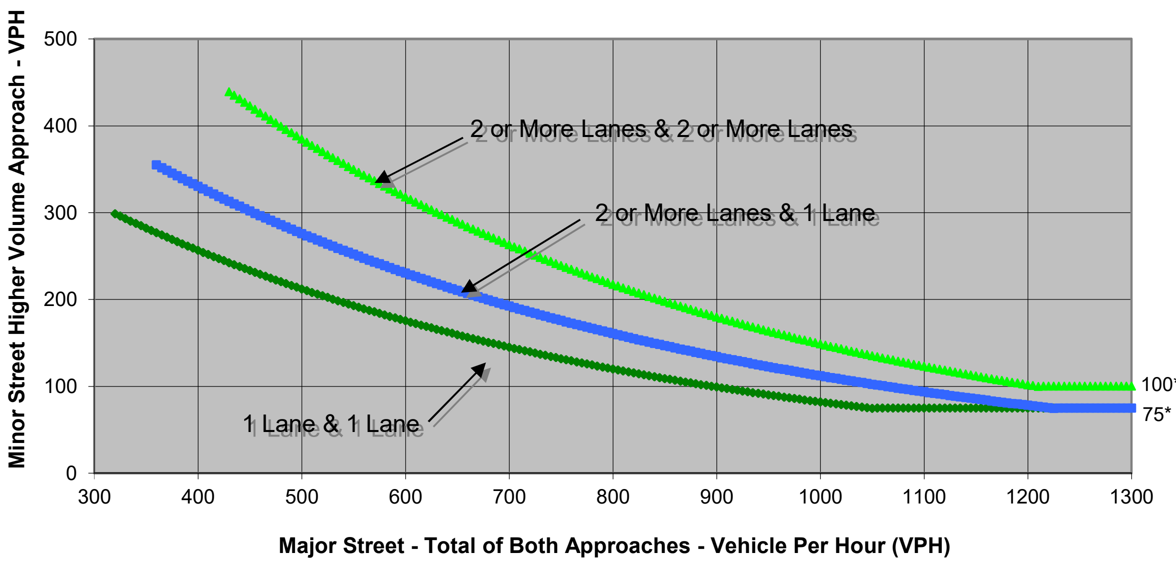
Turn Movement Volumes

	NB	SB	EB	WB
Left	265	0	21	0
Through	556	695	0	0
Right	0	21	252	0
Total	821	716	273	0

Major Street Direction

x	North/South
	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR
ABOVE 40 MPH ON MAJOR STREET



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Golden State Blvd	Minor Street KI (South) Driveway	Warrant Met
Number of Approach Lanes	**1**	**1**	**YES**
Traffic Volume (VPH) *	**1,537**	**273**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	Golden State Blvd		Project	Keyes Community Plan Area TIA
Minor Street	KI (South) Driveway		Scenario	EX with Project Trips Combined
			Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	265	0	21	0
Through	556	695	0	0
Right	0	21	252	0
Total	821	716	273	0

Major Street Direction

x	North/South
	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	229
Approach with Worst Case Delay	EB
Total Vehicles on Approach	273

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced (vph)
EX with Project Trips Combined	**17.4**	**273**	**1,810**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Met**	**Met**	**Met**
Warrant Met		**YES**	

FEHR & PEERS

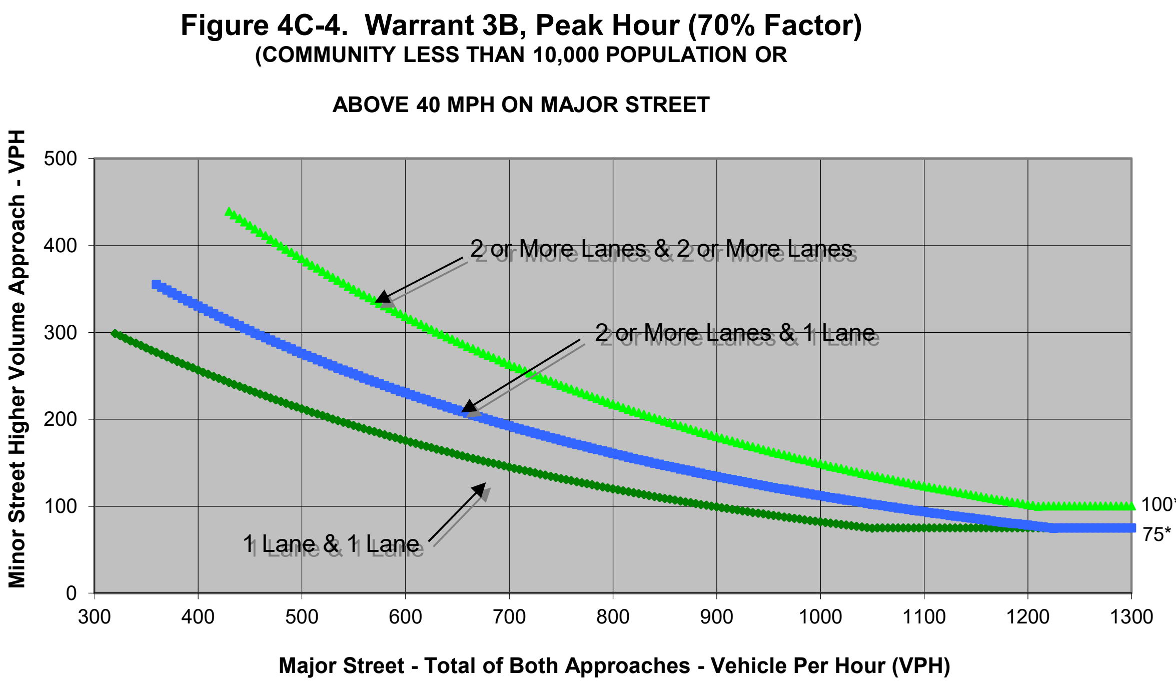
Major Street	Keyes Road	Project	Keyes Community Plan Area TIA
Minor Street	Foote Road	Scenario	CU with Project Trips Combined
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	50	10	0	40
Through	0	10	649	816
Right	40	0	10	10
Total	90	20	659	866

Major Street Direction

	North/South
x	East/West



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Keyes Road	Minor Street Foote Road	Warrant Met
Number of Approach Lanes	**1**	**1**	**YES**
Traffic Volume (VPH) *	**1,525**	**90**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

Major Street	Keyes Road	Project	Keyes Community Plan Area TIA
Minor Street	Foote Road	Scenario	CU with Project Trips Combined
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	50	10	0	40
Through	0	10	649	816
Right	40	0	10	10
Total	90	20	659	866

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	290.7
Approach with Worst Case Delay	NB
Total Vehicles on Approach	90

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced (vph)
CU with Project Trips Combined	**7.3**	**90**	**1,635**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Met**	**Not Met**	**Met**
Warrant Met	**NO**		

FEHR PEERS

		Project	Keyes Community Plan Area TIA
Major Street	Keyes Road	Scenario	CU with Project Trips Combined
Minor Street	Foote Road	Peak Hour	PM

Turn Movement Volumes

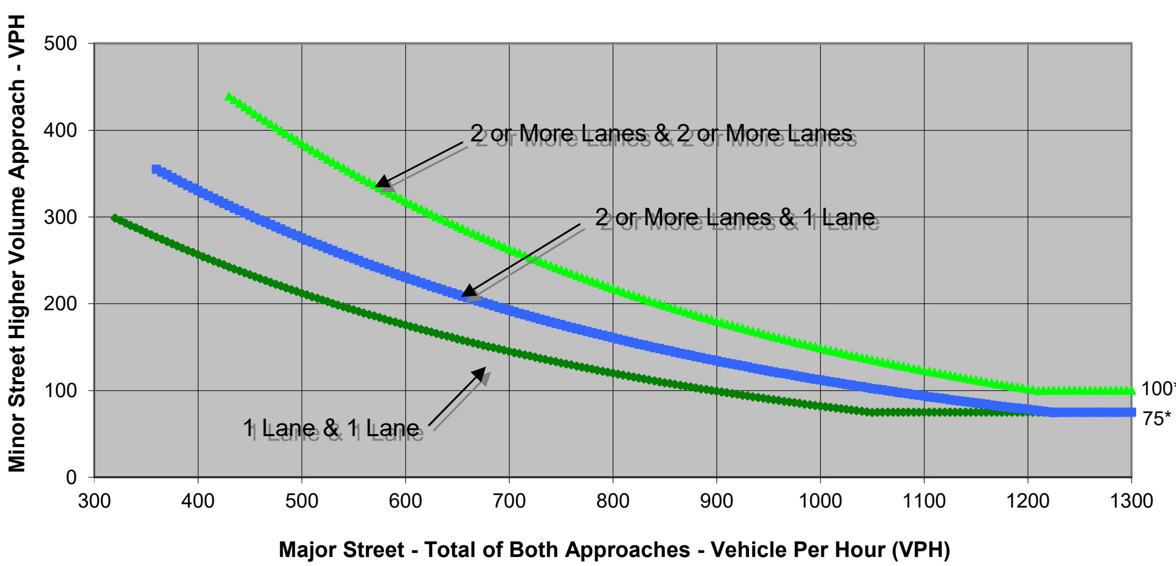
	NB	SB	EB	WB
Left	20	20	10	80
Through	0	0	1,205	509
Right	50	10	30	20
Total	70	30	1,245	609

Major Street Direction

	North/South
x	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR

ABOVE 40 MPH ON MAJOR STREET



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Keyes Road	**Minor Street** Foote Road	**Warrant Met**
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**1,854**	**70**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

Major Street	Keyes Road		Project	Keyes Community Plan Area TIA
Minor Street	Foote Road		Scenario	CU with Project Trips Combined
			Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	20	20	10	80
Through	0	0	1,205	509
Right	50	10	30	20
Total	70	30	1,245	609

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	349
Approach with Worst Case Delay	SB
Total Vehicles on Approach	30

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced (vph)
CU with Project Trips Combined	**2.9**	**70**	**1,954**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Not Met**	**Not Met**	**Met**
Warrant Met	**NO**		

FEHR PEERS

		Project	Keyes Community Plan Area TIA
Major Street	Golden State Blvd	Scenario	CU with Project Trips Combined
Minor Street	Nunes Road	Peak Hour	AM

Turn Movement Volumes

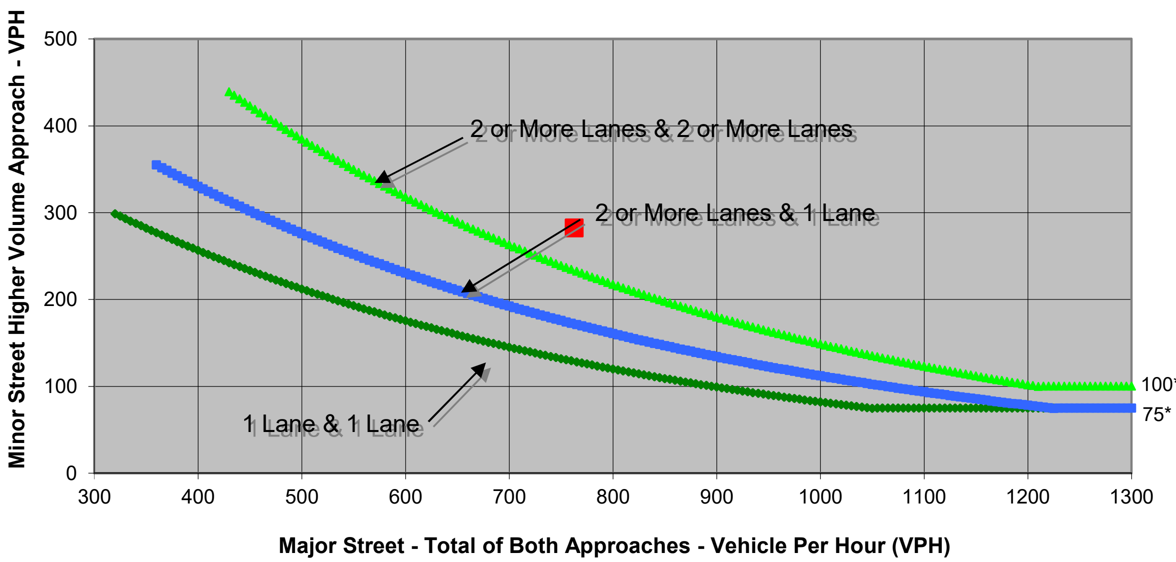
	NB	SB	EB	WB
Left	152	40	10	172
Through	184	315	30	60
Right	52	20	132	50
Total	388	375	172	282

Major Street Direction

x	North/South
	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR

ABOVE 40 MPH ON MAJOR STREET



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Golden State Blvd	Minor Street Nunes Road	Warrant Met
Number of Approach Lanes	**1**	**1**	**YES**
Traffic Volume (VPH) *	**763**	**282**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

Project	Keyes Community Plan Area TIA
Scenario	CU with Project Trips Combined
Peak Hour	AM

Major Street	Golden State Blvd
Minor Street	Nunes Road

Turn Movement Volumes

	NB	SB	EB	WB
Left	152	40	10	172
Through	184	315	30	60
Right	52	20	132	50
Total	388	375	172	282

Major Street Direction

x	North/South
	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	29
Approach with Worst Case Delay	WB
Total Vehicles on Approach	282

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
CU with Project Trips Combined	**2.3**	**282**	**1,217**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Not Met**	**Met**	**Met**
Warrant Met	**NO**		

Major Street	Keyes Road		Project	Keyes Community Plan Area TIA
			Scenario	CU with Project Trips Combined
Minor Street	Nunes Road		Peak Hour	AM

Turn Movement Volumes

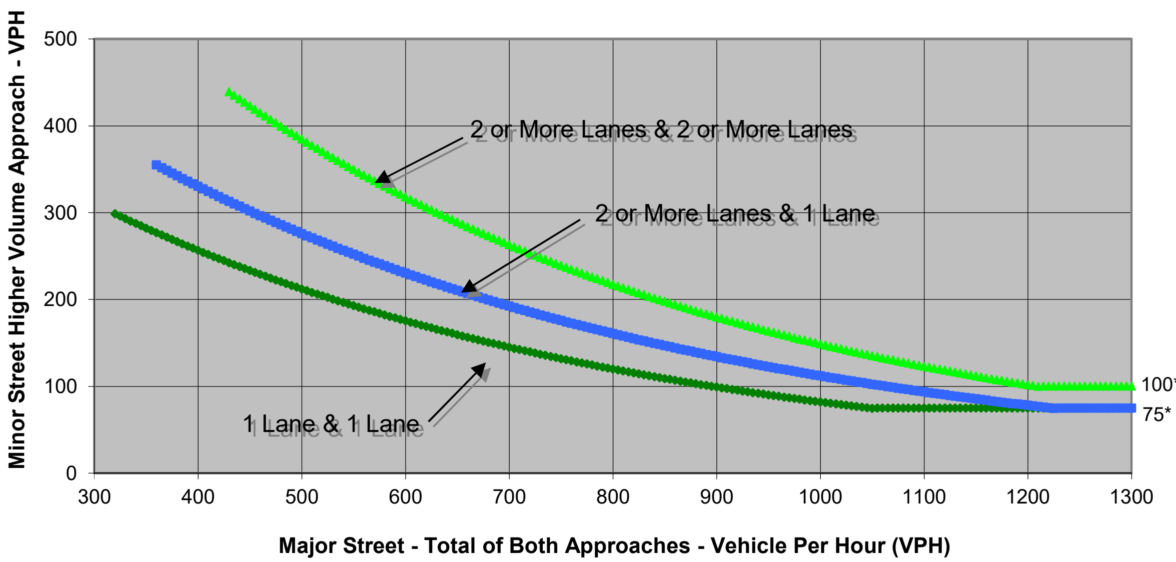
	NB	SB	EB	WB
Left	0	70	80	0
Through	0	0	513	805
Right	0	50	0	110
Total	0	120	593	915

Major Street Direction

	North/South
x	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR

ABOVE 40 MPH ON MAJOR STREET



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Keyes Road	Minor Street Nunes Road	Warrant Met
Number of Approach Lanes	**1**	**1**	**YES**
Traffic Volume (VPH) *	**1,508**	**120**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

Project	Keyes Community Plan Area TIA
Scenario	CU with Project Trips Combined
Peak Hour	AM

Major Street	Keyes Road
Minor Street	Nunes Road

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	70	80	0
Through	0	0	513	805
Right	0	50	0	110
Total	0	120	593	915

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	51.5
Approach with Worst Case Delay	SB
Total Vehicles on Approach	120

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced (vph)
CU with Project Trips Combined	**1.7**	**120**	**1,628**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Not Met**	**Met**	**Met**
Warrant Met	**NO**		

FEHR PEERS

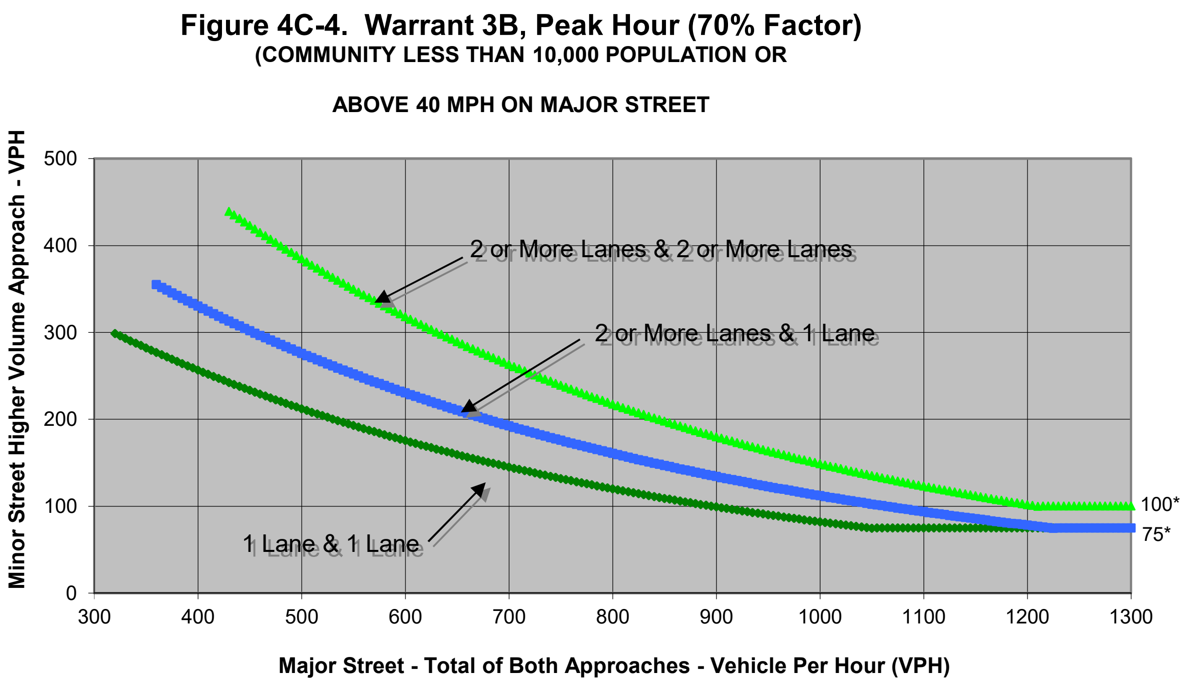
		Project	Keyes Community Plan Area TIA
Major Street	Keyes Road	Scenario	CU with Project Trips Combined
Minor Street	Nunes Road	Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	60	90	0
Through	0	0	804	489
Right	0	70	0	90
Total	0	130	894	579

Major Street Direction

	North/South
x	East/West



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Keyes Road	**Minor Street** Nunes Road	**Warrant Met**
Number of Approach Lanes	**1**	**1**	**YES**
Traffic Volume (VPH) *	**1,473**	**130**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

Major Street	Keyes Road		Project	Keyes Community Plan Area TIA
Minor Street	Nunes Road		Scenario	CU with Project Trips Combined
			Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	60	90	0
Through	0	0	804	489
Right	0	70	0	90
Total	0	130	894	579

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	38.3
Approach with Worst Case Delay	SB
Total Vehicles on Approach	130

Warrant 3A, Peak Hour

	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Serviced (vph)
CU with Project Trips Combined	**1.4**	**130**	**1,603**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Not Met**	**Met**	**Met**
Warrant Met	**NO**		

Major Street	Golden State Blvd		Project	Keyes Community Plan Area TIA
Minor Street	KI (Middle)/NRTP (North) Driveways		Scenario	CU with Project Trips Combined
			Peak Hour	AM

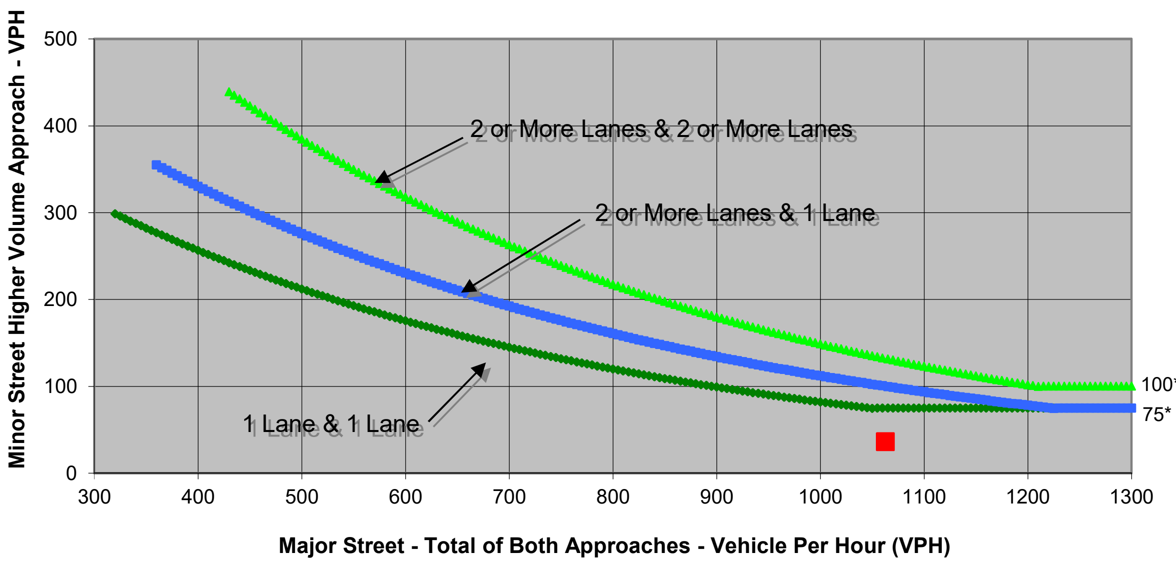
Turn Movement Volumes

	NB	SB	EB	WB
Left	0	2	1	34
Through	414	613	0	0
Right	34	0	35	2
Total	448	615	36	36

Major Street Direction

x	North/South
	East/West

Figure 4C-4. Warrant 3B, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR
ABOVE 40 MPH ON MAJOR STREET



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

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street Golden State Blvd	Minor Street KI (Middle)/NRTP (North) Driveways	Warrant Met
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**1,063**	**36**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	Golden State Blvd	Project	Keyes Community Plan Area TIA
Minor Street	KI (Middle)/NRTP (North) Driveways	Scenario	CU with Project Trips Combined
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	2	1	34
Through	414	613	0	0
Right	34	0	35	2
Total	448	615	36	36

Major Street Direction

x	North/South
	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	33.5
Approach with Worst Case Delay	WB
Total Vehicles on Approach	36

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
CU with Project Trips Combined	**0.3**	**36**	**1,135**
Limiting Value	**4**	**100**	**800**
Condition Satisfied?	**Not Met**	**Not Met**	**Met**
Warrant Met	**NO**		

Appendix D:
Freeway Mainline & Ramp Junction Operation Worksheets

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing)
Project Description	Northbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	175
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	4952	319
Peak Hour Factor (PHF)	0.87	0.84
Total Trucks, %	8.00	18.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.847
Flow Rate (v_i),pc/h	6147	448
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.85	0.22

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3130	Speed Index (D_S)	0.468
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2359
Distance to Downstream Ramp (L_{DOWN}), ft	2780	Off-Ramp Influence Area Speed (S_R), mi/h	56.9
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.586	Outer Lanes Freeway Speed (S_O), mi/h	71.5
Flow in Lanes 1 and 2 (v_{12}), pc/h	3788	Ramp Junction Speed (S), mi/h	61.7
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	33.2
Level of Service (LOS)	E	Density in Ramp Influence Area (D_R), pc/mi/ln	35.3

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Existing)
Project Description	Northbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	175
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	4825	366
Peak Hour Factor (PHF)	0.98	0.93
Total Trucks, %	7.00	7.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.935	0.935
Flow Rate (v_i),pc/h	5266	421
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.73	0.21

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3130	Speed Index (D_S)	0.466
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1894
Distance to Downstream Ramp (L_{DOWN}), ft	2780	Off-Ramp Influence Area Speed (S_R), mi/h	57.0
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.609	Outer Lanes Freeway Speed (S_O), mi/h	73.3
Flow in Lanes 1 and 2 (v_{12}), pc/h	3372	Ramp Junction Speed (S), mi/h	62.0
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	28.3
Level of Service (LOS)	D	Density in Ramp Influence Area (D_R), pc/mi/ln	31.7

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing)
Project Description	Northbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	4633	Heavy Vehicle Adjustment Factor (f_{HV})	0.926
Peak Hour Factor	0.87	Flow Rate (V_p), pc/h/ln	1917
Total Trucks, %	8.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.81
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	62.8
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	30.5
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing)
Project Description	Northbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	4459	Heavy Vehicle Adjustment Factor (f_{HV})	0.935
Peak Hour Factor	0.98	Flow Rate (V_p), pc/h/ln	1622
Total Trucks, %	7.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.68
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	66.3
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	24.5
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing)
Project Description	Northbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	4633	367
Peak Hour Factor (PHF)	0.87	0.83
Total Trucks, %	8.00	10.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.909
Flow Rate (v_i),pc/h	5751	486
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.87	0.24

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	1073.7	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	2780	Speed Index (M_S)	0.468
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2318
Distance to Downstream Ramp (L_{DOWN}), ft	11400	On-Ramp Influence Area Speed (S_R), mi/h	56.9
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	63.4
Flow in Lanes 1 and 2 (v_{12}), pc/h	3433	Ramp Junction Speed (S), mi/h	59.2
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	3919	Average Density (D), pc/mi/ln	35.1
Level of Service (LOS)	D	Density in Ramp Influence Area (D_R), pc/mi/ln	31.5

HCS7 Freeway Merge Report

Project Information			
Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Existing)
Project Description	Northbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (V_i)	4459	191
Peak Hour Factor (PHF)	0.98	0.88
Total Trucks, %	7.00	10.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.935	0.909
Flow Rate (v_i),pc/h	4866	239
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.71	0.12

Speed and Density			
Upstream Equilibrium Distance (L_{EQ}), ft	831.5	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	2780	Speed Index (M_S)	0.362
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	1961
Distance to Downstream Ramp (L_{DOWN}), ft	11400	On-Ramp Influence Area Speed (S_R), mi/h	59.9
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	64.7
Flow in Lanes 1 and 2 (v_{12}), pc/h	2905	Ramp Junction Speed (S), mi/h	61.7
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	3144	Average Density (D), pc/mi/ln	27.6
Level of Service (LOS)	C	Density in Ramp Influence Area (D_R), pc/mi/ln	25.6

HCS7 Freeway Diverge Report

Project Information			
Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing)
Project Description	Southbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	225
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (V_i)	3840	144
Peak Hour Factor (PHF)	0.82	0.88
Total Trucks, %	11.00	22.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.901	0.820
Flow Rate (v_i),pc/h	5197	200
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.72	0.10

Speed and Density			
Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	10800	Speed Index (D_S)	0.446
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1894
Distance to Downstream Ramp (L_{DOWN}), ft	3480	Off-Ramp Influence Area Speed (S_R), mi/h	57.5
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.621	Outer Lanes Freeway Speed (S_O), mi/h	73.3
Flow in Lanes 1 and 2 (v_{12}), pc/h	3303	Ramp Junction Speed (S), mi/h	62.4
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	27.8
Level of Service (LOS)	D	Density in Ramp Influence Area (D_R), pc/mi/ln	30.6

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Existing)
Project Description	Southbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	225
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

	Freeway	Ramp
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

	Freeway	Ramp
Demand Volume (V_i)	5030	242
Peak Hour Factor (PHF)	0.78	0.92
Total Trucks, %	8.00	9.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.917
Flow Rate (v_i),pc/h	6964	287
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.97	0.14

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	10800	Speed Index (D_S)	0.454
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	3480	Off-Ramp Influence Area Speed (S_R), mi/h	57.3
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.573	Outer Lanes Freeway Speed (S_O), mi/h	70.2
Flow in Lanes 1 and 2 (v_{12}), pc/h	4264	Ramp Junction Speed (S), mi/h	61.7
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	37.6
Level of Service (LOS)	E	Density in Ramp Influence Area (D_R), pc/mi/ln	38.9

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing)
Project Description	Southbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	3696	Heavy Vehicle Adjustment Factor (f_{HV})	0.901
Peak Hour Factor	0.82	Flow Rate (V_p), pc/h/ln	1668
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.70
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	65.9
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	25.3
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Existing)
Project Description	Southbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	4788	Heavy Vehicle Adjustment Factor (f_{HV})	0.926
Peak Hour Factor	0.78	Flow Rate (V_p), pc/h/ln	2210
Total Trucks, %	8.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.93
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	57.0
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	38.8
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing)
Project Description	Southbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1150	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	3696	434
Peak Hour Factor (PHF)	0.82	0.94
Total Trucks, %	11.00	17.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.901	0.855
Flow Rate (v_i),pc/h	5003	540
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.77	0.27

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	925.2	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3480	Speed Index (M_S)	0.405
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2016
Distance to Downstream Ramp (L_{DOWN}), ft	2650	On-Ramp Influence Area Speed (S_R), mi/h	58.7
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	64.5
Flow in Lanes 1 and 2 (v_{12}), pc/h	2987	Ramp Junction Speed (S), mi/h	60.7
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	3527	Average Density (D), pc/mi/ln	30.4
Level of Service (LOS)	D	Density in Ramp Influence Area (D_R), pc/mi/ln	28.4

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Existing)
Project Description	Southbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1150	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	4788	619
Peak Hour Factor (PHF)	0.78	0.93
Total Trucks, %	8.00	5.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.952
Flow Rate (v_i),pc/h	6629	699
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.02	0.35

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	1307.2	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3480	Speed Index (M_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2671
Distance to Downstream Ramp (L_{DOWN}), ft	2650	On-Ramp Influence Area Speed (S_R), mi/h	50.9
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	3958	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	4657	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	37.2

HCS7 Freeway Diverge Report

Project Information			
Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing with Project Trips Combined)
Project Description	Northbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	175
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (V_i)	4997	517
Peak Hour Factor (PHF)	0.87	0.84
Total Trucks, %	8.00	18.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.847
Flow Rate (v_i),pc/h	6203	727
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.86	0.36

Speed and Density			
Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3130	Speed Index (D_S)	0.493
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2349
Distance to Downstream Ramp (L_{DOWN}), ft	2780	Off-Ramp Influence Area Speed (S_R), mi/h	56.2
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.571	Outer Lanes Freeway Speed (S_O), mi/h	71.5
Flow in Lanes 1 and 2 (v_{12}), pc/h	3854	Ramp Junction Speed (S), mi/h	61.2
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	33.8
Level of Service (LOS)	E	Density in Ramp Influence Area (D_R), pc/mi/ln	35.8

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Existing with Project Trips Combined)
Project Description	Northbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	175
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	4851	575
Peak Hour Factor (PHF)	0.98	0.93
Total Trucks, %	7.00	7.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.935	0.935
Flow Rate (v_i),pc/h	5294	661
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.74	0.33

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3130	Speed Index (D_S)	0.487
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1867
Distance to Downstream Ramp (L_{DOWN}), ft	2780	Off-Ramp Influence Area Speed (S_R), mi/h	56.4
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	73.4
Flow in Lanes 1 and 2 (v_{12}), pc/h	3427	Ramp Junction Speed (S), mi/h	61.4
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	28.7
Level of Service (LOS)	D	Density in Ramp Influence Area (D_R), pc/mi/ln	32.1

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing with Project Trips Combined)
Project Description	Northbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	4480	Heavy Vehicle Adjustment Factor (f_{HV})	0.926
Peak Hour Factor	0.87	Flow Rate (V_p), pc/h/ln	1854
Total Trucks, %	8.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.78
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	63.7
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	29.1
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing with Project Trips Combined)
Project Description	Northbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	4276	Heavy Vehicle Adjustment Factor (f_{HV})	0.935
Peak Hour Factor	0.98	Flow Rate (V_p), pc/h/ln	1556
Total Trucks, %	7.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.65
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	66.8
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	23.3
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing with Project Trips Combined)
Project Description	Northbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	4480	565
Peak Hour Factor (PHF)	0.87	0.83
Total Trucks, %	8.00	10.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.909
Flow Rate (v_i),pc/h	5561	749
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.88	0.37

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	1089.3	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	2780	Speed Index (M_S)	0.500
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2241
Distance to Downstream Ramp (L_{DOWN}), ft	11400	On-Ramp Influence Area Speed (S_R), mi/h	56.0
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	63.7
Flow in Lanes 1 and 2 (v_{12}), pc/h	3320	Ramp Junction Speed (S), mi/h	58.5
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	4069	Average Density (D), pc/mi/ln	36.0
Level of Service (LOS)	D	Density in Ramp Influence Area (D_R), pc/mi/ln	32.6

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing with Project Trips Combined)
Project Description	Northbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	4480	565
Peak Hour Factor (PHF)	0.87	0.83
Total Trucks, %	8.00	10.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.909
Flow Rate (v_i),pc/h	5561	749
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.88	0.37

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	1089.3	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	2780	Speed Index (M_S)	0.500
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2241
Distance to Downstream Ramp (L_{DOWN}), ft	11400	On-Ramp Influence Area Speed (S_R), mi/h	56.0
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	63.7
Flow in Lanes 1 and 2 (v_{12}), pc/h	3320	Ramp Junction Speed (S), mi/h	58.5
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	4069	Average Density (D), pc/mi/ln	36.0
Level of Service (LOS)	D	Density in Ramp Influence Area (D_R), pc/mi/ln	32.6

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing with Project Trips Combined)
Project Description	Southbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	225
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	3893	350
Peak Hour Factor (PHF)	0.82	0.88
Total Trucks, %	11.00	22.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.901	0.820
Flow Rate (v_i),pc/h	5269	485
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.73	0.24

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	10800	Speed Index (D_S)	0.472
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1885
Distance to Downstream Ramp (L_{DOWN}), ft	3480	Off-Ramp Influence Area Speed (S_R), mi/h	56.8
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.606	Outer Lanes Freeway Speed (S_O), mi/h	73.3
Flow in Lanes 1 and 2 (v_{12}), pc/h	3384	Ramp Junction Speed (S), mi/h	61.8
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	28.4
Level of Service (LOS)	D	Density in Ramp Influence Area (D_R), pc/mi/ln	31.3

HCS7 Freeway Diverge Report

Project Information			
Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Existing with Project Trips Combined)
Project Description	Southbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	225
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (V_i)	5060	455
Peak Hour Factor (PHF)	0.78	0.92
Total Trucks, %	8.00	9.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.917
Flow Rate (v_i),pc/h	7006	539
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.97	0.27

Speed and Density			
Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	10800	Speed Index (D_S)	0.477
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	3480	Off-Ramp Influence Area Speed (S_R), mi/h	56.6
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.560	Outer Lanes Freeway Speed (S_O), mi/h	70.2
Flow in Lanes 1 and 2 (v_{12}), pc/h	4306	Ramp Junction Speed (S), mi/h	61.2
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	38.2
Level of Service (LOS)	E	Density in Ramp Influence Area (D_R), pc/mi/ln	39.3

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing with Project Trips Combined)
Project Description	Southbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	3543	Heavy Vehicle Adjustment Factor (f_{HV})	0.901
Peak Hour Factor	0.82	Flow Rate (V_p), pc/h/ln	1598
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.67
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	66.5
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	24.0
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Existing with Project Trips Combined)
Project Description	Southbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	4605	Heavy Vehicle Adjustment Factor (f_{HV})	0.926
Peak Hour Factor	0.78	Flow Rate (V_p), pc/h/ln	2125
Total Trucks, %	8.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.89
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	58.9
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	36.1
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Existing with Project Trips Combined)
Project Description	Southbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1150	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	3543	624
Peak Hour Factor (PHF)	0.82	0.94
Total Trucks, %	11.00	17.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.901	0.855
Flow Rate (v_i),pc/h	4795	776
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.77	0.39

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	931.2	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3480	Speed Index (M_S)	0.420
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	1932
Distance to Downstream Ramp (L_{DOWN}), ft	2650	On-Ramp Influence Area Speed (S_R), mi/h	58.2
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	64.8
Flow in Lanes 1 and 2 (v_{12}), pc/h	2863	Ramp Junction Speed (S), mi/h	60.3
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	3639	Average Density (D), pc/mi/ln	30.8
Level of Service (LOS)	D	Density in Ramp Influence Area (D_R), pc/mi/ln	29.2

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Existing with Project Trips Combined)
Project Description	Southbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1150	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	4605	827
Peak Hour Factor (PHF)	0.78	0.93
Total Trucks, %	8.00	5.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.952
Flow Rate (v_i),pc/h	6376	934
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.02	0.47

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	1303.3	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3480	Speed Index (M_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2570
Distance to Downstream Ramp (L_{DOWN}), ft	2650	On-Ramp Influence Area Speed (S_R), mi/h	49.9
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	3806	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	4740	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	37.7

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative)
Project Description	Northbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	175
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	7020	560
Peak Hour Factor (PHF)	0.87	0.84
Total Trucks, %	8.00	18.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.847
Flow Rate (v_i),pc/h	8714	787
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.21	0.39

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3130	Speed Index (D_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	2780	Off-Ramp Influence Area Speed (S_R), mi/h	56.0
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.506	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	6014	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	6014	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	54.4

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Cumulative)
Project Description	Northbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	175
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	6900	640
Peak Hour Factor (PHF)	0.98	0.93
Total Trucks, %	7.00	7.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.935	0.935
Flow Rate (v_i),pc/h	7530	736
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.05	0.37

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3130	Speed Index (D_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	2780	Off-Ramp Influence Area Speed (S_R), mi/h	56.2
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.538	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	4830	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	44.2

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative)
Project Description	Northbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	6460	Heavy Vehicle Adjustment Factor (f_{HV})	0.926
Peak Hour Factor	0.87	Flow Rate (V_p), pc/h/ln	2673
Total Trucks, %	8.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.12
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	-
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	-
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative)
Project Description	Northbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	6260	Heavy Vehicle Adjustment Factor (f_{HV})	0.935
Peak Hour Factor	0.98	Flow Rate (V_p), pc/h/ln	2277
Total Trucks, %	7.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.96
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	55.4
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	41.1
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative)
Project Description	Northbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	6460	640
Peak Hour Factor (PHF)	0.87	0.83
Total Trucks, %	8.00	10.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.909
Flow Rate (v_i),pc/h	8019	848
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.23	0.42

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	1636.5	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	2780	Speed Index (M_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	11400	On-Ramp Influence Area Speed (S_R), mi/h	10.3
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	5319	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	6167	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	48.9

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Cumulative)
Project Description	Northbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	6260	340
Peak Hour Factor (PHF)	0.98	0.88
Total Trucks, %	7.00	10.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.935	0.909
Flow Rate (v_i),pc/h	6832	425
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.01	0.21

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	1292.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	2780	Speed Index (M_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	11400	On-Ramp Influence Area Speed (S_R), mi/h	52.0
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	4132	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	4557	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	36.5

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative)
Project Description	Southbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	225
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	5500	250
Peak Hour Factor (PHF)	0.82	0.88
Total Trucks, %	11.00	22.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.901	0.820
Flow Rate (v_i),pc/h	7444	346
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.03	0.17

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	10800	Speed Index (D_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	3480	Off-Ramp Influence Area Speed (S_R), mi/h	57.1
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.558	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	4744	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	43.0

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Cumulative)
Project Description	Southbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	225
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	7100	420
Peak Hour Factor (PHF)	0.78	0.92
Total Trucks, %	8.00	9.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.917
Flow Rate (v_i),pc/h	9830	498
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.37	0.25

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	10800	Speed Index (D_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	3480	Off-Ramp Influence Area Speed (S_R), mi/h	56.8
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.491	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	7130	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	63.5

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative)
Project Description	Southbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	5250	Heavy Vehicle Adjustment Factor (f_{HV})	0.901
Peak Hour Factor	0.82	Flow Rate (V_p), pc/h/ln	2369
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.00
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	53.0
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	44.7
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Cumulative)
Project Description	Southbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	6680	Heavy Vehicle Adjustment Factor (f_{HV})	0.926
Peak Hour Factor	0.78	Flow Rate (V_p), pc/h/ln	3083
Total Trucks, %	8.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.30
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	-
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	-
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative)
Project Description	Southbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1150	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	5250	760
Peak Hour Factor (PHF)	0.82	0.94
Total Trucks, %	11.00	17.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.901	0.855
Flow Rate (v_i),pc/h	7106	946
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.12	0.47

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	1462.1	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3480	Speed Index (M_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	2650	On-Ramp Influence Area Speed (S_R), mi/h	39.3
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	4406	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	5352	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	42.5

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Cumulative)
Project Description	Southbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1150	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	6680	1080
Peak Hour Factor (PHF)	0.78	0.93
Total Trucks, %	8.00	5.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.952
Flow Rate (v_i),pc/h	9248	1220
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.45	0.61

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	1979.2	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3480	Speed Index (M_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	2650	On-Ramp Influence Area Speed (S_R), mi/h	0.0
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	6548	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	7768	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	61.2

HCS7 Freeway Diverge Report

Project Information			
Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative with Project Trips Combined)
Project Description	Northbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	175
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (V_i)	7065	758
Peak Hour Factor (PHF)	0.87	0.84
Total Trucks, %	8.00	18.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.847
Flow Rate (v_i),pc/h	8770	1065
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.22	0.53

Speed and Density			
Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3130	Speed Index (D_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	2780	Off-Ramp Influence Area Speed (S_R), mi/h	55.3
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.492	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	6070	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	6070	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	54.9

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Cumulative with Project Trips Combined)
Project Description	Northbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (LA),ft	1500	175
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi)	6926	849
Peak Hour Factor (PHF)	0.98	0.93
Total Trucks, %	7.00	7.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.935	0.935
Flow Rate (vi),pc/h	7559	976
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.05	0.49

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	0.0	Number of Outer Lanes on Freeway (NO)	1
Distance to Upstream Ramp (LUP), ft	3130	Speed Index (DS)	-
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/h/ln	2700
Distance to Downstream Ramp (LDOWN), ft	2780	Off-Ramp Influence Area Speed (SR), mi/h	55.6
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	0.526	Outer Lanes Freeway Speed (SO), mi/h	-
Flow in Lanes 1 and 2 (v12), pc/h	4859	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (DR), pc/mi/ln	44.5

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative with Project Trips Combined)
Project Description	Northbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	6307	Heavy Vehicle Adjustment Factor (f_{HV})	0.926
Peak Hour Factor	0.87	Flow Rate (V_p), pc/h/ln	2610
Total Trucks, %	8.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.10
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	-
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	-
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative with Project Trips Combined)
Project Description	Northbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	6077	Heavy Vehicle Adjustment Factor (f_{HV})	0.935
Peak Hour Factor	0.98	Flow Rate (V_p), pc/h/ln	2211
Total Trucks, %	7.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.93
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	57.0
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	38.8
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative with Project Trips Combined)
Project Description	Northbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	6307	838
Peak Hour Factor (PHF)	0.87	0.83
Total Trucks, %	8.00	10.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.909
Flow Rate (v_i),pc/h	7829	1111
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.24	0.56

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	1652.2	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	2780	Speed Index (M_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	11400	On-Ramp Influence Area Speed (S_R), mi/h	6.4
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	5129	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	6240	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	49.3

HCS7 Freeway Merge Report

Project Information			
Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Cumulative with Project Trips Combined)
Project Description	Northbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1500	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (V_i)	6077	533
Peak Hour Factor (PHF)	0.98	0.88
Total Trucks, %	7.00	10.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.935	0.909
Flow Rate (v_i),pc/h	6632	666
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.01	0.33

Speed and Density			
Upstream Equilibrium Distance (L_{EQ}), ft	1300.8	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	2780	Speed Index (M_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2673
Distance to Downstream Ramp (L_{DOWN}), ft	11400	On-Ramp Influence Area Speed (S_R), mi/h	51.2
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	3959	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	4625	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	36.9

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative with Project Trips Combined)
Project Description	Southbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	225
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	5553	456
Peak Hour Factor (PHF)	0.82	0.88
Total Trucks, %	11.00	22.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.901	0.820
Flow Rate (v_i),pc/h	7516	632
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.04	0.32

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	10800	Speed Index (D_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	798.8	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	3480	Off-Ramp Influence Area Speed (S_R), mi/h	56.4
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.543	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	4816	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	4816	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	43.6

HCS7 Freeway Diverge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Cumulative with Project Trips Combined)
Project Description	Southbound State Route 99 - Keyes Road Off-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Deceleration Length (L_A),ft	1500	225
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	7130	633
Peak Hour Factor (PHF)	0.78	0.92
Total Trucks, %	8.00	9.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.917
Flow Rate (v_i),pc/h	9872	750
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.37	0.38

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	0.0	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	10800	Speed Index (D_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	1253.9	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	3480	Off-Ramp Influence Area Speed (S_R), mi/h	56.1
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.479	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	7172	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	7172	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	63.9

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative with Project Trips Combined)
Project Description	Southbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	5097	Heavy Vehicle Adjustment Factor (f_{HV})	0.901
Peak Hour Factor	0.82	Flow Rate (V_p), pc/h/ln	2300
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.97
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	54.9
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	41.9
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Basic Freeway Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Cumulative with Project Trips Combined)
Project Description	Southbound State Route 99 - Between Keyes Road Off-ramp and On-ramp	Unit	United States Customary

Geometric Data

Number of Lanes, ln	3	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	70.0	Total Ramp Density (TRD), ramps/mi	0.66
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	67.7
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

Demand Volume veh/h	6497	Heavy Vehicle Adjustment Factor (f_{HV})	0.926
Peak Hour Factor	0.78	Flow Rate (V_p), pc/h/ln	2998
Total Trucks, %	8.00	Capacity (c), pc/h/ln	2377
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2377
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.26
Passenger Car Equivalent (E_T)	2.000		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	-
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	-
Total Ramp Density Adjustment	2.3	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	67.7		

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	AM Peak Hour (Cumulative with Project Trips Combined)
Project Description	Southbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1150	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	5097	950
Peak Hour Factor (PHF)	0.82	0.94
Total Trucks, %	11.00	17.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.901	0.855
Flow Rate (v_i),pc/h	6899	1182
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.12	0.59

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	1468.3	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3480	Speed Index (M_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	2650	On-Ramp Influence Area Speed (S_R), mi/h	38.7
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	4199	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	5381	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	42.6

HCS7 Freeway Merge Report

Project Information

Analyst	Fehr & Peers	Date	9/26/2019
Agency	Caltrans District 10	Analysis Year	2019
Jurisdiction	Stanislaus County	Time Period Analyzed	PM Peak Hour (Cumulative with Project Trips Combined)
Project Description	Southbound State Route 99 - Keyes Road On-ramp	Unit	United States Customary

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	70.0	35.0
Segment Length (L) / Acceleration Length (L_A),ft	1150	700
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i)	6497	1288
Peak Hour Factor (PHF)	0.78	0.93
Total Trucks, %	8.00	5.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.926	0.952
Flow Rate (v_i),pc/h	8995	1455
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	1.45	0.73

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	1975.3	Number of Outer Lanes on Freeway (N_O)	1
Distance to Upstream Ramp (L_{UP}), ft	3480	Speed Index (M_S)	-
Downstream Equilibrium Distance (L_{EQ}), ft	0.0	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	2650	On-Ramp Influence Area Speed (S_R), mi/h	0.0
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.597	Outer Lanes Freeway Speed (S_O), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	6295	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	7750	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	60.9

Appendix E:
Study Assumptions Memorandum

Memorandum

Date: August 13, 2019

To: Andrew Malizia, PE, Stanislaus County Department of Public Works

From: Diwu Zhou, PE, Fehr & Peers

Subject: Keyes Community Plan Area TIA and Fee Update - Study Assumptions

WC19-3625

This memorandum documents the proposed analysis assumptions for the Keyes Community Plan (KCP) Area Transportation Impact Analysis (TIA) and Fee Update. The purpose of this memorandum is to confirm the project elements to be evaluated as part of the assessment and provide the project team and City staff an opportunity to review our analysis parameters and assumptions prior to the completion of the technical analysis.

Traffic Impact Fee Program

Stanislaus County seeks to update the existing KCP traffic impact fee program to account for current expectations for growth and transportation improvements.

As a starting point for the fee program update, we have compiled a comprehensive list of previously identified capital improvement projects as presented in **Table 1**. This list is derived from a review of the Northeast Keyes Community Plan Amendment TIA (1997), Keyes Area Community Plan (2000), Comprehensive Public Facilities Impact Fee Update Study (2017), Stanislaus Council of Government's Regional Transportation Plan (2018), and the Faith Home Road/ Garner Road Bridge Transportation Analysis Report (2018).

Table 1: Previously-Identified Capital Improvement Projects

Road	Limits	Length (miles)	Improvements
Faith Home Road	Redwood Rd. to Keyes Rd.	-	Replace Lateral 2 ½ Bridge.
		1.50	Widen SR 99 Overcrossing from 2 to 6 lanes. Widened Roadway from 2 to 4 lanes.
		1.50	Widen Roadway from 4 to 6 lanes.
Keyes Road	Faith Home Rd. to SR 99 SB Ramps	0.83	Widen Roadway from 2 to 4 lanes.
	SR 99 NB Ramps to Golden State Blvd.	0.13	Widen Roadway from 2 to 4 lanes.
	Faith Home Rd. to Golden State Blvd.	-	Widen SR 99 Overcrossing from 4 to 8 lanes. Widen SR 99 NB Ramps. Widen SR 99 SB Ramps.
		1.38	Widen Roadway from 4 to 6 lanes.
Golden State Blvd.	Keyes Rd.	-	Traffic Signal Modification.
	Taylor Rd. to Keyes Rd.	1.10	Widen Roadway from 2 to 4 lanes.
	Taylor Rd. to Nunes Rd.	0.27	Widen Roadway from 2 to 4 lanes.
Washington Road	Nunes Rd. to T.I.D Lateral No. 2 1/2	-	Replace Lateral 2 ½ Bridge.
		1.10	Widen Roadway to 60’ major collector standard.
Nunes Road	Golden State Blvd. to Washington Rd.	0.20	Widen Roadway to 60’ major collector standard.

Sources: Stanislaus Council of Government Plan, 2018; KCP, 2000; Northeast Keyes Community Plan, 2003; Comprehensive Public Facilities Impact Fee Update Study, 2017; Faith Home Road/Garner Road Bridge Transportation Analysis Report, 2018; Fehr & Peers, 2019.

Growth Assumptions

Land-use and future traffic volume forecasts from the City of Ceres General Plan model (Ceres Model) and Faith Home Road/Garner Road Bridge model were referenced to evaluate the continued applicability of each capital improvement project. Both models are derived from the Three-County (San Joaquin, Stanislaus, and Merced) regional travel demand model, developed as a part of the San Joaquin Valley Model Improvement Program.

The Ceres model is calibrated for a 2014 base year and provides forecasts for the buildout year 2040. The model was refined using land use and network characteristics within the specific General Plan Area boundary based on field observations, published reports, data compiled by others on the General Plan update team, and American Community Survey (ACS) data. Note that the Ceres model does not include the Faith Home Road/Garner Road Bridge in the buildout year.

The Faith Home Road/Garner Road Bridge model is a combination of the City of Modesto General Plan model (Modesto model) and the Ceres model. The 2017 base year model was validated to existing daily and peak hour traffic counts using the validation thresholds from the *California Regional Transportation Plan Guidelines* (CTC, 2017), and has a horizon year of 2045. The Faith Home Road/Garner Road Bridge model was used in the analysis of the Faith Home Road/Garner Road Bridge across the Tuolumne River. The project alternatives for the bridge differ in the size of the proposed roadway; Alternative 1 was for a two-lane roadway and bridge, while Alternative 2 was for a four-lane roadway. For the purposes of our current work in Keyes, we refer to the Alternative 2 results.

Land-Use Summary

Land-use projections for transportation analysis zones (TAZs) within the census-designated place of Keyes (Keyes) and surrounding TAZs are derived from the Ceres model and are provided in **Table 2**. A map of the TAZs within and directly adjacent to Keyes is provided in **Figure 1** (all figures and attachments are provided at the end of the memorandum).

The base year model assumes 1,536 households, 4,651 people, and 425 jobs within Keyes. The cumulative year model assumes 2,710 households, 8,144 people, and 754 jobs within Keyes. The net growth within Keyes is 1,174 households, 3,494 people, and 329 jobs.

TAZs near Keyes are shown in the second half of **Table 2;** most of those zones are projected to change very little over time, but a few have notable amounts of growth, including TAZ 5485, located east of SR 99 and north of Keyes along Redwood Road, and TAZ 5495, located west of SR 99 and northwest of Keyes along Faith Home Road. The net growth within TAZ 5485 between the base and cumulative years is 99 households and 297 people. The net growth within TAZ 5495 between the base and cumulative years is 643 jobs.

Table 2: Land-Use Summary

TAZ	Base Year			Cumulative Year			Growth/Difference		
	Total Households	Household Population	Total Employment	Total Households	Household Population	Total Employment	Total Households	Household Population	Total Employment
Within Census Designated Place - Keyes									
5258	0	0	0	0	0	0	0	0	0
5259	15	46	0	15	46	0	0	-0	0
5260	97	300	3	93	287	3	-4	-13	0
5364	203	564	2	214	598	2	+11	+34	0
5365	33	103	4	44	137	4	+11	+34	0
5366	0	0	0	0	0	0	0	0	0
5367	201	558	271	236	596	189	+35	+38	-82
5368	5	14	91	5	14	245	0	+0	+154
5369	19	59	0	19	59	247	0	-0	+247
5371	454	1416	11	808	2502	9	+354	+1086	-2
5372	1	3	34	43	135	29	+42	+132	-5
5373	508	1586	9	1233	3770	26	+725	+2184	+17
5374	0	0	0	0	0	0	0	0	0
Total:	**1536**	**4651**	**425**	**2710**	**8144**	**754**	**+1174**	**+3494**	**+329**
Surrounding Area									
5303	10	30	0	10	30	0	0	-0	0
5304	0	0	4	0	0	4	0	0	0
5308	77	230	11	73	218	8	-4	-12	-3
5347	40	120	1	38	114	1	-2	-6	0

Table 2: Land-Use Summary

TAZ	Base Year			Cumulative Year			Growth/Difference		
	Total Households	Household Population	Total Employment	Total Households	Household Population	Total Employment	Total Households	Household Population	Total Employment
5483	4	13	0	13	40	0	+9	+27	0
5484	1	3	0	1	3	0	0	0	0
5485	61	193	4	160	490	4	+99	+297	0
5486	1	3	0	1	3	0	0	0	0
5487	0	0	8	0	0	8	0	0	0
5489	0	0	21	0	0	21	0	0	0
5495	0	0	0	0	0	643	0	0	+643
5497	0	0	0	0	0	0	0	0	0
5504	30	77	26	30	77	26	0	0	0
5505	18	47	8	18	47	8	0	0	0
6168	0	0	196	0	0	166	0	0	-30
6169	17	52	3	17	52	3	0	+0	0
6174	40	125	43	38	118	36	-2	-7	-7
6177	0	0	162	0	0	195	0	0	+33
6178	1	3	353	1	3	292	0	-0	-61
6179	44	137	5	42	130	5	-2	-7	0
6180	0	0	15	0	0	12	0	0	-3
6240	0	0	0	0	0	0	0	0	0
6243	10	31	0	10	31	0	0	-0	0

Source: City of Ceres General Plan model, 2014; Fehr & Peers, 2019.

Traffic Volume Forecasts

Future traffic volume forecasts from the cumulative year (2040) Ceres model and Alternative 2 (4-lane bridge) of the design year (2045) Faith Home Road/Garner Road Bridge model are presented in **Table 3**. Please note that these volumes have been taken directly from the future year models and have not been adjusted for the base year model's relationship to existing traffic counts. These numbers are for the purpose of initial screening.

Table 3: Traffic Volume Forecasts

Road	Ceres Model (2040)				Faith Home Road/ Garner Road Bridge Model (2045)			
	Number of Lanes	Daily Volume	Daily Vehicles per lane	LOS[1]	Number of Lanes	Daily Volume	Daily Vehicles per lane	LOS[1]
NB Faith Home Road North of Service Road	2	7,300	3,650	A	3	8,910	2,970	A
SB Faith Home Road North of Service Road	2	7,060	3,530	A	3	8,840	2,947	A
NB Faith Home Road North of Keyes Road	2	8,020	4,010	B	2	7,410	3705	A
SB Faith Home Road North of Keyes Road	2	8,360	4,180	B	2	7,170	3585	A
EB Keyes Road West of SR 99	2	6,660	3,330	A	2	6,560	3280	A
WB Keyes Road West of SR 99	2	5,150	2,575	A	2	4,870	2435	A
EB Keyes Road East of SR 99	2	5,540	2,770	A	2	5,570	2785	A
WB Keyes Road East of SR 99	2	5,080	2,540	A	2	4,300	2150	A
NB Golden State Boulevard South of Keyes Road	1	4,200	4,200	B	1	4,670	4,670	B
SB Golden State Boulevard South of Keyes Road	1	3,930	3,930	B	1	4,550	4,550	B

Note(s):

1. Level of Service for roadway segments by street classification as defined in the Stanislaus County General plan. Faith Home Road and Keyes Road are classified as Principal Arterials within the study area. Golden State Boulevard is classified as a Minor Arterial within the study area.

Source: Fehr & Peers, 2019.

Project Considerations

Based on our review of planned land-use changes, transportation network assumptions, and traffic volume forecasts from the Ceres model and the Faith Home Road/Garner Road Bridge model, it appears that both Faith Home Road and Keyes Road would function adequately at a width of 4 lanes, while Golden State Boulevard would function adequately at a width of 2 lanes. Note that these conclusions might change if the underlying assumptions about future land use growth were to be modified.

Based on this initial evaluation, a modified list of capital improvement projects for inclusion in the KCP fee program is presented in **Table 4**.

Table 4: Potential Capital Improvement Projects for KCP Fee Program

Road	Limits	Length (miles)	Improvements
Faith Home Road	Redwood Rd. to Keyes Rd.	-	Replace Lateral 2 ½ Bridge.
		1.50	Widen SR 99 Overcrossing from 2 to 4 lanes. Widened Roadway from 2 to 4 lanes.
Keyes Road	Faith Home Rd. to SR 99 SB Ramps	0.83	Widen Roadway from 2 to 4 lanes.
	SR 99 NB Ramps to Golden State Blvd.	0.13	Widen Roadway from 2 to 4 lanes.
	SR 99	-	Widen SR 99 NB Ramps. Widen SR 99 SB Ramps.
	Faith Home Rd.	-	Traffic Signal Modification.
	Golden State Blvd.	-	Traffic Signal Modification.
Washington Road	Nunes Rd. to T.I.D Lateral No. 2 1/2	-	Replace Lateral 2 ½ Bridge.
		1.10	Widen Roadway to 60' major collector standard.
Nunes Road	Golden State Blvd. to Washington Rd.	0.20	Widen Roadway to 60' major collector standard.

Sources: Fehr & Peers, July 2019.

Fee Program Development

Transportation Impact Fee programs, including the KCP TIF, must comply with basic fee program requirements, including:

- ***Identify the purpose of the fee*** – The KCP TIF generates funds from new development to pay for transportation facilities identified as part of the *Stanislaus County General Plan*, and associated Environment Document subsequent implementation documents such as the *Keyes Community Plan*.
- ***Identify how the fee will be used on the facilities to be funded through the fee*** – Funds generated by the KCP *TIF* will be used to implement a range of transportation projects to be detailed in the fee program.
- ***Determine how there is a reasonable relationship between the fee's use and the type of development on which the fee is imposed*** – The fee would be imposed on future development projects in Keyes commensurate with their projected level of auto trip generation based on trip generation rates from *Trip Generation Manual,* Institute of Transportation Engineers (ITE), 10th Edition.
- ***Determine how there is a reasonable relationship between the need for the public facility and the type of development on which the fee is imposed*** – The fee program is designed to accommodate and mitigate the impact of future travel demand in line with the population and employment growth in the Keyes Community.
- ***Determine how there is reasonable relationship between the amount of the fee and the cost of the public facility (or portion of the facility) attributable to new development*** – Because the fee will be charged based on auto trips generated by new development and is used to either accommodate those trips or reduce existing auto trips such that the transportation system is able to accommodate future growth, there is a rational nexus between fee collection and fee usage. The improvements will also increase travel choices for the community as specified in the General Plan goals. The improvements in the fee program are not designed to fix existing deficiencies; rather they are designed to accommodate new development.

GC 66000 defines transportation facilities for purposes of impact fee programs to include pedestrian, bicycle, transit and traffic calming projects as well as auto-capacity related infrastructure projects.

TIA Study Assumptions

There are three proposed projects within the Community of Keyes, all located near the intersection of Keyes Road at North Golden State Boulevard, as shown on **Figure 2**. Descriptions of each of the proposed projects are provided below:

- 30,000 square-foot semi-truck lease, rental and service facility, and 5,000 square-foot office located at southwest corner (ITC Enterprises);
- 7,000 square-foot convenience market, 4,278 square-foot potential restaurant, 16-pump fuel station, 14,100 square-foot truck wash and repair, 43 truck parking spaces, and a secondary fueling area with 5 diesel fueling stations at northeast corner (Nunes Road Travel Plaza); and
- 4,800 square-foot convenience market, two 3,000 square-foot fast food restaurants with drive-thru, 2,000 square-foot fast-food restaurant, 12-pump fuel station, and 30 truck parking spaces at northwest corner (Kamir Incorporated).

Site plans for each of the proposed projects are provided in **Figures 3A-C**.

Travel Characteristics

This section provides an overview of the project trip generation and trip distribution that will form the basis for the evaluation of project impacts on the surrounding roadway network. The traffic impacts associated with each project includes:

1. **Trip Generation** – The *amount* of vehicle traffic entering/exiting the project site is estimated.

2. **Trip Distribution** – The *direction* trips would use to approach and depart the project site is projected.

3. **Trip Assignment** – Trips were then *assigned* to specific roadway segments and intersection turning movements.

Trip Generation

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. For this project, estimates of weekday morning and evening peak hour trip generation were developed to coincide with the morning and evenings levels of peak activity when traffic flows on SR 99 are the highest, in addition to an estimate of daily weekday traffic volumes.

For the ITC Enterprises development, trip generation will be estimated using local driveway counts at the existing Peterbilt development, located directly adjacent to the proposed ITC Enterprises development. A local trip rate specific to truck leasing/rental/service facilities will be developed using the driveway counts. The local trip rate will be compared to similar ITE land uses for reasonableness.

For the Nunes Road Travel Plaza and Kamir Incorporated developments, trip generation was estimated using rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition*. The resulting vehicle trip generation estimates are presented in **Table 5**.

Internalized Trips

Internalized trips represent trips made within the site; for example, a patron might stop for fuel at the gas station and then use the truck wash. For this assessment it was assumed that trips to or from the truck wash and repair area would be internalized trips from the gas/service station and/or convenience market. It was also assumed that internalized trips between the gas station/convenience market and the fast food restaurant(s) are negligible.

Pass-By and Diverted Trips

Driveway traffic at the Nunes Road Travel Plaza and Kamir Incorporated development is comprised of: (1) new traffic generated by the project, (2) traffic that would otherwise already be on the adjacent roadways but the driver decides to stop at the site (e.g., to purchase an item on their way home from work), and (3) traffic on other nearby roadways, but the driver decides to take a short detour to stop at the site (e.g., to exit off the freeway for gas). The trips in Item 2 are referred to as "pass-by" trips and the trips in Item 3 are referred to as "diverted-link" trips.

Information contained in the ITE *Trip Generation Handbook, 3rd Edition* and surveys of similar uses was used to estimate pass-by trips.

- Fast-food restaurants with drive thru windows have an average pass-by trip rate of approximately 50 percent, and an average diverted trip rate of approximately 25 percent during both the morning (AM) and evening (PM) peak hours;
- Gas/service stations with convenience markets have an average pass-by trip rate of approximately 60 percent during the AM and PM peak hours, and an average diverted trip

rate of approximately 20 percent during the AM peak hour and 30 percent during the PM peak hour.

Table 5: Trip Generation Estimates

Land-Use	Size	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
ITC Enterprises								
Truck lease/rental facility	30,000 sq. ft.	Local data will be used to estimate trip rates						
Office	5,000 sq. ft.							
Total Net New Trips								
Nunes Road Travel Plaza								
Convenience Market/ Gas Station[1]	21 vehicle fueling stations	4,800	295	295	590	241	241	482
Pass-by Trips (60%)		(-2,880)	(-177)	(-177)	(-354)	(-145)	(-145)	(-290)
Diverted Trips (20% AM/30% PM & Daily)		(-1,440)	(-59)	(-59)	(-118)	(-72)	(-72)	(-144)
Fast Food Restaurant with Drive Thru[2]	4.278 sq. ft.	2,000	88	84	172	73	67	140
Pass-by Trips (50%)		(-1,000)	(-44)	(-42)	(-86)	(-37)	(-34)	(-71)
Diverted Trips (25%)		(-500)	(-22)	(-21)	(-43)	(-18)	(-17)	(-35)
Total Net New Trips		**980**	**81**	**80**	**161**	**42**	**40**	**82**
Kamir Incorporated								
Convenience Market/ Gas Station[1]	12 vehicle fueling stations	2,800	168	169	337	138	138	276
Pass-by Trips (60%)		(-1680)	(-101)	(-101)	(-202)	(-83)	(-83)	(-166)
Diverted Trips (20/30%)		(-840)	(-34)	(-34)	(-68)	(-41)	(-41)	(-82)
Fast Food Restaurant with Drive Thru[2]	6,000 sq. ft.	2,800	123	118	241	102	94	196
Pass-by Trips (50%)		(-1400)	(-62)	(-59)	(-121)	(-51)	(-47)	(-98)
Diverted Trips (25%)		(-700)	(-31)	(-30)	(-61)	(-26)	(-24)	(-50)
Fast Food Restaurant without Drive Thru[3]	2,000 sq. ft.	700	30	20	50	28	29	57
Pass-by Trips (50%)		(-350)	(-15)	(-10)	(-25)	(-14)	(-15)	(-29)
Diverted Trips (25%)		(-180)	(-8)	(-5)	(-13)	(-7)	(-7)	(-14)
Total Net New Trips		**1,150**	**70**	**68**	**138**	**46**	**44**	**90**

Notes:
1. Based on *Trip Generation* (10th Edition) trip generation rates for land use 960, Super Convenience Market/Gas Station
2. Based on *Trip Generation* (10th Edition) trip generation rates for land use 934, Fast Food Restaurant with Drive Thru
3. Based on *Trip Generation* (10th Edition) trip generation rates for land use 933, Fast Food Restaurant without Drive Thru

Source: Fehr & Peers, July 2019

In other words, at a typical gas station, approximately, 90 percent of the traffic entering and exiting the site during the PM peak hour is already on the surrounding roadway system. For this assessment, it was assumed that pass-by/diverted trips for the fast-food restaurants (with or without a drive thru window) would comprise 75 percent of the trip generation, and that pass-by/diverted trips for the gas/service stations with convenience markets would comprise 80 to 90 percent of the trip generation. While pass-by and diverted trips are not new vehicle trips to the overall roadway system, they are accounted for in the analysis of driveway operations. Additionally, diverted trips have the potential to change travel patterns in the area, especially at the interchange. These changed travel patterns will be accounted for in the roadway operations analysis.

Trip Distribution & Assignment

Project trip distribution refers to the directions of approach and departure that vehicles would take to access and leave the site. Project trip assignment refers to the specific route and roadway segments vehicles would take to access and leave the site.

Due to the high percentage of pass-by and diverging trips, the project trip distribution of the proposed projects was estimated using previously collected traffic counts from other projects on the existing roadway system. The preliminary trip distribution for the proposed projects are presented in **Figure 4**.

Analysis Parameters

The transportation assessment will include weekday morning, (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak period analyses to coincide with the time periods when adjacent street traffic demands are highest. Multimodal traffic counts, including vehicles, bicycles, and pedestrians, will be collected at each of the study intersections. Based on the initial project trip generation and trip distribution patterns, we recommend including the following study intersections, as presented in **Figure 5**:

1. Faith Home Road at Keyes Road
2. Foote Road at Keyes Road
3. State Route 99 Southbound Ramps at Keyes Road
4. State Route 99 Northbound Ramps at Keyes Road
5. 9th Street/Golden State Boulevard at Nunes Road
6. Golden State Boulevard at Keyes Road
7. South Washington at Nunes Road
8. Nunes Road at Keyes Road

9. Golden State Boulevard at Barnhart Road
10. Kamir Incorporated Driveway (North) at Golden State Boulevard
11. Kamir Incorporated Driveway (Middle)/Nunes Road Travel Plaza Driveway (North) at Golden State Boulevard
12. Nunes Road Travel Plaza (Middle) at Golden State Boulevard
13. Kamir Incorporated Driveway (South)/Nunes Road Travel Plaza Driveway (South) at Golden State Boulevard
14. ITE Enterprises Project Driveway at Golden State Boulevard

Additionally, we will conduct a ramp merge/diverge assessment for the Keyes Road interchange:

1. Northbound SR 99 Off Ramp to Keyes Road
2. Northbound SR 99 On Ramp from Keyes Road
3. Southbound SR 99 Off Ramp to Keyes Road
4. Southbound SR 99 On Ramp from Keyes Road

We will also conduct a freeway mainline assessment for the segments of SR 99 immediately north and south of Keyes Road:

1. Northbound SR 99 Off Ramp to Keyes Road (Diverge)
2. Northbound SR 99 between Off Ramp and On Ramp at Keyes Road (Basic)
3. Northbound SR 99 On Ramp from Keyes Road (Merge)
4. Southbound SR 99 Off Ramp to Keyes Road (Diverge)
5. Southbound SR 99 between Off Ramp and On Ramp at Keyes Road (Basic)
6. Southbound SR 99 On Ramp from Keyes Road (Merge)

Analysis Methodology & Scenarios

Intersections will be evaluated for the following scenarios using the Synchro 10 software based on procedures outlined in the Highway Capacity Manual, 6th Edition (Transportation Research Board):

- Existing Conditions – Existing traffic volumes based on recent count data.
- Existing with ITC Enterprises – Existing traffic volumes based on recent count data plus traffic expected to be generated by the ITC Enterprises project. This scenario assumes the signalization of the SR 99/Keyes Road Interchange with no road or ramp modifications.
- Existing with Nunes Travel Plaza – Existing traffic volumes based on recent count data plus traffic expected to be generated by the Nunes Travel Plaza project. This scenario assumes the signalization of the SR 99/Keyes Road Interchange with no road or ramp modifications.

- Existing with Kamir Incorporated – Existing traffic volumes based on recent count data plus traffic expected to be generated by the Kamir Incorporated project. This scenario assumes the signalization of the SR 99/Keyes Road Interchange with no road or ramp modifications.

- Existing with ITC Enterprises, Nunes Travel Plaza, Kamir Incorporated – Existing traffic volumes based on recent count data plus traffic expected to be generated by all three development proposals in the area. The intent of this scenario is to determine if there are immediate impacts in the existing condition if all three projects are constructed. This scenario assumes the signalization of the SR 99/Keyes Road Interchange with no road or ramp modifications.

- Cumulative – Cumulative year forecasts will be derived from the Three-County Travel Demand Model used for the Ceres General Plan update. Land use growth within the community of Keyes will be reviewed with County Staff for reasonableness prior to use of the model. This task does not include a detailed subarea model validation/calibration.

- Cumulative with Projects – Projected cumulative traffic volumes plus traffic expected to be generated by all three development proposals. Should impacts be identified with development of all three projects, the proportionate share of traffic added to each impacted location will be estimated.

Based on the results of the analysis, we will identify impacts to all travel modes (including transit, bicycle, and pedestrian systems) and develop potential mitigation measures.

Thresholds of Significance

The determination of significance for project impacts is based on applicable policies, regulations, goals, and guidelines defined by Stanislaus County and the California Department of Transportation.

The impacts of the project will be evaluated by comparing the results of the technical analysis under Plus Project conditions to the results under Existing and Cumulative without Project conditions. The following criteria were used to identify significant off-site intersection impacts of the proposed projects under the various criteria.

Stanislaus County General Plan

For this study, based on guidance contained in the County of Stanislaus General Plan and recently prepared environmental documents for other projects in the County, a significant transportation-related impact could occur if:

- Project would substantially increase traffic relative to existing load and capacity;

- Project traffic would result in operations below the acceptable thresholds:
  - For a roadway segment in Stanislaus County, the project would cause the LOS to degrade to LOS E or worse; and
  - For a roadway intersection in Stanislaus County, the project would cause the LOS to degrade to LOS D or worse;
- Project would add traffic to existing roadways/intersections that already exceed the acceptable threshold;
- Project would substantially increase hazards due to design feature or incompatible uses;
- Project would result in inadequate emergency access.

California Department of Transportation

Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on State Highway facilities (Guide for the Preparation of Traffic Studies, Caltrans, December 2002); however, Caltrans recognizes that achieving LOS C/LOS D may not always be feasible. A standard of LOS D or better on a peak hour basis was used as the planning objective for the evaluation of potential impacts to Caltrans facilities of this development as that is the standard set for Caltrans facilities in the study area by Stanislaus County. The following criteria were used to evaluate potential impacts to Caltrans facilities:

- If a Caltrans facility is projected to operate at LOS D or better without project and the project is expected to cause the facility to operate at LOS E or worse, the impact may be considered significant.
- If a Caltrans facility is projected to operate at LOS E or F without project and the project is expected to increase delay, the impact may be considered significant.

VMT Screening

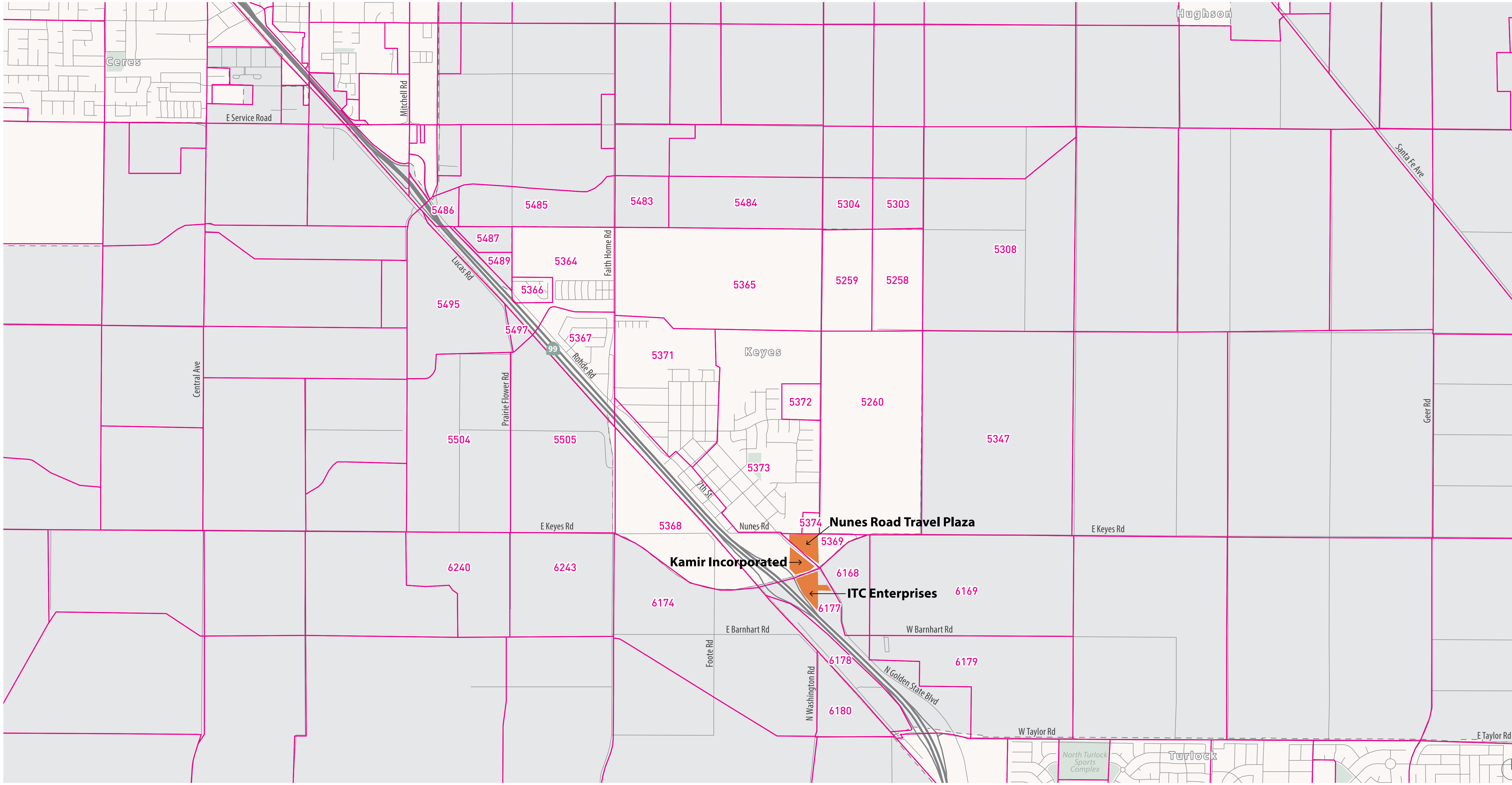
Consistent with SB 743 requirements, Fehr & Peers will estimate project-generated daily vehicle miles of travel (VMT) using the Three County Model. Total daily VMT can be converted into VMT per capita and per employee estimates. Local agencies have discretion to establish VMT-related significance criteria; our understanding is that Stanislaus County has not yet established VMT criteria. Fehr & Peers will coordinate with County staff to identify appropriate methodologies to evaluate potential impacts on VMT. This task does not include a detailed threshold setting process.

Next Steps

We appreciate your time to review and comment on the preliminary project list for the KCP fee program update and transportation impact study assumptions described in this memorandum prior to the commencement of the technical analysis. Please call Diwu at 925-930-7100 with questions or comments.

Attachments:

Figure 1	Three County Model TAZs near Keyes
Figure 2	Site Vicinity Map
Figure 3A	Conceptual Project Site Plan - ITC Enterprises
Figure 3B	Conceptual Project Site Plan – Nunes Road Travel Plaza
Figure 3C	Conceptual Project Site Plan – Kamir Incorporated
Figure 4	Preliminary Project Trip Distribution
Figure 5	Proposed Study Intersection Locations

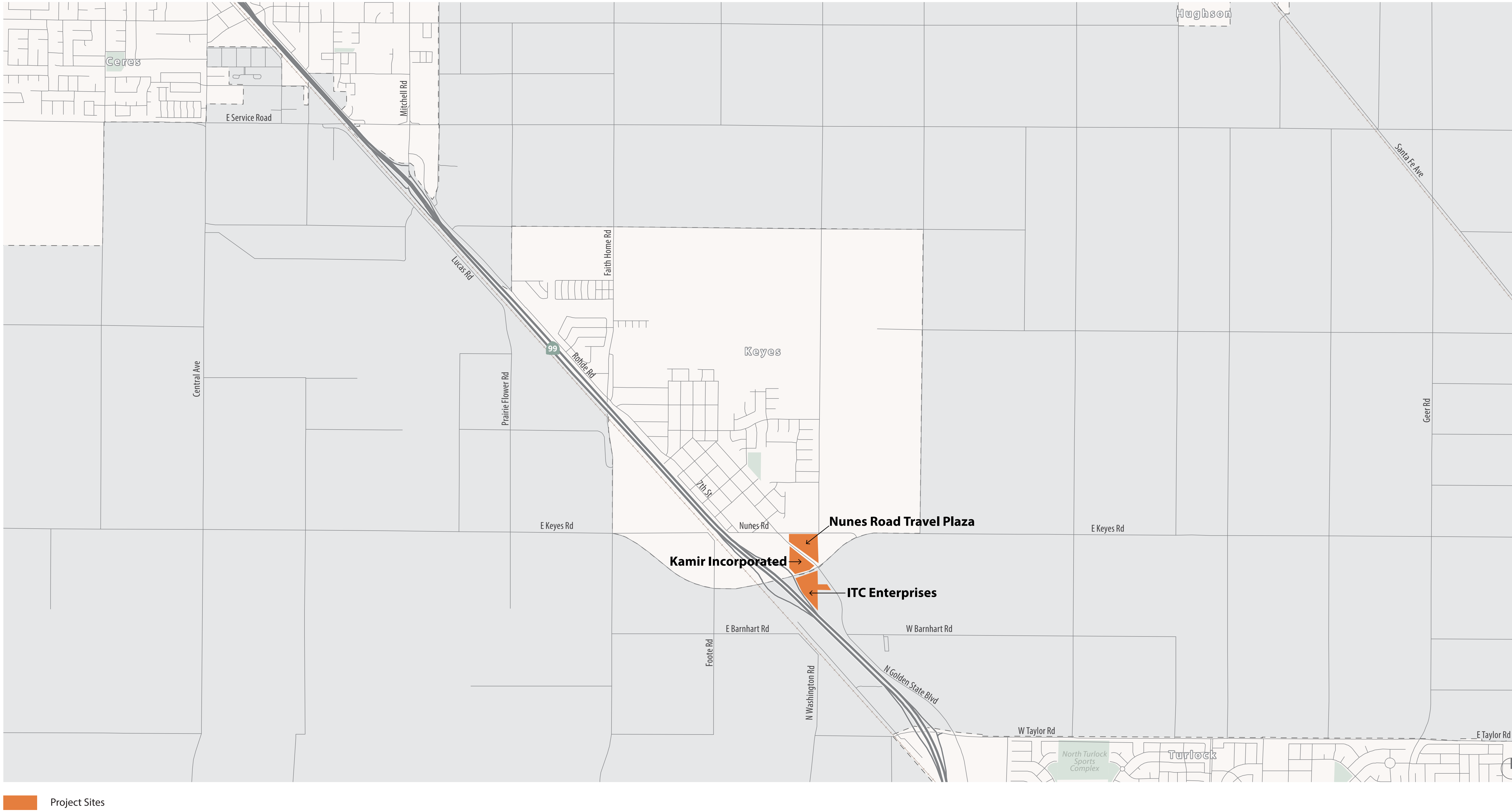


Project Sites
TAZ

Figure 1

Three County Model TAZs Near Keyes

WC19-3625_1_TAZmap



WC19-3625_2_SiteVic

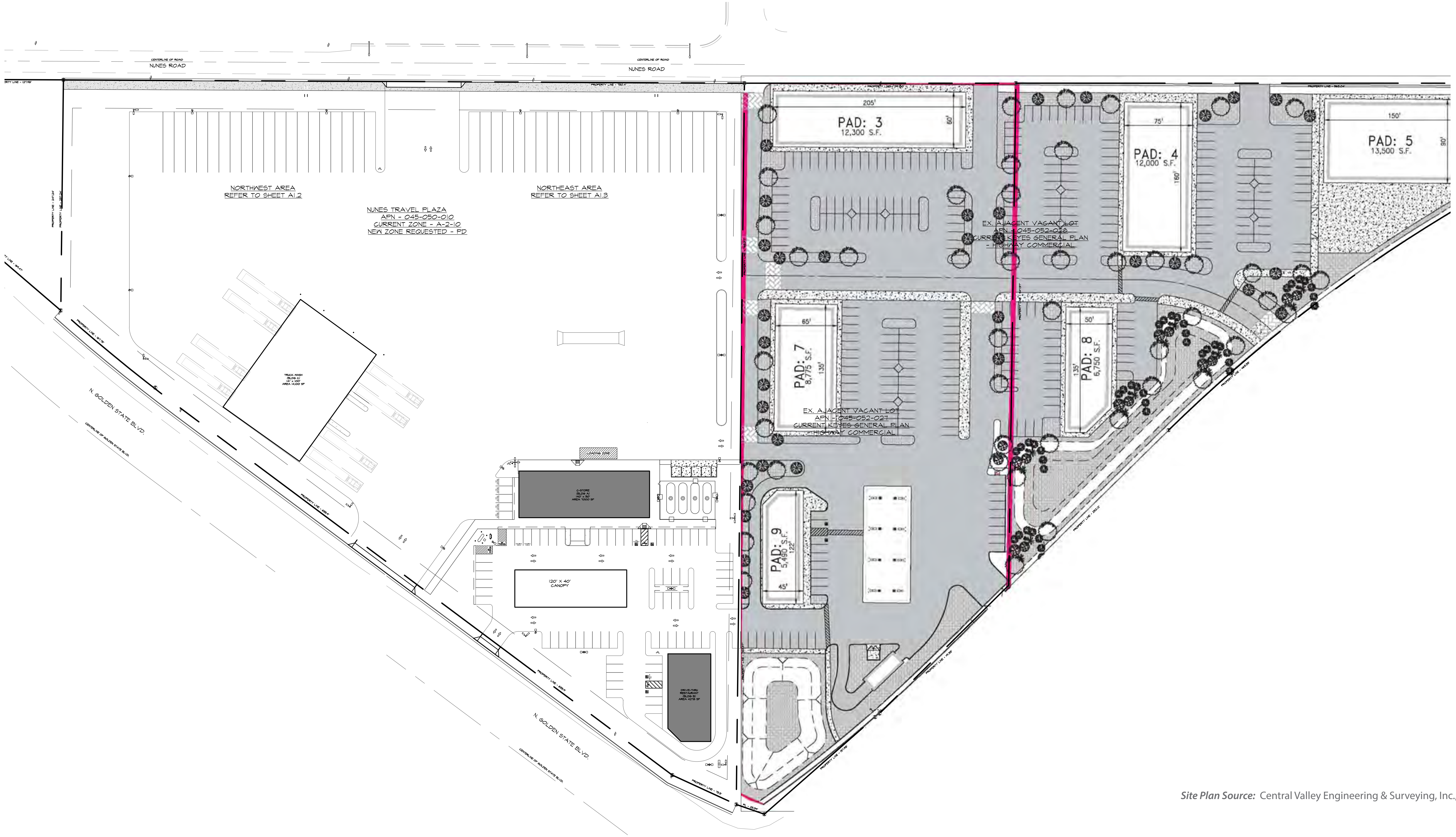
Figure 2

Site Vicinity Map

Site Plan Source: North Star Engineering Group, 2018.

Figure 3A

Conceptual Project Site Plan — ITC Enterprises



Site Plan Source: Central Valley Engineering & Surveying, Inc., 1/22/18.

Figure 3B

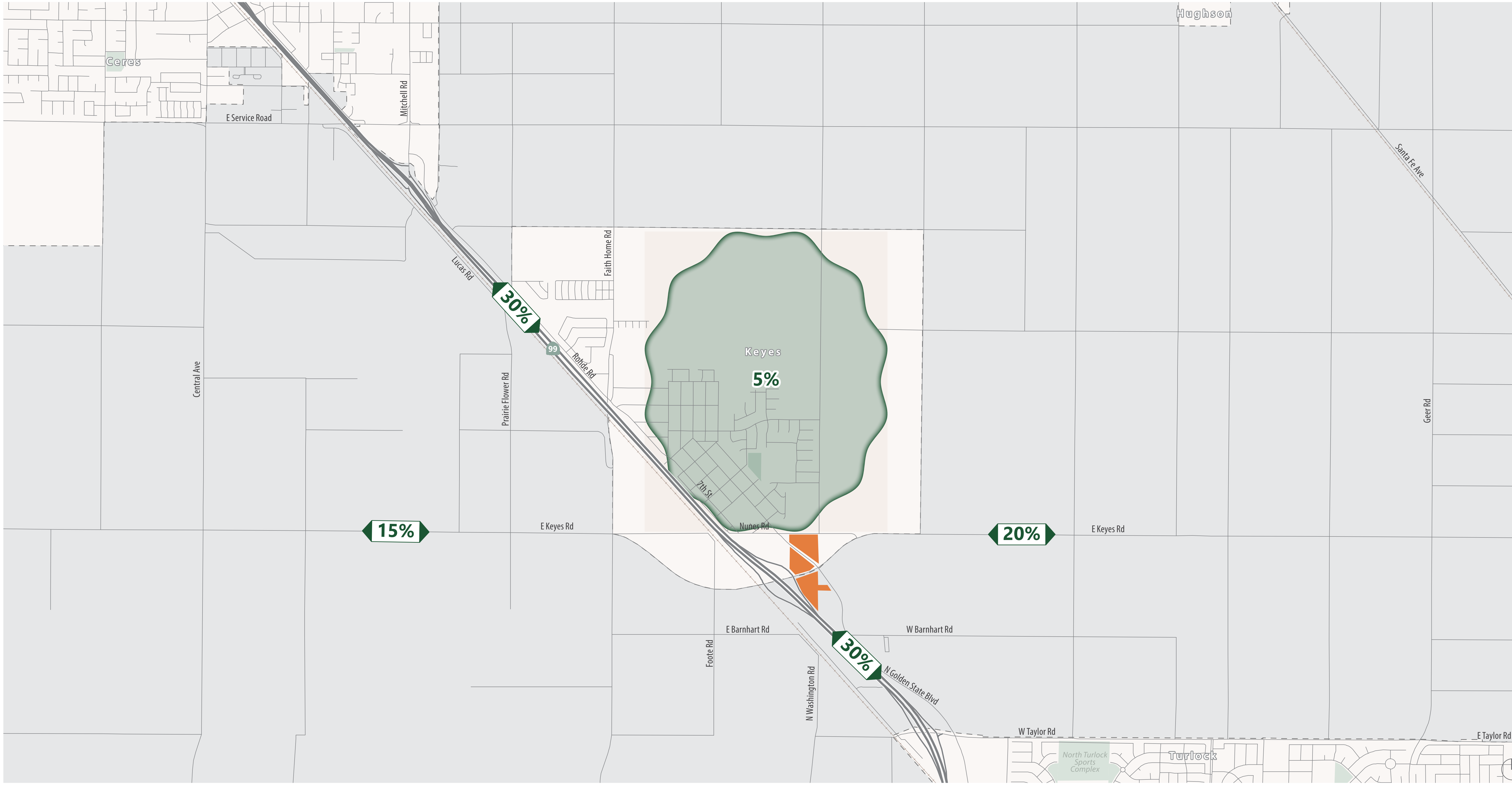
Conceptual Project Site Plan — Nunes Road Travel Plaza

Site Plan Source: Magallon Construction Co., Inc., 10/4/18.

Figure 3C

Conceptual Project Site Plan — Kamir Incorporated

WC19-3625_3_SitePlans



Project Sites XX% Project Trip Distribution

Figure 4

Preliminary Project Trip Distribution

WC19-3625_4_TTripDistro

Project Sites # Study Intersection

WC19-3625_5_StudyLocs

Figure 5

Proposed Study Intersection Locations

MITIGATION MONITORING PLAN KEYES COMMUNITY PLAN UPDATE					
Significant or Potentially Significant Impact		**Mitigation Measure**	**Implementation, Monitoring and Reporting Actions**	**Monitoring and Reporting Responsibilities**	**Implementation, Monitoring and Reporting Schedule**
[1]EIR Mitigation Measures					
4.1 Land Use					
Conversion of additional Prime Farmland to non-agricultural use	4.1-1	Replace Important Farmland at a 1:1 ratio with agricultural land of equal quality and protect the land for agricultural use through long-term land use restrictions, such as agricultural conservation easements.	Developers of new projects in the Community Plan area shall set aside in a long-term conservation or agricultural easement an equal amount of land equivalent to agricultural land proposed for conversion to non-agricultural use. The land shall be of equal quality of that being proposed for development, to the satisfaction of the County.	Planning Department; Agriculture Department	Prior to project approval.
Important Farmland would continue to be converted to non-agricultural uses	4.1-4	Implement Mitigation Measure 4.1-1.	See Mitigation Measure 4.1-1.		

1 These mitigation measures are taken verbatim from the DEIR, except where revised by the Final EIR. Initial Study mitigation measures incorporated in the DEIR are not included in the Initial Study portion of this Mitigation Monitoring Program.

MITIGATION MONITORING PLAN
KEYES COMMUNITY PLAN UPDATE

Significant or Potentially Significant Impact	Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
4.2 Biological Resources				
Loss of wetlands and other waters of the U.S.	4.2-1(a) Prior to approval of development projects in portions of the Community Plan Area that could support wetlands, the project proponent shall conduct a wetland analysis/delineation to determine whether jurisdiction wetlands or waters of the U.S. are present or absent in the proposed development area. If there are no wetlands or waters of the U.S. present no further mitigation is required. If wetlands or waters of the U. S. are present then;	Developers of new projects in the Community Plan area shall conduct a wetland analysis/delineation, in consultation with the US Army Corps of Engineers (Corps) to determine whether jurisdiction wetlands or waters of the U.S. are present in the proposed development area.	Corps; Planning Department	Prior to any construction or grading activity.
	(b) Direct or indirect losses of wetlands shall be compensated by replacement, rehabilitation, contribution to a mitigation bank, or purchase of wetlands habitat at a ratio that ensures no net loss of wetlands. A wetlands mitigation monitoring program shall be submitted to the Corps and CDFG for review prior to permit approval.	If wetlands are present, loss of wetlands shall be compensated ensuring no net loss of wetlands. Prior to grading permit approval, a wetlands mitigation monitoring program shall be submitted to the Corps and CDFG for review.	Corps; CDFG; Planning Department	Prior to any construction or grading activity.
	(c) The project applicant shall obtain applicable permit(s)/agreements(s) and implement all the terms and conditions required by the Corps, USFWS and the CDFG for impacts to wetlands.	If wetlands are present, the project applicant shall obtain all applicable permits required by the Corps, USFWS, and CDFG.	Corps; CDFG; USFWS	Prior to any construction or grading activity.
Loss of potential habitat for the valley elderberry longhorn beetle (VELB).	4.2-2(a) Prior to the approval of development projects in portions of the Community Plan Area that contain natural or artificial drainages, the project proponent shall conduct a project-specific survey for potential VELB habitat (elderberry shrubs).	The project proponent shall conduct a project-specific survey for elderberry shrubs in areas that could contain VELB habitat, consistent with USFWS guidelines.	USFWS	Prior to any construction or grading activity.

55

MITIGATION MONITORING PLAN
KEYES COMMUNITY PLAN UPDATE

Significant or Potentially Significant Impact		Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
	(b)	The project proponent shall avoid and protect all potential identified VELB habitat where feasible. Where avoidance is infeasible and elderberry shrubs are subject to removal or potential damage from the proposed development, the project proponent shall develop and implement a VELB mitigation plan in accordance with the most current USFWS mitigation guidelines for unavoidable take of VELB habitat, pursuant to either Section 7 or Section 10(a) of the Federal Endangered Species Act. The mitigation plan shall provide for no net loss of VELB habitat and shall include, but might not be limited to, relocation of elderberry shrubs, planting of elderberry shrubs, and monitoring of relocated and planted elderberry shrubs.	If VELB habitat is present, the project proponent shall implement mitigation for the protection of elderberry shrubs, ensuring no net loss of habitat, consistent with USFWS mitigation guidelines.	USFWS	Prior to any construction or grading activity.
Take of Swainson's hawk individuals (eggs, nestlings or juveniles) and other raptors (birds-of-prey).	4.2-3(a)	Prior to approval of development in portions of the Community Plan Area that contain trees, the project proponent, in consultation with the DFG, shall conduct a pre-construction survey of trees in the proposed development area for raptor nests. The surveys shall occur during the raptor breeding-season (approximately March 1 through August 31). The survey shall be conducted by a qualified raptor biologist during the same calendar year that the proposed activity is planned.	The project proponent, in consultation with the DFG, shall conduct a pre-construction survey of trees in any proposed development area for raptor nests. The survey shall be conducted by a qualified raptor biologist during the same calendar year that the proposed activity is planned.	CDFG	In the breeding season prior to any construction or grading activity.

56

MITIGATION MONITORING PLAN KEYES COMMUNITY PLAN UPDATE					
Significant or Potentially Significant Impact		Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
	(b)	If an active raptor nest is identified within one half mile of the plan area then a buffer zone shall be implemented within a (0.5 or 0.10) mile radius (depending upon raptor species) of the nest tree or nest burrow, in the case of ground nesting burrowing owls.	A buffer zone around nest trees or burrows shall be implemented in consultation with CDFG.	CDFG	Prior to construction or grading activity.
		If an active Swainson's hawk nest is involved then no construction activities shall be initiated during the Swainson's hawk nesting period (IE., March 1 - August 1) within .25 mile without the approval by DFG. Construction shall be permitted at such time that juvenile Swainson's hawks are no longer dependant upon the nest tree.	There shall be no construction activities initiated during the Swainson's hawk nesting period within .25 miles of an active Swainson's hawk nest without prior approval by CDFG.	CDFG	During construction or grading activity.
Removal of native oak trees.	4.2-4(a)	All oak trees over four inches (dbh) on proposed development sites shall be preserved to the maximum extent practical. Final development plans shall depict all trees proposed for removal. Any trees that are removed shall be replaced at a two to one tree replacement ratio. Prior to issuance of a grading permit, the applicant shall submit a tree preservation plan to the Stanislaus County planning division for review and approval The tree preservation plan shall include the location, number, species, and size of proposed replacement plantings. In addition, the plan shall include monitoring provisions for watering and landscaping to ensure survival and health of planted oak trees. During the monitoring period, dead trees shall be replaced.	Project proponents shall submit a tree preservation plan to the Stanislaus County planning division for review and approval that ensures that any oak trees over four inches (dbh) that are to be removed shall be replaced at a two to one tree replacement ratio. The plan shall include provisions for watering and landscaping and a monitoring period during which time dead trees shall be replaced	Planning Department; Agriculture Department	Prior to issuance of a grading permit.

57

MITIGATION MONITORING PLAN
KEYES COMMUNITY PLAN UPDATE

Significant or Potentially Significant Impact	Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
Cumulative loss and degradation of valley grassland and agricultural habitat supporting native plants and wildlife.	4.2-5 Implement Mitigation Measures 4.2-1 through 4.2-4.	See Mitigation Measures 4.2-1 through 4.2-4.		
4.3 Transportation and Circulation				
Roadway segments in the area could operate at unacceptable levels of service.	4.3-1 (a) Faith Home Road shall be widened to a four-lane major road between Keyes Road and Redwood Road. (b) Keyes Road shall be widened to a four-lane major road from Faith Home Road to State Route 99 southbound on- and off- ramps, and from Golden State Boulevard and State Route 99 northbound on- and off- ramps. (c) Golden State Boulevard shall be widened to a four-lane major road between Keyes Road and Taylor Road. (d) Washington Road shall be widened from a two-lane collector to an access-restricted two-lane, 60-foot wide collector south of the TID canal to Keyes Road at such time that widening is justified, as determined by the Director of Public Works.	The County shall establish a funding mechanism for required roadway improvements identified in the Community Plan. Individual projects within the Community Plan Area shall pay their fair share for roadway improvements based upon a project-specific traffic study. The County shall construct individual roadway projects.	Public Works Department and Board of Supervisors Developer Public Works Department	Prior to first approval of new development in the Plan Area. Prior to project approval. As warranted.

58

MITIGATION MONITORING PLAN
KEYES COMMUNITY PLAN UPDATE

Significant or Potentially Significant Impact	Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
Circulation in the Community Plan Area and the surrounding roadways.	4.3-2 (a) Faith Home Road shall be widened to six lanes between Keyes Road and Redwood Road. (b) Keyes Road shall be widened to six through lanes from Faith Home Road to Golden State Boulevard. (c) Washington Road shall be widened to an access-restricted, two-lane, 60-foot wide collector south of the TID canal to Keyes Road, at such time that widening is justified, as determined by the Director of Public Works.	The County shall establish a funding mechanism for required roadway improvements identified in the Community Plan. Individual projects within the Community Plan Area shall pay their fair share for roadway improvements based upon a project-specific traffic study. The County shall construct individual roadway projects.	Public Works Department and Board of Supervisors Developer Public Works Department	Prior to first approval of new development in the Plan Area. Prior to project approval As warranted.
Reduced levels of service at area intersections to unacceptable levels	4.3-3 (a) Keyes Road / SR 99 NB and SB Ramps Keyes Road shall be widened to six lanes from Faith Home Road to Golden State Boulevard. When a need for signalization is demonstrated through traffic signal warrants analysis, traffic signals shall be provided at the two ramp intersections. In addition to signalization, the following measures are necessary to operate the intersections at LOS C conditions or better during the PM peak hour:	The County shall establish a funding mechanism for required roadway improvements identified in the Community Plan. Individual projects within the Community Plan Area shall pay their fair share for roadway improvements based upon a project-specific traffic study. The County shall construct individual roadway projects.	Public Works Department and Board of Supervisors Developer Public Works Department	Prior to first approval of new development in the Plan Area. Prior to project approval. As warranted.

MITIGATION MONITORING PLAN
KEYES COMMUNITY PLAN UPDATE

Significant or Potentially Significant Impact	Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
	<u>SB Ramps</u> Provide dual left-turn lanes and a separate right-turn lane on the southbound approach. Provide dual westbound left-turn lanes on Keyes Road to southbound SR99. Provide three eastbound and three westbound through lanes. Provide a free eastbound right-turn lane from Keyes Road to southbound SR99. <u>NB Ramps</u> Provide dual left-turn lanes and a separate right-turn lane on the northbound approach. Provide an eastbound left-turn lane from Keyes Road to northbound SR99. Provide three eastbound and three westbound through lanes. Provide a free westbound right-turn lane from Keyes Road to northbound SR99.			

MITIGATION MONITORING PLAN
KEYES COMMUNITY PLAN UPDATE

Significant or Potentially Significant Impact	Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
	(b) Keyes Road / Golden State Boulevard Provide single westbound and dual eastbound left-turn lanes. Provide separate eastbound and westbound right-turn lanes. Provide two northbound and two southbound through lanes. Provide a separate right-turn lane on the northbound approach. Provide a separate southbound left-turn lane. Provide a free southbound right-turn lane.			
4.4 Air Quality				
Generation of CO, PM_{10}, NO_x and ROG emissions could exceed SJVUAPCD thresholds.	4.4-1(a) (Initial Study Mitigation Measure 7) To reduce PM_{10} emissions associated with construction the following strategies shall be included as part in all construction contracts for future development.	The San Joaquin Valley Air Pollution Control District (SJVAPCD) shall confirm that all construction contracts in the Community Plan include emissions reduction strategies included in Mitigation Measure 4.4-1.	SJVAPCD	Prior to issuance of grading or building permits.
	1. All clearing, grading, earth moving, or excavation activities shall cease when wind speeds are consistently equal to or greater than 20 mph.			Ongoing during construction.

MITIGATION MONITORING PLAN
KEYES COMMUNITY PLAN UPDATE

Significant or Potentially Significant Impact	Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
	2. All excavated material, graded or otherwise disturbed shall be watered sufficiently to prevent excessive amounts of dust. Watering shall occur twice daily with complete coverage, preferably in late morning and after work is done for the day. 3. All material transported and vehicle speeds shall be limited to 15 mph on unpaved roadways. 4. Street sweeping and/or washing shall be undertaken to reduce dust emissions on paved roads, shoulders and access ways adjacent to the construction site. Wetting of the pavement shall occur either prior to or in conjunction with rotary sweeping. 5. All internal combustion equipment shall be properly maintained and tuned according to manufacturer's specifications. 6. Idling of all internal combustion equipment shall be limited to ten minutes at any given time. 7. The use of building materials that do not require the use of paints/solvents shall be encouraged. (b) All diesel-fueled construction equipment shall implement the following measures: (i) Retard injection timing 2 degrees.			

62

MITIGATION MONITORING PLAN KEYES COMMUNITY PLAN UPDATE				
Significant or Potentially Significant Impact	Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
	(ii) Install high pressure injectors. (iii) Use reformulated diesel fuel. (iv) Limit diesel warm-up times (normally, a properly tuned diesel engine can be warmed up in 5 to 10 minutes).			
ROG, NO_x, CO, and PM_{10} emissions generated by motor vehicles and on-site sources associated with project operation would exceed established thresholds.	4.4-2(a) (Initial Study Mitigation Measure 8) To ensure the SJVAPCD standards are achieved, all new development within the plan area shall implement the following measures: 1. Lighting controls and energy-efficient lighting in buildings. 2. Light colored roof materials to reflect heat. 3. Provide low nitrogen oxide (NO_x) emitting and/or high efficiency water heaters. 4. If fireplaces are proposed, natural gas fireplaces or EPA-certified wood burning fireplaces/stoves should be installed in every unit that has a fireplace. 5. Include exterior electrical outlets on all residential units to encourage the use of electric powered yard maintenance equipment..	The County and SJVAPCD shall require that all new development in the Community Plan includes design measures, included in Mitigation Measure 4.4-2(a) and (c), to reduce project emissions.	Planning Department; SJVAPCD	Prior to project approval.

C 63

Significant or Potentially Significant Impact	Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
	(b) (Initial Study Mitigation Measure 9) All new development shall prepare an analysis to determine if project emissions would exceed SJVAPCD standards. If the project is found to exceed these standards, mitigation shall be incorporated into the project to reduce the emissions to a level below District standards. If no mitigation is available to reduce emissions below the standards, the project applicant shall participate in the District's offset program, by purchasing new equipment or other measures that would reduce emissions in the district by an amount equivalent to the amount of project emissions in excess of District standards.	All new development in the Community Plan shall prepare a project-specific air quality analysis. If development would exceed SJVAPCD standards after implementation of the measures in Mitigation Measure 4.4-2(a), the project applicant shall participate in the District's offset program, as described in Mitigation Measure 4.4-2(b).	Developer; SJVAPCD	Prior to project approval.
	(c) Increase insulation beyond Title 24 requirements.	See Mitigation Measure 4.4-2(a).		
Ozone in the air basin.	4.4-3 Implement Mitigation Measures 4.4-1(a) and (b) and 4.4-2(a), (b), and (c).	See Mitigation Measures 4.4-1(a) and (b) and 4.4-2(a), (b), and (c).		
	FIS Mitigation Measures			
Unstable soils	1 Design guidelines for individual projects shall include requirements for the preparation of site-specific geotechnical reports and shall require that project design incorporates additional or special construction technique and/or features, if any, to account for potentially unstable soil conditions.	The developer for any new project in the Community Plan shall prepare site-specific geotechnical reports and shall demonstrate that the project design incorporates techniques or features to account for potentially unstable soil conditions.	Public Works; Building Department; Department of Environmental Resources	Prior to issuance of grading permit.

MITIGATION MONITORING PLAN
KEYES COMMUNITY PLAN UPDATE

Significant or Potentially Significant Impact	Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
Soils are capable of supporting septic systems or will require connection to the Keyes CSD lines.	2. If the use of septic tanks is proposed for new development, a study shall be conducted by a qualified hydrologist to determine if the soil is capable of supporting a septic system. If the study determines that the soil is inadequate, the development shall be required to be annexed into the Keyes Community Service District for the provision of wastewater services.	The developer for any new project in the Community Plan shall conduct a study to determine if the soil is capable of supporting a septic system. If the soil is inadequate, the development shall be required to be annexed into the Keyes Community Service District.	Building Department; Department of Environmental Resources	Prior to project approval.
Adequate water would be available to serve future development prior to the approval of any development projects.	3. New development shall not be approved until it has demonstrated that adequate water supplies exist to serve the project.	The developer for any new project in the Community Plan shall provide to the City "will serve" letters from the appropriate water purveyor.	Department of Environmental Resources	Prior to project approval.
Discharge into surface waters.	4. During project construction, all new development shall implement appropriate stormwater runoff BMPs and design features to protect receiving water quality during construction and occupancy, consistent with Stanislaus County standards.	The developer of any new project in the Community Plan area shall incorporate design features to protect receiving water quality during construction and occupancy of the project. The contractor shall implement appropriate stormwater runoff BMPs during construction. The County shall inspect the project site to verify that stormwater runoff measures are being implemented	Public Works	During project construction.
Discharge into surface waters.	5. BMPs shall be incorporated into project design to reduce urban contaminant levels in stormwater runoff, consistent with Stanislaus County standards.	The developer of any new project in the Community Plan area shall incorporate BMPs into project design to reduce urban contaminant levels in stormwater runoff.	Public Works; Department of Environmental Resources	Prior to issuance of building permit.

MITIGATION MONITORING PLAN
KEYES COMMUNITY PLAN UPDATE

Significant or Potentially Significant Impact	Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
Change of absorption rates, drainage patterns and the rate and amount of surface runoff.	6. All new projects within the plan area shall demonstrate through a drainage study or hydrological report, in accordance with the Stanislaus County Public Works standards, that new development would not increase peak storm flows and that adequate capacity exists downstream to accommodate increased flood volume.	The developer of any new project in the Community Plan area shall prepare a drainage study or hydrological report, to demonstrate that new development would not increase peak storm flows and that adequate capacity exists downstream to accommodate increased flood volume.	Public Works; Department of Environmental Resources	Prior to project approval.
Odor	10. To address potential land use incompatibilities related to odor, new residential areas shall not be located immediately adjacent to odor producing land uses. If this is infeasible, adequate setbacks shall be provided as part of the project.	The County shall review new residential development to determine potential odor incompatibilities. If such potential exists, the County shall require adequate setbacks at the residential property to reduce odor impacts to acceptable levels.	Department of Environmental Resources; SJVAPCD	Prior to project approval.
Potential hazardous materials	11. Prior to development at locations suspected or known to have used hazardous materials, a Phase 1 Environmental Site Assessment shall be prepared in accordance with ASTM Standard to identify whether past or existing uses of the site have adversely affected soil or groundwater, or would otherwise pose a health hazard during site development. Results of the Phase 1 investigation shall be used to determine whether additional investigation or site management is needed.	A Phase 1 Environmental Site Assessment shall be prepared by the developer of any new project in the Community Plan area prior to development at locations suspected or known to have used hazardous materials. Based on results of the Phase 1 investigation, additional investigation or site management shall be required.	Planning Department; Department of Environmental Resources	Prior to grading or construction activities.
Potential hazardous materials	12. Construction contracts shall include a stop-work provision in the event previously unidentified contamination is discovered during construction so that appropriate actions can be taken to reduce potential human health and environmental hazards.	The developer of any new project in the Community Plan area shall include in all construction contracts a stop-work provision in the event unidentified contamination is discovered during construction.	Planning Department; Department of Environmental Resources	Prior to construction.

MITIGATION MONITORING PLAN KEYES COMMUNITY PLAN UPDATE				
Significant or Potentially Significant Impact	Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
Increase in noise levels.	13. New residential development located within areas subject to noise levels in excess of 60 $_{Ldn}$ shall demonstrate through an acoustical study that project design would reduce noise impacts to acceptable levels (per the County General Plan). Measures to reduce noise could include, sound-rated windows, sound walls, barriers, increased setbacks or other modifications to project design, or noise attenuation of proposed or existing buildings.	An acoustical study shall be prepared by the developer of any new project in the Community Plan area which demonstrates that project design would reduce noise impacts to acceptable levels in areas of new residential development subject to noise levels in excess of 60 $_{Ldn}$.	Planning Department; Department of Environmental Resources	Prior to project approval.
Increase in noise levels.	14. New development shall implement the following measures during construction:	All construction contracts shall include the measures identified in Mitigation Measure 14.	Planning Department	Prior to issuance of grading and construction permits.
	a. Construction shall be allowed only during the day, during hours designated by the County. b. All construction equipment shall be fitted with properly functioning mufflers. c. Any noisy construction equipment shall be located away from sensitive receptors, and, if necessary, temporary noise barriers shall be constructed between noise sources and sensitive receptors.	The County shall inspect the project site to verify that noise reduction measures are implemented.	Building Department	During construction.
Fire protection	15. All new development in the Community Plan Area shall be required to pay all applicable program fees, as defined by the Keyes Fire Protection District, which shall be used to prevent fire protection service from dropping below its current level. Fees may be used towards the purchase of new or replacement vehicles or substation space.	All new development in the Community Plan Area shall pay all applicable program fees, as defined by the Keyes Fire Protection District.	Planning Department; Keyes Fire Protection District	Prior to project approval.

MITIGATION MONITORING PLAN
KEYES COMMUNITY PLAN UPDATE

Significant or Potentially Significant Impact	Mitigation Measure	Implementation, Monitoring and Reporting Actions	Monitoring and Reporting Responsibilities	Implementation, Monitoring and Reporting Schedule
Light and glare	16. New multistory development in Highway Commercial, Industrial and Planned Industrial areas shall minimize the use of reflective surfaces and have those reflective surfaces which are used to be oriented in such a manner to reduce glare impacts along roadways.	The County shall review new multistory development in Highway Commercial, Industrial, and Planned Industrial areas to ensure that reflective surfaces would not result in glare along roadways.	Planning Department	Prior to project approval.
Light and glare	17. In Highway Commercial areas, cut-off luminaries, and/or shield, low-intensity lights shall be used to minimize the visibility of the lighting from nearby areas, and to prevent "spill over" of light onto adjacent residential properties.	New development in Highway Commercial areas shall include cut-off luminaries, and/or shield, low-intensity lights to prevent spillover.	Planning Department	Prior to project approval.
Park facilities	18. New development shall be required to contribute its fair share, as determined by the County of Stanislaus, toward provision of the parks proposed by this plan.	The developer of any new project in the Community Plan area shall to contribute its fair share toward provision of the parks proposed by the Community Plan.	Planning Department; Parks Department	Prior to project approval.