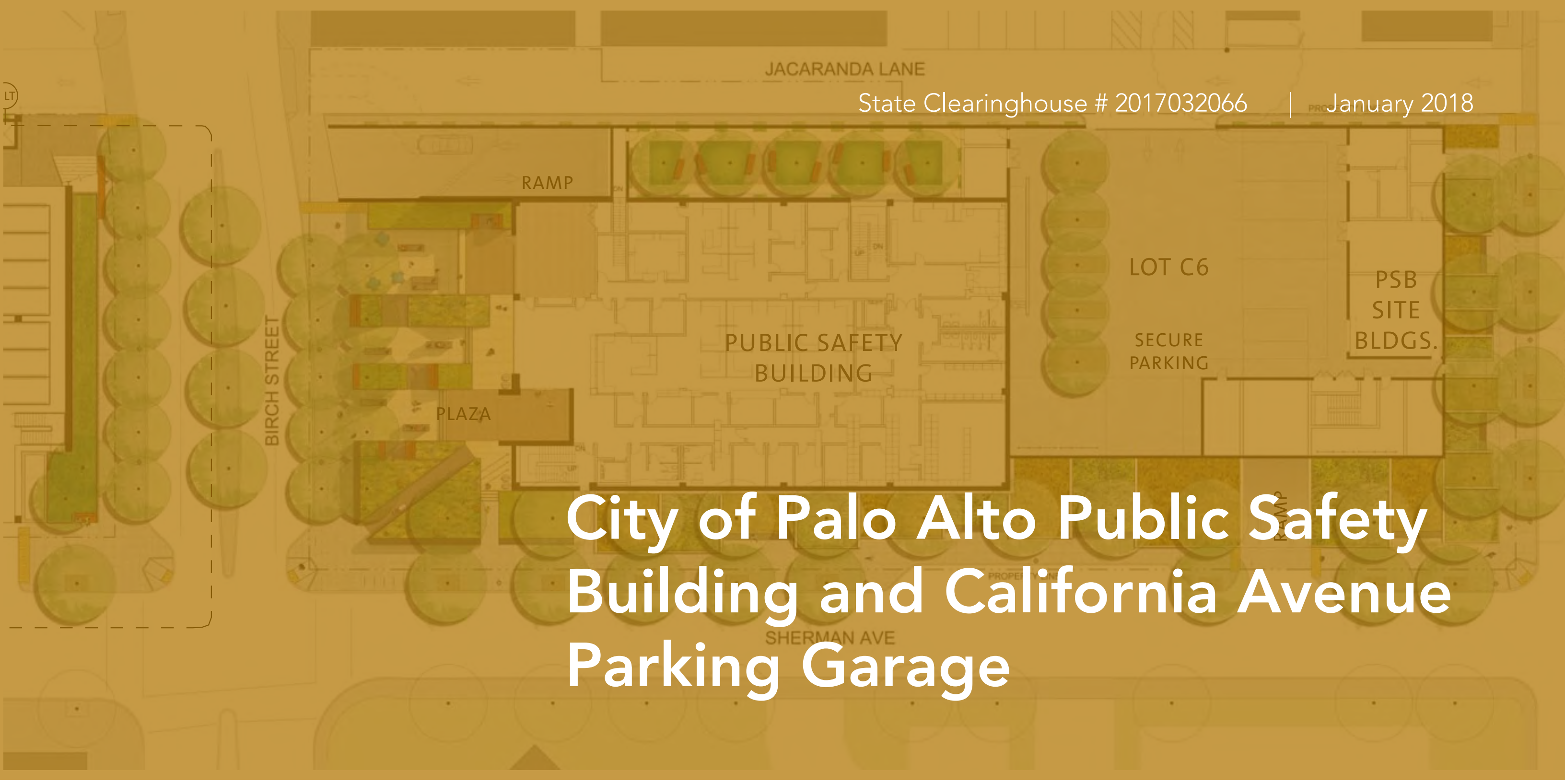

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City of Palo Alto Public Safety Building and California Avenue Parking Garage

Draft Environmental Impact Report

Prepared by the CITY OF PALO ALTO
Assisted by MIG

10754.00

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1. INTRODUCTION

1.1 EIR PURPOSE AND INTENDED USE

Pursuant to the California Environmental Quality Act (CEQA) Guidelines, this ***environmental impact report*** (EIR) has been prepared by the City of Palo Alto (City/project applicant) to describe the environmental consequences of the City of Palo Alto Public Safety Building (PSB) and California Avenue Parking Garage (collectively referred to as “the project”). The City proposes to relocate its Police Department, Fire Administration, Emergency Communications Center (911), Office of Emergency Services, Emergency Operations Center (EOC), and associated parking and other support spaces from their current downtown location at the Palo Alto Civic Center at 275 Forest Avenue and 250 Hamilton Avenue (Fire Administration only) to a new, adequately sized PSB facility at 250 Sherman Avenue, designed to meet the operational and essential facility standards for police and emergency service providers. The City also proposes to construct a new, adjacent public parking garage at 350 Sherman Avenue (California Avenue Parking Garage), to provide approximately 326 net new public parking stalls for the California Avenue commercial area. The construction of the PSB and adjacent parking garage comprise the project. (It is assumed that that space vacated in the civic center will be occupied by other City employees, and no substantive change in use will occur at that location.)

The proposed project is within the City’s jurisdiction and will require approval from the City Council. The specific City approvals required to implement the project include:

(1) Certification of the Final EIR and approval of the Mitigation Monitoring and Reporting Program; and

(2) An amendment to Chapter 18.28 of Title 18 (Zoning) of the Palo Alto Municipal Code (PAMC) to allow the City Council to modify the development standards to permit setbacks less than the current minimum along Birch and Ash Streets, Sherman Avenue, and Jacaranda Lane, heights exceeding the current maximum for the PSB building’s emergency telecommunications tower and the public parking garage; and for the parking garage, to exceed floor area ratio (FAR) and site coverage maximums. Although the PSB and parking garage only require these development standard modifications, the proposed ordinance amending the PAMC would allow the City Council to modify existing development standards and parking requirements generally for this and other similar projects involving Essential Services Facilities in the city and City parking garages in Downtown and the California Avenue Business District;

(3) Architectural review by the City’s Architectural Review Board, with a recommendation to City Council;

(4) City approval of a demolition permit and tree removal permits;

(5) City approvals of a grading permit and building permits; and

(6) City approval of a street work permit for temporary construction-related dewatering, and associated approvals.

This EIR has been prepared by the City to provide the CEQA-required environmental documentation for each of these project-related approvals. As used in this EIR, the terms "Public Safety Building and Public Parking Garage," "PSB project," and "project" are intended to be synonymous and refer to all aspects of the current Public Safety Building and California Avenue Parking Garage proposal, including all of the approval actions listed above. This EIR is intended to serve as a public information and disclosure document identifying those environmental impacts associated with the proposed project that are expected to be significant, and describing mitigation measures and alternatives that could minimize or eliminate significant adverse impacts and increase beneficial effects.[1] Such impacts and needed mitigations are discussed in this EIR to the level of detail necessary to allow reasoned decisions about the project and conditions of project approval. As a result of the information in this EIR, the City Council of Palo Alto may act to approve or deny these various project actions, and/or to establish any associated requirements or conditions of approval considered necessary to mitigate identified project impacts on the environment.

The proposed project does not require approval from State or federal agencies. However, agencies (e.g., Bay Area Air Quality Management District, Regional Water Quality Control Board) may use information in the EIR when issuing permits for particular project actions within their jurisdiction, as described in individual chapters of this EIR.

1.2 EIR APPROACH AND ASSUMPTIONS

1.2.1 Impact Assessment Assumptions

The purpose of this EIR is to evaluate the likely environmental consequences (impacts and benefits) with full realization of the buildout potential anticipated with adoption of the proposed project and to describe mitigation measures and alternatives that could minimize or eliminate potentially significant adverse environmental impacts and increase beneficial effects.[2] The PSB project buildout assumptions used as the basis for the impact analyses in this EIR are derived from the Architectural Review application and project plans (July 7, 2017).

The impact analyses in this EIR are based on the conservative assumption that the project will reach full operation in approximately three years, by the end of year 2020. This EIR assumes this buildout period in order to provide a conservative analysis of potential environmental impacts. Each impact analysis chapter in this EIR (e.g., aesthetics; air quality; greenhouse gas emissions and energy; noise; transportation, traffic, and parking) includes a description of related existing conditions, followed by an analysis of the proposed PSB project's impacts and mitigation needs.

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[1] CEQA Guidelines section 15149(b).

[2] CEQA Guidelines section 15149(b).

1.2.2 Impact Assessment Baseline

CEQA Guidelines section 15125(a) and (e) stipulate that the existing environmental setting (the environmental conditions in the project vicinity at the time the environmental analysis is commenced) should normally constitute the baseline physical conditions by which it is determined whether an impact is significant. Pursuant to this guideline, all impact assessments in this EIR compare development of the proposed PSB project with the existing environmental setting (environmental conditions) rather than with some future condition (i.e., development under buildout of the adopted Palo Alto Comprehensive Plan).

1.3 EIR SCOPE--SIGNIFICANT ISSUES AND CONCERNS

As required by the state CEQA Guidelines, the scope of this EIR includes all environmental issues to be resolved and all areas of controversy known to the Lead Agency (the City of Palo Alto), including those issues and concerns identified as possibly significant by the City in its preliminary environmental review of the project, and by other agencies, organizations, and individuals in response to the City's Notice of Preparation and Initial Study/Environmental Checklist Form[1] (dated March 22, 2017). Areas of potential controversy raised by agencies or the public include:

- Impacts on traffic, parking supply, and walkability
- Impacts on nearby residents
- Visual impacts/massing of parking garage, landscaping, and telecommunications tower height
- Construction impacts
- Greenhouse gases
- Groundwater extraction

The Initial Study/Environmental Checklist Form ("Initial Study") for this EIR is included in the EIR Appendix 21.1. The environmental questions in the Initial Study align closely with Appendix G of the CEQA Guidelines, with some revisions to address specific issues of particular importance to the City of Palo Alto. Based on research undertaken for the Initial Study, the following environmental questions have been answered either "less-than-significant impact" or "no impact" (see various definitions in Table 1.1) and, therefore, are not discussed further in this EIR:

Less-than-significant impact. Would the project:

Biological Resources:

- 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?

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[1] The Notice of Preparation (NOP) is a CEQA-required brief notice sent by the Lead Agency to notify the Responsible Agencies, Trustee Agencies, and potentially involved federal agencies that the Lead Agency plans to prepare an EIR for the project, and solicits guidance regarding EIR scope and content. The Initial Study is the preliminary analysis prepared to identify the significant environmental effects to be analyzed in the EIR (CEQA Guidelines section 15063). The City's NOP and Initial Study for the proposed project and written comments received in response to them are included in the EIR Appendices.

Hazards and Hazardous Materials:

- 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, result in a safety hazard for people residing in or working in the project area?
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Hydrology and Water Quality:

- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge?

No impact. Would the project:

Aesthetics:

- Have a substantial, adverse effect on a scenic vista?
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
- Substantially shadow public open space (other than public streets and adjacent sidewalks) between 9:00 a.m. and 3:00 p.m. from September 21 to March 21?

Agricultural and Forestry Resources:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use?
- Conflict with existing zoning for agricultural use, or a Williams Act contract?
- Conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production?
- Result in the loss of forest land or conversion of forest land to non-forest use?
- 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?

Air Quality:

- Create objectionable odors affecting a substantial number of people/

Biological Resources:

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?
- Have a substantial adverse effect on federally protected wetlands as defined by section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?
- Conflict with the provisions of an adopted habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

Geology and Soils:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault or landslides?

- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

Hazards and Hazardous Materials:

- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?
- For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the area?

Hydrology and Water Quality:

- Result in stream bank instability?
- Result in inundation by seiche, tsunami, or mudflow?

Mineral Resources:

- 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?
- 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?

Noise:

- 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, expose people residing or working in the project area to excessive noise levels?
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels?

Population and Housing:

- Induce substantial 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)?
- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?
- Create a substantial imbalance between employed residents and jobs?

Public Services:

- Result in an adverse physical impact from the construction of additional parks and recreation facilities in order to maintain acceptable performance standards?
- Result in an adverse physical impact from the construction of additional library facilities in order to maintain acceptable performance standards?

Recreation:

- 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?
- Include recreational facilities, or require the construction or expansion of recreational facilities, which might have an adverse effect on the environment?

Transportation/Traffic:

- Result in a change air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

Utilities and Service Systems:

- Not comply with federal, State, and local statutes and regulations related to solid waste?

So that the reader does not have to refer back to the EIR Appendices while reading the body of the EIR, the above Initial Study questions, explanations, and conclusions are repeated in their appropriate EIR chapter under the "Significance Criteria" heading. The discussions on agricultural resources, forest land, mineral resources, population/housing, and recreation are summarized in EIR section 17.5 (Effects Found Not to be Significant); none of these topics required its own EIR chapter because there were no potentially significant environmental impacts associated with the environmental topic upon completion of the Initial Study.

An Initial Study, by definition, is the first, preliminary analysis of any proposed project. Consistent with CEQA, for the proposed PSB project, further environmental analysis was undertaken for all impacts identified as "potentially significant" in the Initial Study. In some cases, this additional analysis concluded that the potentially significant impact would be less than significant. In other cases, for impacts identified as "less than significant" in the Initial Study, additional research during EIR preparation revealed additional detail, which is presented in the appropriate EIR chapter. In these cases, the EIR includes a comprehensive evaluation of the environmental issue under its own heading. Likewise, for a potentially significant impact that requires mitigation, the issue is discussed under its own heading.

1.4 "SIGNIFICANT IMPACTS" AND OTHER KEY EIR TERMINOLOGY

This EIR identifies those adverse environmental impacts that are expected to be "significant" and corresponding mitigation measures designed to eliminate or reduce those impacts to less-than-significant levels or, if less-than-significant levels cannot feasibly be achieved, to reduce the significant impacts to the extent feasible. Where it is determined in this report that a particular impact cannot be mitigated to a less-than-significant level, the EIR identifies that impact as "unavoidable." Section 17.2 of the EIR (Significant Unavoidable Impacts) notes that no potential impact of the proposed project is considered "significant and unavoidable." All identified potentially significant impacts resulting from the proposed PSB project can be mitigated to a less-than-significant level by implementation of the associated mitigation measure or measures identified in this EIR.

CEQA Guidelines section 15130 mandates that an EIR shall consider and discuss the cumulative impacts of a project when the project's incremental effect is cumulatively considerable. A cumulative impact is the result of the combination of the impacts resulting from the project together with other projects causing related impacts (section 15130). Accordingly, chapter 17 (section 17.4) in this EIR includes a discussion of potential cumulative impacts and, if a significant cumulative impact would occur, whether the project's incremental effect under that environmental topic is cumulatively considerable. The term "cumulatively considerable" is not quantitatively defined under CEQA; however, consideration of cumulative impacts for each environmental topic must consider the "cumulative context," such as the geographic area, existing environmental conditions, environmental analysis timeframe (how far into the future the potential impact is analyzed), and the type of project being analyzed. CEQA Guidelines section 15065(a)(3) considers a project's incremental contribution to a significant cumulative impact to be "cumulatively considerable" if the contribution is "significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects."

For localized impacts, the vicinity of the project development site constitutes the geographic scope of the analysis of cumulative effects; for certain other impacts, the boundary of the City of Palo Alto, and in certain other instances areas beyond Palo Alto, constitute the relevant geographic scope. Due to the regional context of air quality, climate change, and transportation (traffic) issues, the EIR analysis of these topics also includes consideration of potential impacts of development occurring in the regional context. In a few specified instances, such as water service impacts and wastewater service impacts, the service area of the service provider (the San Francisco Public Utility Commission and City of Palo Alto Wastewater Engineering Section, respectively) has been used as the geographic area for evaluation of cumulative impacts, in accordance with the growth projections for each of these service areas.

CEQA Guidelines section 15130(b)(1) stipulates that, in analyzing such cumulative impacts, the EIR can discuss either: (1) "a list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the [lead] agency"; or (2) "a summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area-wide conditions contributing to the cumulative impact." This CEQA Guidelines section indicates that the EIR should discuss not only approved projects under construction and approved projects not yet under construction, but also unapproved projects currently under review. When utilizing a list, the lead agency must decide the date on which the cumulative list of projects is considered current, so that the environmental analysis can proceed.

In this EIR, a combination of listed projects and consistency with regional growth projections was used. The traffic analysis of “Background Conditions” (2021) was based on a list of approved projects and an annual traffic growth rate, while the “Cumulative Conditions” (2035) traffic analysis was based on the City’s Travel Demand Forecasting Model. The EIR chapters on air quality (chapter 5), greenhouse gas emissions and energy (chapter 9), and noise (chapter 13) also used quantitative data to evaluate cumulative impacts. Cumulative impact analysis for all other topics relied on projections from the City’s Comprehensive Plan.

The particular EIR terms noted above ("significant," “cumulative,” "unavoidable," "mitigation") and other key CEQA terminology used in this report are defined in Table 1.1 on the following page.

1.5 REPORT ORGANIZATION AND CONTENT

The impact and mitigation information in this EIR is generally organized in chapters under individual environmental headings (see Table of Contents). Each environmental chapter includes sections describing the following for that issue:

(1) the environmental setting;

(2) the regulatory setting; and

(3) impacts and mitigation measures (impacts anticipated with the proposed project and measures identified to mitigate potentially significant adverse impacts).

In addition, in keeping with CEQA Guidelines, the EIR includes a chapter summarizing the EIR information in terms of various CEQA-required impact finding categories (growth-inducing impacts, significant unavoidable impacts, irreversible environmental changes, cumulative impacts, effects found not to be significant - chapter 17), and a chapter evaluating various alternatives to the proposed project (chapter 18).

Table 1.1

DEFINITIONS OF KEY EIR TERMINOLOGY	
Significant/Potentially Significant Impact	"Significant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic and aesthetic significance. (CEQA Guidelines, section 15382.) *"An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant."* (CEQA Guidelines, section 15382.)
Significant Cumulative Impact	"Cumulative impacts" are defined as *"two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts."* (CEQA Guidelines, section 15355.)
Unavoidable Significant Impact	"Unavoidable significant impacts" are defined as those significant adverse environmental impacts for which either no mitigation or only partial mitigation is feasible. If the project is to be approved without imposing an alternative design, the Lead Agency (the City) must include in the record of the project approval a written statement of the specific reasons to support its action--i.e., a "statement of overriding considerations." (CEQA Guidelines, sections 15126.2(b) and 15093(b).)
Significance Criteria	The criteria used in this EIR to determine whether an impact is or is not *"significant"* are based on (a) CEQA-stipulated "mandatory findings of significance"--i.e., where any of the specific conditions occur under which the Legislature and the Secretary of Resources have determined to constitute a potentially significant effect on the environment, which are listed in CEQA Guidelines section 15065; (b) the relationship of the project effect to the adopted policies, ordinances and standards of the City and of responsible agencies; and/or (c) commonly accepted practice and the professional judgment of the EIR authors and Lead Agency staff.
Mitigation Measures	For each significant impact, the EIR must identify a specific "mitigation" measure or set of measures capable of *"(a) avoiding the impact altogether by not taking a certain action or parts of an action;* *(b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the impacted environment; (d) reducing or eliminating the impact over time by preservation or maintenance operations during the life of the action; or (e) compensating for the impact by replacing or providing substitute resources or environments."* (CEQA Guidelines, section 15370.)
SOURCE: MIG, 2018.	

2. SUMMARY

This EIR chapter includes: (1) a summary description of the various components and actions included in the draft Palo Alto Public Service Building and California Avenue Parking Garage (the "project"); (2) a list of related environmental issues to be resolved; (3) a summary of the associated significant environmental impact and mitigation findings of this EIR; and (4) a summary of the EIR-identified alternatives to the proposed project.

This summary should not be relied upon for a thorough understanding of the proposed project or its associated impacts and mitigation needs. Please refer to chapters 3 through 18 of this EIR for a more complete description of the proposed project, associated project impacts and mitigation measures, and alternatives.

2.1 PROPOSED PROJECT

The proposed Public Safety Building (PSB), at 250 Sherman Avenue, would be located on the City's existing surface Parking Lot C-6. The PSB would be approximately a 45,000 to 50,000 square-foot (excluding accessory site buildings), three-story police station and fire/police administration building. The PSB would include two full-block subterranean floors of police parking and operations, and share its parcel with smaller operational accessory buildings, a secure operational yard, and a public plaza. The PSB would be a secure, essential services facility designed to support and protect the critical operations that occur inside. Due to the PSB's specialized uses, its design requires the careful balancing of transparency and solidity. The height of the PSB would be approximately 50 feet to the rooftop.

As a law enforcement and emergency response building, the PSB would require specialized building and site design accommodations. For example, no unscreened vehicle may come within 20'-0" of the building, thereby requiring a security setback enforced with perimeter vehicle barriers. The subterranean parking for patrol vehicles must have two separate vehicular exits onto two unique streets, in the event that one street is obstructed in some way (e.g., flooding, protest, fire, or other obstructing hazard). Site design should follow CPTED (Crime Prevention Through Environmental Design) best practices. Windows and openings are to be protected from line-of-sight vulnerabilities, resulting in careful placement and type of windows, types of visual screening, and quantity of openings. Outdoor programmatic areas must be secured and screened from view to protect critical operations. The project would include facility resiliency, redundancy, and hardening strategies which, when deployed, will enable the PSB to remain operational after a major disaster.

The proposed parking garage, at 350 Sherman Avenue, would be located on the City's existing surface Parking Lot C-7. The parking garage would be four levels above grade and two stories below grade, with 636 public parking spaces serving the needs of the California Avenue business district. The parking structure would fill its site to nearly the property lines and utilize strategies such as a cascading exterior grand staircase and landscaped setback (on Birch Street), a pedestrian arcade (on Ash Street), and a partial-block pedestrian arcade leading to a mid-block paseo (on Jacaranda Lane) to provide appropriately scaled site amenities. The height of the California Avenue Parking Garage would be approximately 49'-0" above sidewalk level to top of roof-mounted photovoltaic (PV) panels.

As a public-serving amenity, the garage's key design imperatives include ease of wayfinding, generosity toward the pedestrian environment, and a perimeter skin that offers an appropriate visual character when viewed by its neighbors

2.2 REQUIRED APPROVALS

The proposed PSB project is within the City's jurisdiction and will require approval from the City Council.

The specific City approvals required to implement the project include:

(1) Certification of the Final EIR and Approval of the Mitigation Monitoring and Reporting Program.

(2) An amendment to Chapter 18.28 of Title 18 (Zoning) of the Palo Alto Municipal Code to allow the City Council to modify the development standards to permit setbacks less than the current minimum along Birch and Ash Streets, Sherman Avenue, and Jacaranda Lane, heights exceeding the current maximum for the PSB building's emergency telecommunications tower and the public parking garage; and for the public parking garage to exceed the floor area ratio (FAR) and site coverage maximums. Although the PSB and parking garage only require these development standard modifications, the proposed ordinance amending the PAMC would allow the City Council to modify existing development standards and parking requirements generally for this and other similar projects involving Essential Services Facilities in the Public Facilities (PF) zone in the city and City parking garages in the PF zone in the Downtown and the California Avenue Business District;

(3) Architectural review by the City's Architectural Review Board, with a recommendation to City Council;

(4) City approval of a demolition permit and tree removal permits;

(5) City approvals of a grading permit and building permits; and

(6) City approval of a street work permit for temporary construction-related dewatering, and associated approvals.

2.3 ENVIRONMENTAL ISSUES

As required by the state CEQA Guidelines, the scope of this EIR includes all environmental issues to be resolved and any areas of environmental controversy known to the Lead Agency (the City), including those issues and concerns identified as possibly significant by other agencies, organizations, and individuals in response to the City's Notice of Preparation and

Initial Study/Environmental Checklist Form[1] (dated March 22, 2017). Areas of potential controversy raised by agencies or the public include:

- Impacts on traffic, parking supply, and walkability
- Impacts on nearby residents
- Visual impacts/massing of parking garage, landscaping, and telecommunications tower height
- Construction impacts
- Greenhouse gases
- Groundwater extraction

2.4 SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION MEASURES

For each of the environmental topics discussed in this EIR, any ***"potentially significant"*** project or cumulative impact and associated mitigation measure or measures identified in this EIR are summarized in Table 2-1, SUMMARY OF POTENTIALLY SIGNIFICANT IMPACTS AND RECOMMENDED MITIGATION MEASURES, which follows. The summary chart has been organized to correspond with the more detailed impact and mitigation discussions in chapters 4 through 16 of this EIR. The chart is arranged in five columns: (1) impacts, (2) potential significance without mitigation, (3) mitigation measures, (4) the entity responsible for implementing each mitigation measure, and (5) the level of potential impact significance after implementation of the mitigation measure(s).

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[1] The Notice of Preparation (NOP) is a CEQA-required brief notice sent by the Lead Agency to notify the Responsible Agencies, Trustee Agencies, and potentially involved federal agencies that the Lead Agency plans to prepare an EIR for the project, and solicits guidance regarding EIR scope and content. The Initial Study is the preliminary analysis prepared to identify the significant environmental effects to be analyzed in the EIR (CEQA Guidelines section 15063). The City's NOP and Initial Study for the proposed project and scoping comments received in response to the them are included in the appendices of this EIR.

Table 2-1

SUMMARY OF POTENTIALLY SIGNIFICANT IMPACTS AND RECOMMENDED MITIGATION MEASURES

Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
AIR QUALITY				
Impact 5-1: Construction Toxic Air Contaminant Emissions. Project construction would expose sensitive receptors located adjacent to and in close proximity of the proposed project site to localized, outdoor concentrations of DPM and PM$_{2.5}$ that could exceed BAAQMD risk thresholds even with the implementation of feasible mitigation measures. This project-related effect is considered to represent a ***potentially significant impact.***	S	**Mitigation 5-1.** To reduce potential short-term adverse health risks associated with PM2.5 emissions, including emissions of diesel particulate matter (DPM), generated during project construction activities, the City and/or it’s designated contractors, contractor’s representatives, or other appropriate personnel shall: 1. *Implement BAAQMD-recommended “Additional Construction Measures”.* The City shall implement the following BAAQMD-recommended additional construction mitigation measures during construction activities: 1. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent, to be verified by lab samples or moisture probe. 2. All excavation, grading, and/or demolition activities shall be suspended when average winds speeds exceed 20 miles per hour. 3. Temporary wind breaks (e.g., fences) shall be installed on the windward (generally the north / northwest) of actively	City	LS

S = Significant
LS = Less than significant
SU = Significant unavoidable impact
NA = Not applicable

Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		disturbed areas of construction. The wind breaks should have at maximum 50 percent air porosity 4. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established 5. Simultaneous occurrence of excavation, grading, and ground-disturbing construction activities in the same area at any one time shall be limited and/or phased to reduce the amount of disturbed surfaces at any one time. 6. All trucks and equipment, including their tires, shall be washed off prior to leaving the site. 7. Site access to a distance of 100 feet from the paved road, or as much as feasible, shall be treated with a compacted layer of wood chips, mulch, gravel, or other cover as feasible to reduce track-out. 8. Minimize the idling time for diesel-powered construction equipment to two minutes provided such idling restrictions are consistent with manufacturer's equipment specifications.		

S = Significant
LS = Less than significant
SU = Significant unavoidable impact
NA = Not applicable

Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		2. *Construction equipment restrictions*. The City shall apply the following construction equipment restrictions to the proposed project:		
		1. Electric-powered and liquefied or compressed natural gas equipment shall be employed instead of diesel powered equipment to the maximum extent feasible.		
		2. All construction equipment with a rated power-output of 25 horsepower or greater shall meet U.S. EPA and CARB Tier IV Final Emission Standards for particulate matter. This may be achieved via the use of equipment with engines that have been certified to meet Tier IV emission standards, or through the use of equipment that has been retrofitted with a CARB-verified diesel emission control strategy (e.g., oxidation catalyst, particulate filter) capable of reducing exhaust PM emissions to levels that meet Tier IV standards.		
		3. Prepare Construction Risk Reduction Plan. Prior to the start of construction activity, the City and/or its contractor shall prepare a Construction Risk Reduction Plan for the project which:		
		1. Identifies the final planned construction phasing schedule and anticipated equipment operations.		

S = Significant
LS = Less than significant
SU = Significant unavoidable impact
NA = Not applicable

Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		2. Estimates the proposed project's construction emissions based on the final phasing and equipment plan. Any emission update shall be performed using the latest-recommended emissions estimator model recommended by the BAAQMD or other standard, acceptable methodology (e.g., contractor-specific fleet emission factors and estimates of equipment operating hours) 3. Models the potential diesel particulate matter and total PM2.5 concentrations resulting from refined emissions estimates. Any modeling shall be performed using an accepted screening or refined dispersion-model recommended for use by the BAAQMD. The modeling shall focus on discrete, residential receptors located at and near the proposed project site. 4. Estimates potential adverse health effects associated with exposure to DPM. Risk estimates shall follow the latest recommendations of the BAAQMD. The goal of the risk estimation shall be to identify the receptor(s) or areas of receptors where carcinogenic and non-carcinogenic risk thresholds may be exceeded. If risks are exceeded, the plan shall identify feasible on- and off-site		

S = Significant
LS = Less than significant
SU = Significant unavoidable impact
NA = Not applicable

Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		measures to reduce risks to levels below BAAQMD thresholds. On-site measures may include the BAAQMD "Additional Construction Measures" and construction equipment restrictions included in Mitigation Measure 5-1, as well as phasing / activity restrictions. Off-site measures may include coordinating with all impacted receptors to replace and upgrade existing HVAC systems to provide high-performance panel filters capable of reducing potential modeled outdoor PM2.5 concentrations / risks to levels that are below BAAQMD thresholds. 4. *Implement Off-Site Mitigation.* In-lieu of preparing the Construction Risk Reduction Plan identified above, the City may, prior to the start of construction activities, coordinate directly with impacted residential receptors to replace and upgrade existing residential HVAC systems with a high-performance panel filter with a rated minimum efficiency reporting value (MERV) for particles in the range of 0.3 to 1.0 µm of 70% (presumed to be a minimum MERV-14), or equivalent system upgrade. This level of control would reduce risks to levels below current BAAQMD thresholds. Based on the results of the modeling conducted for the EIR, the City shall coordinate with residential receptors located in the area bound by Park Boulevard to the north, Ash Street to the south,		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		Sheridan Avenue to the east, and Sherman Avenue to the west. The implementation of these measures would limit construction activities and require the implementation of controls that would reduce predicted adverse construction health risks to less than significant levels. Therefore, toxic air contaminant emissions generated during construction of the proposed project is considered ***less-than-significant with mitigation.***		
BIOLOGICAL RESOURCES				
Impact 6-1: Potential Impacts on Nesting Birds. The proposed PSB project is intended to improve the natural environment on the project site with an extensive array of coordinated new landscaping and trees. However, 38 existing trees are proposed to be removed. Without a proactive mitigation procedure in place, project construction could inadvertently result in the removal of trees containing nests or eggs of migratory birds, raptors, or bird species during the nesting season, which would be considered an "unlawful take" under the Federal Migratory Bird Treaty Act and USFW provisions protecting migratory and nesting birds (see Regulatory Setting above). This is considered a ***potentially significant impact.***	S	**Mitigation 6-1.** To avoid impacts to nesting birds and violation of State and federal laws pertaining to birds, all construction-related activities (including but not limited to mobilization and staging, clearing, grubbing, vegetation removal, fence installation, demolition, and grading) should occur outside the avian nesting season (that is, prior to February 1 or after August 31). If construction and construction noise occurs within the avian nesting season (from February 1 to August 31), all suitable habitats located within the project's area of disturbance, including staging and storage areas plus a 150-foot buffer around these areas, shall be thoroughly surveyed, as feasible, for the presence of active nests by a qualified biologist no more than five days	City	LS

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		before commencement of any site disturbance activities and equipment mobilization. If project activities are delayed by more than five days, an additional nesting bird survey shall be performed. Active nesting is present if a bird is sitting in a nest, a nest has eggs or chicks in it, or adults are observed carrying food to the nest. The results of the surveys shall be documented. If it is determined that birds are actively nesting within the survey area, the additional procedures below shall apply. Conversely, if the survey area is found to be absent of nesting birds, the additional procedures shall not be required. **Additional Procedures.** If pre-construction nesting bird surveys result in the location of active nests, no site disturbance and mobilization of heavy equipment (including but not limited to equipment staging, fence installation, clearing, grubbing, vegetation removal, fence installation, demolition, and grading) shall take place within 150 feet of nests, or as determined by a qualified biologist, until the chicks have fledged. Monitoring shall be required to insure compliance with the MBTA and relevant California Fish and Game Code requirements. Monitoring dates and findings shall be documented.		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		Implementation of this measure would reduce the impact to a ***less-than-significant level.***		
Impact 6-2: Impact 6-2: Removal of Protected and Designated Trees. Because 6 protected trees and 5 designated trees are proposed to be removed as part of the proposed PSB project, Palo Alto Municipal Code Title 8 (Trees and Vegetation) Chapters 8.04 and 8.10 would apply to the project to require on-site tree replacement or off-site replacement and mitigation in accordance with the standards in the City's Tree Technical Manual (Section 8.10.050(d)(2)). Without adequate replacement or other mitigation as set forth in the Tree Technical Manual, the project would be inconsistent with the Municipal Code tree protection provisions. This potential inconsistency with the tree protection policy and these tree removals are considered a **potentially significant impact.**	S	**Mitigation 6-2.** Prior to removal of the protected trees and street trees, the applicant shall obtain a tree removal permit issued by the City of Palo Alto Urban Forestry Division for the removal of any and all protected, designated, or street trees (referred to collectively as "Regulated Trees"). In all cases, replacement trees would be required as a condition of the tree removal permit, and the project applicant must demonstrate to the satisfaction of the City that there is no alternative that could preserve the tree(s) on-site. The project applicant must provide an evaluation and summary for any Regulated Tree (the collective term for any protected, designated, or street tree) proposed to be removed. The applicant shall be required, in accordance with the Tree Protection and Management Regulations (PAMC 8.10) and Tree Technical Manual (PAMC 8.10.130), to replace the tree canopy for the six (6) protected trees, in accordance with the tree canopy formula identified in the Tree Technical Manual (TTM, 3.20). If the tree canopy cannot be replaced on-site, the canopy shall be replaced off-site as close to the project site as feasible. If trees are being replaced off-site, the applicant must	City	LS

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		submit a Tree Planting Plan to the Urban Forestry Division and obtain the Urban Forestry Division’s approval of the plan prior to issuance of a building permit. The Tree Planting Plan must include: ▪ The canopy calculation for trees removed and the number of trees planned to replace them, consistent with the formula identified in the Tree Technical Manual ▪ The specific location where the new trees would be planted with specific baseline information about that proposed site (e.g., surrounding vegetation or development) ▪ The species of trees to be planted ▪ Specific planting details (e.g., size of sapling, size of containers, irrigation plan) ▪ Success criteria ▪ Monitoring and maintenance schedule Replacement tree planting will be monitored by a qualified arborist. To verify the success of replacement trees, monitoring shall occur for two years after initial planting. After the two-year period, the arborist will determine if the trees are capable of surviving without further		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		maintenance. Implementation of this measure would reduce the impact to a ***less-than-significant level.***		
CULTURAL AND HISTORIC RESOURCES				
Impact 7-1: Potential Disturbance of Archaeological or Paleontological Resources. Project construction (e.g., excavation for underground parking and utilities) could disturb existing unrecorded sensitive archaeological or paleontological resources at the PSB project site. Although unlikely, this possibility represents a ***potentially significant impact.***	S	**Mitigation 7-1.** In the event of the unanticipated discovery of subsurface archaeological or paleontological resources during earth-moving operations, the following measures are recommended to reduce potentially significant impacts on these resources to a less-than- significant level: ▪ Conduct Archaeological/Paleontological Sensitivity Training for Construction Personnel. The City shall retain a qualified professional archaeologist who meets U.S. Secretary of the Interior's Professional Qualifications and Standards, and a professionally qualified paleontologist, to conduct an Archaeological/Paleontological Sensitivity Training for construction personnel prior to commencement of excavation activities. The training session will include a written handout and will focus on how to identify archaeological and paleontological resources that may be encountered during earth-moving activities, including the procedures to be followed in such an event, the duties of archaeological and paleontological monitors, and the	City	LS

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		general steps a qualified professional archaeologist or paleontologist would follow in conducting a salvage investigation if one is necessary. ▪ Cease Ground-Disturbing Activities and Implement Treatment Plan if Archaeological Resources Are Encountered. In the event that archaeological resources are unearthed during ground-disturbing activities, the ground-disturbing activities shall be halted or diverted away from the vicinity of the find so that the find can be evaluated. A buffer area of at least 50 feet shall be established around the find, where construction activities will not be allowed to continue until a qualified archaeologist has examined the newly discovered artifact(s) and has evaluated the area of the find. Work shall be allowed to continue outside the buffer area. All archaeological resources unearthed by project construction activities shall be evaluated by a qualified professional archaeologist, who meets the U.S. Secretary of the Interior's Professional Qualifications and Standards. Should the newly discovered artifacts be determined to be prehistoric, Native American		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		Tribes/Individuals shall be contacted and consulted, and Native American construction monitoring should be initiated. The City shall coordinate with the archaeologist to develop an appropriate treatment plan for the resources. The plan may include implementation of archaeological data recovery excavations to address treatment of the resources, along with subsequent laboratory processing and analysis. ▪ Conduct Periodic Archaeological Resources Spot Checks During Grading and Earth-Moving Activities in All Sediments. The City shall retain a qualified professional archaeologist who meets the U.S. Secretary of the Interior's Professional Qualifications and Standards, to conduct periodic Archaeological Spot Checks beginning at depths below two (2) feet to determine if construction excavations have exposed, or have a high probability of exposing, archaeological resources. After the initial Archaeological Spot Check, further periodic checks shall be conducted at the discretion of the qualified archaeologist. If the qualified archaeologist determines that construction excavations have		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		exposed, or have a high probability of exposing, archaeological artifacts, construction monitoring for archaeological resources will be required. The City shall retain a qualified archaeological monitor, who meets the qualifications set forth by the U.S. Secretary of the Interior's Professional Qualifications and Standards, who will work under the guidance and direction of a professional archaeologist. The archaeological monitor shall be present during all construction excavations (e.g., grading, trenching, or clearing/grubbing) into non-fill sediments. Multiple earth-moving construction activities may require multiple archaeological monitors. The frequency of monitoring shall be based on the rate of excavation and grading activities, proximity to known archaeological resources, the materials being excavated (native versus artificial fill soils), the depth of excavation, and if found, the abundance and type of archaeological resources encountered. Full-time monitoring can be reduced to part-time inspections if determined adequate by the project archaeologist.		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		▪ If subsurface paleontological resources are encountered, excavation shall halt in the vicinity of the resources and a qualified paleontologist shall evaluate the resource and its stratigraphic context. The monitor shall be empowered to temporarily halt or redirect construction activities to ensure avoidance of adverse impacts to paleontological resources. During monitoring, if potentially significant paleontological resources are found, "standard" samples shall be collected and processed by the qualified paleontologist to recover micro vertebrate fossils. If significant fossils are found and collected, they shall be prepared to a reasonable point of identification. Excess sediment or matrix shall be removed from the specimens to reduce the bulk and cost of storage. Itemized catalogs of material collected and identified shall be provided to a museum repository with the specimens. Significant fossils collected during this work, along with the itemized inventory of these specimens, shall be deposited in a museum repository for permanent curation and storage. A report documenting the results of the monitoring and salvage activities, and the significance of the		

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		fossils, if any, shall be prepared. The report and inventory, when submitted to the lead agency, shall signify the completion of the program to mitigate impacts on paleontological resources. Implementation of these measures would reduce impacts on archaeological and paleontological resources to a ***less-than-significant level***.		
Impact 7-2: Unanticipated Discovery of Tribal Cultural Resources. Project construction activities (e.g., excavation) could disturb as yet unidentified and/or unrecorded tribal cultural resources, including possible human remains. This possibility represents a ***potentially significant impact.***	S	**Mitigation 7-2.** In the event that cultural resources of Native American origin are identified during construction, all earth-disturbing work within the vicinity of the find must be temporarily suspended or redirected until an archaeologist has evaluated the nature and significance of the find and an appropriate Native American representative, based on the nature of the find, is consulted. If the City determines that the resource is a tribal cultural resource and thus significant under CEQA, a mitigation plan shall be prepared and implemented in accordance with State guidelines and in consultation with Native American groups. The plan would include avoidance of the resource or, if avoidance of the resource is infeasible, the plan would outline the appropriate treatment of the resource in coordination with the archaeologist and the appropriate Native American tribal representative.	City	LS

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		Implementation of this measure would reduce impacts on tribal cultural resources to a ***less-than-significant level.***		
GEOLOGY AND SOILS				
Impact 8-1: Geotechnical Hazards Associated with Project Excavation and Grading. The project's proposed excavation and grading activities have the potential to create conditions that would potentially compromise the safety or stability of proposed project improvements. The preliminary site-specific geotechnical investigation (Romig Engineers, May 2016) made initial assessments of these conditions, but a construction-level geotechnical investigation will be needed to adequately address all grading and excavation activities on the proposed Public Safety Building and California Avenue Parking Garage (PSB project) site. Without such a detailed study--and without the associated supervision of an engineering geologist or geotechnical engineer during project grading and construction--the safety and long-term stability of existing and proposed project improvements cannot be assured. These possible excavation and grading hazards represent a ***potentially significant impact.***	S	**Mitigation 8-1.** As recommended by the project's preliminary geotechnical investigation, prior to City issuance of grading permits for individual project construction components, the City shall be required to retain a registered engineering geologist or geotechnical engineer to prepare detailed, construction-level geotechnical investigations to guide the construction of all project grading and excavation activities. The detailed, construction-level geotechnical investigations shall be performed for each of the structures proposed for the development site. Subsurface conditions shall be explored and laboratory tests conducted on selected soil samples to establish parameters for the design of excavations, foundations, shoring, and waterproofing. Recommendations from the investigations shall be incorporated into all plans for project grading, excavation, soil support (both temporary and long-term), and utility construction, to the satisfaction of the City Engineer.	City	LS

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		The detailed, construction-level investigations, relevant recommendations, and all associated project grading, excavation and foundation plans, shall be subject to review and approval by an independent engineering geologist or geotechnical engineer retained by the City Engineer. In addition, the project civil engineer shall certify to the City Engineer (e.g., through plan submittal for City review) that all relevant provisions of the investigations have been incorporated into the grading, excavation and construction plans, and all earthwork and site preparation shall be performed under the direct supervision of a registered engineering geologist or geotechnical engineer. Implementation of these measures would reduce the potential excavation and grading impacts to a ***less-than-significant level***.		
HAZARDS AND HAZARDOUS MATERIALS				
Impact 10-1: Potential Project-Related Exposure to Existing Soil or Groundwater Contamination. Project-related excavation and construction activities could expose on-site construction personnel, employees, and members of the public to existing soil and groundwater contamination. This current situation is considered a ***potentially significant impact.***	S	**Mitigation 10-1.** Recommendations included in the Phase II ESA (Stantec, June 8, 2017) shall be implemented, based on construction-level project plans when more specific and precise design and construction activities are formulated. The Phase II ESA recommends additional assessment of local and regional groundwater conditions in advance of dewatering activities, combined with, as necessary, evaluation of pertinent and cost-	City	LS

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		effective water management strategies, including preparation of Site Management Plans. Likewise, the project must comply with the City's standard dewatering requirements. This assessment and mitigation process shall be subject to review and approval by the City Engineer. Implementation of these mitigations would reduce this impact to a ***less-than-significant level***.		
NOISE				
Impact 13-1: Project Construction Noise. Project construction would include site preparation, excavation and grading, utility trenching, construction of a new parking garage and public safety building, and application of architectural coatings. The noise levels generated by project construction would be in excess of 10 dB above ambient conditions at sensitive receptor locations for several hours a day for a period of approximately 16 to 21 months. Thus, the proposed project construction activities could result in a ***potentially significant impact.***	S	**Mitigation 13-1.** To reduce potential noise levels associated construction of the proposed project, the City and/or it's designated contractors, contractor's representatives, or other appropriate personnel shall: ▪ *Restrict work hours/equipment noise.* All work shall be subject to the construction noise and time limits contained in City Municipal Code Chapter 9.10. Construction activities (including deliveries) shall only occur during the following time periods: – 8 AM to 6 PM Monday through Friday; and – 9 AM to 6 PM on Saturday	City	LS

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		Construction activities shall be prohibited on Sundays and holidays. The City and/or its contractor shall post a sign at all entrances to the construction site informing contractors, subcontractors, construction workers, etc. of these requirements in accordance with Section 9.10.060(c). The sign shall also provide a name (or title) and phone number for an appropriate on-site and City representative to contact to submit a noise complaint. ▪ *Construction equipment care, siting, and design measures*. The following construction equipment care, siting, and design measures shall apply during construction activities: – Heavy equipment engines shall be covered and exhaust pipes shall include a muffler in good working condition. Pneumatic tools shall include a noise suppression device on the compressed air exhaust. – All stationary noise-generating equipment such as pumps, compressors, and welding machines shall be shielded and located as far from sensitive receptor locations as practical. At a minimum, such shielding shall consist of a three-sided sound enclosure		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		(with a full or partial roof) that provides for proper ventilation, equipment operation, and effective noise control. The enclosure should be designed to achieve a 10 to 15 dB reduction in stationary equipment noise levels. The design of the enclosure shall be reviewed by a qualified acoustical consultant prior to installation to ensure the enclosure will achieve a minimum 10 dB reduction in stationary equipment noise levels. – The City shall connect to existing electrical service at the site to avoid the use of stationary, diesel- or other alternatively-fueled power generators. – No radios or other amplified sound devices shall be audible beyond the property line of the construction site. ▪ *Construction traffic.* Construction truck traffic, including soil hauling, equipment deliveries, potential concrete deliveries, and other vendor deliveries shall follow designated delivery routes prepared for the project, which are anticipated to include travel on Oregon Expressway and Birch Road.		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		▪ *Construct/Install Temporary Noise Barrier:* The City shall install and maintain throughout the duration of all site preparation, excavation, foundation construction, and building construction activities, one or more physical noise barriers capable of achieving a minimum reduction in predicted construction noise levels of 15.5 dB. Potential barrier options would include: – A concrete, wood, or other barrier installed at-grade (or mounted to structures located at-grade, such as K-Rail) along the project property line. Such a wall/barrier shall consist of material that have a minimum rated transmission loss value of 25.5 dB (or equivalent rating), and shall contain no gaps in the structure through which noise may pass. – Commercially available acoustic panels or other products such as acoustic barrier blankets installed along the project property line, building envelope or, if feasible and necessary, at or near sensitive residential receptor areas. – Any combination of noise barriers and commercial products capable of achieving a 15.5 dB reduction in		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		construction noise levels at sensitive receptor locations. – Prior to the start of the project, the City may prepare an acoustical analysis that reflects the final site plan, construction activities, equipment use and duration, and refines potential construction noise reductions required for the project. The final type, placement, and design of the project's temporary noise barrier(s) shall be reviewed by a qualified acoustical consultant prior to installation to ensure proper function and a minimum attenuation of 15.5 dBs in construction noise levels. ▪ *Prepare Project Construction Noise Control Plan.* Prior to the start of construction activity, the City or its contractor shall prepare a Construction Noise Complaint Plan for the project which: – Identifies the name and/or title and contact information (including phone number and email) of the Contractor and City-representatives responsible for addressing construction-noise related issues.		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		– Contains a detailed construction schedule and predicted noise levels associated with construction activities. – Includes procedures describing how the construction contractor will receive, respond, and resolve to construction noise complaints. At a minimum, upon receipt of a noise complaint, the Contractor and/or City representative described in the first sub-bullet above shall identify the noise source generating the complaint, determine the cause of the complaint, and take steps to resolve the complaint. ▪ *Prepare Construction Noise Monitoring Plan*. Prior to the start of construction, the City or its contractor shall prepare a Construction Noise Monitoring Plan which identifies: – Construction activities, hours of operation, and predicted construction noise levels; and – Construction noise monitoring locations, duration, and frequency. The intent of the Construction Noise Monitoring Plan is to document updated ambient noise levels, monitor construction noise levels, and verify compliance with the noise reduction requirements in mitigation		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		measure 13-1. If monitoring indicates temporary noise barriers are not achieving a minimum 15.5 dB reduction in construction noise levels or otherwise indicates construction noise is resulting a 10 dB increase in noise levels above ambient conditions, the City shall increase the height, size (length or width), density, and/or amount of noise barriers installed such that attenuation requirements are achieved. The Construction Noise Monitoring Plan may be combined with and/or incorporated into the Construction Noise Complaint Plan described above. The implementation of these measures would limit construction activities and require the implementation of controls that would reduce predicted construction noise levels to less than a 10 dB increase above existing ambient conditions. Therefore, the construction noise impact of the proposed project is considered ***less than significant with mitigation.***		
Impact 13-2: Project Groundborne Vibration Levels. Project construction activities could generate perceptible groundborne vibration at adjacent buildings, including residential buildings, for a period of approximately 8 months. Thus, groundborne vibration generated during project construction	S	**Mitigation 13-2.** To reduce potential groundborne vibration levels associated with construction of the proposed project, the City and/or it's designated contractors, contractor's representatives, or other appropriate personnel shall:	City	LS

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
could result in a ***potentially significant impact.***		▪ *Prohibit Vibratory Equipment.* The City shall prohibit the use of large vibratory rollers (small plate compactors are acceptable) and vibratory pile driving equipment during construction. Any deep foundation piers or caissons shall be auger drilled. ▪ *Provide Notice to Adjacent Property Owners / Occupants.* Five (5) days advanced written notice shall be provided to adjacent property owners and building occupants before commencing all drilling and significant earthmoving activities within 65 feet of adjacent buildings. The notice shall provide the name (or title) and contact information (including phone number and email) of the Contractor and City-representatives responsible for addressing construction vibration-related concerns. ▪ *Prepare Vibration Mitigation Plan.* Prior to the start of construction activity, the City or its contractor shall prepare a Construction Vibration Response Plan for the project which: – Identifies the name and/or title and contact information (including phone number and email) of the Contractor and City-representatives responsible for		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		addressing construction vibration-related issues. – Contains a detailed schedule of drilling and substantial earth moving activities expected to occur within 65 feet of adjacent buildings. – Includes procedures describing how the construction contractor will receive, respond, and resolve to construction vibration complaints. At a minimum, upon receipt of a vibration complaint, the Contractor and/or City representative described in the first sub-bullet above shall identify the vibration source generating the complaint, determine the cause of the complaint, and take steps to resolve the complaint by reducing groundborne vibration levels to less than 75 VdB and 0.04 in/sec PPV. Such measures may include the use of non-impact drivers, use of rubber-tired equipment instead of track equipment, or other measures that limit annoyance from groundborne vibration levels. The implementation of these measures would limit the potential for groundborne vibration during construction activities, require advanced notice to adjacent property owners and building occupants, and develop procedures designed to		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		limit potential annoyance and interference with daily activities at adjacent buildings. Therefore, the construction vibration impact of the proposed project is considered ***less than significant with mitigation.***		
Impact 13-3: Project Operational Noise. Noise generated by the parking garage ventilation fans and the public safety building generator, fire pump, and heating and air conditioning equipment may exceed standards contained in the City Municipal Code unless shielding or other means of attenuation is provided. This is considered a ***potentially significant impact.***	S	**Mitigation 13-3.** To reduce potential stationary source noise levels associated with the operation of the proposed project, the City and/or it's designated contractors, contractor's representatives, or other appropriate personnel shall: ▪ *Site equipment away from residential areas.* Garage ventilation fans and public safety building generators, fire pumps, and heating and air conditioning equipment shall be located outside of setbacks and screened from view from residential areas. ▪ *Enclose and/or Shield Stationary Noise-Generating Equipment.* The City shall enclose, shield, baffle, or otherwise attenuate noise generated from garage ventilation fans and public safety building generators, fire pumps, and heating and air conditioning equipment. The attenuation achieved through such enclosure, shielding, and/or baffling shall be sufficient to comply with Section 9.10.050(a) of the Municipal Code, which is estimated to be 78.2 dBA.	City	LS

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		▪ *Prepare Acoustical Study.* In accordance with Chapters 9.10 and 18.23 of the Municipal Code, the City shall have an acoustical analysis prepared by a licensed acoustical engineer that demonstrates: – The proposed parking garage's generator would comply with the requirements of the City's Noise Ordinance (Section 9.10.050, as excepted). – The proposed parking garages ventilation fans would not result in a calculated Ldn of 63.0 at sensitive residential receptor locations. – The proposed public safety building fire pump, back-up generator, and heating and air conditioning equipment would comply with the requirements of the City's Noise Ordinance (Section 9.10.050, as excepted) and would not result in a calculated increase of more than 3.0 dB Ldn at sensitive receptor locations. The acoustical analysis shall be based on the final project design, reflect the actual equipment type and location at the project site, and the actual noise enclosure, shielding, or other attenuation measures		

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Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Significance With Mitigation
		included in the final project design. If the acoustical study demonstrates the noise levels from these sources would be at or within 5 dB less than the Noise Ordinance limits, the City shall demonstrate through monitoring that the equipment complies with the anticipated noise levels. Implementation of these measures would ensure the project is designed and constructed in a manner consistent with the City's Municipal Code requirements and would reduce this impact to a ***less-than-significant level***.		

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2.5 SUMMARY OF ALTERNATIVES

Four alternatives to the proposed project are evaluated in chapter 18 (Alternatives to the Proposed Project) of this EIR to provide a further understanding of the environmental effects of the proposed project and possible approaches to reducing identified significant impacts, and to meet CEQA requirements for EIR content. The four alternatives are summarized below.

2.5.1 Identified Alternatives

- **Alternative 1: No Project—Existing Parking Lots Remain at 250 and 350 Sherman Avenue.** As required by CEQA Guidelines section 15126.6(e)(1), under Alternative 1 (No Project), there would be no change in the current location or size of the Palo Alto Police Department building at 275 Forest Avenue. There would be no development on the parking lots at 250 and 350 Sherman Avenue. The Police Department, Emergency Operations Center (EOC) and Emergency Communications Center (911) would remain at the Police Department building, and Fire Administration would remain at 250 Hamilton Avenue, both at the Palo Alto Civic Center. The current 25,000 square-foot Police Department building was constructed in 1970 and would remain undersized by approximately 20,000 square feet to accommodate all of the public safety services planned for consolidation in one building. The Police Department building would continue to not meet current seismic, security, survivability, accessibility, and regulatory code requirements applicable to an “essential services facility” under State law.

- **Alternative 2: PSB as Proposed, Smaller Parking Garage on Lot C-7.** This alternative would include the PSB as proposed (e.g., 45,000 to 50,000 square feet), but the public parking garage on Lot C-7 would be reduced from the proposed 636 spaces to 300 spaces. This reduction is assumed to result in the following: (1) the parking garage would be three levels above grade and one level below grade (approximately 40 feet in height), instead of four levels above grade and two levels below grade (approximately 49 feet in height); and (2) a redesign of the parking garage would retain three (3) of the eleven (11) protected/designated trees proposed to be removed for the PSB project. The parking garage total of 300 spaces for this alternative is based on a City Council approved 2014 Infrastructure Plan; the total approximates the number of existing spaces on the two surface parking lots that comprise the PSB project site.

- **Alternative 3: Renovation and Expansion of 275 Forest Avenue, Smaller Parking Garage on Lot C-7.** This alternative would revisit and revise the feasibility study prepared by Hohbach-Lewin Structural Engineers to renovate and expand the existing Police Department building at 275 Forest Avenue at the Palo Alto Civic Center (Feasibility Study: Palo Alto Public Safety Building, 275 Forest Avenue, Palo Alto, CA; Hohbach-Lewin, Inc., Structural Engineers; May 18, 2010); the study evaluated eight options. In addition for this alternative, a public parking garage would be constructed on Lot C-7 on Sherman Avenue, but its size would be reduced from the project-proposed 636 spaces to 300 spaces. Similar to Alternative 2, this garage reduction is assumed to result in the following: (1) the garage would be three levels above grade and one level below grade (approximately 40 feet in height), instead of four levels above grade and two levels below grade (approximately 49 feet in height); and (2) a redesign of the parking garage would retain the three (3) protected/designated trees proposed to be removed for the parking garage component of the PSB project. The parking garage total of 300 spaces for this alternative is based on a City Council approved 2014 Infrastructure Plan; with the surface parking spaces remaining on Lot C-6, this alternative would result in a net increase of approximately 148 parking spaces at Lots C-6 and C-7.

- **Alternative 4: Alternative Project Location**. Section 15126.6 of the CEQA Guidelines indicates that the EIR evaluation of alternatives may include alternatives to the project's proposed location. Twenty-two locations were considered for a new PSB before selecting 250 and 350 Sherman Avenue as the project site. From 1999 to 2000, extensive site assessments were conducted for potential new locations for a public safety building (PSB) at Park Boulevard, California Avenue, Page Mill/El Camino Real, the Downtown Library, and the existing location at 275 Forest Avenue. At a May 6, 2015 study session, City staff presented three candidate sites to the City Council. Based on feedback from the Council, the 250 Sherman Avenue location was the only one that met the City Council's criteria.

  One other particular alternative location was reviewed for this EIR: 3045 Park Boulevard, which is approximately 0.4-mile southeast of the proposed Sherman Avenue project site.

2.5.2 Conclusion: Environmentally Superior Alternative

The CEQA Guidelines (section 15126[e][2]) stipulate, "If the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives." The No Project alternative would be the environmentally superior alternative, as defined by CEQA. Of the identified alternatives other than the No Project alternative, Alternative 2: PSB as Proposed, Smaller Parking Garage on Lot C-7 would result in the least adverse overall environmental impacts, and would therefore be the "environmentally superior alternative." This conclusion is based on the overall similarity or reduction in the severity of impacts, as well as the attainment of basic project objectives.

2.6 MITIGATION IMPLEMENTATION

For those mitigation measures identified in this EIR that are adopted by the City, a ***mitigation monitoring and reporting program*** will be undertaken by City staff to ensure and verify mitigation implementation. Implementation of most of the mitigation measures recommended in this EIR could be effectively implemented through incorporation into the final version of one or more of the various project components (e.g., parking garage) and/or can be implemented (monitored and verified) through the City's standard development review procedures following adoption of these components. Pursuant to CEQA Guidelines section 15097, adoption of a mitigation monitoring and reporting program will be necessary before the project can be adopted by the City Council of Palo Alto. Chapter 19 (Mitigation Monitoring) of this EIR provides additional detail.

3. PROJECT DESCRIPTION

This EIR chapter describes the proposed City of Palo Alto Public Safety Building (at 250 Sherman Avenue) and California Avenue Parking Garage (at 350 Sherman Avenue) project actions (together, the "project") addressed in this EIR. Throughout the EIR, the Public Safety Building (PSB) and parking garage are collectively referred to as the “PSB project” because (1) they are being proposed and designed together as one integrated project, and (2) CEQA Guidelines section 15378 (Project) defines a “project” as “the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment[.]” Any references to the individual Public Safety Building or the California Avenue Parking Garage will be labeled in terms of “PSB” or “parking garage” without the collective term “project.”

In accordance with CEQA Guidelines section 15124 (Project Description), the project description that follows has been detailed to the extent needed for adequate evaluation of environmental impacts. The description includes: (a) the location and boundaries of the project site; (b) the background leading up to the proposed project; (c) the overall objectives sought by the project; (d) the various project design and operational characteristics; (e) the potential project construction timing; and (f) the jurisdictional approvals required to implement the project.

3.1 SETTING

3.1.1 Regional Location

As illustrated by Figure 3.1, the project site is located in northwestern Santa Clara County in the City of Palo Alto. Palo Alto is located on the San Francisco Bay Peninsula, approximately 40 miles south of the city and county of San Francisco, and immediately south of the southern boundary of San Mateo County. Regional access to the project site is provided via US Highway 101 (US 101) to the east, Interstate Highway 280 (I-280) to the west, the California Avenue Caltrain station one block to the northeast, and El Camino Real one block to the southwest.

3.1.2 Local Setting

The PSB project site and vicinity are shown on Figures 3.1 and 3.2.

The project site is located at 250 and 350 Sherman Avenue, in the California Avenue Business District. The site is bounded by Sherman Avenue to the southeast (“south”), Jacaranda Lane to the northwest (“north”), Ash Street to the southwest (“west”), and Park Boulevard to the northeast (“east”), and bisected by Birch Street. The site includes two surface parking lots, identified as Lot C-6 on the east and Lot C-7 on the west.[1]

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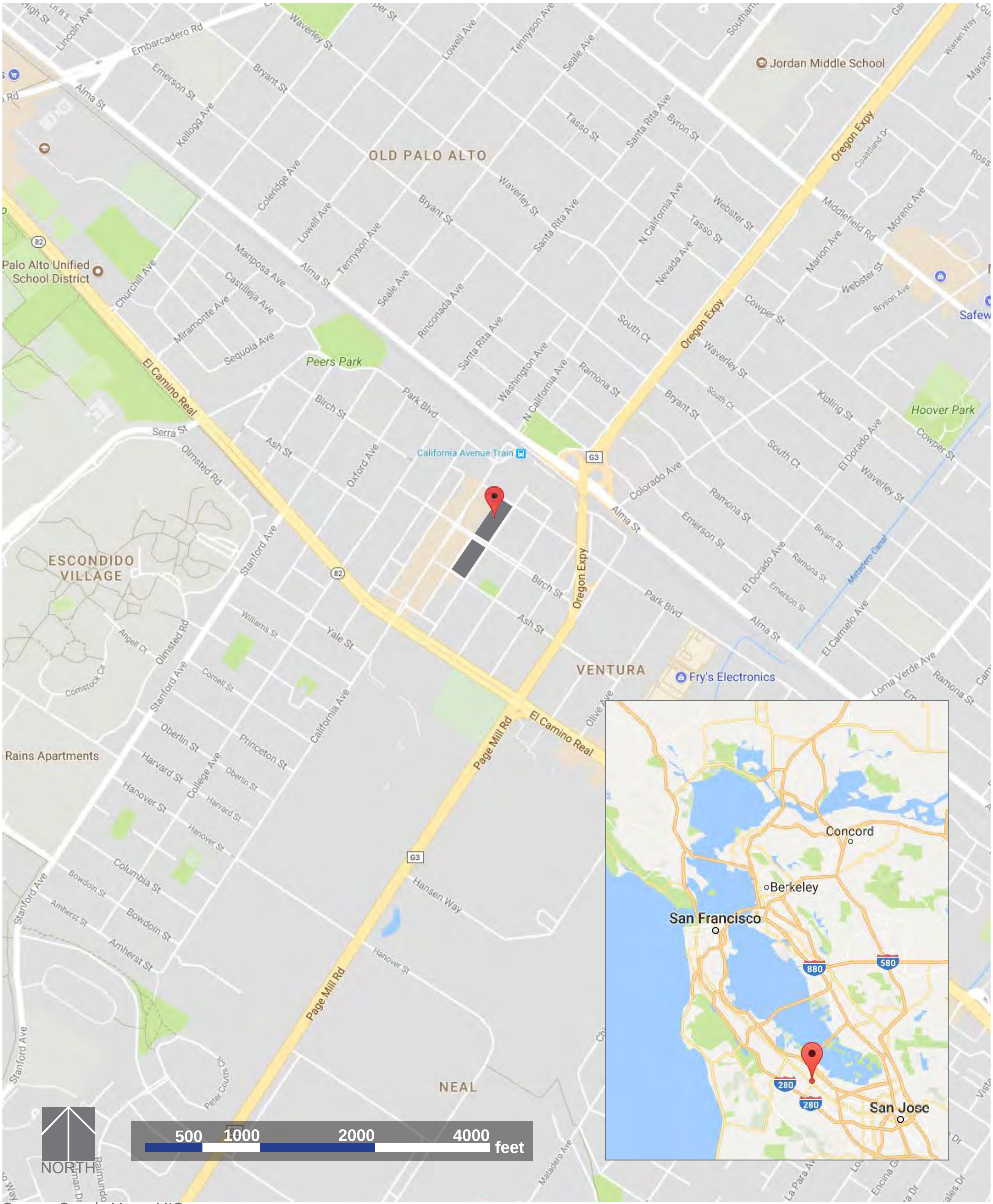
[1] In this EIR, true directions in the immediate project vicinity have been simplified as indicated on applicable figures, whose directional arrow indicates “PN” (Project North) and “TN” (True North).



Source: Google Maps, MIG

Figure 3.1 - Project Location Map

Source: RossDrulisCusenbery Architecture

Figure 3.2 - Project Vicinity

Across Sherman Avenue from the project site are the Santa Clara County Courthouse and parking lot, and the Visa Research office building at 385 Sherman. Properties fronting Ash Avenue between Grant Avenue and Sherman Avenue include multiple-family residential uses and Sarah Willis Park. Land uses along Park Boulevard from Grant Avenue to Sherman Avenue include office/commercial uses, including several restaurants.

3.2 PROJECT BACKGROUND

The current 25,000 square-foot Palo Alto Police Department facility at 275 Forest Avenue was constructed in 1970. Numerous City-sponsored studies, beginning in 1997 through the City's 2014 City Council Infrastructure Plan, identified and substantiated the need for a new PSB facility that would include space for the Police Department, Communications (911 Dispatch) Center, Office of Emergency Services, Emergency Operations Center, and Fire Administration Division. The existing facility - which currently houses only the Police Department, Communications Center, and Emergency Operations Center - is undersized by approximately 20,000 square feet to meet the programmatic space needs of all of the public safety functions to be sited in a new PSB facility, and does not meet current seismic, security, survivability, accessibility, and regulatory code requirements applicable to an "essential services facility[1]" under State law. A variety of sites and options were considered for the project over the past 17 years, including renovating and expanding the current police facilities at the City Hall location. None of these options proved feasible or were completed. The proposed PSB project meets the projected long-term (at least 50-year) facility requirements of the Palo Alto Police Department, Communications Dispatch Center, Office of Emergency Services, Emergency Operations Center, and Fire Administration Division.

The PSB project represents Palo Alto's largest investment in municipal infrastructure since the construction of City Hall. During the Preliminary Architectural Review by the City's Architectural Review Board (ARB) in June 2017, the ARB reviewed three different approaches to the PSB project. These previous options were: *Screening/Greening*, which proposed to veil the PSB building and public parking garage in a naturalized setting to reduce their visual presence and secure vulnerable openings; *Dynamic Massing*, which proposed to break down building massing by modulating the building volumes to make the two-block project appear smaller, more intimate, and visually dramatic; and *Simple Civic,* which proposed a dignified and semi-formal visual presence to create a confident, approachable, and community-scaled civic image for the PSB project. The ARB offered input about the design opportunities inherent in each concept and provided direction to the design team on how best to further refine the design as the project progresses. During this same time frame, the three options were also presented to the PSB's user groups and some community representatives. In October 2017, the City presented a single design based on previous input at the first ARB review of the formal application. The ARB provided more detailed design input on the selected design and continued the hearing to allow design modifications and publication and circulation of this CEQA document. The current proposal evaluated in this EIR emerged from this process.

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[1] Under the Essential Services Buildings Seismic Safety Act of 1986, new "essential services buildings," which include police stations, fire stations, emergency operations centers, and emergency communication dispatch centers, shall be designed and constructed in accordance with certain procedures and specifications established in the law to minimize fire hazards and to resist, to the extent practical, the forces generated by earthquakes, gravity, and winds. (Cal. Health & Safety Code §§16000-16023.)

3.3 PROJECT OBJECTIVES

The project objectives, as identified by the City of Palo Alto, are described below. These objectives are also used in EIR chapter 20 (Alternatives to the Proposed Project) to help compare project alternatives.

1. To locate and operate the City's Police Department, Office of Emergency Services, Emergency Operations Center, Emergency Communications (911 Dispatch) Center, and Fire Administration Division in one centralized facility that is adequately sized to meet the programmatic needs of these public safety functions.

2. To locate the City's Police Department, Office of Emergency Services, Emergency Operations Center, Emergency Communications (911 Dispatch) Center, and Fire Administration Division operations within a facility that meets the standards of an essential services facility to substantially increase the probability of maintaining operation after a major earthquake, natural disaster, or other substantial disruption or disaster.

3. To provide more parking in the California Avenue area of Palo Alto.

4. Ensure that project construction proceeds in a manner that would minimize disruption of existing parking for current users of the surface parking lots on the project site.

3.4 PROPOSED PROJECT CHARACTERISTICS

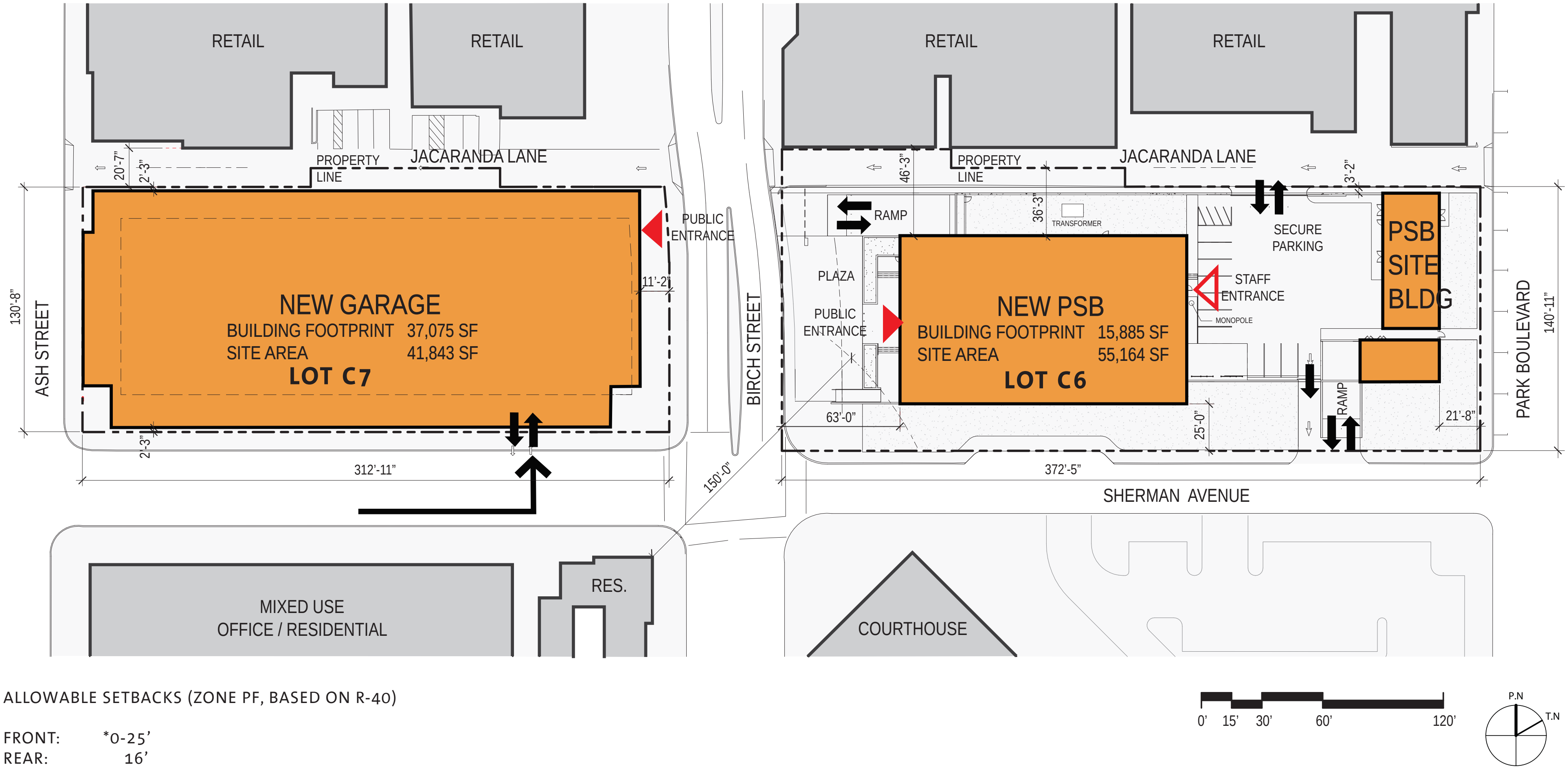
3.4.1 Overview

See Figures 3.2, 3.3, and 3.4. The proposed **Public Safety Building (PSB)**, at 250 Sherman Avenue, would be located on the City's existing surface Parking Lot C-6. The PSB would be approximately a 45,000 to 50,000 square-foot, three-story police station and fire/police administration building. The PSB would include two full-block subterranean floors of police parking and operations, and share its parcel with two, smaller, one-story accessory buildings (totaling 4,300 square feet, which would include a mechanical room, trash enclosure, generator, chiller, and transformer), a secure operational yard, and a public plaza. The PSB would be a secure, essential services facility designed to support and protect the critical operations that occur inside. Due to the PSB's specialized uses, its design requires the careful balancing of transparency and solidity. The height of the PSB would be approximately 50'-0" above sidewalk level to top of roof.

As a law enforcement and emergency response building, the PSB would require specialized building and site design accommodations. For example, no unscreened vehicle may come within 20'-0" of the building, thereby requiring a security setback enforced with perimeter vehicle barriers. The subterranean parking for patrol vehicles must have two separate vehicular exits onto two unique streets, in the event that one street is obstructed in some way (e.g., flooding, protest, fire, or other obstructing hazard). Site design should follow CPTED (Crime Prevention Through Environmental Design) best practices. Windows and openings are to be protected from line-of-sight vulnerabilities, resulting in careful placement and type of windows, types of visual screening, and quantity of openings. Outdoor programmatic areas must be secured and

Source: RossDrulisCusenbery Architecture, Interstice Architects

Figure 3.3 - Illustrative Site Plan



ALLOWABLE SETBACKS (ZONE PF, BASED ON R-40)

FRONT:	*0-25'
REAR:	16'
SIDE:	10'
STREET:	20'

*BETWEEN 0' AND 25', DETERMINED BY ARCHITECTURAL REVIEW BOARD

Source: RossDrulisCusenbery Architecture

Figure 3.4 - Technical Diagrammatic Site Plan

screened from view to protect critical operations. The project would include facility resiliency, redundancy, and hardening strategies which, when deployed, will enable the PSB to remain operational after a major disaster.

The **parking garage**, at 350 Sherman Avenue, would be located on the City's existing surface Parking Lot C-7. The parking garage would be four levels above grade and two stories below grade, with 636 public parking spaces serving the needs of the California Avenue business district. The parking structure would fill its site to nearly the property lines and utilize strategies such as a cascading exterior grand staircase and landscaped setback (on Birch Street), a pedestrian arcade (on Ash Street), and a partial-block pedestrian arcade leading to a mid-block paseo (on Jacaranda Lane) to provide appropriately scaled site amenities. The height of the California Avenue Parking Garage would be approximately 49'-0" above sidewalk level to top of roof-mounted photovoltaic (PV) panels. As a public-serving amenity, the garage's key design imperatives include ease of wayfinding, generosity toward the pedestrian environment, and a perimeter skin that offers an appropriate visual character when viewed by its neighbors.

3.4.2 Site Development

The City of Palo Alto (City/project applicant) proposes to relocate the City's Police Department, Emergency Communications Center (911), Office of Emergency Services, Emergency Operations Center (EOC), Fire Administration, and associated parking and other support spaces from their current downtown location at the Palo Alto Civic Center at 275 Forest Avenue and 250 Hamilton Avenue (Fire Administration only), Palo Alto, California, to a new Public Safety Building (PSB) facility adequately sized and designed to meet the operational and essential facility standards for police and emergency service providers. The City also proposes to construct a new California Avenue Parking Garage to provide 326 net new public parking stalls (for total of 636 public parking stalls) for the California Avenue commercial area. The construction of the PSB and parking garage comprise the "PSB project." (It is assumed that space vacated in the civic center will be backfilled with other, existing City employees, and no substantive change in use will occur at that location.)

The project site is comprised of two City-owned surface parking lots designated as Lot C-6 and Lot C-7 on Sherman Avenue between Ash Street and Park Boulevard in the California Avenue commercial area in Palo Alto. The construction of the PSB on the 1.27-acre Lot C-6 would displace approximately 158 existing public parking spaces. Redevelopment of the adjoining 0.96-acre surface Parking Lot C-7 for a new garage would displace approximately 152 existing parking spaces. The new parking garage would contain 636 stalls to replace and increase the parking spaces on-site, for a net increase of 326 public parking stalls. The construction of the new public parking garage on Lot C-7 must be complete prior to the start of construction of the new PSB on the adjacent Lot C-6 in order to minimize construction disruption to the neighborhood and loss of parking to local businesses.

Coordinated vehicular movement is a key consideration in the site planning (see Figure 3.4). Due to its lower pedestrian volumes, Sherman Avenue will be the primary vehicular activity zone, with both the public garage and the patrol vehicle garages entering off Sherman. Birch Street has been selected as the back-up/emergency access (and staff vehicle access point) for the PSB to avoid conflicts between vehicles and the bike pathway along Park Boulevard. The Birch Street access will be right turn in/right turn out only.

See Figures 3.5 through 3.8. The PSB project includes two primary elements:

WEST ELEVATION -- ALONG BIRCH STREET

SOUTH ELEVATION -- ALONG SHERMAN AVE.

Source: RossDrulisCusenbery Architecture

Figure 3.5 - Public Safety Building Elevations: West and South

EAST ELEVATION -- ALONG PARK BLVD

NORTH ELEVATION -- ALONG JACARANDA LANE

Source: RossDrulisCusenbery Architecture

Figure 3.6 - Public Safety Building Elevations: East and North

WEST ELEVATION -- ALONG ASH STREET

SOUTH ELEVATION -- ALONG SHERMAN AVE.

Source: RossDrulisCusenbery Architecture

Figure 3.7 - Parking Garage Elevations: West and South

EAST ELEVATION -- ALONG PARK BLVD

NORTH ELEVATION -- ALONG JACARANDA LANE

Source: RossDrulisCusenbery Architecture

Figure 3.8 - Parking Garage Elevations: East and North

- A new three-story PSB of approximately 45,000 to 50,000 square feet (excluding accessory site buildings), over two levels of secure basement parking and operations, and associated site improvements. The PSB would provide between 145 and 150 secure underground parking spaces for police vehicles, other personnel vehicles, and departmental vehicles; some of the spaces would be oversized to accommodate specialty vehicles. The PSB would also provide secure surface parking for 6 to 10 police vehicles in the exterior operations yard.

- A new four-level public parking garage over two basement parking levels, providing 636 spaces on Lot C-7, and associated site improvements.

The principal components of the PSB project are listed below.

- **Demolition and Site Preparation:** The existing site improvements on Parking Lots C-6 and C-7 will be demolished and removed, including all existing landscaping and trees. Combined, approximately 2.13 acres of existing site improvements will be demolished and removed. Both sites will be excavated to allow for basement construction and all excavation spoils off-hauled and legally disposed of. Additional demolition, patching, and repair under all City streets bounding the project will be required for the potential relocation or connection of the project to City utilities.

- **Public Safety Building (PSB):** The PSB is designed as a three-story, approximately 45,000 to 50,000 square-foot building (excluding accessory site buildings), 50’-0” tall at the roofline, over two levels of secure below-grade parking and secure police operations. The PSB will be approximately rectangular in shape with an articulated façade, constructed with an interior light well, and set back from the property line by an approximately 25-foot security standoff distance. Per City zoning guidelines, building equipment penthouse spaces (e.g., for elevators and stairs) may exceed the 50-foot building height limit by up to 15 feet.

- **Public Safety Building Basement Garage:** The PSB will include an approximately 101,000 square-foot secure parking basement with between 145 and 150 parking spaces for police officers and staff. In addition to parking of police and staff vehicles, a variety of programmatic functions associated with police operations will also be located in the basement. The PSB basement will be served by two vehicle ramps. The primary two-way ramp will be located on Sherman Avenue, approximately 85 feet to the center of the ramp from the corner of Park Boulevard. The secondary two-way ramp will be located on Birch Street, approximately 136 feet from the corner of Sherman Avenue. Visitor parking for the PSB will be available in the project’s new public parking garage across the street from the main entry on Birch Street.

- **Public Safety Building Exterior Operations Yard:** The PSB will include an approximately 10,000 to 15,000 square-foot visually screened, secure exterior vehicle parking and staging area and two associated one-story site support buildings totaling 4,300 square feet. The PSB’s mechanical room, trash enclosure, generator, chiller, and transformer will be located in accessory structures at this location, as well as 6 to 10 surface parking spaces.

- **California Avenue Parking Garage:** The approximately 149,500 square-foot California Avenue Parking Garage will be a four-level parking structure over two levels of underground parking, providing 636 spaces to replace and increase the approximately 310 parking spaces on-site, for a net increase of 326 public parking spaces. The parking garage will fill its site to nearly the property lines and utilize strategies such as a cascading exterior grand staircase and landscaped setback (on Birch Street), a pedestrian arcade (on Ash Street), and a partial-block pedestrian arcade leading to a mid-block paseo (on Jacaranda Lane) to provide scale-mitigating site amenities. The height of the garage will be approximately 49'-0" above sidewalk level to top of roof-mounted photovoltaic (PV) panels, which will feed into the PSB's electrical system. The garage will have one (1) two-way vehicular entry/exit onto Sherman Avenue, approximately 90 feet to center of ramp west from the corner of Birch Street.

The proposed PSB and parking garage will require amendments to the City of Palo Alto Municipal Code (PAMC) Title 18 (Zoning), Chapter 18.28 (Special Purpose [PF, OS and AC] Districts), Sections 18.28.050, 18.28.060, and 18.28.090 to revise the Public Facilities (PF) zone parking and development standards to allow encroachments into the Minimum Setbacks (front, rear, interior side, and street side setbacks), and a public parking garage that would exceed Maximum Floor Area Ratio (FAR), Maximum Site Coverage, and Maximum Height (including within 150 feet of a residential district) in the Public Facilities zone. To the extent that other PF-zoned sites are included and affected by this ordinance revision, any future development of those sites would be subject to its own environmental review. See section 3.4.4 (Palo Alto Municipal Code Title 18 Amendment to Public Facilities Zone) of this EIR chapter for further detail.

- **Telecommunications Tower:** The PSB requires a 135-foot-high telecommunications tower (microwave tower). This component will be integrated into the building by providing a wall-mounted monopole approximately in the center of the project site, where the main building and the exterior operations yard meet (see Figures 3.5 and 3.6). The monopole will visually relate to the pattern of verticals in the PSB's exterior design, and mounting it to the building is intended to improve its overall visual integration. The Palo Alto Municipal Code currently limits the monopole height to 65 feet; therefore, the proposed monopole, at 135 feet, would exceed City height restrictions. The same Public Facilities (PF) zone regulations being processed for the PSB and public parking garage include zoning text changes to allow for the planned monopole. See section 3.4.4 (Palo Alto Municipal Code Title 18 Amendment to Public Facilities Zone) of this EIR chapter for further detail.

  The requested microwave tower is needed for Palo Alto's participation in the Santa Clara County ECOMM Network for Public Safety Answering Points (PSAPs). The ECOMM system established a private microwave radio network that links all the 9-1-1 call centers in the County. The system also provides high-speed sharing of dispatch services, record databases, and voice traffic so that law enforcement, fire protection, and emergency medical services throughout the County can share communications. This integration allows first responders to improve response times and better manage regional incidents.[1]

- **Site Circulation and On-Street Parking:** The PSB and California Avenue Parking Garage lots are bounded on all sides by City streets. There are no anticipated changes in existing vehicular or pedestrian circulation except at Jacaranda Lane. Jacaranda Lane is a service alley located on what will be the north edge of both buildings. The public parking garage will have a cascading exterior grand staircase and landscaped setback (on Birch Street), a

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[1] ECOMM Digital Microwave Project, Phase II, Initial Study/Environmental Assessment and Mitigated Negative Declaration. ESA, February 2010. P. 3.

pedestrian arcade (on Ash Street), and a partial-block pedestrian arcade leading to a mid-block paseo on Jacaranda Lane to provide appropriately scaled site amenities.

Vehicular access to the portion of Jacaranda Lane adjacent to the PSB will be restricted to authorized entry and business owners only. Public parking will be prohibited on a portion of Jacaranda Lane and Sherman Avenue directly adjacent to the PSB. Temporary parking spaces for oversized emergency vehicles, including fire engines, will be provided adjacent to the PSB on Sherman Avenue and Jacaranda Lane, with secure parking for oversized vehicles located in the PSB exterior operations yard (see Figure 3.4).

- **Parking and Deliveries:** All public parking will be located in the new public parking garage. All police vehicle and staff parking will be in the PSB basement or in the surface exterior operations yard. PSB trash pick-up and deliveries will be in the operations yard. Trash pick-up for the parking garage will be off Sherman Avenue. Authorized small truck deliveries could take place in the PSB basement.

- **Architectural Design:** The PSB project employs contemporary architectural design carefully focusing on appropriate site planning, context, massing, scale, style, and materials and finishes, and subject to review and a recommendation by the City of Palo Alto Architectural Review Board (ARB). The City Council will receive the ARB's recommendation and make a final decision on the architectural design of the PSB, parking garage, and associated landscaping and site improvements. The architectural design presented in this EIR followed a preliminary review of three potential design concepts by the ARB (see section 3.2, Project Background, above).

- **Sustainable LEED Silver or Higher Certified Design:** The PSB portion of the project will be designed and built in conformance with the City's Green Building Policy, which requires LEED Silver or higher, and will be registered and certified with the United States Green Building Council as LEED Silver or higher. See chapter 9 (Greenhouse Gas Emissions and Energy) for further detail.

- **Public Plazas:** See earlier Figure 3.3. The project will include a new exterior public plaza of approximately 5,000 square feet, including hardscape, street furniture, and landscape plantings on Birch Street in front of the PSB, and a smaller public space at the parking garage pedestrian entry on Birch Street on the property corner closest to California Avenue. The east side of the garage site is designed to visually connect the public space at the garage with the PSB plaza.

  The plaza will include a variety of seating types, including built-in, planter edge, and moveable. Lighting will be on tapered poles with multiple heads providing a tree-like motif. Also, plaza furniture will have integrated, complementary lighting. The Birch Street, Sherman Avenue, and Park Avenue frontages of the PSB will have pole lights and planter-mounted landscape lights.

- **Landscaping:** See earlier Figure 3.3. In order to implement a comprehensive landscaping plan, the project proposes to remove 38 on-site trees and protect one tree in place. The **PSB public plaza** will feature a low stone wall, a series of natural stone bollards, and a large raised planter that will provide soil and plantings otherwise absent due to the PSB parking garage directly below. The stone wall and bollards will provide a security barrier to vehicles while also demarcating entry into the public plaza. The plaza will be bordered along Birch Street by a double row of approximately 12 trees that will reinforce the public realm and provide shade.

The plaza planting is purposefully designed as a demonstration garden highlighting plants for water conservation and for habitat, including, for example, California native pollinator species, native grasses, drought-tolerant succulents, and native meadow rain garden plantings. Educational signage will be included.

Sherman Avenue and Park Avenue frontages of the PSB will feature a double row of approximately 24 street trees, utilizing raised planters where needed due to the parking garage below. The profile of the raised planters will vary to create seating areas and to provide rain gardens for storm water treatment. Jacaranda Lane will feature a raised garden courtyard secured for PSB staff.

The Birch Street, Sherman Avenue, and Park Avenue frontages of the PSB will have pedestrian pole lights and planter-mounted landscape lights. The Jacaranda Lane side of the security wall will feature vine plantings and lighting. From a street lighting standpoint, all pedestrian areas will be lit with low-level, focused lighting that reinforces the small-scale aspects of the plazas and streets, avoids light pollution, and reinforces the civic character of the facilities.

The landscaping of the **California Avenue Parking Garage** will work in tandem with the PSB. The Birch Street frontage will be composed of a series of raised planters with integral seating, an area of rain garden planting at the Sherman Avenue corner, and native woodland planting below the exterior staircase. Seating areas will be distributed along the length of the sidewalk. Along Sherman, the sidewalk will be widened to allow for street trees and rain garden planters and benches. Ash Street will have an arcade with seating and a widened sidewalk. The garage arcade along Jacaranda Lane has the potential to connect to the adjacent mid-block pedestrian paseo. Vine plantings along the Jacaranda façade will be considered to help green this face. Birch Street, Sherman Avenue, and Ash Street frontages of the garage will have pedestrian pole lights and planter-mounted landscape lights, in addition to building-mounted lighting.

The general tree planting strategy is to select species that will thrive in an urban environment, provide appropriate architectural emphasis and scale, and have relatively low maintenance and water requirements. Chapter 6 (Biological Resources) of this EIR provides more detail.

- **Storm Water:** The project will remain connected to the City's storm drain system and will include a system to capture, store, and reuse rainwater to support landscape irrigation. See chapter 16 (Utilities and Service Systems) for further detail.

- **Water Supply:** Potable water will be provided to the project through the existing City system. See chapter 16 for further detail.

- **Sanitary Sewer:** Sanitary sewer service will be provided through the existing City system. See chapter 16 for further detail.

- **Utilities and Services:** Electricity and natural gas will be provided through the City's grid. Solid waste recycling and trash removal will be provided through City contracted haulers.

3.4.3 Material Relationships and Architecture

See earlier Figures 3.5 through 3.8. The PSB project's visual palette draws upon the terra cotta and off-white materials of Palo Alto's historic buildings, as well as the California Avenue district's mix of scales, materials, uses, styles, and pedestrian and public qualities.

The **PSB** massing is based on the articulation of a simple three-story rectangular volume elaborated through a series of additive, subtractive, and textural strategies. Some of these strategies include: a glass corner revealing an interior public staircase, a glazed ground level along the public plaza, generous window areas for key public interior spaces (such as the multi-purpose room), a canopy at the roofline that inflects toward the public plaza, and vertical window fins that provide both solar shading and a visual reference to traditional columns.

The primary exterior material for the PSB will be cast-in-place concrete. This material provides for the stringent ballistic resistance requirements as well as durability and aesthetics. The off-white concrete panels will have a rough, stone-like texture. Additional exterior materials will include terra cotta horizontal window screens in a neutral color to match the earth tones of the precast concrete building; clear glass; painted steel at overhangs; and polycarbonate translucent canopy surface at the overhangs.

The **parking garage** massing will be simple and understated. The focal points are the grand exterior staircase that leads to California Avenue and the recessed pedestrian arcades along Ash and Jacaranda. Changes in materials visually reduce the long horizontal bands of the parking levels. Horizontal slats will support green screen vine planting.

The garage will be a cast-in-place concrete structure, with horizontal slats of terra cotta. The top level of the garage will have a continuous canopy of photovoltaic (PV) panels supported on a painted steel structure, providing solar power, shade, and a visual roof. The garage façade also will provide opportunities for public art installations, including along the wall that will support the grand staircase or along the Ash Street arcade.

3.4.4 Palo Alto Municipal Code (PAMC) Title 8 (Zoning) Amendment to Public Facilities (PF) Zone Parking and Development Standards

The project includes amendments to certain sections of Chapter 18.28 of Title 18 (Zoning) related to the Public Facilities (PF) zoning district, including Sections 18.28.050, 18.28.060 and 18.28.090, to allow the City Council to modify the development standards (i.e., minimum setbacks, maximum floor area ratio, site coverage, height, daylight plane) and parking requirements in Chapter 18.28 for public parking facilities in the Downtown and California Avenue business district owned or leased, and operated or used, by the City of Palo Alto, and for Essential Services Buildings in Palo Alto. The proposed ordinance would allow the Council to make exceptions to the established development standards in Section 18.28.050, Table 2, and parking requirements in Section 18.28.090 for these facilities in order to achieve community objectives for the specified types of public facilities, including appurtenant or ancillary structures. Any such exceptions would be included in the review of the project through the applicable development review process.

As noted above, the ordinance is needed to facilitate the PSB project which would not meet the current height limit for the emergency telecommunications tower associated with the PSB building, the height limit and minimum setbacks for the public parking garage, and the minimum setbacks for the PSB building. The public parking garage will encroach into required setbacks above and below grade on all street frontages and the alley. The below grade garage of the PSB will encroach into street setbacks, and the accessory buildings will encroach into the alley setback.

The ordinance would apply generally to Essential Services Facilities located in the PF zone in the city and public parking garages owned or leased, and operated or used, by the City in the PF zone in Downtown and the California Avenue Business District. The Council would have the same flexibility to modify the development standards and parking requirements for any other such projects in the PF zone. Any future projects, however, would require their own environmental review

3.5 PRELIMINARY CONSTRUCTION TIMING

The preliminary construction timing for the PSB project is as follows:

California Avenue Parking Garage (based on 16-month construction duration):

Demolition:	2 weeks
Excavation (approximately 35,000 cubic yards):	12 weeks
Utility Trenching:	4 weeks
Foundations:	12 weeks
Vertical Construction:	34 weeks

Public Safety Building (based on 23-month construction duration):

Demolition:	2 weeks
Excavation (approximately 45,000 cubic yards):	15 weeks
Utility Trenching:	8 weeks
Foundations:	12 weeks
Vertical Construction:	55 weeks

The California Avenue Parking Garage is intended to be completed prior to start of construction of the new PSB so that disruption to public parking in the area is minimized. There may be some minor overlap in construction after substantial completion of the parking garage, when minor garage details are completed while the garage is operating and PSB construction is beginning.

The construction of the PSB and parking garage may result in intermittent closure of streets surrounding Parking Lots C-6 and C-7 during project construction. The streets potentially affected could include portions of Sherman Avenue, Birch Street, Ash Street, and Jacaranda Lane. To a lesser degree, construction activities may also result in intermittent reduced service on Park Boulevard adjacent to the project site.

3.6 REQUIRED JURISDICTIONAL APPROVALS

City approvals required to implement the project include: (1) Certification of the Final EIR and Approval of the Mitigation Monitoring and Reporting Program; (2) an amendment to Chapter

18.28 of Title 18 (Zoning) of the Palo Alto Municipal Code to allow the City Council to modify the development standards to permit setbacks less than the current minimum along Birch and Ash Streets, Sherman Avenue, and Jacaranda Lane, heights exceeding the current maximum for the PSB building's emergency telecommunications tower and the public parking garage, and for the public parking garage to exceed the FAR and site coverage maximums; (3) site and architectural design review by the City's Architectural Review Board, with a recommendation to City Council; (4) City approval of a demolition permit and tree removal permits; (5) City approvals of a grading permit and building permits; and (6) City approval of a street work permit for temporary construction-related dewatering, and associated approvals.

The proposed project does not require approval from State or federal agencies. However, agencies (e.g., Bay Area Air Quality Management District, Regional Water Quality Control Board) may use information in the EIR when issuing permits for particular project actions within their jurisdiction, as described in individual chapters of this EIR.

4. AESTHETICS

This EIR chapter describes aesthetic implications of the proposed PSB and California Avenue Parking Garage project (PSB project). The chapter addresses the specific aesthetic impact concerns identified by the CEQA Guidelines--i.e., would development of the proposed project result in a substantial adverse effect on a scenic vista, substantially damage scenic resources, substantially degrade the existing visual character or quality of the project site or its surroundings, or create any new source of substantial light or glare.[1] The shadow impacts of the PSB project on the existing aesthetic environment are also described and diagrammed (the City of Palo Alto has an impact criterion related to shadowing public spaces).

Much of the information in this chapter is repeated from chapter 3 (Project Description) of this EIR; however, the information and graphics here focus on the ***visual*** characteristics of the proposed PSB project.

4.1 SETTING

The PSB project site is located at 250 and 350 Sherman Avenue, in the California Avenue Business District. The site is bound by Sherman Avenue to the southeast (“south”), Jacaranda Lane to the northwest (“north”), Ash Street to the southwest (“west”), and Park Boulevard to the northeast (“east”), and bisected by Birch Street. The northern edge of the project site, Jacaranda Lane, is generally the service and delivery alley for businesses fronting on California Avenue.

The site includes two surface parking lots, identified as Lot C-6 (1.27 acres) on the east and Lot C-7 (0.96 acre) on the west.[2] The approximately 2.23-acre project site area is generally flat, with no native vegetation, creeks, or other significant natural features. The site (plus the portion of Birch Street between the two lots) includes 39 trees, all of which, except one, are proposed to be removed as part of the project and replaced with new trees and landscaping; see chapter 6 (Biological Resources) of this EIR for further detail.

Across Sherman Avenue from the project site are the Santa Clara County Courthouse and parking lot. Properties fronting Ash Avenue between Grant Avenue and Sherman Avenue include multiple-family residential uses and Sarah Willis Park. Land uses along Park Boulevard from Grant Avenue to Sherman Avenue include office/commercial uses, including several restaurants. The buildings in the project vicinity are generally one to three stories, with the Courthouse being the tallest, at four stories.

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[1] CEQA Guidelines, Appendix G, item I (a through d).

[2] In this EIR, true directions in the immediate project vicinity have been simplified as indicated on applicable figures, whose directional arrow indicates “PN” (Project North) and “TN” (True North).

Upcoming Figure 4.1A shows an aerial view of the project vicinity, with the site in the center, bifurcated by Birch Street.

Existing sources of nighttime light within and around the project site include those common to urban areas, including street lights, parking lot lighting, building lighting, signs, vehicle headlamps, and interior lighting visible through windows. Generally, glare is created by the reflection of sunlight and artificial light off windows, buildings, and other surfaces in the day, and from inadequately shielded and improperly directed light sources at night.

4.2 REGULATORY SETTING

This section summarizes State and local regulations, programs, and guidelines related to preservation of, and potential change to, aesthetic features in both the natural and built environment of Palo Alto. Other aesthetic-related provisions that do not apply to the proposed PSB project (e.g., for areas outside the PSB project vicinity or for residential development only) are not included.

4.2.1 State Regulations

California Scenic Highway Program. The California Scenic Highway Program, maintained by the California Department of Transportation (Caltrans), protects scenic State highway corridors from changes that would diminish the aesthetic value of lands adjacent to the highways. Caltrans has not designated any highway within Palo Alto as a scenic highway. The stretch of Interstate 280 (I-280) in Palo Alto is an officially designated State Scenic Highway.[1]

4.2.2 Local Regulations

(1) City of Palo Alto Municipal Code

Chapter 2.21 Architectural Review Board. Under Chapter 2.21 of the Palo Alto Municipal Code, the City maintains a City Council appointed citizen Architectural Review Board to implement the aesthetic-preservation intent of the zoning ordinance by promoting high aesthetic quality that is harmonious with neighboring uses and enhances conditions on-site and in adjacent areas. The Board meets regularly to review development proposals and site designs for commercial and multi-family residential projects. The Board's purview includes new buildings, additions, significant design changes, conversion of historic buildings to commercial use, pedestrian features adjacent to designated pedestrian paths, accessory uses, on-site recreation areas, and noise-generating areas such as parking lots, driveways, and loading docks, as well as other site plan changes. The Board provides recommendations on projects to the Director of Planning and to the City Council for their final approval. (The proposed PSB project is subject to the Major Architectural Review process which requires a recommendation from the Architectural Review Board and approval from the Director of Planning. However, because other discretionary approvals for the project require Council approval, Council will issue the decision on the project.)

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[1] California Department of Transportation California Scenic Highways Program, available online at http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm, accessed on October 4, 2017.

Title 8, Trees and Vegetation. Title 8 of the Municipal Code establishes the City's regulations pertaining to Street Trees, Shrubs and Plants, Weed Abatement, and Tree Preservation and Management. Title 8 includes measures to ensure that trees throughout the city are maintained and protected as development occurs. Chapter 8.10 is the City's Tree Preservation Ordinance, which protects trees in order to promote the health, safety, welfare, and quality of life of the residents. Specifically, this chapter of the Municipal Code regulates specific types of trees on public and private property for the purpose of avoiding their removal or disfigurement without first being reviewed and permitted by the City's Planning or Public Works Department. (See chapter 6, Biological Resources, of this EIR for a discussion of existing on-site trees and proposed project landscaping.)

Chapter 16.61, Public Art for Private Developments. The Public Art in Private Development ordinance went into effect in January 2014. The ordinance requires that developers with projects over 10,000 square feet and with an estimated construction valuation of more than $200,000 incorporate artwork that is accessible to the public on-site or pay in-lieu fees equivalent to one percent of the construction valuation. The in-lieu fees will be spent commissioning other public art projects throughout Palo Alto. Public Art in Private Development projects are presented to the Public Art Commission for input and approval of the art prior to the issuance of a building permit. The Public Art Commission is a seven-member volunteer panel selected by City Council to make aesthetic decisions regarding artwork to be installed in public places within the city. (The proposed PSB project offers opportunities for public art, especially in the public plaza and on the parking garage).

Title 18, Zoning. Contained in Title18 of the Palo Alto Municipal Code, the City's Zoning Ordinance establishes regulations that apply to specific areas of the city, and include provisions related to the visual quality of the built environment and both public and private spaces visible to passersby. These regulations include district-specific development standards, such as height limits, setbacks, and other site restrictions, as well as provisions for residential design review. The Zoning Ordinance also establishes a process and parameters for code exceptions.

The Zoning Ordinance also enumerates site plan and architectural review requirements for development in commercial and industrial districts, including specific provisions governing building location, exterior design and appearance, colors, lighting, and landscaping, and additional special requirements when adjacent to residential areas.

Together, the stipulations of the Zoning Ordinance are intended, among many other purposes, to preserve the visual quality of urban design in Palo Alto. Specific aesthetic requirements for all development include:

- Shielding of interior and exterior light sources to prevent visibility from off-site and using low-intensity and timed lighting in outdoor areas.
- Avoiding use of reflective surfaces that can create glare.
- Utilizing architectural features and landscaping to reduce apparent building mass and bulk.
- Screening of trash and storage areas, mechanical equipment, and loading docks.

The Zoning Ordinance also identifies specific requirements to reduce visual impacts on residential neighborhoods from adjacent non-residential uses, including open space buffers, landscaping, and fences or walls.

Chapter 18.23.030. Lighting. Chapter 18.23.030 of the Municipal Code establishes performance criteria related to lighting and glare impacts for Multiple Family, Commercial, and Manufacturing and Industrial Districts to minimize the visual impacts of lighting on, abutting, or nearby residential sites and from adjacent roadways. For example, Chapter 18.23.030 requires that exterior lighting in parking areas, pathways and common open space shall be designed to achieve the following: (1) provide for safe and secure access on the site, (2) achieve maximum energy efficiency, and (3) reduce impacts or visual intrusions on abutting or nearby properties from spillover and architectural lighting that projects upward. Other requirements include that where light source is visible from outside the property boundaries, such lighting shall not exceed 0.5 footcandle as measured at the abutting residential property line, and that interior lighting shall be designed to minimize nighttime glow visible from and/or intruding into nearby properties and shall be shielded to eliminate glare and light spillover beyond the perimeter property line of the development. (This EIR chapter includes an upcoming Figure 4.7, which illustrates light levels from the proposed PSB project).

Chapter 18.23.050, Visual, Screening, and Landscaping. Chapter 18.23.050 of the Municipal Code establishes visual, screening, and landscaping criteria for Multiple Family, Commercial, and Manufacturing and Industrial Districts in order to provide adequate screening for development abutting residential properties or properties with existing residential uses located within nonresidential zones (residential properties) to protect the visual character of residential development. For example, Chapter 18.23.050 requires that landscape buffers and architectural design features be incorporated in to the design of development in order to reduce apparent mass and bulk, which helps to maintain the character and visual quality of existing development while providing adequate privacy.

Chapter 18.40.130. Landscaping. Chapter 18.40.130 of the Municipal Code establishes landscaping regulations and performance criteria for all development within the city. The purpose of Chapter 18.40.130 is to encourage creative and sustainable landscape design that enhances structures, open space areas, streetscapes and parking areas in order to preserve native plant species and to provide tree shading and landscape design which can contribute to economic vitality and public health, as well as enhance the character of Palo Alto. (A description of the proposed PSB project's landscaping is included in this EIR chapter, with further detail provided in chapter 6, Biological Resources).

Chapter 18.76.020. Architectural Review. Chapter 18.76.020 establishes guidelines for architectural review of major and minor projects. Projects must be reviewed to carefully evaluate various aspects of their design and appearance, including their compatibility with the immediate environment of the site; compatibility with the design character of the surrounding area; harmonious transitions in scale and character in areas between different designated land uses; internal sense of order; amount and arrangement of open space; integration of natural features; and appropriate materials, textures, colors and details of construction and plant material, among other aspects. (See "Chapter 2.21 Architectural Review Board" discussion above).

<u>(2) Design Guidelines</u>. The City of Palo Alto has adopted guidelines to direct development in ways that preserve and enhance the visual quality of the built and natural environment in the community.

4.3 IMPACTS AND MITIGATION MEASURES

4.3.1 Significance Criteria

Based on Appendix G of the CEQA Guidelines[1] and on a City of Palo Alto impact criterion related to shadowing public spaces, the proposed PSB project would have a significant aesthetic impact if it would:

(a) Have a substantial, adverse effect on a scenic vista;

(b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;

(c) Substantially degrade the existing visual character or quality of the site and its surroundings;

(d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area ("glare" is defined in this EIR as the reflection of harsh bright light sufficient to cause physical discomfort or loss in visual performance and visibility); or

(e) Substantially shadow public open space (other than public streets and adjacent sidewalks) between 9:00 AM and 3:00 PM from September 21 to March 21.

Regarding criterion (a), the project site and immediate vicinity are relatively flat. Existing views *in the vicinity* are of a built environment that includes mixed use/commercial buildings, parking lots, and several multi-family residences. Also, there are no views of scenic vistas *from the project site.* There would be no impact, and this issue is not discussed further.

Regarding criterion (b), there are no designated or eligible state scenic highways within one mile of the project site and the project would not be visible from any locally designated scenic roads. There would be no impact, and this issue is not discussed further.

4.3.2 Proposed PSB Project Components

See earlier Figures 3.2, 3.3, and 3.4. The proposed **Public Safety Building (PSB)**, at 250 Sherman Avenue, would be located on the City's existing surface Parking Lot C-6. The PSB would be approximately a 45,000 to 50,000 square-foot (excluding accessory site buildings), three-story police station and fire/police administration building. The PSB would include two full-block subterranean floors of police parking and operations, and share its parcel with smaller operational accessory buildings, a secure operational yard, and a public plaza. The PSB would be a secure, essential services facility designed to support and protect the critical operations that occur inside. Due to the PSB's specialized uses, its design requires the careful balancing of transparency and solidity. The height of the PSB would be approximately 50'-0" above sidewalk level to top of roof.

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[1] Criteria (a) through (d) are derived from CEQA Guidelines, Appendix G, Item I (a-d).

The **parking garage**, at 350 Sherman Avenue, would be located on the City's existing surface Parking Lot C-7. The parking garage would be four levels above grade and two stories below grade, with 636 public parking spaces serving the needs of the California Avenue business district. The parking structure would fill its site to nearly the property lines and utilize strategies such as a cascading exterior grand staircase and landscaped setback (on Birch Street), a pedestrian arcade (on Ash Street), and a partial-block pedestrian arcade leading to a mid-block paseo (on Jacaranda Lane) to provide appropriately scaled site amenities. The height of the California Avenue Parking Garage would be approximately 49'-0" above sidewalk level to top of roof-mounted photovoltaic (PV) panels.

The garage will require amendments to the City of Palo Alto Municipal Code (PAMC) Title 18 (Zoning), Chapter 18.28 (Special Purpose [PF, OS and AC] Districts), Sections 18.28.050, 18.28.060, and 18.28.090 to revise the Public Facilities (PF) zone parking and development standards to allow for the planned Minimum Setbacks (front, rear, interior side, and street side setbacks), Maximum Floor Area Ratio (FAR), Maximum Site Coverage, and Maximum Height (including within 150 feet of a residential district) in the Public Facilities zone. An ordinance is being processed with the PSB project development proposal. To the extent that other PF-zoned sites are included and affected by this ordinance revision, any future development of those sites would be subject to its own environmental review. See section 3.4.4 (Palo Alto Municipal Code Title 18 Amendment to Public Facilities Zone) of this EIR for further detail.

The principal components of the PSB project are further described below.

Public Safety Building (PSB): The PSB is designed as a three-story, approximately 45,000 to 50,000 square-foot building (excluding accessory site buildings), 50'-0" tall at the roofline, over two levels of secure below-grade parking. The PSB will be approximately rectangular in shape with an articulated façade, constructed with an interior light well, and set back from the property line by an approximately 25-foot security standoff distance. Per City zoning guidelines, building equipment penthouse spaces (e.g., for elevators and stairs) may exceed the 50-foot building height limit by 15 feet.

Public Safety Building Basement Garage: The PSB will include an approximately 101,000 square-foot secure parking basement with between 145 and 150 parking spaces for police officers and staff. In addition to parking of police and staff vehicles, a variety of programmatic functions associated with police operations will also be located in the basement. The PSB basement will be served by two vehicle ramps. The primary two-way ramp will be located on Sherman Avenue, approximately 85 feet to the center of the ramp from the corner of Park Boulevard. The secondary two-way ramp will be located on Birch Street, approximately 136 feet from the corner of Sherman Avenue. Visitor parking for the PSB will be available in the project's new public parking garage across the street from the main entry on Birch Street.

Public Safety Building Exterior Operations Yard: The PSB will include an approximately 10,000 to 15,000 square-foot visually screened, secure exterior vehicle parking and staging area and associated one-story site support buildings. The PSB's emergency generator, chiller plant, and other building systems will be located in accessory structures at this location, as well as 6 to 10 surface parking spaces.

Telecommunications Tower: The PSB requires a 135-foot-high telecommunications tower (microwave tower). This component will be integrated into the building by providing a wall-mounted monopole approximately in the center of the project site, where the main building and the exterior operations yard meet (see earlier Figures 3.5 and 3.6). The monopole will visually relate to the pattern of verticals in the PSB's exterior design, and mounting it to the building is intended to improve its overall visual integration. The Palo Alto Municipal Code currently limits the monopole height to 65 feet; therefore, the proposed monopole, at 135 feet, would exceed City height restrictions. The same PF zone regulations being processed for the public parking garage includes zoning text changes to allow for the planned monopole. See section 3.4.4 (Palo Alto Municipal Code Title 18 Amendment to Public Facilities Zone) of this EIR for further detail.

The requested microwave tower is needed for Palo Alto's participation in the Santa Clara County ECOMM Network for Public Safety Answering Points (PSAPs). The ECOMM system established a private microwave radio network that links all the 9-1-1 call centers in the County. The system also provides high-speed sharing of dispatch services, record databases, and voice traffic so that law enforcement, fire protection, and emergency medical services throughout the County can share communications. This integration allows first responders to improve response times and better manage regional incidents.[1]

Architectural Design: The PSB project employs contemporary architectural design carefully focusing on appropriate site planning, context, massing, scale, style, and materials and finishes, and subject to review and a recommendation by the City of Palo Alto Architectural Review Board (ARB). The City Council will receive the ARB's recommendation and make a final decision on the architectural design of the PSB, parking garage, and associated landscaping and site improvements. The architectural design presented in this EIR follows a preliminary review of three design concepts by the ARB (see section 3.2, Project Background, of this EIR).

Public Plazas: See earlier Figure 3.3. The project will include a new exterior public plaza of approximately 5,000 square feet, including hardscape, street furniture, and landscape plantings on Birch Street in front of the PSB, and a smaller public space at the parking garage pedestrian entry on Birch Street on the property corner closest to California Avenue. The east side of the garage site is designed to visually connect the public space at the garage with the PSB plaza.

The plaza will include a variety of seating types, including built-in, planter edge, and moveable. Lighting will be on tapered poles with multiple heads providing a tree-like motif. Also, plaza furniture will have integrated, complementary lighting. The Birch Street, Sherman Avenue, and Park Avenue frontages of the PSB will have pole lights and planter-mounted landscape lights.

Landscaping: See earlier Figure 3.3. In order to implement a comprehensive landscaping plan, the project proposes to remove 38 on-site trees and protect one tree in place. The **PSB public plaza** will feature a low stone wall, a series of natural stone bollards, and a large raised planter that will provide soil and plantings otherwise absent due to the PSB parking garage directly below. The stone wall and bollards will provide a security barrier to vehicles while also demarcating entry into the public plaza. The plaza will be bordered along Birch Street by a double row of trees that will reinforce the public realm and provide shade.

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[1] ECOMM Digital Microwave Project, Phase II, Initial Study/Environmental Assessment and Mitigated Negative Declaration. ESA, February 2010. P. 3.

The plaza planting is purposefully designed as a demonstration garden highlighting plants for water conservation and for habitat, including, for example, California native pollinator species, native grasses, drought-tolerant succulents, and native meadow rain garden plantings. Educational signage will be included.

Sherman Avenue and Park Avenue frontages of the PSB will feature a double row of street trees, utilizing raised planters where needed due to the parking garage below. The profile of the raised planters will vary to create seating areas and to provide rain gardens for storm water treatment. Jacaranda Lane will feature a raised garden courtyard secured for PSB staff.

The Birch Street, Sherman Avenue, and Park Avenue frontages of the PSB will have pedestrian pole lights and planter-mounted landscape lights. The Jacaranda Lane side of the security wall will feature vine plantings and lighting. From a street lighting standpoint, all pedestrian areas will be lit with low-level, focused lighting that reinforces the small-scale aspects of the plazas and streets, avoids light pollution, and reinforces the civic character of the facilities.

The landscaping of the **California Avenue Parking Garage** will work in tandem with the PSB. The Birch Street frontage will be composed of a series of raised planters with integral seating, an area of rain garden planting at the Sherman Avenue corner, and native woodland planting below the exterior staircase. Seating areas will be distributed along the length of the sidewalk. Along Sherman, the sidewalk will be widened to allow for street trees and rain garden planters and benches. Ash Street will have an arcade with seating and a widened sidewalk. The garage arcade along Jacaranda Lane has the potential to connect to the adjacent mid-block pedestrian paseo. Vine plantings along the Jacaranda façade will be considered to help green this face. Birch Street, Sherman Avenue, and Ash Street frontages of the garage will have pedestrian pole lights and planter-mounted landscape lights, in addition to building-mounted lighting.

The general tree planting strategy is to select species that will thrive in an urban environment, provide appropriate architectural emphasis and scale, and have relatively low maintenance and water requirements. Chapter 6 (Biological Resources) of this EIR provides more detail.

4.3.3 Material Relationships and Architecture

See earlier Figures 3.5 through 3.8, which illustrate the proposed PSB project within the context of adjacent buildings. The PSB project's visual palette draws upon the terra cotta and off-white materials of Palo Alto's historic buildings, as well as the California Avenue district's mix of scales, materials, uses, styles, and pedestrian and public qualities.

The **PSB** massing is based on the articulation of a simple three-story rectangular volume elaborated through a series of additive, subtractive, and textural strategies. Some of these strategies include: a glass corner revealing an interior public staircase, a glazed ground level along the public plaza, generous window areas for key public interior spaces (such as the multi-purpose room), a canopy at the roofline that inflects toward the public plaza, and vertical window fins that provide both solar shading and a visual reference to traditional columns.

The primary exterior material for the PSB will be cast-in-place concrete. This material provides for the stringent ballistic resistance requirements as well as durability and aesthetics. The off-white concrete panels will have a rough, stone-like texture. Additional exterior materials will include terra cotta horizontal window screens in a neutral color to match the earth tones of the precast concrete building; clear glass; painted steel at overhangs; and polycarbonate translucent canopy surface at the overhangs.

The **parking garage** massing will be simple and understated. The focal points are the grand exterior staircase that leads to California Avenue and the recessed pedestrian arcades along Ash and Jacaranda. Changes in materials visually reduce the long horizontal bands of the parking levels. Horizontal slats will support green screen vine planting.

The garage will be a cast-in-place concrete structure, with horizontal slats of terra cotta. The top level of the garage will have a continuous canopy of photovoltaic (PV) panels supported on a painted steel structure, providing solar power, shade, and a visual roof. The garage façade also will provide opportunities for public art installations, including along the wall that will support the grand staircase or along the Ash Street arcade.

4.3.4 Visual Simulations

To support this EIR visual impact analysis, computer-generated “before and after” visual simulations of the PSB project site as seen from an aerial perspective plus two representative off-site, public viewpoints have been prepared. (For these descriptions, Sherman Avenue is considered traversing east-west, and Birch Street is considered traversing north-south, consistent with the “Project North” arrows shown on the architectural illustrations.) The three selected viewpoints are:

- an aerial perspective from south of the PSB project site, looking north toward California Avenue (Figures 4.1A and 4.1B);

- a public, street-level view from the intersection of Birch Street and Jacaranda Lane, looking southeast toward Sherman Avenue and the County Courthouse (Figure 4.2); and

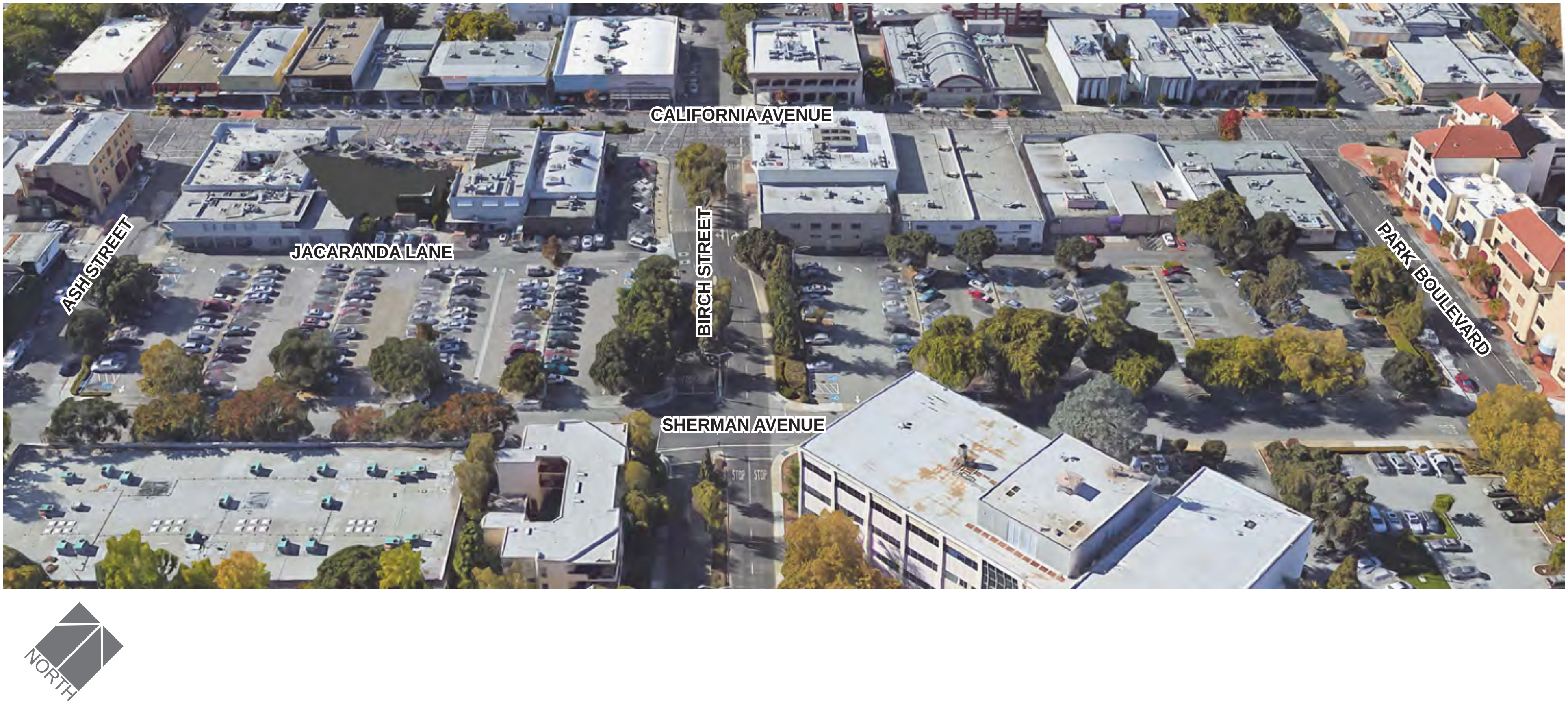
- a public, street-level view from Sherman Avenue, looking northeast across Birch Street toward the PSB and California Avenue (Figure 4.3).

The visual simulation images are based on the architectural renderings included in the Architectural Review Board (ARB) submittal package dated July 19, 2017.

4.3.5 Impacts and Mitigations

Would the project substantially degrade the existing visual character or quality of the site and its surroundings (Significance Criterion [c])? The proposed PSB land uses would be consistent with the land use designations for the site, as identified in the City of Palo Alto Comprehensive Plan Land Use Map, as well as the with the land uses allowed within this zone district, as identified in the Zoning Ordinance. The Comprehensive Plan designation for Lot C-6 (PSB) is “Public Facilities” and for Lot C-7 (public parking garage) “Regional Community Commercial.” The zoning district for both Lots C-6 and C-7 is “Public Facilities (PF).”

The garage will require amendments to the City of Palo Alto Municipal Code (PAMC) Title 18 (Zoning), Chapter 18.28 (Special Purpose [PF, OS and AC] Districts), Sections 18.28.050, 18.28.060, and 18.28.090 to revise the Public Facilities (PF) zone parking and development standards to allow for the planned Minimum Setbacks (front, rear, interior side, and street side setbacks), Maximum Floor Area Ratio (FAR), Maximum Site Coverage, and Maximum Height



Source: RossDrulisCusenbery Architecture

Figure 4.1A - Existing Aerial View

Parking garage on left, Public Safety Building on right.

Source: RossDrulisCusenbery Architecture

Figure 4.1B - Visual Simulation: Aerial View

Source: RossDrulisCusenbery Architecture

Figure 4.2 - Visual Simulation: Birch Street at Jacaranda Lane

Source: RossDrulisCusenbery Architecture

Figure 4.3 - Visual Simulation: Sherman Avenue at Birch Street

(including within 150 feet of a residential district) in the Public Facilities zone. An ordinance is being processed with the PSB project development proposal. To the extent that other PF-zoned sites are included and affected by this ordinance revision, any future development of those sites would be subject to its own environmental review. See section 3.4.4 (Palo Alto Municipal Code Title 18 Amendment to Public Facilities Zone) of this EIR for further detail.

Regarding the proposed telecommunications tower, the Palo Alto Municipal Code currently limits the monopole height to 65 feet; therefore, the proposed monopole, at 135 feet, would exceed City height restrictions. The same PF zone regulations being processed for the public parking garage include zoning text changes to allow for the planned monopole and alley setback encroachment by the PSB. See section 3.4.4 (Palo Alto Municipal Code Title 18 Amendment to Public Facilities Zone) of this EIR for further detail.

As discussed above, the proposed PSB project is purposefully designed to be integrated into, and contribute to, the public environment of the California Avenue business district and the surrounding neighborhood. Simultaneously, the project has been designed to meet the programmatic and security needs of the City's Police Department, Office of Emergency Services, Emergency Operations Center, Emergency Communications Center, and Fire Administration Division. The telecommunications monopole is a necessary structure that will enable the City to participate in the countywide police protection and first responder ECOMM network; the monopole would be centrally located on the project site and integrated into the PSB design.

Regarding materials, the PSB project's visual palette draws upon the terra cotta and off-white materials of Palo Alto's historic buildings, as well as the California Avenue district's mix of scales, materials, uses, styles, and pedestrian and public qualities.

The project design has been subject to the City's Architectural Review process. The ARB offered input about design opportunities and provided direction to the design team on how best to further refine the design as various iterations were presented. Designs options were also presented to the PSB's user groups and some community representatives. The current proposal evaluated in this EIR has emerged from this process.

In summary, the proposed PSB project would be expected to result in a more connected and coherent pedestrian and visual environment in the California Avenue business district and the surrounding neighborhood, with building heights and massing consistent and compatible with nearby structures, including the County Courthouse across Sherman Avenue form the project site. The impacts of the proposed PSB project on the visual character and quality of the project site and surrounding area would therefore be ***less than significant.***

Mitigation. No significant impact has been identified; no mitigation is required.

Would the project substantially shadow public open space (other than public streets and adjacent sidewalks) between 9:00 AM and 3:00 PM from September 21 to March 21 (Significance Criterion [e])? Regarding shadow impacts, there are no public spaces immediately adjacent to the project site. The nearest public space is Sarah Wallis Park, located at Grant and Ash Streets, approximately one-half block to the south and obscured from the project site by existing buildings. Therefore, no shadow impact from the proposed PSB project would result relevant to the City's criterion. Generally, in the northern hemisphere, shadows are cast to the north; because the PSB site is north of Sarah Wallis Park, project shadows should not affect the park. Figures 4.4 through 4.6 confirm this conclusion. (Note that shadow patterns on the spring equinox, March 21, are very similar to those on the fall equinox, September 21; and that the winter solstice has the longest shadows.) Therefore, the shadow impacts of the proposed PSB project would be ***less than significant.***

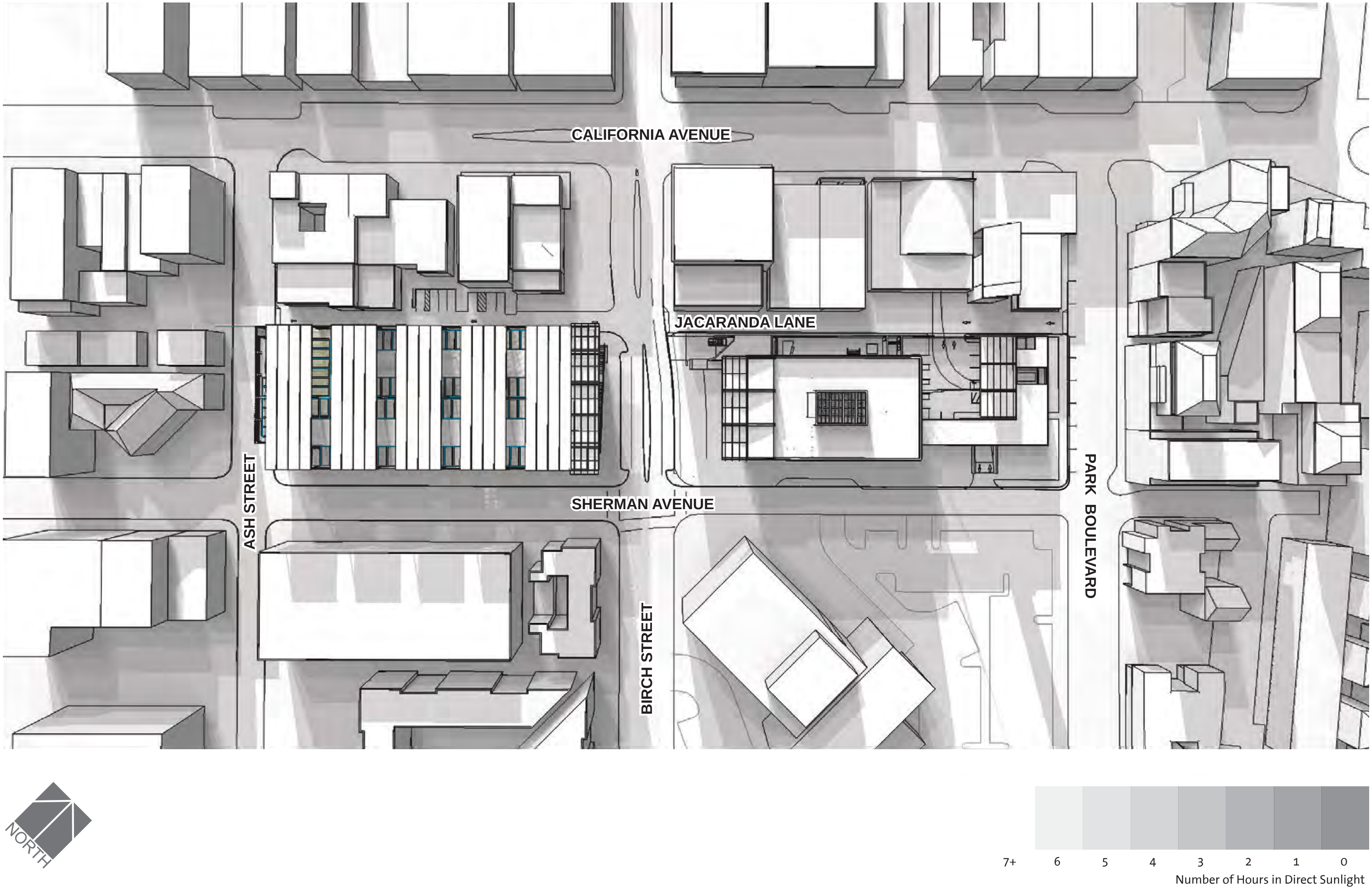
Mitigation. No significant impact has been identified; no mitigation is required.

Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area ("glare" is defined in this EIR as the reflection of harsh bright light sufficient to cause physical discomfort or loss in visual performance and visibility) (Significance Criterion [d])? See Figure 4.7, which illustrates the light levels of the proposed PSB project. Existing sources of nighttime light within and around the project site include those common to urban areas, including street lights, parking lot lighting, building lighting, signs, vehicle headlamps, and interior lighting visible through windows. Glare is created by the reflection of sunlight and artificial light off windows, buildings, and other surfaces in the day, and from inadequately shielded and improperly directed light sources at night.

The proposed PSB project would result in additional nighttime lighting and increased light emanating from the project site. New sources of light would be installed as part of the new PSB and public parking garage, and new street lights and other light sources would be installed to illuminate entries, parking areas, sidewalks and open spaces for safety, security, and architectural purposes. The Birch Street, Sherman Avenue, and Park Avenue frontages of the PSB would have pedestrian pole lights and planter-mounted landscape lights. The Jacaranda Lane side of the security wall would feature vine plantings and lighting. From a street lighting standpoint, all pedestrian areas would be lit with low-level, focused lighting that reinforces the small-scale aspects of the plazas and streets, avoids light pollution, and reinforces the civic character of the facilities.

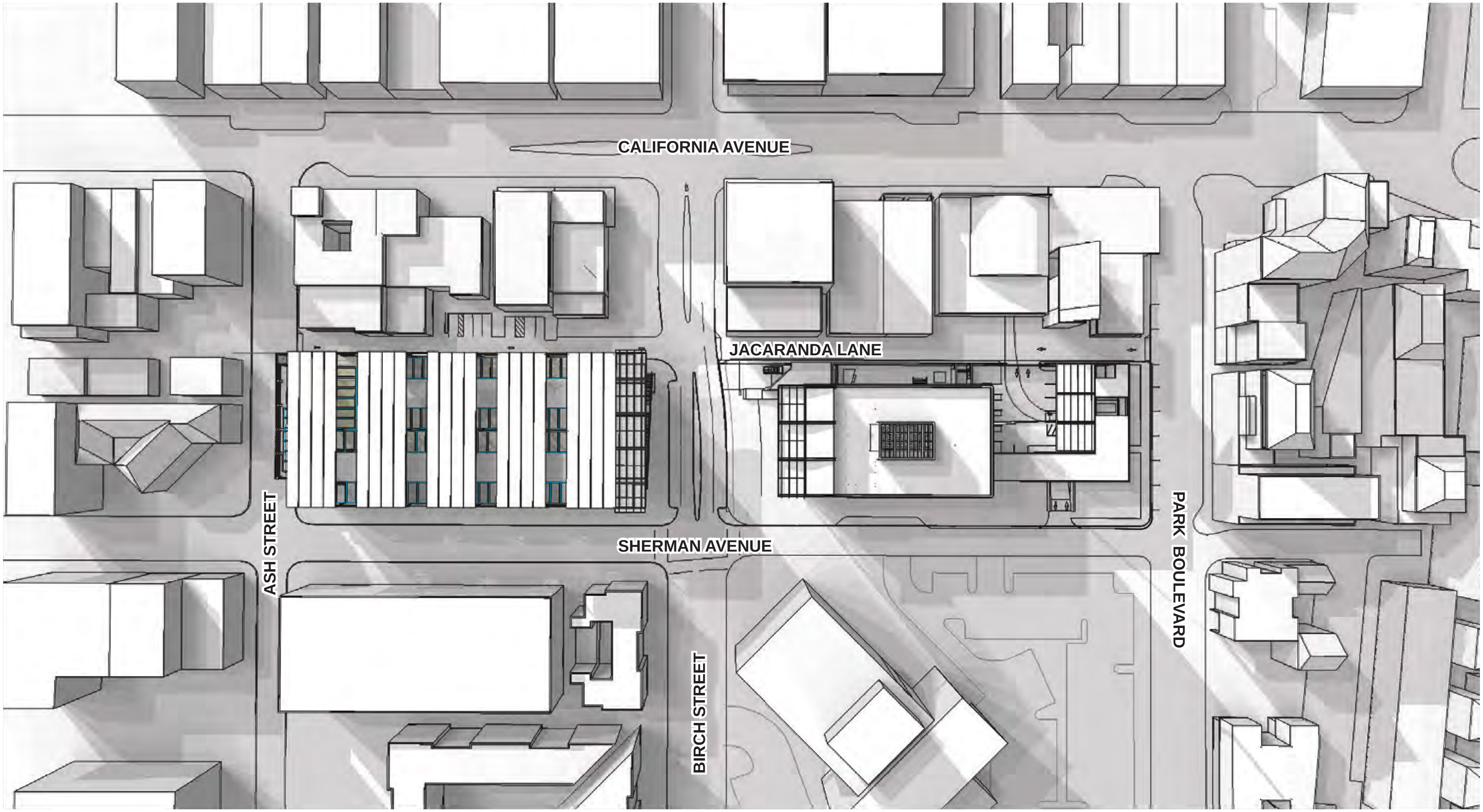
The PSB project would be required to meet the lighting performance criteria of Chapter 18.23.030 (Lighting) of the municipal code (see section 4.2, Regulatory Setting, above), which would be expected to adequately control brightness of lighting, glare, and sky glow. The light and glare impacts of the proposed PSB project would therefore be ***less than significant.***

Mitigation. No significant impact has been identified; no mitigation is required.



Source: RossDrulisCusenbery Architecture

Figure 4.4 - Shadow Patterns: June 21 (Summer Solstice)

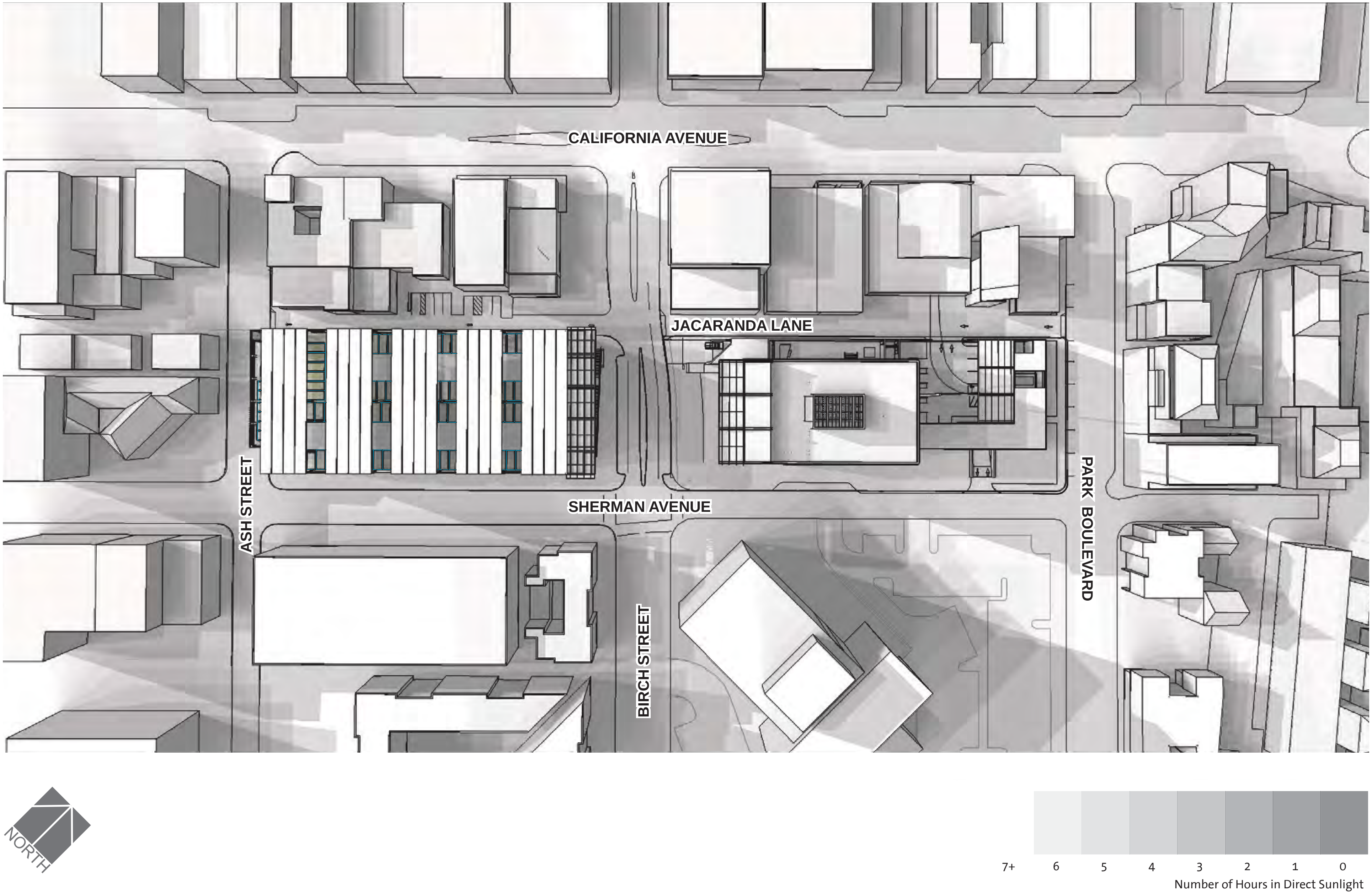


7+	6	5	4	3	2	1	0

Number of Hours in Direct Sunlight

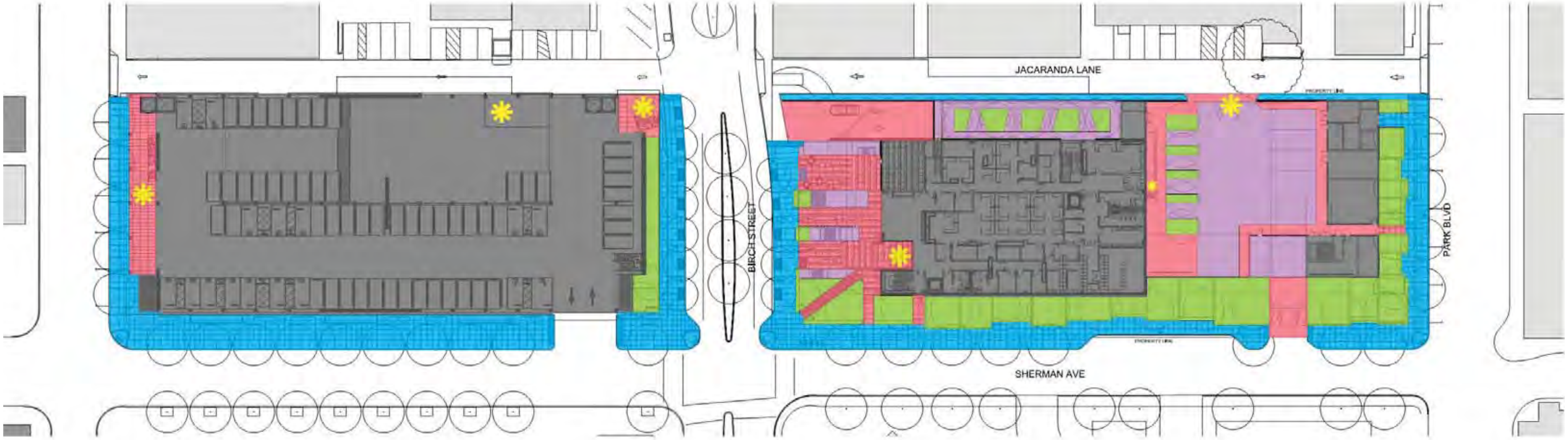
Source: RossDrulisCusenbery Architecture

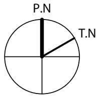
Figure 4.5 - Shadow Patterns: September 21 (Fall Equinox)



Source: RossDrulisCusenbery Architecture

Figure 4.6 - Shadow Patterns: December 21 (Winter Solstice)





LIGHT LEVEL LEGEND (FOOTCANDLES - FC)

- ⬛ BUILDING FOOTPRINT
- 🟩 LANDSCAPE AREAS
- ✳ 3-5 FC (AVERAGE)
- 🟥 1 FC (MINIMUM)
- 🟦 .5-1 FC (AVERAGE)
- 🟪 .2-.6 FC (AVERAGE)

Source: RossDrulisCusenbery Architecture

Figure 4.7 - Site Lighting Plan

5. AIR QUALITY

This EIR chapter provides information on the environmental and regulatory air quality setting of the proposed project and evaluates the potential amount of emissions of regulated air pollutants that could be generated by construction and operation of the project. The methodologies and assumptions used in preparation of this section follow the CEQA Guidelines developed by the Bay Area Air Quality Management District (BAAQMD, as revised in May 2017 (BAAQMD 2017a). Information on existing air quality conditions, federal, and state ambient air quality standards, and pollutants of concern was obtained from the U.S. Environmental Protection Agency (U.S. EPA), California Air Resources Board (CARB), and BAAQMD.

This EIR air quality analysis has been closely coordinated with the climate change analysis in chapter 9 of this EIR.

5.1 BACKGROUND INFORMATION AND SETTING

Air quality is a function of pollutant emissions and topographic and meteorological influences. The physical features and atmospheric conditions of a landscape interact to affect the movement and dispersion of pollutants and determine its air quality.

5.1.1 Regulated Air Pollutants

The U.S. EPA has established National Ambient Air Quality Standards (NAAQS) for six common air pollutants: ozone (O_3), particulate matter (PM), which consists of “inhalable coarse” PM (particles with an aerodynamic diameter between 2.5 and 10 microns in diameter, or PM_{10}) and “fine” PM (particles with an aerodynamic diameter smaller than 2.5 microns, or $PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. The U.S. EPA refers to these six common pollutants as “criteria” pollutants because the agency regulates the pollutants on the basis of human health and/or environmentally-based criteria.

CARB has established California Ambient Air Quality Standards (CAAQS) for the six common air pollutants regulated by the federal Clean Air Act (the CAAQS are more stringent than the NAAQS) plus the following additional air pollutants: hydrogen sulfide (H_2S), sulfates (SO_X), vinyl chloride, and visibility reducing particles.

A description of the air pollutants associated with the proposed project and its vicinity is provided below. Air pollutants not commonly associated with the existing or proposed sources in the vicinity of the project site, such as lead and visibility reducing particles, are not described below.

- **Ground-level Ozone**, or smog, is not emitted directly into the atmosphere. It is created from chemical reactions between oxides of nitrogen (NO_X) and volatile organic compounds (VOCs), also called Reactive Organic Gasses (ROG), in the presence of sunlight (U.S. EPA, 2017a). Thus, ozone formation is typically highest on hot sunny days in urban areas with

NO_X and ROG pollution. Ozone irritates the nose, throat, and air pathways and can cause or aggravate shortness of breath, coughing, asthma attacks, and lung diseases such as emphysema and bronchitis.

- **Particulate Matter**, also known as particle pollution, is a mixture of extremely small solid and liquid particles made up of a variety of components such as organic chemicals, metals, and soil and dust particles (U.S. EPA, 2016a).
  - PM_{10}, also known as inhalable coarse, respirable, or suspended PM_{10}, consists of particles less than or equal to 10 micrometers in diameter (approximately 1/7th the thickness of a human hair). These particles can be inhaled deep into the lungs and possibly enter the blood stream, causing health effects that include, but are not limited to, increased respiratory symptoms (e.g., irritation, coughing), decreased lung capacity, aggravated asthma, irregular heartbeats, heart attacks, and premature death in people with heart or lung disease (U.S. EPA, 2016a).
  - $PM_{2.5}$, also known as fine PM, consists of particles less than or equal to 2.5 micrometers in diameter (approximately 1/30th the thickness of a human hair). These particles pose an increased risk because they can penetrate the deepest parts of the lung, leading to and exacerbating heart and lung health effects (U.S. EPA, 2016a).
- **Carbon Monoxide (CO)** is an odorless, colorless gas that is formed by the incomplete combustion of fuels. Motor vehicles are the single largest source of carbon monoxide in the Bay Area. At high concentrations, CO reduces the oxygen-carrying capacity of the blood and can aggravate cardiovascular disease and cause headaches, dizziness, unconsciousness, and even death (U.S. EPA 2016b).
- **Nitrogen Dioxide (NO_2)** is a by-product of combustion. NO_2 is not directly emitted, but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as NO_X and are major contributors to ozone formation. NO_2 also contributes to the formation of particulate matter. NO_2 can cause breathing difficulties at high concentrations (U.S. EPA, 2016c).
- **Sulfur Dioxide (SO_2)** is one of a group of highly reactive gases known as oxides of sulfur (SO_X). Fossil fuel combustion in power plants and industrial facilities are the largest emitters of SO_2. Short-term effects of SO_2 exposure can include adverse respiratory effects such as asthma symptoms. SO_2 and other SO_X can react to form PM (U.S. EPA, 2016d).
- **Sulfates (SO_4^{2-})** are the fully oxidized ionic form of sulfur. SO_4^{2-} are primarily produced from fuel combustion. Sulfur compounds in the fuel are oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. Sulfate exposure can increase risks of respiratory disease (CARB, 2009a).

In addition to criteria air pollutants, the U.S. EPA and CARB have classified certain pollutants as hazardous air pollutants (HAPs) or toxic air contaminants (TACs), respectively. These pollutants can cause severe health effects at very low concentrations, and many are suspected or confirmed carcinogens. The U.S. EPA has identified 187 HAPs, including such substances as benzene and formaldehyde; CARB also considers particulate emissions from diesel-fueled engines (DPM) and other substances to be TACs.[1]

- **DPM**. The exhaust from diesel engines comprised includes hundreds of different gaseous and particulate components, many of which are toxic. Many of the toxic compounds adhere to the particles, and because diesel particles are very small (less than 2.5 microns in diameter), they can penetrate deeply into the lungs. Mobile sources using diesel fuel, including trucks, buses, automobiles, trains, ships and farm equipment, are the largest source of DPM emissions in the Bay Area.

5.1.2 Project Air Basin

The U.S. EPA and CARB are the federal and state agencies charged with maintaining air quality in the nation and state, respectively. The U.S. EPA delegates much of its authority over air quality to CARB. CARB has geographically divided the state into 15 air basins for the purposes of managing air quality on a regional basis. An air basin is a CARB-designated management unit with similar meteorological and geographic conditions. The proposed project site is located in the City of Palo Alto, in Santa Clara County, within the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB covers all of Alameda, Contra Costa, Marin, Napa, Santa Clara, San Mateo, and San Francisco counties, and portions of Solano and Sonoma counties. The City of Palo Alto is located south of the San Francisco Peninsula; approximately 25 miles southeast of San Francisco and 10 miles northwest of San Jose.

5.1.2.1 SFBAAB Topography and Meteorology

The topography and meteorology of the SFBAAB are characterized by the coast mountain ranges and the seasonal migration of the Pacific high-pressure cell. Regionally, basin airflow is affected by the coast mountain ranges, which create complex terrains consisting of higher elevations, valleys, and bays. The Golden Gate to the west and the Carquinez Strait to the east create gaps in the mountain ranges that allow air to flow into and out of the SFBAAB. In the summer, winds from the northwest are channeled through the Golden Gate and other narrow openings, resulting in localized areas of high wind speeds. Air flowing from the coast inland is called the sea breeze and begins developing in the late morning or early afternoon; air flowing from the inland regions back to the coast, or drainage, occurs at night.

Basin climate is also influenced by the Pacific high-pressure cell, a semi-permanent area of high pressure located over the Pacific Ocean. In the summer, the cell is centered over the northeastern Pacific Ocean, pushing storms to the north and resulting in generally stable conditions within the Bay Area. In the winter, the cell weakens and migrates south, bringing cooler temperatures and stormy conditions.

The SFBAAB is most susceptible to air pollution during the summer when cool marine air flowing through the Golden Gate can become trapped under a layer of warmer air (known as an inversion) and prevented from escaping the valleys and bays created by the Coast Ranges. Air pollution potential is highest along the southeastern portion of the peninsula because this area is most protected from the high winds and fog of the marine layer, the emission density is

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[1] Since CARB's list of TACs references and includes U.S. EPA's list of HAPs, this EIR uses the term TAC when referring to HAPs and TACs.

relatively high, and pollutant transport from upwind sites is possible. Wintertime inversions are weaker and more localized and are the result of rapid heat radiation from the earth's surface.

5.1.2.2 SFBAAB Air Quality Conditions

The federal and state governments have established emissions standards and limits for air pollutants which may reasonably be anticipated to endanger public health or welfare. These standards typically take one of two forms: standards or requirements that are applicable to specific types of facilities or equipment (e.g., petroleum refining, metal smelting), or concentration-based standards that are applicable to overall ambient air quality. Air quality conditions are best described and understood in the context of these standards; areas that meet, or attain, concentration-based ambient air quality standards are considered to have levels of pollutants in the ambient air that, based on the latest scientific knowledge, do not endanger public health or welfare.

5.1.2.3 SFBAAB Attainment Status and Emissions Summary

The U.S. EPA, CARB, and regional air agencies assess the air quality of an area by measuring and monitoring the amount of pollutants in the ambient air and comparing pollutant levels against NAAQS and CAAQS. Based on these comparisons, regions are classified into one of the following categories.

- **Attainment**. A region is "in attainment" if monitoring shows ambient concentrations of a specific pollutant are less than or equal to the NAAQS or CAAQS. In addition, an area that has been re-designated from nonattainment to attainment is classified as a "maintenance area" for 10 years to ensure that the air quality improvements are sustained.

- **Nonattainment**. If the NAAQS or CAAQS are exceeded for a pollutant, the region is designated as nonattainment for that pollutant. It is important to note that some NAAQS and CAAQS require multiple exceedances of the standard in order for a region to be classified as nonattainment. Federal and state laws require nonattainment areas to develop strategies, implementation plans, and control measures to reduce pollutant concentrations to levels that meet, or attain, standards.

- **Unclassified.** An area is unclassified if the ambient air monitoring data are incomplete and do not support a designation of attainment or nonattainment.

Table 5-1 lists the NAAQS and CAAQS and summarizes the SFBAAB's attainment status.

5.1.3 Existing Stationary Sources and Risks

The proposed project is generally located at the intersection of Sherman Avenue and Birch Street, in the City's California Avenue commercial district. The project site consists of two unenclosed parking lots (Lot C-6 and Lot C-7) that contain a total of 310 parking spaces (158 at Lot C-6 and 152 at Lot C-7). Parking lots themselves do not generate trips; the land uses around them are the attraction and reason for vehicular travel to the area. As such, there are no attributable sources of criteria air pollutants generated by the existing land use.

Table 5-1
AMBIENT AIR QUALITY STANDARDS AND SFBAAB ATTAINMENT STATUS

Pollutant	**Averaging Time**	**California AAQS (A)**		**National AAQS (B)**	
		Standard (C)	**Attainment Status (D)**	**Standard (C)**	**Attainment Status (D)**
Ozone	1-Hour	180 µg/m^3	**N**	--	--
	8-Hour	137 µg/m^3	**N**	137 µg/m^3	**N**
PM10	24-Hour	50 µg/m^3	**N**	150 µg/m^3	U
	Annual Average	20 µg/m^3	**N**	--	--
PM2.5	24-Hour	--	--	35 µg/m^3	**N (E)**
	Annual Average	12 µg/m^3	**N**	12 µg/m^3	U/A(F)
Carbon Monoxide	1-Hour	23,000 µg/m^3	A	40,000 µg/m^3	A
	8-Hour	10,000 µg/m^3	A	10,000 µg/m^3	A
Nitrogen Dioxide	1-Hour	339 µg/m^3	A	188 µg/m^3	U(G)
	Annual Average	57 µg/m^3	--	100 µg/m^3	A
Sulfur Dioxide	1-Hour	655 µg/m^3	A	196 µg/m^3	U(H)
	24-Hour	105 µg/m^3	A	--	--
Sulfates	24-Hour	25 µg/m^3	A	--	--
Hydrogen Sulfide	1-Hour	42 µg/m^3	U	--	--
Vinyl Chloride	24-Hour	26 µg/m^3	--	--	--

SOURCE: BAAQMD 2017b, modified by MIG.

(A) Table does not list CAAQS for lead and visibility reducing particles. California standards for ozone, carbon monoxide, sulfur dioxide (1 and 24-hour), nitrogen dioxide, suspended PM10 and PM2.5 are values that are not to be exceeded. The standards for sulfates, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.
(B) Standards shown are the primary NAAQS designed to protect public health.
(C) All standards shown in terms of micrograms per cubic meter (µg/m^3) for comparison purposes.
(D) A= Attainment, N= Nonattainment, U=Unclassifiable.
(E) On January 2013, the U.S. EPA issued a final rule to determine the Bay Area attains the 24-hour PM2.5 national standard. This EPA rule suspends key SIP requirements as long as monitoring data continues to show that the Bay Area attains the standard. Despite this EPA action, the Bay Area will continue to be designated as “non-attainment” for the national 24-hour PM2.5 standard until such time as the Air District submits a “redesignation request” and a “maintenance plan” to EPA, and EPA approves the proposed redesignation.

(F) In December 2012, EPA strengthened the annual PM 2.5 NAAQS from 15.0 to 12.0 micrograms per cubic meter (ug/m3). In December 2014, EPA issued final area designation for the 2012 primary annual PM 2.5 NAAQS. Areas designated “unclassifiable/attainment” must continue to take steps to prevent their air quality from deteriorating to unhealthy levels. The effective date of this standard is April 15, 2015.

(G) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100ppm (effective January 22, 2010). The US Environmental Protection Agency (EPA) expects to make a designation for the bay area by the end of 2017.

(H) On June 2, 2010, the US EPA established a new 1-hour SO2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The existing 0.030 ppm annual and 0.14 ppm 24-hour SO2 NAAQS however must continue to be used until one year following US EPA initial designations of the new 1-hour SO2 NAAQS. EPA expects to make this designation for the Bay Area by the end of 2017.

At their closest, Lots C-6 and C-7 are located approximately 450 feet southwest of the Caltrain rail corridor, 670 feet west of Oregon Expressway, and approximately 600 feet north of El Camino Real (State Route (SR) 82).[1] The emissions from rail activities and vehicles traveling on these high volume roadways contribute to local ambient air quality at and around the project site. In addition, there are five stationary sources of emissions located within 1,000 feet of the project site that contribute to existing, local air quality condition, including three back-up generators (at the Santa Clara Superior Court, the Sunrise Assisted Living Center, and a Sprint facility on Page Mill Road) one gas station (Palo Alto Shell), and a groundwater treatment system on Oregon Expressway (BAAQMD, 2012).

5.1.4 Air Quality Sensitive Receptors

Some people are more affected by air pollution than others. The BAAQMD defines sensitive receptors as “facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly and people with illnesses” (BAAQMD 2017a). In general, children, senior citizens, and individuals with pre-existing health issues, such as asthmatics, are considered sensitive receptors. Both CARB and the BAAQMD consider schools, schoolyards, parks and playgrounds, daycare facilities, nursing homes, hospitals, and residential areas as sensitive air quality land uses and receptors (BAAQMD 2017a, CARB 2005). The potentially sensitive air quality receptors adjacent or in close proximity to the perimeter of the proposed project site include numerous mixed-use and/or multi-family residential buildings that are generally located in the California Avenue commercial district. In particular, there are several multi-family residential buildings located directly adjacent to the project area that would be particularly susceptible to potential emissions generated by the proposed project, including:

- 2454 - 2458 Ash Street. This two-story, multi-family residential building is located approximately 60 feet southwest of Lot C-7 where the parking garage would be constructed.

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[1] These distances reflect the distance between the edge of the rail corridor or roadway and the closest point associated with Lot C-6 or Lot C-7.

- 5212 Birch Street. This three-story, multi-family apartment complex is located on the southeastern corner of the Birch Street / Sherman Avenue intersection, approximately 45 feet southeast of Lot C-7 (where the proposed parking garage would be located), and approximately 90 feet south of Lot C-6 (where the proposed public safety building would be located).

- 109 California Avenue / 122 Sherman Avenue. These mixed-use buildings, located along Park Boulevard, feature commercial and office space on the first two floors, and residential units on floors three and four. The buildings are approximately 50 feet north / northeast of Lot C-6 where the public safety building would be constructed.

5.2 REGULATORY SETTING

5.2.1 Federal and State Clean Air Acts

The federal Clean Air Act, as amended, provides the overarching basis for both federal and state air pollution prevention, control, and regulation. The Act establishes the U.S. EPA's responsibilities for protecting and improving the nation's air quality. The U.S. EPA oversees federal programs for setting air quality standards and designating attainment status, permitting new and modified stationary sources of pollutants, controlling emissions of hazardous air pollutants, and reducing emissions from motor vehicles and other mobile sources. The U.S. EPA also requires that each state prepare and submit a State Implementation Plan (SIP) that consists of background information, rules, technical documentation, and agreements that an individual state will use to attain compliance with the NAAQS within federally-imposed deadlines. State and local agencies implement the plans and rules associated with the SIP, but the rules are also federally enforceable.

In addition to being subject to federal requirements, air quality in California is also governed by more stringent regulations under the California Clean Air Act. In California, both the federal and state Clean Air acts are administered by CARB. It sets all air quality standards including emission standards for vehicles, fuels, and consumer goods as well as monitors air quality and sets control measures for toxic air contaminants. CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional level.

5.2.2 CARB In-Use Off-Road Diesel Equipment Program

CARB's In-Use Off-Road Diesel Equipment regulation is intended to reduce emissions of NO_x and PM from off-road diesel vehicles, including construction equipment, operating within California. The regulation imposes limits on idling; requires reporting equipment and engine information and labeling all vehicles reported; restricts adding older vehicles to fleets; and requires fleets to reduce their emissions by retiring, replacing, or repowering older engines or installing exhaust retrofits for PM. The requirements and compliance dates of the off-road regulation vary by fleet size, and large fleets (fleets with more than 5,000 horsepower) must meet average targets or comply with Best Available Control Technology (BACT) requirements beginning in 2014. CARB has off-road anti-idling regulations affecting self-propelled diesel-fueled vehicles 25 horsepower and up. The off-road anti-idling regulations limit idling on applicable equipment to no more than five minutes, unless exempted due to safety, operation, or maintenance requirements.

5.2.3 CARB On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation

CARB's In-Use Heavy-Duty Diesel-Fueled regulation (also known as the Truck and Bus Regulation) is intended to reduce emission of nitrous oxides (NO_x), particulate matter (PM), and other criteria pollutants generated from existing on-road diesel vehicles operating in California. The regulation applies to nearly all diesel-fueled trucks and buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds that are privately or federally owned, and for privately and publicly owned school buses. Heavier trucks and buses with a GVWR greater than 26,000 pounds must comply with a schedule by engine model year or owners can report to show compliance with more flexible options. Fleets complying with the heavier trucks and buses schedule must install the best available PM filter on 1996 model year and newer engines, and replace the vehicle 8 years later. Trucks with 1995 model year and older engines had to be replaced starting in 2015. Replacements with a 2010 model year or newer engine meet the final requirements, but owners can also replace the equipment with used trucks that have a future compliance date (as specified in regulation). By 2023, all trucks and buses must have at least 2010 model year engines with few exceptions.

5.2.4 CARB Stationary Diesel Engines – Emission Regulations

In 1998, CARB identified DPM as a TAC. To reduce public exposure to DPM, in 2000, the Board approved the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (Risk Reduction Plan) (ARB 2000). Integral to this plan is the implementation of control measures to reduce diesel PM such as the Airborne Toxic Control measures (ATCM) for stationary diesel-fueled engines. As such, diesel generators must comply with regulations under the ARB's amendments *to Airborne Toxic Control Measure for Stationary Compression Ignition Engines* and be permitted by BAAQMD.

5.2.5 Bay Area Air Quality Management District

The BAAQMD is the agency primarily responsible for maintaining air quality and regulating emissions of criteria and toxic air pollutants within the SFBAAB. The BAAQMD carries out this responsibility by preparing, adopting, and implementing plans, regulations, and rules that are designed to achieve attainment of state and national air quality standards. The BAAQMD currently has 13 regulations containing more than 100 rules that control and limit emissions from sources of pollutants. Table 5-2 summarizes the major BAAQMD rules and regulations that may apply to the proposed project.

5.2.5.1 2017 Clean Air Plan

On April 29, 2017, the BAAQMD adopted its *Spare the Air-Cool the Climate 2017 Clean Air Plan* (Clean Air Plan). The 2017 Clean Air Plan updates the most recent Bay Area ozone plan, the *2010 Clean Air Plan*, in fulfillment of state ozone planning requirements. Over the next 35 years, the Plan will focus on the three following goals:

- Attain all state and national quality standards;
- Eliminate disparities among Bay Area communities in cancer health risk from toxic air contaminants; and
- Reduce Bay Area GHG Emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050.

Table 5-2
POTENTIALLY APPLICABLE BAAQMD RULES AND REGULATIONS

Regulation	**Rule**	**Description**
2 – Permits	1 – General Requirements	Includes criteria for issuance or denial of permits, exemptions, appeals against decisions of the District actions on applications.
2 – Permits	2 – New Source Review	Provides for the review of new and modified sources of pollutants; requires use of Best Available Control Technology and emissions offsets to achieve no net increase in nonattainment pollutants; implements Prevention of Significant Deterioration review for attainment pollutants.
6 – Particulate Matter	1 – General Requirements	Limits visible particulate matter emissions.
9 – Inorganic Gaseous Pollutants	8 – NOx and CO from Stationary Internal Combustion Engines	Limits emissions of NOX and CO from stationary internal gas combustion engines more than 50 brake horsepower.
SOURCE: BAAQMD 2017c		

The Plan includes 85 distinct control measures to help the region reduce air pollutants and has a long-term strategic vision which forecasts what a clean air Bay Area will look like in the year 2050. The control measures aggressively target the largest source of GHG, ozone pollutants, and particulate matter emissions – transportation. The 2017 Plan includes more incentives for electric vehicle infrastructure, off-road electrification projects such as Caltrain and shore power at ports, and reducing emissions from trucks, school buses, marine vessels, locomotives and off-road equipment (BAAQMD 2017c).

5.2.6 City of Palo Alto

5.2.6.1 Palo Alto Municipal Code

The City of Palo Alto Municipal Code outlines several requirements for new development that would reduce air quality impacts:

- Chapter 5.24, Construction and Demolition Debris Diversion Facilities: Requires development to divert at least fifty percent of construction and debris from landfill pursuant to the California Integrated Waste Management Act of 1989 and the California Green Building Code (CALGreen). Any and all of the debris not salvaged for reuse must be sent to an "approved facility," meaning a facility who has obtained all applicable federal, state and local permits, and specializes in the re-use, recycling, composting, and/or recovery of materials.

5.2.6.2 Palo Alto Green Building Program

The City of Palo Alto requires compliance with the local Green Building Ordinance, which is encompassed in Chapter 16.14 of the Palo Alto Municipal Code. The Green Building Ordinance includes the mandatory measures of CALGreen (Title 24, Part 11), including the City's landscape water efficiency standards adopted under the Model Water Efficient Landscape Ordinance (WELO); and also requires projects in the city to adhere to even more stringent sustainability measures by expanding the types of projects that are covered under CALGreen.

5.2.6.3 Palo Alto Climate Protection Program

In 2007, the City of Palo Alto adopted its *Climate Protection Plan* (CPP), which set GHG reduction goals for short-term, medium-term, and long-term time frames. The City's *Sustainability and Climate Action Plan* (S/CAP) initiative was launched in August of 2014 expands upon the goals set forth in the CPP. On November 28, 2016, the City Council adopted the S/CAP framework, which includes the documents guiding principles, decision criteria, design principles, and key goals and strategies Although primarily directed toward reducing GHG emissions, many of the strategies contained in these documents have co-benefits of reducing criteria air pollutants and TACs. The CPP and S/CAP are discussed in greater detail in Chapter 9: Greenhouse Gas Emissions.

5.3 IMPACTS AND MITIGATION MEASURES

5.3.1 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the proposed project would have a significant air quality impact if it would:

(a) Conflict with or obstruct implementation of the applicable air quality plan;

(b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

(c) Result in a cumulatively considerable net increase of any criteria pollutant for which the region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);

(d) Expose sensitive receptors to substantial pollutant concentrations; or

(e) Create objectionable odors affecting a substantial number of people.

In May 2017, the BAAQMD published a new version of the *CEQA Air Quality Guidelines,* which includes revisions made to address the Supreme Court's decision on the *California Building Industry Association v. BAAQMD*. The Guidelines contain the BAAQMD's recommendations to Lead Agencies for evaluating and assessing the significance of a project's potential air quality impacts (BAAQMD 2017)*.* The BAAQMD's construction- and operational-related thresholds of significance for criteria pollutants and toxic air contaminants are summarized in Table 5-3.

Table 5-3
BAAQMD CEQA THRESHOLDS OF SIGNIFICANCE

Pollutant	**BAAQMD Project-Level Threshold of Significance** [(A)]		
	Construction Emissions	**Operational Emissions**	
	Daily Emissions (pounds/day)	Daily Emissions (pounds/day)	Annual Emissions (tons per year)
ROG	54	54	10
NO_X	54	54	10
Exhaust PM10	82	82	15
Exhaust PM2.5	54	54	10
Fugitive Dust PM_{10}/$PM_{2.5}$	Best Management Practices	*None*	
Local CO	*None*	9.0 ppm (8-hour average) 20.0 ppm (1-hour average)	
Risks and Hazards – New Source/Receptor (Individual)	Compliance with Qualified Community Risk Reduction Plan; or Increased cancer risk of >10.0 in a million; and Increased non-cancer risk of >1.0 Hazard Index (chronic or acute); and Ambient $PM_{2.5}$ increase: >0.3μg/m^3 annual average		
Risks and Hazards – New Source/Receptor (Cumulative)	Compliance with Qualified Community Risk Reduction Plan; or Increased cancer risk of >100 in a million (from all local sources); and Increased non-cancer risk of >10.0 Hazard Index (from all local sources) (chronic); and Ambient $PM_{2.5}$ increase: >0.8μg/m^3 annual average (from all local sources)		
Accidental Release of Acutely Hazardous Pollutants	*None*	Storage or use of acutely hazardous materials locating near receptors or receptors locating near stored or used acutely hazardous materials considered significant	
Odors	*None*	Complaint History – 5 confirmed complaints per year averaged over three years	
SOURCE: BAAQMD 2017			

5.3.2 Project Consistency with Air Quality Plan

Would the project conflict with or obstruct implementation of the applicable air quality plan (Significance Criterion [a])?

The proposed Palo Alto Public Safety Building project would not conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan (Plan). The Plan includes criteria air pollutant emissions from construction, mobile, and stationary source activities in its emissions inventories and plans for achieving attainment of air quality standards. Eighty-five control strategies are grouped into nine categories: Stationary Source Measures, Transportation Control Measures, Energy Control Measures, Buildings Control Measures, Agriculture Control Measures, Natural and Working Lands Control Measures, Waste Management Control Measures, Water Control Measures, and Super GHG Control Measures. Most of these control strategies do not apply to the proposed project or are implemented at the local and regional level by municipal government and the BAAQMD. Table 5-4, below, presents the potentially applicable control strategies and project consistency with those measures.

Table 5-4
PROJECT CONSISTENCY WITH BAAQMD 2017 CLEAN AIR PLAN

2017 Clean Air Plan Control Measures	Project Consistency
Stationary Source Measures	
SS32 – Emergency Backup Generators	Project drawings indicate an emergency generator would be installed on the northwestern side of the public safety building (see ARB 04.05). Control measure SS32 focuses on the reduction of emissions of diesel PM and back carbon from back-up generators through Draft Rule 11-18. Although still currently in draft form, the proposed project would comply with the Rule upon adoption by the BAAQMD. This control measure would result in reduced health risks to impacted individuals, and in climate protection benefits.
Transportation Measures	
TR2 – Trip Reduction Programs	The proposed project would comply with control measure TR2 that requires employers with 50 or more Bay Area employees to provide commuter benefits. The control measure encourages local governments, on top of other things, to develop innovative ways to encourage rideshare, transit, cycling, and walking for work trips. The project site is located approximately 700 feet from the Caltrain California avenue train station, and within 200 feet of two bus stops on California Avenue. Additionally, the parking garage would feature ample bicycle parking – something the existing parking lots on site currently lack.
Building Control Measures	
BL1 – Green Buildings	The proposed Palo Alto Public Safety Building project is seeking LEED Silver certification with an aspiration of LEED Gold. The project features many green elements, such as, but not limited to, access to quality transit, bicycle facilities, and optimized energy performance.
WA4 – Recycling and Waste Reduction	The proposed project would comply with Palo Alto Municipal Code Chapter 5.24 that would require the project to divert at least fifty percent of construction and debris from landfill. Additionally, any and all of the debris not salvaged for reuse must be sent to a facility specializing in the re-use, recycling, composting, and/or recovery of materials.

The project would consist of the construction and operation of a new parking garage and public safety building that have been designed to meet community needs. The proposed project is seeking LEED Silver certification at a minimum, and encourages non-vehicular modes of transit given its proximity to regional transit facilities and supplied bicycle parking. The Palo Alto Public Safety Building project supports the primary goals of the Clean Air Plan in the fact that it does not exceed the BAAQMD thresholds for criteria air pollutant emissions (see section 5.3.3 and 5.3.4, below), it would not promote or increase the disparities among Bay Area communities in cancer risk from TACs, and it is consistent with AB32 reduction goals (see Chapter 9: Greenhouse Gases). The project is consistent with the Clean Air Plan and, therefore, would not result in a significant impact related to air quality. This impact would be ***less-than-significant***.

Mitigation. No significant impact has been identified; no mitigation is required.

5.3.3 Violations of Air Quality Standards

Would the project violate and air quality standard or contribute substantially to an existing or projected air quality violation (Significance Criterion [b])? This significance criterion applies to Sections 5.3.3 (Violations of Air Quality Standards), 5.3.4 (Construction Emission Air Quality Impacts), and 5.3.5 (Operational Air Quality Impacts).

The proposed project would generate short-term construction and long-term operational emissions of regulated air pollutants (i.e., criteria air pollutants and TACs). These emissions would be released to the ambient air and disperse according to the topographic and meteorological influences that prevail near the Palo Alto Public Safety Building site and in the greater SFBAAB (see Section 5.1.2.1). The BAAQMD and/or CARB monitor levels of criteria air pollutant concentrations in ambient air to evaluate attainment of CAAQS and NAAQS; the significance of the level of criteria air pollutant emissions that the proposed project could emit during construction and operation is evaluated below.

Neither the BAAQMD nor CARB conduct regular and routine monitoring of TACs because most TACs do not have an established ambient air quality standard against which ambient air concentrations can be compared;[1] however, TAC emissions could result in local effects if substantial concentrations were to occur at sensitive receptor locations as a result of the proposed project. The proposed project's TAC emissions are discussed in Section 5.3.6.

5.3.4 Construction Emission Air Quality Impacts

Construction activities associated with development of the proposed parking garage and public safety building would include: site preparation, grading, utility trenching, foundation construction, vertical building development, and architectural coating. Ground-disturbing activities, such as site preparation, grading, utility trenching, and foundation construction, as well as on- and off-site travel would generate dust and PM emissions. Construction is anticipated to occur over an approximate three-year period, with initial ground breaking occurring in Spring 2018. Generally speaking, development of the two structures would occur independently of one another, with parking garage construction occurring prior to the public safety building.[2]

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[1] Ambient air quality standards have been adopted for lead and vinyl chloride, both of which are TACs; however, these pollutants are monitored at far fewer locations than criteria air pollutants like ozone precursor and PM.

[2] It is anticipated construction of the parking garage would take approximately one year and three months to complete, and the public safety building would take a year and nine months of erect. The last three weeks of parking garage construction (i.e., the last couple weeks of vertical building construction and one week of architectural coating) would overlap with the first three weeks of site preparation for the public safety building.

The project's potential construction emissions were modeled using the California Emissions Estimator Model (CalEEMod), Version 2016.3.1 (see the Air Quality Appendix). Construction phase and duration information was provided by the project Architect and is summarized in Table 5-5; the type and amount of equipment used during construction was generated using CalEEMOD default assumptions and modified as necessary to reflect specific construction activities (e.g., adding trips for concrete deliveries). Parking garage construction activities were presumed to start in April 2018 and last approximately 16 months while construction of the public safety building was presumed to start in June 2019 and last 22 months.

In addition to on-site construction equipment and off-site vendor and worker vehicle trip emissions, the CalEEMod project file also includes emissions for the following project-specific activities:

1. Debris and soil hauling: Site preparation and excavation activities for the proposed parking garage would remove approximately 35,730 total cubic yards of debris and soil from the site and generate a total of approximately 4,465 heavy-duty truck trips. Similarly, site preparation and excavation activities for the proposed public safety building would remove approximately 46,650 total cubic yards of debris and soil from the site and generate a total of approximately 5,830 heavy-duty truck trips.
2. Additional vendor deliveries: Construction of the proposed parking garage and public safety building was presumed to require approximately 12,000 cubic yards of concrete delivery, adding approximately 30 vendor truck trips per day to each modeled building construction phase.

The average daily emissions generated by the proposed project are shown in Table 5-6.

As shown in Table 5-6, potential construction emissions would be below all BAAQMD significance thresholds for construction equipment exhaust emissions; however, fugitive dust emissions could be potentially significant if not adequately controlled. The BAAQMD's *CEQA Guidelines* identify and recommend a series of "Basic" measures to control and reduction construction-related emissions. For all projects, the BAAQMD recommends implementation of eight Basic Construction Measures (BAAQMD 2017a, pg. 8-4) to reduce construction fugitive dust emissions levels; these basic measures are also used to meet the BAAQMD's best management practices (BMPs) threshold of significance for construction fugitive dust emissions (i.e., the implementation of all basic construction measures renders fugitive dust impacts a less than significant impact). Accordingly, the City would incorporate the following BAAQMD-recommended basic construction measures into all appropriate project bid, design, and construction drawings:

Standard Best Management Practices (BMPs) for Fugitive Dust Control

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

Table 5-5

PROJECT CONSTRUCTION PHASES, DURATION, AND TYPICAL EQUIPMENT USE

Project / Phase[A]	**Duration (Days)**[B]	**Typical Equipment Used**[C]
Parking Garage (Lot C-7)		
Site Preparation (2018)	10	Grader, tractor, backhoe
Grading (Excavation) (2018)	60	Excavator, bull dozer, backhoe
Trenching (Utility Work) (2018)	20	Trencher, welder, material handler
Building Construction (Foundation Work) (2018)	60	Bore/drill rig, material lifts, backhoe, concrete trucks
Building Construction (Vertical Building Construction)	170	Crane, material handling equipment, concrete trucks
Architectural Coating (2019)	5	Compressor
Public Safety Building (Lot C-6)		
Site Preparation	10	Grader, tractor, backhoe
Grading (Excavation)	75	Excavator, bull dozer, backhoe
Trenching (Utility Work)	40	Trencher, welder, material handler
Building Construction (Foundation Work)	60	Bore/drill rig, material lifts, backhoe, concrete trucks
Building Construction (Vertical Building Construction)	275	Crane, material handling equipment, concrete trucks
Architectural Coating	5	Compressor

Table 5-6

ESTIMATED PROJECT CONSTRUCTION EMISSIONS (UNMITIGATED)

Construction Year	**Pollutant Emissions (Average Pounds per Day)** (A)						
	ROG	**NOx**	**CO**	**PM_{10}**		**$PM_{2.5}$**	
				Dust[B]	**Exhaust**	**Dust**[B]	**Exhaust**
2018	2.2	27.6	16.3	0.9	1.1	0.3	1.0
2019	7.9	30.8	18.3	2.4	1.2	1.1	1.1
2020	3.5	30.8	24.6	0.7	1.4	0.2	1.4
2021	12.8	25.0	22.1	0.7	1.1	0.2	1.2
BAAQMD CEQA Threshold	*54*	*54*	--	*BMPs*	*82*	*BMPs*	*82*
Potential Significant Impact?	**No**	**No**	**No**	**Yes**	**No**	**Yes**	**No**

SOURCE: BAAQMD 2017, MIG 2017, see the Air Quality Appendix.

(A) Average daily emissions assume 195 active construction days in 2018, 260 days in 2019, 260 days in 2020, and 55 days in 2021. (Assumes 5 days a week; 39 weeks in 2018, 52 weeks in 2019 and 2020, and 11 weeks in 2021.)

(B) For all projects, the BAAQMD recommends implementing eight basic construction best management practices (BMPs) to control fugitive dust from construction activities.

4. All vehicle speeds on unpaved roads shall be limited to 15 mph.

5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.

8. A publicly visible sign shall be posted with the telephone number and person to contact at the City regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to help ensure compliance with applicable regulations.

The BMPs listed above would control and reduce fugitive dust in accordance with the BAAQMD CEQA Guidelines. With the incorporation of these measures, the proposed project's construction emissions would not cause or contribute to an existing or projected air quality violation and would be ***less than significant***.

Mitigation. No significant impact has been identified; no mitigation is required

5.3.5 Operational Air Quality Impacts

Once constructed, the proposed project would generate long-term emissions of criteria air pollutants from the following sources:

1. **Small "area" sources.** The proposed parking garage and public safety building would generate emissions from small area sources including landscaping equipment and the use of consumer products such as paints, cleaners, and fertilizers that result in the evaporation of chemicals to the atmosphere during product use.

2. **Energy use and consumption**. The proposed parking garage and public safety building would not generate emissions from electricity because the City has committed to a net zero carbon intensity by 2020. The proposed public safety building would, however, generate emissions from the combustion of natural gas in the facility's water and space heating equipment The CalEEMod default estimate of natural gas use for the facility is equal to approximately 7,900 therms.[1]

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[1] One therm is equal to 99,996.1 British thermal units (BTUs), or approximately 99.99 thousand British thermal units (kBTUs). 56,652 therms is equivalent to 5,665,200 kBTU. A BTU equals the amount of heat needed to raise one pound of water by one degree Fahrenheit.

3. **Mobile sources.** The proposed project would generate emissions from vehicles travelling to and from the project site. According to the Traffic Impact Assessment (TIA) prepared for the project by Fehr & Peers (pg. 1), "Parking facilities are not typically traffic generators by themselves. Trips are actually generated by the nearby retail, office and residential uses, and parking lots or structures simply provide vehicle storage. The Parking Structure trips are generally going to be existing vehicles that currently park at adjacent facilities (e.g. street parking, Lot C-8, etc.), but now park in the new Parking Structure." Accordingly, for the purposes of this EIR's air quality analysis, vehicle trips associated with the proposed parking structure are not considered to be a new source of emissions that require analysis.[1] The TIA prepared for the project identifies that the proposed public safety building would generate 29.74 trips per thousand square feet (KSF) of building space. At a projected 45,000 to 50,000 square feet in size, the proposed public safety building is estimated to generate approximately 1,428 total vehicle trips per day.

   Since the City currently maintains police and fire adminstration services, not all of the vehicle trips generated by the proposed Public Safety Building would actually be "new" vehicle trips. Rather, existing trips would only be redistributed to a different part of the City. Nonetheless, since data is not available on the existing level of police and fire adminstration trips, this EIR considers all vehicle trips generated by the proposed public safety building to be new vehicle trips.

4. **Stationary sources.** The proposed project would generate emissions from one 250-horsepower, diesel-fueled back-up generator to be installed at the proposed parking garage and one 537-horsepower, diesel-fueled back-up generator. Although these sources would be regulatory tested (approximately one-hour per month each), they would not be part of routine, regular operations at the proposed parking garage or public safety building. Their operation would be subject to compliance with BAAQMD permit requirements and CARB's ATCM for Stationary Compression Ignition Engines (see Section 5.2.5).

The emissions resulting from operation of the proposed project are shown in Table 5-7.

As shown in Table 5-7, the proposed project's potential long-term increases in emissions would be substantially below all BAAQMD significance thresholds for operational emissions. As such, the project's operational emissions would result in a ***less-than-significant impact***.

5.3.6 Exposure of Sensitive Receptors to Substantial Air Pollutant Concentrations

Would the project expose sensitive receptors to substantial pollutant concentrations (Significance Criterion [d])? This significance criterion applies to Section 5.3.6 (Exposure of Sensitive Receptors to Substantial Air Pollutant Concentrations), including 5.3.6.1 (Health Risk Assessment Methodology) and 5.3.6.2 (Construction Health Risk Assessment Results).

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[1] The TIA (pg. 55) also states it is likely the proposed parking garage would actually reduce vehicle miles travelled (VMT) in the area since it would reduce the need for vehicles to circulate around the area trying to find an available street parking space.

Table 5-7
ESTIMATED PROJECT OPERATIONAL EMISSIONS

Scenario	**Pollutant Emissions (Tons per Year) [(A)]**							
	ROG	**NOx**	**CO**	**SO_2**	**PM_{10}**		**$PM_{2.5}$**	
					Dust	**Exhaust**	**Dust**	**Exhaust**
Proposed Project	0.54	0.41	3.26	0.00	0.90	0.01	0.24	0.01
BAAQMD CEQA Threshold	10	10	-- [(A)]	-- [(B)]	None	15	None	10
Potential Significant Impact?	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

SOURCE: BAAQMD 2017 and MIG 2017, see the Air Quality Appendix.

(A) BAAQMD CO significant thresholds are based on ambient air quality standards (See Table 5-3). According to the BAAQMD screening criteria, a project does not result in significant CO impacts if it would be consistent with the congestion management program and not increase traffic volumes to 44,000 vehicles per hour at impacted intersections. The Palo Alto Public Safety Building project would be consistent with the screening criteria and would not result in a significant CO impact.

(B) The BAAQMD's *CEQA Air Quality Guidelines* do not recommend a threshold for use by lead agencies when evaluating the significance of a project's sulfur dioxide emissions. The BAAQMD is designated attainment or unclassified for C/NAAQS for sulfur dioxide (see Table 5-1). For attainment pollutants, federal prevention of significant deterioration requirements apply. Per BAAQMD Regulation 2, Rule 2, the BAAQMD shall not issue an authority to construct for the proposed project if it would emit 250 tons per year unless modeling shows the project would not interfere with attainment of the sulfur dioxide NAAQS. The proposed project would not cause or contribute to a violation of sulfur dioxide standards because it would emit less than 250 tons per year of sulfur dioxide.

Impact 5-1: Construction Toxic Air Contaminant Emissions. Project construction would expose sensitive receptors located adjacent to and in close proximity of the proposed project site to localized, outdoor concentrations of DPM and $PM_{2.5}$ that could exceed BAAQMD risk thresholds even with the implementation of feasible mitigation measures. This project-related effect is considered to represent a ***potentially significant impact*** (see criteria [d] in subsection 5.3.1, "Significance Criteria," above).

CARB designates pollutants that pose a hazard to human health as TACs. The proposed project could result in local health hazards if emissions of one or more TACs would result in substantial concentrations at sensitive receptor locations. Since TACs are a class of pollutants, there is no single definition for what constitutes a substantial concentration; each individual TAC is associated with specific risk and toxicity factors compiled and published by the U.S. EPA, CARB, and the California Office of Environmental Health Hazard Assessment (OEHHA).

The proposed Palo Alto Public Safety Building project has the potential to emit DPM, a TAC, during project construction activities (for a description of DPM, see Section 5.1.1). DPM is produced from the combustion of diesel fuel in both on- and off-road equipment.

A construction health risk assessment (HRA) was conducted to evaluate the potential health hazards from the proposed Palo Alto Public Safety Building project. The HRA methodology is summarized in Section 5.3.6.1; results for construction hazards are presented in Section 5.3.6.2. The HRA prepared for the project indicates the project would result in significant impacts at residential receptors near the proposed project site.

As discussed in Section 5.3.5, the operation of the proposed project would not generate long-term emissions that would exceed BAAQMD thresholds of significance. Project operation would involve testing of a back-up generator at both the parking garage and public safety building. These back-up generators would be diesel-powered, but would not generate significant health risks because they would be limited to approximately 12 hours of testing per year (each) and would be permitted by the BAAQMD.

5.3.6.1 Health Risk Assessment Methodology

The construction HRA was conducted consistent with OEHHA (OEHHA 2015) and BAAQMD guidelines (BAAQMD 2016) for determining local community risks and hazards. The US EPA's AERMOD dispersion model was used to predict pollutant concentrations at existing sensitive receptors near the project site. The AERMOD dispersion model is a US EPA-approved and BAAQMD-recommended model for simulating the dispersion of pollutant emissions and estimating ground level concentrations of pollutants at specified receptor locations. AERMOD requires the user to input information on the he source(s) of pollutants being modeled, the receptors where pollutant concentrations are modeled, and the meteorology, terrain, and other factors that affect the potential dispersion of pollutants. These variables are described below and shown in detail in the Air Quality Appendix.

Modeled Construction Sources / Emissions Rates

On- and off-site construction emissions were modeled as a series of area and line volume sources as shown in Table 5-8.

Consistent with BAAQMD-recommendations, PM2.5 construction exhaust emissions were presumed to be 100% DPM; PM2.5 fugitive dust emissions were also modeled to determine total combined PM2.5 exposure pursuant to BAAQMD CEQA Guidelines.

An emissions rate for each source listed in Table 5-8 was derived from the CalEEMod emissions estimates described in Section 5.3.4. The annual emissions generated during construction of the proposed parking garage and public safety building were converted to an average emission rate in terms of grams / second per hour of construction activity.[1]

On-site fugitive dust emissions were modeled as a single area source at each site, with a near-ground release height of two meters. On-site DPM emissions were also modeled as a single area source at each site for each year of parking garage and public safety building

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[1] The average emission rate is based on up to 2,640 active construction hours at maximum. Please refer to the Air Quality Appendix for modeled emission rates.

Table 5-8
AERMOD SOURCE PARAMETERS

ID	Description	UTM Coordinates[(A)]		Size (m^2)
		X	Y	
Area01	Parking Garage Fugitive Dust (2018-19)	575728.9	4142508.4	4896.0
Area02	Public Safety Bldg. Fugitive Dust (2019-20)	575795.1	4142609.0	5522.5
Area03	Public Safety Bldg. Equip. Exhaust (2019-20)	575728.9	4142508.4	4896.0
Area04	Parking Garage Equip. Exhaust (2019-20)	575728.9	4142508.44	4896.0
Area05	Parking Garage Equip. Exhaust (2019-20)	575795.1	4142609.0	5522.5
Area06	Public Safety Bldg. Equip. Exhaust (2019-20)	575806.7	4142620.1	2200.0
Area07	Public Safety Bldg. Equip. Exhaust (2019-20)	575852.1	4142688.8	600.0
Sline01	Off-site Vehicle DPM (2018-19)	575791.8 / 576029.3[(B)]	4142600.7 / 4142447.0[(B)]	NA
Sline02	Off-site Vehicle DPM (2018-19)	575791.8 / 576029.3[(B)]	4142600.7 / 4142447.0[(B)]	NA
Sline03	Off-site Vehicle DPM (2018-19)	575791.8 / 576029.3[(B)]	4142600.7 / 4142447.0[(B)]	NA

SOURCE: MIG 2017, see the Air Quality Appendix.

(A) UTM coordinates represent the southwest corner of the source, with the exception of Sline 01, 02, and 03, which represent X and Y values for the line volume source nodes.

(B) Coordinates are for source nodes. The total source length is 282.8 meters, and consists of 19 volume sources.

construction, with the exception of the second year of public safety building construction, which was modeled as two area sources, with most (80%) of the total emissions coming from the vicinity of the proposed building footprint (as opposed to being uniformly distributed throughout the site). DPM Exhaust emissions were assigned a release height of six meters; this elevated source height reflects the height of the equipment exhaust pipes plus an additional distance for the height of the exhaust plume above the exhaust pipes to account for plume rise of the exhaust gases.

Off-site DPM emissions from vehicles were modeled as a line volume source. For the purposes of the modeling, all vehicles were assumed to travel to and from the project site using Birch Road. The release plume height for emissions from the line source was set to six meters and the initial lateral dimension for the emission was set to the approximate width of Birch Street (15.2 meters).

Meteorological Data Inputs

AERMOD requires meteorological data as an input into the model. The meteorological data is processed using AERMET, a pre-processor to AERMOD. AERMET requires surface meteorological data, upper air meteorological data, and surface parameter data such as albedo (reflectivity) and surface roughness. For the proposed project, pre-processed surface data from the California Air Resources Board was obtained from Moffett Field Airbase; upper air data was obtained from Oakland International Airport since this is the closest upper air meteorological station with data available. Five complete years of meteorological data from January 2009 to December 2013 were utilized. Emissions were presumed to be generated during potential construction hours only (i.e., 8 AM to 6 PM Monday to Friday and 9 AM to 6 PM on Saturday).

Terrain Inputs

Terrain was incorporated by using AERMAP (an AERMOD pre-processer) to import the elevation of the project site using data from the National Elevation Dataset (NED) with a resolution of 1/3 arcsecond.

Modeled Receptors

For construction activities, a multi-tier grid was generated as follows:

1. Receptors were placed every 15 meters within 100 meters of the grid center.[1]
2. Receptors were placed every 25 meters within 100 to 500 meters of the grid center.
3. Receptors were placed every 100 meters within 500 to 1,000 meters of the grid center.

The grid was then converted to discrete Cartesian receptors (2,096 in total). Receptors were modeled at heights of 1.8 meters (4.9 feet) for first floor receptors and 4.8 meters to approximate second, third, and fourth floor receptors.

Risk Assessment

Health risks were assessed according to the recommendations provided in the BAAQMD's *Recommended Methods for Screening and Modeling Local Risks and Hazards* and *Air Toxics New Source Review Program Health Risk Guidelines*, as well as the Office of Environmental Health Hazard Assessment's *Air Toxics Hot Spots Program Guidance Manual*. The ground level concentrations of pollutants produced by the project during construction, as estimated using AERMOD, were used to derive:

1. **Individual excess cancer risk**: Cancer risk is the calculated, pollutant-specific estimated probability of developing cancer based upon the dose and exposure to the TAC. Cancer risk is calculated using predefined cancer potency factors, ground level exposure concentration, duration of exposure, and other parameters such as age sensitivity. For the proposed project, cancer risk was estimated for the inhalation pathway (i.e., breathing). In general, the inhalation dose is a function of the concentration of a chemical and the intake of that chemical. The dose can be calculated as follows:

$$\mathbf{DOSE_{air} = C_{air} \times DBR \times A \times EF \times CF}$$

Where:

Dose = Dose of chemical in the air (mg/kg-day)
C_{air} = Chemical concentration in the air (μg/m^3)
DBR = Daily breathing rate (L/kg-day)

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[1] Grid center coordinates are 575875.52 E and 4142576.42 N, which is approximately at the corner of Birch Street and Sherman Avenue.

A = Inhalation adsorption factor
EF = Exposure Frequency, days at home / days in year (unitless)
CF = 10^{-6} Conversion Factor (m^3/L and mg/μg)

Consistent with BAAQMD methodology, the DBR was set to the 95th percentile for the third trimester and 0 – 2 (i.e., infant) age groups and the 80th percentile for 2 - 16 and 16 - 30 age groups.

Receptors were assumed to be exposed to modeled chemical concentrations 24 hours per day, for 350 days per year (or 96% of the year).

Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unit-less probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF). The equation used to calculate the potential excess lifetime cancer risk for the inhalation pathway is:

$$\mathbf{RISK_{(inh)} = DOSE_{air} \times CPF \times ASF \times (ED/AT) \times FAH \times 1{,}000{,}000}$$

Where:

Risk = Cancer risk per million population; the incremental probability of an individual developing cancer as a result of inhalation exposure to a particular potential carcinogen (unitless)
Dose = Dose of chemical in the air (mg/kg-day)
CPF = Inhalation cancer potency factor (mg/kg-day)
ASF = Age sensitivity factor for specified age group (unitless)
ED = Exposure duration (in years) for specified age group
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time at spent at home (unitless)

The cancer potency factor for DPM is 1.1 mg/kg-day. The age sensitivity factor, exposure duration and fraction of time spent at home for 3rd trimester, 0 - 2, 2 - 16, and 16 - 70 age bins were set to BAAQMD-recommended levels.

The risk parameters used to calculate excess individual cancer risk are summarized in Table 5-9 below.

2. **Noncancer hazard quotient.** The noncancer hazard quotient is the calculated pollutant-specific indicator for risk of developing an adverse health effect on specific organ system(s) targeted by the identified TAC.

The potential for exposure to result in chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) to the chemical-specific, non-cancer chronic reference exposure levels (RELs). The REL is a concentration below which there is assumed to

Table 5-9
HEALTH RISK ASSESSMENT PARAMETERS

Risk Assessment Parameter	**Infant Receptor**		**Child Receptor**	**Adult Receptor**
	3^{rd} Trimester	**0 - 2 Years**	**2 - 16 Years**	**16 - 30 Years**
Daily Breathing Rate (L/kg-day)	361	572	1090	261
Exposure Frequency	0.96	0.96	0.96	0.96
DPM Inhalation Cancer Potency (mg/kg-day)	1.1	1.1	1.1	1.1
Age Sensitivity Factor	10	10	3	1
Exposure Duration (Years)	0.25	2	14	14
Averaging Time (Years)	70	70	70	70
Fraction of Time at Home	0.85	0.85	0.72	0.73

be no observable adverse health impact to a target organ system. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient. To evaluate the potential for adverse chronic non-cancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index. For an acute hazard quotient, the one-hour maximum concentration is divided by the acute REL for the substance.

In general, the equations used to calculate chemical-specific hazard quotients and summed hazard index are:

$$Chronic\ HQ_i = C_i/REL_i$$
$$Chronic\ HI = \sum HQ_i$$

Where:

Chronic HQ_i = Chronic Hazard quotient for $chemical_i$ (unitless)
Chronic HI = Hazard Index (unitless)
C_i = Annual average air concentration for $chemical_i$ (μg/m^3)
REL_i = Chronic non-cancer Reference Exposure Level for $chemical_i$ (μg/m^3)

The chronic inhalation REL for DPM is 5 μg/m^3. No acute non-cancer impacts were estimated since there is no acute reference exposure level for DPM.

5.3.6.2 Construction Health Risk Assessment Results

The Construction HRA evaluated DPM and total PM2.5 emissions associated with on- and off-road diesel-fueled trucks and equipment. Gasoline-fueled vehicles emit various TACs in much smaller quantities and health toxicity compared to DPM. Thus, gasoline fueled emission sources were not included in the health risk assessment.

The proposed project would involve different construction activities occurring at different intensities and in different areas over an approximately three year period, presumed to commence as early as Spring 2018.[1] Receptors would be exposed to varying concentrations of pollutants throughout the construction period, and maximum impacts would occur at different locations during each year as construction activities change and then cease. Accordingly, annual average DPM and PM2.5 concentrations were modeled for each year of construction activity and used to estimate individual excess cancer risks at receptor locations for each year, which were then summed to estimate the total excess cancer risk resulting from project construction. Please refer to the Air Quality Appendix for detailed AERMOD outputs and health risk calculations.

Individual Cancer Risk from Exposure to DPM

The predicted locations of the annual, unmitigated point of maximum impact (PMI) and the maximum exposed individual receptor (MEIR) for DPM exposure are shown in Figure 5-1. The predicted PMI locations are generally located near the southeast corner of Lot C-6 (in Year 1 and Year 2) and Lot C-7 (in Year 3), either in the roadway or at the commercial building located at 399 Sherman Avenue. Since the PMIs for DPM exposure are located on lands that are not occupied by a receptor on a permanent basis, lifetime excess cancer risks and chronic non-cancer health hazards, which are based on exposure to annual average pollutant concentrations, were not estimated for modeled PMI locations.

Accordingly, health risks were assessed at modeled residential MEIR locations. For all years, the MEIR for DPM exposure is located at the multi-family residential building located at 2502 to 2518 Birch Street. The HRA evaluated worst case carcinogenic and non-carcinogenic risks to child (3rd trimester, 0 to 2 years, and 2 to 16 years) and adult (16 to 30 and 30 to 70 years) receptors. The calculated risks are greatest for child receptors, in particular child receptors that are less than two years old at the start of construction activities. The calculated excess individual cancer risks for this subset of the population is substantially higher (16 times higher) than the BAAQMD-recommended significance threshold of 10 excess cancers per million population. At the same DPM concentrations, risks to children ages 2 to 16 would be 3 times higher than the BAAQMD-recommended significance threshold, and risks to adult receptors would not be significant (i.e., less than the BAAQMD threshold value). The magnitude of the project's predicted cancer risks at sensitive residential receptors is partly a function of the latest OEHHA and BAAQMD-guidance on health risk assessments, which account for increased susceptibility from exposure to toxic air contaminants in early life stages, but is

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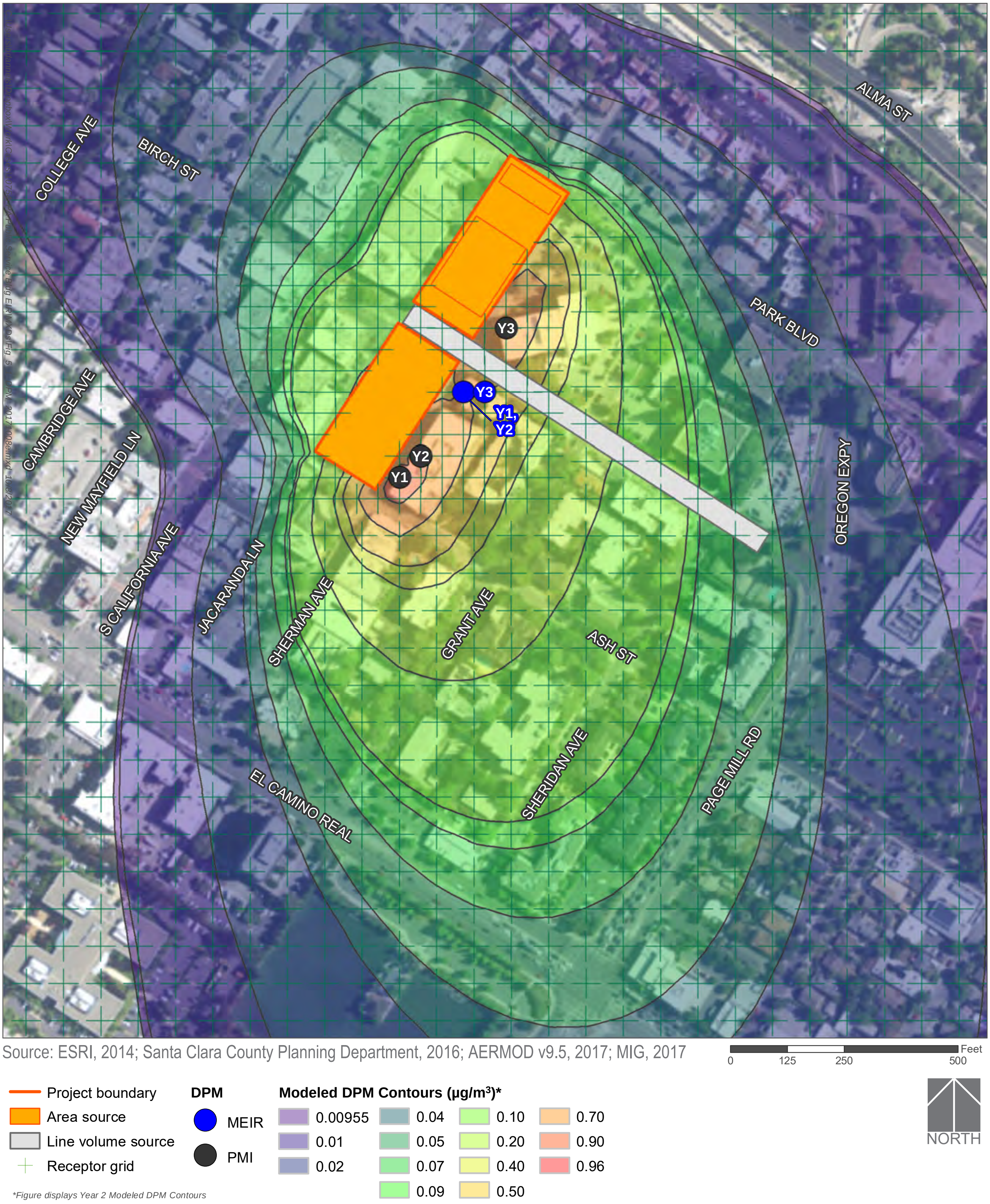
[1] CalEEMod emissions were presumed to start on April 1, 2018. Thus, the three year period covered by the modeling would be approximately April, 2018 to March 31, 2019 (Year 1), April 1, 2019 to March 31, 2020 (Year 2), and April 1, 2020 to March 31, 2021 (Year 3).



Source: ESRI, 2014; Santa Clara County Planning Department, 2016; AERMOD v9.5, 2017; MIG, 2017

Figure 5.1 - Unmitigated DPM Concentrations and PMI/MEIR Locations

primarily a function of the anticipated construction activities, equipment usage, and the close proximity of the receptors to the proposed construction activities (i.e., across the street).[1]

To reduce potential DPM (and PM2.5) emissions generated by project construction activities, the City is incorporating Mitigation Measure 5-1 into the proposed project. This measure:

1. Incorporates BAAQMD-recommended “Additional Construction Measures” into the proposed project (BAAQMD 2017, pg. 8-5). For projects that exceed a BAAQMD recommended CEQA significance threshold, the BAAQMD recommends the implementation of up to 13 additional measures to reduce potential construction emission impacts to less than significant levels.

2. Requires the use of electric-powered and liquefied or compressed natural gas equipment to the maximum extent feasible.

3. Requires the use of construction equipment that meets U.S. EPA Tier IV Final emissions standards (for equipment greater than 25-horsepower). The use of Tier IV equipment for all diesel-powered construction equipment greater than 25-horsepower was estimated to reduce PM2.5 exhaust emissions by approximately 89%, as estimated using CalEEMod.

The above measures would substantially reduce the amount of DPM that MEIRs would be exposed to; however, carcinogenic risks would continue to exceed BAAQMD thresholds of significance for child receptors. Therefore, mitigation measure 5-1 also requires the City to prepare a Construction Risk Reduction Plan that refines the proposed project’s construction emissions estimates (once a contractor has been selected), updates potential construction DPM and PM2.5 concentrations and risk estimates and, if necessary, define impacted residential receptors and implement additional on- and/or off-site controls that reduce and improve indoor air quality concentrations to levels that do not exceed BAAQMD thresholds. This may be achieved through the implementation of a longer, less intensive construction schedule or by coordinating with residential unit owners/operators to replace and upgrade existing HVAC filtration systems with high-performance filters other systems capable of reducing ambient PM2.5 concentrations by a minimum of 90% (e.g., a 2-inch pleated panel with a rated minimum efficiency reporting value (MERV) for particles in the range of 0.3 to 1.0 µm of 70%, presumed to be a minimum MERV-14). Based on the mitigated risk values estimated for this EIR, a 90% reduction in outdoor/indoor PM2.5 concentrations would reduce potential child receptor risks to less than significant levels. The proposed project’s unmitigated and mitigated construction health risks are summarized in Table 5-10.

Non-Carcinogenic Health Hazard from Exposure to DPM

The maximum annual average DPM concentration at any receptor location would be 1.77 µg/m^3, which would occur at the PMI associated with Year 3 construction activities (see Figure 5-2). Based on the chronic inhalation REL for DPM (5 µg/m^3), the calculated chronic hazard quotient during maximum exposure to DPM concentrations would be 0.35, which is below the

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[1] Based on the AERMOD modeling conducted for the project, off-site diesel truck trips travelling along Birch Street are not a substantial contributor to potential health risks.

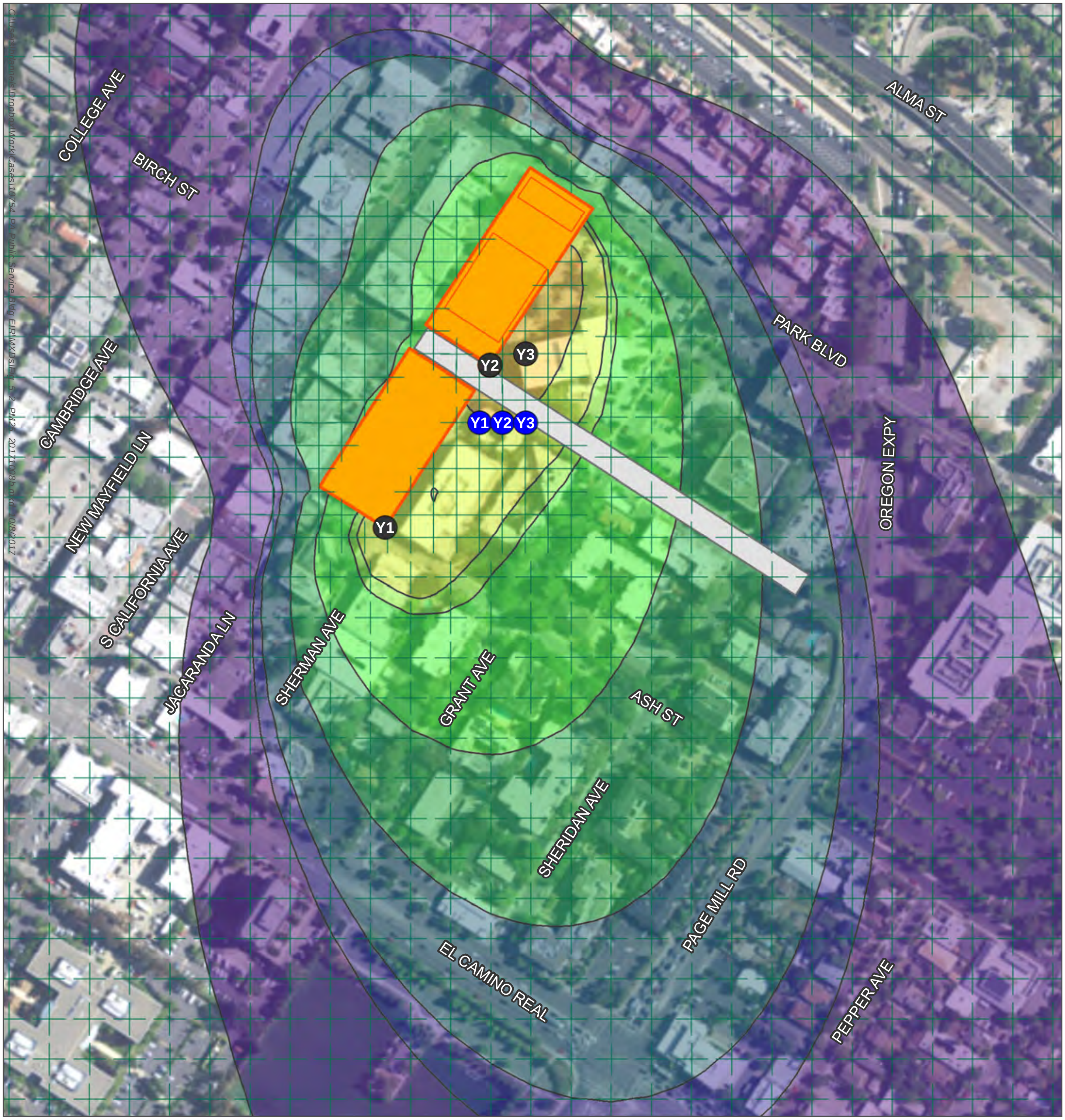
Table 5-10
SUMMARY OF CONSTRUCTION HEALTH RISK ESTIMATES

Receptor	**Residential Receptor Cancer Risks (Child)**		
	Unmitigated Risk	**Risk with On-Site Mitigation**	**Risk with On- and Off-Site Mitigation**
Year 1 MEIR	32.3 – 158.4	6.4 – 28.1	1.9 – 8.4
Year 2 MEIR	32.3 – 158.4	6.4 – 28.1	1.9 – 8.4
Year 3 MEIR	33.4 – 144.5	7.3 – 30.2	2.2 – 9.1
BAAQMD Threshold	10	10	10
Potential Significant Impact?	**Yes**	**Yes**	**No**
Receptor	**Residential Receptor Cancer Risks (Adult)**		
	Unmitigated Risk	**Risk with On-Site Mitigation**	**Risk with On- and Off-Site Mitigation**
Year 1 MEIR	4.5 – 5.0	0.9 – 1.0	0.3
Year 2 MEIR	4.5 – 5.0	0.9 – 1.0	0.3
Year 3 MEIR	4.6 – 5.1	1.0 – 1.1	0.3
BAAQMD Threshold	10	10	10
Potential Significant Impact?	**No**	**No**	**No**
SOURCE: MIG 2017, See the Air Quality Appendix.			

BAAQMD's non-cancer hazard index threshold of significance value of 1.0. The proposed project, therefore, would not result in significant non-carcinogenic health risks from DPM exposure.

Annual Average PM2.5 Concentrations

The predicted locations of the PMI and the MEIR for total PM2.5 exposure (dust and exhaust) are shown in Figure 5-2. Similar to DPM, the predicted PMI locations are generally located near the southeast corner of Lot C-6 (in Year 1 and Year 2) and Lot C-7 (in Year 3) in areas that are not occupied by a receptor on a permanent basis, and thus are not appropriate locations to evaluate for annual average pollutant concentrations. Like DPM, the predicted locations of the MEIR for total PM2.5 exposure also occur at the residential multi-family residential building located at 2502 to 2518 Birch Street. The results of the modeling indicate annual average PM2.5 concentrations at these locations would exceed the BAAQMD-recommended threshold of significance for average annual PM2.5 concentrations (0.3 $\mu g/m^3$). The implementation of the Mitigation Measure 5-1 would require the City to implement additional equipment exhaust and fugitive dust controls that would reduce annual average PM2.5 concentrations to less than significant levels. The proposed project's unmitigated and mitigated annual average PM2.5 concentrations are summarized in Table 5-11.



Source: ESRI, 2014; Santa Clara County Planning Department, 2016; AERMOD v9.5, 2017; MIG, 2017

▬ Project boundary	**PM 2.5**	**Modeled PM 2.5 Contours (µg/m³)***
🟧 Area source	● MEIR	🟪 0.02 · 🟩 0.10 · 🟨 1.00
⬜ Line volume source	● PMI	🟪 0.05 · 🟩 0.20 · 🟧 2.00
+ Receptor grid		🟦 0.06 · 🟩 0.50 · 🟥 2.04
		🟨 0.60

**Figure displays Year 2 Modeled PM 2.5 Contours*

Figure 5.2 - Unmitigated PM 2.5 Concentrations and PMI/MEIR Locations

Table 5-11
SUMMARY OF MODELED ANNUAL AVERAGE CONSTRUCTION PM2.5 CONCENTRATIONS

Receptor	**Annual Average PM2.5 Concentration (µg/m^3)**	
	Unmitigated	**On-Site Mitigation**
Year 1 MEIR	0.26	0.02
Year 2 MEIR	1.45	0.23
Year 3 MEIR	0.41	0.12
BAAQMD Threshold	0.3	0.3
Potential Significant Impact?	**Yes**	**No**
SOURCE: MIG 2017, See the Air Quality Appendix.		

Mitigation 5-1. To reduce potential short-term adverse health risks associated with PM2.5 emissions, including emissions of diesel particulate matter (DPM), generated during project construction activities, the City and/or it's designated contractors, contractor's representatives, or other appropriate personnel shall:

1. *Implement BAAQMD-recommended "Additional Construction Measures".* The City shall implement the following BAAQMD-recommended additional construction mitigation measures during construction activities:

    1. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent, to be verified by lab samples or moisture probe.
    2. All excavation, grading, and/or demolition activities shall be suspended when average winds speeds exceed 20 miles per hour.
    3. Temporary wind breaks (e.g., fences) shall be installed on the windward (generally the north / northwest) of actively disturbed areas of construction. The wind breaks should have at maximum 50 percent air porosity
    4. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established
    5. Simultaneous occurrence of excavation, grading, and ground-disturbing construction activities in the same area at any one time shall be limited and/or phased to reduce the amount of disturbed surfaces at any one time.
    6. All trucks and equipment, including their tires, shall be washed off prior to leaving the site.

(continued)

Mitigation 5-1 (continued):

7. Site access to a distance of 100 feet from the paved road, or as much as feasible, shall be treated with a compacted layer of wood chips, mulch, gravel, or other cover as feasible to reduce track-out.

8. Minimize the idling time for diesel-powered construction equipment to two minutes provided such idling restrictions are consistent with manufacturer's equipment specifications.

2. *Construction equipment restrictions*. The City shall apply the following construction equipment restrictions to the proposed project:

1. Electric-powered and liquefied or compressed natural gas equipment shall be employed instead of diesel powered equipment to the maximum extent feasible.

2. All construction equipment with a rated power-output of 25 horsepower or greater shall meet U.S. EPA and CARB Tier IV Final Emission Standards for particulate matter. This may be achieved via the use of equipment with engines that have been certified to meet Tier IV emission standards, or through the use of equipment that has been retrofitted with a CARB-verified diesel emission control strategy (e.g., oxidation catalyst, particulate filter) capable of reducing exhaust PM emissions to levels that meet Tier IV standards.

3. Prepare Construction Risk Reduction Plan. Prior to the start of construction activity, the City and/or its contractor shall prepare a Construction Risk Reduction Plan for the project which:

1. Identifies the final planned construction phasing schedule and anticipated equipment operations.

2. Estimates the proposed project's construction emissions based on the final phasing and equipment plan. Any emission update shall be performed using the latest-recommended emissions estimator model recommended by the BAAQMD or other standard, acceptable methodology (e.g., contractor-specific fleet emission factors and estimates of equipment operating hours)

3. Models the potential diesel particulate matter and total PM2.5 concentrations resulting from refined emissions estimates. Any modeling shall be performed using an accepted screening or refined dispersion-model recommended for use by the BAAQMD. The modeling shall focus on discrete, residential receptors located at and near the proposed project site.

4. Estimates potential adverse health effects associated with exposure to DPM. Risk estimates shall follow the latest recommendations of the BAAQMD. The goal of the risk estimation shall be to identify the receptor(s) or areas of

(continued)

Mitigation 5-1 (continued):

receptors where carcinogenic and non-carcinogenic risk thresholds may be exceeded. If risks are exceeded, the plan shall identify feasible on- and off-site measures to reduce risks to levels below BAAQMD thresholds. On-site measures may include the BAAQMD "Additional Construction Measures" and construction equipment restrictions included in Mitigation Measure 5-1, as well as phasing / activity restrictions. Off-site measures may include coordinating with all impacted receptors to replace and upgrade existing HVAC systems to provide high-performance panel filters capable of reducing potential modeled outdoor PM2.5 concentrations / risks to levels that are below BAAQMD thresholds.

4. *Implement Off-Site Mitigation.* In-lieu of preparing the Construction Risk Reduction Plan identified above, the City may, prior to the start of construction activities, coordinate directly with impacted residential receptors to replace and upgrade existing residential HVAC systems with a high-performance panel filter with a rated minimum efficiency reporting value (MERV) for particles in the range of 0.3 to 1.0 µm of 70% (presumed to be a minimum MERV-14), or equivalent system upgrade. This level of control would reduce risks to levels below current BAAQMD thresholds. Based on the results of the modeling conducted for the EIR, the City shall coordinate with residential receptors located in the area bound by Park Boulevard to the north, Ash Street to the south, Sheridan Avenue to the east, and Sherman Avenue to the west.

The implementation of these measures would limit construction activities and require the implementation of controls that would reduce predicted adverse construction health risks to less than significant levels. Therefore, toxic air contaminant emissions generated during construction of the proposed project is considered ***less than significant with mitigation.***

5.3.7 Potential Impacts from Odors

Would the project create objectionable odors affecting a substantial number of people (Significance Criterion [e])?

Odor impacts could result from siting a new odor source near existing sensitive receptors or siting a new sensitive receptor near an existing odor source. Major sources of odor typically are wastewater treatment plants; landfills; confined animal facilities; composting stations; food manufacturing plants; refineries; and chemical plants. The proposed project does not include any of these sources.

Construction related activities may result in odors associated with the intermittent operation of diesel-powered equipment, and paving activities may also generate odors. The effects of these odor sources would be temporary and short in duration. Similarly, operational activities would not result in objectionable odors affecting a substantial number of people. For the parking garage, exhaust emissions from individual vehicles would be dispersed throughout the structure, and the exhaust fan system on the north side of the structure (near California Avenue) would collect exhaust from the underground parking levels. Therefore, this impact would be ***less than significant***.

5.3.8 Cumulative Impacts

Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the region is in non-attainment under applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors (Significance Criterion [c])?

As discussed in Sections 5.3.3 through 5.3.5, the proposed project would not result in amounts of construction or operational emissions of criteria air pollutants that exceed BAAQMD thresholds of significance. In developing its CEQA significance thresholds, the BAAQMD considered the emission levels at which a project's individual emissions would be cumulatively considerable. The BAAQMD considers project's that result in emissions that exceed its CEQA significance thresholds to result in individual impacts that are cumulatively considerable and significant. Since the proposed project would not individually exceed any BAAQMD CEQA significance thresholds, the proposed project would result in ***less-than-significant cumulative air quality impacts.***

For TAC emissions, the BAAQMD recommends all local sources of TAC emissions within 1,000 feet of a sensitive receptor be evaluated. The stationary sources and local roadway emissions that would combine at the MEIR impacted by the proposed project are listed in Table 5-12 below.

Mitigation. No significant cumulative impact has been identified; no mitigation is required.

Table 5-12
CUMULATIVE RISKS AND HAZARDS

Name	Cancer Risk Per Million	Annual Average PM2.5 Concentration	Chronic Hazard Index
Proposed Project, Mitigated(A)	9.1	0.23	0.35
Courthouse	0.92	<0.00	<0.00
Sunrise Assisted Living	0.16	<0.00	<0.00
Palo Alto Shell	--	N/A	0.06
Santa Clara County	1.68	0	<0.00
Sprint Facility	0.54	<0.00	<0.00
Oregon Expressway (ADT 30,825)	1.48	0.03	N/A
El Camino Real (ADT 35,862)	3.03	0.06	N/A
Total Risk	16.91	0.32	0.41
BAAQMD Cumulative Threshold	**100**	**0.8**	**10**
Potential Significant Impact	**No**	**No**	**No**

SOURCE: BAAQMD 2017d.

(A) See Table 5-10 and 5-11. Risks reflect worst-case value for MEIR locations.

5.4 REFERENCES

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6. BIOLOGICAL RESOURCES

This EIR chapter describes biological resource implications of the proposed PSB project. The chapter addresses the specific biological resource concerns identified by the CEQA Guidelines--i.e., would development under the proposed project have a substantial adverse effect on special-status species, sensitive natural habitat, protected wetlands, or wildlife or fish movement, or would it conflict with adopted policies or plans for protecting biological resources.[1]

6.1 SETTING

6.1.1 Natural Communities in Palo Alto

Palo Alto encompasses a variety of natural plant communities amidst a densely built environment. The plant communities provide habitat for wildlife species. The City limits extend from the San Francisco bay wetlands to the Santa Cruz mountains, including several microclimates[2] and, as a result, several habitats. The undeveloped land near San Francisco Bay (in the area known as the "Baylands") and undeveloped land in the western hills contain undisturbed plant communities and habitat for a variety of species. The natural vegetation has been substantially altered in the developed areas of the city, leaving the urban forest as the dominant habitat. Some of the stream corridors in the developed portions of the city also support natural vegetation.

Most of Palo Alto east of Interstate 280, including the PSB project site, is urban habitat. The "urban forest" is comprised of street trees, trees in parks, landscaping trees planted around public facilities, and trees on private property throughout the city. The city's urban forest functions as a bridge for wildlife movement between the crest of the Santa Cruz Mountains and the baylands, particularly for birds. It provides cover, forage, and nesting habitat for common wildlife. The urban forest is well established in the older parts of the city, where mature street trees provide a dense canopy. There are more than 300 different species of trees on Palo Alto's streets. However, the following five species make up almost 35 percent of the total trees planted: southern magnolia, London plane, American sweetgum, Modesto ash, and camphor. In the foothills the urban forest intersects with the natural forests.

6.1.2 PSB Project Site

There are multiple trees that surround the two surface parking areas that comprise the project site. These trees could provide nesting habitat for raptor species and habitat for sensitive bat species. Some raptor species, like Cooper's hawk (*Accipiter cooperii*, a state species of special concern on its nesting sites) are specifically listed as sensitive, and all raptor species are

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[1] CEQA Guidelines, appendix G, item IV (a through f).

[2] Microclimate refers to localized environmental conditions. Because the City limits include the baylands, the Santa Cruz Mountains, and all of the terrain in between, there are several microclimatic situations that affect what plants and animals occur in that location.

protected while nesting by Fish and Game Code Section 3503.5. Sensitive bat species with potential for occurrence in large trees and groves include the pallid bat (*Antrozous pallidus*, a State species of special concern), Townsend's big-eared bat (*Plecotus townsendii*), and Myotis species. These bat species have no legal protection under federal or State Endangered Species Act, but may meet the criteria of section 15380 (Endangered, Rare or Threatened Species) of the CEQA Guidelines.

The environmental setting information below is taken directly from the Tree Survey Report prepared for the project (Tree Survey Report, Public Safety Building and Parking Garage, Parking Lots C-6 and C-7, Palo Alto, California; David L. Babby, Registered Consulting Arborist; March 17, 2016).

The tree survey report identified the type, amount, and condition of the 39 existing trees on and immediately adjacent to the project site, including both surface parking lots and the center street median along Birch Street. The survey also identified which trees are regulated as defined by Title 8 (Trees and Vegetation) of the Palo Alto Municipal Code (see section 6.2, Regulatory Setting – Local Regulations, below), and provided general guidelines to help avoid or mitigate impacts on any retained trees.

Thirty-nine (39) trees of 10 species were inventoried for the survey report. The most prevalent trees include:

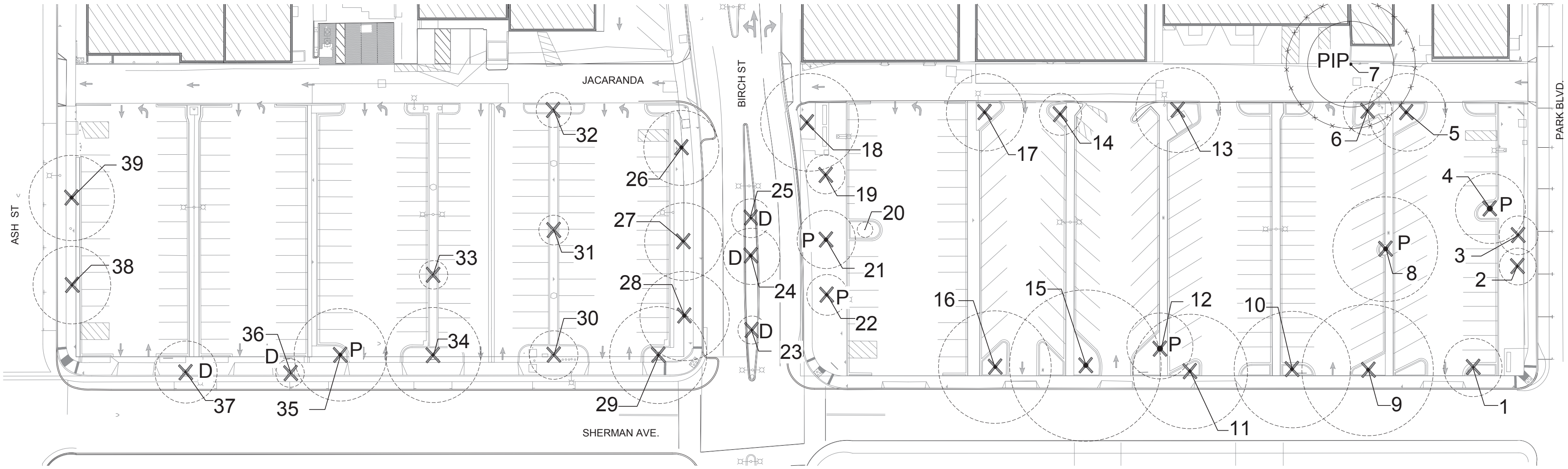
- holly oak (15 trees)
- Chinese elm (7 trees)
- coast redwood (7 trees)

Other surveyed trees include Palo Alto sweetgum (3), weeping bottlebrush (2), coast live oak, Colorado blue spruce, evergreen pear, London plane tree, and valley oak. All surveyed trees except one are publicly owned (i.e., on City property); the privately owned tree is in Jacaranda Lane.

The Palo Alto Municipal Code regulates specific types of trees on public and private property. Three categories included under the term "regulated trees" include "protected trees" (Municipal Code 8.10 - Tree Preservation and Management Regulations), "street trees" (Municipal Code 8.04 - Street Trees, Shrubs, and Plants), and "designated trees" (i.e., as identified by the City for a particular development site). See section 6.2 (Regulatory Setting, Local Regulations) below.

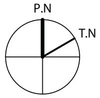
The survey report defines six (6) trees as protected trees because they are either coast live oak (1 tree) or valley oak (1 tree) with trunk diameter =/> 11.5 inches, or coast redwood (4 trees) with trunk diameter =/> 18 inches. Five (5) surveyed trees are designated street trees (i.e., in the public right-of-way). The six protected trees to be removed as part of the proposed PSB project (tree #4, 8, 12, 21, 22 and 35) have a canopy of 210 linear feet (representing the sum total of each tree's crown diameter).

Figure 6.1 includes information from the Tree Survey Report and reproduces Plan Sheet ARB 06.01. As shown on the figure, one of the 39 surveyed trees would be retained and protected in place – a Chinese elm in Jacaranda Lane (tree #7). Because protected and designated trees are proposed to be removed, Palo Alto Municipal Code Title 8 (Trees and Vegetation) would apply to the project.



SHEET NOTES

1. TREE NUMBERS REFERENCE ABORIST REPORT BY DAVID L. BABBY (CONSULTING ABORIST) DATED 3-17-16



LEGEND

SYMBOL	DESCRIPTION
●	APPROX. TRUNK DIAMETER (EX)
○	APPROX. TREE CANOPY (EX)
✕	TREE TO REMOVE
1	TREE NUMBER
●PIP	PROTECT IN PLACE
●P	PROTECTED TREE
●D	DESIGNATED STREET TREE
-×-×-×-	10 FT. OFFSET TREE PROTECTION FENCING

TOTAL TREES TO BE REMOVED	38
TOTAL PROTECTED TREES TO BE REMOVED	6
TOTAL DESIGNATED TREES TO BE REMOVED	5

Source: RossDrulisCusenbery Architecture

Figure 6.1 - Tree Removal/Protection Plan

6.2 REGULATORY SETTING

Biological resources in California are managed by a complex network of federal and State regulations, in addition to local ordinances (such as tree preservation ordinances). The California Department of Fish and Wildlife (CDFW) and the U.S. Fish and Wildlife Service (USFWS) administer laws pertaining to the protection of threatened and endangered species, as well as permits for project activities occurring near or in waters of the State or United States. For marine environment species, the National Oceanic and Atmospheric Administration (NOAA)/National Marine Fisheries Service (NMFS) administers the same or similar laws as the CDFW and USFWS. This section describes the federal, State, and local regulations that provide protection and management of sensitive biological resources.

6.2.1 Federal Regulations

The federal laws that regulate the treatment of biological resources include the Federal Endangered Species Act, the Migratory Bird Treaty Act, and the Clean Water Act. The following describes these laws and their relevant principles.

Federal Endangered Species Act. The United States Endangered Species Act (federal ESA) is administered and implemented by the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) Fisheries, whereby the USFWS is responsible for all species but fish, and NOAA Fisheries is responsible for fish species. The federal ESA provides protection for species listed as threatened or endangered by the federal government, including their habitat. “Endangered” species, subspecies, or distinct population segments are those that are in danger of extinction through all or a significant portion of their range, and “threatened” species, subspecies, or distinct population segments are likely to become endangered in the near future.

In particular, the federal ESA has specific sections that regulate projects based on effects to listed species. Section 7 mandates that if a proposed project that is funded by or has a permit from a federal agency may affect listed species or its habitat, then that federal agency must consult with USFWS and/or NOAA Fisheries (depending on the species involved). The aim of the consultation is to ensure that the project does not jeopardize the existence of a listed species, or destroy or adversely modify critical habitat for the species. Section 9 of the federal ESA prohibits the take of any fish or wildlife species listed as endangered, including the destruction of habitat that prevents the species’ recovery. "Take" is defined by the ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect a federally listed, endangered species of wildlife, or to attempt to engage in any such conduct." Federal regulations also define take to include the incidental destruction of animals in the course of an otherwise lawful activity, such as habitat loss due to development. Under those rules, the definition of “take” includes significant habitat modification or degradation that actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR Section 17.3).

Take may be allowed under a permit by either Section 7 or Section 10(a) of the ESA. The permit is issued under Section 7 if another federal agency funds or issues a permit for the project (US Army Corps of Engineers [USACE] for example). The permit is issued under Section 10(a) if there is no federal involvement in the project.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver; or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not, except as authorized under a valid permit (50 CFR 21.11).

In short, under the MBTA it is illegal to remove vegetation-containing nests that are in active use, since this could result in killing a bird or destroying an egg. This would also be a violation of California Fish and Game Code (described under Section 4.3.1.1, State Regulations). Most, but not all, bird species are protected under the MBTA. Birds that are considered non-native, human-introduced species (whether they were deliberately or unintentionally introduced) are not protected. Furthermore, native birds that are members of unprotected bird families are also not protected. Invasive birds such as the house sparrow and European starling are not protected, but neither are many game birds such as wild turkeys, different types of grouse, and different ptarmigan species.

Federal Clean Water Act. The federal Clean Water Act is the primary federal law regulating water quality. The implementation of the Clean Water Act is the responsibility of the US Environmental Protection Agency (EPA). That agency depends on other agencies, such as the individual states and the USACE, to assist in implementing the Act. The objective of the Clean Water Act is to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” Section 404 and 401 apply to project activities that would impact “waters of the United States (lakes, ponds, creeks, streams, wetlands, etc.).” As part of its mandate under the Clean Water Act, the USACE regulates the discharge of dredged or fill material into “waters of the United States” under Section 404 of the Act. The USACE enforces Section 404 of the Clean Water Act and the California State Water Resources Control Board enforces Section 401. “Waters of the United States" include territorial seas, tidal waters, and non-tidal waters in addition to wetlands and drainages that support wetland vegetation, exhibit ponding or scouring, show obvious signs of channeling, or have discernible banks and high-water marks.

The EPA also regulates excavation and changes in drainage. The discharge of dredged or fill material into waters of the United States is prohibited under the Clean Water Act except when it is in compliance with Section 404 of the Act. Enforcement authority for Section 404 was given to the USACE, which it accomplishes under its regulatory branch.

Any applicant for a federal permit to impact waters of the United States under Section 404 of the Clean Water Act, including Nationwide Permits where pre-construction notification is required, must also provide to the USACE a certification from the State of California. The “401 Certification” is provided by the State Water Resources Control Board through the local Regional Water Quality Control Board (RWQCB).

6.2.2 State Regulations

State laws regulating the treatment of biological resources in California include the California Endangered Species Act, the California Fish and Game Code, and the California Native Plant Protection Act. The following sections describe these laws and the relevant principles.

California Endangered Species Act. The California Endangered Species Act (CESA; Fish and Game Code 2050 et seq.) establishes the policy of the State to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that State agencies shall not approve projects that would jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy. For projects that would affect a species that is on the federal and State lists, compliance with the federal ESA satisfies CESA if the California Department of Fish and Wildlife (CDFW) determines that the federal incidental take authorization is consistent with CESA under California Fish and Game Code Section 2080.1. For projects that would result in the take of a species that is only State-listed, the project proponent must apply for a take permit under Section 2081(b).

California Fish and Game Code. CDFW is authorized under the California Fish and Game Code, Sections 1600-1607 to develop mitigation measures and enter into Streambed Alteration Agreements with applicants who propose projects that would obstruct the flow of, or alter the bed, channel, or bank of a river or stream in which there is a fish or wildlife resource, including intermittent and ephemeral streams.

Sections 3500-3516, 4700, 5050, and 5515 address Fully Protected species. Prior to the passage of CESA, the classification of Fully Protected was the State's initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction. Subsequently, many Fully Protected species have been listed under the State and/or federal endangered species acts. The only exceptions are golden eagle, white-tailed kite, trumpeter swan, northern elephant seal, and ringtail. Fully Protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

Nesting birds, including raptors, are protected by the California Fish and Game Code Section 3503, which reads, "It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." In addition, under Fish and Game Code section 3503.5, "it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto". Passerines and non-passerine land birds are further protected under the federal Migratory Bird Treaty Act. As such, the CDFW typically recommends surveys for nesting birds that could potentially be directly (actual removal of trees/vegetation) or indirectly (noise disturbance) impacted by project-related activities. Disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "taking" by the CDFW.

California Fish and Game Code Section 4150 states, "All mammals occurring naturally in California which are not game mammals, fully protected mammals, or fur-bearing mammals, are nongame mammals. Nongame mammals or parts thereof may not be taken or possessed except as provided in this code or in accordance with regulations adopted by the commission." The non-game mammals that may be taken or possessed are primarily those that cause crop damage.

California Native Plant Protection Act. The California Native Plant Protection Act of 1977 prohibits importation of rare and endangered plants into California, “take” of rare and endangered plants, and sale of rare and endangered plants. CESA defers to the California Native Plant Protection Act, which ensures that State-listed plant species are protected when State agencies are involved in projects subject to the California Environmental Quality Act (CEQA). In this case, plants listed as rare under the California Native Plant Protection Act are not protected under CESA but rather under CEQA.

6.2.3 Local Regulations

(1) City of Palo Alto Municipal Code. The Palo Alto Municipal Code includes provisions for the preservation and protection of trees as well as the protection of flora and fauna within the City limits.

Title 8 (Trees and Vegetation), Chapter 8.04 (Street Trees, Shrubs and Plants), and Chapter 8.10 (Tree Preservation and Management Regulations); and Title 18 (Zoning), Chapter 18.76 (Permits and Approvals). Title 8 Trees and Vegetation, and Title 18 Zoning include regulations that protect trees in the city.

Chapter 8.04 gives the City control of all street trees, shrubs and plants in any street, park or public place within City limits, and the power to maintain them. It prohibits others from planting, removing, or damaging these resources without a permit. It identifies when these resources constitute a public nuisance (such as a diseased or dead tree) and the remedy.

Chapter 8.10 protects specified trees in the city and establishes a standard for removal, maintenance, and planting of trees in the city, with the goal of preserving the city’s trees. Chapter 8.10 provides rules for the protection of trees, designation of heritage trees, and for when trees can be removed. The Palo Alto community has long valued the environmental, aesthetic, and functional benefits of trees[1] as recognized by the Palo Alto Municipal Code, Chapter 8.10 (Tree Preservation Ordinance) and Palo Alto’s status as “Tree City USA.”

The City of Palo Alto Municipal Code regulates specific types of trees on public and private property for the purpose of avoiding their removal or disfigurement without first being reviewed and permitted by the City’s Planning or Public Works Departments. Three categories within the status of regulated trees include protected trees (Municipal Code Title 8, Chapter 8.10), public trees (Municipal Code Title 8, Chapter 8.04) and designated trees (Municipal Code Title 18), when so provisioned to be saved and protected by a discretionary approval.

- Protected Trees. Includes all coast live oak (Quercus agrifolia) and valley oak trees 11.5 inches or greater in diameter, coast redwood trees 18 inches or greater in diameter at standard height, and heritage trees designated by the City Council according to any of the following provisions: it is an outstanding specimen of a desirable species; it is one of the largest or oldest trees in Palo Alto; or it possesses distinctive form, size, age, location, and/or historical significance.

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[1] Public Tree Resource Benefits provided by shade trees are: carbon dioxide reduction, extended asphalt service life, urban runoff management, real estate value, etc.

- Public Trees. Includes City-owned street trees (all trees growing within the street right-of-way, outside of private property), and trees in City parks and other City-controlled public places.

- Designated Trees. Designated or amenity trees are established by the City when a project is subject to discretionary environmental or design review process, such as architectural review by the Architecture Review Board. Municipal Code Section 18.76.020(d)(2)(B) includes as part of the findings for architectural review approval, “Preserves, respects and integrates existing natural features that contribute positively to the site…”. An amenity tree or grouping of trees may be “designated” if it has a particular significance because of its screening function or as a unique natural or other feature that contributes to the existing site, neighborhood, or community area. Outstanding tree specimens contributing to the existing site, neighborhood or community, and that have a rating of “High” Suitability for Preservation would constitute a typical designated tree.

In accordance with Municipal Code Section 8.10.040 (Disclosure of information regarding existing trees), for all development projects within the City of Palo Alto, discretionary or ministerial, a Tree Disclosure Statement (TDS) is part of the submittal checklist to establish and verify trees that exist on the site, trees that overhang the site originating on an adjacent property, and trees that are growing in a City easement, parkway, or publicly owned land adjacent to the site. Section 8.10.050 (Prohibited acts) explains when a tree survey prepared by a certified arborist is required (for multiple trees), when a tree preservation report is required (for development within the dripline of a Regulated Tree), and specifies who may prepare these documents. The City of Palo Alto Tree Technical Manual (PAMC Section 8.10.030) describes procedures and standards to preserve regulated trees (Protected Trees, Public Trees and Designated Trees, referred to collectively as “Regulated Trees”), including:[1]

- The protection of trees during construction;

- If allowed to be removed, the acceptable replacement strategy;

- Maintenance of protected trees (such as pruning guidelines);

- Format and procedures for tree reports; and

- Criteria for determining whether a tree is a hazard.

Title 22 Parks, Chapter 22.04. Chapter 22.04 of the Palo Alto Municipal Code provides for the protection of flora and fauna in city parks and open space by prohibiting the removal or injury to plants, trees, or wildlife in the parks without written consent of the director unless authorized by park regulations.

(2) City of Palo Alto Urban Forest Plans and Policies. The City has adopted a range of plans and policies aimed at maintaining, protecting, and enhancing the urban forest. The management plans and programs for trees in the city consist of the Urban Forest Master Plan (UFMP),

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[1] City of Palo Alto, City of Palo Alto Tree Technical Manual, June 2001, http://www.cityofpaloalto.org/civicax/filebank/documents/6436, accessed on June 8, 2015 by Placeworks, for the Comprehensive Plan Update Environmental Impact Report.

approved in 2015; the Street Tree Management Plan (STMP); and the Line Clearing and Right Tree, Right Place (RTRP) Programs.

The Urban Forest Master Plan (UFMP) establishes long-term management goals and strategies to foster a sustainable urban forest in Palo Alto. The UFMP addresses topics such as the state of Palo Alto's tree canopy, best management practices, interdepartmental coordination, and tree-related City regulations. The UFMP advises tree trimming and removal practices within the City limits to include inspection for nests and restricting removal as appropriate. It also indicates how to select appropriate, site-specific, tree species to ensure successful growth and that unwanted invasive species are not planted. The UFMP advises virtually all aspects of land development and use, sustainability and human health programs, and vegetative environmental services benefits. Additionally, the UFMP advises all potential land use changes outside County lands to maximize tree canopy benefits.

The Street Tree Management Plan (STMP) sets strategies for the preservation and care of the street tree system – one component of the urban forest.

The Right Tree Right Place (RTRP) Program assists residents and businesses with removal and replacement of private trees that conflict with power lines. Palo Alto operates its own utility, and Line Clearing activities involve trimming trees around power lines. It is done to comply with State law, to help ensure continued service, and to help ensure safety.

(3) San Francisquito Creek Joint Powers Authority. The San Francisquito Creek Joint Powers Authority (SFCJPA) was created by local land use agencies to address community concerns, primarily regarding flooding along San Francisquito Creek. The SFCJPA is comprised of the cities of Palo Alto, Menlo Park and East Palo Alto, the Santa Clara Valley Water District, and the San Mateo County Flood Control District. Stanford University and the San Francisquito Watershed Council are non-voting members of the SFCJPA. The organization plans, designs, and implements projects from the upper watershed to coastal wetlands that are of mutual interest to the member agencies. The organization also takes conservation issues into account in its work on projects that stabilize, restore, and maintain the channel for flood control.

6.3 IMPACTS AND MITIGATION MEASURES

6.3.1 Significance Criteria

Based on Appendix G of the CEQA Guidelines,[1] the proposed PSB would have a significant impact on biological resources if it would:

(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 Wildlife or U.S. Fish and Wildlife Service;

(b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service;

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[1] CEQA Guidelines, Appendix G, items IV (a) through (f).

(c) Have a substantial adverse effect on federally protected wetlands as defined by section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

(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;

(e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or

(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.

Regarding criterion (b), the State of California recognizes some plant communities as sensitive natural communities if they are uncommon, regionally declining, or vulnerable. Among these communities are riparian habitat, coast live oak forest, freshwater seeps, freshwater marshes, and coastal salt marsh. However, there is no riparian habitat or other sensitive natural community within or adjacent to the project site. The project would have no impact on riparian habitat or other sensitive natural community. There would be no impact, and this issue is not discussed further.

Regarding criterion (c), although definitions vary, wetlands are generally considered to be areas that are periodically or permanently inundated by surface or groundwater, and support vegetation adapted to life in saturated soil. Wetlands are recognized as important features on a regional and national level due to their inherent value to fish and wildlife; use as storage areas for storm water and floodwaters; and water recharge, filtration, and purification functions.

The U.S. Army Corps of Engineers (Corps), Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW) have jurisdiction over modifications to wetlands and other “waters of the United States.” Corps jurisdiction is established through provisions of Section 404 of the Clean Water Act, which prohibits the discharge of dredged or fill material into “waters of the United States” without a permit. RWQCB jurisdiction is established through Section 401 of the Clean Water Act, which requires certification or waiver for water quality whenever a Corps permit is required under Section 404 of the Clean Water Act. CDFW jurisdiction is established under Sections 1600-1607 of the State Fish and Game Code, which pertains to activities that would substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake. Any such activities require a Streambed Alteration Agreement to be issued by CDFW prior to project construction.

According to the U.S. Fish and Wildlife Service Wetlands Mapper (accessed March 2017), there are no wetlands or jurisdictional waters in or near the project site. There is a creek that bisects John Boulware Park, about one mile southeast of the project site. The proposed project would not involve the direct removal or fill of wetlands or indirectly affect the hydrology, soil, vegetation, or wildlife of wetlands. There would be no impact, and this issue is not discussed further.

Regarding criterion (d), wildlife use on the project site is expected to be relatively low due to the absence of natural habitat, the proximity to streets in a mostly built environment adjacent to the project site, and the lack of protective cover. Birds (e.g., house sparrow, starling, crow) and wildlife such as opossums and small rodents typically associated with developed commercial properties would be expected to occur. The project site is surrounded by the built environment, and therefore is limited as a potential wildlife movement corridor. Trees on the project site could potentially provide nesting habitat for small songbirds; nesting birds are protected by the Migratory Bird Treaty Act and the California Fish and Game Code. The project would have a less-than-significant impact on wildlife movement or native wildlife nursery sites. This issue is not discussed further.

Regarding criterion (e), no portion of the project site is located in the following land use designation categories: Open Space/Controlled Development, Streamside Open Space, or Publicly-owned Conservation Land (Palo Alto Comprehensive Plan, Land Use Designation Map). However, the proposed project will be subject to the City's Tree Preservation Ordinance (PAMC Chapter 8.10). The findings of the site-specific tree survey report prepared for the project (David L. Babby, 2016) are reported, and applicable tree preservation/replacement regulations explained, below.

Regarding criterion (f), there is no Habitat Conservation Plan, Natural Community Conservation Plan, or other adopted habitat conservation plan applicable to the project site. There would be no impact, and this issue is not discussed further.

6.3.2 Impacts and Mitigations

Would the project 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 Wildlife or U.S. Fish and Wildlife Service (Significance Criterion [a])?

The Federal Migratory Bird Treaty Act and California Fish and Game Code sections 3503, 3503.5, 3513, and 3800 protect migratory and nesting birds. Trees that might provide nesting habitat would be removed by project construction. The possibility of removing trees that contain nests is identified here as a potentially significant impact. Any direct removal of trees or indirect disturbance by construction or operational activities during the nesting season that causes nest abandonment and/or loss of reproductive effort (killing or abandonment of eggs or young) is considered a "take." Mitigation 6-1 below would reduce this potentially significant impact to migratory and nesting birds to a less-than-significant level.

Impact 6-1: **Potential Impacts on Nesting Birds.** The proposed PSB project is intended to improve the natural environment on the project site with an extensive array of coordinated new landscaping and trees. However, 38 existing trees are proposed to be removed. Without a proactive mitigation procedure in place, project construction could inadvertently result in the removal of trees containing nests or eggs of migratory birds, raptors, or bird species during the nesting season, which would be considered an "unlawful take" under the Federal Migratory Bird Treaty Act and USFW provisions protecting migratory and nesting birds (see Regulatory Setting above). This is considered a ***potentially significant impact*** (see criterion [a] in subsection 6.3.1, “Significance Criteria,” above).

Mitigation 6-1. To avoid impacts to nesting birds and violation of State and federal laws pertaining to birds, all construction-related activities (including but not limited to mobilization and staging, clearing, grubbing, vegetation removal, fence installation, demolition, and grading) should occur outside the avian nesting season (that is, prior to February 1 or after August 31). If construction and construction noise occurs within the avian nesting season (from February 1 to August 31), all suitable habitats located within the project’s area of disturbance, including staging and storage areas plus a 150-foot buffer around these areas, shall be thoroughly surveyed, as feasible, for the presence of active nests by a qualified biologist no more than five days before commencement of any site disturbance activities and equipment mobilization. If project activities are delayed by more than five days, an additional nesting bird survey shall be performed. Active nesting is present if a bird is sitting in a nest, a nest has eggs or chicks in it, or adults are observed carrying food to the nest. The results of the surveys shall be documented. If it is determined that birds are actively nesting within the survey area, the additional procedures below shall apply. Conversely, if the survey area is found to be absent of nesting birds, the additional procedures shall not be required.

Additional Procedures. If pre-construction nesting bird surveys result in the location of active nests, no site disturbance and mobilization of heavy equipment (including but not limited to equipment staging, fence installation, clearing, grubbing, vegetation removal, fence installation, demolition, and grading) shall take place within 150 feet of nests, or as determined by a qualified biologist, until the chicks have fledged. Monitoring shall be required to ensure compliance with the MBTA and relevant California Fish and Game Code requirements. Monitoring dates and findings shall be documented.

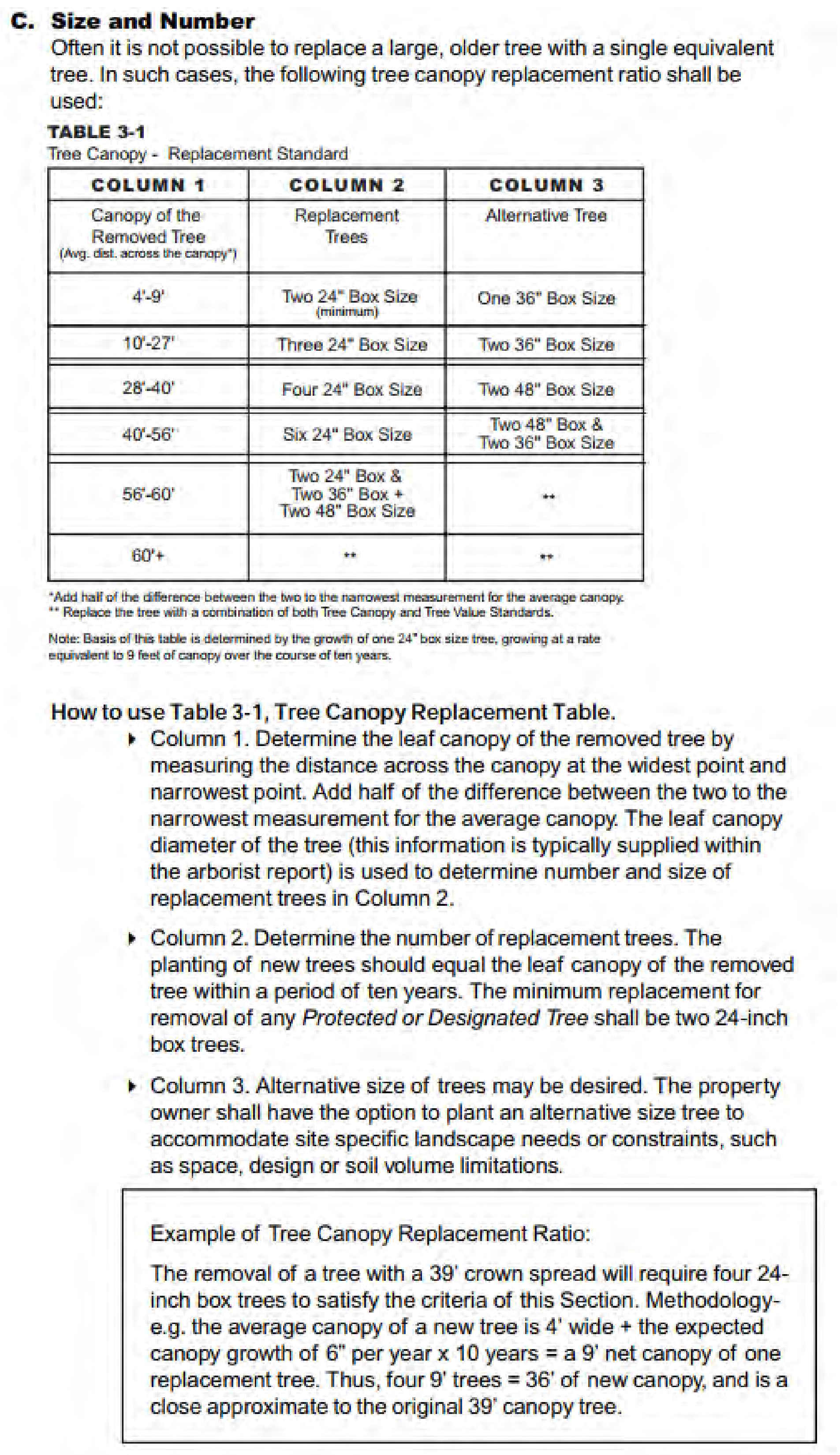
Implementation of this measure would reduce the impact to a ***less-than-significant level.***

Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (Significance Criterion [e])? See section 6.2 (Regulatory Setting, Local Regulations) above. The Palo Alto Municipal Code

(PAMC) includes provisions for the preservation and protection of trees as well as the protection of flora and fauna within the City limits. PAMC Title 8 (Trees and Vegetation) and Title 18 (Zoning) include regulations that protect trees in the city. Implementing regulations are set forth in the Tree Technical Manual pursuant to PAMC Section 8.10.030. , Section 3.00 (Removal, Replacement, and Planting of Trees) of the Tree Technical Manual includes standards and procedures for preventing unnecessary tree removal, determining if a tree may be removed, describing replacement tree requirements, and determining the replacement value of a tree that cannot be replaced in its original location. Except for these identified provisions, the proposed PSB project would not conflict with other policies or ordinances protecting biological resources.

As shown on Figure 6.1 above, the tree survey report for the proposed PSB project defines six (6) trees on site as protected trees because they are either coast live oak (1 tree) or valley oak (1 tree) with a trunk diameter of 11.5 inches or more, or coast redwood (4 trees) with a trunk diameter of 18 inches or more. Five (5) surveyed trees are designated street trees (i.e., in the public right-of-way). These eleven (11) protected and designated trees are proposed to be removed under the PSB project. One of the 39 surveyed trees would be retained and protected in place – a Chinese elm in Jacaranda Lane (tree #7).

The City of Palo Alto Tree Technical Manual (TTM) provides guidance on tree replacement. For public property projects, the City can mitigate the removal of the six on-site Protected trees by planting trees on another City-owned site to provide an equal canopy (TTM 3.15 Alternatives When Trees Cannot Be Replaced Onsite). The site(s) and mitigation tree locations, sizes, and species are a collaborative effort between Urban Forestry staff and PWE staff, following the size and number specified in the “Size and Number” chart below.



C. Size and Number

Often it is not possible to replace a large, older tree with a single equivalent tree. In such cases, the following tree canopy replacement ratio shall be used:

TABLE 3-1
Tree Canopy - Replacement Standard

COLUMN 1	COLUMN 2	COLUMN 3
Canopy of the Removed Tree (Avg. dist. across the canopy*)	Replacement Trees	Alternative Tree
4'-9'	Two 24" Box Size (minimum)	One 36" Box Size
10'-27'	Three 24" Box Size	Two 36" Box Size
28'-40'	Four 24" Box Size	Two 48" Box Size
40'-56'	Six 24" Box Size	Two 48" Box & Two 36" Box Size
56'-60'	Two 24" Box & Two 36" Box + Two 48" Box Size	**
60'+	**	**

*Add half of the difference between the two to the narrowest measurement for the average canopy.
** Replace the tree with a combination of both Tree Canopy and Tree Value Standards.

Note: Basis of this table is determined by the growth of one 24" box size tree, growing at a rate equivalent to 9 feet of canopy over the course of ten years.

How to use Table 3-1, Tree Canopy Replacement Table.

- Column 1. Determine the leaf canopy of the removed tree by measuring the distance across the canopy at the widest point and narrowest point. Add half of the difference between the two to the narrowest measurement for the average canopy. The leaf canopy diameter of the tree (this information is typically supplied within the arborist report) is used to determine number and size of replacement trees in Column 2.
- Column 2. Determine the number of replacement trees. The planting of new trees should equal the leaf canopy of the removed tree within a period of ten years. The minimum replacement for removal of any *Protected or Designated Tree* shall be two 24-inch box trees.
- Column 3. Alternative size of trees may be desired. The property owner shall have the option to plant an alternative size tree to accommodate site specific landscape needs or constraints, such as space, design or soil volume limitations.

Example of Tree Canopy Replacement Ratio:

The removal of a tree with a 39' crown spread will require four 24-inch box trees to satisfy the criteria of this Section. Methodology- e.g. the average canopy of a new tree is 4' wide + the expected canopy growth of 6" per year x 10 years = a 9' net canopy of one replacement tree. Thus, four 9' trees = 36' of new canopy, and is a close approximate to the original 39' canopy tree.

Impact 6-2: Removal of Protected and Designated Trees. Because 6 protected trees and 5 designated trees are proposed to be removed as part of the proposed PSB project, Palo Alto Municipal Code Title 8 (Trees and Vegetation) Chapters 8.04 and 8.10 would apply to the project to require on-site tree replacement or off-site replacement and mitigation in accordance with the standards in the City's Tree Technical Manual (Section 8.10.050(d)(2)). Without adequate replacement or other mitigation as set forth in the Tree Technical Manual, the project would be inconsistent with the Municipal Code tree protection provisions. This potential inconsistency with the tree protection policy and these tree removals are considered a ***potentially significant impact*** (see criterion [e] in subsection 6.3.1, "Significance Criteria," above).

Mitigation 6-2 . Prior to removal of the protected trees and street trees, the applicant shall obtain a tree removal permit issued by the City of Palo Alto Urban Forestry Division for the removal of any and all protected, designated, or street trees (referred to collectively as "Regulated Trees"). In all cases, replacement trees would be required as a condition of the tree removal permit, and the project applicant must demonstrate to the satisfaction of the City that there is no alternative that could preserve the tree(s) on-site. The project applicant must provide an evaluation and summary for any Regulated Tree (the collective term for any protected, designated, or street tree) proposed to be removed.

The applicant shall be required, in accordance with the Tree Protection and Management Regulations (PAMC 8.10) and Tree Technical Manual (PAMC 8.10.130), to replace the tree canopy for the six (6) protected trees, in accordance with the tree canopy formula identified in the Tree Technical Manual (TTM, 3.20). If the tree canopy cannot be replaced on-site, the canopy shall be replaced off-site as close to the project site as feasible. If trees are being replaced off-site, the applicant must submit a Tree Planting Plan to the Urban Forestry Division and obtain the Urban Forestry Division's approval of the plan prior to issuance of a building permit. The Tree Planting Plan must include:

- The canopy calculation for trees removed and the number of trees planned to replace them, consistent with the formula identified in the Tree Technical Manual
- The specific location where the new trees would be planted with specific baseline information about that proposed site (e.g., surrounding vegetation or development)
- The species of trees to be planted

(continued)

<u>Mitigation 6-2 (continued)</u>:

- Specific planting details (e.g., size of sapling, size of containers, irrigation plan)
- Success criteria
- Monitoring and maintenance schedule

Replacement tree planting will be monitored by a qualified arborist. To verify the success of replacement trees, monitoring shall occur for two years after initial planting. After the two-year period, the arborist will determine if the trees are capable of surviving without further maintenance. Implementation of this measure would reduce the impact to a ***less-than-significant level.***

7. CULTURAL, HISTORIC, PALEONTOLOGICAL, AND TRIBAL CULTURAL RESOURCES

This EIR chapter describes the PSB project's potential impacts on historic, archaeological, and paleontological resources, and identifies mitigation measures as necessary to reduce identified potentially significant impacts to less-than-significant levels.

For the protection and confidentiality of archaeological and tribal cultural resources, the descriptions of these resources are generalized.

7.1 SETTING

7.1.1 Prehistoric Habitation and Potential for Archaeological Resources

At the time of Euro-American contact, Native Americans in the Bay Area typically lived along alluvial terraces and the historic margins of San Francisco Bay. The PSB project site was historically along the San Francisco Bay margin, and is therefore a location of high archaeological sensitivity. Ground-disturbing activities during previous development of the project site would likely have disturbed archaeological resources that may have existed; however, the proposed PSB project would be excavated for underground parking, which has not occurred in the past.

There are no dedicated cemeteries located on the project site. However, as noted above, the project site was historically along the San Francisco Bay margin, and is therefore a location of high archaeological sensitivity.

7.1.2 Project Vicinity Historical Context

The PSB project site comprises two City-owned surface parking lots. It contains no buildings or structures, and is not considered a historic site.

The 1979 Historic Resources Inventory of the City of Palo Alto shows two historic properties on 1795 and 2110 Park Boulevard; these properties are located about one mile north of the project site.

One historic property was identified adjacent to the project site in the most recent historic resources survey of 1998 (see section 7.1.4 below). Other adjacent and nearby buildings constructed in the 1950s have not been studied for potential historic eligibility since the 1998 survey was completed. Earlier Figures 3.2 (Project Vicinity) and 4.1A (Existing Aerial View) in this EIR show the project vicinity, including the historic building on the northwest corner of California Avenue and Birch Street.

7.1.3 Potential for Paleontological Resources

The Holocene Formation, the geologic formation which underlies the project site, is a relatively recent formation (about 12,000 years old). The Holocene Formation is likely to contain only occasional small marine and non-marine invertebrate fossils. Ground-disturbing activities during previous development of the site would likely have disturbed, altered, or eliminated paleontological resources that may have existed.

7.1.4 California Historical Resources Information System (CHRIS) Search

The information in this section includes the results of a records search performed by the California Historical Resources Information System (CHRIS)/Northwest Information Center (NWIC) for the PSB project in May 2017. The records search also included the City's report "Final Survey Report, Palo Alto Historic Update, August 1997 – August 2000." From that survey report, the California Department of Parks and Recreation DPR523 Primary Record for the one historic resource adjacent to the project site is summarized below.

Twenty (20) recorded cultural resource studies were identified by the NWIC within a half-mile radius of the PSB project site. No cultural or historic resources have been recorded on the site. There are three prehistoric archaeological sites, all of which were occupied, located between approximately 400 and 1,700 feet from the PSB site. Two of these archaeological sites, in addition to other recorded sites beyond a half-mile radius of the project site, appear to be related.

There are four recognized historic buildings located within a half-mile radius of the project site, one of which is across Jacaranda Lane from the project site and, because of its proximity, may be affected by the proposed project. The building, constructed in 1938 and located at 321 California Avenue (at the northwest corner of California Avenue and Birch Street) is known historically as the Super Drive-In Market. The building, which had a drive-in pick-up at the corner of California Avenue, was an original Safeway Grocers store. As of the writing of this EIR (November 2017), it is "Antonio's Nut House" restaurant.

The DPR523 form states:

"The building at 321 California Avenue is a one-story, reinforced concrete structure with a flat roof. The roof is hidden by parapet walls….A cantilevered marquee shades the storefront and the first bay on the side facing the parking lot [the site of the proposed parking garage]. The marquee on the side was part of the drive-in feature. The plate glass storefront windows are supported by a low bulkhead wall clad in glazed tile. By a few simple devices, this building was ornamented in the Moderne style – vertical ribs above horizontal bands on the edge of the marquee. This is a rectangular building in plan, measuring 45 feet by 90 feet."

The Safeway was a "super-market," which was a new building type in 1938. "[This building] represents a dramatic shift of retailing in general and grocery retailing in particular – accommodating an increasingly automobile based society. It is also an early example of a major chain – Safeway." According to the DPR523 Primary Record, the building appears eligible for the National Register of Historic Places (NRHP) under the following criteria: A – "associated with events that have made a significant contribution to the broad patterns of our [United States] history; and C – "embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction."[1] Although no longer used for its original purpose, the building is a rare example of a once common type – a 1930s super-market with a drive-in.

7.1.5 Tribal Cultural Resources

The results of a record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) were negative; no tribal cultural resources have been recorded on the project site. The NAHC does not consider a records search as the final step in researching the possible presence of tribal cultural resources, so, as suggested by the NAHC, the EIR preparers contacted (through Certified Mail) the following Native American tribes who may have knowledge of cultural resources in the project vicinity: Costanoan Rumsen Carmel Tribe, Amah Mutsun Tribal Band of Mission San Juan Bautista, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area, Ohlone Indian Tribe, and Indian Canyon Mutsun Band of Costanoan. None of the tribes responded to the request for information. However, there is always the possibility that tribal cultural resources, including human remains, may be discovered during excavation activities for the proposed PSB project.

7.2 REGULATORY SETTING

The treatment of cultural and historical resources in Palo Alto is governed by federal, State, and local laws, policies, and guidelines. These provisions set forth specific criteria for determining whether prehistoric and historic sites or objects are significant and/or protected by law. Federal and State significance criteria generally focus on the resource's integrity and uniqueness, its relationship to similar resources, and its potential to contribute important information to scholarly research. Some resources that do not meet federal significance criteria may be considered significant under State or local criteria.

7.2.1 Federal Regulations

National Historic Preservation Act of 1966 – National Register of Historic Places. The National Historic Preservation Act of 1966 established the National Register of Historic Places (National Register) as the official federal designation of historical resources, including districts, sites, buildings, structures, and objects. Resources less than 50 years in age, if of exceptional importance, may be considered eligible for the National Register. Properties may be eligible for the National Register if one or more criterion for historic significance is met and physical integrity is retained.

According to 36 Code of Federal Regulations (CFR) part 60.4, the criteria for inclusion on the National Register, which are worded in a manner to provide for a wide diversity of resources, are based on the resources' quality of significance in American history, architecture, archaeology, engineering, as well as the significance of the culture present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association. The following aspects are also used to evaluate the eligibility of potential resources for listing in the National Register:

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[1] National Register Bulletin (NRB 15), "How to Apply the National Register Criteria for Evaluation"; U.S. Department of the Interior, National Park Service; viewed on-line June 8, 2017 at www.nps.gov/br/publications/bulletins/nrb15/nrb15_2.htm.

- That are associated with events that have made a significant contribution to the broad patterns of our history; or
- That are associated with the lives of persons significant in our past; or
- That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- That have yielded, or may be likely to yield, information important in prehistory or history.

Executive Order 11593. Executive Order 11593, Protection of the Cultural Environment, orders the protection and enhancement of the cultural environment through providing leadership, establishing State offices of historic preservation, and developing criteria for assessing resource values. It was issued on May 13, 1971 and is included in 36 Code of Federal Regulations, Section 8921 as incorporated into Title 7, United States Code.

American Indian Religious Freedom Act. The American Indian Religious Freedom Act, Title 42 United States Code, Section 1996 protects Native American religious practices, ethnic heritage sites, and land uses.

Native American Graves Protection and Repatriation Act. Native American Graves Protection and Repatriation Act (NAGPRA), Title 25, United States Code (1990), defines “cultural items,” “sacred objects,” and “objects of cultural patrimony;” establishes an ownership hierarchy; provides for review; allows excavation of human remains, but stipulates return of the remains according to ownership; sets penalties for violations; calls for inventories; and provides for return of specified cultural items.

7.2.2 State Regulations

California Register of Historical Resources. The California Register of Historical Resources (California Register) is the authoritative guide to the state's significant historical and archeological resources. The State Historical Resources Commission designed the California Register program for use by state and local agencies, private groups, and citizens to identify, evaluate, register, and protect California's historical resources.

The California Register eligibility criteria and standards are very similar to those of the National Register, with some minor differences.[1] For example, while both the National Register and the California Register process may consider for listing a property less than 50 years old, the State Office of Historic Preservation (OHP), as a general guideline, has recommended that properties 45 years or older (instead of 50 for the National Register) may be of historical or cultural value. Similar to listing in the National Register, a listing in the California Register does not prohibit demolition or alteration of a property. CEQA requires the evaluation of project effects and feasible mitigation of significant impacts on properties that are listed in, or determined eligible for listing in, the California Register; there is a similar federal process under the National Environmental Policy Act (NEPA) and National Park Service regulations for properties listed in, or determined eligible for, the National Register.

According to California Public Resources Code (PRC) Section 5020.1(j), the criteria for inclusion of any object, building, structure, site, area, place, record, or manuscript in the California Register are based on the resources’ quality of significance in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of

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[1] Public Resources Code Section 5024.1.

California. A historic resource may be determined eligible to be listed in the California Register if it meets one or more of the following criteria:

- It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- It is associated with the lives of persons important in California's past.
- It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic value.
- It has yielded or is likely to yield information important in prehistory or history.

Additionally, for a resource to be eligible for the California Register, it must retain sufficient integrity to be recognizable as a historic resource and to convey its significance.

The California Register automatically includes properties that are listed or have been formally determined eligible for listing in the National Register, as well as California Historical Landmarks (#770 and above) and eligible California Points of Historical Interest. Other resources that are eligible for the California Register include historic landmarks and districts designated under a local ordinance consistent with the procedures of the State Historic Resources Commission, and historical resources identified in historic surveys conducted in accordance with OHP procedures.

California Environmental Quality Act. Section 15064.5 of the CEQA Guidelines states that a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment. The CEQA Guidelines define four ways that a property can qualify as a historical resource for purposes of CEQA compliance:

- The resource is listed in or determined eligible for listing in the California Register of Historical Resources, as determined by the State Historical Resources Commission.
- The resource is included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code, or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
- The lead agency determines the resource to be significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, as supported by substantial evidence in light of the whole record.
- The lead agency determines that the resource may be a historical resource as defined in Public Resources Code Sections 5020.1(j) or 5024.1 (CEQA Guidelines Section 15064.5) which means, in part, that it may be eligible for the California Register.

In addition, Public Resources Code Section 21083.2 and Section 15126.4 of the CEQA Guidelines specify lead agency responsibilities in determining whether a project may have a significant effect on archaeological resources. If it can be demonstrated that a project will damage a unique archaeological resource, the lead agency may require reasonable efforts for the resources to be preserved in place or left in an undisturbed state. Preservation in place is the preferred approach to mitigation. The Public Resources Code also details required mitigation if unique archaeological resources are not preserved in place.

Section 15064.5 of the CEQA Guidelines specifies procedures to be used in the event of an unexpected discovery of Native American human remains on non-federal land. These provisions protect such remains from disturbance, vandalism, and inadvertent destruction, establish procedures to be implemented if Native American skeletal remains are discovered during construction of a project, and establish the Native American Heritage Commission (NAHC) as the authority to identify the most likely descendant (MLD) and mediate any disputes regarding disposition of such remains.

California Public Resources Code Section 21074, 21080.3.1, 21084.2, and 21084.3 (enacted by Assembly Bill 52, Tribal Cultural Resources). Assembly Bill 52 (2014) established that a project with an effect that may cause a substantial adverse change in the significance of a "tribal cultural resource" is a project that may have a significant effect on the environment. AB 52 requires the Native American Heritage Commission (NAHC) to provide each California Native American tribe with: (1) a list of all public agencies that may be a lead agency within the geographic area in which the tribe is traditionally and culturally affiliated, (2) the contact information of those agencies, and (3) information on how the tribe may request those public agencies to notify the tribe of projects for the purposes of requesting consultation. AB 52 requires a lead agency to begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project if: (1) the tribe requested to the lead agency, in writing, to be informed by the lead agency of proposed projects in that geographic area, and (2) the tribe then requests formal consultation for that particular proposed project. Consultation must be completed prior to releasing a negative declaration, mitigated negative declaration, or environmental impact report.

As discussed in section 7.1.5 above, although no tribal cultural resources have been recorded on the project site and none of the tribes responded to a request for information for this EIR, there is always the possibility that tribal cultural resources, including human remains, may be discovered during excavation activities for the proposed PSB project.

California Historical Building Code, California Code of Regulations, Title 24, Part 8. The California Historical Building Code (CHBC) (as set forth in Sections 18950 to 18961 of Division 13, Part 2.7 of Health and Safety Code and as subject to the rules and regulations set forth in 24 CCR Part 8), provides alternative building regulations and standards for permitting repairs, alterations, and additions necessary for the rehabilitation, preservation, restoration (including related reconstruction) or relocation of historical buildings, structures, and properties deemed by any level of government as having importance to the history, architecture, or culture of an area. The CHBC was updated in 2013 as a part of the adoptions, amendments and repeal of administrative regulations to California Code of Regulations, Title 24, also known as the California Building Standards Code.

California Government Code Sections 65040.2, 65092, 65351, 65352.3, 65560, and 65562.5. California Government Code Sections 65040.2, 65092, 65351, 65352.3, 65560, and 65562.5 (enacted by Senate Bill 18 in 2004) set forth requirements for local governments (cities and counties) to consult with Native American tribes to aid in the protection of traditional tribal cultural places through local land use planning upon amendment of a general plan.[1] The intent of California Government Code Sections 65040.2, 65092, 65351, 65352.3, 65560, and 65562.5 is to provide California Native American tribes an opportunity to participate in local land use decisions at an early stage of planning for the purpose of protecting, or mitigating impacts to, cultural places. The purpose of involving tribes at these early planning stages is to allow consideration of cultural places in the context of broad local land use policy prior to individual site-specific, project level land use designations are made by a local government.

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[1] SB 18 amends Government Sections (GC) 65040.2, 65092, 65351 and 65560, while adding GC sections 65352.3, 65352.4 and 65562.5.

California Health and Safety Code Section 7052 and 7050.5. Section 7052 of the Health and Safety Code states that the disinterment of remains known to be human, without authority of law, is a felony. Section 7050.5 requires that construction or excavation be stopped in the vicinity of discovered human remains until the County coroner can determine whether the remains are those of a Native American. If determined to be Native American, the coroner must contact the NAHC.

California Public Resources Code Section 5097. Public Resources Code Section 5097 specifies the procedures to be followed in the event of the unexpected discovery of human remains on non-federal public lands. The disposition of Native American burials falls within the jurisdiction of the NAHC, which prohibits willfully damaging any historical, archaeological, or vertebrate paleontological site or feature on public lands.

7.2.3 Local Regulations

Palo Alto has taken important steps to recognize and preserve the historical resources that exist in the city. The Historic Resources Board, Historic Preservation ordinance, and the Historic Inventory and other provisions of the Municipal Code are the principal local tools for the protection and enhancement of historical resources.

Palo Alto Municipal Code.

Historic Resources Board (Chapter 2.27). Chapter 2.27 of the Palo Alto Municipal Code establishes a Historic Resources Board (HRB), charged with advising property owners of historic residences who apply for alterations to their properties to understand and incorporate the Secretary of Interior’s Standards for Rehabilitation as well as recommends conditions of project approval for those projects subject to discretionary review. Additionally, the HRB is in place to inform the Architectural Review Board of the significance of properties which are under review, as well as to provide recommendations to the Architectural Review Board regarding proposed alterations to historic structures. Another important duty of the board is to advise the City Council on the designation of buildings and structures to the City’s inventory of historic structures and sites. The City Council has the authority to delegate additional functions to the HRB from time to time. The HRB is composed of seven members, at least one of whom must be the owner or occupant of an historic structure, three of whom must be architects, or design professionals and at least one of whom must possess academic education or practical experience in history or a related field.

Historic Preservation Ordinance (Chapter 16.49). In 1980, the City adopted the Historic Preservation Ordinance to protect and enhance structures, districts, and neighborhoods of historical and architectural significance located in Palo Alto for the cultural and aesthetic benefit to the community. The ordinance serves to protect historic resources by providing for the creation and maintenance of an historic resources inventory, as well as establishing regulations pertaining to the alteration, maintenance, and destruction of designated resources listed on the inventory. As described above, the HRB makes recommendations to the City Council on buildings and districts to be included on the inventory. The ordinance also contains criteria to be used for designation of a building or district on the historic resources inventory. The criteria are as follows:

- The structure or site is identified with the lives of historic people or with important events in the city, state, or nation;

- The structure or site is particularly representative of an architectural style or way of life important to the city, state, or nation;
- The structure or site is an example of a type of building which was once common, but is now rare;
- The structure or site is connected with a business or use which was once common, but is now rare;
- The architect or building was important;
- The structure or site contains elements demonstrating outstanding attention to architectural design, detail, materials, or craftsmanship.

In addition to the criteria for designation, the definitions of historic categories and districts, as defined in the ordinance, shall be used for designation of properties to the inventory. The definitions are as follows:

- Category 1: An "Exceptional Building" of pre-eminent national or State importance. These buildings are meritorious works of the best architects, outstanding examples of a specific architectural style, or illustrate stylistic development of architecture in the United States. These buildings have had either no exterior modifications or such minor ones that the overall appearance of the building is in its original character.
- Category 2: A "Major Building" of regional importance. These buildings are meritorious works of the best architects, outstanding examples of an architectural style, or illustrate stylistic development of architecture in the State or region. A major building may have some exterior modifications, but the original character is retained.
- Category 3 or 4: A "Contributing Building" which is a good local example of an architectural style and relates to the character of a neighborhood grouping in scale, materials, proportion, or other factors.

A contributing building may have had extensive or permanent changes made to the original design, such as inappropriate additions, extensive removal of architectural details, or wooden facades resurfaced in asbestos or stucco.

Historical Resources Review and Preservation Incentives. The Municipal Code contains special provisions to encourage the preservation and rehabilitation of historic structures for the following residential districts:

- Chapter 18.10 for Residential Estate (RE), Two Family Residential District (R2), and Two Unit Multiple-Family Residential District (RMD); and
- Chapter 18.12, which pertains to the Single-Family Residence District (R-1); and
- Chapter 18.13 for Low Density Multiple-Family Residence District (RM15), Medium Density Multiple-Family Residence District (RM-30), and High Density Multiple-Family Residence District (RM-40).

The provisions, found in Municipal Code Chapters 18.10.140, 18.12.140, and 18.13.140, relate to the subdivision of parcels where at least one of the structures on the parcel is designated as historic. In order to make use of preservation development incentives, such as smaller minimum lot sizes of resultant lots, owners agree to a covenant to be recorded, which would run with the land in perpetuity, assuring that the historic residences would be preserved and maintained consistent with the Secretary of the Interior's Standards for Rehabilitation. The covenant must stipulate that HRB review is required for all major projects on the site, including significant changes to any non-historic residence. The Municipal Code also contains special provisions that allow floor area bonuses in the Downtown zone districts: Downtown Commercial-

Community (CD-C), Downtown Commercial-Neighborhood (CD-N), and Downtown Commercial-Service (CD-S) as found in Section 18.18.070. The intent of these provisions is to encourage rehabilitation of existing Downtown structures that are designated in Seismic Categories I, II, or III and/or have a Category 1 or 2 historic designations. A property owner of a building within either (or both) of these designations may, upon successful rehabilitation(s) in accordance with the requirements and regulations, be awarded bonus floor area of 2,500 square feet or 25 percent of the floor area of the existing building, whichever is greater. A property owner undertaking a seismic and historic rehabilitation may be granted bonuses for each type of rehabilitation, subject to Council approval. As an additional incentive, the bonus floor area received as part of the rehabilitation(s) may be transferred to an off-site location in the Downtown area, subject to the regulation and requirements described in Transfer Development Rights (TDR) (PAMC 18.18.080). The TDR program is an incentive program that is also available to properties within the SOFA II area and to City properties.

7.3 IMPACTS AND MITIGATION MEASURES

7.3.1 Significance Criteria

Based on the CEQA Guidelines,[1] the project would have a significant cultural or historic resource impact if it would:

(a) Adversely affect a historic resource listed or eligible for listing on the National and/or California Register, or listed on the City's Historic Inventory;

(b) Eliminate important examples of the major periods of California history or prehistory;

(c) Cause a substantial adverse change in the significance of an archaeological resource as defined in CEQA Guidelines section 15064.5;

(d) Disturb any human remains, including those interred outside of formal cemeteries;

(e) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature;

(f) Directly or indirectly destroy a local cultural resource that is recognized by City Council resolution; or

(g) 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, or 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:

> 1) Listed or eligible for listing on 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

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[1] CEQA Guidelines, Appendix G, item V(a-d); and sections 15064.5, 15065(a), and 15126.4. CEQA sections 21083.2 and 21084.1.

2) A resource determined by a lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to the criteria set forth in subdivision (c) of Public Resource Code section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

When a proposed project may adversely affect a historical resource, CEQA requires the lead agency to carefully consider the possible impacts before proceeding (Public Resources Code section 21084.1). CEQA equates a substantial adverse change in the significance of a historic resource with a significant effect on the environment (section 21084.1).

Under the current CEQA Guidelines (Guidelines section 15064.5[b][1] and [2]), a "substantial adverse change" is defined as "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired." Further, the significance of a historic resource is materially impaired when a project "demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the California Register of Historical Resources"; or "demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources...or demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA."

CEQA Guidelines section 15064.5(b)(3) states that "generally, a project that follows the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings*, or the *Secretary of the Interior's Standards for Rehabilitation with Guidelines for Rehabilitating Historic Buildings...* shall be considered as mitigated to a level of less-than-a-significant impact on the historical resource."

7.3.2 Impacts and Mitigations

Would the project:

Adversely affect a historic resource listed or eligible for listing on the National and/or California Register, or listed on the City's Historic Inventory (Significance Criterion [a]); or

Directly or indirectly destroy a local cultural resource that is recognized by City Council resolution (Significance Criterion [f])?

The PSB project site does not contain any historic buildings or structures. However, the adjacent 1938 building across Jacaranda Lane from the project site, at the northwest corner of California Avenue and Birch Street, was an original Safeway super-market. Other adjacent and nearby buildings constructed in the 1950s have not been studied for potential historic eligibility since the 1998 historic resources survey was completed, but they are now over 50 years old and may contribute to the Post-WW II history of Palo Alto.

Based on the California Register of Historic Resources criteria for evaluating impacts on historic and potentially historic resources (i.e., original Safeway and adjacent/nearby 1950s buildings, respectively; collectively "historic resources"), the following conclusions are made:

- The proposed PSB project will not demolish, destroy, relocate, touch, or alter any historic resources. The public parking garage features pedestrian friendly elements near the historic resource (circa 1938 former Safeway building) across Jacaranda Lane and would not impact the setting of the resource.
- The proposed PSB project will not alter the immediate surroundings such that it would affect any resource's historic integrity, mainly because the project would be located on a surface parking lot behind the California Avenue business district and would not disrupt the continuity of buildings along the avenue or among any other identified set of potentially historic buildings.
- As explained in chapter 13 (Noise), section 13.3.2 (Impacts and Mitigation Measures) of this EIR, "Under no circumstances are groundborne vibration levels predicted to exceed Caltrans' vibration damage threshold criteria for historic or older buildings."

Based on the above conclusions, the PSB's impact on historic and potentially historic buildings is considered ***less than significant***.

Mitigation. No significant impact has been identified; no mitigation is required.

Would the project:

Eliminate important examples of the major periods of California history or prehistory (Significance Criterion [b]);

Cause a substantial adverse change in the significance of an archaeological resource as defined in CEQA Guidelines section 15064.5 (Significance Criterion [c]);

Disturb any human remains, including those interred outside of formal cemeteries (Significance Criterion [d]);

Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature (Significance Criterion [e]); or

Directly or indirectly destroy a local cultural resource that is recognized by City Council resolution (Significance Criterion [f])?

As discussed above, there are no cultural, archaeological, or paleontological resources known to the present on the project site. Ground-disturbing activities during previous development of the project site would likely have disturbed, altered, or eliminated archaeological resources that may have existed on the surface level. However, based on the results of the CHRIS records search, the project site has a high sensitivity for subsurface archaeological resources.

The proposed project includes excavation at depths that have not previously been disturbed on the site. Therefore, although no archaeological or paleontological resources are known to be present, the proposed project could disrupt, alter, or eliminate as-yet undiscovered archaeological or paleontological resources, potentially including Native American remains, that may be present below the surface.

Impact 7-1: Potential Disturbance of Archaeological or Paleontological Resources. Project construction (e.g., excavation for underground parking and utilities) could disturb existing unrecorded sensitive archaeological or paleontological resources at the PSB project site. Although unlikely, this possibility represents a ***potentially significant impact*** (see criteria [b], [c], [d], [e], and [f] in subsection 7.3.1, "Significance Criteria," above).

Mitigation 7-1. In the event of the unanticipated discovery of subsurface archaeological or paleontological resources during earth-moving operations, the following measures are recommended to reduce potentially significant impacts on these resources to a less-than- significant level:

- Conduct Archaeological/Paleontological Sensitivity Training for Construction Personnel. The City shall retain a qualified professional archaeologist who meets U.S. Secretary of the Interior’s Professional Qualifications and Standards, and a professionally qualified paleontologist, to conduct an Archaeological/Paleontological Sensitivity Training for construction personnel prior to commencement of excavation activities. The training session will include a written handout and will focus on how to identify archaeological and paleontological resources that may be encountered during earth-moving activities, including the procedures to be followed in such an event, the duties of archaeological and paleontological monitors, and the general steps a qualified professional archaeologist or paleontologist would follow in conducting a salvage investigation if one is necessary.

- Cease Ground-Disturbing Activities and Implement Treatment Plan if Archaeological Resources Are Encountered. In the event that archaeological resources are unearthed during ground-disturbing activities, the ground-disturbing activities shall be halted or diverted away from the vicinity of the find so that the find can be evaluated. A buffer area of at least 50 feet shall be established around the find, where construction activities will not be allowed to continue until a qualified archaeologist has examined the newly discovered artifact(s) and has evaluated the area of the find. Work shall be allowed to continue outside the buffer area.

  All archaeological resources unearthed by project construction activities shall be evaluated by a qualified professional archaeologist, who meets the U.S. Secretary of the Interior’s Professional Qualifications and Standards. Should the

(continued)

Mitigation 7-1 (continued):

newly discovered artifacts be determined to be prehistoric, Native American Tribes/Individuals shall be contacted and consulted, and Native American construction monitoring should be initiated. The City shall coordinate with the archaeologist to develop an appropriate treatment plan for the resources. The plan may include implementation of archaeological data recovery excavations to address treatment of the resources, along with subsequent laboratory processing and analysis.

- Conduct Periodic Archaeological Resources Spot Checks During Grading and Earth-Moving Activities in All Sediments. The City shall retain a qualified professional archaeologist who meets the U.S. Secretary of the Interior's Professional Qualifications and Standards, to conduct periodic Archaeological Spot Checks beginning at depths below two (2) feet to determine if construction excavations have exposed, or have a high probability of exposing, archaeological resources. After the initial Archaeological Spot Check, further periodic checks shall be conducted at the discretion of the qualified archaeologist.

  If the qualified archaeologist determines that construction excavations have exposed, or have a high probability of exposing, archaeological artifacts, construction monitoring for archaeological resources will be required. The City shall retain a qualified archaeological monitor, who meets the qualifications set forth by the U.S. Secretary of the Interior's Professional Qualifications and Standards, who will work under the guidance and direction of a professional archaeologist. The archaeological monitor shall be present during all construction excavations (e.g., grading, trenching, or clearing/grubbing) into non-fill sediments. Multiple earth-moving construction activities may require multiple archaeological monitors.

  The frequency of monitoring shall be based on the rate of excavation and grading activities, proximity to known archaeological resources, the materials being excavated (native versus artificial fill soils), the depth of excavation, and if found, the abundance and type of archaeological resources encountered. Full-time monitoring can be reduced to part-time inspections if determined adequate by the project archaeologist.

- If subsurface paleontological resources are encountered, excavation shall halt in the vicinity of the resources and a qualified paleontologist shall evaluate the resource and its stratigraphic context. The monitor shall be empowered to temporarily halt or redirect construction activities to ensure avoidance of adverse impacts to paleontological resources. During monitoring, if potentially significant

(continued)

<u>Mitigation 7-1 (continued)</u>:

paleontological resources are found, “standard” samples shall be collected and processed by the qualified paleontologist to recover micro vertebrate fossils. If significant fossils are found and collected, they shall be prepared to a reasonable point of identification. Excess sediment or matrix shall be removed from the specimens to reduce the bulk and cost of storage.

Itemized catalogs of material collected and identified shall be provided to a museum repository with the specimens. Significant fossils collected during this work, along with the itemized inventory of these specimens, shall be deposited in a museum repository for permanent curation and storage. A report documenting the results of the monitoring and salvage activities, and the significance of the fossils, if any, shall be prepared. The report and inventory, when submitted to the lead agency, shall signify the completion of the program to mitigate impacts on paleontological resources.

Implementation of these measures would reduce impacts on archaeological and paleontological resources to a ***less-than-significant level***.

Would the project:

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, or 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:

1) Listed or eligible for listing on 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

2) A resource determined by a lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to the criteria set forth in subdivision (c) of Public Resource Code section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe? (Significance Criterion [g])

The results of a record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) were negative; no tribal cultural resources have been recorded on the project site. The NAHC does not consider a records search as the final step in researching the possible presence of tribal cultural resources, so, as suggested by the NAHC, the EIR preparers contacted (through Certified Mail) the following Native American tribes who may have knowledge of cultural resources in the project vicinity: Costanoan Rumsen Carmel Tribe, Amah

Mutsun Tribal Band of Mission San Juan Bautista, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area, Ohlone Indian Tribe, and Indian Canyon Mutsun Band of Costanoan. None of the tribes responded to the request for information.
In May 2016 the City of Palo received a single request from a tribe to be contacted in accordance with AB 52. However, through subsequent correspondence with the tribe, it was concluded that the tribe had contacted the City of Palo Alto in error and did not wish to be contacted regarding future projects within the City's jurisdiction. The tribe, the Torres Martinez Desert Cahuilla Indians, is not traditionally or culturally affiliated with the geographic area within the City of Palo Alto. Because no other tribes have requested to be contacted, no notices in accordance with AB 52 were sent and no further action is required.

Although no tribal cultural resources are known to the present, the proposed project includes excavation at depths that have not previously been disturbed on the site. Therefore, the proposed project could disrupt, alter, or eliminate as-yet undiscovered tribal cultural resources that may be present below the surface.

Impact 7-2: Unanticipated Discovery of Tribal Cultural Resources. Project construction activities (e.g., excavation) could disturb as yet unidentified and/or unrecorded tribal cultural resources, including possible human remains. This possibility represents a ***potentially significant impact*** (see criteria [g] in subsection 7.3.1, "Significance Criteria," above).

Mitigation 7-2. In the event that cultural resources of Native American origin are identified during construction, all earth-disturbing work within the vicinity of the find must be temporarily suspended or redirected until an archaeologist has evaluated the nature and significance of the find and an appropriate Native American representative, based on the nature of the find, is consulted. If the City determines that the resource is a tribal cultural resource and thus significant under CEQA, a mitigation plan shall be prepared and implemented in accordance with State guidelines and in consultation with Native American groups. The plan would include avoidance of the resource or, if avoidance of the resource is infeasible, the plan would outline the appropriate treatment of the resource in coordination with the archaeologist and the appropriate Native American tribal representative.

Implementation of this measure would reduce impacts on tribal cultural resources to a ***less-than-significant level.***

8. GEOLOGY AND SOILS

This EIR chapter describes existing geologic (including seismic) and soil conditions on the PSB project site and in the vicinity, identifies associated potential geotechnical impacts related to the proposed project, and identifies measures to mitigate potentially significant impacts. The following project-specific report supplied much of the information for this chapter:

- Geotechnical Investigation for Palo Alto Public Safety Building and Parking Garage, Sherman Avenue, Palo Alto, California 94306. Romig Engineers, Inc., Geotechnical & Environmental Services. Project No. 3723-1. May 2016.

8.1 SETTING

8.1.1 Topography and Surface Soils in Palo Alto

In the eastern and central parts of the EIR Study Area, the predominant soil types include Urban-Land Stevenscreek, Flaskan, Hangerone, and Clear Lake complexes, and Urban-Land Orthents and Botella soils.[1] Most belong to the Mollisol soil order that is formed on alluvium on slopes of zero to five percent grade. These soils are typically well to moderately-well drained, and they are characterized by low runoff. One exception is the Urban-Land Hangerone complex, which is poorly drained. The Botella complex soils are generally composed of deep or very deep, well-drained clay loams, whereas Urban-Land Orthents are very deep, poorly drained, texturally heterogeneous soils.

Prevalent soil types in the west part of Palo Alto include Zepplin-McCoy, Footpath-Mouser, and Literr Urbanland-Merbith soil complexes as well as the Montevista clay loam. These soils generally form on terraces and moderate to steep slopes, ranging from 10 to 50 percent grade, and are typically moderately well to well drained. Constituent soil types include loam, clayey loam, sandy loam, and gravelly loam.

Together, the soils described above are known to be expansive in places. Expansive soils possess a “shrink-swell” characteristic, the cyclic expansion and contraction that occurs in fine-grained clay sediments from the process of wetting and drying. Structural damage may result over a long period of time, usually the result of inadequate soil and foundation engineering or the placement of structures directly on expansive soils. (See “Expansive Soils,” below.)

8.1.2 Expansive Soils

Expansive soils can change dramatically in volume depending on moisture content. When wet, these soils can expand; conversely, when dry, they can contract or shrink. Sources of moisture

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[1] University of California-Davis Soil Resource Laboratory, 2014, California Soil Resource Lab, Online Soil Survey. Available online at: http://casoilresource.lawr.ucdavis.edu/soilweb/, accessed on February 3, 2015 by Placeworks for the Comprehensive Plan Update EIR.

that can trigger this shrink-swell phenomenon can include seasonal rainfall, landscape irrigation, utility leakage, and/or perched groundwater. Expansive soil can exhibit wide cracks in the dry season, and changes in soil volume have the potential to damage concrete slabs, foundations, and pavement. Special building/structure design or soil treatment are often needed in areas with expansive soils.

Expansive soils are generally very fine-grained with a high to very high percentage of clay, typically montmorillonite, smectite, or bentonite clay. In general, soil shrink-swell potential is considered moderate to high if the soil has a linear extensibility greater than 3 percent, or a Plasticity Index of 30 or greater.[1] Shrink-swell soil behavior can cause damage to buildings, roads, and other structures.

8.1.3 Seismicity

The Earth's crust includes tectonic plates that collide with or slide past one another along plate boundaries. California is particularly susceptible to such plate movements, notably, the largely horizontal or "strike-slip" movement of the Pacific Plate, as it impinges on and slides past the North American Plate. In general, earthquakes occur when the accumulated stress along a plate boundary or fault is suddenly released, resulting in seismic slippage. The amount of slippage can vary widely, ranging in scale from a few millimeters or centimeters, to tens of feet.

The performance of built structures during a major seismic event varies widely due to a number of factors: location with respect to active fault traces or areas prone to liquefaction or seismically induced landslides; the type of building construction (e.g., wood frame, unreinforced masonry, non-ductile concrete frame); the proximity, magnitude, and intensity of the seismic event itself; and many other factors. The California Building Code (CBC) includes seismic requirements that are designed to ensure the satisfactory performance of building materials under prescribed seismic conditions. See section 8.2 (Regulatory Setting) below.

Palo Alto, like much of the San Francisco Bay Area, is vulnerable to seismic activity due to the presence of several active earthquake faults in the region, the closest and most prominent of which is the San Andreas Fault System, located about 2.5 miles west of Interstate 280. The Alquist-Priolo Earthquake Fault Zone associated with the San Andreas Fault intersects the southwestern-most edge of the city, near the crest of the Santa Cruz Mountains and just east of the intersection of Page Mill Road and State Route 35. Other active earthquake faults in the region include the Monte Vista Fault, that lies roughly 3 miles to the south, the Hayward Fault that lies roughly 13 miles to the east, the Calaveras Fault that lies approximately 19 miles to the east, and the San Gregorio Fault, whose trace passes as close as 13 miles southwest of the city.

The PSB project site is not in an Earthquake Fault Zone.

(1) Ground Shaking. Ground shaking is the most widespread cause of earthquake damage. Most loss of life and injuries during an earthquake are related to the collapse of buildings and structures. The intensity of the ground shaking at a particular site depends on characteristics of

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[1] Army Corps of Engineers Field Manual TM 5-818-7, 1985. Available online at: http://armypubs.army.mil/eng/DR_pubs/DR_a/pdf/tm5_818_7.pdf, accessed on February 3, 2012 by Placeworks for the Comprehensive Plan Update EIR.

the earthquake source (e.g., magnitude, location, and area of causative fault surface), distance from the fault, and amplification effects of local geologic deposits. Project improvements could be exposed to strong seismic ground shaking and related risk of loss or injury in the event of an earthquake on one of the active or potentially active faults in the region. In general, ground-shaking hazards are most pronounced in areas that are underlain by loosely consolidated soil/sediment. Potential risks to life and property from these seismic hazards are expected to be adequately mitigated by existing laws, regulations, and polices, including the CBC and the City's development review procedures.

When earthquake faults within the Bay Area's nine-county area were considered, the USGS estimated that the probability of a MW ("Magnitude") 6.7 or greater earthquake prior to year 2036 is 63 percent, or roughly a two-thirds probability over this timeframe.[1] Individually, the forecasted probability for a given fault to produce a MW 6.7 or greater seismic event by the year 2036 is as follows: 31 percent for the Hayward Fault, 21 percent for the San Andreas Fault, 7 percent for the Calaveras Fault, and 6 percent for the San Gregorio Fault.

Earthquakes of this magnitude can create ground accelerations severe enough to cause major damage to structures and foundations not designed to resist the forces generated by earthquakes. Underground utility lines are also susceptible to damage where they lack sufficient flexibility to accommodate the seismic ground motion. In the event of an earthquake of this magnitude, the seismic forecasts presented on the Association of Bay Area Governments' website (developed by a cooperative working group that included the USGS and the California Geological Survey [CGS]) suggest that most parts of Palo Alto southwest of US 101, including the PSB project site, are expected to experience "strong" shaking (i.e., Modified Mercali Intensity [MMI] VII), whereas most parts of Palo Alto east of US 101 are expected to experience "very strong" shaking (MMI VIII).[2]

(2) Landslides. Landslides are gravity-driven movements of earth materials that may include rock, soil, unconsolidated sediment, or combinations of these materials. The rate of landslide movement can vary considerably. Some move rapidly as in a soil or rock avalanche, while other landslides creep or move slowly for extended periods of time. Although the susceptibility of a given area to landslides depends on many variables, the factors that influence landslide hazards are well understood, and include slope material, slope steepness, geological structure, water content, vegetation coverage, proximity to manufactured cuts, and earthquake ground shaking.

Landslides have the potential to occur within Palo Alto, most notably on some of the hilly slopes west of Interstate 280. The PSB project site is relatively flat and is not subject to landslides.

(3) Liquefaction. Soil liquefaction is a process that occurs in water-saturated, unconsolidated sediment due to ground shaking. During liquefaction, soils lose strength and ground failure may

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[1] United States Geological Survey, 2015, 2008 Bay Area Earthquake Probabilities. Available online at: http://earthquake.usgs.gov/regional/nca/ucerf/, accessed on February 3, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[2] Association of Bay Area Governments, 2015, Geographic Information Systems, Earthquake Shaking Scenarios, 2012, United States Geological Survey, 2013. Available online at: http://resilience.abag.ca.gov/earthquakes/santaclara/, accessed on February 3, 2015 by Placeworks for the Comprehensive Plan Update EIR.

occur, affecting structures and improvements. Soils most susceptible to liquefaction are loose- to medium-dense, saturated granular soils with poor drainage, including Bay mud and artificial fill.

Liquefaction generally occurs in areas where moist, fine-grained, cohesionless sediment or fill materials are subjected to strong, seismically induced ground shaking. Under certain circumstances, the ground shaking can temporarily transform an otherwise solid, granular material to a fluid state. Liquefaction is a serious hazard because buildings in areas that experience liquefaction may subside and suffer major structural damage. Liquefaction is most often triggered by seismic shaking, but it can also be caused by improper grading, landslides, or other factors. In dry soils, seismic shaking may cause soil to consolidate rather than flow, a process known as densification. Assuming a MW 7.8 earthquake on the San Andreas Fault, the USGS estimated that the liquefaction potential in Palo Alto ranges from 0 to 5 percent in the western hill areas, and from 5 to 10 percent in the area immediately southwest of US 101.[1]

Detailed evaluations and maps prepared by the CGS show that a significant portion of the eastern part of the EIR Study Area lies within State-designated liquefaction hazard zones.[2,3] These zones dominate a broad area, extending northeast from the vicinity of Alma Street, past US 101, and as far northeast as the shore of San Francisco Bay. In addition, the area flanking San Francisquito Creek near the northwest edge of Palo Alto has been mapped by the State as a liquefaction hazard zone.

According to City Comprehensive Plan Update Liquefaction Susceptibility map, the PSB project site is in an area of “Moderate” liquefaction susceptibility.

8.2 REGULATORY SETTING

The State of California and the City of Palo Alto have established laws and regulations that pertain to geology (including seismicity) and soils. The following laws and regulations are relevant to the CEQA review process for the proposed PSB project. There are no federal regulations regarding geology and soils applicable to the proposed project.

8.2.1 State Regulations

Alquist-Priolo Earthquake Fault Zoning Act. The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface fault rupture to structures used for human

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[1] United States Geological Survey, 2008, Liquefaction Hazard Maps for Three Earthquake Scenarios for the Communities of San Jose, Campbell, Cupertino, Los Altos, Los Gatos, Milpitas, Mountain View, Palo Alto, Santa Clara, Saratoga, and Sunnyvale, Northern Santa Clara County, California, by Thomas L. Holzer, Thomas E. Noce, and Michael J. Bennett, Open File Report 2008-1270.

[2] California Geological Survey, 2006, Seismic Hazards Zones, Palo Alto Quadrangle, Official Map, released October 18, 2006. Scale 1:24,000.

[3] California Geological Survey, 2006, Seismic Hazards Zones, Palo Alto Quadrangle, Official Map, released October 18, 2006. Scale 1:24,000.

occupancy.[1] The main purpose of the Act is to prevent the construction of buildings used for human occupancy on top of the traces of active faults. Although the Act addresses hazards associated with surface fault rupture, it does not address other earthquake-related hazards, such as seismically induced ground shaking, liquefaction, or landslides.

The law requires the State Geologist to establish regulatory zones (known as Earthquake Fault Zones or Alquist-Priolo Zones) around the surface traces of active faults, and to publish appropriate maps that depict these zones.[2] The maps are then distributed to all affected cities, counties, and State agencies for their use in planning and controlling new or renewed construction. In general, constructing structures intended for human occupancy within 50 feet of an active fault zone is prohibited. The PSB project site is not in an Earthquake Fault Zone.

Seismic Hazards Mapping Act. The Seismic Hazards Mapping Act, which was passed by the California legislature in 1990, addresses earthquake hazards related to liquefaction and seismically induced landslides. Under this Act, seismic hazard zones are mapped by the State Geologist in order to assist local governments in land use planning. The Act states "it is necessary to identify and map seismic hazard zones in order for cities and counties to adequately prepare the safety element of their general plans and to encourage land use management policies and regulations to reduce and mitigate those hazards to protect public health and safety."[3] Section 2697(a) of the Act states that "cities and counties shall require, prior to the approval of a project located in a seismic hazard zone, a geotechnical report defining and delineating any seismic hazard."[4] Two exceptions to this are allowed under Section 2693 of the Act: 1) certain single-family residential dwellings that might otherwise qualify as a "project" may be exempted by the city or county with jurisdiction over the project, and 2) alterations or additions to *any* [emphasis added] structure within a seismic hazard zone that do not exceed 50 percent of the structure's value or 50 percent of the floor area of the existing structure.[5]

California Building Code. The California Building Code (CBC) is part of Title 24 of the California Code of Regulations, known as the California Building Standards Code. The CBC incorporates the International Building Code, a model building code adopted across the United States. Current State law requires every local agency enforcing building regulations, such as cities and counties, to adopt the provisions of the CBC within 180 days of its publication. The publication date of the CBC is established by the California Building Standards Commission. The most recent building code adopted by the legislature and used throughout the State is the 2016 CBC, which went into effect on January 1, 2017. The CBC, as adopted by local cities or counties, is often modified with more restrictive amendments that are based on local geographic, topographic, or climatic conditions. These codes provide minimum standards to protect property and public safety by regulating the design and construction of excavations,

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[1] Originally titled the Alquist-Priolo Special Studies Zones Act until renamed in 1993, Public Resources Code Division 2, Chapter 7.5, Section 2621.

[2] California Geological Survey, Alquist-Priolo Earthquake Fault Zones. Available online at: http://www.conservation.ca.gov/cgs/rghm/ap/Pages/index.aspx.

[3] California Public Resources Code, Division 2, Chapter 7.8, Section 2691(c).

[4] California Public Resources Code, Division 2, Chapter 7.8, Section 2697(a).

[5] California Public Resources Code, Division 2, Chapter 7.8, Section 2693.

foundations, building frames, retaining walls, and other building elements to mitigate the effects of seismic shaking and adverse soil conditions.[1] They also regulate grading activities, including drainage and erosion control.

8.2.2 Local Regulations

City of Palo Alto Municipal Code. The City of Palo Alto has adopted the current CBC as the basis for the City's Building Regulations, a part of the City's Municipal Code.[2] The provisions of the City's Building Regulations are set forth in Chapter 16.04 of the Palo Alto Municipal Code. Several additional building-related requirements were put in place as the CBC was adopted by the City, some of which are relevant to geology, soils, and seismicity. For example, Chapter 16.04.330 of the Municipal Code includes additional provisions for the seismic evaluation of earthquake-damaged structures and related design procedures for their repair.

The Palo Alto Municipal Code contains other requirements that pertain to geologic or seismic hazards. Chapter 16.42 lays out the building-related requirements of the City's Seismic Hazards Identification Program. The program seeks to enhance public safety through the identification of buildings that may possess structural deficiencies from a seismic safety perspective. Such buildings are investigated to determine the severity and extent of those deficiencies and the potential to result in loss of life or injury during an earthquake.

Depending on the project scope or location, certain proposed construction projects that are subject to the City's Municipal Code must perform a detailed soils investigation beforehand to identify potentially unsuitable soil conditions, such as expansive, corrosive, or compressible soils. In these instances, the soil investigation report must include recommendations for foundation type/design, and the recommendations are to be incorporated in the construction design. Examples of projects where a soils report is required under current Palo Alto Building Regulations include, but are not limited to 1) single family residential construction that includes a basement, retaining walls, or pier grade beam foundation, or single-family residential construction "west of I-280," or 2) new commercial building construction, including building additions or modifications, that include "substantial foundation design" of commercial buildings that "include a basement."[3]

Chapter 16.28 of the City's Municipal Code includes detailed requirements for construction-related grading and erosion and sediment control. The main goal of these requirements is to "provide for safe grading operations, to safeguard life, limb and property, and to preserve and enhance the natural environment, including, but not limited to, water quality, by regulating clearing and grading on private property."[4] Through their excavation and grading permit

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[1] California Building Standards Commission. Available online at: http://www.bsc.ca.gov/codes.aspx.

[2] City of Palo Alto Municipal Code, Title 16, Chapter 16.04. Available online at: http://www.amlegal.com/nxt/gateway.dll/California/paloalto_ca/title16buildingregulations*/chapter1604californiabuildingcode*?f=templates$fn=default.htm$3.0$vid=amlegal:paloalto_ca$anc=JD_16.04.330.

[3] City of Palo Alto, Development Services Department, Building Division. Available online at: http://www.cityofpaloalto.org/gov/depts/ds/building/.

[4] City of Palo Alto Municipal Code, Title 16, Chapter 16.28. Available online at: http://www.amlegal.com/nxt/gateway.dll/California/paloalto_ca/paloaltomunicipalcode?f=templates$fn=default.htm$3.0$vid=amlegal:paloalto_ca.

program, the City's Public Works Department, Engineering Services Division, requires the submittal of a detailed Erosion and Sediment Control Plan as an important part of the permit application.[1] Chapter 16.28.150 requires detailed engineering geology reports in areas of suspected geological hazards.[2]

City of Palo Alto Zoning Ordinance. The City's Zoning Ordinance, Title 18 of the Municipal Code, Chapter 18.40.120, Hazardous Conditions, contains provisions for more stringent permitting and soil/geotechnical evaluations in areas that have been identified as having moderate or high risk due to seismic or other geologic hazards.[3] In such areas, the City may require detailed, site-specific geologic, soils, and engineering evaluations as part of the building permitting process. Accordingly, these requirements would have to be satisfied before construction can commence. The aforementioned evaluations are intended to identify potential hazards, and to the maximum extent feasible, develop construction measures to mitigate those hazards.

City of Palo Alto Office of Emergency Services (OES). The City's OES seeks to prevent, prepare for, and mitigate recovery from all hazards by developing and maintaining a comprehensive risk-based emergency management program that engages the entire community in the City of Palo Alto. OES manages the ESV program to ensure that residents, businesses, and other groups can participate with the City in disaster preparation, response, and recovery by facilitating a means for neighbors to help neighbors and by providing supplemental resources to professional first responders.

8.3 IMPACTS AND MITIGATION MEASURES

8.3.1 Significance Criteria

Based on the CEQA Guidelines and on an associated City of Palo Alto impact criterion related to standard engineering techniques, the project would have a significant geology and soils impact if it would:[4]

(a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

(1) 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

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[1] City of Palo Alto Public Works Department, Engineering Division, 2015, Excavation and Grading Permit Instructions, Section E, page 3, revised July 2, 2009.

[2] City of Palo Alto Municipal Code, Title 16, Chapter 16.28. Available online at: http://www.amlegal.com/nxt/gateway.dll/California/paloalto_ca/paloaltomunicipalcode?f=templates$fn=default.htm$3.0$vid=amlegal:paloalto_ca.
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[3] City of Palo Alto Municipal Code, Title 18, Section 18.40.120. Available online at: http://www.amlegal.com/nxt/gateway.dll/California/paloalto_ca/paloaltomunicipalcode?f=templates$fn=default.htm$3.0$vid=amlegal:paloalto_ca.

[4] CEQA Guidelines, Appendix G, items VI(a-e) and IX(b).

other substantial evidence of a known fault (Division of Mines and Geology Special Publication 42);

(2) strong seismic ground shaking;

(3) seismic-related ground failure, including liquefaction;

(4) landslides; or

(5) expansive soils;

(b) Result in substantial soil erosion or the loss of topsoil;

(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;

(d) Be located on expansive soil, as defined by Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property;

(e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater; or

(f) Expose people or property to major geologic hazards that cannot be mitigated through the use of standard engineering design and seismic safety techniques.

Regarding criterion (a)(1), there are no mapped through-going faults within or adjacent to the project site, nor is the project site within an Alquist-Priolo Fault zone. The closest fault is the San Andreas Fault, located about 5.5 miles southwest of the project site. There will be no impact, and this issue is not discussed further.

Regarding criterion (a)(4), the project site is relatively flat and is not subject to landslides. There will be no impact, and this issue is not discussed further.

Regarding criterion (b), see chapter 11 (Hydrology and Water Quality) of this EIR. Section 11.3.3 (Hydrology and Water Quality – Impacts and Mitigations) describes uniformly applied construction period and post-construction water quality protection requirements administered by the Regional Water Quality Control Board (RWQCB) and the City of Palo Alto. These requirements - such as implementation of National Pollution Discharge Elimination System (NPDES) permit requirements, a Storm Water Pollution Prevention Plan (SWPPP), and a site-specific erosion control plan – would minimize construction period soil erosion. The impact would be less-than-significant, and no mitigation is required.

Regarding criterion (e), no use of septic tanks or alternative wastewater disposal systems are proposed for the project site. Therefore, the proposed project would have no impact related to the capacity of local soils to effectively accommodate septic systems. This issue is not discussed further.

8.3.2 Romig Engineers Site-Specific Geotechnical Report

The information below is taken from the following site-specific geotechnical report prepared for the proposed PSB project:

- Geotechnical Investigation for Palo Alto Public Safety Building and Parking Garage, Sherman Avenue, Palo Alto, California 94306. Romig Engineers, Inc., Geotechnical & Environmental Services. Project No. 3723-1. May 2016.

The Romig Engineers geotechnical investigation comprised the following tasks:

- Review of geologic, geotechnical, seismic, and groundwater conditions on the project site and in the vicinity;

- Subsurface exploration consisting of drilling, sampling, and logging of three exploratory borings, and advancing seven cone penetration test (CPT) probes at the project site;

- Laboratory testing of selected soil samples to aid in soil classification and to help evaluate their engineering properties;

- Engineering analysis and evaluation of the available surface and subsurface data to develop geotechnical design criteria for the project; and

- Preparation of the geotechnical report presenting Romig Engineers' findings, conclusions, and geotechnical recommendations for the proposed project.

(1) Site Survey and Subsurface Exploration. Three exploratory borings were drilled to a depth of 44.5 feet, and seven CPTs were advanced to depths ranging from 43.8 to 44.1 feet. During drilling and sampling, groundwater was encountered at depths of approximately 21.6, 23.5, and 26.6 feet below the ground surface (bgs). During the CPTs, groundwater was present between depths of about 19.6 to 23.9 feet bgs. Groundwater levels in the site vicinity have been artificially lowered for many years by pumping of groundwater from the Oregon-Page Mill Expressway Underpass pump station and from several extraction wells. The highest groundwater level that has been encountered in the site vicinity is about 12 to 13 feet bgs.

Based on the groundwater information described above, Romig Engineers recommends assuming a design groundwater level of 12 feet bgs for design of the basements of both the PSB and parking garage basements. It may be assumed that groundwater would be encountered during basement excavation at depths of about 21 to 24 feet after below-average to average winter rainfall, and at depths of about 17 to 20 feet after above-average winter rainfall.

(2) City of Palo Alto Basement Drainage Requirements. In this area of the city, the City of Palo Alto Public Works Department requires basement floors and basement walls to be designed and constructed without underdrains or wall backdrains. Therefore, (1) the project's lower floor level must be designed to resist uplift pressure from the high groundwater level, (2) the basement walls must be designed to resist lateral pressure from undrained wall backfill, and (3) the basement floor and walls must be waterproofed.

<u>(3) Faulting and Seismicity</u>. There are no mapped faults within or adjacent to the project site, and the site is not located within an Earthquake Fault Zone. However, the on-site loose-to-medium dense granular soils are subject to liquefaction during severe ground shaking caused by an earthquake. Romig Engineers performed a liquefaction analysis based on the on-site soil borings and CPTs, using the recommended design groundwater level of 12 feet bgs. Romig concluded that some on-site soils could liquefy during a major earthquake, resulting in total settlement at the ground surface in the range of approximately 1/4- to 3/4-inch, with differential settlement of the basement structures of about 1/4- to 1/2-inch. Liquefaction-induced differential settlement of about 1/4- to 3/4-inch could occur across on-site buildings supported at-grade and between the basement structures and the adjacent at-grade buildings.

Since there are no open geologic faces or steep creek beds on the project site or in the immediate vicinity, the potential for lateral spreading (i.e., horizontal displacement of land toward an open cut or excavation) during an earthquake is low.

<u>(4) Differential Compaction</u>. Differential compaction can occur during moderate and large earthquakes when soft or loose, natural or fill soils above the water table are densified and settle, often unevenly across a site. According to the Romig Engineers soils analysis, the likelihood of significant differential soil compaction is low, provided the recommendations presented below (8.3.3, Impacts and Mitigations) are followed during design and construction.

8.3.3 Impacts and Mitigations

Would the project:

Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

(1) 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 (Division of Mines and Geology Special Publication 42);

(2) strong seismic ground shaking;

(3) seismic-related ground failure, including liquefaction;

(4) landslides; or

(5) expansive soils (Significance Criterion [a]);

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 (Significance Criterion [c]);

Be located on expansive soil, as defined by Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property (Significance Criterion [d]); or

Expose people or property to major geologic hazards that cannot be mitigated through the use of standard engineering design and seismic safety techniques (Significance Criterion [f])?

According to the Romig Engineers geotechnical report, some portions (sand and sandy silt strata) of the soil could experience liquefaction during an earthquake. However, risks to life and property from these seismic hazards would be adequately mitigated by existing laws, regulations, and polices, including the California Building Code and the City's development review procedures, which require a site-specific geotechnical investigation be prepared by a licensed professional for proposed developments for seismic design categories C, D, E, and F (see section 8.2, Regulatory Setting, above). The final geotechnical investigation based on construction-level plans would be reviewed by City staff prior to issuance of building permits to ensure compliance.

Expansive soils are likely to be encountered on the project site, given the underlying Holocene Formation and the presence of clayey soils noted in the geotechnical report. However, review and permitting of specific development projects would involve characterization and consideration of site-specific geologic and soils conditions, and implementation of individual project mitigations, where needed. State and local planning, building, and engineering regulations also address structures, excavation, foundations, retaining walls, and grading activities (see section 8.2, Regulatory Setting, above).

According to the Romig Engineers geotechnical report, the primary geotechnical concerns for the proposed project are: (1) the need for temporary shoring of the basement excavations; (2) the likelihood that ground water will be present above the depth of the basement excavations, requiring dewatering; (3) the need to design and waterproof the floors and walls of the basement and access tunnel; and (4) the likelihood of severe ground shaking during a major earthquake. The geotechnical report's site-specific recommendations are described below under Mitigation 8-1.

Impact 8-1: Geotechnical Hazards Associated with Project Excavation and Grading. The project's proposed excavation and grading activities have the potential to create conditions that would potentially compromise the safety or stability of proposed project improvements. The preliminary site-specific geotechnical investigation (Romig Engineers, May 2016) made initial assessments of these conditions, but a construction-level geotechnical investigation will be needed to adequately address all grading and excavation activities on the proposed Public Safety Building and California Avenue Parking Garage (PSB project) site. Without such a detailed study--and without the associated supervision of an engineering geologist or geotechnical engineer during project grading and construction--the safety and long-term stability of existing and proposed project improvements cannot be assured. These possible excavation and grading hazards represent a ***potentially significant impact*** (see criteria [a], [c], [d], and [f] in subsection 8.3.1, "Significance Criteria," above).

Mitigation 8-1. As recommended by the project's preliminary geotechnical investigation, prior to City issuance of grading permits for individual project construction components, the City shall be required to retain a registered engineering geologist or geotechnical engineer to prepare detailed, construction-level geotechnical investigations to guide the construction of all project grading and excavation activities. The detailed, construction-level geotechnical investigations shall be performed for each of the structures proposed for the development site. Subsurface conditions shall be explored and laboratory tests conducted on selected soil samples to establish parameters for the design of excavations, foundations, shoring, and waterproofing. Recommendations from the investigations shall be incorporated into all plans for project grading, excavation, soil support (both temporary and long-term), and utility construction, to the satisfaction of the City Engineer.

The detailed, construction-level investigations, relevant recommendations, and all associated project grading, excavation and foundation plans, shall be subject to review and approval by an independent engineering geologist or geotechnical engineer retained by the City Engineer. In addition, the project civil engineer shall certify to the City Engineer (e.g., through plan submittal for City review) that all relevant provisions of the investigations have been incorporated into the grading, excavation and construction plans, and all earthwork and site preparation shall be performed under the direct supervision of a registered engineering geologist or geotechnical engineer. Implementation of these measures would reduce the potential excavation and grading impacts to a ***less-than-significant level***.

Any potential for earthquake-induced on-site differential settlement, liquefaction, lateral spreading, and subsidence, and associated damage to proposed buildings or other improvements can be mitigated to a less-than-significant level through implementation of City-required geotechnical investigations and associated engineering design standards, specifications, and measures. Geotechnical mitigation requirements identified here include completion of detailed studies to address specific concerns as future site-specific project designs are refined. The CEQA Guidelines and recent court decisions indicate that mitigation measures must be mandated that will alter the potentially significant geologic and soil impacts of the project. In particular, mitigation measures must ensure that a project would be implemented in a manner that renders insignificant or minimizes potentially significant geologic and soil impacts of the project. There is substantial, reasonable, historical information to support the conclusion that the specific subsequent geotechnical/geologic investigations, inspections, and specific formulations required to meet City-adopted standards would adequately mitigate related impacts to less-than-significant levels. The City of Palo Alto routinely requires such geotechnical/geologic investigations and specifications at phases of discretionary development review that follow CEQA compliance. Individual measures are typically, and most efficiently, specified at a later, more detailed level of design.

A significant record exists demonstrating the effectiveness of such post-CEQA-certification design and engineering requirements in mitigating the potential geologic and soil impacts of concern. Under the City's grading permit and building permit provisions, requirements, and regulations, an individual development project cannot be given final approval without project compliance with geotechnical/geologic requirements. These requirements and related City inspection and verification procedures prior to project operation provide reasonable, professional assurances that the project would incorporate the design and engineering refinements necessary to reduce the degree of impacts to less-than-significant levels by either avoiding identified geologic and soil impact areas altogether (i.e., basic project design changes), or by rectifying the impact through conventional engineering and construction procedures (e.g., suitable foundation design and construction) identified throughout the post-EIR investigation and monitoring process.

Geotechnical Report Recommendations:

The recommendations from the Romig Engineers geotechnical report use the verb “should,” on the premise that the final geotechnical report based on the construction-level project plans will confirm or revise the recommendations.

The conclusions and recommendations below shall be verified or refined based on the construction-level geotechnical investigations. The recommendations below would be coordinated with the excavation and construction recommendations in chapter 10 (Hazards and Hazardous Materials) of this EIR.

<u>(1) Foundations</u>. Based on an anticipated finished floor elevation of 26 feet bgs (Plan Sheet ARB 05.02), the basement floor is expected to bear on firm to stiff clay. For adequate support of the superstructures and basement walls, and to resist hydrostatic (i.e., groundwater) uplift pressure on the lower basement floor, the PSB and the parking garage should be supported on a reinforced concrete mat foundation.

The surface of the excavation for the basement mat should be cleaned of all loose or soft soil and debris, with monitoring by the project’s geotechnical engineer. A thin working slab or 6-inch-thick section of crushed rock or aggregate base could be placed at the bottom of the prepared and approved mat subgrade, if required by the waterproofing consultant or contractor.

Lateral loads may be resisted by friction between the waterproofing system below the basement mat and the supporting subgrade, and by passive soil pressure acting against the sides of foundation elements and basement walls. The structural engineer should consult with the waterproofing consultant for the coefficient of friction that should be assumed for design.

The project’s geotechnical engineer should observe all foundation excavations prior to placement of reinforcing steel.

On a preliminary basis (i.e., until the building loads are available), 30-year total settlement of basement mat foundations is expected to be no greater than about ¾-inch, and differential settlement across the mats is expected to be about ½-inch under static loading conditions. Thirty-year differential settlement due to static loads is not expected to exceed ¾-inch across the at-grade retail building.

<u>(2) Slabs-on-Grade</u>. To reduce vapor transmission up through at-grade concrete floor slabs in any sections underlain by crushed rock (which prevents damp floors), the crushed rock should be should be covered with a high-quality, UV-resistant membrane meeting professional

standards, with all seams and penetrations sealed in accordance with the manufacturer's recommendations.

(3) Excavation Shoring. Construction shoring and bracing shall be designed and installed in accordance with all applicable local, State, and federal safety regulations, including Occupational Safety and Health Administration (OSHA) excavation and trench safety standards. Due to the anticipated variation of the on-site soils, a pre-construction survey and daily monitoring of the excavation shoring system and the streets and structures around the basement excavations should be performed.

Romig Engineers anticipates that the temporary basement excavation shoring system would consist of tied-back soldier beams and lagging or soil nails with shot-crete facing.

(4) Earthwork. After the project site is cleared, a professional geotechnical engineer should observe and evaluate the basement excavation to determine whether the excavation bottom needs to be scarified (loosened) or compacted. The engineer should evaluate proposed import materials prior to their delivery to the site.

During construction, dewatering should draw-down and maintain the groundwater level at least two feet below the bottom of the of the basement excavations.

(5) Future Work. Romig Engineers expects the City of Palo Alto to require a geotechnical plan review letter as part of the City's review of project construction plans.

9. GREENHOUSE GAS EMISSIONS AND ENERGY

This chapter provides information on the environmental and regulatory greenhouse gas (GHG) setting of the proposed project and evaluates the potential amount of GHG emissions that could be generated by construction and operation of the project. The methodologies and assumptions used in the preparation of this section follow the CEQA Guidelines developed by the BAAQMD, as revised in May 2017. Information on existing GHG emissions levels and potentially applicable federal and state regulations was obtained from the U.S. Environmental Protection Agency (U.S. EPA), California Air Resources Board (CARB), and BAAQMD. As described in this Chapter, the proposed project's GHG emissions would not exceed the CEQA significance threshold established by the BAAQMD, nor conflict with an applicable GHG-reduction plan, policy, or regulation. Therefore, the proposed project would not result in a significant GHG-related impact. As described in this chapter, the proposed project also would not result in the wasteful or inefficient use of energy resources.

9.1 BACKGROUND INFORMATION AND SETTING

Gases that trap heat in the atmosphere and affect regulation of the earth's temperature are known as "greenhouse" gases (GHG). Many chemical compounds found in the earth's atmosphere exhibit the GHG property. GHG allow sunlight to enter the atmosphere freely. When sunlight strikes the earth's surface, it is either absorbed or reflected back toward space. Earth that has absorbed sunlight warms up and emits infrared radiation toward space. GHG absorb this infrared radiation and "trap" the energy in the earth's atmosphere. Entrapment of too much infrared radiation produces an effect commonly referred to as "Global Warming."

GHG that contribute to climate regulation are a different type of pollutant than criteria or hazardous air pollutants because climate regulation is global in scale, both in terms of causes and effects. Some GHG are emitted to the atmosphere naturally by biological and geological processes such as evaporation (water vapor), aerobic respiration (carbon dioxide), and off-gassing from low oxygen environments such as swamps or exposed permafrost (methane); however, GHG emissions from human activities such as fuel combustion (e.g., carbon dioxide) and refrigerants use (e.g., hydrofluorocarbons) significantly contribute to overall GHG concentrations in the atmosphere, climate regulation, and global climate change. Human production of GHG has increased steadily since pre-industrial times (approximately pre-1880) and atmospheric carbon dioxide concentrations have increased from a pre-industrial value of 280 parts per million (ppm) in the early 1800's to 407 ppm in May 2016 (NOAA 2016). The effects of increased GHG concentrations in the atmosphere include climate change (increasing temperature and shifts in precipitation patterns and amounts), reduced ice and snow cover, sea level rise, and acidification of oceans. These effects in turn will impact food and water supplies, infrastructure, ecosystems, and overall public health and welfare.

The 1997 United Nations' Kyoto Protocol international treaty set targets for reductions in emissions of four specific greenhouse gases – carbon dioxide, methane, nitrous oxide, and sulfur hexafluoride – and two groups of gases – hydrofluorocarbons and perfluorocarbons.

These GHG are the primary GHG emitted into the atmosphere by human activities. Water vapor is also a common GHG that regulates the earth's temperature; however, the amount of water vapor in the atmosphere can change substantially from day to day, whereas other GHG emissions remain in the atmosphere for longer periods of time. Black carbon consists of particles emitted during combustion; although a particle and not a gas, black carbon also acts to trap heat in the Earth's atmosphere. The six common GHG are described below.

- **Carbon Dioxide (CO_2)**. CO_2 is released to the atmosphere when fossil fuels (oil, gasoline, diesel, natural gas, and coal), solid waste, and wood or wood products are burned.

- **Methane (CH_4)**. CH_4 is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from the decomposition of organic waste in municipal solid waste landfills and the raising of livestock.

- **Nitrous Oxide (N_2O)**. N_2O is emitted during agricultural and industrial activities, as well as during combustion of solid waste and fossil fuels.

- **Sulfur Hexafluoride (SF_6)**. SF_6 is commonly used as an electrical insulator in high voltage electrical transmission and distribution equipment such as circuit breakers, substations, and transmission switchgear. Releases of SF_6 occur during maintenance and servicing as well as from leaks of electrical equipment.

- **Hydrofluorocarbons (HFCs) and Perfluorocarbons (PFCs)**. HFCs and PFCs are generated in a variety of industrial processes. Although the amount of these gases emitted into the atmosphere is small in terms of their absolute mass, they are potent agents of climate change due to their high global warming potential.

GHG can remain in the atmosphere long after they are emitted. The potential for a particular greenhouse gas to absorb and trap heat in the atmosphere is considered its global warming potential (GWP). The reference gas for measuring GWP is CO_2, which has a GWP of one. By comparison, CH_4 has a GWP of 25, which means that one molecule of CH_4 has 25 times the effect on global warming as one molecule of CO_2. Multiplying the estimated emissions for non-CO_2 GHG by their GWP determines their carbon dioxide equivalent (CO_2e), which enables a project's combined global warming potential to be expressed in terms of mass CO_2 emissions. The GWPs and estimated atmospheric lifetimes of the common GHG are shown in Table 9-1.

9.1.1 State and Regional GHG Emissions Levels

CARB prepares an annual statewide GHG emissions inventory using regional, state, and federal data sources, including facility-specific emissions reports prepared pursuant to the state's Mandatory GHG Reporting Program (see Section 9.2.2). The statewide GHG emissions inventory helps CARB track progress towards meeting the state's AB32 GHG emissions target of 431 million metric tons of CO_2 equivalents (MTCO2e), as well as establish and understand trends in GHG emissions.[1] Statewide GHG emissions for the 2005 to 2015 time period are shown in Table 9-2.

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[1] CARB approved use of 431 MMCO2e as the state's 2020 GHG emission target in May 2014. Previously, the target had been set at 427 MMCO2e.

Table 9-1

GLOBAL WARMING POTENTIAL (GWP) OF COMMON GHG (100 YEAR HORIZON)

GHG	**GWP[(A)]**	**GHG**	**GWP[(A)]**
Carbon Dioxide (CO_2)	1	Perfluorocarbons (PFCs)	
Methane (CH_4)	25	CF_4	6,500
Nitrous Oxide (N_2O)	298	C_2F_6	9,200
Hydrofluorocarbons (HFCs)		C_4F_{10}	7,000
HFC-23	14,800	C_6F_{14}	7,400
HFC-134a	1,430	Sulfur Hexafluoride (SF_6)	22,800
HFC-152a	140		
HCFC-22	1,700		

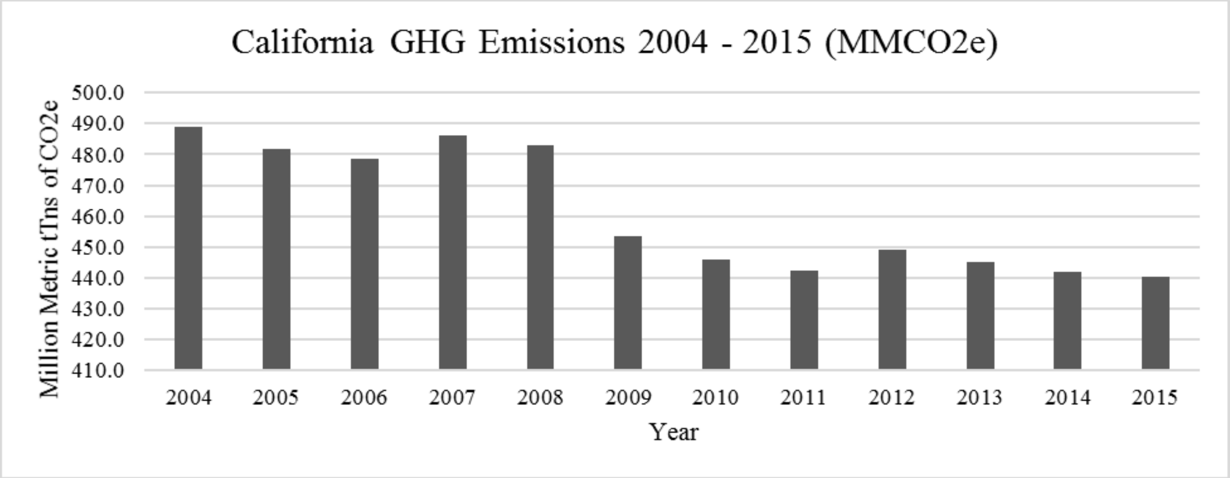
SOURCE: CARB 2014

(A)GWPs are based on the United Nations Intergovernmental Panel on Climate Change 4th Assessment Report.

Table 9-2

2004 – 2015 STATEWIDE GHG EMISSIONS ($MMTCO_2E$)

Scoping Plan Sector	**'04**	**'05**	**'06**	**'07**	**'08**	**'09**	**'10**	**'11**	**'12**	**'13**	**'14**	**'15**
Agriculture	34	34	36	36	36	34	35	36	37	35	36	35
Commercial/Residential	44	42	43	43	44	44	45	46	43	43	38	38
Electric Power	115	108	105	114	120	101	90	88	95	90	88	84
High GWP	7	8	8	9	10	11	12	14	15	16	17	19
Industrial	98	95	93	90	90	88	91	90	91	93	93	92
Recycling and Waste	8	8	8	8	8	8	9	9	9	9	9	9
Transportation	182	184	184	184	173	166	163	159	159	158	160	165
TOTAL $MMCO_2e$[(A)]	**488**	**480**	**476**	**484**	**481**	**452**	**445**	**442**	**448**	**444**	**442**	**440**



SOURCE: CARB, 2017.

(A) Totals may not equal due to rounding. CARB GHG inventory uses GWPs based on the United Nations' IPCC's 4th Assessment Report.

As shown in Table 9-2, statewide GHG emissions have generally decreased over the last decade, with 2015 levels (440 million MTCO2e) approximately 10 percent less than 2004 levels (488 million MTCO2e). The transportation sector (165 million MTCO2e) accounted for more than one-third (approximately 37.5%) of the state's total GHG emissions inventory (440 million MTCO2e) in 2015.

Regionally, the BAAQMD estimates emissions from the nine counties that comprise the San Francisco Bay Air Basin (see Section 5.1). Data for the most recent inventory (Year 2011) indicates the Bay Area emitted a total of 86.6 MMTCO$_2$e, or approximately 20 percent of the total statewide GHG emissions in Year 2011(BAAQMD 2015).[1] Similar to the state inventory, the combustion of fossil fuels in mobile sources such as cars, trucks, locomotives, ships, and boats accounted contribute the most (34.3 MMTCO$_2$e) toward regional GHG levels (approximately 40 percent of regional GHG emissions). The BAAQMD's regional GHG inventory identifies that Santa Clara County emitted 16.0 MMTCO$_2$e in 2011.

9.1.2 City of Palo Alto Emissions

The City of Alto Palo has long been a pioneer in efforts to reduce the effects of climate change through aggressive GHG reduction strategies and sustainability commitments. As early as 2007, the City adopted one of the first municipal climate action plans in the United States. Annually, City Staff prepare an Earth Day Report highlighting the City's progress in meeting its climate goals and sustainability commitments. The latest Earth Day Report from 2017 indicates that the City of Palo Alto as a whole has reduced emissions by 35 percent from 2005 to 2016, and by 37 percent from 1990 to 2016 (Palo Alto 2017). Mobile source emissions resulting from transportation into, around, and through the City remain the largest source of GHG emissions at 66 percent, followed by natural gas use at approximately 29 percent. On December 5, 2016, the City Council unanimously approved Palo Alto's "Carbon Neutral Natural Gas Plan," which directed staff to achieve carbon neutrality for natural gas usage by using a combination of physical biogas and high-quality environmental offsets to achieve a carbon-neutral portfolio. As of July 1, 2017, the City achieved this ambitious goal, making the City of Palo Alto Utility (CPAU) 100% carbon neutral for both electricity and natural gas.

The City continues to make strides in surpassing regional and state GHG reduction goals through updated plans and policies. For more information on the City's regulatory framework, see Section 9.2.4.

9.1.3 Existing Project Site GHG Emissions

The proposed project is generally located at the intersection of Sherman Avenue and Birch Street, in the City's California Avenue commercial district. The project site consists of two unenclosed parking lots (Lot C-6 and Lot C-7) that contain a total of 310 parking spaces (158 at Lot C-6 and 152 at Lot C-7). Parking lots themselves do not generate trips; the land uses

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[1] The BAAQMD GHG inventory is based on the U.N. IPCC's 2nd Assessment Report, which uses different GWP values to compute carbon dioxide equivalents. The GWP values in the 2nd Assessment Report are generally lower than the values in the UN IPCC 4th Assessment Report, which the CARB statewide inventory uses. For example, the GWP of methane was reported as 21 in the 2nd Assessment Report and is reported as 25 in the 4th Assessment Report.

around them are the attraction and reason for vehicular travel to the area. As such, there are no noteworthy sources of GHG emissions generated by the existing land use.

9.1.4 Energy Setting

9.1.4.1 State and Regional Energy

According to the California Energy Commission's (CEC) 2015 Integrated Energy Policy Report, Californians consumed about 280,500 gigawatt hours (GWh) of electricity in 2014, and 13,240 million British thermal units (BTU) of natural gas in 2013. The California Energy Commission estimates that by 2025, California's electricity consumption will reach between 297,618 GWh and 322,266 GWh, an annual average growth rate of 0.54 to 1.27 percent (CEC 2015), and natural gas consumption is expected to reach between 12,673 million and 13,731 million BTU by 2024, an average annual growth rate of -0.4 to 0.33 percent (CEC 2015).

Approximately 70 percent of California's electricity is generated from power plants located within the state and from plants that are outside of the state but owned by California utilities. About 10 percent is imported from the Pacific Northwest and 20 percent from the American Southwest (CEC 2011). In-state power is attained from 61.1 percent natural gas, 17.1 renewable energy and 11.7 percent large hydropower. A small portion of the state's local energy, 0.8 percent, is generated from coal (CPUC 2013).

Due in part to the state's emphasis on renewable energy, California is second in leading the nation when it comes to net electricity generation from renewable resources. A top producer of electricity from conventional hydroelectric power, California is also a leader in net electricity generation from several other renewable energy sources. In 2016, California generated approximately 73,900 GWh of renewable electricity, accounting for 28.9 percent of the state's overall electricity sales (CEC 2017).

In 2016, total electricity use in Santa Clara County was 16,812 million kilowatt hours (kWh), including 12,879 million kWh of consumption for non-residential land uses (CEC 2017a). Natural gas consumption was 411 million therms[1] in 2015, including 195 million therms from residential uses (CEC 2017b).

9.1.4.2 City of Palo Alto Energy

The City consumed approximately 978,500 MWh and 26 million therms of electricity and natural gas, respectively, in 2014. (Palo Alto 2017). The City runs its own community-owned utilities, including electricity and natural gas. In 2013, the majority of the electric power delivered by the City comes from renewable energy sources and is 100 percent carbon neutral by offsetting the non-renewable portion of its portfolio with renewable energy certificates (RECs). With 50 percent of the electric needs met by carbon-free large hydroelectric resources and a Renewable Portfolio Standard (RPS) of over 50 percent by 2017, the City will be carbon neutral without RECs (except as may be required in dry hydro years) (City of Palo Alto 2016). The City's projection of a 50% RPS in 2017 far exceeds existing statewide goals (which set a 33% RPS by 2020 and a 50% RPS by 2030). Additionally, as of July 1, 2017, the CPAU has also achieved carbon neutral natural gas usage.

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[1] Therms a unit of heat equivalent to approximately 100,000 BTUs.

9.2 REGULATORY SETTING

Agencies at the international, national, statewide, and local levels are considering or have adopted strategies to control emissions of gases that contribute to global climate change. The agencies described below work jointly, as well as individually, to address climate change through legislation, regulations, planning, policy-making, education, and implementation programs.

9.2.1 Federal: U.S. EPA GHG Tailing Rule and GHG Reporting System

On December 7, 2009, the U.S. EPA issued an endangerment finding that current and projected concentrations of the six Kyoto GHGs (CO_2, CH_4, N_2O, $SF_{6,}$ HFCs, and PFCs) in the atmosphere threaten the public health and welfare of current and future generations. This finding came in response to the Supreme Court ruling in *Massachusetts v. EPA*, which found that GHG are pollutants under the federal Clean Air Act. As a result, the U.S. EPA issued its GHG Tailoring Rule in 2010, which applies to facilities that have the potential to emit more than 100,000 MTCO2e. In 2014, the U.S. Supreme Court issued its decision in *Utility Air Regulatory Group v. EPA* (No. 12-1146), finding that the U.S. EPA may not treat greenhouse gases as an air pollutant for purposes of determining whether a source is a major source required to obtain a permit pursuant to the Clean Air Act's Prevention of Significant Deterioration or Title V operating permit programs. The U.S. EPA's Greenhouse Gas Reporting Program requires facilities that emit 25,000 MTCO2e or more of GHG to report their GHG emissions to the U.S. EPA to inform future policy decisions.

9.2.2 State

9.2.2.1 AB 32 (California Global Warming Solutions Act) and Related GHG Rules

CARB is the lead agency for implementing Assembly Bill (AB) 32, the California Global Warming Solutions Act adopted by the Legislature in 2006. AB 32 requires the CARB to prepare a Scoping Plan containing the main strategies that will be used to achieve reductions in GHG emissions in California.

In 2007, CARB approved a statewide 1990 emissions level and corresponding 2020 GHG emissions limit of 427 million metric tons of carbon dioxide equivalents ($MTCO_2e$) (CARB 2007). In 2008, CARB adopted its *Climate Change Scoping Plan*, which projects, absent regulation or under a "business as usual" (BAU) scenario, 2020 statewide GHG emissions levels of 596 million $MTCO_2e$ and identifies the numerous measures (i.e., mandatory rules and regulations and voluntary measures) that will achieve at least 174 million $MTCO_2e$ of reductions and reduce statewide GHG emissions to 1990 levels by 2020 (CARB 2009). In 2011, CARB released a supplement to the 2008 *Scoping Plan Functional Equivalent Document* (FED) that included an updated 2020 BAU statewide GHG emissions level projection of 507 million $MTCO_2e$ (CARB 2011), and in 2014 CARB adopted its First Update to the Climate Change Scoping Plan (CARB 2014).

Executive Order B-30-15, 2030 Carbon Target and Adaptation, issued by Governor Brown in April 2015, sets a target of reducing GHG emissions by 40 percent below 1990 levels in 2030. By directing state agencies to take measures consistent with their existing authority to reduce GHG emissions, this order establishes coherence between the 2020 and 2050 GHG reduction goals set by AB 32 and seeks to align California with the scientifically established GHG emissions levels needed to limit global warming below two degrees Celsius.

To reinforce the goals established through Executive Order B-30-15, Governor Brown went on to sign SB-32 and AB-197 on September 8, 2016. SB-32 made the GHG reduction target to reduce GHG emissions by 40 percent below 1990 levels by 2030 a requirement as opposed to a goal. AB-197 gives the Legislature additional authority over CARB to ensure the most successful strategies for lowering emissions are implemented, and requires CARB to, "protect the state's most impacted and disadvantaged communities …[and] consider the social costs of the emissions of greenhouse gases."

There are five key goals for reducing GHG emissions in California through 2030: (1) increase renewable electricity to 50 percent; (2) double energy efficiency savings achieved in existing buildings and make heating fuels cleaner; (3) reduce petroleum use in cars and trucks by up to 50 percent; (4) reduce emissions of short-lived climate pollutants, and (5) manage farms, rangelands, forests and wetlands to increasingly store carbon. In addition, the order requires CARB to work closely with other state agencies and the public to update the State's climate change Scoping Plan. Under the Scoping Plan, approximately 85 percent of the state's emissions are subject to a cap-and-trade program where covered sectors are placed under a declining emissions cap. Emissions reductions are achieved through regulatory requirements and the option to reduce emissions further or purchase allowances to cover compliance obligations. It is expected that emission reductions from this cap-and trade program will account for a large portion of the reductions required by AB-32. Although there was initial concern AB-197 may have come at the expense of the Cap-and-Trade Program, AB-398 (approved in July 2017) extended the state's Cap-and-Trade program through 2030 thereby ensuring the program will continue to assist the state in meeting future GHG reduction goals.

On January 20, 2017, CARB released the Draft 2017 Climate Change Scoping Plan Update, which is the newly proposed strategy for achieving California's 2030 GHG target.

9.2.2.2 CARB Mandatory Reporting of GHG Emissions

CARB has adopted the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (Title 17, CCR, Section 95100 – 95133 (17 CCR §95100 – 95133)), which requires facilities that emit greater than or equal to 10,000 metric tons of CO_2e from combustion annually to report their GHG emissions to CARB.

9.2.2.3 Assembly Bill 1493

With the passage of Assembly Bill (AB) 1493 (Pavley I) in 2002, California launched an innovative and pro-active approach for dealing with GHG emissions and climate change at the state level. AB 1493 requires CARB to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards apply to automobiles and light trucks from 2009 through 2016. Although litigation was filed challenging these regulations and the US EPA initially denied California's related request for a waiver, a waiver has since been granted (CARB 2013b). In 2012, the EPA issued a Final Rulemaking that sets even more stringent fuel economy and GHG emissions standards for model years 2017 through 2025 among light-duty vehicles. In January 2012, CARB approved the Advanced Clean Cars program (formerly known as Pavley II) for model years 2017 through 2025. The components of the ACC program are the Low-Emission Vehicle (LEV) regulations and the Zero-

Emission Vehicle (ZEV) regulation. The program combines the control of smog, soot, and global warning gases and requirements for greater numbers of zero-emission vehicles into a single package of standards.

9.2.2.4 Senate Bill 375 & Plan Bay Area

The Sustainable Communities and Climate Protection Act of 2008 (SB 375) was adopted to connect the GHG emissions reductions targets established in the Scoping Plan for the transportation sector to local land use decisions that affect travel behavior. Its intent is to reduce GHG emissions from light-duty trucks and automobiles (excludes emissions associated with goods movement) by aligning regional long-range transportation plans, investments, and housing allocations to local land use planning to reduce vehicle miles travelled (VMT) and vehicle trips. Specifically, SB 375 required CARB to establish GHG emissions reduction targets for each of the 18 regions in California managed by a metropolitan planning organization (MPO). On July 18, 2013, the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) adopted Plan Bay Area 2013. The Plan includes two main elements; the Sustainable Communities Strategy (SCS) and the Regional Transportation Plan (RTP).

An update to the plan, Plan Bay Area 2040, was jointly approved by the ABAG Executive Board and by MTC on July 26, 2017. As an update to the region's long-range RTP and SCS, Plan Bay Area 2040 projects household and employment growth in the Bay Area over the next 24 years, provides a roadmap for accommodating expected growth, and connects it all to a transportation investment strategy focused on moving the Bay Area toward key regional goals for the environment (e.g., state GHG reduction goals), economy, and social equity (ABAG/MTC 2017).

The Plan identifies Priority Development Areas (PDAs) in nearly 200 locations throughout the Bay Area. PDAs are transit-oriented locations envisioned for infill development. The Plan identifies the Palo Alto California Avenue Transit Neighborhood as one of these PDAs. The approximately 118 acres between the California Avenue Caltrain Station and El Camino Real features numerous access points to regional transit, such as Caltrain and the Valley Transit Administration (VTA) Route 22. Access to these forms of transportation and increased residential development intensity, in addition to pedestrian oriented features, are anticipated to support the economic vitality of California Avenue and nearby businesses.

9.2.2.5 California Green Building Standards Code

The 2016 California Green Building Standards Code (CalGREEN) went into effect on January 1, 2017. The purpose of the addition to the California Building Code is to improve public health, safety, and general welfare by enhancing the design and construction of buildings using concepts to reduce negative impacts or produce positive impacts on the environment. The CalGREEN regulations cover planning and design, energy efficiency, water efficiency and conservation, material conservation and resources efficiency, and environmental quality. The CalGREEN code is typically implemented at the local level and may be augmented by local building standards. The 2016 updates to the CalGREEN code addresses clean air vehicles and increased requirements for electric vehicle charging infrastructure. Additional updates/additions to the code include, but are not limited to, a new universal waste code section and a new section for food waste disposers.

9.2.2.6 Refrigerant Management Program

The Refrigerant Management Program (RMP) requires specific best management practices such as leak inspections, registration, and reporting to ARB to reduce greenhouse gases emissions from non-residential refrigeration systems. The regulation includes provisions similar to current federal and local ozone-depleting substance (ODS) regulations, and extends regulatory requirements to the use of ODS refrigerant substitutes such as HFCs. The regulation affects any owner/operator of a facility with a stationary, non-residential refrigeration system using more than 50 pounds of a high-global warming potential (high-GWP) refrigerant. The 50-pound threshold applies to the refrigeration system with the largest refrigerant charge at that facility. It is not based on the cumulative total charge of all refrigeration systems at the facility (ARB 2014).

9.2.3 Regional: Bay Area Air Quality Management District

The BAAQMD is the regional agency responsible for air quality regulation within the SFBAAB. The agency is primarily responsible for assuring that the NAAQS and CAAQS are attained and maintained in the Bay Area. As described in Air Quality section 5.2.5.2, the BAAQMD's *Spare the Air-Cool the Climate* 2017 Clean Air Plan focuses on the three following goals:

- Attain all state and national air quality standards;
- Eliminate disparities among Bay Area communities in cancer health risk from toxic air contaminants; and
- Reduce Bay Area GHG Emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050.

The 2017 Clean Air Plan includes 85 distinct control measures to help the region reduce air pollutants and has a long-term strategic vision which forecasts what a clean air Bay Area will look like in the year 2050. The control measures aggressively target the largest source of GHG, ozone pollutants, and particulate matter emissions – transportation. The 2017 Plan includes more incentives for electric vehicle infrastructure, off-road electrification projects such as Caltrain and shore power at ports, and reducing emissions from trucks, school buses, marine vessels, locomotives and off-road equipment (BAAQMD 2017b).

9.2.4 Local: City of Palo Alto

The following summarizes the applicable regulatory setting for the greenhouse gas chapter contained in the Palo Alto Comprehensive Plan Update EIR (2016).

9.2.4.1 Palo Alto Municipal Code

The City of Palo Alto Municipal Code outlines several requirements for new development that would reduce the amount of GHG emissions attributable to the proposed project.

- Chapter 5.24, Construction and Demolition Debris Diversion Facilities: Requires development to divert at least fifty percent of construction and debris from landfill pursuant to the California Integrated Waste Management Act of 1989 and the California Green

Building Code (CalGREEN). Any and all of the debris not salvaged for reuse must be sent to an “approved facility,” meaning a facility who has obtained all applicable federal, state and local permits, and specializes in the re-use, recycling, composting, and/or recovery of materials.

- Chapter 8.10, Tree Preservation and Management Regulations: Prohibits removal of protected trees unless they are dead, hazardous, or a detriment to or crowding of adjacent protected tree.

- Chapter 10.70, Trip Reduction and Travel Demand: This ordinance requires the City to adopt and implement a trip reduction and travel demand ordinance. While this code section references the now rescinded BAAQMD Regulation 13, Rule 1, BAAQMD has since adopted a new Rule (Regulation 14, Rule 1) known as the Bay Area Commuter Benefits Program, which requires employers with 50 or more full-time employees in the Bay Area to provide commuter benefits to their employees.

- Chapter 12.32, Water Use Regulations: Requires residents and businesses in the City to use water in a sustainable, efficient manner and prohibits potable water run-off into gutters, driveways, streets, and other landscape areas; use of a house without shut-off valve; and requires broken landscaping systems to be repaired as soon as possible.

In addition to the policies listed above, many of the policies and programs applicable to the project, as identified in Chapter 5: Air Quality, would also help reduce greenhouse gas emissions associated with the proposed project.

9.2.4.2 Palo Alto Green Building Policy

The City of Palo Alto Green Building Ordinance is contained in Chapter 16.14 of the Palo Alto Municipal Code. The Green Building Ordinance includes the mandatory measures of CALGreen (Title 24, Part 11), including the City’s landscape water efficiency standards adopted under the Model Water Efficient Landscape Ordinance (WELO), and also requires projects in the city to adhere to even more stringent sustainability measures by expanding the types of projects that are covered under CALGreen. In 2007, the Green Building Policy was updated to require all new City buildings over 5,000 square feet be designed to achieve (at a minimum) LEED Silver certification.

9.2.4.3 City of Palo Alto Utilities (CPAU)

Since 2003, CPAU has offered the voluntary PaloAltoGreen (PAG) Program that provided residential and commercial customers with the opportunity to “green up” their use of electricity. Under the PAG Program, CPAU purchases Renewable Energy Credits (RECs) on behalf of participants in order to provide 100 percent renewable supplies for the participant’s electricity usage. Since CPAU’s entire electric supply became carbon neutral in 2013, the PAG Program became redundant and the program was terminated in 2014 for residential customers, but commercial customers can still participate to be in compliance with corporate sustainability goals, U.S. EPA recognition programs, or to maintain LEED certifications.

In April 2014, the Council approved a voluntary PAG Gas Program that provides residential and commercial customers with the opportunity to “green up” their use of gas. Under the PAG Gas Program, CPAU purchases high quality environmental offsets on behalf of participants in order to reduce or eliminate the impact of greenhouse gas (GHG) emissions associated with each customer's gas usage. On December 5, 2016, the City Council unanimously approved Palo Alto's "Carbon Neutral Natural Gas Plan," which directed staff to achieve carbon neutrality for natural gas usage by using a combination of physical biogas and high-quality environmental offsets to achieve a carbon-neutral portfolio. This goal of carbon neutrality was achieved as of July 1, 2017, resulting in termination of the PAG Gas Program.

Also in April 2014, the Council approved a voluntary PAG Local Solar Plan that sets a goal of increasing the installation of local solar photovoltaic facilities to provide 4 percent of the City's total energy needs by 2023. The Local Solar Plan identifies a number of strategies and initiatives that promote solar in a cost-effective and sustainable manner by accelerating and increasing solar penetration in Palo Alto. The sixth strategy in the Plan is to "maximize solar installations on City-owned facilities" – facilities such as elevated garages.

Since 2013, Palo Alto's electric utility has been required to participate in CARB's Cap and Trade program, with the gas utility participating starting in 2015. In December 2012, the Council adopted a policy for the use of cap-and-trade revenues for the electric utility. In January 2015, Council updated that policy to add the gas utility.

9.2.4.4 Palo Alto Zero Waste

In 2005, the City adopted a Zero Waste policy. Since that time, Palo Alto has substantially reduced the amount of material going into landfills; the waste diversion rate is now at 80 percent, up from 63 percent in 2005. To expand upon its existing success, the City began implementing the first phase of the Recycling and Composting Ordinance in April 2016, requiring all large business and institutions, food service establishments and multifamily complexes to subscribe to compost services. The City anticipates this ordinance will dramatically increase the amount of food scraps and composted material, and keep it from landfills. Proper diversion of waste helps reduce the amount of GHGs (e.g., methane) emitted through material decomposition. The S/CAP, described below in 9.2.4.6, seeks to divert 95 percent of waste from landfills by 2030 and ultimately achieve zero waste.

9.2.4.5 Palo Alto Climate Protection Plan (CPP) and Draft Sustainability and Climate Action Plan (S/CAP)

Since adoption of its *Climate Protection Plan* (CPP) in December 2007, and adoption of updated goals in 2010, the City's municipal operations and the community at large have made considerable progress in reducing their carbon footprint and adopting sustainable practices. Based on data for the calendar year 2016, Palo Alto has cut its overall GHG emissions by an estimated 32 percent from 2005 levels and 37 percent from 1990 levels. The main driver of the GHG emissions reductions include bold actions such as achieving carbon neutral electricity, and systematic improvements ranging from water conservation and electric vehicle (EV) readiness to green building ordinances and safe routes to schools.

Like most cities, Palo Alto must take additional action to meet the long-term GHG emissions reduction challenge to reduce GHG emissions 80 percent below 1990 levels by 2050 identified within Executive Order S-03-05. Therefore, as part of its Comprehensive Plan update process, the City is developing a Sustainability and Climate Action Plan (S/CAP). The S/CAP evaluates GHG emissions within the City boundaries and actions the City can take to achieve its own, as well as the state's, GHG emissions reduction goals. On April 18, 2016 the Palo Alto City

Council unanimously approved the primary goal of the S/CAP, which is to achieve an 80% reduction in GHGs below 1990 levels by 2030 - 20 years ahead of the state's reduction goals (AB32 set a GHG reduction target equal to 80% below 1990 levels by 2050).

Some of the key strategies under evaluation for Palo Alto's pathway to a low-carbon—or no carbon—future include radical resource efficiency, comprehensive electrification ("fuel switching" from fossil fuels to carbon-neutral electricity), local renewable energy generation and distributed energy storage, rethinking mobility to provide more convenient transportation with less congestion, forthrightly facing water risk, bringing municipal operations—from facilities to fleets—in line with Council policy and community vision, exploring future business implications for CPAU as it adapts to new conditions, and broadening our focus from "sustainability" —a broad notion of "do no harm"—to "adaptation" —expanding Palo Alto's capacity to respond and thrive in the face of shocks and stresses like drought and sea level rise—to "regeneration" —building the health and vitality and the ecosystems, both local and far-flung, that support it.

Although still in draft form, if adopted, the S/CAP would require existing City facilities to prepare a Facilities Master Plan. Each Facilities Master Plan would:

- Analyze resource consumption in the building to identify priority opportunities for efficiency gains and management improvements;
- Identify capital improvement goals, and methods for ensuring sustainability and efficiency goals are embedded in the capital improvement process; and
- Provide criteria for Facilities, Engineering and the Sustainability Office to use to guide inter-division coordination and collaboration, and evaluate city performance.

9.3 IMPACTS AND MITIGATION MEASURES

Consistent with CEQA and the CEQA Appendix G Guidelines, this EIR focuses on the potentially significant direct and indirect impacts that could result from implementation of the proposed Palo Alto Public Safety Building project. The potentially significant impacts that could result from implementation of the project are described in this section.

9.3.1 Significance Criteria

Based on Appendices F and G of the CEQA Guidelines, the proposed project would have a significant GHG or energy impact if it would:

(a) Generate GHG emissions, either directly or indirectly, that may have a significant effect on the environment;

(b) Conflict with an applicable plan, policy, or regulation adopted for the purposes of reducing GHG emissions; or

(c) Result in a substantial increase in net energy demand or result in the use of fuel or energy in a wasteful manner.

In May 2017, the BAAQMD published a new version of the *CEQA Air Quality Guidelines,* which includes revisions made to address the Supreme Court's decision on the *California Building Industry Association v. BAAQMD*. The Guidelines contain the BAAQMD's recommendations to Lead Agencies for evaluating and assessing the significance of a project's potential greenhouse gas impacts (BAAQMD 2017). The BAAQMD's recommended CEQA thresholds of significance are shown in Table 9-3.

9.3.2 GHG Emissions

Would the project:

Generate GHG emissions, either directly or indirectly, that may have a significant effect on the environment (Significance Criterion [a]); or

Conflict with an applicable plan, policy, or regulation adopted for the purposes of reducing GHG emissions (Significance Criterion [b])?

Global climate change is the result of GHG emissions worldwide; individual projects do not generate enough GHG emissions to influence global climate change. Thus, the analysis of GHG emissions is, by nature, a cumulative analysis focused on whether an individual project's contribution to global climate change is cumulatively considerable.

The proposed project would generate GHG emissions during short-term construction and long-term operational activities. Construction activities would generate GHG emissions primarily from equipment fuel combustion. Construction activities would cease to emit GHG upon completion, unlike operational emissions that would be continuous year after year until the project is decommissioned. The BAAQMD has not adopted a threshold of significance for construction-related GHG emissions. The BAAQMD's *CEQA Air Quality Guidelines* do, however, encourage lead agencies to quantify and disclose construction-related GHG emissions, determine the significance of these emissions, and incorporate best management practices to reduce construction-related GHG emissions. Accordingly, construction-related GHG emissions are annualized over the lifetime of the proposed project (presumed to be a minimum of 30 years). This normalizes construction emissions so that they can be grouped with operational emissions and compared to appropriate thresholds, plans, etc. Table 9-3 includes the BAAQMD thresholds of significance for GHG emissions.

Table 9-3
BAAQMD THRESHOLDS OF SIGNIFICANCE FOR GHG EMISSIONS

Source	Construction Emissions	Operational Emissions
Non-Stationary Source	*None*	1,100 $MTCO_2e$ per year(A)
Stationary Source	*None*	10,000 $MTCO_2e$ per year

SOURCE: BAAQMD 2017

(A) The BAAQMD also lists compliance with a qualified greenhouse gas reduction strategy and 4.6 MTCO2e / service population (residents and employees)

When operational, the proposed project would generate emissions of GHG from the area, energy, and mobile sources described in Air Quality section 5.3.5, as well as the following additional sources specific to GHG emissions:

- **Energy use and consumption.** In addition to natural gas usage, the proposed project would generate GHG emissions from electricity use, water conveyance and use, waste water generation, and solid waste generation. As estimated using CalEEMod, the proposed parking garage and public safety building would consume approximately 590,630 kWh and 1,594,794 annual kilowatt hours of electricity, respectively; however, as described in Section 9.2.4.4, electricty and natural gas provided by CPAU has a net zero carbon intensity due to a combination of renewable electricity and carbon offsets. In addition, as described in more detail below, the proposed project would be, at minimum, LEED-certified Silver, which would serve to increase energy efficiency.

- **Water use and waste water generation.** The City estimates the water consumption at the proposed parking garage would be 0.09 million gallons of water per year (for landscaping purposes); the estimated water consumption at the proposed public safety building would be 1.11 million gallons of water per year (indoor and outdoor use). The proposed project plans call for water efficient landscaping and irrigation systems to be installed in site landscaping.

- **Solid waste generation.** The proposed public safety building would produce solid waste that requires landfilling. As estimated using CalEEMod, the total solid waste generated by the facility is estimated to be 44.6 for the public safety bulding). This estimate does not reflect City waste diversion goals.

- **Refrigeration.** The City estimates the proposed public safety building would have a 5-ton centralized refrigeration system, as well a 40-unit air conditiong system with a 100-ton total charge.

GHG emissions from construction and operation of the proposed project were estimated using CalEEMod, Version 2016.3.1. Table 9-4, below, presents the project's potential GHG emissions.

Table 9-4
PROJECT CONSTRUCTION AND OPERATIONAL GHG EMISSIONS

Source	**GHG Emissions (Metric Tons/Year)$^{(A)}$**			
	CO_2	**CH_4**	**N_2O**	**Total MTCO2e**
Construction				
Total Construction GHG	1,684.8	0.3	0.0	1,692.5
30-Year Average	*56.2*	*<0.0*	*0.0*	*56.4*
Operational				
Area	<0.0	<0.0	0.0	<0.0
Energy$^{(B)}$	0.0	0.0	0.0	0.0
Mobile	953.3	<0.0	0.0	954.2
Stationary	3.6	<0.0	0.0	3.6
Waste	9.1	0.5	0.0	22.4

Water	0.3	<0.0	<0.0	1.4
Refrigeration(C)	--	--	--	5.1
Total Project GHG Emissions	**1,022.5**	**0.6**	**<0.0**	**1,043.1**
BAAQMD Threshold				1,100
Exceeds Threshold?				No

SOURCE: MIG, 2017. See the Greenhouse Gas Emissions and Energy Appendix.

(A) Totals may not equal due to rounding. “<0.0” does not indicate the emissions are less than or equal to 0; rather, it indicates the emission is smaller than 0.1, but larger than 0.0.

(B) Since 2013, CPAU has provided 100% carbon neutral electricity and, as of July 1, 2017, also provides 100% carbon neutral natural gas. Accordingly, CalEEMod GHG emissions for the “Energy” source category have been set to 0. No credit has been taken for the on-site renewable energy generated by the rooftop solar photo voltaic (PV) system included in the proposed parking garage, because this energy would support the City’s 100% carbon free electricity portfolio.

(C) Refrigerant emissions based on 105 total tons of system charge and presume five pounds of R-427A refrigerant (GWP equal to 2,138.25) per ton of charge (525 pounds total). The systems are presumed to have a one percent annual leak rate, resulting in the loss of 0.002 MT per year, or 5.1 MTCO2e.

As shown in Table 9-4, construction and operation of the proposed project would not exceed the BAAQMD’s 1,100 MTCO$_2$e threshold of significance for non-stationary source GHG emissions. The magnitude of the project’s GHG emissions is primarily a function of CalEEMod-estimated mobile source emissions, which, as shown in Table 9-4, account for approximately 91% of the project’s total estimated GHG emissions. This estimate of mobile source emissions is very likely an overestimate of the project’s actual net increase in mobile emissions and, therefore represents a conservative, worst-case estimate for a number of reasons.

- First, the TIA prepared for the project and this EIR’s air quality and GHG impact analyses presume all trips generated by the public safety building would be new trips, and does not take credit for any existing emissions resulting from existing police and fire administration operations that currently occur elsewhere in the City.

- Second, the CalEEMod file developed for the proposed project uses default trip length assumptions for public safety building trips. The CalEEMod default assumptions estimate the proposed public safety building would generate a total of 2,448,026 annual vehicle miles travelled (VMT), with an average VMT of 4.7 miles per trip. In contrast, the Traffic Impact Analysis (TIA) prepared for the project by Fehr & Peers determined the average VMT for the project in 2020, as calculated using the Metropolitan Transportation Commission’s Travel Demand Model, would be 1.5 miles per trip, or approximately 68% less than the CalEEMod default and 1.8 miles per trip in 2040, or an approximately 62% reduction below CalEEMod defaults.[1] A 62% to 68% reduction in VMT would reduce the project’s total GHG emissions from 1,043.1 MTCO2e per year to approximately 332.9 to 399.5 MTCO2e per year.

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[1] Based on the travel demand model, the average weekday VMT generated by the public safety building would be approximately 2,250 VMT in 2020 (Fehr and Peers 2017, pg. 56). Distributed across 1,487 weekday trips, this would result in an average trip length of 1.5 miles (Fehr and Peers 2017, pg. 30).

Table 9-4 evaluates and compares the proposed project's emissions against the BAAQMD's 1,100 $MTCO_2e$ threshold of significance for land use projects because this threshold is the only applicable threshold recommended for use by CEQA lead agencies by the BAAQMD. The 1,100 $MTCO_2e$ threshold was developed in the early-2010s, and is intended to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions (e.g., AB32, SB375, etc.). Specifically, the 1,100 $MTCO_2e$ value was designed as the threshold value required to meet the AB32 requirement of reducing GHG emissions to 1990 levels by 2020. Since the proposed project is anticipated to become operational in 2021 (i.e., after 2020), it is not necessarily appropriate to evaluate the significance of the proposed project's GHG emissions against the BAAQMD's 1,100 $MTCO_2e$ threshold, although this threshold does provide useful context for the City in determining the significance of the project's GHG emissions. For example, presuming at least a 40 reduction in the BAAQMD's existing CEQA threshold is necessary to achieve the state's 2030 GHG reduction goal (which is a 40% reduction below 1990 GHG emissions levels), a threshold of 660 MTCO2e may be more appropriate for use in evaluating projects with long-term emissions commencing after 2020.[1] However, in the absence of an updated threshold from the BAAQMD designed to meet the 2030 and 2050 reduction requirements established under AB32 and SB-32, this EIR's GHG analysis focuses on determining significance of the proposed project's GHG emissions in the context of its consistency with the following adopted city and regional plans: 2040 Plan Bay Area, 2017 BAAQMD Clean Air Plan, and the Palo Alto CPP and S/CAP. These plans have been designed to ensure city and regional emissions meet future local, regional, and state GHG reduction goals. Therefore, if the project does not conflict with these plans, its emissions are considered to be consistent with future GHG reduction goals and to not have a significant effect on the environment.

2040 Plan Bay Area

As described in Section 9.2.2.4, Plan Bay Area 2040 is a long-range planning document developed by ABAG and MTC to reduce GHG emissions from land use and transportation. Plan Bay Area identifies PDAs as transit-oriented, infill development opportunity areas within existing communities. The Plan identifies the Palo Alto California Avenue Transit Neighborhood as one of the nearly 200 PDAs within the Bay Area. The proposed project is consistent with the goals and objectives for this PDA because it consists of infill development in a transit oriented area and features a number of sustainable building features.

The project site currently consists of two parking lots providing a total of 298 parking spaces. These lots do not generate trips, nor do they provide employment opportunities for residents of the Bay Area. Implementation of the proposed project would not only enhance the current function of the land use, it would also provide new employment opportunities in a transit-oriented location. Upon full buildout, the new public safety building would be located approximately 700 feet from the Caltrain California Avenue train station and within 200 feet of two bus stops. In addition to its proximity to regional transit, the public safety building would provide a minimum of 18 bicycle parking spaces located at building entrances or in visible areas for guests and employees; should all of these spaces be filled, the parking garage would also

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[1] This estimate reflects a 40% reduction from the BAAQMD's existing 1,100 MTCO2e threshold, calculated as: 1,100 – ((100-40)/100) = 660. This linear reduction oversimplifies the threshold development process and is identified for information purposes only. The City is not applying or proposing to use 660 MTCO2e as a CEQA significance threshold for GHG emissions.

provide bicycle parking on the first floor. Finally, the proposed project's overall trip length for employees at the public service building is estimated to be more than 15 percent below the regional average for both 2020 and 2040 – this supports Plan Bay Area's target of reducing per-capita CO_2 emissions from cars and light-duty trucks by 15% (ABAG 2017, Fehr and Peers 2017).

The proposed project is designed to be, at a minimum, LEED Silver certified and is seeking LEED Gold certification. Some of the sustainable building features include, but are not limited to: reduced water consumption from lavatories, advanced monitoring of building electricity consumption, cooling units not using CFCs (a potent GHG), solar panels on the roof of the parking garage that would provide direct energy to the public service building, and use of low VOC products.

Development of the proposed parking garage and public service building is consistent with Plan Bay Area 2040; the project would increase development intensity in a transit-oriented area, and include sustainable practices during construction and throughout operation.

BAAQMD 2017 Clean Air Plan

The proposed project would not conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan (Plan). The Plan includes greenhouse gas emissions from construction, mobile, and stationary source activities in its emissions inventories and plans for achieving attainment of air quality standards. Eighty-five control strategies are grouped into nine categories: Stationary Source Measures, Transportation Control Measures, Energy Control Measures, Buildings Control Measures, Agriculture Control Measures, Natural and Working Lands Control Measures, Waste Management Control Measures, Water Control Measures, and Super GHG Control Measures. Most of these control strategies do not apply to the proposed project or are implemented at the local and regional level by municipal government and the BAAQMD. Table 9-5 presents the potentially applicable GHG control strategies and project consistency with those measures.

As shown in Table 9-5, the proposed project would be consistent with relevant GHG-related control measures identified in the BAAQMD 2017 Clean Air Plan.

Table 9-5
PROJECT CONSISTENCY WITH BAAQMD 2017 CLEAN AIR PLAN

2017 Clean Air Plan Control Measures	Project Consistency
Stationary Source Measures	
SS32 – Emergency Backup Generators	Project drawings indicate an emergency generator would be installed on the northwestern side of the public safety building (see ARB 04.05). Control measure SS32 focuses on the reduction of emissions of diesel PM and back carbon from back-up generators through Draft Rule 11-18. Although still currently in draft form, the proposed Project would comply with the Rule upon adoption by the BAAQMD. This control measure would result in reduced health risks to impacted individuals and climate protection benefits.

2017 Clean Air Plan Control Measures	**Project Consistency**
Transportation Measures	
TR2 – Trip Reduction Programs	The proposed project would comply with control measure TR2 that requires employers with 50 or more Bay Area employees to provide commuter benefits. The control measure encourages local governments, on top of other things, to develop innovative ways to encourage rideshare, transit, cycling, and walking for work trips. The project site is located approximately 700 feet from the Caltrain California avenue train station, and within 200 feet of two bus stops on California Avenue. Additionally, the parking garage would feature ample bicycle parking – something the existing parking lots on site currently lack.
TR13 – Parking Policies	The proposed project would take two, existing parking lots in Palo Alto, and increase their development intensity. A new public safety building would be constructed on one of the lots (in-fill development) and the other would be developed with a new parking garage. It is anticipated the parking garage would reduce VMT (and resulting emissions) in the area since it will reduce the need for vehicles to circulate around the project area trying to find an available parking space on the street. The project would be located in a transit-oriented area, which is likely to increase the number of employees who use regional transit.
Building Control Measures	
BL1 – Green Buildings	The proposed Palo Alto Public Safety Building project is seeking LEED Silver certification with an aspiration of LEED Gold. The project features many green elements, such as, but not limited to, access to quality transit, bicycle facilities, and optimized energy performance.
WA4 – Recycling and Waste Reduction	The proposed project would comply with Palo Alto Municipal Code Chapter 5.24 that would require the project to divert at least fifty percent of construction and debris from landfill. Additionally, any and all of the debris not salvaged for reuse must be sent to a facility specializing in the re-use, recycling, composting, and/or recovery of materials.

Palo Alto Climate Protection Plan

Although the CPP's long-range goal is set for a horizon year of 2020, it is still the City's most recently adopted document when it comes to addressing climate change. Accordingly, the proposed project is subject to its requirements despite the horizon year occurring one year before the public safety building would be operational. The proposed project would support the following action items identified in the CPP to reduce GHG emissions: expansion of non-vehicular employee commute incentives (the project would be located closer to regional transit), providing showers for staff commuting by bicycle and other human powered commute options, and incentives for low emission vehicle and hybrid parking. The City's Green Building Policy, identified in the CPP, required LEED certification for all new City buildings over 10,000 feet.[1]

The proposed Palo Alto Public Safety Building would be consistent with the action items identified in the CPP, and would continue to contribute to the City's success in GHG reductions to date, which have achieved a 37 percent reduction below 1990 levels as of 2016, with a target of reducing GHG emission 80 percent below 1990 levels by 2030, which is a more aggressive target than state GHG reduction goals (which are 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050).

Palo Alto Climate Sustainability / Climate Action Plan

Although still in draft form, operation of the proposed project would be subject to the operational requirements of the City's S/CAP once it is adopted. The S/CAP would require the new public safety building to develop a Facilities Master Plan. The Facilities Master Plan would:

- Analyze resource consumption in the building to identify priority opportunities for efficiency gains and management improvements;
- Identify capital improvement goals, and methods for ensuring sustainability and efficiency goals are embedded in the capital improvement process; and
- Provide criteria for Facilities, Engineering and the Sustainability Office to use to guide inter-division coordination and collaboration, and evaluate city performance.

Significance Determination

As discussed above, the proposed project's GHG emissions would be below the BAAQMD's only applicable GHG threshold of significance (1,100 MTCO2e). Using the VMT estimate from the TIA, the proposed project's GHG emissions (332.9 MTCO2e) would be less than an equivalent threshold that is based on a 40% reduction from the current threshold (660 MTCO2e). Nonetheless, absent an updated threshold from the BAAQMD designed to meet the 2030 and 2050 reduction requirements established under AB-32 and SB-32, the City has evaluated the proposed project for consistency with the 2040 Plan Bay Area, 2017 BAAQMD Clean Air Plan, and the Palo Alto CPP and S/CAP. These local and regional plans are intended to achieve the GHG emission reductions necessary the state's 2030 and 2050. In particular, the City's CPP and related policies have reduce City-wide GHG emissions by 37 percent below 1990 levels, and the S/CAP is intended to reduce GHG emissions by 80 percent below 1990 levels by 2030. The project would be consistent with the CPP, Draft S/CAP, 2017 Clean Air Plan, and 2040 Plan Bay Area and would therefore not result in GHG emissions that have a significant effect on the environment. This impact would be ***less than significant***.

Mitigation. No significant impact has been identified; no mitigation is required.

9.3.3 Energy Consumption

Would the project result in a substantial increase in net energy or result in the use of fuel or energy in a wasteful manner (Signifcance Criterion [c])?

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[1] The Green Building Policy was updated in 2007. The update requires the assessment of "green building" potential for substantial renovations and additions over 5,000 square feet.

Short-term energy demand would result from construction of the parking garage and public service building. This would include energy demand from worker and vendor vehicle trips and construction equipment usage. Long-term energy demand would result from operation of facilities, which would include lighting, electric vehicle charging, heating and cooling of the public safety building, etc. Operational energy demands would typically be a result of vehicle trips, electricity and natural gas usage, and water and wastewater conveyance. This discussion generally describes the energy needs of these activities and how they are applicable to the proposed project.

Construction Activities

Project construction would commence in April 2018 with development of the parking garage; construction of the public safety building would begin once the parking garage is almost complete and operational. In totality, project construction is anticipated to last approximately three years. Construction would require the use of heavy-duty construction equipment (e.g. backhoes, excavators, scrapers, loaders, etc.) during most phases of construction, particularly during site preparation and grading for both the parking garage and the public safety building. Construction of proposed project would involve site preparation, grading, utility trenching, foundation construction, vertical building construction, and architectural coating. Project construction would result in use of gasoline and diesel fuels used to power the workers' vehicles and equipment.

Operational Activities

Upon the completion of construction activities, the project would consist of the operation of a new parking garage and public service building. Operation of these facilities would involve energy usage from mobile sources (employees operating motor vehicles to go to work, do work, etc.), electricity (used for lighting, charging of potential electric/hybrid cars, and water transport), and natural gas (for heating). The project would be located in a transit-oriented area, increasing the likelihood of employees using regional transit, and include a numerous green building features (e.g., solar panels, conservative water appliances, etc.) to help achieve LEED certification.

The LEED Green Building Rating System is a voluntary, consensus-based, market-driven building rating system based on existing, proven technology. It evaluates environmental performance from a whole-building perspective over the building's life cycle. LEED is comprised of various assessment types depending on the type of development. The most widely used assessment type is LEED for New Construction and Major Renovations (LEED NC) and Core & Shell (LEED CS). The most current LEED NC rating system is LEED NC version 4, or "NC v4." The assessment categories for LEED NC v4 are: Integrative Process (IP); Location and Transportation (LT); Sustainable Site (SS); Water Efficiency (WE); Energy and Atmosphere (EA); Material and Resources (MR); Indoor Environmental Quality (EQ); Innovation (IN); and Regional Priority (RP). Based on the number of points obtained through green and sustainable building design, certification can be achieved at the following levels:

- "LEED Certified" with a minimum of 40 points,
- "LEED Silver" with a minimum of 50 points,
- "LEED Gold" with minimum of 60 points, and
- "LEED Platinum" with a minimum of 80 points.

As described in Section 9.2.4.3, the proposed project would be required to achieve a minimum LEED Silver certification, and is pursuing LEED Gold Certification. Specifically, the project includes the following energy efficiency and reduction measures that will aid in the project's LEED certification:

- A 400,000 BTU/Hr electric heat pump for the public safety building, which could eliminate natural gas use and reduce overall energy consumption associated with water and space heating.
- A rooftop solar PV array on the parking garage capable of generating 265 kilowatts of energy at peak times and approximately 417 MWh annually, in support of the City's carbon neutral electricity supply.
- Energy performance optimization measures, including building energy simulations and establishment of a performance target.
- Advanced energy metering to augment monitoring, data collection, and energy efficiency.
- Advanced water metering for irrigation an indoor plumbing fixtures, as well reduction in indoor water use through low flow and automated fixtures. This would reduce water consumption and energy use associated with water conveyance and treatment.

Conclusion

Energy would be consumed during both project constructionand operation. Energy in the form of gasoline and diesel fuel would be required during construction. This energy is a necessary component of construction, and the project would implement measures such as minimizing idling time of diesel powered construction equipment to two minutes (see Air Quality section 5.3.4), that would reduce the amount of fuel consumption during construction. The Bay Area is well served by suppliers of gasoline and diesel fuels; the project would not constitute a significant impact for demand on either of these sources of energy.

Although operation of the parking garage and public safety building would increase energy usage compared to current conditions (two surface parking lots), this increase would not be substantial because the City's existing energy supplies are sufficent to meet this increased demand, and the proposed project would be more efficient than existing public service facilities. Furthermore, the proposed project's proximity to regional transit, provisions for alternative transportation sources, and commitment to energy reduction and efficiency measures would ensure the project does not waste energy or consume energy in an inefficient or unnecessary manner. The project would have a ***less-than-significant impact*** on energy and energy resources.

Mitigation. No significant impact has been identified; no mitigation is required.

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10. HAZARDS AND HAZARDOUS MATERIALS

This EIR chapter describes known and potential hazards and hazardous materials conditions on the PSB site and in the vicinity, any related potentially significant adverse health impacts that could result from the proposed project, and associated mitigation measures and regulatory agency protocols to reduce potentially significant impacts to less-than-significant levels. The following project-specific reports supplied much of the information for this chapter:

- Phase I Environmental Site Assessment, Parking Lots C-6 and C-7, Sherman Avenue, Palo Alto, California; Project No. 1210.06; Northgate Environmental Management, Inc.; April 22, 2016.

- Phase II Site Assessment Report – New Public Safety Building and Parking Garage Structure Near California Avenue, Palo Alto, CA; Stantec Consulting Services, Inc.; June 8, 2017.

For purposes of this EIR, *hazardous materials* are defined as materials that, because of their quantity, concentration, or physical or chemical characteristics, pose substantial hazards to human health or safety, or to the environment, particularly if released. *Hazardous wastes* are defined as a subset of hazardous materials that may pose substantial hazards to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

10.1 SETTING

10.1.1 Phase I ESA (Northgate)

The information below is taken from the Phase I ESA (Northgate).

The purpose of the Phase I ESA was to identify and evaluate the presence of Recognized Environmental Concerns (RECs) at the PSB project site. The term “RECs” means the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. The term is not intended to include *de minimis* conditions that generally do not pose a material risk of harm to public health or the environment, and that generally would not be subject of an enforcement action if brought to the attention of appropriate governmental agencies. Northgate Environmental Management endeavored to perform the Phase I ESA in general conformance with the scope and limitations of the industry-recognized ASTM E-1527-13 *Standard Practice for Environmental Site Assessments*, and the U.S. Environmental Protection Agency (U.S. EPA) *All Appropriate Inquiry* guidelines.

The PSB project site was historically occupied be residences and some commercial businesses from at least 1939 through the mid-1960s. Besides residences, former uses have included

Sherman School, a slipcover and drapery studio, a rug-making school-hobby shop, Metal Products and Umpco heating, a trucking company, a news agency, and an investment firm. The site has been paved parking since the late-1960s. None of the historical photographs researched for the Phase I ESA indicate an obvious use or storage of hazardous materials on the project site.

The PSB project site is not listed on any regulatory database related to the use, storage, or release of hazardous materials. However, there are several agency-listed sites in the near vicinity that are known to impact soil or groundwater quality nearby and at the project site; these include (1) the former Hewlett-Packard (HP) site at 620-640 Page Mill Road, which is a Federal Superfund site listed on the National Priorities List; (2) the former Varian Medical Systems (Varian) site at 601 California Avenue; and (3) the former Shell service station at 299 South California Avenue. Historic solvent releases at the former HP and Varian sites have resulted in a groundwater contamination plume covering an area known as the "California-Olive-Emerson (COE) designated groundwater study area." The commingled Hewlett-Packard/Varian groundwater contaminant plume is referred to as the "HP/Varian VOC [volatile organic compound] plume." The project site is in the COE study area, and groundwater containing VOCs from the HP/Varian VOC plume extends onto the PSB project site. HP and Varian are jointly responsible for the monitoring and remedial activities in the COE study area.

Three groundwater monitoring wells associated with HP/Varian, and one well associated with the former Shell station, are on the project site. In 2011 VOCs, including tetrachloroethene (PCE) and trichloroethene (TCE), were detected in one of the on-site HP/Varian groundwater monitoring wells at concentrations of 60 µg/L and 3.0 µg/L, respectively; the monitoring well associated with the former Shell station has historically contained low levels of MTBE, but none has been detected since 2009.

Known contaminated sites are present in the PSB project site vicinity. Notable sites are summarized below.

Hewlett-Packard (HP), 620-640 Page Mill Road (HP-640 PMR). The HP Federal Superfund site is located at the Stanford Research Park, approximately 1,700 feet south-southwest (upgradient) of the PSB project site. The property is listed on several environmental databases related to a waste solvent leak that occurred in 1981. The leak consisted of at least 300 gallons waste solvent from a 1,000-gallon underground storage tank (UST) over a period of at least three weeks; the tank was removed, and 100 cubic yards (cy) of contaminated soil were excavated and transported to a hazardous waste disposal facility. Soil and groundwater cleanup actions have been implemented both on- and off-site, since 1982. These actions have included soil excavation and disposal (over 10,000 cy), groundwater extraction and treatment, and soil vapor extraction.

Today, a groundwater contamination plume extends about 2,000 feet north from the HP Superfund site, and the plume is commingled with contamination plumes associated with other solvent release sites, including the former Varian site at 601 California Avenue and a former HP site located at 395 Page Mill Road. The commingled groundwater contaminant plume is referred to as the "HP/Varian VOC plume," and the area associated with the plume is referred to as the "California-Olive-Emerson (COE) designated groundwater study area," named for the streets that define the limits of the study area. HP and Varian are jointly responsible for the monitoring and remedial activities in the COE study area, as regulated by the Regional Water Quality Control Board (RWQCB).

Varian Associates, 601 South California Avenue. The Varian site is approximately 1,000 feet southeast (upgradient) of the PSB project site. The property is listed on several environmental databases but is not a Federal Superfund site. It is in the COE study area and is part of the HP/Varian VOC plume. The contaminants of concern are trichloroacetic acid (TCA), TCE, and other chlorinated hydrocarbons. Varian conducted remedial actions, including soil excavation, in 1990, plus on-site soil vapor extraction and on-site and off-site groundwater extraction from 1987 to 2003. The Regional Water Quality Control Board (RWQCB) has approved a pilot study for enhanced in-situ bioremediation on the Varian site; this process involves the addition of micro-organisms (e.g., fungi, bacteria, and other microbes) or nutrients (e.g., oxygen, nitrates) underground to accelerate the natural biodegradation process (Google search definition, September 18, 2017). The Varian site is regulated under the same RWQCB Order as the HP 640 and 395 Page Mill Road sites.

Minkoff Group (Former Premier Properties), 385-399 Sherman Avenue. This property is located directly across Sherman Avenue from the PSB project site. The property is listed on the RWQCB database as an open assessment and interim remedial action for VOC-impacted groundwater related to the HP/Varian groundwater plume that underlies the property. The predominant VOC of concern is TCE. The RWQCB-approved Vapor Intrusion Mitigation and Risk Management Plan (VIM/RMP) (May 7, 2014) for the Minkoff property defines mitigation measures for an approved new development that include, among others, installation of a vapor barrier and water-proofing membrane below the building foundation; a specialized heating, ventilation, and air conditioning system that prevents underground parking garage air from entering the building; and indoor air monitoring.

Former Shell Station, 299 South California Avenue. This site is located at the intersection of California and Birch, approximately 85 feet west-northwest of the PSB project site. In the past, leaking underground storage tanks (LUSTs) released gasoline and diesel products. Four USTs were removed in 1974, and impacted soil was excavated during the subsequent redevelopment of the property. Based on groundwater monitoring wells, RWQCB water quality objectives have not been met, and the property is still listed as an open assessment (GeoTracker website, April 2016). However, due to the limited extent of the contaminant plume, the RWQCB issued a closure and well destruction directive (March 9, 2016). One of the monitoring wells is located on the PSB project site, but no contaminant has been above the Maximum Contaminant Level (MCL) since 2002, and no contamination has been detected since 2009.

Keeble and Shuchat Photography, 290 California Avenue. This business is located directly across Jacaranda Lane from the PSB project site. It stores hazardous chemicals and generates hazardous wastes related to photography. The business is classified as a “small quantity generator,” and no releases have been reported.

Radon. All of Santa Clara County is designated as a Federal Radon Zone 2 (indoor average between 2 and 4 picocuries per liter). The US EPA and California Department of Health Services recommend mitigation for houses with indoor radon concentrations above 4. The proposed PSB project would not contain any residences, and site-specific radon testing is required.

Phase I ESA Conclusions and Recommendations:

Groundwater contamination associated with a regional Superfund plume may have migrated beneath the southeastern portion of the PSB project site. The plume is being investigated and remediated by others under RWQCB jurisdiction (i.e., the City of Palo Alto is not responsible for remediation). However, VOCs present in the groundwater could impact future construction of the project's underground parking and could impact indoor air quality in the proposed buildings.

Northgate Environmental Management recommended that the City: (1) evaluate groundwater conditions beneath the project site, (2) evaluate potential construction impacts related to dewatering and excavation for the proposed underground parking, (3) evaluate potential indoor air quality impacts related to vapor intrusion, (4) prepare Site Management Plans for managing potentially contaminated soil or groundwater that might be encountered during construction, and (5) because dewatering for construction of underground parking could draw contaminated water from the Shell property onto the PSB project site, the City should evaluate potential groundwater quality impacts related to the former Shell station and prepare Site Management Plans for managing potentially contaminated soil or groundwater that might be encountered during construction.

10.1.2 Phase II ESA (Stantec)

Based on the Phase I ESA conclusions and recommendations, a Phase II ESA was prepared for the proposed PSB project. The information below is taken from the Phase II ESA (Stantec).

The Phase II ESA describes subsurface investigation activities undertaken specifically for the proposed PSB project, in order to characterize the on-site soil and groundwater expected to be generated during dewatering, excavation, and construction. Also, to help evaluate soils for potential reuse and/or disposal, Stantec screened soil chemical data against Tier 1 Environmental Screening Levels (ESLs) established by the RWQCB (February 2016). Tier 1 ESLs are default values that are protective of residential and commercial exposure scenarios, and protective of the potential to impact groundwater. To evaluate potential soil disposal options, Stantec also screened soil chemical data against regulatory limits for hazardous waste established by Title 22 of the California Code of Regulations.

Eight boreholes were advanced. Maximum explored depth did not exceed 43 feet below ground surface (bgs). According to Plan Sheets ARB 05.02 and ARB 05.06 (7/19/17), the maximum depth of excavation for both the PSB and the parking garage would be approximately 30 feet.

Soil chemical data suggest that the PSB project site materials would not be considered hazardous waste for soil disposal purposes, and the site soils should meet acceptance criteria for disposal at a municipal waste landfill.

Groundwater chemical data reported no widespread chemical impacts to the shallow groundwater zone beneath the project site. However, based on the identified local and regional groundwater conditions - such as the site's location within the COE groundwater study area and known or suspected nearby sources of chemically impacted groundwater (see Phase I ESA, above) – it is possible that VOC-impacted groundwater could be encountered during dewatering and excavation for the PSB project.

Eight boreholes were advanced at locations selected by Stantec and approved by appropriate City staff, based on historical hazardous contamination activity in the area. Discrete soil samples were collected from each borehole at depths of 1, 5, 10, 15, 20, 25, 30, 35, and 40 feet bgs, with minor deviations due to site conditions. At terminal depth in each borehole, a groundwater sample was collected. A total of 68 soil samples and 8 groundwater samples were collected and analyzed.

Subsurface materials encountered consisted primarily of clay with variable amounts of sand. First groundwater was encountered at depths ranging from 15 to 21 feet bgs, and a second water-bearing zone was encountered at about 35 feet bgs. In all but one borehole, static depth to water ranged from 17.1 to 18.1 feet bgs.

Soil chemical data for the materials examined do not indicate the presence of substantial chemical impacts, and do not appear to represent problematic conditions for soil disposal and/or reuse, as described below.

Concentrations of Title 22 metals (e.g., arsenic, barium, cobalt, lead, nickel, mercury) appear to be uniform except for concentrations of barium in three samples. Concentrations of metals did not exceed Tier 1 ESLs, with the following exceptions:

- Cobalt in one sample (C6-3)
- Nickel in one sample (C7-1)
- Thallium in one sample (C7-3) (commercial ESL)

The sample labeling above (e.g., C6-3) refers to location. “C6” is Lot C-6, where the PSB would be located, and “C7” is Lot C-7, where the parking garage would be located.

Because naturally occurring concentrations of arsenic in soil frequently exceed risk-based screening criteria, Stantec compared arsenic concentrations with the upper range of background arsenic in the urbanized San Francisco Bay Area (11.0 mg/kg). Concentrations of arsenic in six samples exceeded the background value, with the highest concentration at 14.8 mg/kg.

Compared to Total Threshold Limit Concentration (TTLC), Soluble Threshold Limit Concentration (STLC), and Toxicity Characteristic Leaching Potential (TCLP) hazardous waste criteria for soil established by Title 22 of the California Code of Regulations, no reported metal concentrations exceeded the TTLC criteria, and concentrations of soluble barium exceeded the STLC criteria (one sample).

Concentrations of the following substances in the PSB site soils did not exceed Tier 1 ESLs, with exceptions noted:

- petroleum hydrocarbons (e.g., gasoline, diesel, motor oil)
- volatile organic compounds (VOCs) (e.g., acetone, PCE)
- semivolatile organic compounds (SVOCs) - except for naphthalene, which exceeded the Tier 1 ESL
- pesticides – except for dieldrin and heptachlor epoxide, which exceeded the Tier 1 ESL but not the TTLC and STLC hazardous waste criteria
- PCBs
- Asbestos (none detected)

Groundwater chemical data did not indicate the presence of substantial chemical impacts, and do not appear to represent conditions expected to be problematic for water disposal, as summarized here:

- Groundwater concentrations of Title 22 metals appear to be uniform, with detectable concentrations of barium, cobalt, molybdenum, and nickel reported in several samples.

- Low concentrations of diesel- and motor oil-range organics were reported in one sample (at the northeast corner of Lot C-7, the parking garage site).

- No VOCs were detected above Tier 1 ESLs except for MTBE in one sample (at the northeast corner of Lot C-6, the proposed Public Safety Building site).

Although the data indicate no existing substantial groundwater contamination conditions on-site, several factors may affect water handling, discharge, and/or disposal procedures during future dewatering activities associated with project excavation and construction. Groundwater near the PSB project site reportedly has been, and may still be, impacted with VOCs and petroleum hydrocarbons. This situation may affect the quality of water generated during dewatering operations, as follows:

- The Phase I ESA (see discussion above) identified the historical presence of a Shell gas station at the corner of California and Birch. MBTE and other gasoline-related VOCs have historically been reported in groundwater samples from a monitoring well located at the southwest corner of Lot C-6 (the proposed Public Safety Building site). Also, for the Phase II ESA, MBTE was detected at a low concentration in a sample from the northeast corner of Lot C-6.

- The Santa Clara Valley Water District completed a study across the District's service area identifying existing or historical dry cleaners. The compound PCE was historically used in dry cleaners, and PCE (and degradation products, such as TCE) in groundwater is often characteristic of releases from a dry cleaner via, for example, leaking equipment, faulty sewer lines, and/or poor chemical handling practices. The study identified a cluster of up to 13 historical dry cleaners, and one operating facility, located along California Avenue between El Camino Real and Alma Street. Although these facilities were rated "low" for potential chemical release, their presence may represent a potential risk to groundwater quality in the area, including on the PSB project site.

- The PSB project site is located in the northern portion of the California-Olive-Emerson (COE) study area (see Phase I ESA discussion above). Portions of the COE study area are underlain by commingled plumes of VOC-impacted groundwater originating from multiple sources. One COE study area groundwater monitoring well is located on the southwest boundary of the PSB project site (Ash Street), and two COE wells are located on the northeast boundary of the PSB project site (Park Boulevard). The most recently collected groundwater samples from one Park Boulevard well (2011) had reported concentrations of PCE and TCE.

The Phase II ESA conclusions and recommendations are included in section 10.3 (Impacts and Mitigation Measures) below.

10.2 REGULATORY SETTING

Hazardous materials and wastes can pose a significant actual or potential hazard to human health and the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Many federal, State, and local programs that regulate the use, storage, and transportation of hazardous materials and hazardous waste are in place to prevent these unwanted consequences. These regulatory programs are designed to reduce the danger that hazardous substances may pose to people and businesses under normal daily circumstances and as a result of emergencies and disasters. Regulations relevant to the proposed PSB project are described below.

10.2.1 Federal Regulations

United States Environmental Protection Agency. The EPA is the primary federal agency that regulates hazardous materials and waste. In general, the EPA works to develop and enforce regulations that implement environmental laws enacted by Congress. The agency is responsible for researching and setting national standards for a variety of environmental programs and delegates to states and Native American tribes the responsibility for issuing permits and for monitoring and enforcing compliance. EPA programs promote handling hazardous wastes safely, cleaning up contaminated land, and reducing waste volumes through such strategies as recycling. California falls under the jurisdiction of EPA Region 9. Under the authority of RCRA, and in cooperation with State and tribal partners, the EPA Region 9 Waste Management and Superfund Divisions manage programs for site environmental assessment and cleanup, hazardous and solid waste management, and underground storage tanks.

United States Department of Transportation. Transportation of chemicals and hazardous materials are governed by the DOT, which stipulates the types of containers, labeling, and other restrictions to be used in the movement of such material on interstate highways.

Occupational Safety and Health Administration. The Occupational Safety and Health Administration (OSHA) oversees administration of the Occupational Safety and Health Act, which requires: specific training for hazardous materials handlers; provision of information to employees who may be exposed to hazardous materials; and acquisition of material safety data sheets (MSDS) from materials manufacturers. Material safety data sheets describe the risks, as well as proper handling and procedures, related to particular hazardous materials. Employee training must include response and remediation procedures for hazardous materials releases and exposures.

Resource Conservation and Recovery Act of 1976, as Amended by the Hazardous and Solid Waste Amendments of 1984. Federal hazardous waste laws are generally promulgated under the RCRA. These laws provide for the “cradle to grave” regulation of hazardous wastes. Any business, institution, or other entity that generates hazardous waste is required to identify and track its hazardous waste from the point of generation until it is recycled, reused, or disposed. The DTSC is responsible for implementing the RCRA program, as well as California’s own hazardous waste laws, which are collectively known as the Hazardous Waste Control Law. Under the Certified Unified Program Agency (CUPA) program, the California Environmental Protection Agency (CalEPA) has, in turn, delegated enforcement authority to the County of Santa Clara for State law regulating hazardous waste producers or generators in the EIR Study Area.

Comprehensive Environmental Response, Compensation, and Liability Act and the Superfund Amendments and Reauthorization Act of 1986. Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, on December 11, 1980. CERCLA established prohibitions and requirements concerning closed and abandoned hazardous waste sites; provided for liability of persons responsible for releases of hazardous waste at these sites; and established a trust fund to provide for cleanup when no responsible party could be identified. Superfund Amendments and Reauthorization Act (SARA) amended CERCLA on October 17, 1986. The SARA stressed the importance of permanent remedies and innovative treatment technologies in cleaning up hazardous waste sites; required Superfund actions to consider the standards and requirements found in other federal and State environmental laws and regulations; provided new enforcement authorities and settlement tools; increased State involvement in every phase of the Superfund program; increased the focus on human health problems posed by hazardous waste sites; encouraged greater citizen participation in making decisions on how sites should be cleaned up; and increased the size of the trust fund to $8.5 billion.

Emergency Planning Community Right-to-Know Act. The Emergency Planning Community Right-to-Know Act (EPCRA), also known as SARA Title III, was enacted in October 1986. This law requires any infrastructure at the State and local levels to plan for chemical emergencies. Reported information is then made publicly available so that interested parties may become informed about potentially dangerous chemicals in their community. EPCRA Sections 301 through 312 are administered by EPA's Office of Emergency Management. EPA's Office of Information Analysis and Access implements the EPCRA Section 313 program. In California, SARA Title III is implemented through the California Accidental Release Program (CalARP). The State of California has delegated local oversight authority of the CalARP program to the County of Santa Clara.

Hazardous Materials Transportation Act . The DOT regulates hazardous materials transportation under Title 49 of the Code of Federal Regulations (CFR). State agencies that have primary responsibility for enforcing federal and State regulations and responding to hazardous materials transportation emergencies are the California Highway Patrol and the California Department of Transportation (Caltrans). The California State Fire Marshal's Office has oversight authority for hazardous materials liquid pipelines. The California Public Utilities Commission has oversight authority for natural gas pipelines in California. These agencies also govern permitting for hazardous materials transportation.

National Response Framework. The 2013 National Response Framework, published by the Department of Homeland Security, is a guide to how the Nation responds to all types of disasters and emergencies. The Framework describes specific authorities and best practices for managing incidents that range from serious local to large-scale terrorist attacks or catastrophic natural disasters. In addition, the Framework describes the principles, roles, responsibilities, and coordinating structures for responding to an incident and further describes how response efforts integrate with those of the other mission areas.

10.2.2 State Regulations

California Environmental Protection Agency. CalEPA was created in 1991 by Governor Executive Order W-5-91. Several State regulatory boards, departments, and offices were placed under the CalEPA umbrella to create a cabinet-level voice for the protection of human health and the environment and to assure the coordinated deployment of State resources. Among those responsible for hazardous materials and waste management are the DTSC, Department of Pesticide Regulation, and Office of Environmental Health Hazard Assessment (OEHHA). CalEPA also oversees the unified hazardous waste and hazardous materials management regulatory program (Unified Program), which consolidates, coordinates, and makes consistent the following six programs:

- Hazardous Materials Release Response Plans and Inventories (Business Plans)
- Underground Storage Tank Program
- Aboveground Petroleum Storage Tank Act
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment Programs
- California Uniform Fire Code: Hazardous Material Management Plans and Inventory Statements
- CalARP

California Department of Toxic Substances Control. The California DTSC, which is a department of CalEPA, is authorized to carry out the federal RCRA hazardous waste program in California to protect people from exposure to hazardous wastes. The department regulates hazardous waste, cleans up existing contamination, and looks for ways to control and reduce the hazardous waste produced in California, primarily under the authority of RCRA and in accordance with the California Hazardous Waste Control Law (California H&SC Division 20, Chapter 6.5) and the Hazardous Waste Control Regulations (Title 22, California Code of Regulations (CCR), Divisions 4 and 4.5). Permitting, inspection, compliance, and corrective action programs ensure that people who manage hazardous waste follow federal and State requirements and other laws that affect hazardous waste specific to handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning.

State Water Resources Control Board. The San Francisco Bay Regional Water Quality Control Board (RWQCB) is authorized by the State Water Resources Control Board (SWRCB) to enforce provisions of the Porter-Cologne Water Quality Control Act of 1969. This act gives the San Francisco RWQCB authority to require groundwater investigations when the quality of groundwater or surface waters of the State is threatened and to require remediation actions, if necessary.

California Division of Occupational Safety and Health. Like OSHA at the federal level, the California Division of Occupational Safety and Health (Cal OSHA) is the responsible State-level agency for ensuring workplace safety. Cal OSHA assumes primary responsibility for the adoption and enforcement of standards regarding workplace safety and safety practices. In the event that a site is contaminated, a Site Safety Plan must be crafted and implemented to protect the safety of workers. Site Safety Plans establish policies, practices, and procedures to prevent the exposure of workers and members of the public to hazardous materials originating from the contaminated site or building.

California Department of Transportation. Caltrans manages more than 50,000 miles of California's highway and freeway lanes, provides inter-city rail services, permits more than 400 public-use airports and special-use hospital heliports, and works with local agencies. Caltrans is also the first responder for hazardous material spills and releases that occur on those highway and freeway lanes and inter-city rail services.

California Health and Safety Code. California H&SC, Division 20, Chapter 6.95, and Title 19 of the California Code of Regulations, Section 2729, set out the minimum requirements for business emergency plans and chemical inventory reporting. These regulations require businesses to provide emergency response plans and procedures, training program information, and a hazardous material chemical inventory disclosing hazardous materials stored, used, or handled on site. A business which uses hazardous materials or a mixture containing hazardous materials must establish and implement a business plan if the hazardous material is handled in certain quantities.

California Building Code. The State of California provides a minimum standard for building design through Title 24 of the California Code of Regulations (CCR), also known as the California Building Standards) Code. The 2013 California Building Code (CBC), is Part 2 of Title 24. The 2013 CBC is based on the 2012 International Building Code, but has been modified for California conditions. It is generally adopted on a jurisdiction-by-jurisdiction basis, subject to further modification based on local conditions. Commercial and residential buildings are plan-checked by local City and County building officials for compliance with the CBC Typical fire safety requirements of the CBC include the installation of sprinklers in all new high-rise buildings and residential buildings; the establishment of fire resistance standards for fire doors, building material; and particular types of construction.

California Fire Code. The California Fire Code (CFC) is Part 9 of Title 24. The CFC includes provisions and standards for emergency planning and preparedness, fire service features, fire protection systems, hazardous materials, fire flow requirements, fire hydrant locations and distribution, and the clearance of debris and vegetation within a prescribed distance from occupied structures in wildlife hazard areas. The Palo Alto Fire Department provides fire protection services for the City and, as such, implements and enforces the CFC in Palo Alto.

Polychlorinated Biphenyls. The United States EPA prohibited the use of polychlorinated biphenyls (PCBs) in the majority of new electrical equipment starting in 1979, and initiated a phase-out for much of the existing PCB-containing equipment. The inclusion of PCBs in electrical equipment and the handling of those PCBs are regulated by the provisions of the Toxic Substances Control Act (TSCA), United States Code Title 15, Section 2601 et seq. Relevant regulations include labeling and periodic inspection requirements for certain types of PCB-containing equipment and outline highly specific safety procedures for their disposal. Likewise, the State of California regulates PCB-laden electrical equipment and materials contaminated above a certain threshold as hazardous waste. These regulations require that such materials be treated, transported, and disposed accordingly. At lower concentrations for non-liquids, RWQCBs may exercise discretion over the classification of such wastes.

Standardized Emergency Management System Chapter 1, Division 2, Title 21 of the California Code of Regulations. The standardized Emergency Management System (SEMS) is intended to standardize responses to emergencies involving multiple jurisdictions or multiple agencies. SEMS requires that emergency response agencies use basic principles and components of emergency management, multi-agency or inter-agency coordination, the operational area concept, and established mutual aid systems. As of December 1, 1996, local government must use SEMS in order to be eligible for State funding of response-related personnel costs.

Governor's Executive Order W-9-91. In 1991, Executive Order W-9-91 established basic emergency preparedness objectives and policies to be carried out by State officials. The order states that California is to maintain a high degree of preparedness in the event of a disaster, such as fire, flood, storm, air pollution, plant or animal infestation, disease, or earthquake.

California Disaster and Civil Defense Master Mutual Aid Plan. The California Disaster and Civil Defense Master Mutual Aid Plan outlines policies, procedures, and authorities for provision of emergency management personnel from unaffected jurisdictions to support affected jurisdictions during an emergency event, in accordance with the Master Mutual Aid Agreement. The Master Mutual Aid Agreement establishes that jurisdictions should voluntarily aid and assist each other in the event that a disaster should occur, by the interchange of services and facilities, including, but not limited to, fire, police, medical and health, communication, and transportation services and facilities.

State Emergency Plan. In 2009, the California State Emergency Plan was adopted to address the State's response to extraordinary emergency situations associated with natural disasters or human-caused emergencies. The State Emergency Plan describes the methods for carrying out emergency operations, the process for rendering mutual aid, the emergency services of governmental agencies, and how the public will be informed during an emergency or disaster.

10.2.3 Regional Regulations

Bay Area Air Quality Management District. The Bay Area Air Quality Management District (BAAQMD) has primary responsibility for control of air pollution from sources other than motor vehicles and consumer products (which are the responsibility of CalEPA and the California Air Resources Board [CARB]). The BAAQMD is responsible for preparing attainment plans for non-attainment criteria pollutants, control of stationary air pollutant sources, and the issuance of permits for activities including demolition and renovation activities affecting ACM (District Regulation 11, Rule 2) and lead (District Regulation 11, Rule 1).

Association of Bay Area Governments Multi-Jurisdictional Local Hazard Mitigation Plan for the San Francisco Bay Area. The Federal Disaster Mitigation Act of 2000 (DMA) requires all cities, counties, and special districts to adopt a Local Hazard Mitigation Plan (LHMP) to receive disaster mitigation funding from the Federal Emergency Management Agency (FEMA). The DMA provides that a local agency may adopt a Local Hazard Mitigation Plan or participate in the preparation of and adopt a Multi-Jurisdictional Hazard Mitigation Plan. ABAG received funds from FEMA to serve as the lead agency in the creation of a Multi-Jurisdictional Hazard Mitigation Plan for the nine-county Bay Area. With participation from the City of Palo Alto and other local agencies, ABAG created an umbrella Hazard Mitigation Plan entitled "Taming Natural Disasters."

Regional Catastrophic Earthquake Mass Transportation/Evacuation Plan. The Regional Catastrophic Earthquake Mass Transportation/Evacuation Plan (Evacuation Plan) was been prepared for the Bay Area Urban Area Security Initiative Approval Authority on behalf of the counties and cities within 12-county Bay Area region. The Evacuation Plan describes the general strategy for emergency response to an incident with regional impact. The Evacuation Plan was prepared in accordance with the standards of the National Incident Management System, the California Standardized Emergency Management System, and other federal and State requirements and standards for emergency response plan applicable as of the date of the plan's preparation. Further, the Evacuation Plan provides guidance only; it is intended for use in further development of response capabilities, implementation of training and exercises, and defining the general approach to incident response.

10.2.4 Local Regulations

Santa Clara County Department of Environmental Health. A CUPA is a local agency that has been certified by CalEPA to implement the local Unified Program. The CUPA can be a County, City, or joint powers authority. A participating agency is a local agency that has been designated by the local CUPA to administer one or more Unified Programs within their jurisdiction on behalf of the CUPA. A designated agency is a local agency that has not been certified by CalEPA to become a CUPA, but is the responsible local agency that would implement the six Unified Programs until they are certified. Currently, there are 83 CUPA's in California. The Santa Clara County Department of Health's Hazardous Materials Compliance Division (HMCD) is the certified CUPA for the EIR Study Area and consolidates, coordinates, and makes consistent the following existing programs:

- Hazardous Materials Release Response Plans and Inventories (Business Plans)
- CalARP Program
- Underground Storage Tank Program
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment (tiered permitting) Programs
- California Uniform Fire Code: Hazardous Materials Management Plans and Hazardous Material Inventory Statements

The County of Santa Clara Ordinance Code, specifically Title B, Division B11, Chapter XIII, contains requirements that pertain to hazardous materials, including containment and disclosure standards; inspections, records, permitting, and enforcement procedures, and remedial action requirements.

Santa Clara County Hazard Mitigation Plan. Pursuant to the Disaster Mitigation Act, the Santa Clara County's Office of Emergency Services prepared an annex to the 2010 ABAG Local Hazard Mitigation Plan (LHMP) to serve as Santa Clara County's Local Hazard Mitigation Plan. The LHMP emerged from a collaborative planning effort that involved the assembly of a Local Planning Team (LPT) comprised of representatives from County departments, private sector businesses, stakeholders, and 13 of the 15 incorporated cities in Santa Clara County, including Palo Alto. The LHMP identifies and prioritizes potential and existing hazards across jurisdictional borders, including hazards that may be further amplified by climate change. In an effort to guide the County's ongoing hazard mitigation efforts, through the life of the LHMP, the following priority mitigation objectives were identified:

- Collaborate as a County and create a county-wide Community Wildfire Protection Plan (CWPP).
- Reduce number of unreinforced masonry/soft-story buildings through demolition or seismic retrofitting.
- Implement a combination of financial incentives and regulated mandates in order to mitigate the clear and present danger of soft-story buildings pervading Santa Clara County.
- Engage infrastructure providers in a cooperative partnership with County government to develop a responsible middle ground sharing the most critical infrastructure information with those stakeholders that have a need to know.
- Collaborate as a County and verify or create the plan for replacing and/or upgrading localized flooding pump systems, including the generation of alternate power to operate these systems.

- Establish a siren system targeted specifically for catastrophic dam failure to provide a complete public warning system in Santa Clara County.

In order to meet these priority mitigation objectives, the LHMP further identifies and prioritizes specific actions for each objective. In addition, the responsible departments, potential funding sources, and target completion date are identified for each mitigation action with the highest priority, in order to guide their implementation.

Palo Alto Airport Comprehensive Land Use Plan. Assembly Bill 2776, which went into effect January 1, 2004, defines an “airport influence area” as the area where airport-related factors “may significantly affect land uses or necessitate restrictions on those uses as determined by an airport land use commission (ALUC).” The California Public Utilities Code establishes airport land use commissions in every county to provide for the orderly development of air transportation and ensure compatible land uses around airports that are open to public use. According to the State Division of Aeronautics, the airport influence area is usually the planning area designated by an airport land use commission for each airport.

A Comprehensive Land Use Plan (CLUP) was adopted in November 2008 by the Santa Clara County ALUC[1] and provides guidance related to the placement of land uses near the Palo Alto Airport. On June 1, 2009, Palo Alto adopted a Resolution 8935 incorporating the County CLUP into the Comprehensive Plan and adding policies the Land Use Element. Specifically, the CLUP seeks to protect the public from adverse effects of aircraft noise, to ensure that people and facilities are not concentrated in areas susceptible to aircraft accidents, and to ensure that no structures or activities adversely affect navigable airspace. Land use compatibility safety zones established by the CLUP are shown on Figure 4.9-1 and discussed further in Chapter 4.9, Land Use and Planning. The safety policies of the CLUP restrict land uses such as schools, hospitals, nursing homes, and other uses in which the majority of occupants are children, elderly, and/or disabled; amphitheaters, sports stadiums and other very high concentrations of people; and storage of fuel or other hazardous materials.

City of Palo Alto Annex to the Santa Clara County Local Hazard Mitigation Plan. In 2005, the City of Palo Alto adopted an Annex to the 2005 ABAG LHMP. The City's LHMP Annex was updated in 2011 through the regional planning process coordinated by ABAG and the local planning process coordinated by Santa Clara County Office of Emergency Services. A resolution approving the City of Palo Alto Annex was adopted in April 2012.

City of Palo Alto Municipal Code. The Palo Alto Municipal Code contains requirements that pertain to hazards and hazardous materials. For example, the purpose of Title 17 of the Municipal Code is the protection of health, life, resources, and property through prevention and control of unauthorized discharges of hazardous materials. Chapter 17.08 addresses materials regulated and those that are excluded. Chapter 17.10 discusses underground storage tank requirements, including fees, permitting and inspection procedures, and monitoring requirements. Chapter 17.12 includes containment standards for new and existing storage facilities. Chapters 17.16 and 17.20 discuss hazardous materials management plans and hazardous materials inventories, respectively. Reporting responsibilities, inspections, and records are discussed in Chapters 17.24 and 17.28. Hazardous materials storage permits are discussed in Chapter 17.32. Section 2.12.050 establishes that the Director of Emergency

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[1] Santa Clara County Airport Land Use Commissions, 2008, Palo Alto Airport Comprehensive Land Use Plan. Referenced by Placeworks in the Comprehensive Plan Update EIR.

Services is accountable to the City Manager.[1] Additionally, this section lays out the official duties of the Director of Emergency Services, which includes being responsible for the request for City Council to proclaim a local emergency, to control and direct the City's emergency organization,[2] and to represent the City in all dealings with public or private agencies on matters pertaining to emergencies and disasters.

City of Palo Alto Zoning Ordinance. The City's Zoning Ordinance, Title 18, Chapters 18.64.010 to 18.64.060, Special Regulations for Hazardous Waste Facilities, contains provisions for new or expanded hazardous waste facilities to comply with certain siting criteria, contained in the Santa Clara County Hazardous Waste Management Plan, in order to assure compatibility with neighboring land uses, adequate mitigation for any identified environmental impacts, and consistency with the City's Comprehensive Plan and zoning and the county hazardous waste management plan.

Palo Alto Fire Department. The Palo Alto Fire Department, pursuant to Titles 15 and 17 of the City's Municipal Code, administers the following programs through the Fire Prevention Bureau:

- California Fire Code (with local amendments)
- Hazardous Materials Storage Ordinance
- Toxic Gas Ordinance

In addition, as a Participating Agency (PA), the Department also administers the following hazardous materials programs:

- Hazardous Materials Business Plans (California Health and Safety Code Chapter 6.95)
- Aboveground Storage Tanks (California Health and Safety Code Chapter 6.67)

Palo Alto Office of Emergency Services. The Mission of the Office of Emergency Services (Palo Alto OES) is to coordinate the unified and efficient use of City resources, outside agencies (mutual aid), and community resources to prevent, prepare for, respond to, and recover from all hazards. OES is responsible for planning, training, and exercises to maintain and improve our operational readiness. OES manages the Emergency Operations Center (EOC) and the new Mobile Emergency Operations Center (MEOC), in collaboration with the Public Safety Answering Point (911 Communications Dispatch Center) for Palo Alto and Stanford University.

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[1] Per the Municipal Code language, the City Manager is the statutory director of emergency services who appoints the assistant director of emergency services (who has the title of Director of Emergency Services or "OES Chief"). Per the recommendations of the outside consulting firm retained by the City Manager: "The City is advised to appoint a Director of Emergency Services assigned at a senior staff level, with a position description that defines specific responsibility for the City's overall emergency/ disaster readiness. ... This position would be a direct report to the City's executive management with organization-wide authority." Available online at http://www.cityofpaloalto.org/civica/filebank/blobdload.asp?BlobID=26844, page 8, accessed October 23, 2015. Per the recommendations of the ICMA Tri-Data study, the Palo Alto Office of Emergency Services is considered a public safety department, along with the Police Department and the Fire Department, and the Director of Emergency Services retains his status as a sworn officer, available online at http://www.cityofpaloalto.org/civica/filebank/blobdload.asp?BlobID=26200, accessed October 23, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[2] See Palo Alto Municipal Code Section 2.12.070.

Palo Alto Department of Public Works, Watershed Protection Group. The Public Works – Watershed Protection group regulates discharges to the sanitary sewer system through permitting, inspection, and enforcement. The Sewer Use Ordinance (Municipal Code Chapter 16.09) prohibits discharge of hazardous waste and regulates the storage of hazardous materials above sinks.

Mercury and Dioxin Elimination Policy. The City in July 2000 approved a Mercury and Dioxin Elimination Policy to eliminate the creation of dioxin and its subsequent release to the environment and to eliminate the use of mercury and its subsequent release to the environment.[1] The mercury elimination strategy focuses on products that contain mercury as an intentional ingredient; laboratory, medical, and manufacturing processes that use mercury; and the combustion of mercury-containing fuels or wastes. The dioxin elimination strategy focuses on products that contain dioxin, manufacturing processes that create dioxin as a by-product, and combustion of fuels or wastes that contain dioxin precursors.

Integrated Pest Management Policy. The City adopted in October 2001 an Integrated Pest Management Policy to reduce or eliminate chemicals to the maximum extent.[2] The policy states that the City will carry out its pest management activities using low-risk integrated pest management techniques, with chemicals used only as a last resort. The policy also states that the City will actively pilot non-toxic alternatives using the most recent technology, best management practices, and least toxic methods available. Lastly, the policy states that the City will educate staff and the public about its integrated pest management commitment.

Environmentally Preferred Purchasing Policy. The City adopted in February 2008 an Environmentally Preferred Purchasing Policy, recognizing its purchases of goods and services can contribute significantly to the success of its sustainability polices and goals. This policy aligns the City's purchases and Purchasing Department policies and procedures with the City's sustainability policies and programs to (1) protect and conserve natural resources; (2) minimize the City's contributions to global warming, solid waste, local, and global pollution, and toxic chemical exposures to people and the environment; and (3) promote human health and well-being.

Emergency Operations Plan and Emergency Services Volunteers Program. The Palo Alto Emergency Operations Plan (EOP), adopted by the City in 2007, establishes the policies and structures for City government management of emergencies and disasters. The EOP prescribes four phases of emergencies and disasters: preparedness, response, recovery, and mitigation/prevention. The EOP is an all-hazard plan. It assigns responsibilities for action and tasks that the City will take to help protect the safety and welfare of its citizens against the treat of natural, technological, and national security emergencies and disasters. It established a base on which further plans procedures, guidelines, arrangements, and agreements can be elaborated. Emergency operations for the City of Palo Alto are consistent with California's Standardized Emergency Management System (SEMS) and the federal National Incident

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[1] City of Palo Alto Mercury and Dioxin Elimination Policy, July 17, 2000. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[2] City of Palo Alto Integrated Pest Management Policy, October 2001. Referenced by Placeworks in the Comprehensive Plan Update EIR.

Management System (NIMS). All components are included in the City's EOP. Additionally, the Palo Alto RWQCP maintains an emergency response plan, as a large industrial facility.

The City also has an Emergency Services Volunteers (ESV) program.[1] The mission of the program is to 1) provide supplemental resources to the professional first responders of the city and communities, and 2) facilitate means for neighbors to help neighbors (including business and other entities). The Emergency Services Volunteers nomenclature is an "umbrella" to include all City-sponsored emergency preparedness volunteer programs, such as Amateur Radio Emergency Services/Radio Amateur Civil Emergency Services (ARES/RACES) (ham radio), Block Preparedness Coordinators (BPCs) and Neighborhood Preparedness Coordinators (NPCs) the Community Emergency Response Team (CERT) volunteers and the Emergency Medical Unit (EMU). The Palo Alto Office OES is the sponsor of the ESV program. In addition, the city participated in development of the Regional Catastrophic Earthquake Mass Transportation/Evacuation Plan.[2] This Plan is an annex to the 2008 San Francisco Bay Area Regional Emergency Coordination Plan and addresses mass transportation/evacuation issues in response to a major earthquake.

10.3 IMPACTS AND MITIGATION MEASURES

10.3.1 Significance Criteria

Based on the CEQA Guidelines, the project would have a significant impact related to hazards and hazardous materials if it would:[3]

(a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

(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;

(c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

(d) Create a significant hazard to the public or the environment from existing hazardous materials contamination by exposing future occupants or users of the site to contamination either in excess of ground soil and groundwater cleanup goals developed for the site or from the location on listed hazardous materials sites complied pursuant to Government Code section 65962.5;

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[1] City of Palo Alto, Emergency Services Volunteers Policy Manual and Standard Operating Procedures, 2013, available online at http://www.cityofpaloalto.org/publicsafety, accessed October 23, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[2] California Emergency Management Agency, 2011, Regional Catastrophic Earthquake Mass Transportation/Evacuation Plan. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[3] CEQA Guidelines, Appendix G, items VII(a-h).

(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 for people residing or working in the project area?

(f) For a project within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the area;

(g) Impact implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or

(h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Regarding criterion (c), there are no existing or planned schools within one quarter mile of the project site. No impact would result, and this issue is not discussed further.

Regarding criteria (e) and (f), the project site is not located within two miles of the Palo Alto Airport, or within the Palo Alto Airport Land Use Plan area, nor is there a private airstrip in the project vicinity. No impacts would result, and these issues are not discussed further.

Regarding criterion (g), chapter 15 (Transportation, Traffic, and Parking) of this EIR evaluates traffic conditions, trip generation, and traffic distribution under the proposed PSB project. Traffic generated by the proposed project would shift existing vehicle trips for emergency police calls from 275 Forest Avenue to the new PSB project site. Based on the analysis in chapter 15, project operation would not interfere with an adopted emergency response plan or evacuation plan. The impact would be less than significant, and no mitigation is required.

Regarding criterion (h), according to the Santa Clara County Fire Hazards Map, the City of Palo Alto is not in a moderate, high, or very high fuel hazard zone. Moreover, the project site and vicinity are a built environment largely devoid of wildfire-prone vegetation (e.g., expanses of grasses and shrubs). No impact would result, and this issue is not discussed further.

10.3.2 Project Use and Storage of Hazardous Materials

The Palo Alto Fire Department requires that project applicants complete a Hazardous Materials Disclosure Checklist, which generally classifies the following materials as hazardous: explosives, compressed gases, flammable and combustible liquids, flammable solids, oxidizers/organic peroxides, pyrophorics, highly toxic/toxic materials, radioactives, corrosives, cryogenics, water reactives, and “other health hazards.”

According to the Hazardous Materials Disclosure Checklist supplied to the Palo Alto Fire Department, Bureau of Fire Prevention, for the proposed PSB (July 19, 2017), the proposed building would include an armory, a diesel fuel tank, and an exhaust hood (for evidence processing). These materials and associated operations would be the same or similar as those at the current police headquarters at the civic center, and are regulated by standard safety and operational procedures currently implemented by the Police Department. Therefore, this impact is considered less than significant (see criterion [a] in section 10.3.1, “Significance Criteria,” above).

According to the Hazardous Materials Disclosure Checklist supplied to the Fire Department for the proposed public parking garage (July 19, 2017), no hazardous materials, as defined by the Fire Department, would be used or stored at the garage. This impact is considered less than significant (see criterion [a] in section 10.3.1, "Significance Criteria," above).

10.3.3 Impacts and Mitigations

Would the project:

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 (Significance Criterion [b]); or

Create a significant hazard to the public or the environment from existing hazardous materials contamination by exposing future occupants or users of the site to contamination either in excess of ground soil and groundwater cleanup goals developed for the site or from the location on listed hazardous materials sites complied pursuant to Government Code section 65962.5 (Significance Criterion [d])?

The Phase I ESA (Northgate) recommended that the City: (1) evaluate groundwater conditions beneath the project site, (2) evaluate potential construction impacts related to dewatering and excavation for the proposed underground parking, (3) evaluate potential indoor air quality impacts related to vapor intrusion, (4) prepare Site Management Plans for managing potentially contaminated soil or groundwater that might be encountered during construction, and (5) because dewatering for construction of underground parking could draw contaminated water from the Shell property onto the PSB project site, the City should evaluate potential groundwater quality impacts related to the former Shell station and prepare Site Management Plans for managing potentially contaminated soil or groundwater that might be encountered during construction.

Following up from the Phase I ESA, the Phase II ESA (Stantec) included conclusions and recommendations, which are summarized below, based on the information included above in section 10.1 (Setting):

Soil chemical data suggest that the PSB project site materials would not be considered hazardous waste for soil disposal purposes, and the site soils should meet acceptance criteria for disposal at a municipal waste landfill. Concentrations of several compounds in soil to be removed exceed conservative, risk-based screening criteria. Chemical concentrations in excess of Tier I ESLs do not preclude potential reuse of the excavated soils for other projects, but additional evaluation of the soils' properties should occur before reuse (the PSB project itself would not require reuse of any of the site's excavated soil).

Groundwater chemical data reported no widespread chemical impacts to the shallow groundwater zone beneath the project site. However, based on the identified local and regional groundwater conditions - such as the site's location within the COE groundwater study area and known or suspected nearby sources of chemically impacted groundwater (see Phase I ESA, above) – it is possible that VOC-impacted groundwater could be encountered during dewatering and excavation for the PSB project. Stantec recommends additional assessment of local and regional groundwater conditions in advance of dewatering activities, combined with evaluation of pertinent and cost-effective water management strategies; this process, if necessary, could be accomplished during a more detailed level of project design, when more specific and precise design and construction details have been formulated. Likewise, the project must comply with the City's standard dewatering requirements, which are described in EIR chapter 11 (Hydrology and Water Quality), section 11.2.3 (Regional and Local Programs and Regulations, "Construction Dewatering System Policy").

Impact 10-1: Potential Project-Related Exposure to Existing Soil or Groundwater Contamination. Project-related excavation and construction activities could expose on-site construction personnel, employees, and members of the public to existing soil and groundwater contamination. This current situation is considered a ***potentially significant impact*** (see criteria [b] and [d] in section 10.3.1, "Significance Criteria," above).

To the extent that the proposed PSB project could involve removing existing contaminants from soil and groundwater, it could be beneficial over the long term.

Mitigation 10-1. Recommendations included in the Phase II ESA (Stantec, June 8, 2017) shall be implemented, based on construction-level project plans when more specific and precise design and construction activities are formulated. The Phase II ESA recommends additional assessment of local and regional groundwater conditions in advance of dewatering activities, combined with, as necessary, evaluation of pertinent and cost-effective water management strategies, including preparation of Site Management Plans. Likewise, the project must comply with the City's standard dewatering requirements. This assessment and mitigation process shall be subject to review and approval by the City Engineer. Implementation of these mitigations would reduce this impact to a ***less-than-significant level***.

11. HYDROLOGY AND WATER QUALITY

This EIR chapter describes the hydrology and water quality implications of the proposed PSB project. The chapter addresses the specific hydrology and water quality impact concerns identified by the CEQA Guidelines--i.e., would development under the proposed project violate water quality or waste discharge standards (including wastewater treatment requirements); deplete or interfere with groundwater supplies; alter drainage patterns; degrade water quality; place structures within a 100-year flood zone; expose people to flooding; or expose people to a seiche, tsunami, or mudflow.[1]

11.1 SETTING

This section includes a discussion of the existing hydrology and water quality conditions in Palo Alto, as relevant to the proposed PSB project.

11.1.1 Climate

Palo Alto is located within a Mediterranean-type climate zone, with almost all precipitation falling between the months of October and May. Due to the Santa Cruz Mountains to the west, there is a "rain shadow" in Palo Alto, resulting in an average annual rainfall of only 15.21 inches.[2] Temperatures in Palo Alto tend to be fairly mild, with an average annual high of 69 degrees Fahrenheit (°F) and an average annual low of 47°F. The hottest temperatures occur in July and August, with an average maximum temperature of 78.4°F, and the coldest temperatures occur in January, with an average minimum temperature of 38.5°F.

11.1.2 Hydrology and Surface Water Drainage

The City of Palo Alto lies within the Santa Clara Basin watershed.[3] This watershed can be further divided into four smaller watersheds that are within the city boundaries: (1) San Francisquito Creek watershed, (2) Matadero Creek watershed, (3) Barron Creek watershed, and (4) Adobe Creek watershed. Matadero Creek is the closest waterbody to the project site and is located approximately 0.4 miles east of the site. In addition to the natural drainage system throughout the City, a network of storm drains collects runoff from city streets and carries it to the creeks and San Francisco Bay. Staff within the City's Storm Drain Enterprise Fund approves, constructs, and maintains the storm drainage system in Palo Alto. The system includes over 107 miles of underground pipelines, 2,750 catch basins, 800 manholes, and eight

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[1] CEQA Guidelines, Appendix G, items IX (a through j) and XVII (a).

[2] Western Regional Climate Center, 2015, Period of Record Monthly Climate Summary, Palo Alto, California (046646). Referenced by Placeworks in the Comprehensive Plan Update EIR.

[3] Santa Clara Valley Water District, 2003, WMI Watershed Characteristics Report. Revised 2003 Edition. Referenced by Placeworks in the Comprehensive Plan Update EIR.

pump stations.[1] Some sections of the system are inadequately designed to handle runoff during heavy rains, causing localized street flooding. The City has a Storm Drain Oversight Committee that reviews the expenditure and budgeting of monies from the storm drainage fees collected by the City since 1989 to fund storm drain capital improvements, maintenance, and stormwater quality protections programs.[2]

The City of Palo Alto requires all new storm drain facilities be designed in conformance with the 2015 Storm Drain Master Plan and the associated Palo Alto Drainage Design Standards dated June 27, 2015 and to convey the 10-year storm event with the Hydraulic Grade Line 0.5-foot below storm drain inlet grate elevations. The Santa Clara Valley Water District (SCVWD) is responsible for maintenance and improvements in the creeks and flood control channels; their design standards are to contain the 100-year flood. Creeks and flood control channels are designed to higher standards because they are regional drainage facilities with the potential to inflict substantial property damage and injury or death over a widespread area, whereas storm drain overflows typically result in localized flooding of streets and intersections.

11.1.3 Groundwater

Palo Alto lies within the Santa Clara Subbasin of the Santa Clara Valley Groundwater Basin.[3] The Santa Clara Subbasin extends from the southern edge of San Francisco Bay through the Coyote Valley, with the boundary located at approximately Cochrane Road in Morgan Hill.

Palo Alto purchases 100 percent of its potable water from the San Francisco Public Utilities Commission (SFPUC). This water is delivered from the City and County of San Francisco's Regional Water System (RWS), operated by the SFPUC. This supply is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties.

Non-potable shallow groundwater levels within Palo Alto typically range from 4 to 95 feet bgs, with an average value of about 19 feet bgs.[4] The City owns eight deep-groundwater wells, with a combined total rated capacity of 10,000 gallons per minute (gpm). These wells are currently available for emergency use should the Hetch Hetchy water supply system be unable to meet the City's needs during a drought or emergency period.

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[1] City of Palo Alto, 2014, Storm Drain System Facts and Figures, http://www.cityofpaloalto.org/civicax/filebank/documents/2806, accessed October 20, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[2] City of Palo Alto, 2014, Storm Drain Oversight Committee, http://www.cityofpaloalto.org/gov/agendas/committees/storm_drain/default.asp, accessed October 20, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[3] Santa Clara Valley Water District, 2012, 2012 Groundwater Management Plan. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[4] Gregg Drilling, 2015, Northern California Groundwater Depth Chart, http://www.greggdrilling.com/docs-and-datasheets/label/groundwater-depth-table, accessed October 20, 2015 by Placeworks for the Comprehensive Plan Update EIR.

There are both shallow and deep aquifers beneath the City of Palo Alto. The shallow, unconfined aquifer, sometimes called perched water, is recharged by rainwater infiltration, water percolating through stream beds, and landscape irrigation. The typical depth to the shallow aquifer is 10 to 30 feet bgs in most areas of Palo Alto, except the hills. This water is non-potable and does not meet drinking water standards. The shallow aquifer is often encountered during construction activities such as basement excavations, thus requiring dewatering.

The deep aquifer beneath Palo Alto occurs under confined conditions. In the confined zone, lower permeability clay and silt deposits restrict the downward flow of groundwater and separate shallow and deep aquifer zones. These low permeability deposits also provide some natural protection to deeper aquifers as they restrict the movement of contaminants.[1]

11.1.4 Water Quality

Surface water quality is affected by point source and non-point source pollutants. Point source pollutants are those emitted at a specific point, such as a pipe, while non-point source pollutants are typically generated by surface runoff from diffuse sources, such as agricultural drainage. Point source pollutants from industrial sources within the city are controlled with pollutant discharge regulations, such as the Sewer Use Ordinance and other permit requirements. Industrial stormwater discharge is controlled by obtaining coverage under the Industrial General Permit issued by the State Water Resources Control Board (SWRCB). Wastewater discharged from the Regional Water Quality Control Plant (RWQCP) is regulated by a National Pollutant Discharge Elimination System (NPDES) permit. Non-point source pollutants such as those contained in urban stormwater and non-stormwater runoff are more difficult to monitor and control, although they are important contributors to poor surface water quality in urban areas.

Stormwater runoff pollutants vary with land use, topography, the amount of impervious surface, as well as the amount and frequency of rainfall and irrigation practices. Runoff in developed areas typically contains oil, grease, litter, and metals accumulated in streets, driveways, parking lots, and rooftops, as well as pesticides, herbicides, particulate matter, nutrients, animal waste, and other oxygen-demanding substances from landscaped areas. The highest pollutant concentrations usually occur at the beginning of the wet season during the “first flush.”

Santa Clara Valley streams do not receive direct discharges from industrial or municipal wastewater.[2] Industrial discharges are routed to municipal sanitary sewers and then to regional municipal wastewater treatment plants that discharge to the tidal sloughs of San Francisco Bay. In general, pollutant concentrations in stormwater runoff do not vary significantly within an urbanized watershed. However, pollutant concentrations do increase when impervious cover is more than 40 to 50 percent of the drainage area.[3] Runoff volume is the most important variable in predicting pollutant loads.

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[1] Santa Clara Valley Water District, 2012, 2012 Groundwater Management Plan. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[2] Santa Clara Basin Watershed Initiative, 2003, Volume 1, Watershed Characteristics Report. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[3] Santa Clara Basin Watershed Initiative, 2003, Volume 1, Watershed Characteristics Report. Referenced by Placeworks in the Comprehensive Plan Update EIR.

The San Francisco Bay RWQCB monitors surface water quality through implementation of the Basin Plan and designates beneficial uses for surface water bodies and groundwater within the Santa Clara Valley.

In addition to the establishment of beneficial uses and water quality objectives, another approach to improving water quality is a watershed-based methodology that focuses on all potential pollution sources and not just those associated with point sources.

11.1.5 Flooding

FEMA prepares maps of the 100-year flood hazard area of United States communities. Areas within the 100-year flood hazard area are subject to 100-year floods, which mean that in any given year, the risk of flooding in the designated area is one percent. Maps are also available for 500-year floods, which mean that in any given year, the risk of flooding in the designated area is 0.2 percent. In some locations, FEMA also provides a measurement of base flood elevation for the 100-year flood, which is the minimum height of the flood waters during a 100-year event; base flood elevation is reported in feet above sea level based on the North American Vertical Datum (NAVD 1988). Depth of flooding is determined by subtracting the land's height above sea level from the base flood elevation. Areas within the 100-year flood hazard area are subject to federal requirements, which include mandatory flood insurance purchase for all federally backed real estate loans and minimum building standards to reduce flood damage.

In an effort to reduce the risk of loss of life, health, and property due to periodic flood inundation, the City of Palo Alto has adopted a Flood Hazard Regulations Ordinance (Palo Alto Municipal Code, Chapter 16.52). The building regulations require that new or substantially improved structures' lowest finished floor elevation be constructed at or above the base flood elevation (BFE) of the 100-year floodplain to protect the building and improvements from flood damage. The City Engineer is responsible for enforcing this ordinance.

The PSB project site is not within a 100-year flood hazard area as mapped by FEMA (Comprehensive Plan Update EIR Figure 4.8-3 – 100-Year Flood Zones).

11.1.6 Sea Level Rise

California Executive Order S-13-2008 states that all State agencies planning construction projects in areas vulnerable to sea level rise must consider a range of sea level rise scenarios for the years 2050 and 2100 to assess project vulnerability and to the extent feasible, reduce expected risks to sea level rise.[1] BCDC has jurisdiction to regulate new development within 100 feet inland from the Bay shoreline. Local governments retain authority over development more than 100 feet inland from the Bay shoreline.

The National Oceanic and Atmospheric Administration (NOAA) has produced a sea level rise scenario map for long range planning.[2] The map can be used to approximate the areas that

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[1] State of California, Executive Order S-13-08, http://gov.ca.gov/news.php?id=11036, accessed October 21, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[2] National Oceanic and Atmospheric Administration, 2015, Sea Level Rise and Coastal Flooding Impacts, http://coast.noaa.gov/slr/, accessed October 21, 2015 by Placeworks for the Comprehensive Plan Update EIR.

would be vulnerable to projected 16-inch and 55-inch scenarios. Much of the area north of Middlefield Road is vulnerable to a projected sea level rise of 55 inches. There are many critical City facilities within the projected area of sea level rise, including fire stations, pump stations, utility control stations, airport, and the RWQCP. Some of these facilities are also within the 100-year floodplain.

The PSB project site is not in an area vulnerable to sea level rise (Comprehensive Plan Update Figure 4.8-4 – Sea Level Rise), nor is it within BCDC jurisdiction.

11.1.7 Dam Inundation

Dam failure is the uncontrolled release of impounded water behind a dam. Flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, and terrorism can all cause a dam to fail.[1] Dam failure can occur with little warning. Intense storms may produce floods in a few hours or even minutes for upstream locations. Dam failure is a very rare occurrence. There is no historic record of dam failure in Santa Clara County or Palo Alto.[2] The CalOES is required by State law to work with State and federal agencies, dam owners and operators, municipalities, floodplain managers, planners, and the public to make available dam inundation maps.[3] Dam inundation maps are used in the preparation of Local Hazard Mitigation Plans (LHMPs) and General Plan Safety Element updates. In addition, CalOES requires all dam owners to develop Emergency Action Plans (EAPs) for warning, evacuation, and post-flood actions in the event of a dam failure.

Several reservoirs in the area present the remote risk of downstream inundation in the event of a dam failure as the result of an earthquake or other catastrophic event. Dams that pose an inundation threat to the City of Palo Alto are:[4]

- Searsville Reservoir
- Felt Lake
- Lagunita Reservoir

The potential inundation zone is mainly in the western portion of Palo Alto, west of the Oregon Expressway. No probability data are available for Bay Area dam failure hazards, because when a dam is known to have a failure potential, the water level is reduced, as required by the State Division of Safety of Dams and by safety protocols established by dam owners, and, as described above, there have been no dam failures in Santa Clara County.

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[1] California Office of Emergency Services, 2013, California Multi-Hazard Mitigation Plan. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[2] Santa Clara County, 2011, Annex to 2010 Association of Bay Area Local Hazard Mitigation Plan. Taming Natural Disasters. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[3] California Office of Emergency Services, 2013, California Multi-Hazard Mitigation Plan. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[4] California Office of Emergency Services, 2009. Dam Inundation Registered Images and Boundary Files in Shape Format, Version DVD 3. Referenced by Placeworks in the Comprehensive Plan Update EIR.

On the Dam Inundation Map, the PSB project site is shown as on the edge of the dam inundation zone for Lagunita Reservoir. Stanford University also owns and operates Lagunita Reservoir, which used to be filled with diversion from San Francisquito Creek to allow recreational use by students. However, the lake has not been filled since the late 1990s and today serves as a drainage basin with vernal pools. Stanford University is also considering removing the dam in the future. Because of the lack of water behind the dam, the actual dam inundation zone is minimal to non-existent as compared to that shown on the City's Dam Inundation Map.

Based on the discussion above (e.g., emergency plans and smaller zones), dam inundation is not considered a potential impact for the PSB project.

11.1.8 Tsunami, Seiche, and Mudflow

(a) Tsunami. A tsunami is a series of traveling ocean waves generated by a rare, catastrophic event, including earthquakes, submarine landslides, and volcanic eruptions. Tsunamis can travel over the ocean surface at speeds of 400 to 500 miles per hour (mph) or more, and wave heights at the shore can range from inches to an excess of 50 feet. According to the Association of Bay Area Governments (ABAG) Tsunami Inundation Map, only the Baylands area of Palo Alto is located within the tsunami inundation zone.[1] Since the Baylands is a large area of undisturbed marshlands open for recreational access, it is unlikely that in the event of a tsunami, people, or structures within Palo Alto would be exposed to a significant risk of loss, injury, or death due to flooding.

In addition, Santa Clara County and the City of Palo Alto are an integral part of the tsunami warning system that would be implemented to evacuate and protect citizens of Palo Alto in the unlikely event that a tsunami occurs.

The PSB project site is not subject to the potential effects of a tsunami.

(b) Seiche. A seiche is an oscillation wave generated in a closed or partially closed body of water, which can be compared to the back-and-forth sloshing in a bath tub. Seiches can be caused by winds, changes in atmospheric pressure, underwater earthquakes, tsunamis, or landslides into the water body. Bodies of water such as bays, harbors, reservoirs, ponds, and swimming ponds can experience seiche waves up to several feet in height during a strong earthquake. The city is located next to San Francisco Bay, and a small portion of the Baylands is within the tsunami inundation zone. A seiche could theoretically occur in the Bay as the result of an earthquake or other disturbance, but the threat of flooding would be no greater than the threat of tsunami inundation in the tsunami inundation zone. In addition, there are no large bodies of water within the City of Palo Alto. Therefore, seiches could occur in the Baylands area, but the potential impact to the City of Palo Alto would be minimal.

The PSB project site is not subject to the potential effects of a seiche.

(c) Mudflow. Mud and debris flows are mass movements of dirt and debris that occur after intense rainfall, earthquakes, and severe wildfires. According to the ABAG map of rainfall-

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[1] Association of Bay Area Governments, 2015, Interactive Tsunami Inundation Map, http://gis.abag.ca.gov/website/Hazards/?hlyr=tsunami, accessed on October 21, 2015 by Placeworks for the Comprehensive Plan Update EIR.

induced landslides, there are several small, isolated areas in the southern, mountainous portion of Palo Alto that have been subject to rainfall-induced landslides in the past.[1] ABAG also provides maps that show debris flow source areas.[2] The source areas are all in the southern, mountainous area of Palo Alto which is maintained as open space. Therefore, the potential for a debris flow to impact residents of Palo Alto is minimal.

The PSB project site is not subject to the potential effects of mudflow.

11.2 REGULATORY SETTING

The following section summarizes key federal, State, and local regulations, policies, and programs that pertain to hydrology and water in Palo Alto, as relevant to the proposed PSB project.

11.2.1 Federal Regulations

Federal Emergency Management Agency. The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in floodplains.[3] FEMA also issues Flood Insurance Rate Maps (FIRMs) that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection is established by FEMA. FEMA's minimum level of flood protection for new development is the 100-year flood event, also described as a flood that has a one in 100 chance of occurring in any given year.

Minimum NFIP floodplain management building requirements are applicable to some properties in Palo Alto per Title 44 of the Code of Federal Regulations, Parts 59 through 65. As required by these regulations, all new and substantially-improved buildings constructed within a designated floodplain (i.e., Special Flood Hazard Zones A, AE, AO, and AH, as delineated on the FIRM) must be elevated so that the lowest floor is at or above the base flood elevation level in accordance with the effective FIRM.

Upon completion of any development or flood protection project that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision, as soon as practicable, but not later than six months after such data becomes available.

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[1] Association of Bay Area Governments, 2014, Interactive Rainfall-Induced Landslides Map, http://gis.abag.ca.gov/website/LandslideDistribution/index.html, accessed February 4, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[2] Association of Bay Area Governments, 2014, Interactive Rainfall-Induced Landslides: Debris Flow Source Areas, http://gis.abag.ca.gov/website/LandslideDebrisFlow/index.html, accessed February 4, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[3] Federal Emergency Management Agency's website, http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping, accessed October 20, 2015 by Placeworks for the Comprehensive Plan Update EIR.

Clean Water Act. The United States Environmental Protection Agency (EPA) is the lead federal agency responsible for water quality management. The Clean Water Act of 1972 (CWA, codified at Title 33 of the United States Code, Sections 1251 through 1376) is the primary federal law that governs and authorizes water quality control activities by the EPA, as well as by the states.

National Pollutant Discharge Elimination System. The National Pollutant Discharge Elimination System (NPDES) permit program was established by the CWA to regulate municipal and industrial discharges to surface waters of the United States, including discharges from municipal separate storm sewer systems (MS4s). Federal NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges and urban stormwater runoff. NPDES permits generally identify effluent and receiving water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge; prohibitions on discharges not specifically allowed under the permit; and provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities.

Under the NPDES program, all facilities that discharge pollutants into waters of the United States are required to obtain an NPDES permit. Requirements for stormwater discharges are also regulated under this program. In California, the NPDES permit program is administered by the SWRCB through the nine RWQCBs. The City of Palo Alto is subject to the waste discharge requirements of the Municipal Regional Stormwater Permit (Order No. R2-2015-0049) and NPDES Permit No. CAS612008, issued on November 19, 2015 and in effect starting on January 1, 2016. Santa Clara County, the Santa Clara Valley Water District, and eleven cities and two towns, including Palo Alto, are co-permittees within Santa Clara County under the Permit, which covers a total of 76 co-permittees in the Bay Area.

Under Provision C.3 of the Municipal Regional Stormwater Permit (MRP), the co-permittees use their planning authorities to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects. The measures address both soluble and insoluble stormwater runoff pollutant discharges and prevent increases in runoff flows, primarily through the implementation of low impact development (LID) techniques. In addition, one of the new provisions under the recently issued MRP is the requirement to implement a Green Infrastructure Plan that incorporates LID drainage design into storm drain infrastructure on public and private land, including streets, roads, storm drains, parking lots, building roofs, and other storm drain infrastructure elements. The intent of the Plan is to shift from “gray” or traditional storm drain infrastructure, where runoff flows directly into the storm drain and then into the receiving water, to a more sustainable “green” system that slows runoff by dispersing it to vegetated areas, harvests and uses runoff, promotes infiltration and evapotranspiration, and uses bioretention and other green infrastructure practices to clean stormwater runoff.

The NPDES Program also covers stormwater discharges and waste discharge requirements (WDRs) for industrial activities. The NPDES General Permit for stormwater industrial discharges was revised and became effective on July 1, 2015 as Order No. 2014-0057-DWQ and NPDES No. CAS000001. Designated industrial sources are required to submit Permit Registration Documents (PRDs) to the SWRCB, implement Best Available Technology (BAT), prepare a Stormwater Pollution Prevention Control Plan (SWPPP), and comply with stormwater monitoring requirements. The NPDES Program also regulates point discharges through the WDR program. One wastewater NPDES permit has been issued to the City of Palo Alto for the

Regional Water Quality Control Plant (RWQCP), which is the regional wastewater treatment plant that serves the Cities of Los Altos, Los Altos Hills, Palo Alto, and Mountain View; the East Palo Alto Sanitary District; and Stanford University. The WDR permit requirements are set forth in Order No. R2-2014-0024 (NPDES No. CA0037834). The RWQCP also must comply with two watershed permits, the region-wide Mercury and PCB Watershed Permit (Order No. R2-2012-0096) and the Nutrient Watershed Permit (Order No. R2-2014-0014).

11.2.2 State Regulations

Porter-Cologne Water Quality Control Act. The Porter-Cologne Water Quality Act (California Water Code Sections 13000 et seq.) is the basic water quality control law for California. The act established the SWRCB and divided the State into nine regional basins, each under the jurisdiction of a RWQCB. The SWRCB is the primary State agency responsible for the protection of California's water quality and groundwater supplies. The RWQCBs carry out the regulation, protection, and administration of water quality in each region. Each regional board is required to adopt a water quality control plan or basin plan that recognizes and reflects the regional differences in existing water quality, the beneficial uses of the region's ground and surface water, and local water quality conditions and problems.

The Porter-Cologne Water Quality Act also authorizes the SWRCB and RWQCBs to issue and enforce waste discharge requirements (WDRs), NPDES permits, Section 401 water quality certifications, or other approvals. Other State agencies with jurisdiction over water quality regulation in California include the California Department of Health Services (DHS) (for drinking water regulations), the California Department of Pesticide Regulation, the CDFW, and the Office of Environmental Health and Hazard Assessment (OEHHA).

State Water Resources Control Board. In California, the State Water Resources Control Board (SWRCB) has broad authority over water quality control issues. The SWRCB is responsible for developing statewide water quality policy and exercises the powers delegated to the State by the federal government under the CWA.

Construction activities that disturb one or more acres of land that could impact hydrologic resources must comply with the requirements of the SWRCB Construction General Permit (CGP) (2009-0009-DWQ) as amended by 2010-0014-DWQ and 2012-006-DWQ. Under the terms of the permit, applicants must file Permit Registration Documents (PRDs) with the SWRCB prior to the start of construction. The PRDs include a Notice of Intent (NOI), risk assessment, site map, SWPPP, annual fee, and a signed certification statement. The PRDs are now submitted electronically to the SWRCB via the Storm Water Multiple Application and Report Tracking System (SMARTS) website.

Applicants must also demonstrate conformance with applicable best management practices (BMPs) and prepare a SWPPP containing a site map that shows the construction site perimeter; existing and proposed buildings, lots, roadways, stormwater collection, and discharge points; general topography both before and after construction; and drainage patterns across the project site. The SWPPP must list BMPs that will be implemented to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources. Additionally, the SWPPP must contain a visual monitoring program, a chemical monitoring program for nonvisible pollutants if there is a failure of the BMPs, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Some sites also require implementation of a Rain Event Action Plan (REAP). The CGP (2010-0014-

DWQ), effective on September 2, 2012, also requires applicants to comply with post-construction runoff reduction requirements. Under the Municipal Regional Stormwater Permit, City inspectors inspect sites over one acre, and those in high-priority areas monthly during the wet season.

Emergency Services Act. The Emergency Services Act, under California Government Code Section 8589.5(b), calls for public safety agencies whose jurisdiction contains populated areas below dams to adopt emergency procedures for the evacuation and control of these areas in the event of a partial or total failure of the dam. The Governor's Office of Emergency Services (CalOES), formerly the California Emergency Management Agency (CalEMA), is responsible for the coordination of overall State agency response to major disasters and assisting local governments in their emergency preparedness, response, recovery, and hazard mitigation efforts. In addition, the CalOES Dam Safety Program provides assistance and guidance to local jurisdictions on emergency planning for dam failure events and is also the designated repository of dam failure inundation maps.

Division of Safety of Dams. Since 1929, the State of California has supervised all non-federal dams in California through the Dam Safety Program under the jurisdiction of the Department of Water Resources, Division of Safety of Dams (DSOD).

The DSOD engineers and engineering geologists review and approve plans and specifications for the design of dams and oversee their construction to ensure compliance with approved plans and specifications. Reviews include site geology, seismic setting, site investigations, construction material evaluation, dam stability, hydrology, hydraulics, and structural review of appurtenant structures. In addition, the DSOD engineers inspect over 1,200 dams on a yearly schedule to ensure they are performing and being maintained in a safe manner.

State Updated Model Water Efficient Landscape Ordinance (AB 1881). The California Department of Water Resources (DWR) requires cities and counties in California to enforce a Water Efficient Landscape Ordinance (WELO) or local ordinance that is at least as effective as the State's model ordinance (MWELO) in terms of achieving water savings. The City of Palo Alto integrated its outdoor water use efficiency guidelines into the adoption of the State Green Building Standards Code (CALGreen). The City's new Green Building Ordinance, which incorporates CALGreen with local amendments, covers more landscaping projects than the DWR MWELO and requires eligible projects to adhere to a stricter water budget than the MWELO, resulting in lower allowable water use.

11.2.3 Regional and Local Programs and Regulations

San Francisco Bay Regional Water Quality Control Board. As described above, regional authority for planning, permitting, and enforcement related to water quality is delegated to the nine RWQCBs. The regional boards are required to formulate and adopt water quality control plans for all areas in the region and establish water quality objectives in the plans.

The San Francisco Bay RWQCB addresses region-wide water quality issues through the creation of the Water Quality Control Plan for San Francisco Bay Basin (Basin Plan). The Basin Plan was updated most recently in March 2015. This Basin Plan designates beneficial uses of the State waters within Region 2, describes the water quality that must be maintained to support such uses, and provides programs, projects, and other actions necessary to achieve the standards established in the Basin Plan.[1]

Santa Clara Valley Water District. The Santa Clara Valley Water District (SCVWD) is a water resources agency responsible for balancing flood protection needs with the protection of natural water courses and habitat in the Santa Clara Valley. SCVWD serves 16 cities and 1.8 million residents; providing wholesale water supply, operating three water treatment plants, and providing flood protection along the creeks and rivers within the county. The Safe, Clean Water and Natural Flood Protection Program was approved by Santa Clara County voters in November 2012 to create a countywide special parcel tax to accomplish the following four goals:[2]

- Ensure a safe, reliable water supply for the future
- Reduce toxins, hazards, and contaminants, such as mercury and pharmaceuticals, in our waterways
- Protect our water supply and local dams from the impacts of earthquakes and natural disasters
- Restore fish, bird and wildlife habitat and provide open space access
- Provide flood protection to homes, businesses, schools, streets, and highways.

The 15-year program is overseen by an external independent monitoring committee and the results of these efforts and expenditures are published in annual reports. In addition, the SCVWD has developed the Water Supply and Infrastructure Master Plan, which provides the strategy for meeting the county's future water demands to the year 2035 with a combination of reliable water supply sources and conservation programs. Groundwater in the Santa Clara Basin is also managed by SCVWD through its 2012 Groundwater Management Plan.[3] The SCVWD also prepares an Urban Water Management Plan (UWMP) that provides information on water supply sources, historical water usage, water conservation programs, demand projections, water shortage contingencies, and water quality.

The SCVWD reviews plans for development projects near streams to ensure that the proposed storm drain systems and wastewater disposal systems will not adversely impact water quality in the streams. In addition, the SCVWD reviews projects for conformance to SCVWD flood control design criteria, stream maintenance and protection plans, and groundwater protection programs.

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[1] San Francisco Bay Regional Water Quality Control Board, 2015, San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan). Referenced by Placeworks in the Comprehensive Plan Update EIR.

[2] Santa Clara Valley Water District, http://www.valleywater.org/programs/cleansafecreeksplan.aspx, accessed October 20, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[3] Santa Clara Valley Water District, 2012, 2012 Groundwater Management Plan. Referenced by Placeworks in the Comprehensive Plan Update EIR.

On October 24, 2006, the SCVWD adopted the Water Resources Protection Ordinance (Ordinance 06-1).[1] This ordinance established the policy through which, beginning on February 28, 2007, the SCVWD issues permits for modifications, entry, use, or access to SCVWD facilities or easements. This ordinance was adopted following the creation of the guidelines and standards for land use near streams by the Santa Clara Valley Water Resources Protection Collaborative (Collaborative). The Collaborative was formed in 2003 and includes the SCVWD and representatives from the County of Santa Clara, the cities within the county (including the City of Palo Alto), the Guadalupe-Coyote Resource Conservation District, the San Francisco Bay RWQCB, and representatives of various community interests.[2] The Collaborative members share the water and watershed resources protection goals of flood management, drinking water quality and adequate quantity, surface and groundwater quality and quantity, and habitat protection and enhancement throughout the county.

Santa Clara Valley Urban Runoff Pollution Prevention Program. The Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) is an association of thirteen Cities and Towns in the Santa Clara Valley, together with the County of Santa Clara and the SCVWD. The RWQCB has permitted Bay Area municipalities, including the member agencies of SCVURPPP, to implement stormwater regulations. SCVURPPP incorporates regulatory, monitoring, and outreach measures aimed at improving the water quality of South San Francisco Bay and the streams of the Santa Clara Valley to reduce pollution in urban runoff to the “maximum extent practicable.” SCVURPPP promotes stormwater pollution prevention within that context. Participating agencies (including the City of Palo Alto) must meet the provisions of the Municipal Regional Stormwater Permit by ensuring that new development and redevelopment mitigate water quality impacts to stormwater runoff both during the construction and operation of projects. In addition, other provisions of the Municipal Regional Stormwater Permit include construction site control, water quality monitoring program, pollutants of concern control programs (including litter, PCBs, mercury, pesticides, and copper), watershed management, illicit discharge detection and elimination, industrial and commercial site controls, municipal operations, and public information/participation.

The Municipal Regional Stormwater Permit also requires development of a Hydromodification Management Plan (HMP) to manage increased peak runoff flows and volumes and avoid erosion of stream channels and degradation of water quality caused by new and redevelopment projects. The permit was issued to cover “surface runoff generated from various land uses in all the hydrologic sub basins in the basin which discharge into watercourses, which in turn flow into South San Francisco Bay.” Projects in susceptible areas, as defined by the HMP Applicability Map for Palo Alto, are subject to hydromodification management (HM) requirements.[3]

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[1] Santa Clara Valley Water District, 2006, Water Resource Protection Ordinance 06-1, http://www.valleywater.org/uploadedFiles/Programs/BusinessInformationPermits/Permits/Ordinance071213%281%29.pdf, accessed October 20, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[2] Santa Clara Valley Water District, 2015, Water Resources Protection Collaboration, http://www.valleywater.org/Programs/WRPC.aspx, accessed October 20, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[3] Santa Clara Valley Urban Runoff Pollution Prevention Program, 2015, Hydromodification Management, Local HM Applicability Maps, http://www.scvurppp-w2k.com/nd_wp.shtml#hmp, accessed October 12, 2015 by Placeworks for the Comprehensive Plan Update EIR.

Provision C.10 of the MRP requires a reduction in trash loads from municipal separate storm sewer systems of 40 percent by 2014, 70 percent by 2017, and 100 percent by 2022.

Santa Clara Basin Watershed Management Initiative. The Santa Clara Basin Watershed Management Initiative (WMI) was initiated in 1996 by the EPA, the SWRCB, and the San Francisco Bay RWQCB to address all sources of pollution that threaten the Bay and to protect water quality throughout Santa Clara Basin watersheds. In the past, specific issues affecting watersheds had been addressed by separate regulatory actions, resulting in a "patchwork" approach. A major aim of the WMI is to coordinate existing regulatory activities on a basin wide scale, ensuring that problems are addressed efficiently and cost effectively.

The Santa Clara Basin WMI consists of 34 collaborative groups from regional and local public agencies; civic, environmental, resource conservation and agricultural groups; professional and trade organizations; business and industrial sectors; and the general public. The purpose of the WMI is “to develop and implement a comprehensive watershed management program – one that recognizes that healthy watersheds mean addressing water quality problems and quality of life issues for the people, animals, and plants that live in the watershed.”[1] The WMI has continued to develop its foundation by producing a watershed assessment report (2003), a watershed action plan (2003), a plastics pollution prevention summit (2011), impacts of homelessness on creeks report (2011), and educational materials to reduce water usage by the general public.[2]

Part of the WMI is the Zero Litter Initiative (ZLI) that brings together multiple cities and agencies with a common interest in preventing litter and reducing trash loads into local streets, transportation corridors, neighborhoods, creeks, and the Bay. Key players include staff from the Cities of Palo Alto, San Jose, and Campbell; the Santa Clara Valley Water District; CalTrans; the Santa Clara Valley Transportation Authority (VTA); and SCVURPPP. The WMI is in the process of finalizing and beginning implementation of the strategic plan for eliminating trash throughout Santa Clara County. The initiatives include engagement with the business community, legislative advocacy, managing the impacts of trash from homeless encampments, and actions to reduce highway litter.

Initiatives in Palo Alto include banning single-use checkout bags retail and food service establishments, banning restaurant and retail use and distribution of plastic foam products (e.g., Styrofoam™ foodware and packaging), expanding smoking ordinances to reduce cigarette butt litter, adopting City green purchasing policies and procedures to reduce the purchase of products and/or accompanied packaging that may contribute to litter, pursuing alternatives to single use takeout food containers, anti-litter campaigns with education and outreach, improving the removal of trash in local creeks with trash booms, and conducting creek cleanup events.[3]

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[1] San Francisco Bay Regional Water Quality Control Board, 2015, San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan), page 4-6. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[2] Santa Clara Basin Watershed Management Initiative, 2015, http://www.scbwmi.org/index.htm, accessed October 20, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[3] Palo Alto Regional Water Quality Control Plant, 2015, Clean Bay Pollution Prevention Plan 2015. Referenced by Placeworks in the Comprehensive Plan Update EIR.

City of Palo Alto Municipal Code. Seven chapters of the City of Palo Alto Municipal Code contain directives pertaining to hydrology and water quality issues, as explained in the following paragraphs:

- Sewer Use Ordinance – Chapter 16.09. The Sewer Use Ordinance is designed to reduce the amount of pollutants that enter the sanitary sewer, the storm drain system, or surface waters that would obstruct or damage the sanitary sewer or storm drain system or interfere with, inhibit or disrupt the Palo Alto RWQCP or its treatment processes. The intent of the ordinance is to provide a program for protection of the storm drain system and pretreatment of industrial wastes which is approved by federal and State regulatory agencies.

- Stormwater Pollution Prevention – Chapter 16.11. This chapter provides the stormwater requirements for projects conducted within the City of Palo Alto and is consistent with the requirements of the San Francisco RWQCB's Municipal Regional Permit.

- Recycled Water – Chapter 16.12. This chapter requires that identified customers and applicants for new or redevelopment projects within the boundaries of a recycled water project area use treated nonpotable water for construction, toilet and urinal flushing, and irrigation, resulting in an increase in the amount of potable water available for other uses in the city. Recycled water reduces potable water consumption and is not subject to rationing during drought.

- Water Efficiency Landscape Ordinance – Chapter 16.14. As described above, the City of Palo Alto has also adopted a Water Efficiency Landscape Ordinance in coordination with the Bay Area Water Supply and Conservation Agency (BAWSCA) that exceeds the State's model ordinance in terms of water savings. These provisions are incorporated into the City's new Green Building Ordinance and also can be found in Chapters 16.14.140 – Landscape Design, 16.14.200 – Low-Water Consumption Irrigation System, 16.14.310 – Irrigation Efficiency, and 16.14.340 – Potable Water Reduction.

- California Green Building Standards Code – Chapter 16.14. This chapter incorporates the Title 24 requirements of the 2013 California Green Building Standards. One section references local stormwater pollution prevention (Chapter 16.14.150) and the other references irrigation efficiency standards (Chapter 16.14.200).

- Grading and Erosion and Sediment Control – Chapter 16.28. This chapter requires projects to obtain a grading and excavation permit and requires submittal of an interim erosion and sediment control and stormwater pollution prevention plan (Chapter 16.28.120) that describes the surface runoff and erosion control measures that will be implemented during construction of the project. Chapter 16.28.200 contains the provisions for the final erosion and sediment control and stormwater pollution prevention plan that describes permanent control measures to improve the quality of stormwater runoff from the site.

- Flood Hazard Regulations Ordinance – Chapter 16.52. The Flood Hazard Regulations Ordinance is designed to minimize loss of life, damage to private land development, public facilities and utilities, the need for rescue and relief efforts, business interruptions, and future blighted areas caused by flooding. The ordinance also ensures that property owners construct new and substantially improved buildings in the 100-year floodplain in accordance with the National Flood Insurance Program's goals to protect life and property.

- Retail and Food Service Establishment Checkout Bag Requirements– Chapter 5.35. This chapter prohibits the use or distribution of single use plastic check out bags as defined by the ordinance to reduce litter in streets, creeks and San Francisco Bay.

- Smoking Ordinance–Chapter 9.14. This ordinance prohibits smoking in commercial areas to reduce cigarette butt litter and to reduce exposure to secondhand smoke.

Policies. The City of Palo Alto has also established various policies that contain directives pertaining to hydrology and water quality. Each policy provides a clear statement of principle and guiding actions that provide the path for implementation.

- Ahwahnee Water Principles for Resource Efficient Land Use. This policy encourages community development principles to improve the reliability and quality of water resources, including community design that is compact, mixed use, and transit-oriented with open space; preservation of natural resources; water detention facilities to recharge groundwater and reduce runoff; energy efficient irrigation and landscaping; permeable surfaces for hardscape; grey water systems; maximizing the use of recycled water; and other urban water conservation technologies.

- Basement Exterior Drainage Policy. To protect public safety and health by preventing the continual discharge of groundwater into the City's gutters and streets, the Department of Public Works will not permit the use of basement exterior drainage systems consisting of perforated pipes located on the exterior of the basement walls or underneath the slab that collect water, which is then pumped to the surface of the ground for discharge, either on-site or off-site, for all city parcels northeast of the Foothill Expressway (i.e., bayside).

- Construction Dewatering System Policy. A Construction Dewatering Plan must be submitted to the Department of Public Works for excavation activities that encounter groundwater or other water that needs to be removed from the excavation during construction and disposed of in the City's storm drain system. Geotechnical investigations are required for basement construction and dewatering permits must be obtained from the City. Groundwater pumping is prohibited from October to April to ensure adequate storm drain capacity during the winter months. City staff verifies that construction dewatering meets the requirements for pH and sediment prior to allowing discharge to the storm drain system. The City does not allow permanent drains around basement foundations for the continuous pumping and removal of groundwater; basements must be constructed to be waterproof. The Department of Public Works reviews and approves the dewatering plan, charges a dewatering fee, and issues a Street Work Permit.

  Construction dewatering applicants are required to develop a Use Plan to maximize the use of the pumped groundwater. The following recent enhancements to the basement dewatering program have been adopted:[1]

  - Encouraging greater fill station use by distributing more door-hangers and enlisting other public outreach regarding dewatering, fill stations, and trees.

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[1] Guidelines for Dewatering During Basement Or Below Ground Garage Construction, City of Palo Alto Public Works, May 2017, www.cityofpaloalto.org/civicax/filebank/documents/51707, accessed October 6, 2017.

  - Strengthening outreach on the water cycle and value of fresh water flows to storm drains, creeks, and the Bay.

  - Refining requirements for contractor Use Plans, including maximizing on-site water use, one day/week water truck hauling service for neighbors, and City landscaping and piping to nearby parks or major users where feasible.

  - Expanding fill station specifications to address water pressure issues resulting from multiple concurrent users, including separate pumps for neighbors where needed and sidewalk bridges for hoses to prevent tripping hazards.

  - Broadening the City's Basement Pumping Guidelines to require a determination of the impacts of groundwater pumping on adjacent buildings, infrastructure, and trees or landscaping. Applicants would determine the size of the temporary cone of depression caused by pumping and avoidance measures would be required if impacts are anticipated. City Urban Forestry staff may develop guidelines for soil enhancement and supplemental watering (by project applicant) for neighboring landscaping. Additional measures could include adjusting the location, depth, or duration of pumping or altering construction methods.

- <u>Recycled Water Salinity Reduction Policy</u>. This policy sets targets for reduction the salinity of recycled water to maximize the availability of recycled water for use on landscaping.

- <u>Green Building Policy for City Buildings</u>. The City incorporates clean, sustainable, green building practices into the design and construction of City buildings, as part of the overall Sustainability Policy. All new buildings over 5,000 square feet shall be designed to achieve Leadership in Energy and Environmental Design (LEED) Silver or equivalent rating certification. All renovations or additions to existing City facilities shall be designed using environmental sound, green building techniques and materials, using LEED or equivalent checklists as guidelines.

- <u>Integrated Pest Management Policy</u>. The City shall carry out its pest management operations using reduced risk integrated pest management (IPM) techniques to reduce or eliminate chemicals to the maximum extent possible and pilot non-toxic alternatives for structural and landscape pest control. Implementation of this policy is intended to reduce the potential for water quality issues with discharge of runoff to the storm drain system and streams.

- <u>Mercury and Dioxin Elimination Policy</u>. The goal of this policy is to eliminate the creation of dioxin and the use of mercury to prevent their subsequent release into the environment. To achieve this goal, the City must evaluate pollution prevention opportunities to eliminate mercury and dioxin sources from municipal, commercial, industrial, and residential activities. The focus is on laboratory, medical, and manufacturing processes that use mercury or create dioxins, as well as the formation of these materials in the combustion of fuels or wastes. This will improve water quality in South San Francisco Bay, which is impaired for mercury and dioxins.

- <u>Green Purchasing</u>. The goal of this policy is to purchase products and services that improve the health of the environment throughout the manufacture, use, or disposal of the product.

- Single-use Plastics Reduction. The goal of this policy is to prohibit the use of single-use plastic bottles, bags and other products for City operations or City-sponsored events.

Innovative Stormwater Measures Rebate Program. The City has also implemented various programs to reduce stormwater runoff and pollution. The City administers the Innovative Stormwater Measures Rebate Program, which is funded with revenue from monthly storm drainage fees. The goal of the program, which was started in 2008, is to help Palo Alto residents, businesses, and City departments reduce the amount and improve the quality of runoff that flows into the storm drain system by offering rebates to those who install qualifying stormwater reduction measures, such as:

- Capturing rainwater in rain barrels or cisterns for use on landscaping and gardens;

- Constructing or reconstructing driveways, patios, walkways, and parking lots with permeable paving materials;

- Constructing a green (vegetated) roof to absorb and filter rainfall.

Office of Emergency Services. The mission of the Palo Alto Office of Emergency Services (OES) is to prevent, prepare for, mitigate, respond to, and recover from all hazards, including natural disasters, technological failures/accidents, crime, and terrorism. The OES manages the City's Emergency Operations Center (EOC) located in the Police Department and coordinates with all City departments involved in emergency response. The OES is also responsible for preparing the Palo Alto annex to the Santa Clara County Local Hazard Mitigation Plan (LHMP) and the City's Emergency Operations Plan (EOP). The hazards for which the OES is prepared include earthquake, liquefaction, landslides, fire, flooding, severe winter storms, drought, dam failure, disease outbreak, hazardous material spills, and tsunamis. Technological or human-caused events include airplane accidents, civil disorder, terrorism, energy outage, train accident or nuclear attack/acts of war. Critical facilities have been identified in the LHMP and the EOP identifies the City's emergency planning, organization, and response policies and procedures, including the public alert and warning systems.

The OES and EOC are two of the operations proposed to be relocated to the new Public Safety Building (PSB) as part of the project evaluated in this EIR.

11.3 IMPACTS AND MITIGATION MEASURES

This section describes potential impacts related to hydrology and water quality that could result from the proposed PSB project, and discusses components of the project that would avoid or reduce those potential impacts. Storm drainage *infrastructure* (e.g., physical improvements to collect and convey drainage) are detailed in chapter 17 (Utilities and Service Systems) of this EIR.

11.3.1 Significance Criteria

Based on the CEQA Guidelines,[1] implementation of the proposed PSB project would have a significant impact related to hydrology and water quality if it would:

(a) Violate any water quality standards or waste discharge requirements;

(b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);

(c) Substantially alter the existing drainage pattern (increase the rate, volume, or flow duration of storm water runoff) of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in new or increased flooding on- or off-site;

(d) Result in stream bank instability;

(e) Significantly alter the existing drainage pattern (increase the rate, volume, or flow duration) of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff, in a manner which would increase flooding on- or off-site;

(f) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;

(g) Provide substantial additional sources of pollutants associated with urban runoff or otherwise substantially degrade water quality;

(h) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;

(i) Place within a 100-year flood hazard area structures which would impede or redirect flood flows;

(j) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or

(k) Expose people or structures to a significant risk of loss, injury, or death resulting from inundation by seiche, tsunami, or mudflow.

Regarding criterion (b), according to the City of Palo Alto Urban Water Management Plan, the City does not use groundwater during normal water years; therefore, impacts to groundwater supplies or recharge for public consumption would be less-than-significant. Regarding the need for dewatering of contaminated groundwater during project construction, this issue is discussed in EIR chapter 10 (Hazards and Hazardous Materials), section 10.3.3 (Impacts and Mitigations). Mitigation 10-1 describes dewatering requirements, including implementation of the City's

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[1] CEQA Guidelines, appendix G, items VIII (a) through (i) and XVI (a).

standard dewatering requirements (see "Construction Dewatering System Policy" in section 11.2.3, above). With implementation of Mitigation 10-1, including the City's standard dewatering requirements, construction impacts of dewatering would be less-than-significant.

Regarding criterion (d), the project site is not located near a stream. There would be no impact, and this issue is not discussed further.

Regarding criterion (f), storm water infrastructure *capacity* is discussed in chapter 16 (Utilities and Service Systems) of this EIR.

Regarding criteria (h) and (i), the PSB project site is not located in a 100-year flood hazard area as mapped by FEMA, nor is it located in an area vulnerable to sea level rise (Comprehensive Plan EIR Figure 4.8.4 – Sea Level Rise).

Regarding criterion (j), on the Dam Inundation Map for the Comprehensive Plan Update EIR (Figure 4.8-5), the PSB project site is shown as on the edge of the dam inundation zone for Lagunita Reservoir. Based on the discussion in section 11.1 (Setting – Dam Inundation), dam inundation is not considered a potential impact for the PSB project.

Regarding criterion (k), a seiche is a tidal change in an enclosed or semi-enclosed water body caused by sustained high winds or an earthquake. A tsunami is a series of waves created when a body of water such as an ocean is rapidly displaced on a massive scale, most commonly as the result of an earthquake.

The project site is not near a lake and is not located close enough to San Francisco Bay to experience a seiche (there are no published maps or information on seiche hazards in the Bay Area). Also, the project site and vicinity are not in a Tsunami Inundation Area as identified by the State of California Department of Conservation (Mountain View Quadrangle Tsunami Inundation Map, viewed 10/5/17). The project site is relatively level and would not be susceptible to mudflow. These issues are not discussed further.

11.3.2 Proposed PSB Project Components

The project site consists of two paved parking lots totaling approximately 2.23 acres. Generally, the perimeters of the lots are planted with trees, bushes, and other plants (see earlier Figure 4.1A – Existing Aerial View). Overall, the project site is approximately 90 percent covered with impermeable pavement. The proposed PSB project would include new landscaping, also primarily along the project perimeter, resulting in a similar permeable surface coverage (see earlier Figure 4.1B – Visual Simulation: Aerial View). However, as described below, the proposed PSB project would include rain gardens for storm water treatment, trees with relatively low water requirements, a water-conserving demonstration garden, and a fully automated, water-efficient irrigation system, which would improve hydrology and water quality over existing conditions.

Chapter 3 (Project Description) of this EIR describes and illustrates various components of the proposed PSB project design that address hydrology and water quality. These include:

- An extensive, integrated landscaping and tree planting program, with raised planters that will provide rain gardens for storm water treatment along Sherman Avenue and Park Avenue

- A tree planting strategy to select species that have relatively low water requirements
- In the PSB plaza, a demonstration garden highlighting plants for water conservation and for habitat, including, for example, California native pollinator plants, native grasses, drought-tolerant succulents, and native meadow rain garden plantings.
- An area of rain garden planting at the Sherman Street corner of the public parking garage

The irrigation strategy throughout the PSB project is to provide a fully automated irrigation system that is weather-controlled and uses water-conserving, low-flow irrigation heads and drip irrigation, where appropriate. Controllers and backflow preventers are intended to be in interior locations when possible, or in vandal-proof enclosures screened by landscaping. All trees would be planted at 48-inch box size. Silva Cell systems would be installed; these are water-efficient systems with compost, geotextile, bioretention soil, and root barriers that filter surface drainage before it flows into subdrains.

11.3.3 Impacts and Mitigations

The proposed PSB project does not propose changes to existing drainage patterns. The area to be developed consists of two surface parking areas that are approximately 90 percent impervious surfaces. The amount of impervious surface with the proposed PSB project would be approximately the same. The proposed project would disturb more than one acre and would be required to submit a Notice of Intent (NOI) to the RWQCB to be covered by the State's General Construction Permit before beginning construction, which would require the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) containing Best Management Practices (BMPs) that would be implemented during construction.

Storm water runoff from impervious surfaces on the project site could degrade water quality in downstream receiving waters and San Francisco Bay. The San Francisco Bay Regional Water Quality Control Board (RWQCB) Municipal Regional Permit Provision C.3 requirements apply to the proposed PSB project because it would create or replace more than 10,000 square feet of impervious area. The project must prepare and implement a Stormwater Control Plan containing treatment and source control measures that meet the "maximum extent practicable" standard as specified in the NPDES permit and the C.3 Guidebook. The project must also prepare a Stormwater Facility Operation and Maintenance Plan and execute agreements to ensure the stormwater treatment and flow-control facilities are maintained in perpetuity.

Section 11.2 (Regulatory Setting) above describes the extensive, interrelated, and coordinated regulations, policies, and programs that apply to new development in Palo Alto. These regulations, policies, and programs are uniformly applied development standards that are implemented in Palo Alto by appropriate and authorized departments and staff. The discussion below summarizes the typical process for these requirements, which apply to the proposed Public Safety Building (PSB) and California Avenue Parking Garage project ("PSB project").

Would the project:

Violate any water quality standards or waste discharge requirements (Significance Criterion [a]); or

Provide substantial additional sources of pollutants associated with urban runoff or otherwise substantially degrade water quality (Significance Criterion [g])?

The PSB project would implement mandated measures (uniformly applied development standards) to protect water quality. The Regional Water Quality Control Board (RWQCB) and City of Palo Alto water quality protection requirements applicable to the PSB project are intended to reduce any potential construction period and post-construction water quality impacts to a *less-than-significant level.*

Any project grading activities involving disturbance of more than one acre would require a Notice of Intent (NOI) and a National Pollution Discharge Elimination System (NPDES) permit from the San Francisco Bay Regional Water Quality Control Board (RWQCB, Region 2 for Palo Alto). The RWQCB administers the NPDES stormwater permitting program in the Bay Area, including the Municipal Regional Stormwater NPDES Permit and C.3 (stormwater compliance) Permit. The City of Palo Alto would submit a Notice of Intent (NOI) to the RWQCB to be covered by the General Construction Permit prior to the beginning of construction. The General Construction Permit requires the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP). For a project entailing disturbance of more than one acre (conservatively estimated to include each of the PSB project lots, C-6 and C-7), the SWPPP must be prepared before construction begins, usually during the planning and design phases of a project, and must include specifications for Best Management Practices (BMPs) that would be implemented during project construction to control contamination of surface flows and the potential discharge of pollutants from commencement of construction through project completion. The SWPPP document itself remains on-site during construction. After completion of the project, the City is required to submit a Notice of Termination to the RWQCB to indicate that construction is completed.

Also, grading permits would be required. For all grading permits, the City mandates site-specific measures (uniformly applied development standards) to be implemented during grading to minimize construction period erosion, including a site-specific erosion control plan subject to City review and approval.

The temporary use of hazardous materials (e.g., diesel fuel) and heavy equipment, which represent a secondary component of construction, could introduce materials that might be spilled on the project site or in the vicinity, and subsequently washed into water bodies, such as San Francisco Bay. These substances could have a direct, adverse effect on water quality in water bodies. Implementation of the standard, required NPDES and City construction period measures to reduce the risk of construction period pollutants would reduce this risk to a *less-than-significant level*.

As noted above, the PSB project would be required to treat and detain stormwater runoff on a site-specific basis. Road resurfacing and sidewalk repair and/or replacement are exempt from the NPDES C.3 Permit requirements if the work is within the existing impervious area footprint. Chapters 3 (Project Description) of this EIR describes and illustrates the proposed streetscape improvements to enhance the pedestrian environment and connectivity with the California Avenue commercial district. Where these improvements include new roadway impervious surfaces outside existing impervious areas, the NPDES C.3 Permit requirements must be implemented.

Based on the above discussion, construction period and post-construction water quality impacts resulting from the proposed PSB project would be ***less than significant*** .

Mitigation. No significant impact has been identified; no mitigation is required.

Would the project:

Violate any water quality standards or waste discharge requirements (Significance Criterion [a]);

Substantially alter the existing drainage pattern (increase the rate, volume, or flow duration of storm water runoff) of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in new or increased flooding on- or off-site (Significance Criterion [c]);

Significantly alter the existing drainage pattern (increase the rate, volume, or flow duration) of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff, in a manner which would increase flooding on- or off-site (Significance Criterion [e]); or

Provide substantial additional sources of pollutants associated with urban runoff or otherwise substantially degrade water quality (Significance Criterion [g])?

Project long-term operation could result in contamination of project site and vicinity stormwater runoff with petroleum and other contaminants from motor vehicles. PSB project operations would be required to comply with RWQCB- and City-mandated post-construction, non-point source pollution control measures (uniformly applied development standards; also known as facilities and maintenance practices) that would ensure that such impacts would be remain at a *less-than-significant level*.

Project operation could result in the deposition by motor vehicles of oil and other contaminants along adjacent and nearby streets, and in the public parking garage, PSB garage, and PSB exterior operations yard. Rainfall has the potential to wash these contaminants into the municipal storm drainage system, potentially contaminating downstream waterways. Such non-point pollution is typically controlled through a combination of source controls (generally through the use of infiltration devices).

Under the terms of the countywide Municipal Regional Stormwater NPDES Permit (MRP) that the City of Palo Alto is subject to (see section 11.2, Regulatory Setting, above), the project must also implement post-construction measures to prevent or control pollutants in runoff (recommended measures are included in the Stormwater C.3 Guidebook), and identify a plan to inspect and maintain these measures. Project designs, subject to review and approval by the City, would be required to include the on-site collection of runoff from all parking facilities and, if feasible, its on-site treatment (oil/grease traps, filters, oil/water separators, or similar in-line filtration systems), and an associated periodic clean out/maintenance program that ensures acceptable trap efficiencies, specifies appropriate disposal procedures, and adequately reduces the risk that the traps become sinks for pollutants. A regular schedule of parking facility sweeping would also be required. In addition, source control features such as roofed trash enclosures would be required to keep pollutants from contacting stormwater. These mandated, uniformly applied stormwater treatment measures would also need to meet engineered sizing criteria approved by the City Engineer.

Under the NPDES permit, permanent post-construction Best Management Practices (BMPs) are required. Permanent treatment BMPs can include, for example:

- rainwater harvesting and re-use,
- biofiltration swales,
- detention basins,
- bioretention areas, and
- flow-through planter boxes.

Low Impact Development (LID) features can be integrated with BMPs, control measures, and permit requirements. LID features reduce impervious surfaces and can include pervious pavements, landscape features, and green roofs. Parking stalls and plaza areas in the PSB project would utilize pervious asphalt, pervious concrete, or permeable pavers. Medians would be landscaped to increase permeability.

Stormwater treatment for street improvements and walkways can take several forms to accommodate at-grade treatment facilities:

- “Green Street” features that include bioretention swales and pre-filtration plantings,
- landscape strips/buffers that accept storm runoff from roads and walkways located either at the center or outer edges of the roadway,
- collecting and piping of stormwater to a localized treatment basin,
- catch basin inserts to remove trash prior to stormwater treatment,
- a modular suspended pavement system that uses soil volumes to support tree growth while providing stormwater treatment (this pavement has underground rooting systems that allow trees to grow without disrupting the pavement above).

All the above BMPs and LID features are compatible with the proposed PSB project. Chapter 3 (Project Description) of this EIR describes and illustrates various components of the proposed PSB project design that address hydrology and water quality. These include:

- An extensive, integrated landscaping and tree planting program, with raised planters that will provide rain gardens for storm water treatment along Sherman Avenue and Park Avenue
- A tree planting strategy to select species that have relatively low water requirements
- In the PSB plaza, a demonstration garden highlighting plants for water conservation and for habitat, including, for example, California native pollinator plants, native grasses, drought-tolerant succulents, and native meadow rain garden plantings.

- An area of rain garden planting at the Sherman Street corner of the public parking garage

The irrigation strategy throughout the PSB project is to provide a fully automated irrigation system that is weather-controlled and uses water-conserving, low-flow irrigation heads and drip irrigation, where appropriate. Controllers and backflow preventers are intended to be in interior locations when possible, or in vandal-proof enclosures screened by landscaping. All trees would be planted at 48-inch box size. Silva Cell systems would be installed; these are water-efficient systems with compost, geotextile, bioretention soil, and root barriers that filter surface drainage before it flows into subdrains.

Based on the discussion above, the effects of contaminated site runoff on water quality in the local (municipal) storm drainage system would represent a ***less-than-significant impact*** .

Mitigation. No significant impact has been identified; no mitigation is required.

Would the project:

Substantially alter the existing drainage pattern (increase the rate, volume, or flow duration of storm water runoff) of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in new or increased flooding on- or off-site (Significance Criterion [c]);

Significantly alter the existing drainage pattern (increase the rate, volume, or flow duration) of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff, in a manner which would increase flooding on- or off-site (Significance Criterion [e]); or

Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff (Significance Criterion [f])?

As noted in section 11.3.1 (Significance Criteria) above, the PSB project site is not located in a 100-year flood hazard area as mapped by FEMA, nor is it located in an area vulnerable to sea level rise. Because the project site is already covered with structures, paved surface parking, and introduced landscaping, the PSB project would not significantly alter the total volume or rate of stormwater runoff into the existing municipal storm drain system.

The City applies uniformly applicable stormwater management regulations to avoid or reduce the potential impacts of development. Practices include controlling the amount and timing of runoff from development sites (e.g., see the BMPs and LID features described above, which control runoff as well as improve water quality).

Based on the above discussion, the impact of potential localized flooding is considered ***less than significant*** .

Mitigation. No significant impact has been identified; no mitigation is required.

12. LAND USE AND PLANNING

This EIR chapter addresses the land use and planning implications of the proposed project. The chapter describes existing land uses in the project vicinity, applicable City of Palo Alto and other land use policies, the potential effects of the proposed project on these land use factors based on CEQA Guidelines criteria, and any mitigation measures warranted to address any potentially significant land use and planning impacts.

12.1 SETTING

The PSB project site and vicinity are shown on earlier Figures 3.1 (Project Location Map) and 3.2 (Project Vicinity) in chapter 3 (Project Description), and on Figure 4.1A (Existing Aerial View) in chapter 4 (Aesthetics).

The project site is located in northwestern Santa Clara County in the city of Palo Alto. Palo Alto is located on the San Francisco Bay Peninsula, approximately 40 miles south of the city of San Francisco, and south of the southern boundary of San Mateo County. Regional access to the project site is provided via US Highway 101 (US 101) to the east, Interstate Highway 280 (I-280) to the west, the California Avenue Caltrain station one block to the northeast, and El Camino Real one block to the southwest.

The project site is located at 250 and 350 Sherman Avenue, in the California Avenue Business District. The site is bound by Sherman Avenue to the southeast (“south”), Jacaranda Lane to the northwest (“north”), Ash Street to the southwest (“west”), and Park Boulevard to the northeast (“east”), and bisected by Birch Street. The site includes two surface parking lots, identified as Lot C-6 on the east and Lot C-7 on the west.[1]

Across Sherman Avenue from the project site are the Santa Clara County Courthouse and parking lot. Properties fronting Ash Avenue between Grant Avenue and Sherman Avenue include multiple-family residential uses and Sarah Willis Park. Land uses along Park Boulevard from Grant Avenue to Sherman Avenue include office/commercial uses, including several restaurants.

The California Avenue Business District – with retail shops, restaurants, and services that serve primarily locals – is one block north of the PSB project site.

12.2 REGULATORY SETTING

The following is a summary of regulations relating to land use and planning in Palo Alto, as relevant to the proposed PSB project.

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[1] In this EIR, true directions in the immediate project vicinity have been simplified as indicated on applicable figures, whose directional arrow indicates “PN” (Project North) and “TN” (True North).

12.2.1 State Regulations

Senate Bill 375. In order to aid in reaching the goals set by Assembly Bill (AB) 32, Senate Bill (SB) 375 directs the California Air Resources Board (CARB) to set regional targets for reducing greenhouse gas (GHG) emissions from cars and light trucks. Using the template provided by the State's Regional Blueprint Planning Program, to accomplish this goal, the bill works to align transportation and land use planning in order to reduce vehicle miles traveled (VMT) through modified land use patterns. There are five basic parts to the bill which contribute to this goal: (1) creation of regional targets for GHG emissions reduction tied to land use; (2) a requirement that regional planning agencies create a Sustainable Communities Strategy (SCS) to meet those targets (or an Alternative Planning Strategy (APS) if the strategies in the SCS would not reach the target set by CARB), even if that plan is in conflict with local plans; (3) a requirement that regional transportation funding decisions be consistent with the SCS; (4) a requirement that the Regional Housing Needs Allocation numbers conform to the SCS; and (5) new California Environmental Quality Act (CEQA) exemptions and streamlining for projects that conform to the SCS.

AB 32 and SB 375 components relevant to the proposed PSB project are discussed in chapters 5 (Air Quality), 9 (Greenhouse Gas Emissions and Energy), and 15 (Transportation, Traffic, and Parking) of this EIR.

12.2.2 Local Regulations

City-Adopted General Plan and Zoning Designations for the PSB Project Site. Lot C-6 of the project site (proposed for the PSB) is designated *Major Institutional Special Facility (MISP)* by the City of Palo Alto Comprehensive Plan and is zoned *Public Facilities (PF)* by the City of Palo Alto Zoning Ordinance. Lot C-7 (proposed for the public parking garage) is designated *Community Commercial (CC)* by the City of Palo Alto Comprehensive Plan and is zoned *Public Facilities (PF)* by the City of Palo Alto Zoning Ordinance.

See section 12.3.3 (Impacts and Mitigations), below, for a discussion of Zoning Ordinance Amendments being processed concurrently as part of the proposed PSB project.

Palo Alto Municipal Code. The sections of the Palo Alto Municipal Code that are most relevant to land use and planning are summarized below. Many other sections of the code that deal with specific technical issues will also affect land use and development. These sections are summarized where relevant in other chapters of this Draft EIR.

Chapter 2.21 Architectural Review Board. Under Chapter 2.21 of the Palo Alto Municipal Code, the City maintains a citizen-appointee Architectural Review Board (ARB) to implement the aesthetic-preservation intent of the Zoning Ordinance by promoting high aesthetic quality that is harmonious with neighboring uses and enhances conditions on-site and in adjacent areas. The Architectural Review Board meets regularly to review development proposals and site designs for commercial and multi-family residential projects.

The Board's purview includes conversion of historic buildings to commercial use, pedestrian features adjacent to designated pedestrian paths, recycling storage projects, mechanical equipment, trash enclosures, onsite recreation areas, and noise-generating areas such as parking lots, driveways, and loading docks.

The proposed PSB project has been subject to the Architectural Review Board process.

Title 18, Zoning. Palo Alto's Zoning Ordinance serves to implement the City's land use designations by establishing comprehensive zoning regulations for the City. The Zoning Ordinance includes the zoning map, which establishes and delineates various districts within the incorporated territory of the city, and zoning regulations that apply development standards to the different zones delineated on the zoning map. The purpose of the Zoning Ordinance is to promote the general welfare of the people of Palo Alto; accomplish objectives, policies and programs from the Palo Alto Comprehensive Plan; and prevent land use conflicts. Additionally, the Zoning Ordinance contains the procedures that apply to the review of development projects in the city, including the Planning Commission's role in that process.

Chapter 18.76.020 of the Zoning Ordinance establishes Architectural Review procedures for "major" and "minor" projects in Palo Alto, excluding single-family and two-family homes. Through the architectural review process, projects are evaluated for their compatibility with their surroundings, harmonious transitions in scale and character between different land uses, safe and convenient access, integration of natural features, appropriate construction materials, and other aspects.

Title 19, Master Plan. Title 19, Master Plan, contains chapters relating to the Planning Commission, Specific Plans, and Coordinated Area Plans (CAPs).

Chapter 19.04, Planning Commission. This chapter outlines and specifies the duties of the Palo Alto Planning and Transportation Commission. Some of these duties include preparing, adopting, and recommending to the City Council to adopt a long-range, comprehensive General Plan (the Comprehensive Plan). Additionally, the Planning and Transportation Commission is responsible for the annual review of the Comprehensive Plan and can recommend to the City Council changes or additions to the plan as the Planning and Transportation Commission may consider necessary in the view of any change in conditions. The Planning and Transportation Commission also has other duties prescribed by the ordinances of the City and the resolutions and motions of the City Council.

California Avenue Area Concept Plan.[1] In conjunction with the Palo Alto Comprehensive Plan Update ("Our Palo Alto 2030"), the California Avenue Area Concept Plan (Draft, March 2014) was developed to guide future land uses in the area between Cambridge Avenue, the railroad tracks, Lambert Avenue, and El Camino Real. The Plan weaves together a variety of prior planning initiatives for the area - including Caltrain station area development regulations, streetscape improvements, a design guidelines update, designation as a Priority Development Area (PDA), and the rail corridor study – together in a unified vision to guide future change while preserving and enhancing the quality of life in nearby residential neighborhoods.

Development of the proposed PSB project was anticipated in the California Avenue Area Concept Plan. Plan Policy CACP-1.9 states, "Recognize the California Avenue area, including Park Boulevard, as an appropriate location for a public safety building."

Rail Corridor Study. The Caltrain rail corridor was the subject of a significant planning effort from 2010 to 2013 to evaluate land use, transportation and urban design, particularly in

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[1] City of Palo Alto, March 2014, California Avenue Area Concept Plan.

response to Caltrain electrification and other possible upgrades and the potential for High Speed Rail. The study area encompasses approximately 1,000 acres, and is bounded by Palo Alto Avenue on the north, San Antonio Road on the south, one-half block east of Alma Street, and one-half block west of El Camino Real. The City Council adopted the Rail Corridor Study policy document and incorporated it into the Comprehensive Plan on January 22, 2013 to "generate a community vision for land use, transportation, and urban design opportunities along the rail corridor, particularly in response to improvements to fixed rail services along the tracks through Palo Alto." The Study provides land use and transportation policies under a variety of scenarios, allowing Palo Alto to be proactive to changes to the rail system. The Study is intended to guide staff and the City as decisions are made regarding land use and transportation improvements, such as private development and the Capital Improvement Program.

Bicycle + Pedestrian Transportation Plan. The 2012 Bicycle + Pedestrian Transportation Plan (BPTP) was adopted in July 2012 and builds upon the 2003 Bicycle Transportation Plan by adding coverage of pedestrian issues, priorities, and design standards. The BPTP contains the policy vision, design guidance, and specific recommendations to increase walking and biking rates to address the impacts of regional growth while maintaining mobility.

Urban Forest Master Plan. The Urban Forest Master Plan (UFMP), adopted in 2015, establishes long-term management goals and strategies to foster a sustainable urban forest in Palo Alto. The UFMP addresses topics such as the state of Palo Alto's tree canopy, best management practices, interdepartmental coordination, and tree-related City regulations. The UFMP affects various aspects of land use, development, sustainability, human health programs, and vegetative environmental services benefits. Additionally, the UFMP advises that potential land use changes outside County lands should maximize tree canopy benefits.

12.3 IMPACTS AND MITIGATION MEASURES

12.3.1 Significance Criteria

Based on the CEQA Guidelines, the project would have a significant land use and planning impact if it would:[1]

(a) Physically divide an established community; or

(b) Conflict with any applicable City land use plan, policy, or regulation (including but not limited to the Comprehensive Plan, CAP, or the City's Zoning Ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

(c) Conflict with any applicable habitat conservation plan or natural community conservation plan.

Regarding the project's relationship to criterion (b), plans, policies, and regulations relevant to specific environmental topics are discussed in detail in their respective EIR chapters – for example, chapters 5 (Air Quality), 6 (Biological Resources), 8 (Geology and Soils), 9 (Greenhouse Gas Emissions and Energy), 10 (Hazards and Hazardous Materials), 11

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[1] CEQA Guidelines, Appendix G, item IX(a-c); and sections 15064(b and d) and 15125(d).

(Hydrology and Water Quality), 13 (Noise), and 15 (Transportation, Traffic, and Parking). As concluded in these individual EIR chapters, the proposed PSB project is considered substantially consistent with the applicable plans, policies, and regulations adopted for the purpose of avoiding or mitigating an environmental effect for these specific environmental topics.

Regarding criterion (c), no habitat conservation plan or natural community conservation plan is applicable to the project site. The project would have no impact related to conflicts with any applicable habitat conservation plan or natural community conservation plan. This issue is not discussed further.

12.3.2 Proposed PSB Project Objectives

The project objectives, as identified by the City of Palo Alto, are described below.

1. To locate and operate the City's Police Department, Office of Emergency Services, Emergency Operations Center, Emergency Communications (911 Dispatch) Center, and Fire Administration Division in one centralized facility that is adequately sized to meet the programmatic needs of these public safety functions.

2. To locate the City's Police Department, Office of Emergency Services, Emergency Operations Center, Emergency Communications (911 Dispatch) Center, and Fire Administration Division operations within a facility that meets the standards of an essential services facility to substantially increase the probability of maintaining operation after a major earthquake, natural disaster, or other substantial disruption or disaster.

3. To provide more parking in the California Avenue area of Palo Alto.

4. Ensure that project construction proceeds in a manner that would minimize disruption of existing parking for current users of the surface parking lots on the project site.

12.3.3 PSB Project Components Relevant to Land Use and Planning Criteria

Project components directly relevant to the land use and planning significance criteria (see section 13.3.1 above) are described below. A more detailed description of the proposed project, with illustrations, is included in chapter 3 (Project Description) of this EIR.

Public Safety Building. The PSB would be approximately a 45,000 to 50,000 square-foot (excluding accessory site buildings), three-story police station and fire/police administration building. The PSB would include two full-block subterranean floors of police parking and operations, and share its parcel with smaller operational accessory buildings, a secure operational yard, and a public plaza. The PSB would be a secure, essential services facility designed to support and protect the critical operations that occur inside. Due to the PSB's specialized uses, its design requires the careful balancing of transparency and solidity. The height of the PSB would be approximately 49'-0" above sidewalk level to top of roof.

As a law enforcement and emergency response building, the PSB would require specialized building and site design accommodations. For example, no unscreened vehicle may come within 20'-0" of the building, thereby requiring a security setback enforced with perimeter vehicle barriers. The subterranean parking for patrol vehicles must have two separate vehicular exits onto two unique streets, in the event that one street is obstructed in some way (e.g., flooding, protest, fire, or other obstructing hazard). Site design should follow CPTED (Crime Prevention Through Environmental Design) best practices. Windows and openings are to be protected from line-of-sight vulnerabilities, resulting in careful placement and type of windows, types of visual screening, and quantity of openings. Outdoor programmatic areas must be secured and screened from view to protect critical operations. The project would include facility resiliency,

Public Parking Garage. The parking garage, at 350 Sherman Avenue, would be located on the City's existing surface Parking Lot C-7. The parking garage would be four levels above grade and two stories below grade, with 636 public parking spaces serving the needs of the California Avenue business district. The parking structure would fill its site to nearly the property lines and utilize strategies such as a cascading exterior grand staircase and landscaped setback (on Birch Street), a pedestrian arcade (on Ash Street), and a partial-block pedestrian arcade leading to a mid-block paseo (on Jacaranda Lane) to provide appropriately scaled site amenities. The height of the California Avenue Parking Garage would be approximately 49'-0" above sidewalk level to top of roof-mounted photovoltaic (PV) panels.

As a public-serving amenity, the garage's key design imperatives include ease of wayfinding, generosity toward the pedestrian environment, and a perimeter skin that offers an appropriate visual character when viewed by its neighbors.

Public Plazas. The project will include a new exterior public plaza of approximately 5,000 square feet, including hardscape, street furniture, and landscape plantings on Birch Street in front of the PSB, and a smaller public space at the parking garage pedestrian entry on Birch Street on the property corner closest to California Avenue. The east side of the garage site is designed to visually connect the public space at the garage with the PSB plaza.

The plaza will include a variety of seating types, including built-in, planter edge, and moveable. Lighting will be on tapered poles with multiple heads providing a tree-like motif. Also, plaza furniture will have integrated, complementary lighting. The Birch Street, Sherman Avenue, and Park Avenue frontages of the PSB will have pole lights and planter-mounted landscape lights.

Landscaping. In order to implement a comprehensive landscaping plan, the project proposes to remove 38 on-site trees and protect one tree in place. The **PSB public plaza** will feature a low stone wall, a series of natural stone bollards, and a large raised planter that will provide soil and plantings otherwise absent due to the PSB parking garage directly below. The stone wall and bollards will provide a security barrier to vehicles while also demarcating entry into the public plaza. The plaza will be bordered along Birch Street by a double row of trees that will reinforce the public realm and provide shade.

The plaza planting is purposefully designed as a demonstration garden highlighting plants for water conservation and for habitat, including, for example, California native pollinator species, native grasses, drought-tolerant succulents, and native meadow rain garden plantings. Educational signage will be included.

Sherman Avenue and Park Avenue frontages of the PSB will feature a double row of street trees, utilizing raised planters where needed due to the parking garage below. The profile of the raised planters will vary to create seating areas and to provide rain gardens for storm water treatment. Jacaranda Lane will feature a raised garden courtyard secured for PSB staff.

The Birch Street, Sherman Avenue, and Park Avenue frontages of the PSB will have pedestrian pole lights and planter-mounted landscape lights. The Jacaranda Lane side of the security wall will feature vine plantings and lighting. From a street lighting standpoint, all pedestrian areas will be lit with low-level, focused lighting that reinforces the small-scale aspects of the plazas and streets, avoids light pollution, and reinforces the civic character of the facilities.

The landscaping of the **California Avenue Parking Garage** will work in tandem with the PSB. The Birch Street frontage will be composed of a series of raised planters with integral seating, an area of rain garden planting at the Sherman Avenue corner, and native woodland planting below the exterior staircase. Seating areas will be distributed along the length of the sidewalk. Along Sherman, the sidewalk will be widened to allow for street trees and rain garden planters and benches. Ash Street will have an arcade with seating and a widened sidewalk. The garage arcade along Jacaranda Lane has the potential to connect to the adjacent mid-block pedestrian paseo. Vine plantings along the Jacaranda façade will be considered to help green this face. Birch Street, Sherman Avenue, and Ash Street frontages of the garage will have pedestrian pole lights and planter-mounted landscape lights, in addition to building-mounted lighting.

The general tree planting strategy is to select species that will thrive in an urban environment, provide appropriate architectural emphasis and scale, and have relatively low maintenance and water requirements. Chapter 6 (Biological Resources) of this EIR provides more detail.

Zoning Amendments. In order to meet the project's program needs and objectives, the proposed PSB and parking garage would require amendments to the City of Palo Alto Municipal Code (PAMC) Title 18 (Zoning), Chapter 18.28 (Special Purpose [PF, OS and AC] Districts), Sections 18.28.050, 18.28.060, and 18.28.090 to revise the Public Facilities (PF) zone parking and development standards to allow encroachments into the Minimum Setbacks (front, rear, interior side, and street side setbacks), and a public parking garage that would exceed Maximum Floor Area Ratio (FAR), Maximum Site Coverage, and Maximum Height (including within 150 feet of a residential district) in the Public Facilities zone. Also, the PAMC currently limits the monopole height to 65 feet; therefore, the proposed monopole, at 135 feet, would exceed City height restrictions. The same PF zone regulations being processed for the public parking garage include zoning text changes to allow for the planned monopole and alley setback encroachment by the PSB. To the extent that other PF-zoned sites are included by this ordinance revision, those sites would be subject to their own environmental review.

As of the preparation of this EIR, the zoning revisions related to the PSB, parking garage, and monopole included the following preliminary draft text, in part:

> Section 18.28.060
>
> (e) Development Standards Exceptions
>
> For parking facilities, when it is the principal use and constructed within the Downtown and California Avenue commercial districts, that are to be owned or leased, and operated or used, by the City of Palo Alto, the City Council may in its discretion modify the development standards in Table 3 of Section 18.28.050 to achieve community objectives. The exceptions shall be included in the review of the project through the applicable development review process.

> (f) Maximum Height Standard Exception
>
> For noncommercial emergency communication towers on or for Essential Services Buildings as defined in Health and Safety Code section 16007, as amended, the City Council may in its discretion allow an exceedance of the maximum height development standard in Table 3 of Section 18.28.050 to a height necessary to support and facilitate emergency communications by public agencies.
>
> Section 18.28.090
>
> (a) PF District
>
> In the PF district, no required parking space shall be located in the first 10 feet adjoining the street property line of any required yard. This requirement shall not apply when required spaces are below grade or are provided in a public parking facility that is located less than 10 feet from a property line pursuant to an exception under Section 18.28.060(e).

The requested microwave tower is needed for Palo Alto's participation in the Santa Clara County ECOMM Network for Public Safety Answering Points (PSAPs). The ECOMM system established a private microwave radio network that links all the 9-1-1 call centers in the County. The system also provides high-speed sharing of dispatch services, record databases, and voice traffic so that law enforcement, fire protection, and emergency medical services throughout the County can share communications. This integration allows first responders to improve response times and better manage regional incidents.[1]

12.3.4 Impacts and Mitigations

Would the project physically divide an established community (Significance Criterion [a])? Development of the proposed PSB project was anticipated in the California Avenue Area Concept Plan. Plan Policy CACP-1.9 states, "Recognize the California Avenue area, including Park Boulevard, as an appropriate location for a public safety building."

The PSB project would not physically divide an established community. The PSB project site currently comprises two City-owned surface parking lots that do not provide any recognizable pedestrian amenities, public spaces, landscaping, or connections to the vicinity, including the California Avenue business district. As described above, the proposed PSB project would include a wide variety of coordinated, integrated public amenities. The proposed project is intentionally designed to improve connections between adjacent and nearby properties and the surrounding neighborhood.

Based on the analyses and findings in this EIR chapter, the proposed project would improve the physical arrangement of the site and surrounding neighborhood. Therefore, there would be no impact**.**

Mitigation. No significant impact on the physical arrangement of the community has been identified; no mitigation is required.

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[1] ECOMM Digital Microwave Project, Phase II, Initial Study/Environmental Assessment and Mitigated Negative Declaration. ESA, February 2010. P. 3.

Would the project conflict with any applicable City land use plan, policy, or regulation (including but not limited to the Comprehensive Plan, CAP, or the City's Zoning Ordinance) adopted for the purpose of avoiding or mitigating an environmental effect (Significance Criterion [b])? Plans, policies, and regulations ("policies") relevant to specific environmental topics are discussed in detail in their respective EIR chapters – for example, chapters 5 (Air Quality), 6 (Biological Resources), 8 (Geology and Soils), 9 (Greenhouse Gas Emissions and Energy), 10 (Hazards and Hazardous Materials), 11 (Hydrology and Water Quality), 13 (Noise), and 15 (Transportation, Traffic, and Parking). As concluded in these individual EIR chapters, the proposed PSB project is considered substantially consistent with the applicable policies adopted for the purpose of avoiding or mitigating and environmental effect for these specific environmental topics.

Regarding consistency with specific land use plans, policies and regulations, development of the proposed PSB project was anticipated in the California Avenue Area Concept Plan. The proposed zoning amendments described above are needed to make the proposed project consistent with the Public Facilities (PF) parking and development standards outlined in the Zoning Ordinance. These proposed code changes would not substantially adversely change the type or intensity of the land use in this area, would not be incompatible with adjacent land uses or with the general character of the surrounding area, and would not affect established uses, including nearby residential uses in this area. Therefore, this impact is considered ***less than significant.***

Mitigation. No significant land use or planning impact related to consistency with policies adopted for avoiding or mitigating environmental effects has been identified; no mitigation is required.

13. NOISE

This EIR chapter describes the existing noise environment in the project vicinity, anticipated changes in that noise environment as a result of the project development, and related significant adverse noise impacts and mitigation needs.

13.1 BACKGROUND INFORMATION AND SETTING

13.1.1 Noise Definition and Sound Measurement

Noise is generally defined as unwanted sound and is widely recognized as a form of environmental degradation. Airborne sound is the rapid fluctuation of air pressure above and below atmospheric pressure. The frequency (pitch), amplitude (intensity or loudness), and duration of a sound all contribute to the effect on a listener, or receptor, and whether or not the receptor perceives the sound as "noisy" or annoying.

Pitch is the height or depth of a tone or sound and depends on the frequency of the vibrations by which it is produced. Sound frequency is expressed in terms of cycles per second, or Hertz (Hz). Humans generally hear sounds with frequencies between 20 and 20,000 Hz and perceive higher frequency sounds, or high pitch noise, as louder than low-frequency sound or sounds low in pitch. Sound intensity or loudness is a function of the amplitude of the pressure wave generated by a noise source combined with the reception characteristics of the human ear. Atmospheric factors and obstructions between the noise source and receptor also affect the loudness perceived by the receptor. Sound pressure levels are typically expressed on a logarithmic scale in terms of decibels (dB). A dB is a unit of measurement that indicates the relative amplitude (i.e., intensity or loudness) of a sound, with 0 dB corresponding roughly to the threshold of hearing for the healthy, unimpaired human ear.

Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 dBs represents a ten-fold increase in acoustic energy, while 20 dBs is 100 times more intense, 30 dBs is 1,000 times more intense, etc. In general, there is a relationship between the subjective noisiness or loudness of a sound and its intensity, with each 10 dB increase in sound level perceived as approximately a doubling of loudness. Due to the logarithmic basis, decibels cannot be directly added or subtracted together using common arithmetic operations:

$$50\ decibels + 50\ decibels\ \neq 100\ decibels$$

Instead, the combined sound level from two or more sources must be combined logarithmically. For example, if one noise source produces a sound power level of 50 dBA, two of the same sources would combine to produce 53 dB as shown below.

$$10 * \ 10\,log\left(10^{\left(\frac{50}{10}\right)} + \ 10^{\left(\frac{50}{10}\right)}\right) \ = 53\ decibels$$

In general, when one source is 10 dB higher than another source, the quieter source does not add to the sound levels produced by the louder source because the louder source contains ten times more sound energy than the quieter source.

13.1.2 Sound Characterization

Although humans generally can hear sounds with frequencies between 20 and 20,000 Hz most of the sounds humans are normally exposed to do not consist of a single frequency, but rather a broad range of frequencies perceived differently by the human ear. In general, humans are most sensitive to the frequency range of 1,000–8,000 Hz and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. Instruments used to measure sound, therefore, include an electrical filter that enables the instrument's detectors to replicate human hearing. This filter, known as the "A-weighting" or "A-weighted sound level" filters low and very high frequencies, giving greater weight to the frequencies of sound to which the human ear is typically most sensitive. Most environmental measurements are reported in dBA, meaning decibels on the A-scale. See Table 13-1 for a list of common noise sources and their A-weighted noise levels.

Sound levels are usually not steady and vary over time. Therefore, a method for describing either the average character of the sound or the statistical behavior of the variations over a period of time is necessary. The continuous equivalent noise level (Leq) descriptor is used to represent the average character of the sound over a period of time. The Leq represents the level of steady-state noise that would have the same acoustical energy as the sum of the time-varying noise measured over a given time period. Leq is useful for evaluating shorter time periods over the course of a day. The most common Leq averaging period is hourly, but Leq can describe any series of noise events over a given time period.

Variable noise levels are the values that are exceeded for a portion of the measured time period. Thus, the L1, L10, L50, and L90 descriptors represent the sound levels exceeded 1%, 10%, 50%, and 90% of the time the measurement was performed. The L90 value usually corresponds to the background sound level at the measurement location.

When considering environmental noise, it is important to account for the different responses people have to daytime and nighttime noise. In general, during the nighttime, background noise levels are generally quieter than during the daytime but also more noticeable due to the fact that household noise has decreased as people begin to retire and sleep. Noise exposure over the course of an entire day is described by the day/night average sound level, DNL (or Ldn), and the community noise equivalent level, or CNEL, descriptors. Both descriptors represent the 24-hour noise exposure in a community or area. For DNL, the 24-hour day is divided into a 15-hour daytime period (7 AM to 10 PM) and a 9-hour nighttime period (10 PM to 7 AM) and a 10 dB "penalty" is added to measure nighttime noise levels when calculating the 24-hour average noise level. For example, a 45 dBA nighttime sound level would contribute as much to the overall day-night average as a 55 dBA daytime sound level. The CNEL descriptor is similar to DNL, except that it includes an additional 5 dBA penalty for noise events that occur during the evening time period (7 PM to 10 PM). The artificial penalties imposed during Ldn and CNEL calculations are intended to account for a receptor's increased sensitivity to noise levels during quieter nighttime periods.

Table 13-1
TYPICAL OUTDOOR AND INDOOR NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	-110-	Rock Band
Jet flyover at 1,000 feet		
	-100-	
Gas lawn mower at 3 feet		
	-90-	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	-80-	Garbage disposal at 3 feet
Noise urban area, daytime		
Gas lawnmower, 100 feet	-70-	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	-60-	
		Large business office
Quiet urban daytime	-50	Dishwasher next room
Quite urban nighttime	-40-	Theater, large conference room (background)
Quiet suburban nighttime		
	-30-	Library
Quite rural nighttime		Bedroom at night
	-20-	
		Broadcast/recording studio
	-10-	
Typical threshold of human hearing	-0-	Typical threshold of human hearing

SOURCE: Caltrans 2013a

13.1.3 Sound Propagation

The energy contained in a sound pressure wave dissipates and is absorbed by the surrounding environment as the sound wave spreads out and travels away from the noise generating source. The strength of the source is often characterized by its “sound power level.” Sound power level is independent of the distance a receiver is from the source and is a property of the source alone. Knowing the sound power level of an idealized source and its distance from a receiver, sound pressure level at the receiver point can be calculated based on geometrical spreading and attenuation (noise reduction) as a result of distance and environmental factors, such as ground cover (asphalt vs. grass or trees), atmospheric absorption, and shielding by terrain or barriers.

For an ideal “point” source of sound, the energy contained in a sound pressure wave dissipates and is absorbed by the surrounding environment as the sound wave spreads out in a spherical pattern and travels away from the point source. Theoretically, the sound level attenuates, or decreases, by 6 dB with each doubling of distance from the point source; however, the sound level at a receptor location can be modified further by additional factors. The first is the presence of a reflecting plane such as the ground. For hard ground, a reflecting plane typically increases A-weighted sound pressure levels by 3 dB. If some of the reflected sound is absorbed by the surface, this increase will be less than 3 dB. Other factors affecting the predicted sound pressure level are often lumped together into a term called “excess attenuation.” Excess attenuation is the amount of additional attenuation that occurs beyond simple spherical spreading. For sound propagation outdoors, there is almost always excess attenuation, producing lower levels than what would be predicted by spherical spreading. Some examples include attenuation by sound absorption in air; attenuation by barriers; attenuation by rain, sleet, snow, or fog; attenuation by grass, shrubbery, and trees; and attenuation from shadow zones created by wind and temperature gradients. Under certain meteorological conditions, like fog and low-level clouds, some of these excess attenuation mechanisms are reduced or eliminated due to noise reflection.

13.1.4 Noise Effects

Noise effects on human beings are generally categorized as:

- Subjective effects of annoyance, nuisance, and/or dissatisfaction
- Interference with activities such as speech, sleep, learning, or relaxing
- Physiological effects such as startling and hearing loss

Most environmental noise levels produce subjective or interference effects; physiological effects are usually limited to high noise environments such as industrial manufacturing facilities or airports.

Predicting the subjective and interference effects of noise is difficult due to the wide variation in individual thresholds of annoyance and past experiences with noise; however, an accepted method to determine a person’s subjective reaction to a new noise source is to compare it the existing environment without the noise source, or the “ambient” noise environment. In general, the more a new noise source exceeds the ambient noise level, the more likely it is to be considered annoying and to disturb normal activities.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels when exposed to steady, single-frequency (“pure-tone”) signals in the mid-frequency (1,000–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5 dB increase is generally perceived as a distinctly noticeable increase, and a 10 dB increase is generally perceived as a doubling of loudness that would almost certainly cause an adverse response from community noise receptors.

13.1.5 Groundborne Vibration and Noise

Vibration is the movement of particles within a medium or object such as the ground or a building. Vibration may be caused by natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or humans (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources are usually characterized as continuous, such as factory machinery, or transient, such as explosions.

As is the case with airborne sound, groundborne vibrations may be described by amplitude and frequency; however, unlike airborne sound, there is no standard way of measuring and reporting amplitude. Vibration amplitudes can be expressed in terms of velocity (inches per second) or discussed in dB units in order to compress the range of numbers required to describe vibration. Vibration impacts to buildings are usually discussed in terms of peak particle velocity (PPV) in inches per second (in/sec). PPV represents the maximum instantaneous positive or negative peak of a vibration signal and is most appropriate for evaluating the potential for building damage. Vibration can impact people, structures, and sensitive equipment. The primary concern related to vibration and people is the potential to annoy those working and residing in the area. Vibration with high enough amplitudes can damage structures (such as crack plaster or destroy windows). Groundborne vibration can also disrupt the use of sensitive medical and scientific instruments, such as electron microscopes.

Common sources of vibration within communities include construction activities and railroads. Groundborne vibration generated by construction projects is usually highest during pile driving, rock blasting, soil compacting, jack hammering, and demolition-related activities. Next to pile driving, grading activity has the greatest potential for vibration impacts if large bulldozers, large trucks, or other heavy equipment are used.

13.1.6 Existing Noise Environment

The proposed project is generally located at the intersection of Sherman Avenue and Birch Street, in the City’s California Avenue commercial district. The project site consists of two unenclosed parking lots (Lot C6 and Lot C7) that contain a total of 310 parking spaces (158 at Lot C6 and 152 at Lot C7). At their closet, Lots C6 and C7 are located approximately 450 feet southwest of the Caltrain rail corridor, 670 feet west of Oregon Expressway, and approximately 600 feet north of El Camino Real (State Route (SR) 82).[1] The lots are not located within any noise contour zone associated with the Caltrain corridor, Oregon Expressway, El Camino Real, or Palo Alto Airport, which is approximately 2.2 miles north of the Lot C6.

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[1] These distances reflect the distance between the edge of the rail corridor or roadway and the closest point associated with Lot C6 or Lot C7.

Lot C6 is currently zoned and designated as Public Facilities, or “PF” and Major Institution/ Public Facilities, or “MISP”, by the City’s zoning code and existing Comprehensive Plan; Lot C7 is currently zoned and designated as PF and Community Commercial District, or “CC”. Land uses surrounding the two lots are generally zoned as high density multi-family residential (RM-40), CC, or PF (the adjacent County Courthouse and Jail), and designated by the Comprehensive Plan as CC or MISP.

The City’s existing Comprehensive Plan identifies motor vehicle noise as the most pervasive source of noise in the City, with trains, aircraft, concerts, mechanical equipment, leaf blowers, and construction equipment being important contributors to the City’s noise environment. Existing ambient noise levels in the vicinity of the project site were monitored in September 2017 (MIG 2017, see Noise Appendix). Ambient noise levels were measured with two Larson Davis SoundTrack LxT Type 1 sound level meters. Noise monitoring was conducted in 10-minute intervals. Conditions during the September 5, 2017 monitoring were generally clear and sunny during the daytime with a daily high in the mid-80s and winds from the east / northeast at approximately five miles per hour. The overnight temperature cooled off into the high-60s, before returning to another warm day in the mid-80s on September 6, 2017.

The ambient noise monitoring conducted for this EIR included one long-term measurement (“LT”, i.e., 24-hour) and two short-term measurements (“ST”, i.e., 20 minutes) at locations selected to:

- Provide direct observations of existing noise sources associated with the project site (i.e., operation of the two existing parking lots), as well as other sources of noise in the vicinity of the site;
- Determine typical ambient noise levels at the project site and vicinity; and
- Evaluate project noise levels at nearby sensitive receptors (see Section 13.1.6).

The ambient noise monitoring locations are shown on Figure 13.1 and described below:

- **Location ST-1** was located at the corner of Ash Street and Sherman Avenue, near the Lot C7 parking lot. Ambient noise levels at location ST-1 are considered representative of background daytime noise levels along the southern side of the project site as well as daytime ambient noise levels at sensitive receptor location R-1 (see Section 13.1.6)
- **Location ST-2** was located near the driveway on Park Boulevard that provides access to the existing parking lot at Lot C6. Ambient noise levels at location ST-2 are considered representative of background daytime noise levels along the northern side of the project site. ST-2 is considered to be representative of daily, ambient noise levels at sensitive receptor location R-3 (see Section 13.1.6).
- **Location LT-1** was located at the corner of Birch Street and Sherman Avenue, on the same property as the Santa Clara County Superior Court building. The primary sources of noise at this location included automobile activity on California Avenue, and overhead planes (jet and propeller). Location LT-1 was selected for a long-term measurement location due to its proximity to lots C6 and C7. LT-1 establishes ambient community noise exposure levels in the project vicinity and is considered to be representative of ambient noise conditions at sensitive receptor location R-2 (see Section 13.1.6).

Based on observations made during the ambient noise monitoring, the existing noise environmental in the project vicinity consists primarily of transportation noise sources, including vehicular traffic along Birch Street, Park Boulevard, and Ash Street. Table 13-2 summarizes the results of the ambient noise monitoring conducted for the project.

As seen in Table 13-2, daytime noise levels were generally the same at all three monitoring locations, with 20-minute and hourly Leq values ranging from the upper 50s to the lower 60s. Nighttime Leq ranges for LT-1 indicate that although noise levels can drop by up to approximately 10 dBA compared to daytime conditions, the potential for loud noise to be generated during the nighttime hours (e.g., cars with loud exhaust systems) still exists.

Table 13-2
EXISTING AMBIENT NOISE LEVELS (dBA)

Monitoring Location	**Monitoring Duration**	**Hourly LEQ Range**		**Lmin**	**Lmax**	**Ldn**
		Daytime	**Nighttime**			
ST-1	20 minutes	58.0 – 61.2	--	50.1	73.8	--
ST-2	20 minutes	56.8 – 57.0	--	48.0	67.3	--
LT-1	24 hours	55.1 – 62.2	46.4 – 60.6	41.6	87.6	63.2
SOURCE: MIG 2017, see the Noise Appendix.						

It should be noted that during the last couple minutes of the second interval reading for ST-1, a leaf blower began operating across the street. This type of noise source is not atypical of conditions within the project vicinity, and has therefore been included in the results of the monitoring. ST-2 (on Park Boulevard) was observed to be the quietest of the monitoring locations, having what appeared to be fewer vehicles on the roadway, and less foot traffic from pedestrians as compared to Birch Street and Ash Street.

13.1.7 Noise Sensitive Receptors

Noise sensitive receptors are buildings or areas where unwanted sound or increases in sound may have an adverse effect on people or land uses. Residential areas, hospitals, schools, and parks are examples of noise sensitive receptors that could be sensitive to changes in existing environmental noise levels. The noise sensitive receptors adjacent or in close proximity to the perimeter of the project site that are considered in the EIR's noise impact analysis are presented in Figure 13.1, and include:

- Receptor R-1, located at 2454 - 2458 Ash Street, is a multi-family residential building located approximately 60 feet south of the project site, across from Lot C7 where the parking garage would be constructed.

- Receptor R-2, located at 5212 Birch Street, is a multi-family apartment complex located on the southeastern corner of the Birch Street / Sherman Avenue intersection approximately 45 feet east of Lot C7 (where the proposed parking garage would be located), and approximately 90 feet south of Lot C6 (where the proposed public safety building would be located).

Source: ESRI 2014; Santa Clara County Planning Department 2016; MIG 2017

🟧 Project Site

▭ Sensitive Receptors (residential)

● Long-Term Noise Monitoring

● Short-Term Noise Monitoring

Figure 13.1 -
Ambient Noise Monitoring and Sensitive Receptor Locations

- Receptor R-3, located at 122 Sherman Avenue - 109 California Avenue, is a series of mixed-use buildings located along Park Boulevard, north of the project site. The mixed-used buildings feature commercial and office space on the first two floors, and residential units on floors three and four. These buildings are approximately 50 feet from where construction activities would occur for the public safety building.

13.2 REGULATORY SETTING

13.2.1 Federal Transit Administration

No federal regulations apply to noise or vibration from the proposed project, but the Federal Transit Administration's (FTA) 2006 Transit Noise and Vibration Impact Assessment document sets a ground-borne vibration annoyance criterion of 72 VdB for residences and buildings where people normally sleep. This standard is for "frequent" events occurring more than 70 times per day, such as a rapid transit project. The standards for "occasional" events (occurring between 30 to 70 times per day) and "infrequent" events (occurring less than 30 times per day) are 75 VdB and 80 VdB, respectively. The FTA's vibration annoyance criteria for institutional land uses with primarily daytime uses is 75 VdB for frequent events, 78 VdB for occasional events, and 83 VdB for infrequent events.

13.2.2 California Department of Transportation (Caltrans)

The California Department of Transportation' (Caltrans) *Transportation and Construction Vibration Guidance Manual* provides a summary of vibration criteria that have been reported by researchers, organizations, and governmental agencies (Caltrans, 2013b). Chapters six and seven of this manual summarize vibration detection and annoyance criteria from various agencies and provide Caltrans' recommended guidelines and thresholds for evaluating potential vibration impacts on buildings and humans from transportation and construction projects. These thresholds are summarized in Table 13-3 and Table 13-4.

Table 13-3
CALTRANS VIBRATION THRESHOLD CRITERIA FOR BUILDING DAMAGE

Structural Integrity	**Maximum PPV (in/sec)**	
	Transient	**Continuous**
Extremely fragile buildings, ruins, monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some older buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial and commercial structures	2.00	0.50
SOURCE: Caltrans, 2013b		

Table 13-4
CALTRANS VIBRATION THRESHOLD CRITERIA FOR HUMAN RESPONSE

Human Response	Maximum PPV (in/sec)	
	Transient	Continuous
Barely perceptible	0.035	0.012
Distinctly perceptible	0.24	0.035
Strongly perceptible	0.90	0.10
Severely perceptible	2.00	0.40
SOURCE: Caltrans, 2013b		

13.2.3 City of Palo Alto

(a) Comprehensive Plan. The City's existing *Comprehensive Plan* Natural Environment Element includes a number of policies related to noise generation and standards. In general, the noise component of the Comprehensive Plan affirms the City's commitment to locating higher density housing in areas that often have background noise levels above that which is normally desired for residential yards and other exterior living spaces (e.g., patios, balconies), and recognizes that higher exterior noise levels may be acceptable where outdoor areas that may be affected by higher noise levels are not intended for extensive use and interior noise standards can be achieved. The Comprehensive Plan (pg. N-8) states, "The policies and programs in this [Noise] section regulate the placement of future "sensitive receptors" – homes, schools, medical clinics and the like – in compatible noise environments, and acknowledge the importance of quiet environments in public open space and conservation areas. This section also guides the analysis and design of proposed new development to avoid creating new noise impacts on existing sensitive receptors." Sample Comprehensive Plan policies include:

- *Policy N-6.1:* Encourage the location of land uses in areas with compatible noise environments. Use the guidelines in the table "Land Use Compatibility for Community Noise Environment" to evaluate the compatibility of proposed land uses with existing noise environments when preparing, revising, or reviewing development proposals. Acceptable exterior, interior and ways to discern noise exposure include:
  - The guideline for maximum outdoor noise levels in residential areas is an Ldn of 60 dB. This level is a guideline for the design and location of future development and a goal for the reduction of noise in existing development. However, 60 Ldn is a guideline which cannot necessarily be reached in all residential areas within the constraints of economic or aesthetic feasibility. This guideline will be primarily applied where outdoor use is a major consideration (e.g., backyards in single family housing developments, and recreational areas in multiple family housing projects). Where the City determines that providing an Ldn of 60 dB or lower outdoors is not feasible, the noise level in outdoor areas intended for recreational use should be reduced to as close to the standard as feasible through project design.
  - Interior noise, per the requirements of the State of California Building Standards Code (Title 24) and Noise Insulation Standards (Title 25) must not exceed an Ldn of 45 dB in

habitable rooms of all new dwelling units. (Same as Comprehensive Plan Draft EIR Mitigation Measure NOISE-1a)

- *Policy N-6.7:* When a proposed project is in the development review process, the noise impact of the project on existing residential land uses, public open spaces and public conservation land should be evaluated in terms of the increase in existing noise levels and potential for adverse community impact, regardless of existing background noise levels. If an area is below the applicable maximum noise guideline, an increase in noise up to the maximum should not necessarily be allowed.

  Based on Policy N-6.7, a project should be considered to cause a significant degradation of the noise environment if it meets any of the following criteria:

  - The project would cause the average 24-hour noise level (Ldn) to increase by 5.0 dB or more in an existing residential area, even if the Ldn would remain below 60 dB;
  - The project would cause the Ldn to increase by 3.0 dB or more in existing residential area, thereby causing the Ldn in the area to exceed 60 dB;
  - The project would cause an increase of 3.0 dB or more in an existing residential area where the Ldn currently exceeds 60 dB.

Table 13-5 presents the City's land use compatibility guidelines for noise (referenced in Policy N-6.1).

(b) Palo Alto Municipal Code. The Palo Alto Municipal Code establishes various standards related to noise and noise control, including:

Title 9, Public Peace, Morals and Safety, Chapter 9.10, Noise, sets forth standards to protect the City's citizens from excessive, unnecessary, and unreasonable noise from any and all sources in the community, including:

- Section 9.10.050, Public Property Noise Limits, sets forth the following standards:
  - No person shall produce, suffer, or allow to be produced by any machine or device, or any combination of same, on public property, a noise level of more than 15 dB above the local ambient at a distance of twenty-five feet or more, unless otherwise provided in this Chapter (Section 9.10.050(a)).
  - Sound performance and special events not exceeding 80 dBA measured at a distance of fifty feet are exempt from this chapter when approval therefor has been obtained from the appropriate governmental entity, except as provided in Section 22.04.180 of this code (Section 9.10.050(b)).
  - Vehicle horns or other devices primarily intended to create a loud noise for warning purposes, shall not be used when the vehicle is at rest, or when a situation endangering life, health or property is not imminent (Section 9.10.050(c)).

Table 13-5
LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENT

Relevant Land Use Category	Exterior Noise Exposure (Ldn or CNEL, dB)						
	55	60	65	70	75	80	
Residential, Hotel, and Motels	░	░	▒	▒	▓	▓	▓
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds	░	░	░	▒	▒	▒	▓
Schools, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches	░	░	▒	▒	▒	▓	▓
Office Buildings, Business Commercial, and Professional	░	░	░	░	▒	▒	▓
Auditoriums, Concert Halls, & Amphitheaters	▒	▒	▒	▒	▒	▓	▓
Industrial, Manufacturing, Utilities, and Agriculture	░	░	░	░	▒	▒	▒

Key:

░ **Normally Acceptable** – Specified land use is satisfactory, based on the assumption that any building involved are of normal construction, without and special noise insulation requirement.

▒ **Conditionally Acceptable** – New construction should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems will usually suffice.

▓ **Unacceptable** – New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

SOURCE: Palo Alto 2017

- Section 9.10.060, Special Provisions, sets forth certain exceptions to the standards contained in Municipal Code Chapter 9.10. Relevant exceptions include:

  – General Daytime Exception. Any noise source which does not produce a noise level exceeding 70 dBA at a distance of twenty-five feet under its most noisy condition of use shall be exempt from the provisions of [Municipal Code Section 9.10.050(a)] between the hours of 8 AM and 8 PM Monday through Friday, 9 AM and 8 PM on Saturday, except Sundays and holidays, when the exemption herein shall apply between 10 AM and 6 PM (Section 9.10.060(a)).

  – Construction. Except for construction on residential property as described in [Municipal Code Section 9.10.060(c)], construction, alteration and repair activities which are authorized by valid city building permit shall be prohibited on Sundays and holidays and shall be prohibited except between the hours of 8 AM and 6 PM Monday through Friday, 9 AM and 6 PM. on Saturday provided that the construction, demolition or repair activities during those hours meet the following standards (Section 9.10.060(b)):

    - No individual piece of equipment produces a noise level exceeding 110 dBA at a distance of 25 feet;

    - The noise level at any point outside the property plane of the project does not exceed 110 dBA; and

    - The holder of a valid construction permit for a construction project in a non-residential zone shall post a sign at all entrance to the construction site upon commencement of construction, which informs all contractors, subcontractors, construction workers, etc. of the basic requirements in Chapter 9.10 of the municipal code.

    The sign referenced in the third sub-bullet above, should be posted at least five feet above ground level, have a white background with black lettering, and read:

    “CONSTRUCTION HOURS FOR NON-RESIDENTIAL PROPERTY
    (Includes Any and All Deliveries)
    MONDAY-FRIDAY........8:00 a.m. to 6:00 p.m.
    SATURDAY.........9:00 a.m. to 6:00 p.m.
    SUNDAY/HOLIDAYS........Construction prohibited.”

  – Other Equipment. Equipment used by City employees, City contractors, or public utility companies or their contractors, not covered by [Municipal Code Sections 9.10.060(b) and (c)], shall be allowed during the same hours as the exception set forth in [Municipal Code Sections 9.10.060(b)], providing no piece of equipment shall produce a noise level which exceeds 110 dBA, measured at a distance of twenty-five feet from the equipment (Section 9.10.060(d)).

  – Leaf Blowers. No person shall operate any leaf blower which does not bear an affixed manufacturer's label indicating the model number of the leaf blower and designating a noise level not in excess of 65 dBA when measured from a distance of fifty feet utilizing American National Standard Institute methodology. No person shall operate any leaf blower without attachment of all mufflers and full extension tubes supplied by the manufacturer for that leaf blower.

  - Refuse Collection. Refuse collection activities shall be permitted between the hours of 4 AM and 9 PM daily, provided they do not produce a noise level in excess of 95 dBA measured at a distance of 25 feet from the activity.

  - Safety Devices. Aural warning devices which are required by law to protect the health, safety and welfare of the community shall not produce a noise level more than 3 dBA above the standard or minimum level stipulated by law.

  - Emergencies. Emergencies are exempt from [the requirements of Municipal Code Chapter 9.10.

  - Public Parking Lot Cleaning. Cleaning equipment (other than leaf blowers), when used in public parking lots, shall be allowed during the hours of 10 PM and 8 AM daily, providing no such piece of equipment shall produce a noise level that exceeds 90 dBA measured at a distance of 25 feet.

Title 18, Zoning, Chapter 18.23, Performance Standards, sets forth standards for use in the design and evaluation of multi-family, commercial, and industrial zones. The standards are applicable to all multiple family (including RM-40) and commercial (including CC) districts. Relevant standards include:

- Section 18.23.060, Noise and Vibration, is intended to protect residentially zoned properties or properties with existing residential uses located within nonresidential zones (residential properties) from excessive and unnecessary noises and/or vibrations from any sources in abutting industrial or commercially zoned properties. It specifies that the design of new projects should reduce noise from parking, loading, and refuse storage areas and from heating, ventilation, air conditioning apparatus, and other machinery on nearby residential properties. Specific requirements and guidelines include:

  - Noise-producing equipment, including but not limited to generators, pumps, and air conditioning compressors, shall be located out of setbacks where abutting or within 50 feet of residential properties, and shall be screened from view from the residential property (Section 18.23.060(B)(ii)).

  - At the time of building permit issuance for new construction or for installation of any such interior or exterior mechanical equipment, the applicant shall submit an acoustical analysis by an acoustical engineer demonstrating projected compliance with the Noise Ordinance. The analysis shall be based on acoustical readings, equipment specifications and any proposed sound reduction measures, such as equipment enclosures or insulation, which demonstrate a sufficient degree of sound attenuation to assure that the prescribed noise levels will not be exceeded (Section 18.23.060(B)(iii)).

  - Upon completion of construction or installation, the city shall, where the acoustical analysis projected noise levels at or within 5 dB less than the Noise Ordinance limits, require demonstration of the installed equipment and certification that it complies with the anticipated noise levels and the Noise Ordinance prior to final building inspection approval (Section 18.23.060(B)(iv)).

- Parking areas, driveways, loading docks, mechanical equipment, trash enclosures, on-site recreation areas and similar noise generating elements should be sited as far away from residential property as is reasonably possible. When conditions require noise generating elements to be sited within close proximity to residential property, noise mitigation measures should be implemented as deemed suitable by staff or the architectural review board. These measures may include the following (Section 18.23.060(C)(ii):

    - Placement of building mass, and/or concrete or masonry walls at the residential property line or around the noise generating element;

    - Elimination of site access close to residential sites where other access is available;

    - Installation of an earth berm and landscape buffers where appropriate;

- All uses within 150 feet of a residential property should be operated so as not to generate vibration discernible without instruments at or beyond the lot line upon which the source is located or within adjoining enclosed space if more than one establishment occupies a structure. Vibration caused by motor vehicles, trains, and temporary construction or demolition work is exempted from this standard.

13.3 IMPACTS AND MITIGATION MEASURES

13.3.1 Significance Criteria

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains standards of significance for the evaluation of a project's impacts; however, Section 15064.7 of the CEQA Guidelines encourages each public agency to development and publics its own thresholds of significance that the agency uses in evaluating the significance of environmental effects in its jurisdiction.

The City of Palo Alto prepared its *Environmental Criteria Used by the City of Palo Alto* in 2007. In determining which standards of significance to use for evaluating the noise impacts of the proposed project, both Appendix G of the CEQA Guidelines and the City's published environmental criteria were considered. In considering these standards, the City considered: 1) the nature of the standard for the project (e.g., a 24-hour Ldn standard is not appropriate for a daytime construction event); 2) the general applicability of the standard (i.e., is the standard intended to apply to transportation noise sources or non-transportation noise sources such as a public safety building); and 3) the extent to which ambient noise levels exceed established standards. After consideration, the City's criteria were determined to be relevant to the environmental review of the proposed project, as well as the general criteria contained in the CEQA Guidelines. For the proposed project's temporary construction noise, the City considers construction activities resulting in a 10 dB increase in hourly noise levels above ambient conditions to be a temporary and substantial increase in noise levels, provided this increase occurs for two or more hours a day, five days a week, for more than 12 months. A 10 dB increase above existing ambient conditions is typically perceived as a "doubling" of loudness, which in limited doses is not considered substantial. Prolonged exposure to project-specific construction noise levels that are twice as loud as the ambient environmental level in which the receiver is accustomed to, however, would be considered substantial, even if such noise levels occur on a temporary basis. Accordingly, the proposed project would result in a significant noise impact if it would:

(a) Expose people to, or generate noise levels in excess of, the standards established in:

- The City of Palo Alto Municipal Code Chapter 9.10, Noise, or 18.23, Performance Standards; or
- The City of Palo Alto Comprehensive Plan Natural Environment noise policies N-6.1 and N-6.7, including land use compatibility standards (see Table 13-5); or
- Other potentially applicable State or agency standards.

(b) Expose people to or generate excessive groundborne vibrations or groundborne noise levels.

(c) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. For the purposes of this project, a substantial temporary or periodic increase in ambient noise levels is considered to occur if:

- Result in a 10 dB or greater increase in hourly noise levels above ambient conditions for two or more hours per day, five days a week, for a period of 12 months or more.

(d) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. For the purposes of this project, the proposed project would result in a substantial, permanent increase in ambient noise levels if it would:

- Cause the 24-hour noise level (Ldn) to increase by 5.0 decibels (dB) or more in an existing residential area, even if the Ldn would remain below 60 dB; or
- Cause the Ldn to increase by three dB or more in an existing residential area, thereby causing the Ldn in the area to exceed 60 dB; or
- Cause an increase of three dB or more in an existing residential area where the Ldn currently exceeds 60 dB.

(e) Expose people residing or working in the project area to excessive public or private airport-related noise levels.

13.3.2 Impacts and Mitigation Measures

Would the project expose people to, or generate noise levels in excess of, the standards established in the City of Palo Alto Municipal Code, Comprehensive Plan Natural Environment noise policies, or other potentially applicable State or agency standards (Significance Criterion [a])? This significance criterion applies to the discussions, below, of “Comprehensive Plan and Other Applicable Standards” and “Construction Noise Levels.”

The proposed project would not expose people to or generate noise levels that exceed the Comprehensive Plan or other applicable standards.

As shown in Table 13-2, existing community noise exposure levels at and in the project vicinity were calculated to be 63.2 dBA Ldn (measurement LT-1). This noise level is defined as "normally acceptable" for both the "Office Buildings, Business Commercial, Professional" and "Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds" land use categories established by the City's current Comprehensive Plan (see Table 13-5).

The project does not involve the construction of new single- or multi-family residential buildings that are subject to the City's indoor noise standards. The proposed project is not located within the 65 dBA noise contour zone associated with any airport, freeway or expressway, railroad, industrial source, or fixed-guideway source identified in the City's existing Comprehensive Plan. In addition, noise monitoring at location LT-1 did not record any hourly Leq value above 62.2 dBA. Accordingly, the proposed project would not be subject to the acoustical control requirements of Section 5.507 of the California Green Building Standards Code. Nonetheless, Ldn noise exposure at location LT-1 is estimated to be 63.2 dBA.[1] Standard construction techniques and materials are commonly accepted to provide a minimum exterior to interior noise attenuation (i.e., reduction) of 20 – 25 dBA with all windows and doors closed.[2] Based on this minimum attenuation level, interior noise levels within the proposed public safety building would comply with the building code.

The construction of the proposed project would not expose people to noise levels in excess of applicable standards contained in the City's Municipal Code. As shown in Tables 13-6, 13-7, and 13-8 (see discussion under Impact 13-1 below), the proposed construction activities would not involve the use of any individual piece of equipment that produces sound levels in excess of 110 dBA (at a distance of 25 feet), and combined construction noise levels for all phases would not exceed 110 dBA at the property plane (i.e., the property line). Thus, the proposed construction activities would meet the construction noise performance standards contained in Municipal Code Section 9.10.060 (b). Although the proposed project would not generate noise levels that exceed code standards, the proposed construction activities would have the potential to generate noise levels that are substantially higher than the existing ambient noise levels in the vicinity of the project. This issue is discussed under Impact 13-1 below.

In response to separate Significance Criterion (d), the proposed project would have the potential to generate a substantial, *permanent* increase in noise levels that exceed the standards contained in the City's municipal code. This issue is discussed under Impact 13-3 below. Thus, as described above, the proposed project would not expose people to, or generate noise levels in excess of, the standards contained in the City's Comprehensive Plan. This impact would be ***less than significant***.

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[1] The calculated Ldn is higher than the highest hour Leq at LT-1 due to the addition of a 10-dB penalty to nighttime hours (10 PM to 7 AM) when calculating Ldn.

[2] The U.S. Department of Housing and Urban Development (HUD) Noise Guidebook and supplement (2009a, 2009b) includes information on noise attenuation provided by building materials and different construction techniques. As a reference, a standard exterior wall consisting of 5/8-inch siding, wall sheathing, fiberglass insulation, two by four wall studs on 16-inch centers, and 1/2-inch gypsum wall board with single strength windows provides approximately 35 dBs of attenuation between exterior and interior noise levels. This reduction may be slightly lower (2 -3 dBs) for traffic noise due to the specific frequencies associated with traffic noise. Increasing window space may also decrease attenuation, with a reduction of 10 dBs possible if windows occupy 30% of the exterior wall façade.

Table 13-6
ESTIMATED PROJECT CONSTRUCTION NOISE LEVELS (LEQ dBA) AT RECEPTOR R-1

Project Component / Phase	**Phase Duration (Weeks)**	**Ambient Noise Level**	**Project Noise Level(B)**	**Net Change(C)**
Parking Garage Construction				
Site Preparation	2	58.0(A)	76.1	**+18.1**
Grading	12		76.2	**+18.2**
Utility Trenching	4		78.4	**+20.4**
Foundation Construction	12		81.4	**+23.4**
Vertical Building Construction	34		80.3	**+22.3**
Architectural Coating	1		67.7	+9.7

MIG, 2017. See the Noise Appendix.

(A) See Table 13-2. The existing ambient noise level of 58.0 for R-1 represents the lowest hourly Leq value taken between the hours of 8:00 AM to 6:00 PM (i.e., the hours construction activity would be occurring) during the community noise monitoring conducted on September 5th and 6th, 2017.

(B) Project noise levels estimated using the FHWA RCNM, V. 1.1. See Noise Appendix for RCNM output files. The estimated project noise level includes the ambient noise level plus the predicted construction noise level.

(C) Net change calculated as Project Noise Level – Ambient Noise Level. **Bold** values indicate an increase of more than 10 dB above the ambient noise level.

Table 13-7
ESTIMATED PROJECT CONSTRUCTION NOISE LEVELS (LEQ dBA) AT RECEPTOR R-2

Project Component / Phase	**Phase Duration (Weeks)**	**Ambient Noise Level**	**Project Noise Level(B)**	**Net Change(C)**
Parking Garage Construction				
Site Preparation	2	57.4	77.5	**+20.1**
Grading	12		77.6	**+20.2**
Utility Trenching	4		79.8	**+22.4**
Foundation Construction	12		82.7	**+25.3**
Vertical Building Construction	34		81.7	**+24.3**
Parking Garage and Public Safety Building (Concurrent Construction)				
Parking Garage Vertical Building Construction and Public Safety Building Site Preparation	2	57.4	82.6	**+25.2**
Parking Garage Architectural Coating and Public Safety Building Site Preparation	1		76.1	**+18.7**
Public Safety Building Construction				
Site Preparation	2	57.4	75.2	**+17.8**
Grading	15		76.0	**+18.6**
Utility Trenching	8		76.2	**+18.8**
Foundation Construction	12		77.5	**+20.1**
Vertical Building Construction	55		76.3	**+18.9**
Architectural Coating	1		65.4	+8.0

MIG, 2017. See the Noise Appendix.

(A) See Table 13-2. The existing ambient noise level of 58.0 for R-1 represents the lowest hourly Leq value taken between the hours of 8:00 AM to 6:00 PM (i.e., the hours construction activity would be occurring) during the community noise monitoring conducted on September 5th and 6th, 2017.

(B) Project noise levels estimated using the FHWA RCNM, V. 1.1. See Noise Appendix for RCNM output files. The estimated project noise level includes the ambient noise level plus the predicted construction noise level.

(C) Net change calculated as Project Noise Level – Ambient Noise Level. **Bold** values indicate an increase of more than 10 dB above the ambient noise level.

Table 13-8
ESTIMATED PROJECT CONSTRUCTION NOISE LEVELS (LEQ DBA) AT RECEPTOR R-3

Project Component / Phase	**Phase Duration (Weeks)**	**Ambient Noise Level**	**Project Noise Level(B)**	**Net Change(C)**
Public Safety Building Construction				
Site Preparation	2	56.8(A)	78.4	**+21.6**
Grading	15		79.2	**+22.4**
Utility Trenching	8		79.3	**+22.5**
Foundation Construction	12		81.9	**+25.1**
Vertical Building Construction	55		80.8	**+24.0**
Architectural Coating	1		68.6	**+11.8**

MIG, 2017. See the Noise Appendix.

(A) See Table 13-2. The existing ambient noise level of 58.0 for R-1 represents the lowest hourly Leq value taken between the hours of 8:00 AM to 6:00 PM (i.e., the hours construction activity would be occurring) during the community noise monitoring conducted on September 5th and 6th, 2017.

(B) Project noise levels estimated using the FHWA RCNM, V. 1.1. See Noise Appendix for RCNM output files. The estimated project noise level includes the ambient noise level plus the predicted construction noise level.

(C) Net change calculated as Project Noise Level – Ambient Noise Level. **Bold** values indicate an increase of more than 10 dB above the ambient noise level.

Mitigation. No significant impact has been identified; no mitigation is required.

Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above noise levels existing without the project (Significance Criterion [c])?

Impact 13-1: Project Construction Noise. Project construction would include site preparation, excavation and grading, utility trenching, construction of a new parking garage and public safety building, and application of architectural coatings. The noise levels generated by project construction would be in excess of 10 dB above ambient conditions at sensitive receptor locations for several hours a day for a period of approximately 16 to 21 months. Thus, the proposed project construction activities could result in a ***potentially significant impact*** (see criterion [c] in subsection 13.3.1, "Significance Criteria," above).

Project construction activities would generally involve the following phases: site preparation, excavation and grading, utility trenching, foundation construction, vertical building construction, and application of architectural coatings. These activities would require the use of typical heavy-duty construction equipment such as backhoes, graders, excavators, bulldozers, material lifts, and trucks. The project could also involve the use of an auger drill rig during foundation work for both the parking garage and public safety building.

Construction noise levels were estimated using the Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM). The RCNM is a computer program that uses empirical data and sound propagation principles to predict noise levels associated with a variety of construction equipment and operations. For the proposed project, potential construction noise levels were modeled separately for each project construction phase. The modeling accounted for the same type and amount of construction equipment type included in the CalEEMod file prepared for the project's Air Quality and Greenhouse Gas analyses (see Chapters 5 and 9, respectively). Potential parking garage construction noise levels were estimated at receptors R-1 and R-2, while potential public safety building construction noise levels were estimated at receptors R-2 and R-3.[1] The proposed construction schedule includes approximately three weeks of overlap between proposed parking garage and public safety building construction activities. Accordingly, the combined impacts resulting for concurrent construction at the two lots were analyzed at receptor R-2. For the purposes of the modeling:

- Noise-generating equipment during site preparation, grading, utility trenching, and architectural coating work activities was presumed to operate and move throughout parking garage and public safety building work sites and would not result in concentrated equipment operations near each site's property boundary. As such, equipment noise for these phases was modeled at a point approximately 40 feet inside the property boundary. Thus, the RCNM-input distance between these work activities and Receptors R-1, R-2 and R-3 was presumed to be 100 feet (R-1), 85 feet (R-2 Parking Garage), 130 feet (R-2 Public Safety Building), and 90 feet (R-3).

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[1] Parking garage construction activities would occur more than 450 feet from Receptor R-3. Similarly, public safety building construction activities would occur more than 400 feet from Receptor R-1, and the new parking garage would break the line-of-sight and serve to shield Receptor R-1 from public safety building construction activities.

- Noise-generating equipment during foundation construction and vertical building construction was presumed to include extended equipment duration closer to property boundaries (for concrete pouring, building material delivery and handling, and site finishing work). As such, equipment noise for these phases was modeled at a point approximately 10 feet inside the property boundary. Thus, the RCNM-input distance between these work activities and Receptors R-1, R-2, and R-3 was presumed to be 70 feet (R-1), 60 feet (R-2 Parking Garage), 100 feet (R-2 Public Safety Building), and 60 feet (R-3).

The estimated construction noise levels resulting from the construction of the proposed parking garage and public safety building at receptors R-1, R-2, and R-3 are summarized in Table 13-6 (R-1), Table 13-7 (R-2), and Table 13-8 (R-3).

Project construction would generate truck trips on local roadways due to soil hauling, concrete deliveries, vendor deliveries, etc. The highest concentration of truck trips would occur during soil excavation and hauling activities, which are estimated to produce approximately 5,740 total soil hauling trips over approximately 75-working days. Presuming these trucks occur over a six-hour period each day (a conservative approach since construction is permitted at least 9 hours a day Monday through Saturday by the City Municipal Code), soil hauling would generate an average of approximately 13 total truck trips per hour. At a speed of approximately 25 miles per hour, which presumes travel on Birch Street, each truck would be acoustically equivalent to approximately 19 passenger vehicles, or nearly 250 total passenger vehicles per hour (Caltrans 2013a). In general, it takes a doubling of traffic to increase traffic noise volumes by 3 dB (Caltrans 2013a). The Traffic Impact Analysis prepared for the project indicates peak hourly traffic volumes on local roadways are as low as 368 vehicles. The addition of 250 passenger car equivalents (from a noise perspective) to the roadway system during construction would not result in a doubling of traffic and would therefore result in a less than 3 dB increase in noise levels on local roads used to access the project site.

As shown in Tables 13-6 to 13-8, the construction of the proposed project would generally produce temporary, but prolonged, hourly noise levels in the range of 75 to 83 dBA during most construction phases (hourly noise levels during architectural coating phases would be closer to 68 dB). Such noise levels are approximately 18-20 dBA above the existing noise levels in the vicinity of the project, and would last for a period of approximately 16 months at R-1 and approximately 21 months at R-2 and R-3. The worst-case impact is predicted to occur at R-2 (the multi-family residential building at 5212 Birch Street, on the southeastern corner of the intersection of Birch Street and Sherman Avenue) during foundation work for the proposed parking garage. Construction noise levels during this activity are predicted to be approximately 25.3 dBs above ambient daytime conditions for a period of up to 12 weeks. Construction noise levels are also predicted to be more than 20 dBs above ambient daytime conditions at R-1 (the multi-family residential building at 2454 - 2458 Ash Street) during parking garage trenching (20.4 dB), foundation construction (+23.4 dB), and vertical building construction activities (+22.3 dB); R-2 during all parking garage construction phases except architectural coatings (+20.1 dB to +25.3 dB) and public safety building foundation construction (+20.1 dB); and R-3 during all public safety building construction phases except architectural coatings (+21.6 to +25.1 dB).

The magnitude of the project's predicted increase in noise levels at sensitive residential receptors locations is primarily a function of the anticipated construction activities, equipment usage, and the close proximity of the receptors to the proposed construction activities (i.e., across the street); however, there are other factors that could influence sound propagation and the project's predicted noise levels include:

- The RCNM model computes predicted noise levels based on a fixed point of equipment operation and a direct line of sight between the construction activity and the receiver; however, as construction proceeds and the building is constructed, equipment moves around the work area and some level of shielding may be provided by the new building.

- The RCNM model computes predicted noise levels based on at-grade equipment operation and a standard receiver height (i.e., 5 feet); however, the distance between a receptor at grade and and elevated receptor will be slight different, depending on the height of the elevated receptor.

- The RCNM model does not compute predicted noise levels that include potential effects associated with the reflection and/or diffraction of sound waves off or or around hard, reflective surfaces such as existing building walls.

- The proposed project would also involve below grade construction activities during the proposed parking garage's and public safety building's grading, foundation work, and initial vertical building construction activities; some work activities may occur as much as 23 feet below the street surface. As equipment operation proceeds below grade, the distance a sound wave travels from the equipment source / work area to nearby receptors increases. In addition, the earthen wall (including any shoring or bracing) formed between the equipment and receptors to grade difference would begin to serve as noise barrier when equipment operation reaches a depth of approximately 6 feet below grade. While the RCNM model does allow a certain level of acoustic shielding to be applied to equipment noise levels, the predicted noise levels in Table 13-6, 13-7, and 13-8 do not include any shielding because: 1) below grade construction would occur within an enclosed area, which may lead to reflection of sound waves; 2) the path of travel for a diffracted sound wave is not anticipated to double (even for first and second story receptors); and 3) a line of sight is presumed to remain for 3rd and 4th story residents at R-2.

As described above, the factors that are not accounted for in the RCNM modeling would be likely to reduce estimated construction noise levels. As such, although there is some uncertainty regarding the potential construction noise levels associated with the project, the values shown in Table 13-6, 13-7, and 13-8 are considered a reasonable, worst-case estimate of potential construction noise levels. As shown in these tables, the proposed project's construction noise levels would increase hourly ambient noise levels by 10 dB or more for two or more hours per day, five days a week, for a period of 12 months or more. This is considered a ***potentially significant impact.*** As such, the City would implement Mitigation Measure 13-1, which requires the City to take steps to verify predicted construction noise levels, implement measures to reduce construction noise levels, and monitor construction noise levels to ensure the maximum feasible reductions are achieved.

Mitigation 13-1. To reduce potential noise levels associated construction of the proposed project, the City and/or it's designated contractors, contractor's representatives, or other appropriate personnel shall:

- *Restrict work hours/equipment noise.* All work shall be subject to the construction noise and time limits contained in City Municipal Code Chapter 9.10. Construction activities (including deliveries) shall only occur during the following time periods:
  - 8 AM to 6 PM Monday through Friday; and
  - 9 AM to 6 PM on Saturday

  Construction activities shall be prohibited on Sundays and holidays. The City and/or its contractor shall post a sign at all entrances to the construction site informing contractors, subcontractors, construction workers, etc. of these requirements in accordance with Section 9.10.060(c). The sign shall also provide a name (or title) and phone number for an appropriate on-site and City representative to contact to submit a noise complaint.
- *Construction equipment care, siting, and design measures*. The following construction equipment care, siting, and design measures shall apply during construction activities:
  - Heavy equipment engines shall be covered and exhaust pipes shall include a muffler in good working condition. Pneumatic tools shall include a noise suppression device on the compressed air exhaust.
  - All stationary noise-generating equipment such as pumps, compressors, and welding machines shall be shielded and located as far from sensitive receptor locations as practical. At a minimum, such shielding shall consist of a three-sided sound enclosure (with a full or partial roof) that provides for proper ventilation, equipment operation, and effective noise control. The enclosure should be designed to achieve a 10 to 15 dB reduction in stationary equipment noise levels. The design of the enclosure shall be reviewed by a qualified acoustical consultant prior to installation to ensure the enclosure will achieve a minimum 10 dB reduction in stationary equipment noise levels.
  - The City shall connect to existing electrical service at the site to avoid the use of stationary, diesel- or other alternatively-fueled power generators.
  - No radios or other amplified sound devices shall be audible beyond the property line of the construction site.
- *Construction traffic.* Construction truck traffic, including soil hauling, equipment deliveries, potential concrete deliveries, and other vendor deliveries shall follow designated delivery routes prepared for the project, which are anticipated to include travel on Oregon Expressway and Birch Road.

(continued)

Mitigation 13-1 (continued):

- *Construct/Install Temporary Noise Barrier.* The City shall install and maintain throughout the duration of all site preparation, excavation, foundation construction, and building construction activities, one or more physical noise barriers capable of achieving a minimum reduction in predicted construction noise levels of 15.5 dB. Potential barrier options would include:
  - A concrete, wood, or other barrier installed at-grade (or mounted to structures located at-grade, such as K-Rail) along the project property line. Such a wall/barrier shall consist of material that have a minimum rated transmission loss value of 25.5 dB (or equivalent rating), and shall contain no gaps in the structure through which noise may pass.
  - Commercially available acoustic panels or other products such as acoustic barrier blankets installed along the project property line, building envelope or, if feasible and necessary, at or near sensitive residential receptor areas.
  - Any combination of noise barriers and commercial products capable of achieving a 15.5 dB reduction in construction noise levels at sensitive receptor locations.
  - Prior to the start of the project, the City may prepare an acoustical analysis that reflects the final site plan, construction activities, equipment use and duration, and refines potential construction noise reductions required for the project.

  The final type, placement, and design of the project's temporary noise barrier(s) shall be reviewed by a qualified acoustical consultant prior to installation to ensure proper function and a minimum attenuation of 15.5 dBs in construction noise levels.

- *Prepare Project Construction Noise Control Plan.* Prior to the start of construction activity, the City or its contractor shall prepare a Construction Noise Complaint Plan for the project which:
  - Identifies the name and/or title and contact information (including phone number and email) of the Contractor and City-representatives responsible for addressing construction-noise related issues.
  - Contains a detailed construction schedule and predicted noise levels associated with construction activities.

(continued)

<u>Mitigation 13-1 (continued)</u>:

  - Includes procedures describing how the construction contractor will receive, respond, and resolve to construction noise complaints. At a minimum, upon receipt of a noise complaint, the Contractor and/or City representative described in the first sub-bullet above shall identify the noise source generating the complaint, determine the cause of the complaint, and take steps to resolve the complaint.

- *Prepare Construction Noise Monitoring Plan*. Prior to the start of construction, the City or its contractor shall prepare a Construction Noise Monitoring Plan which identifies:
  - Construction activities, hours of operation, and predicted construction noise levels; and
  - Construction noise monitoring locations, duration, and frequency.

  The intent of the Construction Noise Monitoring Plan is to document updated ambient noise levels, monitor construction noise levels, and verify compliance with the noise reduction requirements in mitigation measure 13-1. If monitoring indicates temporary noise barriers are not achieving a minimum 15.5 dB reduction in construction noise levels or otherwise indicates construction noise is resulting a 10 dB increase in noise levels above ambient conditions, the City shall increase the height, size (length or width), density, and/or amount of noise barriers installed such that attenuation requirements are achieved. The Construction Noise Monitoring Plan may be combined with and/or incorporated into the Construction Noise Complaint Plan described above.

The implementation of these measures would limit construction activities and require the implementation of controls that would reduce predicted construction noise levels to less than a 10 dB increase above existing ambient conditions. Therefore, the construction noise impact of the proposed project is considered ***less than significant with mitigation.***

Would the project expose people to or generate excessive groundborne vibrations or groundborne noise levels (Significance Criterion [b])?

Impact 13-2: Project Groundborne Vibration Levels. Project construction activities could generate perceptible groundborne vibration at adjacent buildings, including residential buildings, for a period of approximately 8 months. Thus, groundborne vibration generated during project construction could result in a ***potentially significant impact*** (see criterion [b] in subsection 13.3.1, “Significance Criteria,” above).

As explained in Section 13.1.5, the potential for groundborne vibration is typically greatest when vibratory or large equipment such as rollers, impact drivers, or bulldozers are in operation. For the proposed project, the largest earthmoving equipment would primarily operate during the parking garage and public safety building site preparation, grading, and foundation work activities. At their closest, presuming work occurs on the property line, these activities would occur within approximately 20 feet of the adjacent commercial buildings across Jacaranda Lane, and within 60, 45, and 50 feet from Receptors R- 1, R-2, and R-3, respectively. The estimated groundborne vibration levels associated with the type of equipment that would be used during site preparation, grading, and foundation work is shown in Table 13-9.

Table 13-9
ESTIMATED GROUND-BORNE VIBRATION LEVELS FROM CONSTRUCTION EQUIPMENT

Equipment	**Peak Particle Velocity (in/sec)** [(A)]				**Velocity Decibels (VdB)** [(B)]			
	20 feet	**25 feet**	**45 feet**	**65 feet**	**20 feet**	**25 feet**	**45 feet**	**65 feet**
Large bulldozer	0.114	0.089	0.047	0.031	89.9	87.0	79.3	74.6
Small bulldozer	0.038	0.03	0.016	0.010	60.9	58.0	50.3	45.6
Loaded truck	0.097	0.076	0.040	0.027	88.9	86.0	78.3	73.6
Jackhammer	0.045	0.035	0.018	0.012	81.9	79.0	71.3	66.6
Auger Drill Rig	0.114	0.089	0.047	0.031	89.9	87.0	79.3	74.6

SOURCES: Caltrans 2004 and FTA 2006.

(A) Estimated PPV calculated as: PPV(D)=PPV(ref)*(25/D)^1.3 where PPV(D)= Estimated PPV at distance; PPVref= Reference PPV at 25 ft; D= Distance from equipment to receiver; and n= ground attenuation rate (1.1 for dense compacted hard soils).

(B) Estimated Lv calculated as: Lv(D)=Lv(25 feet)-30Log(D/25) where Lv(D)= estimated velocity level in decibels at distance, Lv(25 feet)= RMS velocity amplitude at 25 f; and D= distance from equipment to receiver.

As shown in Table 13-9, construction equipment vibration levels from large bulldozers and drill rigs (0.114 in/sec PPV and 89.9 VdB) operating within 20 feet of commercial structures could exceed Caltrans' vibration detection thresholds for “strongly perceptible”, as well as the FTA's daytime criterion of 75 VdB (for frequent events), and are therefore presumed to be perceptible by adjacent businesses. Unlike a bulldozer, which would move around during operations, a drill rig would remain stationary until drilling is complete and therefore may result in prolonged groundborne vibration levels that exacerbate potential vibration perception and annoyance.

Within 45 feet, which is the distance between the project site boundary and the closest sensitive receptor (R-2), vibration levels from a large bulldozer and drill rig (0.047 in/sec PPV and 79.3 VdB) would exceed Caltrans criteria for “distinctly perceptible” vibration and the FTA's daytime criterion of 75 VdB. At a distance of 65 feet, vibration levels from all construction equipment would drop below the FTA's criterion for daytime use of 75 VdB, but would still be above Caltrans' vibration detection thresholds for “barely perceptible” vibrations and are thus likely to be perceptible at buildings and residences adjacent to the project site. Groundborne vibration levels are estimated to drop below Caltrans' “barely perceptible” vibration detection threshold of 0.01 in/sec PPV at a distance of 175 feet.

The actual level of vibration that would be perceived at adjacent buildings would vary with time, and depend on the actual equipment operating at any given point, the distance between the equipment and building, and any background vibrations present in the area. Although groundborne vibrations could be perceptible at buildings within 175 feet of work areas during site preparation, grading, trenching, and foundation work activities, which last approximately 7 months for the proposed parking garage and 8 months for the proposed public safety building, worst-case vibration levels during work activities within 20 feet of adjacent commercial buildings and 45 feet of residential buildings are anticipated to occur for no more than one to two days at a time. In addition, construction equipment operating more than 20 feet from the site boundary would generate reduced vibration levels that are estimated to be barely perceptible. Under no circumstances are groundborne vibration levels predicted to exceed Caltrans' vibration damage threshold criteria for historic or older buildings of 0.25 in/sec PPV. The use of this threshold is considered protective of all nearby buildings, which are presumed to be of more recent construction and thus not as susceptible to damage from vibration as older, unreinforced structures.

Mitigation 13-2. To reduce potential groundborne vibration levels associated with construction of the proposed project, the City and/or it's designated contractors, contractor's representatives, or other appropriate personnel shall:

- *Prohibit Vibratory Equipment.* The City shall prohibit the use of large vibratory rollers (small plate compactors are acceptable) and vibratory pile driving equipment during construction. Any deep foundation piers or caissons shall be auger drilled.
- *Provide Notice to Adjacent Property Owners / Occupants.* Five (5) days advanced written notice shall be provided to adjacent property owners and building occupants before commencing all drilling and significant earthmoving activities within 65 feet of adjacent buildings. The notice shall provide the name (or title) and contact information (including phone number and email) of the Contractor and City-representatives responsible for addressing construction vibration-related concerns.
- *Prepare Vibration Mitigation Plan.* Prior to the start of construction activity, the City or its contractor shall prepare a Construction Vibration Response Plan for the project which:
  - Identifies the name and/or title and contact information (including phone number and email) of the Contractor and City-representatives responsible for addressing construction vibration-related issues.
  - Contains a detailed schedule of drilling and substantial earth moving activities expected to occur within 65 feet of adjacent buildings.

(continued)

<u>Mitigation 13-2 (continued)</u>:

- Includes procedures describing how the construction contractor will receive, respond, and resolve to construction vibration complaints. At a minimum, upon receipt of a vibration complaint, the Contractor and/or City representative described in the first sub-bullet above shall identify the vibration source generating the complaint, determine the cause of the complaint, and take steps to resolve the complaint by reducing groundborne vibration levels to less than 75 VdB and 0.04 in/sec PPV. Such measures may include the use of non-impact drivers, use of rubber-tired equipment instead of track equipment, or other measures that limit annoyance from groundborne vibration levels.

The implementation of these measures would limit the potential for groundborne vibration during construction activities, require advanced notice to adjacent property owners and building occupants, and develop procedures designed to limit potential annoyance and interference with daily activities at adjacent buildings. Therefore, the construction vibration impact of the proposed project is considered ***less than significant with mitigation.***

Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (Significance Criterion [d])?

Impact 13-3: Project Operational Noise. Noise generated by the parking garage ventilation fans and the public safety building generator, fire pump, and heating and air conditioning equipment may exceed standards contained in the City Municipal Code unless shielding or other means of attenuation is provided. This is considered a ***potentially significant impact*** (see subsection 13.3.1, "Significance Criteria," above).

Once constructed, the proposed parking garage and public safety building would have the potential to produce noise levels from increased vehicle parking activities, stationary sources of equipment such as ventilation fans and back-up generators, and increases in vehicle traffic on roadways. These potential impacts are described below.

Parking Garage Operational Noise

The new parking garage would increase the noise levels at the site from additional parking capacity, reflection of sound waves, etc. Noise sources associated with the parking garage (e.g., car horns, doors slamming, cars starting, etc.) would be intermittent. These types of noises would not differ substantially from the noise generated by existing parking lot, but the frequency of these events would increase. Potential increases in noise resulting from the new parking garage were quantified using the following equations contained in the FTA's *Transit Noise and Vibration Impact Assessment* manual (FTA 2006).[1]

$$\mathbf{Leq(h) = SEL_{ref} + C_N - 36.5}$$

and

$$\mathbf{C_N = 10 \times \log(N_A / 1{,}000)}$$

Where:

$Leq(h)$ = Hourly Leq at 50 feet
SEL_{ref} = Source Reference Level at 50 feet
C_N = Volume Adjustment (SEL_{ref} is based on 1,000 cars in peak activity hour)
N_A = Number of Automobiles per Hour

According to the FTA, the SEL_{ref} for parking garages is 92 dBA. As indicated in the equation, this SEL_{ref} is based on 1,000 cars per hour during peak time periods. The proposed parking garage would generate much lower activity levels; the Transportation Impact Analysis prepared for the project estimates the parking garage would generate a total of approximately 121 trips during the AM peak hour, 267 trips during the PM peak hour, and 1,902 trips throughout the rest of the day (see Chapter 15).

To calculate the Ldn at 50 feet from the parking garage, hourly noise levels were first calculated throughout the day using the equations above. The AM peak hour (7:00 AM – 9:00 AM) calculations accounted for 121 hourly trips, the PM peak hour (4:00 PM – 6:00 PM) calculations accounted for 267 hourly trips, and the remaining 1,902 trips were divided evenly throughout the remaining 20 hours in the day (i.e., 95 average trips her hour). This methodology is considered conservative (i.e., likely to overestimate Ldn) since it likely overestimates activity at the parking garage from the hours of 10:00 PM to 7:00 AM, when a 10 dBA penalty is applied to the hourly noise levels used to calculate the Ldn (see Section 13.1.2). The results of the calculation indicate the parking garage would result in noise levels of 52.8 dBA Ldn at a distance of 50 feet, which is approximately 10 dBA Ldn lower than the existing ambient noise level of 63.2 dBA Ldn. In general, when two noise levels are 10 dB or more apart, the lower value does not contribute significantly (less than 0.5 dB) to the total noise level.

In addition to the typical noise generated from standard operation of the parking garage, two supply fans and two exhaust fans would be constructed to provide ventilation throughout the garage. Clean air would be channeled into the garage through two intake supply fans located in the northeast and southeastern corner of the garage's first floor. Air from the two basement floors would then be vented from the structure via exhaust fans located in the northwestern and southwestern corners of the facility. Unlike the supply fans, the exhaust fans would be constructed approximately 10 feet above grade. Each fan would be of similar make and is anticipated to generate noise levels of 88 dBA at a distance of 25 feet. Given the purpose of

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[1] It should be noted the FTA guidance document indicates, "only the salient features of each fixed facility [i.e., parking garage] are considered in the noise analysis" (FTA 2006). Accordingly, noise generated from ventilation and exhaust fans are presumed to be unaccounted for in the FTA calculation methodology and are addressed as an additional source in this analysis.

the fans is to help circulate air within the lower levels of the garage, it is anticipated one or more of the fans would operate most if not all hours of the day. A sound performance level of 88 dBA at 25 feet exceeds the limits set by Municipal Code Section 9.10.050(a)), and would serve to substantially increase noise levels by more than 5 Ldn at receptors R-1 and R-2; however, the application submitted to the Architectural Review Board (ARB) indicates the parking garage' supply exhaust fans would be equipped with acoustic controls to abate noise generated from these sources. Specific information pertaining to the level of reduction is unknown at this time. The proposed parking garage may also include a back-up generator, although the size and location of this generator is unknown. As such, noise impacts associated with operation of supply and exhaust fans are considered potentially significant and require the implementation of Mitigation Measure 13-3, which requires the City to conduct an acoustical study in accordance with Section 18.23.060(B)(iii) of the Municipal Code demonstrating parking structure design and acoustical controls would not exceed 63.0 dBA Ldn at receptor locations R-1 and R-2.

Public Safety Building Operational Noise

Upon completion of construction activities, the new public safety building would feature an approximately 46,000 square foot, three-story police station and a fire/police administration building. The public safety building would also include two full-blocks of subterranean floors for police parking and operations. It would feature a secure operational yard, an approximately 5,000 square foot public plaza, and an approximately 250-horsepower electric fire pump and 530-horsepower emergency diesel generator that would be tested approximately one-hour per month.

The public plaza is intended to mark the main entry to the public safety building with an open and welcoming civic space. The space would provide community members with an area to sit, eat, socialize, and pass through on their way to the California Avenue commercial district. This type of anticipated activity is consistent with land uses in the area, and would not result in a substantial increase in noise levels in the immediate area.

The public safety building would house police and fire administration services and include parking for police vehicles equipped with emergency sirens that may operate as needed during emergency periods. Emergency sirens, which can produce sound levels as high as 120 dB are exempt from the limits and restrictions contained in the City's Municipal Code (Section 9.10.060(i)). While siren noise would be noticeable in the project area if operable, the use of sirens in the project area is only anticipated to occur on rare occasion since calls would be dispatched to police already distributed throughout the City (i.e., the trip would not originate at the public safety building). On the rare occasion a police vehicle was leaving from the public safety building, directly responding to a call, the siren would only be audible for a few seconds as the vehicle travels to where it needs to be.

The public safety building would also include the use of a generator and fire pump. The generator and fire pump are anticipated to be approximately 230-horsepower and 530-horsepower in size, respectively, although the exact make, model, and location of the generator on-site has not been determined. Typical pumps and generators with a power output rating of 230- and 530-horsepower produce noise levels of 87 to 95 dBA at a distance of 23 feet (Generac 2011, Caterpillar 2013). Similar to the parking garage ventilation fans, the proposed fire pump and generator could produce noise levels more than 15 dBA above ambient conditions, although given the limited operation of this equipment (presumed to be one-hour per month for testing purposes), their operation would not result in a 3 dB increase in Ldn values.[1] As such, noise impacts associated with the operation of the proposed generator and fire pump considered potentially significant and require the implementation of Mitigation Measure 13-3, which requires the City to conduct an acoustical study in accordance with Section 18.23.060(B)(iii) of the Municipal Code demonstrating public safety building design and acoustical controls would not exceed 71.8 dBA Leq at receptor locations R-2 and R-3.

Traffic Noise

The Traffic Impact Analysis conducted by Fehr and Peers for the proposed project indicates the parking garage and public safety building are anticipated to generate approximately 2,900 new trips daily, with 138 of those new trips occurring during the AM peak hour, and 234 during the PM peak hour. Table 13-10, below, presents existing traffic volumes during peak hour roadway volumes for the three intersections nearest the project site under existing conditions and project conditions.

Table 13-10
TRAFFIC VOLUME INCREASES AT SELECT INTERSECTIONS (VEHICLES/HR)

Intersection	**AM Peak Hour**			**PM Peak Hour**		
	Existing	**Project**	**Increase**	**Existing**	**Project**	**Increase**
Park Blvd / Sherman Ave	368	431	15%	520	607	14%
Birch St / Sherman Ave	580	733	21%	524	607	14%
Ash St / California Ave	367	403	9%	436	502	13%
SOURCE: Fehr and Peers 2017; Modified by MIG 2017						

As shown in Table 13-10 above, the proposed project could result in up to an additional 21% increase in traffic volumes on roadways segments near the project site. As shown through the equations presented in Section 13.1.1, a doubling of a noise source results in an increase of 3 dBA. Because the project-related vehicle trips would not approach the existing, hourly and daily traffic volumes on roadways in the project vicinity, traffic noise would not increase by 3 dBA. A noise level of less than 3 dBA would not be perceptible to the human ear in an outdoor environment.

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[1] As shown in Tables 13-7 and 13-8, the lowest measured ambient noise level at Receptors R-2 and R-3 was equal to 56.8 dBA. Municipal Code Section 9.10.050 permits a 15 dB increase above ambient levels, which would equal 71.8. Based on 24-hour ambient noise monitoring at location R-2, a 15 dB increase in ambient noise levels for one daytime hour would not result in a 3 dB increase in calculated Ldn values.

Mitigation 13-3. To reduce potential stationary source noise levels associated with the operation of the proposed project, the City and/or it's designated contractors, contractor's representatives, or other appropriate personnel shall:

- *Site equipment away from residential areas.* Garage ventilation fans and public safety building generators, fire pumps, and heating and air conditioning equipment shall be located outside of setbacks and screened from view from residential areas.
- *Enclose and/or Shield Stationary Noise-Generating Equipment.* The City shall enclose, shield, baffle, or otherwise attenuate noise generated from garage ventilation fans and public safety building generators, fire pumps, and heating and air conditioning equipment. The attenuation achieved through such enclosure, shielding, and/or baffling shall be sufficient to comply with Section 9.10.050(a) of the Municipal Code, which is estimated to be 78.2 dBA.
- *Prepare Acoustical Study.* In accordance with Chapters 9.10 and 18.23 of the Municipal Code, the City shall have an acoustical analysis prepared by a licensed acoustical engineer that demonstrates:
  - The proposed parking garage's generator would comply with the requirements of the City's Noise Ordinance (Section 9.10.050, as excepted).
  - The proposed parking garages ventilation fans would not result in a calculated Ldn of 63.0 at sensitive residential receptor locations.
  - The proposed public safety building fire pump, back-up generator, and heating and air conditioning equipment would comply with the requirements of the City's Noise Ordinance (Section 9.10.050, as excepted) and would not result in a calculated increase of more than 3.0 dB Ldn at sensitive receptor locations.

  The acoustical analysis shall be based on the final project design, reflect the actual equipment type and location at the project site, and the actual noise enclosure, shielding, or other attenuation measures included in the final project design. If the acoustical study demonstrates the noise levels from these sources would be at or within 5 dB less than the Noise Ordinance limits, the City shall demonstrate through monitoring that the equipment complies with the anticipated noise levels.

Implementation of these measures would ensure the project is designed and constructed in a manner consistent with the City's Municipal Code requirements and would reduce this impact to a ***less-than-significant level***.

Would the project expose people residing or working in the project area to excessive public or private airport-related noise levels (Significance Criterion [e])?

The proposed project is located approximately 13 miles northwest of San Jose International Airport, approximately 5 miles northwest of Moffett Airfield, and approximately 2.2 miles south of the Palo Alto Airport. Although noise generated from aircraft contributes to the local, ambient noise within the City and at the project site, it is not in excessive amounts. The project would not expose people residing or working within the project area to excessive noise levels from public or private aircraft. This impact would be ***less than significant***.

Mitigation. No significant impact has been identified; no mitigation is required.

13.4 REFERENCES

California Department of Transportation (Caltrans) 2004. *Transportation- and Construction-Induced Vibration Guidance Manual*. Prepared by Jones and Stokes for Caltrans Noise, Vibration, and Hazardous Waste Management Office. Sacramento, CA. June 2004.

______2009. Technical Noise Supplement. Prepared by ICF Jones and Stokes for Caltrans Division of Environmental Analysis. Sacramento, CA. November 2009.

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U.S. Federal Highway Administration (FHWA) 2010. "Construction Noise Handbook, Chapter 9 Construction Equipment Noise Levels and Ranges." *U.S. Department of Transportation FHWA*. September 10, 2015. Accessed October 14, 2015 at: http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm.

U.S. Federal Transit Administration (FTA) 2006. *Transit Noise and Vibration Assessment*. FTA-VA-90-1003-06. Washington, DC. May 2006.

City of Palo Alto. 2007. Palo Alto Comprehensive Plan: Chapter 5 – Natural Environment. Palo Alto, CA. Revised July 17, 2007. http://www.cityofpaloalto.org/civicax/filebank/documents/8176, accessed September 27, 2017.

City of Palo Alto, 2017. Municipal Code http://library.amlegal.com/nxt/gateway.dll/California/paloalto_ca/paloaltomunicipalcode?f=templates$fn=default.htm$3.0$vid=amlegal:paloalto_ca, accessed September 27, 2017.

14. PUBLIC SERVICES

This EIR chapter describes existing police protection and fire protection/emergency service conditions in Palo Alto and identifies any project-related environmental impacts associated with these services.

The PSB project proposes to relocate and expand space available for police and emergency services for the City. Construction and operation of the new PSB and public parking garage would not require the construction of new school facilities, parks, recreational facilities, or library facilities. The PSB project would support existing City employees, and the space in the civic center to be vacated by these employees would be backfilled with other, existing City employees. No new residents or employees are anticipated to be generated. These issues will not be discussed further.

14.1 POLICE AND FIRE PROTECTION/EMERGENCY SERVICE

14.1.1 Setting

(1) Palo Alto Police Department. Law enforcement protection services in Palo Alto are provided by the Palo Alto Police Department (PAPD). The Police Department also administers the Public Safety Answering Point (PSAP) 911 Communications Center, serving the city as well as Stanford University and other areas covered by the City's public safety organizations, public works, utilities, animal services, and other departments. The primary service area of the PAPD is coterminous with the city’s jurisdictional border. The portions of Stanford University outside of the Palo Alto city limit are covered by Stanford University Department of Public Safety personnel. The PAPD provides dispatching services to the Stanford University Police through the City’s communications center. In addition, the PAPD has contracts with Los Altos and Los Altos Hills that give the responsibility for emergency and State-mandated animal control services to the PAPD.[1] In addition to these agreements, the PAPD has also cooperated with other agencies in the region for joint purchases including a police records management system and field-based reporting applications in partnership with the cities of Mountain View and Los Altos.

In order to efficiently manage the PAPD’s wide scope of services, the department is split up into several divisions. Field Services is responsible for police response, critical incident resolution, regional assistance response, and police services for special events. Technical Services oversees the PSAP and Records. The Investigations division conducts police investigations, oversees storage and maintenance of evidence, and coordinates some youth services activities. Traffic Services is responsible for traffic enforcement, complaint resolution, and school safety. Parking Services manages parking enforcement, parking citations and adjudication, and

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[1] City of Palo Alto, 1997, Palo Alto Comprehensive Plan, Community Services and Facilities chapter. Referenced by Placeworks in the Comprehensive Plan Update EIR.

abandoned vehicle abatement. Police Personnel Services oversees police hiring, retention, personnel records, and training.

The FY 2016 adopted budget shows that the PAPD has a total of 156 positions.[1] The total expenditures for the 2016 fiscal year adopted budget total $36,859,267. In that same period, total revenues for the department are projected to be $4,324,484. These revenues are primarily recouped through fees as detailed in the adopted 2016 Municipal Fee Schedule. This means that in fiscal year 2016, the department has an operating cost of $32,534,783. The PAPD has indicated that they are in the process of moving forward with plans for a new police station and that construction of a new station could be completed within five years.[2] Although the exact size and location have not been identified, it was indicated that a preferred site is in mind.

(2) San Mateo County Sheriff, Transit Police Bureau. In addition to the Stanford University Public Safety department, the San Mateo County Sheriff's Office, Transit Police Bureau, has jurisdiction along the commuter railroad line operating between San Francisco and Gilroy. The San Mateo County Sheriff's Office, Transit Police Bureau, provides law enforcement services to the Peninsula Corridor Joint Powers Board (Caltrain) and the San Mateo County Transit District (SamTrans) under a contract approved by the two transit agencies and the San Mateo County Board of Supervisors in January 2002. The Transit Police Bureau is responsible for patrolling transit stations, railroad right-of-ways, district parking lots and related properties throughout San Francisco, San Mateo and Santa Clara counties; the investigation of crimes, collisions, accidents and deaths involving SamTrans buses and Caltrain passenger trains. In addition, the Transit Police Bureau participates in special events, projects, and investigations as warranted.[3]

(3) Santa Clara County Sheriff's Department. The Santa Clara County Sheriff's Office also provides police protection services to unincorporated areas of Santa Clara County which include the city of Palo Alto's Sphere of Influence (SOI), as well as other cities and towns, including Saratoga, Los Altos Hills, and the community of Moffett Field. Overall, the Sheriff's Office has 1,400 sworn personnel, including one Sheriff, one Undersheriff, two Assistant Sheriffs, 14 Captains, 20 Lieutenants, and 75 Enforcement Sergeants.

(4) Palo Alto Fire Department. The Palo Alto Fire Department's (PAFD's) service area covers all of the land within the jurisdictional boundaries of Palo Alto in addition to some of the unincorporated land surrounding the city limit, much of which is occupied by the Stanford

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[1] City of Palo Alto, 2016, Adopted Operating Budget Fiscal Year 2016, page 344. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[2] Hagerman, Ian. Senior Administrator, Palo Alto Police Department. Personal communication with Economic & Planning Systems staff. May 27, 2015. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[3] San Mateo County Sheriff's Office, San Mateo County Sheriff's Office website, http://www.smcsheriff.com/divisions/operationsdivision/transit-police-bureau, accessed February 4, 2015 by Placeworks for the Comprehensive Plan Update EIR.

University Campus. The PAFD service area includes a daytime population of almost 150,000 people, including both residents and workers in the city and on the Stanford campus.[1]

The service area occupies a 50-square-mile area and contains a variety of environments including residential neighborhoods, commercial corridors, industrial and high-tech uses, open space and hillside terrain, and freeways.[2] In addition to the PAFD's primary service area, the City has entered into mutual aid and automatic aid agreements with the City of Menlo Park, CAL FIRE, the Central County Fire Department (CCFD), the City of Mountain View, and the Woodside Fire Protection District.[3] These agreements call for the department with crews closest to the incident to respond to the call. Additionally, during the summer months, to respond to increased fire risk, the department serves the town of Los Altos Hills. The PAFD operates the only City-owned and operated ambulances in the county.

In 1976, the City of Palo Alto and Stanford University signed the agreement that resulted in the PAFD providing emergency medical, fire protection, and rescue services for the campus. This agreement sets out the amount that is determined to be Stanford University's fair share to be reimbursed to the City of Palo Alto for fire protection services. As a result of the size of the campus and the number of additional residents served by the inclusion of the Stanford Campus, this agreement serves to account for roughly 30 percent of PAFD's total annual expenditures. Furthermore, this agreement specifies that PAFD occupy and operate portions of the Stanford Fire Station.

Finally, the City does not have the authority to choose the location or placement of a new station on the campus in place of the existing Stanford Station, in the event that the City intends to relocate the existing station.[4] Stanford University and the City of Palo Alto are currently revising terms of the agreement.

PAFD's original mutual aid agreement with the Menlo Park Fire Protection District was established in 1999. In August of 2011, the two Cities entered into another 5-year agreement. This agreement also included the transfer of ownership of one inflatable boat, motor and boat trailer to the Menlo Park Fire Protection District with the expiration of the South Bay Water Rescue Program Joint Power Agreement between the City and the Fire District.[5] In summer

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[1] US Census Bureau, ACS Demographic and Housing Estimates 2011-2013 American Community Survey 5-Year Estimates, generated by City of Palo Alto Office of the City Manager, http://data.cityofpaloalto.org/dashboards/8853/explore-palo-alto/, accessed on January 19, 2016 by Placeworks for the Comprehensive Plan Update EIR.

[2] Stanford University Medical Center Facilities Renewal and Replacement Draft EIR, 2011, Public Services Chapter, page 3.14-1. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[3] Local Agency Formation Commission, Santa Clara County, 2010, 2010 Countywide Fire Service Review, page 66. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[4] Personal Communication between Eric Nickel, Fire Chief, Palo Alto Fire Department and PlaceWorks. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[5] City of Palo Alto, 2011, City Council Staff Report, Approval of Automatic Aid Agreement With the Menlo Park Fire Protection District; and Authorization to Transfer Ownership of One Inflatable Boat, Motor and Boat Trailer to the Menlo Park Fire Protection District. Referenced by Placeworks in the Comprehensive Plan Update EIR.

months, an additional fire engine is staffed at Station 8. In order to preemptively combat fires in the open space and hillside areas of Palo Alto, PAFD also has the Foothills Fire Camera at Station 8, which provides a real time view of some of the city's open space areas through the City's website.[1]

Providing comprehensive fire protection for this area requires a robust combination of staffing and equipment. According to the fiscal year 2016 operating budget, the total expenditures for the department will be $26,531,679 million.[2] As of the 2016 fiscal year, the department includes 107 full time positions, which staff a total of seven fire stations. Stations 1 through 5, and 8 are within Palo Alto city limits, and Station 6 is staffed through a contract with Stanford University. All stations are staffed year-round, with the exception of Station 8, which is staffed for approximately four months each year during fire season.[3] Each fire station has a service area that includes approximately 13,363 residents. At these stations the PAFD keeps six 2009 Pierce Arrow XT Fire Engines and a ladder truck for aerial fire suppression, ventilation, and heavy rescue. Two advanced life support ambulances are strategically staffed out of Stations number one and number two and respond to all medical incidences and are also included in fire, rescue, and vehicle accidents and hazardous materials incidents.[4] There are a total of 30 personnel on duty on a daily basis throughout the fire stations.[5]

In fiscal year 2014 PAFD handled 7,829 calls for service, including approximately 4,757 medical and rescue calls, 150 of which were calls for fire service. Additionally, in 2014 PAFD provided 3,648 ambulance transports as compared to 3,523 in 2013.[6] As can be seen from these numbers, in recent years, the primary services provided by PAFD have shifted toward emergency medical services (EMS). With increased fire safety (e.g., mandatory building sprinklers) and education programs, the risk of building fires has decreased dramatically. Out of approximately 100 to 200 fire calls in recent years, there are only about ten actual fires per year, including only one or two severe fires. Accordingly, traditional firefighting is increasingly a small share of the department's overall efforts. EMS, educational outreach, and technical rescue have become the PAFD's main focus areas.

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[1] City of Palo Alto, http://www.cityofpaloalto.org/gov/depts/fir/wildland/foothills_fire_camera.asp, accessed on February 4, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[2] City of Palo Alto, 2016, Adopted Operating Budget Fiscal Year 2016, page 256. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[3] Cameron, Amber. Strategic Operations Manager, Palo Alto Public Safety Department. Personal communication with Roland Rivera, City of Palo Alto. July 23, 2015. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[4] City of Palo Alto Website, Palo Alto Fire Department, Apparatus, http://www.cityofpaloalto.org/gov/depts/fir/overview/apparatus.asp. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[5] Cameron, Amber. Strategic Operations Manager, Palo Alto Public Safety Department. Personal communication with Roland Rivera, City of Palo Alto. July 23, 2015. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[6] City of Palo Alto, 2016, Adopted Operating Budget Fiscal Year 2016, page 256. Referenced by Placeworks in the Comprehensive Plan Update EIR.

Rather than evaluating the department's level of service by looking at staffing ratio goals, the City has set its service goals based on the percent of calls that are responded to under a specified response time goal. These time goals include responding to 90 percent of fire emergencies and emergency medical requests for service within eight minutes, and responding to 90 percent of paramedic calls for service within 12 minutes. In 2014 Fire Units arrived at 86 percent of fire emergencies within eight minutes, 90 percent of emergency medical services within eight minutes, and 98 percent of paramedic calls within 12 minutes.[1] Therefore, the PAFD met its response time goal for responding to emergency medical service and paramedic calls, but did not meet its goal for responding to fire emergencies; however, the PAFD has attributed the increase in response times to methodology in how response times are calculated associated with the virtual consolidation of Computer Aided Dispatch (CAD) services with the partner cities of Mountain View and Los Altos.[2] The City currently has an Insurance Service Offer (ISO) rating of two.[3,4]

14.1.2 Regulatory Setting

(1) Police Protection. This section summarizes key local regulations related to police protection services. There are no federal or State regulations pertaining to police protection services that apply to the proposed PSB project.

Local Regulations:

Palo Alto Municipal Code

Chapter 2.08.170, Police Department. This chapter establishes that the Chief of Police is accountable to the City Manager. Additionally, this chapter lays out the official duties of the Chief of Police. Some of these duties include being responsible for the preservation of the public peace and order, the prevention and detection of crime, the apprehension of offenders, the protection of persons and of property, the enforcement of law, and the operation of the juvenile law enforcement program of the City.

Chapter 16.58.080 Public Safety and Government Facility Fees. This chapter establishes development impact fees as a condition of the approval of, or permits for, any new residential or nonresidential development to fund police and fire facilities (including fire apparatus and vehicles). The fee schedule for FY 2016 was adopted by the City Council on June 15, 2015.[5] The FY 2016 municipal fee schedule imposes non-residential public safety facilities impact fees

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[1] City of Palo Alto, 2016, Adopted Operating Budget Fiscal Year 2016, page 255. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[2] City of Palo Alto, 2016, Adopted Operating Budget Fiscal Year 2016, page 255. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[3] Local Agency Formation Commission, Santa Clara County, 2010, 2010 Countywide Fire Service Review, page 67. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[4] ISO ratings provide statistical information on risk related to the performance of a fire department.

[5] City of Palo Alto, Municipal Fee Schedule, Fiscal Year 2016, page 4. Referenced by Placeworks in the Comprehensive Plan Update EIR.

at $557 per 1,000 square feet of commercial, $186 per 1,000 square feet of industrial development, and $743 per 1,000 square feet of hotel/motel development. Residential fees are $996 per residence for single-family residential, and $797 per unit for multi-family residential.[1]

(2) Fire Protection/Emergency Service. This section summarizes key State and local regulations related to fire protection services. There are no federal regulations pertaining to fire protection services that apply to the proposed PSB project.

State Regulations. This section describes the State regulations and plans that pertain to fire protection services in Palo Alto.

California Code of Regulations

Division 1 of Title 19, Public Safety. Division 1 of Title 19, Public Safety, of the California Code of Regulations pertains to fire and life safety and constitutes the Basic Building Design and Construction Standards of the Office of the State Fire Marshal. Title 19 includes prevention and engineering measures for new construction. Title 19 is regularly reviewed and updated by the Office of the State Fire Marshal.

California Building Code (Title 24, Part 2). The State of California provides a minimum standard for building design through the 2013 California Building Code (CBC), which is located in Part 2 of Title 24 of the California Code of Regulations. The 2013 California Building Code is generally adopted on a jurisdiction-by-jurisdiction basis, subject to further modification based on local conditions. Commercial and residential buildings are plan-checked by local City and County building officials for compliance with the CBC. Typical fire safety requirements of the CBC include the installation of sprinklers in all high-rise buildings; the establishment of fire resistance standards for fire doors, building materials, and particular types of construction; and the clearance of debris and vegetation within a prescribed distance from occupied structures in wildfire hazard areas. California Fire Code (Title 24, Part 9)

The California Fire Code incorporates, by adoption, the International Fire Code of the International Code Council, with California amendments. This is the official Fire Code for the State and all political subdivisions. It is located in Part 9 of Title 24 of the California Code of Regulations. The California Fire Code is revised and published every three years by the California Building Standards Commission.

Assembly Bill 337 (Sections 51175-51189). In response to the Oakland Hills fire of 1991, the Bates Bill was passed in 1992 and incorporated into the California Code of Regulations, Sections 51175-51189. Pursuant to this law, all new construction that is located in any fire hazard zone must use brush clearance and fire-resistant roof material.

California Public Resources Code.

Fire Protection Fee, Section 4210: Adopted as California Public Resources Code (PRC) Section 4210, Assembly Bill X1 29 (ABX1 29) established an annual Fire Prevention Fee to help

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[1] City of Palo Alto, Municipal Fee Schedule, Fiscal Year 2016, Impact and In-Lieu Fees, page 79. Referenced by Placeworks in the Comprehensive Plan Update EIR.

pay for fire prevention services within State Responsibility Areas (SRAs).[1] Under ABX1 29, owners of habitable structures, defined as a "building that contains one or more dwelling units or that can be occupied for residential use"[2] located within a SRA, which is an area that includes State and privately-owned forest, watershed, and rangeland where the State of California has primary financial responsibility for the prevention and suppression of wildfires. As such, Santa Clara County works in cooperation with the California Department of Forestry and Fire Protection (CAL FIRE).

Hazardous Fire Areas, Section 4290: Section 4290, Hazardous Fire Areas, of the PRC includes fire safety regulations that apply to development in Palo Alto. This section establishes minimum standards for roads, signage, private water supply resources, and wildland fuel modification. Section 4290 works in conjunction with current and new building construction development standards in SRAs, defined by the State Board of Forestry and Fire Protection as an area in which the State has primary financial responsibility for preventing and suppressing fires. These areas exist along the western border of Palo Alto. Section 4291, Mountainous, Forest-, Brush- and Grass-Covered Lands, of the PRC requires annual defensible space of 100 feet to be provided around all structures in or adjoining any mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or any land that is covered with flammable material, including land with such characteristics located in portions of Palo Alto.

California Government Code. SB 1241 amended Section 65302(g)(3) of the Government Code to require the Safety Element of General Plans (or in Palo Alto's case, the Comprehensive Plan) to address the risk of fire for land within SRAs and land classified as a very high fire hazard severity zones. The Safety Element is required to address historical data on wildfires; information on existing and planned land uses in very high fire hazard severity zones and in SRAs; and local, State, and federal agencies with responsibility for fire protection. It is also required to include goals, policies, and objectives to protect the community from the unreasonable risk of wildfire, as well as feasible implementation measures to carry those goals and objectives, such as avoiding or minimizing the wildfire hazards associated with new uses of land, locating new essential public facilities outside of high fire risk areas, ensuring that adequate emergency access and water supplies are available for fire suppression, and working cooperatively with public agencies with responsibility for fire protection.

California Health and Safety Code. The California Health and Safety Code provides regulations pertaining to the abatement of fire-related hazards. This Code also requires that local jurisdictions, including Palo Alto, enforce the California Building Code, which as discussed above provides standards for fire-resistant building and roofing materials and other fire-related construction methods.

California Fire Plan. The California Fire Plan is the State's "road map" for reducing the risk of wildfire. The overall goal of the plan is to reduce total costs and losses from wildland fire in California through focused pre-fire management prescriptions and increased initial attack success. The plan was adopted in March 1996 and is currently undergoing review and revision

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[1] California Fire Prevention Fee, http://www.firepreventionfee.org/sra_faqs.php, accessed August 5, 2013 by Placeworks for the Comprehensive Plan Update EIR.

[2] California Fire Prevention Fee, http://www.firepreventionfee.org/sra_faqs.php, accessed August 5, 2013 by Placeworks for the Comprehensive Plan Update EIR.

by CAL FIRE. The Plan provides guidance to local jurisdictions, such as the City of Palo Alto, to meet these State goals.

Local Regulations

City of Palo Alto Municipal Code

Chapter 2.08.180, Fire Department. This chapter of the Palo Alto Municipal Code contains provisions that lay out the organizational structure of the Palo Alto Fire Department. This chapter makes clear that the fire department is under the direction of the Fire Chief who is accountable to the City Manager. In addition, this chapter contains the official duties of the Fire Chief.

Title 15, Fire Prevention. Title 15 of the Palo Alto Municipal Code includes Chapter 15.04, which adopts the California Fire Code, and Chapter 15.05, which adopts the International Fire Code. In general, Title 15 establishes regulations related to fire safety, such as design and construction of structures related to fire safety, and requires the Fire Chief or his designee to review plans of all new construction, all remodels, and all additions to ensure that proper fire prevention design and construction measures are incorporated.

Chapter 16.58.080 Public Safety and Government Facility Fees. This chapter establishes development impact fees as a condition of the approval of, or permits for, any new residential or nonresidential development to fund police and fire facilities (including fire apparatus and vehicles). The fee schedule for Fiscal Year (FY) 2016 was adopted by the City Council on June 15, 2015.[1] The FY 2016 municipal fee schedule imposes non-residential public safety facilities impact fees at $557 per 1,000 square feet of commercial, $186 per 1,000 square feet of industrial development, and $743 per 1,000 square feet of hotel/motel development. Residential fees are $996 per residence for single-family residential, and $797 per unit for multi-family residential.[2]

14.1.3 Significance Criteria

Based on the CEQA Guidelines, the project would have a significant impact on police and fire protection/EMS if it would:[3]

(a) Result in an adverse physical impact from the construction of additional fire or police protection facilities in order to maintain acceptable performance standards.

14.1.4 Impacts and Mitigation Measures

Would the project result in an adverse physical impact from the construction of additional fire or police protection facilities in order to maintain acceptable performance standards (Significance Criterion [a])?

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[1] City of Palo Alto, Municipal Fee Schedule, Fiscal Year 2016, page 4. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[2] City of Palo Alto, Municipal Fee Schedule, Fiscal Year 2016, Impact and In-Lieu Fees, page 79. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[3] CEQA Guidelines, Appendix G, items XIV (a) and (c).

The primary objective of the proposed PSB component of the project is to relocate the City's Police Department, Office of Emergency Services, Emergency Operations Center, Emergency Communications Center, and Fire Administration Division from their current undersized facility located at 275 Forest Avenue, Palo Alto, to a new adequately sized, secure essential facility, inclusive of required dedicated parking and site improvements, that is designed to support the ongoing mission of the City of Palo Alto's public safety providers. The existing facility, which opened in 1970, does not meet current seismic, accessibility, or regulatory code requirements applicable to a building of this type. The existing facility's space use, functional, technical, security, and safety characteristics have become increasingly inadequate over the past 50 years. The new PSB will be designed as a resilient essential services facility capable of standalone operations and able to perform at an operational or Immediate Occupancy Performance Level following a substantial earthquake, natural disaster, or event of social unrest.

Relevant to CEQA significance criterion, the PSB is not being proposed specifically to address an identified inadequacy in current performance standards for public fire protection/EMS and police protection (e.g., service ratios or response times). Also, the project would not include the construction of commercial, office, or residential uses that would result in the need for additional police and fire protection. Due to its new facilities, new equipment, and improved functional efficiency, the PSB is expected to improve police protection and fire protection/EMS, but the project is proposed specifically to improve the conditions of the physical facility in which Fire Department and Police Department employees work with respect to, for example, seismic safety, accessibility, code requirements, and functional efficiency, as described in the paragraph directly above.

This EIR evaluates the physical impacts that would result from construction and operation of the proposed PSB project. Chapters 4 (Aesthetics) through 15 (Utilities and Service Systems) analyze potential environmental impacts resulting from the project and conclude that all potentially significant impacts could be reduced to a less-than-significant level with implementation of the mitigations recommended in this EIR.

Mitigation. No additional mitigation is required beyond those measures already identified for potentially significant impacts in chapters 4 through 15 of this EIR. With mitigation, all environmental impacts would be less than significant.

Specific to construction period impacts, construction of the PSB project would be temporary and would occur over an approximately 39-month period, with the public parking garage being constructed first (see chapter 3, section 3.5 – Preliminary Construction Timing, of this EIR). The construction of the PSB and parking garage may result in intermittent closure of streets surrounding Parking Lots C-6 and C-7 during project construction. The streets potentially affected could include portions of Sherman Avenue, Birch Street, Ash Street, and Jacaranda Lane. To a lesser degree, construction activities may also result in intermittent reduced service on Park Boulevard adjacent to the project site.

The construction mitigation measures and standard City regulations identified in this EIR (e.g., chapter 5 – Air Quality, chapter 8 – Geology and Soils, chapter 10 – Hazards and Hazardous Materials, chapter 11 – Hydrology and Water Quality, and chapter 13 – Noise) would apply. With the identified mitigation measures and regulations, no significant environmental impact is anticipated with project construction activity. The potential environmental impacts associated with ***construction*** of the Palo Alto Public Safety Building and California Avenue Parking Garage would therefore be ***less than significant after mitigation***.

15. TRANSPORTATION, TRAFFIC, AND PARKING

Due to the specific technical and quantitative methodology required to adequately evaluate transportation and traffic impacts, this EIR chapter is formatted differently from the other chapters. For instance, a summary is provided below, whose details are included in subsequent sections of the chapter.

15.1 SUMMARY

This EIR chapter presents the results of the Transportation Impact Analysis (TIA) conducted by Fehr & Peers, Transportation Consultants, for the proposed Public Safety Building (PSB) and California Avenue Parking Garage to be located on Sherman Avenue in the City of Palo Alto, California (see chapter 21, Appendices, of this EIR for the original TIA). The existing site currently comprises public parking Lots C-6 and C-7. The PSB would be developed on Lot C-6 and the public parking garage (also referred to as “parking structure”) on Lot C-7. The proposed project would remove the existing surface parking lots (which total approximately 310 parking spaces) to construct a new three-story Public Safety Building (PSB) of approximately 45,000 to 50,000 square feet (excluding accessory site buildings) and a new public parking garage with 636 parking spaces (i.e., 326 net new spaces).

The impacts of the proposed project were evaluated following guidelines of the City of Palo Alto, the Santa Clara Valley Transportation Authority (VTA), and the congestion management agency for Santa Clara County.

15.1.1 Project Traffic Estimates

Project-generated trips were estimated for the proposed PSB project based on trip generation studies conducted by Portland State University and at the Central Police precinct of Vancouver, Washington.

Vehicle trip estimates for the net new parking spaces in the public parking garage were estimated based on parking surveys conducted at the two existing parking lots (Lots C-6 and C-7) during the AM and PM peak period. Parking facilities are not typically traffic generators by themselves. Trips are actually generated by the nearby retail, office and residential uses, and parking lots or structures simply provide vehicle storage. The parking structure trips are generally going to be existing vehicles that currently park at adjacent facilities (e.g., street parking, Lot C-8), but would park in the new parking structure.

The proposed project is estimated to generate 2,822 net new daily trips, 129 net new AM peak hour trips (74 inbound and 55 outbound), and 238 net new PM peak hour trips (116 inbound and 122 outbound).

15.1.2 Project Impacts

This analysis identifies potentially significant impacts of the proposed project on the surrounding transportation system and recommends measures to mitigate significant impacts.

(1) Intersection Impacts. Intersection impacts were evaluated for "Plus Project" scenarios under Existing, Background, and Cumulative Conditions by comparing the results to the appropriate "No Project" scenario.

Based on the significance impact criteria by the City of Palo Alto and Valley Transportation Authority (VTA) Congestion Management Program, the PSB project is expected to have a ***less-than-significant impact*** at all 10 study intersections under Plus Project conditions for the Existing, Background, and Cumulative scenarios. Accordingly, no traffic mitigation measures are needed.

(2) Pedestrian, Bicycle, and Transit Impacts. While the project is expected to generate new non-auto trips, the existing pedestrian, bicycle, and transit facilities would accommodate the additional demand. Furthermore, the *City of Palo Alto Bicycle + Pedestrian Transportation Plan* (May 2012) includes the identification of a bicycle boulevard on Park Boulevard. This project does not conflict with that planned bicycle facility. Therefore, the project's impact to the pedestrian, bicycle, and transit facilities is considered **less than significant,** and no off-site mitigation is needed to support multi-modal travel to and from the project site.

15.1.3 Site Access and On-Site Circulation

The general on-site circulation patterns and site access for the PSB and parking structure are considered adequate. The PSB would be served by one primary inbound and outbound secured driveway on Sherman Avenue, approximately 85 feet west of Park Avenue. A secondary inbound and outbound driveway would be provided on Birch Street, adjacent to Jacaranda Lane. These two driveways would provide direct access to the PSB's basement parking that would include 145 to 150 parking spaces for police department service vehicles and PSB staff. To accommodate all turning movements at the PSB's Birch Street outbound driveway, it is recommended that the westbound left-turn movement on Jacaranda Lane be prohibited to reduce vehicle potential conflicts and right-of-way confusion for drivers.

The public parking structure's driveway is recommended to be located on Sherman Avenue, near the Birch Street intersection. This location provides adequate queuing storage on Sherman Avenue for inbound vehicles. The parking structure could potentially be gated at the entrance if a payment system was implemented; however, given the ample capacity available on Sherman Avenue and the relatively low peak hour volumes, it is anticipated that gating the entrance would only result in short temporary vehicle queues on Sherman Avenue, and traffic flow would not be substantially affected.

Key project site improvements are recommended to accommodate all modes of travel:

- Class I long-term bicycle parking such as lockers or secured room should be provided for employee use.

- Provide Class II short-term bicycle parking racks such as inverted u-style bicycle parking racks.

- To enhance safety for pedestrians, it is recommended that signage and or warning systems be installed at all driveways to notify pedestrians of approaching vehicles and to make drivers aware of potential conflicts with pedestrians.

15.1.4 Other Transportation Considerations

The project's PSB related traffic is expected to add minimal traffic to the adjacent residential streets on Birch Street and Park Boulevard. However, due to the nominal increase in traffic from the project and the ample capacity on those roadways, it is not anticipated that the project will result in any impacts to the adjacent neighborhoods.

The vehicle miles traveled (VMT) for a new development project is estimated by adding the VMT for all vehicles generated by a site or use. VMT was calculated for the PSB but not the parking structure, as the PSB would be generating new traffic to the site and parking facilities would not. The VMT was calculated for years 2020 and 2040, which are the two future years of the MTC MPO Travel Demand Model. Based on the project's trip generation and the trip lengths from MTC's travel demand model, the project's average weekday VMT (generated by the PSB) would be approximately 2,250 VMT under 2020 Conditions, which equates to 15 VMT per employee, and 2,700 VMT under 2040 Conditions, which equates to 18 VMT per employee. The average trip length for employees at the proposed project is estimated to be more than 15 percent below the regional averages, which would result in a less-than-significant impact for VMT.

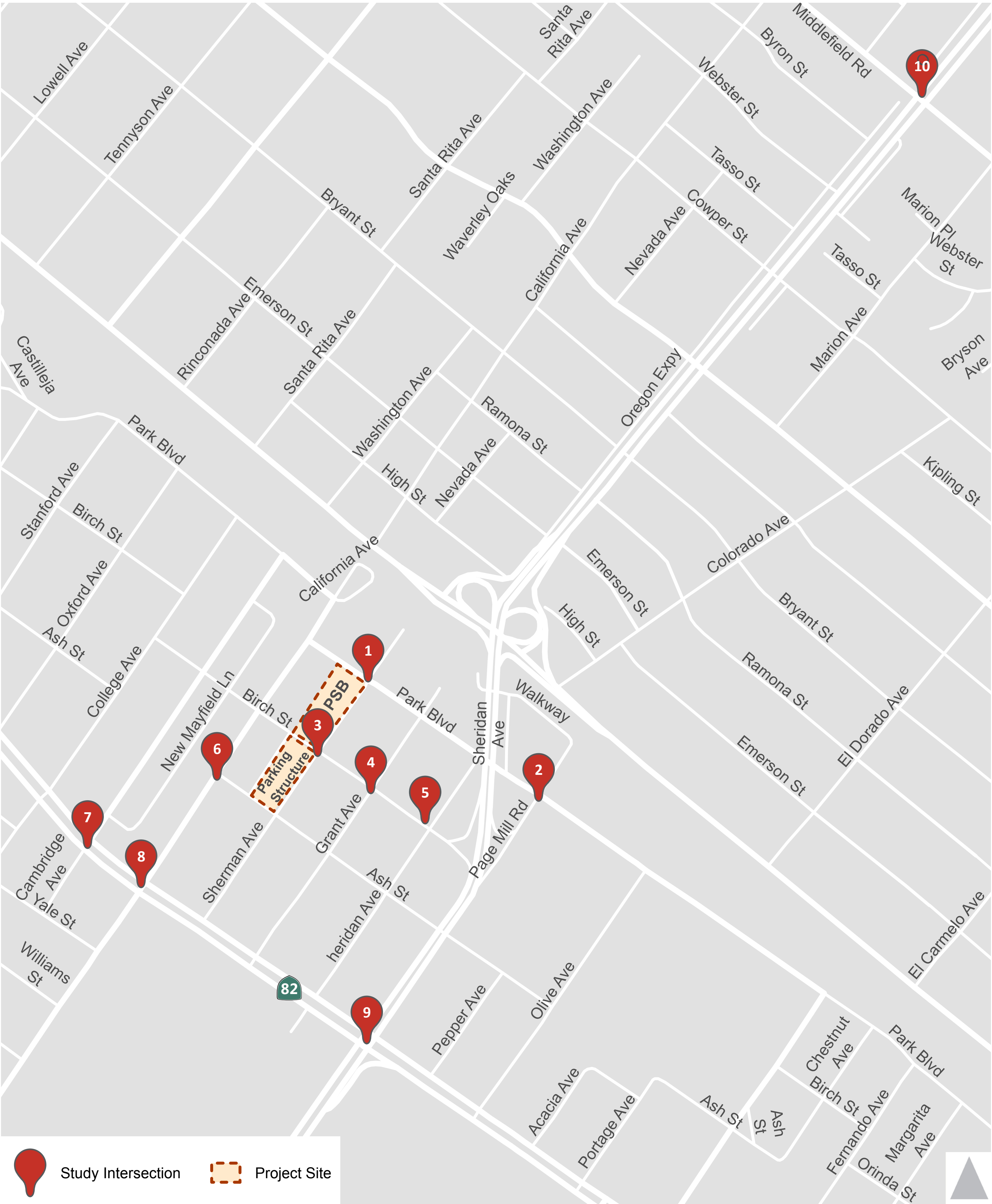
Lastly, a queueing analysis was conducted for critical left-turn movements at study signalized intersections. Based on the analysis, there would be no significant impact to queueing at the study intersections.

15.2 INTRODUCTION

This EIR chapter presents results of the Transportation Impact Analysis (TIA) conducted by Fehr & Peers for the proposed Public Safety Building (PSB) and California Avenue Parking Garage ("the PSB project") on Sherman Avenue in the City of Palo Alto. The analysis was conducted to evaluate the effects of the project on the surrounding transportation system and to identify measures to mitigate any significant mobility impacts. The TIA was prepared following guidelines of the City of Palo Alto and Santa Clara Valley Transportation Authority (VTA), the congestion management agency for Santa Clara County. This chapter provides a detailed project description and outlines the Project Study area, analysis methodologies, and significance criteria.

15.2.1 Project Description

The site location is shown on Figure 15.1, and the proposed site plans are shown on Figure 15.2a and Figure 15.2b. The project site is in the Evergreen Park neighborhood of Palo Alto at the corner of Sherman Avenue and Birch Street. The existing site currently comprises public Parking Lots C-6 and C-7. The PSB would be developed on Lot C-6 and the public parking structure on Lot C-7. The sites are generally bounded by Jacaranda Lane to the north, Sherman Avenue to the south, Park Boulevard to the east, and Ash Street to the west. The

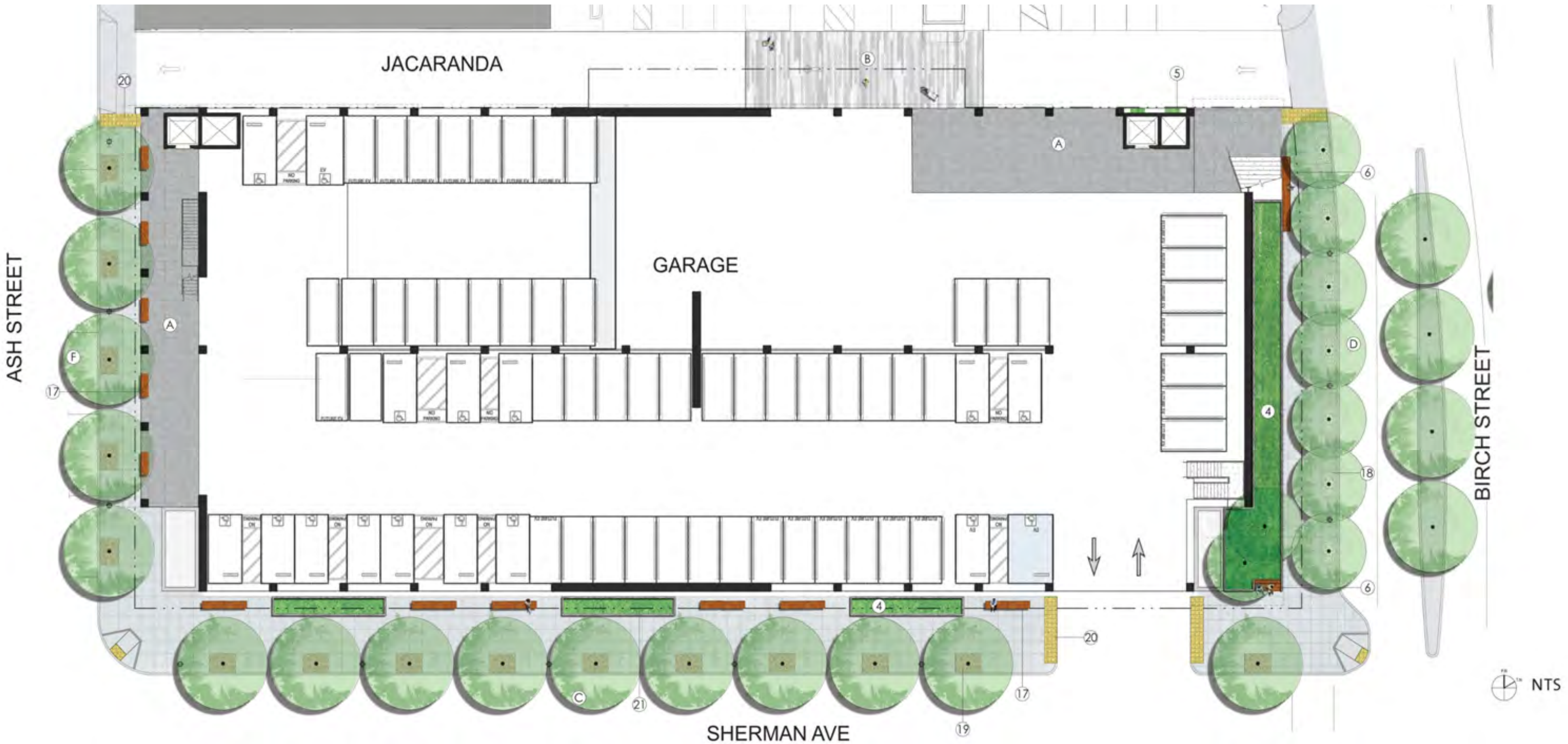


Source: Fehr & Peers

Figure 15.1 - Project Site and Study Intersections

Source: RossDrulisCusenbery Architecture, 2017

Figure 15.2a - Public Safety Building Site Plan



Source: RossDrulisCusenbery Architecture, 2017

Figure 15.2b - Parking Structure Site Plan proposed project would remove the existing surface parking lots (which total approximately 310 parking spaces) to construct a new three-story PSB of approximately 45,000 to 50,000 square feet (excluding accessory site buildings) and a new public parking structure with 636 parking spaces (i.e., 326 net new spaces).

15.2.2 Study Area

Project impacts on the study area roadway facilities were determined by measuring the effect project traffic would have on intersection operations during the morning (6:00 to 9:00 AM) and evening (4:00 to 7:00 PM) peak periods. A total of 10 intersections, as shown on Figure 15.1, were selected as study locations. These locations are:

(1) Study Intersections.

1. Park Boulevard / Sherman Avenue
2. Park Boulevard / Page Mill Road
3. Birch Street / Sherman Avenue
4. Birch Street / Grant Street
5. Birch Street / Sheridan Avenue
6. Ash Street / California Street
7. El Camino Real / Cambridge Avenue
8. El Camino Real / California Avenue
9. El Camino Real / Page Mill Road
10. Middlefield Road / Oregon Expressway

VTA's *Transportation Impact Analysis Guidelines* (VTA, 2014) indicate that intersections should be analyzed if the proposed project adds 10 or more peak hour vehicles per lane to any intersection movement. The listed intersections were selected based on VTA's ten trip per lane guideline.

(2) Freeway Segments. According to VTA's TIA guidelines, a freeway segment analysis should be included if the project meets one of the following requirements:

1. The proposed development project is expected to add traffic equal to at least one percent of a freeway segment's capacity.

2. The proposed development project is adjacent to one of the freeway segment's access or egress points.

3. Based on engineering judgment, Lead Agency staff determines that the freeway segment should be included in the analysis.

The nearest freeways to the project site are I-280 and US 101, which are approximately three miles and two miles away, respectively. The capacity for a freeway mixed-flow lane for freeway facilities greater than two lanes in one direction is 2,300 vehicles per hour per lane (vphpl), 2,200 vphpl for freeway facilities with two lanes or less in one direction, and 1,650 vphpl for High Occupancy Vehicle (HOV) lanes. The segment of I-280 between Alpine Road and El Monte Road has a direction capacity of 9,200 vphpl, and the segment of US 101 between San Antonio Avenue and Embarcadero Road has a one direction capacity of 8,550 vphpl.

The PSB project is not anticipated to meet any of the three criteria listed above; therefore, no freeway segment analysis was conducted for the proposed Project.

15.2.3 Analysis Scenarios

The operations of the study intersections were evaluated during the weekday morning (AM) and weekday evening (PM) peak hours for the following scenarios as presented in sections 15.3 through 15.7:

Scenario 1: *Existing Conditions* – Existing volumes obtained from counts.
Scenario 2: *Existing plus Project Conditions* – Scenario 1 volumes plus traffic generated by the proposed project.
Scenario 3: B*ackground No Project Conditions* – Existing volumes plus traffic from “approved but not yet built” and “unoccupied” developments in the area.
Scenario 4: *Background plus Project Conditions* – Scenario 3 volumes plus traffic generated by the proposed project.
Scenario 5: *Cumulative (2035) No Project Conditions* – Cumulative (2035) traffic volumes from the City of Palo Alto’s updated travel demand forecast, which is based on *City of Palo Alto Comprehensive Plan* land uses and funded transportation improvements.
Scenario 6: *Cumulative (2035) plus Project Conditions* – Scenario 5 volumes plus traffic generated by the proposed project.

15.2.4 Analysis Methods

The operations of roadway facilities are described with the term *level of service*. Level of Service (LOS) is a qualitative description of traffic flow based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels are defined, from LOS A, the best operating conditions, to LOS F, the worst operating conditions. LOS E represents “at-capacity” operations. When traffic volumes exceed the intersection capacity, stop-and-go conditions result, and operations are designated as LOS F.

(1) Signalized Intersections. The method described in Chapter 16 of the 2000 *Highway Capacity Manual* (HCM) (Special report 209, Transportation Research Board) was used to prepare the level of service calculation for the study intersections. This level of service method, which is approved by the City of Palo Alto and VTA, analyzes a signalized intersection’s operation based on average control delay per vehicle. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay for signalized intersections is calculated using TRAFFIX traffic analysis software and is correlated to a LOS designation as shown in Table 15-1. In addition, critical delay is also a factor for determining the intersection’s operation. Critical delay represents the delay associated with the critical movements of the intersection, or the movements that require the most “green time” and have the greatest effect on overall intersection operations. The changes in critical delay and critical volume-to-capacity (V/C) ratio between baseline (i.e., “No Project”) and “Plus Project” conditions are used to identify significant impacts.

(2) Unsignalized Intersections. Operations of the unsignalized intersections (e.g., stop-sign controlled) were evaluated using the methods contained in Chapter 17 of the 2000 HCM and calculated using TRAFFIX analysis software. LOS ratings for stop-sign controlled intersections

Table 15-1
SIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service	**Description**	**Average Control Delay per Vehicle (seconds)**
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B+ B B-	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 12.0 12.1 to 18.0 18.1 to 20.0
C+ C C-	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 23.0 23.1 to 32.0 32.1 to 35.0
D+ D D-	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 39.0 39.1 to 51.0 51.1 to 55.0
E+ E E-	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	55.1 to 60.0 60.1 to 75.0 75.1 to 80.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0

SOURCE: *Traffic Level of Service Analysis Guidelines,* October 2014; VTA Congestion Management Program, June 2003; *Highway Capacity Manual*, Transportation Research Board, 2000.

are based on the average control delay expressed in seconds per vehicle. At two-way or side-street-stop controlled intersections, control delay is calculated for each movement, not for the intersection as a whole. For approaches composed of a single lane, control delay is computed as the average of all movements in that lane. For all-way-stop-controlled locations, a weighted average delay for the entire intersection is presented. Table 15-2 summaries the relationship between delay and LOS for unsignalized intersections.

Table 15-2
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service (v/c ≤ 1.0)	**Description**	**Average Control Delay Per Vehicle (Seconds)**
A	Little or no delay.	≤ 10.0
B	Short traffic delay.	> 10.0 to 15.0
C	Average traffic delays.	> 15.0 to 25.0
D	Long traffic delays.	> 25.0 to 35.0
E	Very long traffic delays.	> 35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded.	> 50.0

SOURCE: *Highway Capacity Manual*, Transportation Research Board, 2000.

15.2.5 Level of Service (LOS) Standards and Significance Criteria

The determination of significance for project impacts is based on applicable policies, regulations, goals, and guidelines defined by the City of Palo Alto and the Santa Clara County Congestion Management Plan. The LOS standard for the City of Palo Alto intersections is LOS D. The Page Mill Road/El Camino Real (intersection 9) and the Middlefield Road/El Camino Real (intersection 10) intersections are designated as Congestion Management Program (CMP) intersections. The threshold for CMP intersections is LOS E. The impacts of the project were evaluated by comparing the results of the level of service calculations under the “Plus Project” scenarios to the baseline “No Project” scenarios. The detailed impact criteria for this study are presented below.

(1) Traffic Operations Impact Criteria. The following LOS standards and impact criteria were applied to the intersection analysis.

Signalized Intersections

Significant impacts at signalized City of Palo Alto intersections are defined to occur when the addition of project traffic causes one of the following:

- Intersection operations to degrade from an acceptable level (LOS D or better for City of Palo Alto intersections, and LOS E or better for regionally significant roadways and CMP intersections) under “No Project” conditions to an unacceptable level (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) for “Plus Project” conditions; or

- Exacerbate unacceptable “No Project” operations (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) by increasing the critical delay by more than four (4) seconds and increasing the volume-to-capacity (V/C) ratio by 0.01 or more; or

- An increase in the V/C ratio of 0.01 or more at an intersection with unacceptable operations (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) when the change in critical delay between No Project and Plus Project conditions is negative (i.e., decreases). Decreases in critical delay can occur if the critical movements change.

Unsignalized Intersections

LOS analysis at unsignalized intersections is generally used to determine the need for modifying intersection control type (i.e., all-way stop or signalization). As part of this evaluation, traffic volumes, delays, and peak hour traffic signal warrants are evaluated to determine if the existing intersection control is appropriate.

The City has generally used LOS D as the minimum acceptable operating level at unsignalized intersections. Significant impacts are defined to occur when the addition of project traffic degrades operations to LOS E or LOS F and the intersection satisfies the peak hour signal warrants from the California Manual of Uniform Traffic Control Devices (MUTCD).

(2) Pedestrian And Bicycle Impact Criteria. The City of Palo Alto Comprehensive Plan describes related policies necessary to ensure that pedestrian and bicycle facilities are safe and effective for City residents. Using the Comprehensive Plan as a guide, significant impacts to these facilities would occur when a project or an element of a project:

- Creates a hazardous condition that currently does not exist for pedestrians and bicyclists, or otherwise interferes with pedestrian or bicycle accessibility to the site and adjoining areas; or
- Conflicts with an existing or planned pedestrian or bicycle facility; or
- Conflicts with policies related to bicycle and pedestrian activity adopted by the City of Palo Alto, Santa Clara County, VTA, or Caltrans for their respective facilities in the study area.

(3) Transit Impact Criteria. Significant impacts to transit service would occur if the project or any part of the project:

- Creates demand for public transit services above the capacity which is provided or planned; or
- Disrupts existing transit services or facilities;[1] or
- Conflicts with an existing or planned transit facility; or
- Conflicts with transit policies adopted by the City of Palo Alto, Santa Clara County, VTA, or Caltrans for their respective facilities in the study area.

15.2.6 Report Organization

The remainder of this chapter is divided into the following sections:

Section 15.3 – Existing Conditions describes the transportation system near the project, including the surrounding roadway network; morning and evening peak period driveway and intersection turning movement volumes; existing bicycle, pedestrian, transit, and parking facilities; and intersection levels of service.

Section 15.4 – Existing Plus Project Conditions addresses the Existing plus Project Conditions, and discusses project vehicular, pedestrian, bicycle, and transit impacts. The relevant project information - such as the project components and project trip generation, distribution, and assignment - is also discussed in this section.

Section 15.5 – Background Conditions addresses the conditions with approved, but not yet constructed projects. The section discusses these conditions both without and with the project, and discusses project vehicular impacts.

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[1] This includes disruptions caused by proposed-project driveways on transit streets and impacts to transit stops/shelters, as well as impacts to transit operations from traffic improvements proposed or resulting from a project.

Section 15.6 – Cumulative Conditions addresses the 2035 cumulative conditions, both without and with the project, and discusses cumulative project vehicular impacts.

Section 15.7 – Site Access, Circulation, and Parking describes project access and circulation for all travel modes.

15.3 EXISTING CONDITIONS

This section describes the Existing Conditions of the roadway facilities, pedestrian and bicycle facilities, as well as parking and transit services near the PSB project site. It also presents existing traffic volumes and operations for the study intersections, with the results of LOS calculations.

15.3.1 Existing Transportation Facilities

(1) Existing Street System. Access to and from the project site is provided by the following roads: Page Mill Road, El Camino Real, Oregon Expressway, Bryant Street, Park Boulevard, Birch Street, Ash Street, Cambridge Avenue, California Avenue, Sherman Avenue, Grant Avenue, and Sheridan Avenue. Each facility is described below in more detail.

Page Mill Road is a two- to four-lane east-west divided arterial road that extends west to Los Altos Hills and connects with Oregon Expressway at El Camino Real. Within the study area, the roadway provides four travel lanes (two in each direction) with exclusive left-turns at all intersections. The posted speed limit ranges between 35 and 50 miles per hour (mph). Page Mill Road provides access to local commercial and industrial areas as well as access to I-280. East of Ash Street, Page Mill Road transitions into Oregon Expressway, and another short street segment designated as Page Mill Road connects the expressway with the California Avenue Transit Station parking lot.

El Camino Real (also identified as State Route 82) is a major north-south arterial that connects San Francisco to San Jose. El Camino Real provides access to local and regional commercial areas. Direct access to the site from El Camino Real is provided via Sherman Avenue. The posted speed limit is 35 mph.

Oregon Expressway is a four-lane, east-west expressway that extends between Alma Street and US 101. Oregon Expressway provides access to local residential areas, as well as access to US 101. West of El Camino Real, the roadway becomes Page Mill Road. Eastbound and westbound traffic is divided by a raised median with enhanced landscaping. Westbound traffic accesses the project site via ramps at Birch Street. Eastbound traffic accesses the project site via Sherman Avenue by turning left on El Camino Real or via the Page Mill Road ramps connecting to Park Boulevard. The posted speed limit is 35 mph.

Park Boulevard is a two-lane, north-south road that extends from Whitclem Drive in the south to El Camino Real in the north. The roadway is primarily a local road; however, in the vicinity of the PSB project site, it is designated as a collector road. The posted speed limit is 25 mph.

Birch Street is a north-south road that extends from Park Boulevard in the north to Oregon Expressway in the south. The road has four lanes between Oregon Expressway and California Avenue, and two lanes between California Avenue and Park Boulevard. Birch Street is a collector street between Oregon Expressway and California Avenue, and a local street between California Avenue and Park Boulevard. The posted speed limit is 25 mph.

California Avenue is a two-lane east-west collector road that extends from Amherst Street (to the west) to Park Boulevard (east of the project site). California Avenue is fronted by retail and restaurants, and includes angled parking on both sides of the street. The posted speed limit is 25 mph.

Sherman Avenue is a two-lane east-west local road that connects El Camino Real in the west to Park Boulevard in the east. The posted speed limit is 25 mph, and on-street parking is provided on both sides of the roadway.

Grant Avenue is an east-west local road that extends from El Camino Real in the west to Park Boulevard in the east. The road includes two lanes from El Camino Real to Birch Street and becomes a one-way eastbound road east of Birch Street.

(2) Existing Pedestrian Facilities. Pedestrian facilities comprise sidewalks, crosswalks, and pedestrian signals (at signalized intersections). The majority of streets in the project vicinity have sidewalks on both sides of the street. Marked crosswalks are provided across all legs of study signalized intersections. A Rectangular Rapid Flashing Beacon (RRFB) pedestrian signal is present at the south crosswalk across the Park Boulevard/Page Mill Road intersection. The project site is located immediately south of the commercial corridor along California Avenue, where there is a high amount of pedestrian traffic. Within the commercial corridor, pedestrian enhancements include wide sidewalks, curb extensions (also known as bulb-outs), and an ample amount of landscaped buffers.

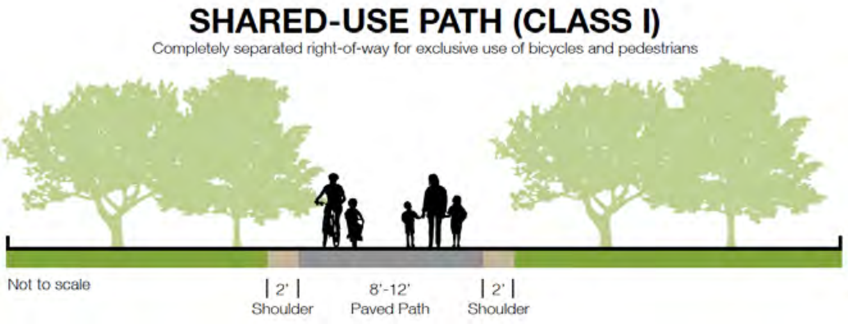
Figure 15.3 presents study locations with pedestrian crosswalks.

(3) Existing Bicycle Facilities. Guidelines and design standards for bikeway planning and design in California are established by the California Department of Transportation (Caltrans) and presented in the *Highway Design Manual* (Chapter 1000: Bikeway Planning and Design). For local reference, the *City of Palo Alto Bicycle + Pedestrian Transportation Plan* (May 2012) provide a bikeway planning and design tool. Bicycle facilities comprise paths (Class I), lanes (Class II), routes (Class III), and boulevards (Class III) as described below **and shown on the accompanying figures.**

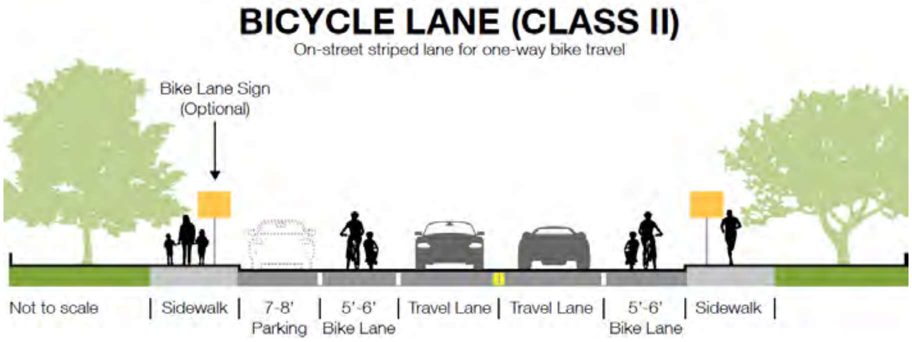
- Class I Bikeway (Bicycle Path) provides a completely separate right-of-way and is designated for the exclusive use of bicycles and pedestrians, with vehicle and pedestrian cross-flow minimized.

Source: Fehr & Peers

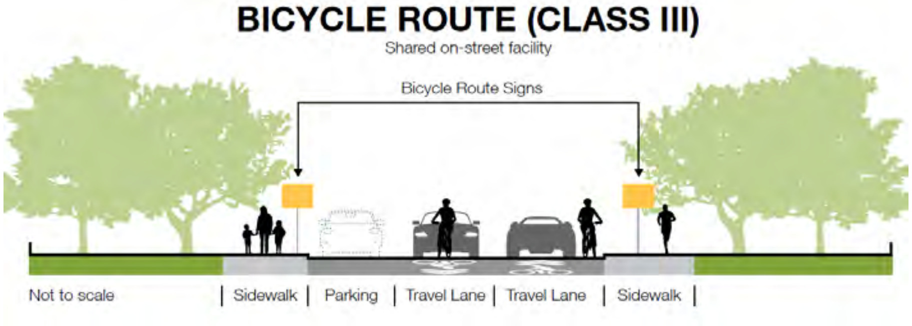
Figure 15.3 - Existing Bicycle and Pedestrian Facilities



- Class II Bikeway (Bicycle Lane) provides a restricted right-of-way and is designated for the use of bicycles, with a striped lane on a street or highway. Bicycle lanes are generally four to six feet wide. Adjacent vehicle parking and vehicle/pedestrian cross-flow are permitted.



- Class III Bikeway (Bicycle Route) provides for a right-of-way designated by signs or pavement markings (sharrows) for shared use with pedestrians or motor vehicles. Sharrows are a type of pavement marking (bike and arrow stencil) placed to guide bicyclists to the best place to ride on the road, avoid car doors, and remind drivers to share the road with cyclists.



- Class IIIA Bikeway (Bicycle Boulevard) is a modified bicycle route providing a convenient and efficient through route for cycles of all skill levels. A bike boulevard includes signage, pavement markings, and in some cases, traffic calming (e.g., mid-block closures to vehicles) and bike lanes.

Figure 15.3 presents existing bicycle facilities within the project vicinity. These facilities include:

- Bicycle lanes on:
  - Park Boulevard between El Camino Real and Lambert Avenue
  - Page Mill Road west of El Camino Real
  - California Avenue west of El Camino Real and east of Alma Street

- Bicycle routes on:
  - California Avenue between Park Boulevard and El Camino Real
  - Bryant Street between Palo Alto Ave and Los Robles Avenue

(4) City of Palo Alto Bicycle + Pedestrian Transportation Plan. The *City of Palo Alto Bicycle + Pedestrian Transportation Plan* (May 2012) contains the policy vision, design guidance, and specific recommendations to guide public and private investments in active transportation (pedestrian and bicycle) facilities and related programs in the City of Palo Alto. In addition to the bicycle boulevard on Park Boulevard near the project site, planned bicycle improvements include:

- Bicycle lanes on:
  - El Camino Real south of Page Mill Road
  - California Avenue between El Camino Real and Park Boulevard

- Bicycle routes on:
  - El Camino Real north of Page Mill Road
  - Page Mill Road/Oregon Expressway east of El Camino Real

(5) Santa Clara Countywide Bicycle Plan. The adopted Santa Clara Countywide Bicycle Plan synthesizes other local and County plans into a comprehensive 20-year cross-county bicycle corridor network and expenditure plan (May 2008). The long-range countywide transportation plan and the means by which projects compete for funding and prioritization are documented in the Valley Transportation Plan (VTP) 2035 (adopted in January 2009). The Santa Clara Countywide Bicycle Plan includes a planned bicycle network of 16 routes of countywide or intercity significance. Several of these proposed facilities travel through the study area, including (listing street with cross-county bicycle corridor number and name):

- Bryant Street (#1 US 101 Corridor)

- Park Boulevard (#2 Alma Street/Caltrain Corridor)

- California Avenue (#3 Dumbarton – East-West Connector Corridor)

- El Camino Real (#4 El Camino Real – Grand Boulevard Corridor)

The bicycle plan is being updated, including through outreach meetings with the community.

(6) Existing Transit Service. Figure 15.4 shows the existing transit service near the PSB project site. Bus service in Palo Alto is operated by the VTA. Commuter rail service (Caltrain) is provided from San Francisco to Gilroy by the Peninsula Joint Powers Board. The project site is served by VTA local, express and rapid transit routes, Caltrain, Deer Creek Caltrain shuttle, Stanford Marguerite shuttle, and AC Transit Dumbarton Express bus service. Table 15-3 describes the extent and frequency of service during the week, with average weekday load factors for VTA buses and Caltrain.

Table 15-3
EXISTING TRANSIT SERVICES

			Weekdays		**Weekends**	
Route[1]	**From**	**To**	**Operating Hours**	**Headways[2] (minutes)**	**Operating Hours**	**Headways[2] (minutes)**
VTA						
22	Palo Alto Transit Center	Eastridge Transit Center	24-hour service	15	24-hour service	15
89	California Avenue Caltrain Station	Palo Alto Veterans Hospital	9:36 AM – 6:39 PM	30	No service	No service
101	Camden and Highway 85	Palo Alto	6:17 AM – 6:44 PM	60	No service	No service
102	South San Jose	Palo Alto	5:50 AM – 6:55 PM	15	No service	No service
103	Eastridge Transit Center	Palo Alto	5:08 AM – 6:37 PM	45		
104	Penitencia Creek Transit Center	Palo Alto	5:56 AM – 6:15 PM	30	No service	No service
182	Palo Alto	IBM/Bailey Avenue	7:29 AM – 6:14 PM	N/A: one peak hour trip	No service	No service
522	Palo Alto Transit Center	Eastridge Transit Center	4:39 AM – 11:26 PM	15	7:46 AM – 11:15 PM	15
Caltrain						
Caltrain California Avenue	San Francisco	Gilroy	4:30 AM – 1:34 AM	20-40	7:00 AM – 12:08 AM	60
AC Transit						
Dumbarton Express (DB1)	Union City BART	3475 Deer Creek Road	5:26 AM – 8:43 PM	20	No service	No service
Stanford Marguerite Shuttle System						
1050 Arastradero (1050 A)	Li Ka Shing Center	1050/1070 Arastradero Road	7:00 AM – 7:10 PM	20-25	No service	No service
Research Park (RP)	Palo Alto Transit Center	3475/3500 Deer Creek Road	6:31 AM – 7:33 PM	20-40	No service	No service
Shopping Express (SE)	Palo Alto Transit Center	Showers Drive @ Walmart	3:15 PM – 4:15 PM	50-60	9:35 AM – 11:08 PM	50-60
SOURCES: VTA, 2017; Caltrain, 2017; Stanford University, 2017.						

Notes:
1. Weekday and weekend services of November 2016.
2. Headways are defined as the time between transit vehicles on the same route (e.g., time between two Route 22 buses stopping at the Page Mill Road and El Camino Real intersection bus stops).

15.3.2 Existing Intersection Volumes and Lane Configurations

Weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak period intersection turning movement counts were conducted at the study locations in September 2016 on clear days with area schools in session. During the periods that counts were conducted, construction was on-going at 385 Sherman Avenue, which resulted in the following road closures near the PSB project site:

- Eastbound closure of Sherman Avenue between Ash Street and Birch Street
- Northbound closure of Ash Street between Grant Avenue and Sherman Avenue

These closures caused minor rerouting for vehicles, particularly at the Birch Street / Sherman Avenue (study intersection 3), Ash Street / Sherman Avenue, and Ash Street / Grant Street intersections. To ensure that the traffic volumes in the area used were not substantially skewed due to the road closures, the 2016 counts at the Park Boulevard, Birch Street, and Ash Street intersections were compared to 2013 counts to determine if there were any substantial count discrepancies in data between the two years. The comparison revealed that traffic volumes and patterns were similar between 2013 and 2016, and thus, were not greatly affected by the closures. However, several turning movements at the Birch Street / Sherman Avenue intersection were closed in 2016, and the volumes were slightly lower than three years prior. Thus, for conservative analysis, 2013 counts were used for this location.

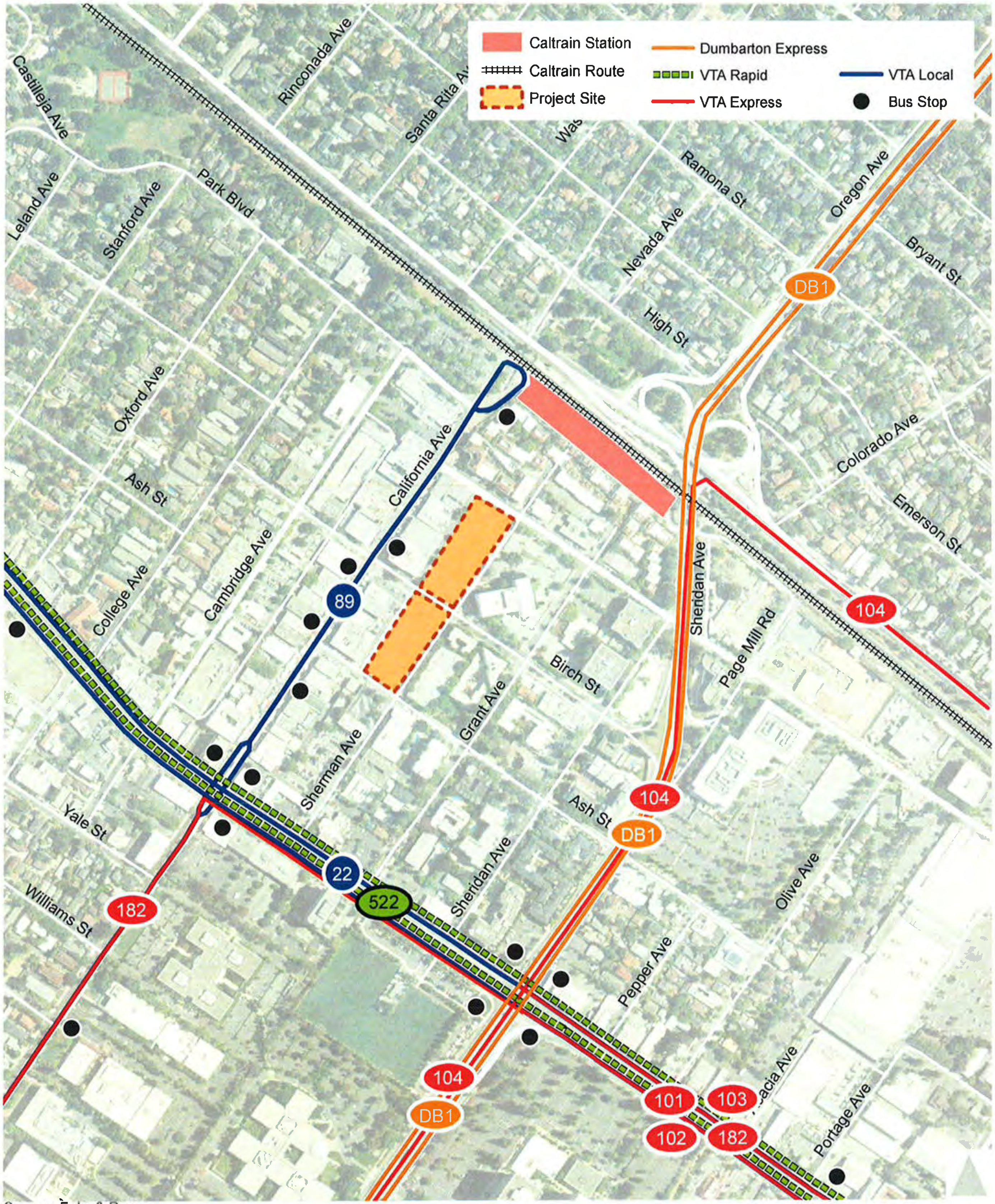
For the study intersections, the single (i.e., peak) hour with the highest traffic volumes during the count period was identified. Existing lane configurations and signal timings were obtained through field observations. The peak hour volumes are presented on Figure 15.5, along with the existing lane configurations and traffic controls.

15.3.3 Existing Parking

The existing parking lots (Lots C-6 and C-7) on the project site currently provide approximately 310 total surface parking spaces. These lots are open to the public and include a two-hour limit. Parking occupancy counts were conducted at the site in October 2016 for purposes of estimating vehicle trip generation rates for Lots C-6 and C-7. More information about these counts is presented in section 15.4 (Existing Plus Project Conditions) of this chapter.

On-street parking with two-hour time limits between 8 AM and 5 PM is also provided on Cambridge Avenue, California Avenue, Sherman Avenue, and Ash Street. Non-time regulated on-street parking is provided on residential streets near the project site, such as Grant Avenue and Sheridan Avenue.

The City is proposing a new Residential Preferential Parking (RPP) program in the Evergreen Park and Mayfield neighborhoods. This program would allow residents or employees in the Evergreen Park and Mayfield neighborhoods to purchase permits that would provide them with



Source: Fehr & Peers

Figure 15.4 - Existing Transit Facilities

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Palo Alto Public Safety Building
and Parking Garage

unrestricted parking on the streets. Vehicles parked on the residential streets without a permit would be subject to the signed time-limits and would be cited if they are parked beyond that period. In May 2016, City Council directed staff to proceed with the RPP program implementation.

15.3.4 Existing Intersection Levels of Service

Existing intersection lane configurations, signal timings, and turning movement volumes were used to calculate the levels of service for the study intersections during each peak hour. The results of the LOS analysis using the TRAFFIX software program for Existing Conditions are presented in Table 15-4.

Table 15-4
EXISTING INTERSECTION LEVEL OF SERVICE

Intersection		**Control**[1]	**Peak Hour**	**Delay**[2]	**LOS**[3]
1	Park Boulevard / Sherman Avenue	SSSC	AM PM	10.3 12.2	B B
2	Park Boulevard / Page Mill Road	SSSC	AM PM	18.4 15.1	C C
3	Birch Street / Sherman Avenue	AWSC	AM PM	9.3 8.6	A A
4	Birch Street / Grant Street	AWSC	AM PM	13.1 11.4	B B
5	Birch Street / Sheridan Avenue	SSSC	AM PM	27.5 16.9	D C
6	Ash Street / California Avenue	AWSC	AM PM	8.1 8.4	A A
7	El Camino Real / Cambridge Avenue	Signal	AM PM	14.5 17.0	B B
8	El Camino Real / California Avenue	Signal	AM PM	21.6 28.5	C+ C
9	El Camino Real / Page Mill Road*	Signal	AM PM	60.1 47.0	E D
10	Middlefield Road / Oregon Expressway*	Signal	AM PM	49.7 54.7	D D-

SOURCE: Fehr & Peers, 2017

Notes:

1. SSSC = Side-Street-Stop Controlled; AWSC = All-Way-Stop Controlled
2. Whole intersection weighted average control delay expressed in second per vehicle for signalized intersections and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop controlled intersections. Signalized intersections include adjusted saturation flow rates to reflect Santa Clara County conditions per VTA guidelines.
3. LOS = Level of Service. LOS calculations conducted using the TRAFFIX level of service analysis software package, which applies the method described in the 2000 Highway Capacity Manual.

Bold text indicates deficient intersection operations.
* Denotes Congestion Management Program (CMP) intersection.

The results of the LOS calculations indicate that all study intersections operate at acceptable service levels (LOS D or better for City intersections and LOS E or better for CMP intersections) during the AM and PM peak hours.

(1) Field Observations. Field observations of the study intersections were conducted during the morning and evening peak periods in September 2016. The purpose of this effort was (1) to identify any existing traffic problems that may not be directly related to intersection LOS, and (2) to identify any locations where the LOS calculation does not accurately reflect actual operations in the field. In most cases, the intersections were observed to operate at the calculated levels of service for each peak hour. However, in a few locations, some differences were identified between the observed and calculated intersection operations.

El Camino Real serves heavy traffic volumes during both the AM and PM peak hours, and long vehicle queues were observed in both the northbound and southbound directions. The El Camino Real and Page Mill Road intersection is very congested on all approaches during both peak periods.

During the PM peak hour, the southbound El Camino Real vehicle queue can extend from Page Mill Road all the way past Stanford Avenue. The southbound queues on the Cambridge Avenue, California Avenue, and Page Mill Road intersections on El Camino Real would need multiple cycles to clear the intersection. The northbound approach on El Camino Real at Page Mill Road also has long vehicle queues; however, the queues were observed to disperse more quickly than the southbound queues.

Page Mill Road/Oregon Expressway also experiences long vehicle queues during the peak periods at the El Camino Real intersection. The southbound queues on Page Mill Road can extend from El Camino Real to Bryant Street during both AM and PM peak periods, and the northbound queue can extend as far back to the HP office driveway during the PM peak period.

15.4 EXISTING PLUS PROJECT CONDITIONS

This section presents the impacts of the proposed PSB project on the surrounding roadway system under Existing plus Project Conditions. First, the method used to estimate the amount of traffic generated by the project is described. Then, the results of the LOS calculations for Existing plus Project Conditions are presented. Existing plus Project Conditions are defined as Existing Conditions plus traffic generated by the proposed PSB project. A comparison of intersection operations under Existing plus Project and Existing Conditions is presented, and the immediate-term impacts of the project on the study intersections are discussed.

15.4.1 Project Traffic Estimates

The proposed PSB project site is located at the corner of Sherman Avenue and Birch Street, and would remove the existing surface parking lots (i.e., Lots C-6 and C-7), with a total of 310 spaces, to construct a new three-story PSB of approximately 45,000 to 50,000 square feet (excluding accessory site buildings) on Lot C-6 and, and a new public parking structure with 636 parking spaces (i.e., 326 net new spaces). A summary of the existing and proposed development on the project site is shown in Table 15-5**.** To provide a conservative estimate, 50,000 square feet was used as the size of the PSB for traffic calculations.

Table 15-5
EXISTING AND PROPOSED DEVELOPMENT

Use	Existing	Proposed	Net Change
Lots C-6 & C-7	310 spaces	-	-310 spaces
Public Safety Building (PSB)	-	50,000 s.f.	50,000 s.f.
Public Parking Structure	-	636 spaces	326 spaces
		Net New Total	**50,000 s.f. of PSB +326 spaces**

SOURCE: City of Palo Alto, 2017

s.f. = square feet

15.4.2 Trip Generation Estimates

The vehicle trip estimates for the proposed PSB were developed based on trip generation studies for similar facilities conducted by Portland State University (PSU) and at the Central Police precinct of Vancouver, Washington. The weekday PM peak hour rate is based on surveys conducted at four police stations in the Portland Metro Area, and average weekday and AM peak hour trip generation rates are based on surveys conducted in Vancouver. A 50/50 split for inbound and outbound trips was used for PSB-generated traffic.

Vehicle trip estimates for the net new parking spaces were estimated based on parking surveys conducted at the two existing parking lots (Lots C-6 and C-7) during the AM and PM peak periods. The parking surveys were used to determine the existing parking turnover rates. During the time the parking surveys were conducted, building construction immediately adjacent to the parking lots at 385 Sherman Avenue occurred, which resulted in some contractors parking in the two lots. The parking surveys and field observations revealed that during the AM peak period, a maximum of 10 percent of the total parking spaces in the two lots were occupied by contractors. Given the relatively low contractor parking occupancy, the contractor parking was included in the trip calculation to provide a conservative analysis.

The parking surveys were conducted on Wednesday, October 19, 2016 from 6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM. The number of parked vehicles and the last four digits of each license plate were recorded once per hour to determine the timing of inbound and outbound trips. The total number of peak hour trips was divided by the total number of parking spaces to determine a trips/space rate. Table 15-6 shows the existing vehicle trip rates and the inbound and outbound split of the parking lots based on the surveyed rates. These parking rates were used to calculate the net new trips for the proposed parking structure.

The parking structure is not expected to create a mode shift from non-auto modes to vehicles since the number of additional parking spaces is not that substantial. For example, if a person is currently biking to her destination in Evergreen Park, she will unlikely shift her transportation mode to driving just because the project adds additional parking spaces. Therefore, the existing vehicle trip rates presented in Table 15-6 are appropriate for forecasting in this study since the proposed public parking structure is not expected to induce a higher rate of vehicle travel.

Source: Fehr & Peers

Figure 15.5 - Traffic   olumes and Lane Configurations
Existing (2016) Conditions: AM & PM Peak Hours

Table 15-6
VEHICLE TRIP RATES AT EXISTING PARKING LOTS

		Vehicle Trips Per Parking Space					
		AM			**PM**		
Lot	**Supply**	**Rate**	**In %**	**Out %**	**Rate**	**In %**	**Out %**
C-6	158	0.11	88%	12%	0.34	52%	48%
C-7	152	0.29	60%	40%	0.50	59%	41%
OVERALL	**310**	**0.19**	**67%**	**33%**	**0.42**	**56%**	**44%**
SOURCE: Fehr & Peers, 2017							

(1) Trip Generation. Table 15-7 summarizes the project's estimated trip generation. For a conservative trip generation analysis, the high end of the PSB square footage range (50,000 square feet) was used, and the net new number of parking spaces in the public parking garage was rounded up from 326 to 330 spaces. The proposed PSB project is estimated to generate 2,822 net new daily trips, 129 net new AM peak hour trips (74 inbound and 55 outbound), and 238 net new PM peak hour trips (116 inbound and 122 outbound).

(2) Trip Distribution and Assignment. The directions of approach and departure of the project trips were based on the locations of complementary land uses (e.g., areas of the city to be patrolled, PSB employee residential areas, existing police station), existing travel patterns in the area, and patterns used in other transportation studies.

The trip distribution pattern is shown on Figure 15.6**.** The general directions of approach and departure are listed in Table 15-8.

Given that parking facilities are not typically traffic generators by themselves, the trip distribution in Table 15-8 was applied only to the PSB-related trips. Trips are generated by the nearby retail, office, and residential uses, and parking lots or structures simply provide vehicle storage.

The parking structure trips are generally going to be existing vehicles that currently park at Lots C-6, C-7, or adjacent facilities (e.g. street parking, Lot C-8) but would then park in the new parking structure upon its completion. Therefore, the parking structure trips were added only to the adjacent intersections in the immediate project vicinity (i.e., Sherman Avenue/Birch Street [intersection 3], California Avenue/Ash Street [intersection 6], Sherman Avenue/Ash Street, and California Avenue/Birch Street) to account for the re-routing of the existing parking trips.

Project trips were assigned to the roadway network based on the trip distribution patterns discussed above. Figure 15.7 shows the AM and PM peak hour project trips assigned to each turning movement at the study intersections. The trip assignment was added to the existing volumes to establish volumes under Existing plus Project Conditions, as shown on Figure 15.8.

15.4.3 Existing Plus Project Intersection Levels of Service

Intersection LOS was calculated with the new traffic added by the proposed PSB project to evaluate intersection operating conditions and identify potential impacts to the roadway system. The results of the intersection LOS calculations for Existing plus Project Conditions are

Table 15-7
PROJECT VEHICLE TRIP GENERATION ESTIMATES

			Weekday		**AM Peak Hour**				**PM Peak Hour**			
Land Use	**Trip Generation Source**	**Quantity[1]**	**Rate**	**Trips**	**Rate**	**In**	**Out**	**Total**	**Rate**	**In**	**Out**	**Total**
Public Safety Building	Supporting Studies[2]	50 ksf	29.74	1,487	1.48	37	37	74	1.90	47	48	95
Parking Structure (New Spaces Only)	Parking Surveys[3]	330 spaces	4.21	1,391	0.19	43	21	64	0.42	69	70	139
TOTAL NET NEW TRIPS				**2,878**		**80**	**58**	**138**		**116**	**118**	**234**

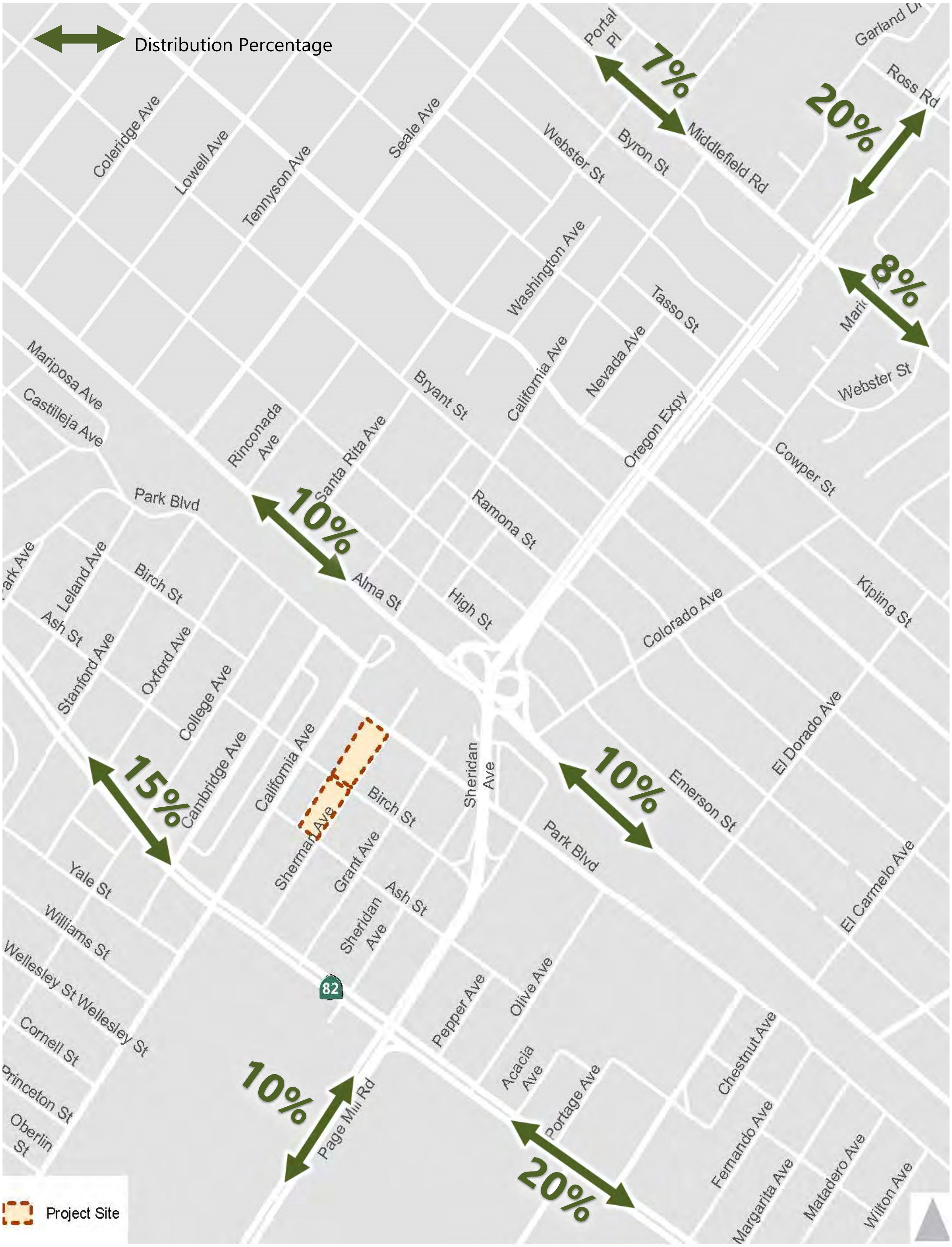
SOURCE: *Fehr & Peers, 2017*

Notes:

[1] ksf = 1,000 square feet

[2] Portland State University (PSU) study of four existing police stations in the Portland metropolitan area, Fall 2009

[3] Parking surveys conducted on lots C-6 and C-7 during the AM and PM peak periods. Daily parking surveys were not conducted; thus, it is assumed that the PM rate represents 10% of the daily rate.



Source: Fehr & Peers

Figure 15.6 - Project Trip Distribution

presented in Table 15-9. The results for Existing Conditions (No Project) are included for comparison. Table 15-9 also reports the change in critical delay and critical volume-to-capacity (V/C) ratios. The changes in critical delay and critical V/C ratios between Existing and Existing plus Project Conditions are used to identify significant impacts.

Table 15-8
TRIP DISTRIBUTION

Direction	**Percentage**
Middlefield Road north	7%
Middlefield Road south	8%
Oregon Expressway east	20%
Alma Street north	10%
Alma Street south	10%
El Camino Real north	15%
El Camino Real south	20%
Page Mill Road west	10%
Total	100%
SOURCE: Fehr & Peers, 2017	

The results of the LOS calculations indicate that all study intersections are projected to operate at acceptable service levels (LOS D or better for City intersections and LOS E or better for CMP intersections) during the AM and PM peak hours under Existing plus Project Conditions.

15.4.4 Existing Plus Project Intersection Impacts and Mitigation Measures

This section evaluates the intersection LOS results presented in Table 15-9 against the City of Palo Alto and VTA's criteria for significant intersection impacts and presents mitigation measures for identified impacts.

For *signalized intersections*, would the addition of project traffic:

- **Degrade intersection operations from an acceptable level (LOS D or better for City of Palo Alto intersections, and LOS E or better for regionally significant roadways and CMP intersections) under "No Project" conditions to an unacceptable level (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) for "Plus Project" conditions; or**

- **Exacerbate unacceptable "No Project" operations (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) by increasing the critical delay by more than four (4) seconds and increasing the volume-to-capacity (V/C) ratio by 0.01 or more; or**

Source: Fehr & Peers

Figure 15.7 - Traffic olumes and Lane Configuration Project Trip Assignment: AM & PM Peak Hours

Source: Fehr & Peers

Figure 15.8 - Traffic olumes and Lane Configuration
Existing (2016) plus Project Conditions: AM & PM Peak Hours

Table 15-9
EXISTING PLUS PROJECT INTERSECTION LEVEL OF SERVICE

				Existing Conditions		**Existing plus Project Conditions**			
Intersection		**Control**	**Peak Hour[1]**	**Delay[2]**	**LOS[3]**	**Delay[2]**	**LOS[3]**	**Δ in Crit. V/C[4]**	**Δ in Crit. Delay[5]**
1	Park Boulevard / Sherman Avenue	SSSC	AM PM	10.3 12.2	B B	10.5 13.2	B B	N/A – Unsignalized Intersection	
2	Park Boulevard / Page Mill Road	SSSC	AM PM	18.4 15.1	C C	18.6 15.3	C C	N/A – Unsignalized Intersection	
3	Birch Street / Sherman Avenue	AWSC	AM PM	9.3 8.6	A A	9.7 9.4	A A	N/A – Unsignalized Intersection	
4	Birch Street / Grant Street	SSSC	AM PM	13.1 11.4	B B	13.5 11.8	B B	N/A – Unsignalized Intersection	
5	Birch Street / Sheridan Avenue	SSSC	AM PM	27.5 16.9	D C	28.8 17.7	D C	N/A – Unsignalized Intersection	
6	Ash Street / California Avenue	AWSC	AM PM	8.1 8.4	A A	8.3 8.8	A A	N/A – Unsignalized Intersection	
7	El Camino Real / Cambridge Avenue	Signal	AM PM	14.5 17.0	B B	14.4 17.0	B B	0.001 0.001	0.0 0.0
8	El Camino Real / California Avenue	Signal	AM PM	21.6 28.5	C+ C	22.3 29.1	C+ C	0.007 0.005	1.0 0.6
9	El Camino Real / Page Mill Road*	Signal	AM PM	60.1 47.0	E D	60.7 47.4	E D	0.002 0.009	0.5 0.7 +
10	Middlefield Road / Oregon Expressway*	Signal	AM PM	49.7 54.7	D D-	49.9 54.9	D D-	0.007 0.008	0.5 0.4

SOURCE: Fehr & Peers, 2017

Notes:

1. SSSC = Side-Street-Stop Controlled; AWSC = All-Way-Stop Controlled
2. Whole intersection weighted average control delay expressed in second per vehicle for signalized intersections and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop controlled intersections. Signalized intersections include adjusted saturation flow rates to reflect Santa Clara County conditions per VTA guidelines.
3. LOS = Level of Service. LOS calculations conducted using the TRAFFIX level of service analysis software package, which applies the method described in the 2000 Highway Capacity Manual.
4. Change in critical movement delay between Existing and Existing plus Project Conditions for signalized intersections. N/A = Not applicable for unsignalized intersections.
5. Change in critical movement delay between Existing and Existing plus Project Conditions for signalized intersections. N/A = Not applicable for unsignalized intersections.

Bold text indicates deficient intersection operations. *Denotes Congestion Management Program (CMP) intersection.
* Denotes Congestion Management Program (CMP) intersection.

- **Increase the V/C ratio by 0.01 or more at an intersection with unacceptable operations (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) when the change in critical delay between No Project and Plus Project conditions is negative (i.e., decreases)?**

For *unsignalized intersections*, would the addition of project traffic degrade operations to LOS E or F <u>and</u> the intersection satisfies the peak hour signal warrants from the California Manual of Uniform Traffic Control Devices (MUTCD)?

(Significance Criterion [1])

Given that the LOS calculations indicate that all study intersections are projected to operate at acceptable service levels based on the City of Palo Alto and VTA's criteria, the proposed PSB project would have a ***less-than-significant impact at all study intersections under the Existing plus Project scenario.***

Mitigation. No significant impact has been identified; no mitigation is required.

<u>15.4.5 Pedestrian, Bicycle, and Transit Impacts and Mitigation Measures</u>

This section discusses project impacts to ***off-site*** pedestrian, bicycle, and transit facilities and services based on the criteria presented in section 15.2.5. Project pedestrian, bicycle, and transit impacts related to ***on-site*** access are discussed in upcoming section 15.7: Site Access, Circulation, and Parking.

Would the project or an element of the project:

- **Create a hazardous condition that currently does not exist for pedestrians and bicyclists, or otherwise interfere with pedestrian or bicycle accessibility to the site and adjoining areas; or**

- **Conflict with an existing or planned pedestrian or bicycle facility; or**

- **Conflict with policies related to bicycle and pedestrian activity adopted by the City of Palo Alto, Santa Clara County, VTA, or Caltrans for their respective facilities in the study area?**

(Significance Criterion [2])

The overall project, particularly the PSB, will generate some new pedestrian and bicycle trips. The site is located approximately 700 feet from the Caltrain California Avenue Train Station, and within 200 feet of two bus stops on California Avenue. Thus, the project is expected to generate pedestrian demand that will require sidewalks or paths for safe and convenient travel to and from these destinations, as well as the retail, office, and service opportunities located on California Avenue and other nearby streets. Existing sidewalks are provided adjacent to and near the project site and could accommodate the additional pedestrians generated by the project. In addition, crosswalks and pedestrian signals are provided at all signalized study intersections in the study area. Thus, the impact to pedestrian facilities is considered ***less than significant.***

The project is not expected to create a hazardous condition that currently does not exist for pedestrians and bicyclists, and would not interfere with pedestrian or bicycle accessibility to the site and adjoining areas. Bicycle travel around the site is on lower-volume and lower-speed streets and, therefore, the environment is more conducive to bicycling. Furthermore, the project does not conflict with existing and planned bicycle facilities. Thus, the impact to bicycle facilities is considered ***less than significant.***

Mitigation. No significant impact has been identified; no mitigation is required.

Would the project:

- **Create demand for public transit services above the capacity which is provided or planned; or**
- **Disrupt existing transit services or facilities;[1] or**
- **Conflict with an existing or planned transit facility; or**
- **Conflict with transit policies adopted by the City of Palo Alto, Santa Clara County, VTA, or Caltrans for their respective facilities in the study area?**

(Significance Criterion [3])

The project is expected to generate some new demand for transit services and facilities. The project site is served by VTA and Stanford Marguerite bus stops located at the El Camino Real/Page Mill Road intersection and along California Avenue. The PSB component of the proposed project is estimated to generate a small number of new transit passengers, which would be distributed across multiple bus routes, shuttles, and Caltrain. Accordingly, the existing transit service is expected to accommodate the additional demand generated by the project and, therefore, is considered ***less than significant.***

Mitigation. No significant impact has been identified; no mitigation is required.

15.5 BACKGROUND CONDITIONS

This section presents the results of the LOS calculations under Background Conditions with and without the PSB project. Traffic volumes for Background No Project Conditions comprise existing volumes *plus* traffic generated by “approved but not yet constructed” and “unoccupied” development near the site *plus* growth from development in the greater study area. Background plus Project Conditions are defined as Background No Project Conditions plus net new traffic generated by the proposed PSB project.

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[1] This includes disruptions caused by proposed-project driveways on transit streets and impacts to transit stops/shelters, as well as impacts to transit operations from traffic improvements proposed or resulting from a project.

15.5.1 Background No Project Traffic Volumes

Staff from the City of Palo Alto provided a list of development projects in the study area that are expected to add traffic to the study intersections in the near future. Trip generation estimates were obtained from their respective traffic reports or estimated based on trip generation rates published in the Institute of Transportation Engineers *Trip Generation* (9th Edition). The trips for each of the background projects were then assigned to the roadway network based on population and employment data, existing and future travel patterns, and recent TIA's completed in the area.

The approved projects include:

- 2555 Park Boulevard (23,269 square feet of office space)
- 2500 & 2600 El Camino Real (70 apartments, 6,253 square feet of retail, and 747 square feet of coffee shop)
- 2747 Park Boulevard (33,300 square feet of office)
- 3045 Park Boulevard (29,120 square feet of office)
- 385 Sherman Avenue (55,560 square feet of office and 4 dwelling units)
- 2515 & 2585 El Camino Real (13 Condominiums, 10,122 square feet of retail, and 9,825 square feet of office)
- 2209 El Camino Real (2,000 square feet of walk-in bank, 3,400 square feet of office, and 4 dwelling units)

Furthermore, an annual growth rate was applied to the through movements on El Camino Real to represent the increase in regional traffic from future developments outside of the study area. The El Camino Real annual growth rate was obtained from the City's Travel Demand Model and applied to existing traffic counts to account for regional growth. This growth rate was compounded over a five-year timeframe (2016 to 2021) up to full development of the proposed PSB project.

Figure 15.9 presents the AM and PM peak hour turning movement volumes at the study intersections under this scenario.

15.5.2 Background Roadway Improvements

The following study intersection is expected to be modified prior to completion of the proposed PSB project due to a planned and funded improvement:

- Park Boulevard / Page Mill Road (intersection #2) – New traffic signal.[1]

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[1] Project improvement associated with 2747 Park Boulevard project.

Source: Fehr & Peers

Figure 15.9 - Traffic Volumes and Lane Configuration Background Conditions: AM & PM Peak Hours

No other approved and funded transportation network improvements were identified that would be constructed and operational prior to project completion. Figure 15.9 also presents the lane configurations and traffic control devices at the study intersections under this scenario.

15.5.3 Background Plus Project Intersection Volumes

Trips generated from the proposed project (see earlier Figure 15.7) were added to the Background traffic projects to develop traffic volumes for Background plus Project Conditions. The resulting volumes are shown on Figure 15.10.

15.5.4 Background Intersection Levels of Service

Table 15-10 presents the delay and LOS calculation results for the study intersections under Background No Project and Background plus Project Conditions. The El Camino Real/Cambridge Avenue intersection shows a reduction in average delay with the addition of project traffic. This is because the average delay values presented in the table are intersection weighted averages. Weighted average delays will be reduced when traffic is added to a movement with a high volume and low to moderate delays, such as through movements on El Camino Real. Conversely, relatively small volume increases to movements with high delays can substantially increase the weighted average.

Table 15-10
EXISTING PLUS PROJECT INTERSECTION LEVEL OF SERVICE

				Existing Conditions		**Existing plus Project Conditions**			
Intersection		**Control**	**Peak Hour[1]**	**Delay[2]**	**LOS[3]**	**Delay[2]**	**LOS[3]**	**Δ in Crit. V/C[4]**	**Δ in Crit. Delay[5]**
1	Park Boulevard / Sherman Avenue	SSSC	AM PM	10.3 12.2	B B	10.6 13.4	B B	N/A – Unsignalized Intersection	
2	Park Boulevard / Page Mill Road	Signal	AM PM	26.3 27.2	C C	26.3 28.4	C C	0.001 0.021	0.1 0.7
3	Birch Street / Sherman Avenue	AWSC	AM PM	9.5 8.7	A A	9.9 9.6	A A	N/A – Unsignalized Intersection	
4	Birch Street / Grant Street	SSSC	AM PM	14.1 11.8	B B	14.6 12.2	B B	N/A – Unsignalized Intersection	
5	Birch Street / Sheridan Avenue	SSSC	AM PM	31.0 20.8	D C	32.6 22.3	D C	N/A – Unsignalized Intersection	
6	Ash Street / California Avenue	AWSC	AM PM	8.2 8.5	A A	8.3 8.8	A A	N/A – Unsignalized Intersection	
7	El Camino Real / Cambridge Avenue	Signal	AM PM	14.1 16.6	B B	14.1 16.5	B B	0.001 0.001	0.0 0.0
8	El Camino Real / California Avenue	Signal	AM PM	22.1 28.5	C+ C	22.8 29.2	C+ C	0.007 0.005	1.0 0.6
9	El Camino Real / Page Mill Road*	Signal	AM PM	64.3 48.9	E D	64.6 49.3	E D	-0.001 0.009	-0.3 0.8
10	Middlefield Road / Oregon Expressway*	Signal	AM PM	53.7 53.4	D- D-	54.0 53.7	D- D-	0.007 0.007	0.5 0.4

SOURCE: Fehr & Peers, 2017

Notes:
1. SSSC = Side-Street-Stop Controlled; AWSC = All-Way-Stop Controlled
2. Whole intersection weighted average control delay expressed in second per vehicle for signalized intersections and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop controlled intersections. Signalized intersections include adjusted saturation flow rates to reflect Santa Clara County conditions per VTA guidelines.
3. LOS = Level of Service. LOS calculations conducted using the TRAFFIX level of service analysis software package, which applies the method described in the 2000 Highway Capacity Manual.
4. Change in critical movement delay between Background and Background plus Project Conditions. N/A = Not applicable for unsignalized intersections.
5. Change in critical movement delay between Background and Background plus Project Conditions. N/A = Not applicable for unsignalized intersections.

Bold text indicates deficient intersection operations.
* Denotes Congestion Management Program (CMP) intersection.

15.5.5 Background Intersection Impacts and Mitigation Measures

This section evaluates the intersection LOS results presented in Table 15-10 against the City of Palo Alto and VTA's criteria for significant impacts and presents mitigation measures for identified impacts.

For *signalized intersections*, would the addition of project traffic:

- **Degrade intersection operations from an acceptable level (LOS D or better for City of Palo Alto intersections, and LOS E or better for regionally significant roadways and CMP intersections) under "No Project" conditions to an unacceptable level (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) for "Plus Project" conditions; or**

- **Exacerbate unacceptable "No Project" operations (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) by increasing the critical delay by more than four (4) seconds and increasing the volume-to-capacity (V/C) ratio by 0.01 or more; or**

- **Increase the V/C ratio by 0.01 or more at an intersection with unacceptable operations (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) when the change in critical delay between No Project and Plus Project conditions is negative (i.e., decreases)?**

For *unsignalized intersections*, would the addition of project traffic degrade operations to LOS E or F and the intersection satisfies the peak hour signal warrants from the California Manual of Uniform Traffic Control Devices (MUTCD)?

(Significance Criterion [1])

Given that the LOS calculations indicate that all study intersections are projected to operate at acceptable service levels based on the City of Palo Alto and VTA's criteria, the PSB project would have a ***less-than-significant impact at all study intersections under the Background plus Project scenario.***

Mitigation. No significant impact has been identified; no mitigation is required.

15.5.6 Pedestrian, Bicycle, and Transit Impacts and Mitigation Measures

Would the project or an element of the project:

- **Create a hazardous condition that currently does not exist for pedestrians and bicyclists, or otherwise interfere with pedestrian or bicycle accessibility to the site and adjoining areas; or**
- **Conflict with an existing or planned pedestrian or bicycle facility; or**
- **Conflict with policies related to bicycle and pedestrian activity adopted by the City of Palo Alto, Santa Clara County, VTA, or Caltrans for their respective facilities in the study area?**

(Significance Criterion [2])

Would the project:

- **Create demand for public transit services above the capacity which is provided or planned; or**
- **Disrupt existing transit services or facilities;[1] or**
- **Conflict with an existing or planned transit facility; or**
- **Conflict with transit policies adopted by the City of Palo Alto, Santa Clara County, VTA, or Caltrans for their respective facilities in the study area?**

(Significance Criterion [3])

The project impacts to pedestrian, bicycle, and transit facilities are discussed above under Existing plus Project Conditions (section 15.4.5), and similar results are expected under the Background plus Project scenario. While the PSB project is expected to generate new non-auto trips, the existing pedestrian, bicycle, and transit facilities could accommodate the anticipated additional demand. Furthermore, the *City of Palo Alto Bicycle + Pedestrian Transportation Plan* (May 2012) includes the identification of a bicycle boulevard on Park Boulevard. The PSB project does not conflict with that planned bicycle facility. Therefore, the project's impact to the pedestrian, bicycle, and transit facilities is considered ***less than significant.***

Mitigation. No significant impact has been identified; no mitigation is required.

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[1] This includes disruptions caused by proposed-project driveways on transit streets and impacts to transit stops/shelters, as well as impacts to transit operations from traffic improvements proposed or resulting from a project.

Source: Fehr & Peers

Figure 15.10 - Traffic olumes and Lane Configuration Background plus Project Conditions: AM & PM Peak Hours

15.6 CUMULATIVE CONDITIONS

This section presents the results of the intersection LOS calculations under Cumulative Conditions with and without the PSB project. Cumulative No Project Conditions are defined as existing volumes plus traffic generated by all foreseen development projects that would affect the transportation system in the study area, including “approved but not yet constructed”, as well as pending development projects that have not yet been approved. Cumulative plus Project Conditions are defined as Cumulative No Project Conditions plus traffic generated by the proposed project.

15.6.1 Cumulative No Project Traffic Volumes

Traffic projections for Cumulative Conditions were estimated based on the City’s Travel Demand Forecasting Model, which uses land use and socioeconomic attributes in Traffic Analysis Zones (TAZs) to generate and assign traffic across the roadway network. This model accounts for traffic growth both in the Palo Alto and in the greater Peninsula region. Per the City’s direction, the future year model with the Comprehensive Plan’s Alternative 1 land use was used to estimate future year growth. Figure 15.11 presents the AM and PM peak hour turning movement volumes at the study intersection under Cumulative No Project Conditions.

15.6.2 Cumulative Roadway Improvements

The following approved and funded improvements are included at the study intersections under Cumulative Conditions:

- Park Boulevard / Page Mill Road intersection #2) – New traffic signal.[1]
- El Camino Real / Page Mill Road (intersection #9) – the addition of a westbound right-turn lane.[2]

No other approved and funded transportation network improvements were identified that would be constructed and operational under Cumulative Conditions.

15.6.3 Cumulative Plus Project Traffic Volumes

Trips generated from the proposed PSB project (earlier Figure 15.7) were added to the Cumulative No Project traffic projections (Figure 15.11) to develop traffic volumes for Cumulative plus Project Conditions. The resulting volumes are shown on Figure 15.12.

15.6.4 Cumulative Intersection Levels of Service

Table 15-11 presents the level of service calculations for the study intersection under Cumulative No Project and Cumulative plus Project Conditions. The results indicate that all study intersections are projected to operate at acceptable service levels during the AM and PM peak hours, except for the Birch Street/Sheridan Avenue intersection, where the side-street approach is anticipated to operate at unacceptable LOS E during the AM peak hour.

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[1] Project Improvement associated with 2747 Park Boulevard project.

[2] City of Palo Alto – California Avenue Streetscape project

Table 15-11
CUMULATIVE AND CUMULATIVE PLUS PROJECT INTERSECTIONS LEVEL OF SERVICE

				Existing Conditions		Existing plus Project Conditions			
Intersection		**Control**	**Peak Hour[1]**	**Delay[2]**	**LOS[3]**	**Delay[2]**	**LOS[3]**	**Δ in Crit. V/C[4]**	**Δ in Crit. Delay[5]**
1	Park Boulevard / Sherman Avenue	SSSC	AM PM	12.1 13.6	B B	12.6 14.8	B B	N/A – Unsignalized Intersection	
2	Park Boulevard / Page Mill Road	Signal	AM PM	28.6 36.8	C D+	28.7 39.7	C D	0.001 0.022	0.1 4.0
3	Birch Street / Sherman Avenue	AWSC	AM PM	10.1 9.3	B A	10.7 10.4	B B	N/A – Unsignalized Intersection	
4	Birch Street / Grant Street	SSSC	AM PM	15.6 12.6	C B	16.2 13.1	C B	N/A – Unsignalized Intersection	
5	Birch Street / Sheridan Avenue	SSSC	AM PM	**43.7** 30.4	**E** D	**46.8** 33.7	**E** D	N/A – Unsignalized Intersection	
6	Ash Street / California Avenue	AWSC	AM PM	8.5 9.0	A A	8.7 9.4	A A	N/A – Unsignalized Intersection	
7	El Camino Real / Cambridge Avenue	Signal	AM PM	15.1 18.7	B B-	15.1 18.7	B B-	0.001 0.001	0.0 0.0
8	El Camino Real / California Avenue	Signal	AM PM	23.8 29.4	C C	24.5 30.1	C C	0.007 0.005	0.9 0.6
9	El Camino Real / Page Mill Road*	Signal	AM PM	74.5 56.4	E D	75.3 57.4	E- E+	0.005 0.009	1.8 2.0
10	Middlefield Road / Oregon Expressway*	Signal	AM PM	59.3 61.8	E+ E	59.6 62.1	E+ E	0.007 0.006	0.6 0.5

SOURCE: Fehr & Peers, 2017

Notes:
1. SSSC = Side-Street-Stop Controlled; AWSC = All-Way-Stop Controlled
2. Whole intersection weighted average control delay expressed in second per vehicle for signalized intersections and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop controlled intersections. Signalized intersections include adjusted saturation flow rates to reflect Santa Clara County conditions per VTA guidelines.
3. LOS = Level of Service. LOS calculations conducted using the TRAFFIX level of service analysis software package, which applies the method described in the 2000 Highway Capacity Manual.
4. Change in critical movement delay between Cumulative and Cumulative plus Project Conditions. N/A = Not applicable for unsignalized intersections.
5. Change in critical movement delay between Cumulative and Cumulative plus Project Conditions. N/A = Not applicable for unsignalized intersections.

Bold text indicates deficient intersection operations according to agency standards.
* Denotes Congestion Management Program (CMP) intersection.

15.6.5 Signal Warrant Analysis

As noted in Table 15-11, the Birch Street / Sheridan Avenue intersection is projected to operate unacceptably and would be impacted with the addition of traffic from the proposed PSB project. To determine if the potential impact is significant, the peak hour signal warrant from the *Manual of Uniform Traffic Control Devices* (MUTCD) was evaluated for this location to determine if a traffic signal may be warranted. Application of the MUTCD criteria shows that the peak hour warrant is not met at the Birch Street / Sheridan Avenue intersection under Cumulative plus Project Conditions.

15.6.6 Cumulative Intersection Impacts and Mitigation Measures

This section evaluates the intersection LOS results presented in Table 15-11 against the City of Palo Alto and VTA's criteria for significant impacts and presents mitigation measures for identified impacts.

For *signalized intersections*, would the addition of project traffic:

- **Degrade intersection operations from an acceptable level (LOS D or better for City of Palo Alto intersections, and LOS E or better for regionally significant roadways and CMP intersections) under "No Project" conditions to an unacceptable level (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) for "Plus Project" conditions; or**

- **Exacerbate unacceptable "No Project" operations (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) by increasing the critical delay by more than four (4) seconds and increasing the volume-to-capacity (V/C) ratio by 0.01 or more; or**

- **Increase the V/C ratio by 0.01 or more at an intersection with unacceptable operations (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) when the change in critical delay between No Project and Plus Project conditions is negative (i.e., decreases)?**

For *unsignalized intersections*, would the addition of project traffic degrade operations to LOS E or F and the intersection satisfies the peak hour signal warrants from the California Manual of Uniform Traffic Control Devices (MUTCD)?

(Significance Criterion [1])

As discussed above, the results of the LOS calculations indicate that all study intersection would operate at acceptable service levels under Cumulative plus Project Conditions, except the Birch Street/Sheridan Avenue intersection, which would operate at LOS E in the AM peak hour without and with the project. However, while the intersection is anticipated to operate unacceptably, the unsignalized intersection does not satisfy the signal warrant. It is not uncommon for one or more approaches at an unsignalized intersection to operate at LOS E or F without meeting the warrant criteria for a signal. Therefore, based on the City of Palo Alto's criteria, the PSB project would have a ***less-than-significant impact at all study intersections under the Cumulative plus Project scenario.***

Mitigation. No significant impact has been identified; no mitigation is required,

Source: Fehr & Peers

Figure 15.11 - Traffic olumes and Lane Configuration Cumulative (2035) Conditions: AM & PM Peak Hours

Source: Fehr & Peers

Figure 15.12 - Traffic   olumes and Lane Configuration Cumulative plus Project Conditions: AM & PM Peak Hours

15.6.7 Pedestrian, Bicycle, and Transit Impacts and Mitigation Measures

Would the project or an element of the project:

- **Create a hazardous condition that currently does not exist for pedestrians and bicyclists, or otherwise interfere with pedestrian or bicycle accessibility to the site and adjoining areas; or**
- **Conflict with an existing or planned pedestrian or bicycle facility; or**
- **Conflict with policies related to bicycle and pedestrian activity adopted by the City of Palo Alto, Santa Clara County, VTA, or Caltrans for their respective facilities in the study area?**

(Significance Criterion [2])

Would the project:

- **Create demand for public transit services above the capacity which is provided or planned; or**
- **Disrupt existing transit services or facilities;[1] or**
- **Conflict with an existing or planned transit facility; or**
- **Conflict with transit policies adopted by the City of Palo Alto, Santa Clara County, VTA, or Caltrans for their respective facilities in the study area?**

(Significance Criterion [3])

The project impacts to pedestrian, bicycle, and transit facilities are discussed above under Existing plus Project Conditions (section 15.4.5), and similar results are expected under the Cumulative plus Project scenario. While the project is expected to generate new non-auto trips, the existing pedestrian, bicycle, and transit facilities could accommodate the additional demand. Furthermore, the *City of Palo Alto Bicycle + Pedestrian Transportation Plan* (May 2012), includes the identification of a bicycle boulevard on Park Boulevard. The PSB project does not conflict with that planned bicycle facility. Therefore, the project's impact to the pedestrian, bicycle, and transit facilities is considered ***less than significant.***

Mitigation. No significant impact has been identified; no mitigation is required,

15.7 SITE ACCESS, CIRCULATION, AND PARKING

This section analyzes site access and internal circulation for vehicles, pedestrians, bicycles, and transit based on the site plans presented in earlier Figures 15.2a and 15.2b. Fehr & Peers

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[1] This includes disruptions caused by proposed-project driveways on transit streets and impacts to transit stops/shelters, as well as impacts to transit operations from traffic improvements proposed or resulting from a project.

coordinated with the parking structure designers, Watry Design, Inc., to determine the ideal location for the parking structure driveway. Below is more detail on the access and circulation for the PSB and parking structure. ***Off-site*** circulation for vehicles, pedestrians, bicycles, and transit is evaluated in sections 15.3 through 15.6, above.

Would the project or an element of the project:

- **Create a hazardous condition that currently does not exist for pedestrians and bicyclists, or otherwise interfere with pedestrian or bicycle accessibility to the site and adjoining areas; or**
- **Conflict with an existing or planned pedestrian or bicycle facility; or**
- **Conflict with policies related to bicycle and pedestrian activity adopted by the City of Palo Alto, Santa Clara County, VTA, or Caltrans for their respective facilities in the study area?**

(Significance Criterion [2])

Would the project:

- **Create demand for public transit services above the capacity which is provided or planned; or**
- **Disrupt existing transit services or facilities;[1] or**
- **Conflict with an existing or planned transit facility; or**
- **Conflict with transit policies adopted by the City of Palo Alto, Santa Clara County, VTA, or Caltrans for their respective facilities in the study area?**

(Significance Criterion [3])

This analysis concludes that the proposed PSB project would result in ***less-than-significant impacts on site access, circulation, and parking***, and no mitigation is required. The recommendations that Fehr & Peers offers below could be integrated with the current project plans to help improve operations; however, the project as proposed is considered to have less-than-significant impacts on site access, circulation, and parking. As with any building project, refinements are expected over time as the design proceeds closer to construction.

Mitigation. No significant impact has been identified; no mitigation is required.

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[1] This includes disruptions caused by proposed-project driveways on transit streets and impacts to transit stops/shelters, as well as impacts to transit operations from traffic improvements proposed or resulting from a project.

15.7.1 Site Access and Circulation

(1) Public Safety Building (PSB). The PSB site plan, developed by RossDrulisCusenbery Architecture, presents three access points to the site:

- *Primary inbound/outbound driveway on Sherman Avenue* – This driveway would be located approximately 85 feet west of Park Avenue and would provide access to the below-grade parking.
- *Secondary inbound/outbound driveway on Birch Street* – This driveway would be located immediately adjacent to the Jacaranda Lane alley driveway. This adjacent driveway configuration would result in potential turning movement conflicts for the vehicles leaving the PSB driveway or Jacaranda Lane. For example, if a vehicle is trying to turn right out of the PSB driveway while another vehicle on Jacaranda Lane is trying to turn left, the two vehicles could potentially conflict due to the close proximity and potential confusion over vehicle right-of-way. Portions of the existing median on Birch Street would need to be removed to allow left-turns out of the PSB driveway.

Recommendation: Prohibit left-turns out of the Jacaranda Lane alley and provide full-access at the PSB's gated driveway. The vehicles on Jacaranda Lane that are destined for areas to the south would need to circulate around the block onto California Avenue, then Ash Street in order to access their southern destination. With the removal of the on-site parking lots as part of the project, the volumes on Jacaranda Lane would be substantially reduced, and the restricted left-turn movement would only affect a small number of vehicles.

(2) Public Parking Structure. The parking structure would consist of six levels total: four levels above grade and two basement levels. The parking structure internal ramps would be on the north side with access to the up ramp on the west and the down ramp on the east side.

The structure would be supported by one full access driveway on Sherman Avenue, approximately 90 feet to center of ramp west from the corner of Birch Street. Similar to the PSB primary driveway, having the driveway closer to the adjacent east intersecting street (i.e., Park Boulevard for the PSB driveway and Birch Street for the parking structure driveway) reduces the potential for queue spillback into the adjacent intersections (i.e., Birch Street and Ash Street). For eastbound vehicles on Sherman Avenue trying to turn left into the structure, they must yield to westbound traffic, but they would have ample queuing storage on Sherman Avenue to make the movement without impeding traffic on Ash Street. For westbound vehicles on Sherman Avenue that need to turn right into the structure, they are not required to stop for conflicting movements (except for pedestrians walking on the sidewalk crossing the parking structure driveway), so the queues would be negligible.

If the parking structure is operated with a payment system, gates may be required at the entrance where each driver would receive a ticket upon entering. As discussed in the trip generation section, the parking structure is anticipated to generate approximately 116 inbound trips in the PM peak hour, which would equate to an average of approximately two vehicles per minute entering the structure. Even at the maximum anticipated queue of twice the average, or four vehicles, gating the entrance to the parking structure is not anticipated to adversely affect operations, given the ample capacity available on Sherman Avenue.

Recommendations: As parking structure plan refinements proceed, the following recommendations should be considered to enhance the vehicle circulation and reduce vehicle conflicts in the parking structure:

- The parking layout should avoid perpendicular parking spaces at the end of the aisles so that drivers can back in and out of the space easily and reduce potential conflicts.

- Stripe all driveways with a double yellow centerline to delineate the separation of entering and exiting traffic.

15.7.2 Pedestrian and Bicycle Access and Circulation

(1) Pedestrians. The PSB project site is supported by sidewalks on all adjacent roadways, except along Jacaranda Lane, which is an alley and will primarily serve only delivery trucks and police vehicles once the project is built and operational. The project site is adjacent to multiple restaurants and retail shops on California Avenue, and it is expected that PSB employees and people parking in the structure will walk to California Avenue to eat, shop, or obtain services. Currently, two pedestrian walkways between buildings connect California Avenue to Jacaranda Lane, and would provide direct access to the PSB and parking structure.

Recommendations: As the site plan refinements proceed, the following recommendations should be considered to enhance the pedestrian circulation and reduce conflicts in the parking structure:

- The parking structure will include stairwells on the northeast and northwest corners of the structure, adjacent to Jacaranda Lane. A clear pedestrian crosswalk should be provided on Jacaranda Lane to connect patrons between the structure and the walkway to California Avenue.

- Pedestrian and vehicle conflicts could potentially occur at project driveways, when a car is exiting while pedestrians are using the sidewalk that crosses the driveway. To enhance safety for pedestrians, it is recommended that signage and/or warning systems be installed at the entry/exit point of the parking garage (both on Sherman Avenue for the parking structure, the Birch Street gated driveway for the PSB, and the Jacaranda Lane gated driveway for the police department vehicles) to alert motorists of potential pedestrian conflicts. These signs or systems should also inform pedestrians that they should exercise caution when crossing the driveway.

(2) Bicycles. Palo Alto Municipal Code (PAMC) Section 18.52.040 stipulates that one bicycle parking space per 2,500 feet of gross floor area is required, with a mix of 80 percent for long-term parking and 20 percent for short-term parking. As a result, the PSB would need to provide 18 parking spaces for bikes (14 long-term bike spaces and 4 short-term spaces). These spaces should be conveniently located at building entrances or in visible areas for guests and employees. The applicant should ensure the following measures are integrated into the project plans:

- Class I long-term bicycle parking, such as lockers or a secured room, for employee use and long-term parking; and

- Inverted U-style bicycle racks for short-term bicycle parking.

For the public parking structure, the plans (Sheet ARB 04.07) show indoor bicycle parking for the public at the northeast corner of the ground level, near the intersection of Jacaranda and Birch.

In addition, PAMC Section 18.54.060 requires signs to be posted at the building entrance to direct cyclists to parking facilities. Where feasible, Fehr & Peers recommends the *Manual on Uniform Traffic Control Devices* (MUTCD) signage standards.

15.7.3 Transit Access

The PSB project is located adjacent to existing transit lines and bus stops operating along El Camino Real, California Avenue, Page Mill Road-Oregon Expressway, and the Caltrain railroad. While the increase in passenger demand may not exceed capacity, it is recommended that signage be provided at the PSB entrance indicating the direction of bus stops or coordinated wayfinding with the Caltrain Station. Also, signage could be placed on or adjacent to the parking structure, as appropriate.

15.7.4 Parking Requirements

The PSB would provide between 145 to 150 underground spaces and 6 to 10 surface parking spaces for police vehicles and staff, for a total of approximately 155 spaces. Visitor parking for the PSB would be available in the project’s new parking structure across the street. According to Section 18.52.40 (parking supply) and 18.54.030 (accessible parking supply) of the City’s Municipal Code, the parking requirement for office uses is one space per 250 square feet of gross floor area. However, the new PSB is a specialized facility and would include a variety of uses, not solely office uses. It would include approximately 3,000 square feet of Prisoner Holding area and 4,250 square feet of warehouse storage located in the basement. Both of these uses have a lower parking requirement (e.g., one space per each 1,000 square feet of warehouse storage) than office uses.

Conservatively assuming a PSB of approximately 48,000 SF, comprising 40,750 square feet of office space and 7,250 square feet of storage/holding space, the PSB would result in a parking requirement of 170 parking spaces based on the City’s Municipal Code. Furthermore, the PSB’s parking demand is anticipated to generate less than the required parking supply since its functionality is different than typical office use, as a portion of the vehicles are police vehicles, which will be on patrol during portions of the day and not parked on site. Therefore, the approximately 155 on-site spaces provided by the PSB would be sufficient to meet demand.

15.8 OTHER TRANSPORTATION CONSIDERATIONS

This section presents other transportation information relating to neighborhood impacts, vehicle miles of travel, and left-turn queues at key study intersections. This analysis integrates various aspects of the significance criteria listed in section 15.2.5 of this chapter (e.g., traffic generation/delay, pedestrian/bicycle safety) by focusing on the particular issues of neighborhoods and queuing. The analysis concludes that the proposed PSB project would result in ***less-than-significant impacts on neighborhoods and queuing.*** The description of Vehicle Miles Traveled (VMT) is provided for information only, not as a significance criterion for evaluating environmental impacts.

15.8.1 Neighborhood Impacts

Since the proposed project is located in the Mayfield neighborhood, it would add some project trips to the residential streets, such as Birch Street and Park Boulevard. It is estimated that trips associated with the PSB would add a maximum of 40 trips during the PM peak hour on Birch Street between Sheridan Avenue and Oregon Expressway. Given that Birch Street is uncontrolled along this segment, the minimal traffic volume increase related to the project would result in a nominal increase in traffic delay on Birch Street.

Additionally, the El Camino Real/Page Mill Expressway intersection would increase in average delay as a result of the PSB project. However, the increase would be negligible (i.e., less than 2 seconds) and is not expected to result in any new cut-through traffic in the Mayfield neighborhood or in the adjacent neighborhoods of College Terrace, Evergreen Park, and Ventura.

The neighborhood impacts described above would be ***less than significant.***

Mitigation. No significant impact has been identified; no mitigation is required.

15.8.2 Vehicle Miles Traveled (VMT)

This section describes the methodology used to calculate the average weekday Vehicle Miles Traveled (VMT) associated with the proposed PSB project. VMT is presented for informational purposes. However, the values shown here are typically used as inputs to other technical studies such as air quality and greenhouse gas emissions (see chapters 5 and 9, respectively, of this EIR).

VMT is considered a useful metric in understanding the overall impacts of a project on the transportation system. VMT is often expressed on a “per capita” or “per employee” basis to understand the relative efficiency of one project versus another. By definition, one VMT occurs when a single vehicle is driven one mile. The VMT for a new development project is estimated by adding the VMT for all vehicles generated by a site or use. In addition, the VMT values in this section represent vehicular miles of travel for an entire weekday. Lastly, VMT values in this section represent the full length of a given trip, and are not truncated at city, county, or regional boundaries.

(1) VMT Estimate. Many factors affect travel behavior, such as density, diversity of land uses, design of the transportation network, distance to high-quality transit, and demographics (the “Ds”). Typically, low-density development at great distance from other land uses, and located in areas with poor access to transit, generate more automobile travel compared to development located in urban areas.

VMT measurement has one primary limitation: it is not directly observed and therefore cannot be easily measured. The amount of VMT can be estimated based on extensive surveys of residents, visitors, and employees, or by using a validated travel demand model that estimates vehicle demand and identifies the origin and destination of every trip (providing the travel distance for each trip). Travel demand model estimation is typically done for larger-scale projects than the proposed PSB project.

To estimate the VMT for the PSB project, Fehr & Peers used the MainStreet tool, which is a web application developed by Fehr & Peers and the Environmental Protection Agency (EPA). The model recognizes that traffic generation by mixed-use and other forms of sustainable development relates closely to the density, diversity, design, destination accessibility, travel proximity, and scale of development. The model estimates the percentage of daily and peak hour trips that remain to the project site, as well as external transit, walk, and vehicle mode splits.

In addition to calculating a project's trip generation, MainStreet is also designed with the flexibility to use custom trip data from travel surveys from a variety of sources, including the 2013 California Household Travel Survey [CHTS], which provides average trip lengths by trip purpose and geographic area, or regional travel demand model's trip lengths to calculate a project's VMT.

VMT was calculated only for the PSB and not the public parking structure. As described under *Trip Generation Estimates* (section 15.4.2), parking facilities are not typically traffic generators by themselves. Trips are actually generated by the nearby retail, office and residential uses, and parking lots or structures simply provide vehicle storage. The parking structure trips are generally going to be existing vehicles that currently park at Lots C-6, C-7, or adjacent facilities (e.g., street parking, Lot C-8) but would then park in the new parking structure upon its completion. Consequently, the parking structure would generate a negligible amount of VMT, and it is likely that it would actually reduce VMT in the area since it will reduce the need for vehicles to circulate around the study area trying to find an available parking space on the street. Furthermore, since the PSB component of the project would relocate employees from the existing PSB in downtown to the new location on Sherman Avenue, the project is not expected to generate significant additional regional trips, but rather redistribute them to a new location in Palo Alto.

The VMT was calculated for years 2020 and 2040, which are the two future years of the MTC MPO Travel Demand Model. Based on the project's trip generation and the trip lengths from MTC's travel demand model, the project's average weekday VMT (generated by the PSB) would be approximately 2,250 VMT under 2020 Conditions, which equates to 15 VMT per employee, and 2,700 VMT under 2040 Conditions, which equates to 18 VMT per employee.

(2) Senate Bill (SB) 743 Assessment. On September 27, 2013, Governor Jerry Brown signed SB 743 into law, starting a process that is expected to fundamentally change the way transportation impact analysis is conducted under CEQA. Within the State's CEQA Guidelines, these changes will include elimination of auto delay, level of service (LOS), and similar measurements of vehicular roadway capacity and traffic congestion as the basis for determining significant impacts. In January 2016, the Governor's Office of Planning and Research (OPR) issued the Draft Guidance, which provided initial recommendations for updating the State's CEQA Guidelines in response to SB 743 and contained recommended specifications for VMT analysis in an accompanying "Technical Advisory on Evaluating Transportation Impacts in CEQA" ("Technical Advisory"). The guidance recommended use of *automobile* Vehicle Miles Traveled, or VMT, as the preferred CEQA transportation metric, along with the elimination of auto delay/LOS for CEQA purposes statewide. For land use projects, the Technical Advisory specifies that automobile VMT be measured by land use type for specific trip purposes or tours depending on the type of forecasting model being used. A revised Technical Advisory was issued in November 2017. The OPR "Final Proposed Updates to the CEQA Guidelines" have been submitted to the State Resources Agency, which will provide the revised CEQA Guidelines

for public review and comment before a decision on formal approval. Based on the "Final Proposed Updates to the CEQA Guidelines," lead agencies will have up to two years to implement the revised CEQA Guidelines upon their formal approval, which could occur later in 2018.

OPR's Technical Advisory contains specifications for VMT analysis methodology and recommendations for significance thresholds. The Technical Advisory contains sufficient information to inform lead agencies about how to prepare for the upcoming transition to VMT. However, the State Resources Agency has not yet adopted the CEQA Guidelines Updates and, therefore, compliance with the OPR Technical Advisory is not yet mandatory.

As noted above, the results of this analysis are for informational purposes because the City of Palo Alto has yet to adopt VMT thresholds; therefore, there is no formal significance criteria set for the VMT analysis. However, in order to understand the PSB project's contribution to the transportation network, the OPR Technical Advisory recommendations were used. At the time this EIR analysis was prepared, OPR's *Revised Proposed Changes to the CEQA Guidelines* (January 2016) and proposed *Technical Advisory on Evaluating Transportation Impacts in CEQA* were consulted to identify the following significance criterion to assess VMT (this criterion has been retained in the final OPR documents):

1. The project will be considered to result in a significant impact to VMT if project-related VMT exceeds the following numeric thresholds:

    - **Workers Per Capita VMT:** A project exceeding a level of 15 percent below existing regional VMT per employee.

VMT Impact Results. For this analysis, VMT per employee results were compared to the Project Transportation Analysis Zone (TAZ) from the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) regional model. Existing VMT data by TAZ was not available, so the Projected VMT estimates for Year 2020 and 2040 were used.

As shown in Table 15-12, the average trip length for employees at the proposed PSB project is estimated to be more than 15 percent **below** the regional averages. Therefore, using the criteria and methodology described above, the proposed project's VMT impact would result in less-than-significant impacts. As noted in the beginning of this section 15.8, this VMT description is provided for information only, not as a significance criterion for evaluating environmental impacts.

15.8.3 Queuing Analysis

The addition of PSB project traffic along the roadway network has the potential to add vehicles to left-turn movements, causing the left-turn queue to exceed the turn pocket storage length. Queues that exceed the turn pocket storage length have the potential to impede through traffic movement along an approach. Potentially affected signalized intersections were selected for this evaluation based on where the PSB project would add at least five (5) vehicles to a study intersection with a left-turn pocket, which include the following three movements at two intersections:

Table 15-12
DAILY VEHICLE MILES TRAVELED PER CAPITA

	Bay Area				**Project**			
	2020		**2040**		**2020**		**2040**	
Land Use	**Regional Average**	**85% of Regional Average**	**Regional Average**	**85% of Regional Average**	**VMT**	**VMT < 85% Regional Average**	**VMT**	**VMT < 85% Regional Average**
Employee (VMT per Capita)[1]	25.3	21.5	23.2	19.7	15	YES	18	YES

SOURCE: Fehr & Peers, 2017.

1. MTC Model results at analytics.mtc.ca.gov/foswiki/Main/PlanBayAreaVmtPerWorker and accessed in June 2017.

- Intersection 8El Camino Real/California Avenue – Westbound left-turn pocket
- Intersection 9El Camino Real/Page Mill Road – Southbound left-turn pocket
- Intersection 9El Camino Real/Page Mill Road – Westbound left-turn pocket

The 95th percentile queues from the TRAFFIX LOS analysis were used to evaluate the projected queues at the identified left-turn movements. The results of the left-turn queue analysis are presented in Table 15-13.

For purposes of this analysis, operational deficiencies were considered to occur under conditions where project traffic causes the queue in a left-turn pocket to extend beyond the turn pocket length by 25 feet or more (i.e., the length needed for one vehicle). Where the vehicle queue already exceeds the turn pocket storage under No Project conditions, a queuing deficiency would occur if project traffic extends the queue by 25 feet or more.

Based on the queue analysis presented in Table 15-13, the southbound and westbound left-turn pockets at El Camino Real/Page Mill Road are projected to serve queues that exceed capacity under Cumulative Conditions without and with the PSB project. However, the addition of project trips for this movement would not extend the queue more than the No Project Conditions, so there would be no project-generated queuing deficiency at the El Camino Real/Page Mill Road intersection.

The southbound left-turn pocket at El Camino Real/California Avenue is also expected to exceed the available storage under Existing, Background, and Cumulative Conditions without and with the PSB project. Under Existing and Background Conditions, the southbound queue remains the same without and with the project, so there would be no project-generated queuing deficiency for those two scenarios. Under Cumulative Conditions, the southbound left-turn queue increases by 25 feet, which is considered a deficiency under Cumulative plus Project Conditions. However, this increase in queue length is considered ***less than significant*** because it could likely be accommodated by adjusting the signal timings and/or the signal phases, without requiring the construction of any physical improvements.

Mitigation. No significant impact has been identified; no mitigation is required.

Table 15-13
LEFT-TURN QUEUES

						Projected Queue Length (feet)[3]					
						Existing		**Background**		**Cumulative**	
Intersection		**Pocket**	**Available Pocket Length (feet)**	**Peak Hour**	**# of Trips Added**	**No Project**	**Plus Project**	**No Project**	**Plus Project**	**No Project**	**Plus Project**
8	El Camino Real / California Avenue	SBL	135	AM PM	6 7	125 175	125 175	175 200	175 200	175 200	200 225
9	El Camino Real / Page Mill Road	SBL[1]	700	AM PM	6 8	450 525	475 550	500 575	525 575	625 750	625 750
		WBL	490	AM PM	7 10	300 400	325 425	325 425	325 450	375 550	375 550

SOURCE: Fehr & Peers, 2017.

Notes:

1. SBL has two lanes; each lane has 350 feet of storage, so the total pocket length is 700 feet.
2. Each vehicle in queue is assumed to occupy 25 feet.

Bold indicates the queue exceeds the storage length.

16. UTILITIES AND SERVICE SYSTEMS

This EIR chapter describes existing water, wastewater, and storm drainage services in the project vicinity; and evaluates the effects of the proposed PSB project on these services.

16.1 SETTING

16.1.1 Wastewater

The City of Palo Alto Utilities Department (CPAU) oversees a wastewater collection system consisting of over 217 miles of sewer lines.[1] Wastewater effluent is routed to the Palo Alto Regional Water Quality Control Plant (RWQCP), managed by the City's Public Works Department, where it is treated prior to discharge into the San Francisco Bay. The wastewater collection system and RWQCP service area includes the City of Palo Alto and its Sphere of Influence (SOI). While the CPAU is responsible for the wastewater collection system and conveyance of collected sewage to the RWQCP, the Palo Alto Public Works Department is responsible for treatment of sewage at the RWQCP.

The RWQCP is an EPA award winning Class V advanced secondary treatment facility featuring primary treatment (e.g., bar screening and primary sedimentation), secondary treatment (e.g., fixed film reactors, conventional activated sludge, clarification, and filtration), and filtration and disinfection treatment (e.g., filtration through a sand and coal filter and ultraviolet (UV) disinfection). Through these treatments, 99 percent of ammonia, organic pollutants, and solid pollutants are removed. The quality of the water leaving the plant approaches the standards for drinking water. In fact, the heavy metal content in the plant's discharge is low enough that the water would be appropriate for reuse with only one additional disinfection step.

Treated effluent is discharged to the San Francisco Bay. The RWQCP is designed to have an average dry weather flow (ADWF) capacity of 39 MGD and an average wet weather flow capacity of 80 MGD. Average daily flow is 20 MGD. According to the City, the RWQCP does not experience any major treatment system constraints and capacity is sufficient for current dry and wet weather loads and for future load projections. There are no plans for expansion or to "build out" the plant; however, the plant is aging and in 2012, in order to make informed decisions in terms of financing and operations, the Palo Alto City Council approved the RWQCP Long Range Facilities Plan (LRFP). The LRFP will ensure capital reinvestment, wastewater treatment services for six agencies, and ongoing water quality control to protect the San Francisco Bay and local creeks.

The general findings of the LRFP are that while the facilities have been well-maintained, much of the RWQCP unit processes and equipment are nearing the end of their useful life and will be

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[1] City of Palo Alto Utilities GIS Database. Referenced by Placeworks in the Comprehensive Plan Update EIR.

considered for replacement or major rehabilitation. Repairing or replacing the aging facilities will require a significant investment in the next 15 years.

16.1.2 Water

This section describes water supply sources, water supply infrastructure, water treatment facilities, projected water demand and supply, and water conservation initiatives and goals for the City of Palo Alto.

(1) Water Supply Sources, Planning, and Infrastructure. The City of Palo Alto Water Utility serves approximately 16,000 residential customers (meters) and approximately 3,500 non-residential customers.[1] The local distribution system includes 236 miles of water piping.

Palo Alto purchases 100 percent of its potable water from the SFPUC. This water is delivered from the City and County of San Francisco's Regional Water System (RWS), operated by the SFPUC. This supply is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties.

The City also maintains several critical interconnections with neighboring water utilities that can be activated during critical events to ensure water supplies are not impacted and also to provide mutual aid to neighboring communities.[2] Interties exist with the following water agencies: the City of East Palo Alto, the City of Mountain View, Purissima Hills Water District, and Stanford University.

(2) San Francisco Public Utilities Commission – Surface Water Supply via Wholesale Purchase. Since 1962, when Palo Alto's groundwater supply wells were discontinued as the primary water system, 100 percent of the City's water supply has been purchased wholesale from the regional surface water supply system operated by the SFPUC.[3] The SFPUC and the City (and other wholesale customers of SFPUC) entered into a Water Supply Agreement (WSA) in July 2009. The WSA addresses the rate-making methodology used by SFPUC in setting wholesale water rates for its wholesale customers and also addresses water supply and water shortages for the system. The WSA has a 25-year term. Palo Alto's Individual Supply Guarantee (ISG) is 17.07 million gallons per day (MGD) (or 19,118 acre-feet/year [AFY]); this is its share of the 184 MGD allocated for the Bay Area Water Supply and Conservation Agency (BAWSCA) members (i.e., the wholesale customers of the SFPUC).

The Water Shortage Allocation Plan (WSAP) between the SFPUC and its wholesale customers, adopted as part of the WSA, addresses shortages of up to 20 percent of system-wide use. The Tier 1 Shortage Plan allocates water from the RWS between San Francisco retail customers and the wholesale customers. The WSA also includes a Tier 2 Shortage Plan, which would

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[1] City of Palo Alto Utilities GIS database. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[2] City of Palo Alto, 2015 Urban Water Management Plan, June 2016.

[3] Palo Alto did use groundwater in 1988 and 1991 during an extended water supply shortage to supplement supplies and in 1977 during a labor dispute in San Francisco. Referenced by Placeworks in the Comprehensive Plan Update EIR.

allocate the available water from the SFPUC system among the wholesale customers. In August 2010, the BAWSCA agencies reached agreement on a new Tier 2 Shortage Plan and on February 7, 2011, the Palo Alto City Council approved the new Tier 2 Water Shortage Implementation Plan, which will remain in effect through 2018.[1]

In January 2014, the Governor of California declared a state of emergency due to severe drought conditions. Subsequently, the SFPUC requested a 10 percent voluntary water use reduction by all retail and wholesale customers. The City responded by implementing Stage I of the WSCP as outlined in its 2010 UWMP, including increasing public outreach efforts. In addition, the City increased its water conservation program efforts and doubled the rebate for removal of lawns and replacement with drought tolerant landscaping. The City's conservation efforts resulted in a savings of 16 percent[2] for the period of June 2014 through February 2015, compared with 2013. As noted above, in response to SWRCB emergency drought regulations, the City began implementing an amended version of Stage II of its WSCP in May 2015.

The SFPUC approved a water delivery limitation from the RWS of 265 MGD until 2018, when it adopted the Water System Improvement Program (WSIP) and certified the Program Environmental Impact Report on October 30, 2008. This 265 MGD Interim Supply Limitation (ISL) for the system allocated 184 MGD to the BAWSCA agencies and 81 MGD to San Francisco. The intent of the ISL was to establish an interim water supply planning horizon that defers decisions on long term water supply issues until after 2018, when additional information will be available, particularly on the impact of water diversion from the Tuolumne River. The ISL does not impact the seismic, public health, and deliverability level of service goals that were identified in the WSIP. The penalty mechanism in the ISL, which provides for a substantial "Environmental Enhancement Surcharge," is only triggered if the SFPUC and the BAWSCA agencies collectively exceed the 265 MGD limitation.

In December 2010, the SFPUC finalized the distribution of the 184 MGD BAWSCA ISL allocation to the individual BAWSCA members. According to SFPUC Resolution No. 10-0213, Palo Alto's Interim Supply Allocation (ISA) is 14.70 MGD (or 16,477 AFY). Section 4 of the CPAU's 2010 UWMP includes updated demand projections. Based on these projections, the City does not anticipate exceeding the 14.70 MGD ISA during the ISL period ending in 2018. The ISA is distinct from the ISG. The ISG is a perpetual entitlement for water delivered from the SFPUC system that survives the expiration of the current water delivery contract. The ISA is an interim water delivery limitation intended to accomplish the goals outlined in the adopted WSIP, and it automatically expires in 2018 (per SFPUC Resolution 10-0213, adopted December 14, 2010).

(3) SFPUC Retail Drought Response. The SWRCB has taken a series of actions to address the increasing severity of water supply conditions across the State and implement the Governor's Order, as outlined above. Many of these actions impose specific restrictions on urban water suppliers and outdoor water use. SFPUC's drought response regulations are

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[1] City of Palo Alto Staff Report, Drought Implementation Plan, ID #1308. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[2] City of Palo Alto, City Council Staff Report (ID # 5724), May 11, 2015 meeting, Appendix F, http://www.cityofpaloalto.org/civicax/filebank/documents/47118. Referenced by Placeworks in the Comprehensive Plan Update EIR.

described in the 2015-2016 Drought Program,[1] dated May 2015. The City of Palo Alto also adopted additional potable water use restrictions on May 11, 2015, as outlined above.

(4) Regional Coordination of Water Conservation, Supply, and Recycling Activities. BAWSCA was created on May 27, 2003 to represent the interests of 26 cities and water districts as well as two private utilities in Alameda, Santa Clara, and San Mateo Counties that purchase water on a wholesale basis from the San Francisco RWS. BAWSCA directly represents the needs of the cities, water districts, and private utilities that depend on the RWS. BAWSCA provides these customers with an ability to work with SFPUC on an equal basis to ensure reliable operation of the regional system and to collectively and efficiently meet local responsibilities. BAWSCA has the mandate to coordinate water conservation, supply and recycling activities for its agencies; acquire water and make it available to other agencies on a wholesale basis; finance projects, including improvements to the RWS; and build facilities jointly with other local public agencies or on its own to carry out the agency's purposes.

As a member of BAWSCA, the City is formally represented on the BAWSCA Board of Directors on matters involving decision-making, policy setting and issues of interest to the BAWSCA members. On the staff level, the City participates on several advisory and policy committees, including the Water Quality Committee and the Technical Advisory Committee.

BAWSCA's water management objective is to ensure that a reliable, high quality supply of water is available where and when people within the BAWSCA service area need it. A reliable supply of water is required to support the health, safety, employment, and economic opportunities of the existing and expected future residents in the BAWSCA service area and to supply water to the agencies, businesses, and organizations that serve those communities.

BAWSCA is developing the Long-Term Reliable Water Supply Strategy (Strategy) to meet the projected water needs of its member agencies and their customers through 2035, and to increase their water supply reliability under normal and drought conditions. The Strategy is proceeding in three phases. Phase I was completed in 2010 and defined the magnitude of the water supply issue and the scope of work for the Strategy. Phase II of the Strategy resulted in a refined estimate of when, where, and how much additional supply reliability and new water supplies are needed throughout the BAWSCA service area through 2035; a detailed analysis of the water supply management projects; and the development of the Strategy implementation plan.[2] The Final (Phase III) Strategy Report will incorporate the results of additional work and present the recommended Strategy and the associated Strategy implementation plan (i.e., who will do what by when). Phase III will include the implementation of specific water supply management projects. Depending on cost-effectiveness, as well as other considerations, the projects may be implemented by a single member agency, by a collection of the member agencies, or by BAWSCA in an appropriate timeframe to meet the identified needs. Project implementation will continue throughout the Strategy planning horizon, in coordination with the

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[1] San Francisco Public Utilities Company, http://sfwater.org/modules/showdocument.aspx?documentid=7228, accessed October 28, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[2] Bay Area Water Supply and Conservation Agency, 2012, Phase II Long-Term Reliable Water Supply Strategy Report, Vol I. July 30. http://bawsca.org/docs/BAWSCA%20PH%20II%20A%20Final%20Report_2012_07_03%20Revised%20073012.pdf, accessed October 23, 2015 by Placeworks for the Comprehensive Plan Update EIR.

timing and magnitude of the supply need. The development and implementation of the Strategy will be coordinated with the BAWSCA member agencies and will be adaptively managed to ensure that the goals of the Strategy (i.e., increased normal and drought year reliability, are efficiently and cost-effectively being met). The City is participating in the Strategy and has submitted several potential projects for review.

The City anticipates these projects will be evaluated during subsequent project phases, but also as part of several other regional efforts that are simultaneously underway. These efforts include the Palo Alto Regional Water Quality Control Plant (RWQCP) Long Range Facilities Plan (LRFP) and the SCVWD Water Supply and Infrastructure Master Plan. The City is actively participating on all of these efforts in conjunction with the BAWSCA study.

<u>(5) Groundwater</u>. The City's original water well system consisted of five wells (Hale, Rinconada, Peers Park, Fernando, and Matadero) with a combined total rated capacity of 4,300 gallons per minute (GPM). Besides normal annual operational testing, the wells have not been used since 1991.

From 1999 to 2003, the City completed numerous studies that provided significant analysis of City-owned wells and the local distribution system. The analysis is discussed in detail in the 2005 UWMP.[1] The results of the studies provided a significant amount of information regarding the costs and operational issues of wells for emergency use, drought-only supply, and full-time operation.

Since the publication of the 2005 UWMP, the City completed the environmental review for the Emergency Water Supply and Storage Project.[2] The project, now complete, consisted of the repair and rehabilitation of the five existing wells, construction of three new wells, construction of a new 2.5 million gallon storage reservoir and associated pump station, and other upgrades to the system. At this time, the City has no plans to use groundwater, but will evaluate using groundwater if needed for supplemental supply if the SFPUC calls for higher levels of water use reduction .

<u>(6) Exchange or Transfer Opportunities</u>. Because the existing San Francisco RWS may not have sufficient supplies in dry years, dry-year water transfers are potentially an important part of future water supplies. The City has undertaken three activities to support such transfers:

- From 1996 to 2000, the City participated in the development of the SFPUC-BAWSCA Water Supply Master Plan (WSMP), which identified dry-year purchases as an important part of the future water supply. The discussion in the WSMP includes purchasing additional Tuolumne River water and water from willing sellers located geographically south of the Delta who possess water rights or contractual entitlements to water diverted from the Delta. In addition, the WSMP identifies potential opportunities for water purchases from willing sellers upstream of the Delta along the Sacramento, Feather, Yuba, American, and San Joaquin

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[1] City of Palo Alto, 2015 Urban Water Management Plan, page 24. Note: The studies referenced can be found in the 2005 Urban Water Management Plan on pages 17 to 18. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[2] City of Palo Alto, http://www.cityofpaloalto.org/gov/depts/utl/eng/water/emergency/default.asp, accessed October 28, 2015 by Placeworks for the Comprehensive Plan Update EIR.

Rivers and their tributaries. The WSMP was formally adopted by the SFPUC and implementation of the WSMP (including investigating dry-year transfers) is ongoing.

- In January 2011, the Palo Alto City Council approved a new Water Shortage Implementation Plan to allocate water between the BAWSCA members. This plan includes the ability to transfer water allocated to the BAWSCA agencies between BAWSCA members during drought periods. All the BAWSCA agencies have adopted the plan.

- The City is monitoring the development of a water transfer market in California, including a mechanism for BAWSCA members to transfer contractual entitlements on the SFPUC system. The City supports SFPUC's efforts to pursue cost-effective dry-year water transfers as part of the overall water supply for the RWS. BAWSCA has the ability to pursue water transfers on its own as long as a wheeling[1] arrangement can be negotiated with the SFPUC.

(7) Recycled Water Supply and Distribution. The City owns and operates the Palo Alto Regional Water Quality Control Plant (RWQCP), a wastewater treatment plant, for the East Palo Alto Sanitary District, Los Altos, Los Altos Hills, Mountain View, Palo Alto, and Stanford University. Wastewater from the City and these communities is treated by the RWQCP prior to discharge to the Bay.

The majority of the wastewater treated at the RWQCP could be recycled. The plant already has some capability to produce recycled water that meets the Title 22 unrestricted use standard. In September 2010, the RWQCP completed installation of a new ultraviolet disinfection facility, which will allow a gradual increase in the amount of recycled water that meets the Title 22 unrestricted use standard if demand requires an upgrade to the recycled water storage capacity. The remaining treated wastewater meets the restricted use standard and can also be recycled.

Recycled water from the RWQCP contains higher than expected total dissolved solids (TDS; i.e., "salinity") compared to average potable source water concentrations of the RWCP partners. The City in partnership with the other RWQCP partners developed a Recycled Water Salinity Reduction Policy to identify and pursue all cost-effective measures to reduce the salinity of the recycled water over time. The Palo Alto City Council approved the Salinity Reduction Policy on January 10, 2010.

(8) Climate Change. As noted above, Palo Alto's water supply comes largely from the Sierra Nevada snowpack. Over the last century, the average early spring snowpack runoff has decreased by about 10 percent, a loss of 1.5 million acre-feet of water. Looking forward to the coming decades, the State of California predicts that higher temperatures will melt the Sierra snowpack earlier and drive the snowline higher, and that a growing proportion of winter precipitation will fall as rain instead of as snow, further reducing the snowpack.[2] Using historical

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[1] In 1986, the Legislature adopted "water wheeling" statutes (Water Code Section 1810-1814) that prohibit public water agencies from withholding use of their canals and pipelines when unused capacity is available and fair compensation is paid. The idea is to encourage water from land with excess water rights, such as certain farms, to urban areas. Source: Water: Ruling for Met Water District Strikes at "Water Wheeling" Plans, California Planning & Development Report, July 1, 2000. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[2] California Natural Resources Agency, 2009 California Climate Adaptation Strategy, 2009, page 82, http://resources.ca.gov/docs/climate/Statewide_Adaptation_Strategy.pdf, accessed October 27, 2015 by Placeworks for the Comprehensive Plan Update EIR.

data in conjunction with climate and hydrologic models, the Department of Water Resources projects that the Sierra Nevada snowpack may be further reduced from its mid-20th century average by 25 to 40 percent by 2050.[1] This will pose challenges not only to the amount of water supply available, but also to water storage and conveyance facilities designed based on historical snowpack levels.

Locally in Santa Clara County, extreme weather events have become more frequent over the past 40 to 50 years, and the trend of extreme weather events is projected to continue. Extreme weather patterns could lead to changes in rainfall distribution and intensity, resulting in fewer but more intense rainfall events followed by prolonged dry periods. More intense heat waves may cause more droughts.[2] Prolonged dry periods in Palo Alto and the Bay Area could contribute to the evaporative loss of potable water from SFPUC's local surface water supplies.

(9) Water Demand and Supply Projections. The water demand projections for the 2015 UWMP were developed with the same "end use" model that was used to develop the projections in the 2010 UWMP. Two main steps are involved in developing an end use model: 1) establishing base-year water demand at the end-use level (e.g., toilets, showers) and calibrating the model to initial conditions; and 2) forecasting future water demand based on future demands of existing water service accounts and future growth in the number of water service accounts.

Water use in Palo Alto is at its lowest in over 25 years. It is forecast that total water use in the city will increase from 2015 to 2020 by approximately 10 percent (from 11,542 AF per year in 2015 to 12,733 AF per year in 2020). After 2020, total water use is forecast to decrease for each forecast period (five-year intervals), from 12,261 AF per year in 2025 to 11,534 AF per year in 2040, for an overall reduction of about nine percent between 2020 and 2040. Therefore, water use in Palo Alto in 2040 (11,534 AF per year) is expected to be similar to use in 2015 (11,542 AF per year).[3]

16.1.3 Storm Drainage

More detail specific to *water quality* is included in chapter 11 (Hydrology and Water Quality) of this EIR. This section focuses on storm drainage infrastructure and capacity.

The City owns and maintains a municipal storm drain system consisting of approximately 107 miles of pipeline and 2,750 catch basins, 800 manholes, and six pump stations. These improvements are located within the Palo Alto public road right-of-way. Storm drain systems within private streets or private development are privately maintained but are permitted to drain into the public system. Most streets have curb and gutter that direct surface runoff into inlets that drain stormwater runoff into the underground storm drainage network. The storm drain

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[1] California Department of Water Resources (DWR), 2008, Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water, http://www.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf, accessed October 27, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[2] Santa Clara County, 2011, Santa Clara County Hazard Mitigation Plan, pages 4-1 and 4-44. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[3] City of Palo Alto, 2015 Urban Water Management Plan, June 2016, page 40 and Table 16; www.cityofpaloalto.org/civiax/filebank/documents/51985, accessed November 16, 2017.

network includes inlets, pipes, bubblers, and manholes that are installed and built per the Palo Alto's Standard Drawings and Specification. The City's storm drain pipe systems are designed for a 10-year storm event and 6-hour duration, and the hydrology and hydraulics design criteria conform to the Santa Clara County Storm Drainage Manual. A storm drain fee is collected from each property on the City's monthly utility bill to pay for storm drain maintenance, capital improvements, and stormwater quality programs.

Under Provision C.3 of the Municipal Regional Stormwater Permit (MRP), the co-permittees (including the City of Palo Alto) use their planning authorities to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address both soluble and insoluble stormwater runoff pollutant discharges and prevent increases in runoff flows. The City submits annual reports in compliance with the MRP on all activities related to stormwater hydrology and pollution prevention that are implemented by various departments.

16.2 REGULATORY SETTING

16.2.1 Wastewater

(1) Federal Regulations. The federal government regulates wastewater treatment and planning through the Federal Water Pollution Control Act of 1972, more commonly known as the Clean Water Act (CWA), as well as through the National Pollutant Discharge Elimination System (NPDES) permit program, both of which are discussed in further detail below.

Clean Water Act. The CWA regulates the discharge of pollutants into watersheds throughout the nation. The CWA consists of two parts, one being the provisions that authorize federal financial assistance for municipal sewage treatment plant construction. The other is the regulatory requirements that apply to industrial and municipal dischargers. Under the CWA, the United States Environmental Protection Agency (EPA) implements pollution control programs and sets wastewater standards.

National Pollutant Discharge Elimination System. The NPDES permit program was established in the CWA to regulate municipal and industrial discharges to surface waters of the United States. Federal NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges, urban runoff, and nonpoint-source stormwater runoff. NPDES permits generally identify effluent and receiving water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge; prohibitions on discharges not specifically allowed under the permit; and provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities. Wastewater discharge is regulated under the NPDES permit program for direct discharges into receiving waters and by the National Pretreatment Program for indirect discharges to a sewage treatment plant.

The City of Palo Alto manages the Regional Water Quality Control Plant (RWQCP), a regional wastewater treatment plant, for the cities of Los Altos, Los Altos Hills, Palo Alto, and Mountain View; the East Palo Alto Sanitary District; and Stanford University. The agreement requires all six agencies to proportionately share in the costs of building and maintaining the facilities.

Operation of the Palo Alto RWQCP and its wastewater collection system is regulated by Waste Discharge Requirements (WDRs; NPDES No. CA0037834), found in RWQCB Order No. R2-2014-0024,[1] effective August 1, 2014, and expiring July 31, 2018. The effluent from the RWQCP also is subject to two other NPDES permits: 1) the WDRs for mercury and polychlorinated biphenyls (PCBs) from municipal and industrial wastewater discharges to San Francisco Bay (NPDES No. CA0038849); and 2) waste discharge requirements for nutrients from municipal wastewater discharges to San Francisco Bay (NPDES No. CA0038873). The three NPDES permits enable Palo Alto to discharge treated wastewater into San Francisco Bay and Matadero Creek.

(2) State Laws and Regulations.

State Water Resources Control Board. On May 2, 2006 the SWRCB adopted a General Waste Discharge Requirement (Order No. 2006-0003) for all publicly owned sanitary sewer collection systems in California with more than one mile of sewer pipe. The order, as amended by Order No. 2013-0058-EXEC, dated July 30, 2013, provides a consistent statewide approach to reducing sanitary sewer overflows (SSOs) by requiring public sewer system operators to take all feasible steps to control the volume of waste discharged into the system, to prevent sanitary sewer waste from entering the storm sewer system, and to develop a Sewer System Management Plan (SSMP). The General Waste Discharge Requirement also requires that storm sewer overflows be reported to the SWRCB using an online reporting system.

The SWRCB has delegated authority to nine RWQCBs to enforce these requirements within their region. The City of Palo Alto is within the jurisdiction of the San Francisco Bay RWQCB.

Sanitary District Act of 1923. The Sanitary District Act of 1923 (Health and Safety Code Section 6400 et seq.) authorizes the formation of sanitation districts and empowers them to construct, operate, and maintain facilities for the collection, treatment, and disposal of wastewater.[2] The Act was amended in 1949 to allow the districts to also provide solid waste management and disposal services, including refuse transfer and resource recovery.

(3) Regional and Local Regulations.

San Francisco Bay Regional Water Quality Control Board. Regional authority in California for planning, permitting, and enforcement is delegated to the nine RWQCBs. The regional boards are required to formulate and adopt water quality control plans for all areas in the region and establish water quality objectives in the plans. Palo Alto is within the jurisdiction of the San Francisco Bay RWQCB (Region 2).

The San Francisco Bay RWQCB addresses region-wide water quality issues through the creation of the Water Quality Control Plan for San Francisco Bay Basin (Basin Plan). The Basin Plan was updated most recently in June 2013. This Basin Plan designates beneficial uses of the

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[1] San Francisco Regional Water Quality Control Board waste discharge permit for City of Palo Alto's RWQCP and wastewater collection system, http://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2014/R2-2014-0024.pdf, accessed October 23, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[2] California Health and Safety Code, http://leginfo.ca.gov/cgi-bin/calawquery?codesection=hsc, accessed February 4, 2015 by Placeworks for the Comprehensive Plan Update EIR.

State waters within Region 2, describes the water quality that must be maintained to support such uses, and provides programs, projects, and other actions necessary to achieve the standards established in the Basin Plan.[1]

In addition to the three NPDES permits listed above governing discharges from the RWQCP to San Francisco Bay, the RWQCB issued Water Reclamation Requirements in Order 93-160[2] governing the production and use of reclaimed (recycled) water from the plant, primarily for irrigation.

City of Palo Alto Sewer System Management Plan. The CPAU Sewer System Management Plan (SSMP)[3] documents the proper operation and maintenance of CPAU's sanitary sewer system, including capacity management and system audits. The City of Palo Alto is one of several sewer systems that feed the RWQCP where the wastewater is treated before discharge to San Francisco Bay. The SWRCB has issued statewide waste discharge requirements for sanitary sewer systems, which include requirements for development of an SSMP.

The SSMP is also required by the San Francisco Bay RWQCB. The RWQCB outlines the SSMP requirements in the Sewer System Management Plan Development Guide in cooperation with the Bay Area Clean Water Agencies (BACWA).

Bay Area Clean Water Agencies. The Bay Area Clean Water Agencies (BACWA) is a local government agency created by a joint powers agreement in 1984. BACWA's membership includes local clean water agencies that provide sanitary sewer services to more than seven million people living in the nine county San Francisco Bay Area. BACWA was founded, and continues, to assist agencies in carrying out mutually beneficial projects, and to facilitate the development of scientific, economic, and other information about the San Francisco Bay environment and the agencies that work to protect it and public health.

City of Palo Alto Municipal Code. The City of Palo Alto Municipal Code contains all ordinances for the City. The Municipal Code is organized by Title, Chapter, and Section.

Chapter 16.09, Sewer Use Ordinance. The overall goal of this chapter of the Municipal Code and of the City's water quality control program is to prevent and control pollution and protect and foster human health and the environment. The specific purpose of this chapter of the Code is to prevent the discharge of any pollutant into the sanitary sewer system, the storm drain system, or surface waters that would: 1) obstruct or damage the sanitary sewer or storm drain system; 2) interfere with, inhibit or disrupt the Palo Alto RWQCP, or its treatment processes, or operations, or its sludge processes, use or disposal; 3) pass through the treatment system and contribute to

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[1] San Francisco Bay Regional Water Quality Control Board, 2013, San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan). Referenced by Placeworks for the Comprehensive Plan Update EIR.

[2] San Francisco RWQCB, 1993. Water Reclamation Requirements order 93-160, http://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/1993/R2-1993-0160.pdf, accessed December 10, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[3] CPAU, Sewer System Management Plan, 2009, http://www.cityofpaloalto.org/civicax/filebank/documents/16504, accessed October 23, 2015 by Placeworks for the Comprehensive Plan Update EIR.

violations of the regulatory requirements placed upon the RWQCP; or 4) result in or threaten harm to or deterioration of human health or the environment. The Sewer Use Ordinance is required in the Palo Alto RWQCP's NPDES permit to protect the health of the San Francisco Bay.

Chapter 16.10, Private Sewage Disposal Systems. The objective of this chapter of the Municipal Code is the provision of public sanitary sewerage facilities for every residence, place of business, or other building where persons reside, congregate, or are employed except where provision of such public sewerage facilities is not feasible. To this end, the City shall have the right to prohibit the installation of private sewage disposal systems in subdivisions except where, in the opinion of the City, installation of public sanitary sewerage facilities is clearly not feasible. The City shall also have the right to require a sub-divider to deposit with the City a cash sum equal to the estimated total cost of construction of a sanitary sewer system to serve a proposed subdivision which is to be served initially by individual sewage disposal facilities, or require sub-divider to construct an approved sanitary sewer system in addition to provision of individual sewage disposal facilities.

16.2.2 Water

(1) Federal Regulations. The following federal regulation affects water service in Palo Alto and its Sphere of Influence (SOI).

Federal Safe Drinking Water Act. The Safe Drinking Water Act authorizes the United States Environmental Protect Agency (U.S. EPA) to set national water quality standards for drinking water to protect against both naturally-occurring and manmade contaminants. These standards set enforceable maximum contaminant levels in drinking water and require all water providers in the United States to treat water to remove contaminants, except for private wells serving fewer than 25 people. In California, the California Department of Public Health (CDPH) conducts most enforcement activities. If a water system does not meet standards, it is the water supplier's responsibility to notify its customers.

(2) State Regulations.

Regulation of Discharges from Drinking Water Systems. To provide coverage to discharges by water purveyors to waters of the United States in compliance with Clean Water Act section 402, the State Water Resources Control Board (SWRCB) adopted the Statewide General NPDES Permit[1] (General Order No. CAG140001) for Drinking Water System Discharges to Waters of the United States on November 18, 2014. To get coverage under the permit, a water purveyor (community drinking water system or wholesaler) must have submitted an application to the SWRCB no later than September 1, 2015. Alternatively, if a water purveyor does not need coverage under the permit, it must have submitted a notice of non-applicability to the SWRCB also by September 1, 2015.

California Safe Drinking Water Act. Effective in July 2014, the California Safe Drinking Water Act strengthens the federal Drinking Water Act by authorizing the State's Department of Health

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[1] SWRCB, 2014. NPDES permit for drinking water system discharges to waters of the United States, http://www.swrcb.ca.gov/water_issues/programs/npdes/docs/drinkingwater/final_statewide_wqo2014_0194_dwq.pdf. Referenced by Placeworks in the Comprehensive Plan Update EIR.

Services to protect the public from contaminants in drinking water by establishing maximum contaminants levels that are at least as stringent as those developed by the U.S. EPA.

California Porter-Cologne Water Quality Control Act. Under the Porter-Cologne Water Quality Control Act (Porter-Cologne), which was passed in California in 1969, the State Water Resources Control Board (SWRCB) has the ultimate authority over State water rights and water quality policy. Porter-Cologne also establishes nine Regional Water Quality Control Boards (RWQCBs) to oversee water quality on a day-to-day basis at the local and regional level. RWQCBs engage in a number of water quality functions in their respective regions. RWQCBs regulate all pollutant or nuisance discharges that may affect either surface water or groundwater.[1] Palo Alto is overseen by the San Francisco Bay RWQCB.

California Urban Water Management Planning Act. Through the Urban Water Management Planning Act of 1983, certain urban water suppliers[2,3] within California must prepare and adopt a UWMP and update it every five years. The Act is intended to support conservation and efficient use of urban water supplies at the local level. The Act requires that total projected water use be compared to water supply sources over the next 20 years in five-year increments, that planning occur for single and multiple dry water years, and that plans include a water recycling analysis that incorporates a description of the wastewater collection and treatment system within the agency's service area along with current and potential recycled water uses.[4] In September 2014 the Act was amended by SB 1420 to require urban water suppliers to provide descriptions of their water demand management measures and similar information.

California Groundwater Management Act. The Groundwater Management Act (AB 3030) provides guidance for applicable local agencies to develop voluntary Groundwater Management Plans (GMPs) in State-designated groundwater basins. GMPs can allow agencies to raise revenue to pay for measures influencing the management of the basin, including extraction, recharge, conveyance, facility maintenance, and water quality.[5]

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[1] California Wetlands Information System. Summary of the Porter-Cologne Water Quality Control Act, http://resources.ca.gov/wetlands/permitting/Porter_summary.html, accessed February 4, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[2] The Act is applicable to water suppliers providing water to more than 3,000 customers or supplying more than 3,000 acre feet of water annually. Referenced by Placeworks in the Comprehensive Plan Update EIR.

[3] One acre-foot is the amount of water required to cover one acre (43,560 square feet) of ground to a depth of one foot.

[4] Department of Water Resources. About Urban Water Management, http://www.water.ca.gov/urbanwatermanagement/, accessed February 4, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[5] Department of Water Resources Planning and Local Assistance Central District. Groundwater, Groundwater Management, http://www.cd.water.ca.gov/groundwater/gwab3030.cfm, accessed February 4, 2015 by Placeworks for the Comprehensive Plan Update EIR.

The Water Conservation Act of 2009 (Senate Bill X7-7).[1] The Water Conservation Act of 2009 requires all water suppliers to increase water use efficiency with an overall goal of reducing per capita water use by 20 percent by 2020.

The California Plumbing Code. The California Plumbing Code (Part 5, Title 24, of the California Code of Regulations) is part of the California Building Standards Code. The general purpose of the universal code is to prevent disorder in the industry as a result of widely divergent plumbing practices and the use of many different, often conflicting, plumbing codes by local jurisdictions. Among many topics covered in the code are water fixtures, potable and non-potable water systems, and recycled water systems. Water supply and distribution shall comply will all applicable provisions of the current edition of the California Plumbing Code.

The California Health and Safety Code. A portion of the state Health and Safety Code is dedicated to water issues, including testing and maintenance of backflow prevention devices, coloring of pipes carrying recycled water, and programs addressing cross-connection control by water users.[2]

The California Water Code. The Water Code contains many statutes surrounding various water-related issues including water shortage emergences, reuse, recycling, treated wastewater, appropriation, and fees.

State Updated Model Water Efficient Landscape Ordinance (Assembly Bill 1881 [2006]).[3] This Ordinance requires cities and counties adopt landscape water conservation ordinances. Please see the heading “Local Regulations, City of Palo Alto Municipal Code” below for a discussion of local ordinances that are required to reduce water consumption and conserve water. Among other changes, the Governor’s Executive Order 29-B-15 (Mandatory Water Use Restrictions) directed the Department of Water Resources to provide for more efficient irrigation systems, greywater usage, and on-site storm water capture, and to limit the portion of landscapes that can be covered in turf.

California Code of Regulations, Title 22. Two State agencies have primary responsibility for regulating the application and use of recycled water: the California Department of Public Health (CDPH) and the SWRCB. Planning and implementing water recycling projects entail numerous interactions with these regulatory agencies prior to project approval.

The CDPH establishes the statewide effluent bacteriological and treatment reliability standards for recycled water uses in Title 22, Division 4 (Environmental Health) of the California Code of Regulations. Under Title 22, the standards are established for each general type of use based on the potential for human contact with recycled water.

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[1] Department of Water Resources. Senate Bill SBX7-7 2009 Information, http://www.water.ca.gov/wateruseefficiency/sb7/, accessed February 4, 2015 by Placeworks for the Comprehensive Plan Update EIR.

[2] Sections 116800 to 116820.

[3] California Department of Water Resources, http://www.water.ca.gov/wateruseefficiency/landscapeordinance/, accessed on January 22, 2016 by Placeworks for the Comprehensive Plan Update EIR.

The SWRCB is charged with establishing and enforcing requirements for the application and use of recycled water within California. Permits are required from the SWRCB for each water recycling operation. As part of the permit application process, applicants are required to demonstrate that the proposed recycled water operation will not exceed the ground and surface water quality objectives in the basin management plan, and that it is in compliance with Title 22 requirements.[1]

(3) Local Regulations. The following are regional and local plans and regulations affecting water service in Palo Alto.

As the primary water resources agency for Santa Clara County, the SCVWD has a Comprehensive Water Resources Management Plan that outlines the key water resource issues facing the county and provides a framework for understanding the SCVWD's policies related to water supply, natural flood protection, and water resources stewardship. The Plan provides factsheets for all cities within Santa Clara County that include shared responsibilities with SCVWD, citywide programs and projects related to water resources management issues, and lists of related Comprehensive Plan elements.

2015 Urban Water Management Plan. In compliance with the SB X7-7 and the Urban Water Management Planning Act, the City Council of Palo Alto adopted its 2015 UWMP in June 2016. Every five years, an UWMP is prepared and submitted as required to the California Department of Water Resources (DWR), per the Urban Water Management Planning Act. SCVWD, which coordinates with City of Palo Alto Utilities (CPAU) as a planning partner and potential future service provider, also adopted its 2015 UWMP in May 2016.

City of Palo Alto Municipal Code. The City of Palo Alto Municipal Code contains all ordinances for the City. The Municipal Code is organized by Title, Chapter, and Section.

Chapter 12.32.010, Water Use Regulation. Chapter 12.32 of the City's Municipal Code prohibits some water uses in order to avoid unnecessary water waste. The regulation includes the following provisions:

- Flooding or runoff of potable water is prohibited.
- A shut-off valve is required for hoses used to wash vehicles, sidewalks, buildings, etc.
- Potable water for construction uses is prohibited if non-potable water is available.
- Broken or defective plumbing and irrigation systems must be repaired or replaced within a reasonable period.

Additional restrictions apply during droughts, as discussed further below.

Chapter 12.32.040, Indoor and Outdoor Water Efficiency. Pursuant to the California Water Conservation in Landscaping Act, also known as the State Landscape Model Ordinance, Government Code Section 65591, et seq. as amended, a city is required to adopt the State Landscape Model Ordinance or equivalent local landscape water efficiency requirements that

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[1] Further information is available at the following links: http://www.waterboards.ca.gov/water_issues/programs/grants_loans/water_recycling/statutes_regulations.shtml, http://www.sdcwa.org/recycled-water. Accessed October 21, 2015 by Placeworks for the Comprehensive Plan Update EIR.

are "at least as effective" as the State ordinance in conserving water. The Palo Alto City Council has adopted requirements that are at least as effective in reducing landscaping water use, also known as outdoor water use, as well as additional requirements for existing landscapes and indoor water use in Municipal Code Chapter 16.14 (California Green Building Code).

Chapter 16.12 (Recycled Water) and 16.14 (Green Building). Chapters 16.12 and 16.14 contain requirements related to recycled water, including new construction requirements related to dual plumbing and irrigation. Requirements in Chapter 16.12 include recycled permit requirements, as well as requirements for recycled water application for irrigation and toilet fixtures. Chapter 16.14 addresses the City's adoption of the 2013 California Green Building Standards.

Additional City of Palo Alto Potable Water Use Restrictions – Resolution 9509, May 11, 2015. In response to the drought, the Palo Alto City Council on May 11, 2015 approved a Resolution[1] amending Appendix H, "Water Shortage Contingency Plan Use Restrictions," of the 2010 Urban Water Management Plan, in compliance with the SWRCB's emergency drought regulations. In addition to restrictions that could be applied in various stages of a drought or other water supply shortage, Appendix H (which remains in the 2015 UWMP) includes the following additional permanent water use regulations that could apply to the proposed PSB project:

- Ornamental landscape or turf irrigation with potable water shall not be allowed between 10:00 a.m. and 6:00 p.m., except via hand watering with a bucket or a hose with an operating shut-off valve.
- The use of potable water in a fountain or other decorative water feature is prohibited, except where the water is part of a recirculating system.
- The use of potable water for street sweepers/washers is prohibited if non-potable water is available, as determined by the Director of Utilities, or his or her designee.

16.2.3 Storm Drainage

More detail specific to *water quality* is included in chapter 11 (Hydrology and Water Quality) of this EIR. The regulations described below are also relevant to how storm drainage infrastructure is designed and operated.

City of Palo Alto Municipal Code. Four chapters of the City of Palo Alto Municipal Code contain directives pertaining to stormwater runoff and utilities.

Chapter 16.09, Sewer Use Ordinance. The City of Palo Alto sewer use ordinance is designed to reduce the amount of pollutants that enter the sanitary sewer and storm drain system.

Chapter 16.11, Stormwater Pollution Prevention. This chapter provides the stormwater requirements for projects conducted within the City of Palo Alto and is consistent with the requirements of the Municipal Regional Stormwater Permit (MRP).

Chapter 16.14, California Green Building Standards Code. This chapter incorporates the Title 24 requirements of the 2013 California Green Building Standards, and one section

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[1] City of Palo Alto, City Council Staff Report (ID # 5724), May 11, 2015 meeting, http://www.cityofpaloalto.org/civicax/filebank/documents/47118, accessed October 16, 2015 by Placeworks for the Comprehensive Plan Update EIR.

references local stormwater pollution prevention (Chapter 16.14.150) and the other references irrigation efficiency standards (Chapter 16.14.200).

Chapter 16.28, Grading and Erosion. This chapter requires projects to obtain a grading and excavation permit and requires submittal of an interim erosion and sediment control and stormwater pollution prevention plan (Chapter 16.28.120) that describes the surface runoff and erosion control measures that will be implemented during construction of the project. Chapter 16.28.200 contains the provisions for the final erosion and sediment control and stormwater pollution prevention plan that describes permanent control measures to improve the quality of stormwater runoff from the site.

Innovative Stormwater Measures Rebate Program. The City has implemented various programs to reduce stormwater pollution. The City administers the Innovative Stormwater Measures Rebate Program, which is funded with revenue from monthly storm drainage fees. The goal of the program, which was started in 2008, is to help Palo Alto residents, businesses, and City departments reduce the amount and improve the quality of runoff that flows into the storm drain system by offering rebates to those who install qualifying stormwater reduction measures, such as:

- Capturing rainwater in rain barrels or cisterns for use on landscaping and gardens;
- Constructing or reconstructing driveways, patios, walkways, and parking lots with permeable paving materials; and
- Constructing a green (vegetated) roof to absorb and filter rainfall.

Grading and Drainage Policies. The City also has several policies and guidelines for construction projects regarding grading and drainage. These policies and guidelines include the following:

- Basement Exterior Drainage Policy. To protect public safety and health by preventing the continual discharge of groundwater into the City's gutters and streets, the Department of Public Works will not permit the use of basement exterior drainage systems consisting of perforated pipes located on the exterior of the basement walls or underneath the slab that collect water, which is then pumped to the surface of the ground for discharge, either on-site or off-site for all City parcels northeast (i.e., bay side) of the Foothill Expressway. (The PSB project site is located within this area.)

- Construction Dewatering System Policy. A Construction Dewatering Plan must be submitted to the Department of Public Works for excavation activities that encounter groundwater or other water that needs to be removed from the excavation and disposed of in the City's storm drain system. The plan must detail a system to remove silt and other pollutants from this water prior to discharging it to the storm drain system. The Department of Public Works reviews and approves the dewatering plans as part of the Street Work Permit.

Storm Drain Master Plan. Palo Alto's Storm Drain Master Plan was first developed in 1993. Since then, the City's drainage system has been expanded and upgraded. The City prepared a Storm Drain Master Plan Update in June 2015. The Master Plan Update plans for new storm drain projects to further improve the storm drain system in the city.

16.3 IMPACTS AND MITIGATION MEASURES

16.3.1 Significance Criteria

Based on the CEQA Guidelines, the project would create a significant impact on utilities and service systems if it would:[1]

(a) Exceed wastewater treatment requirements of the regional water quality control board;

(b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;

(c) Require or result in the construction of new stormwater treatment facilities or expansion of the existing facilities, the construction of which could cause significant environmental effects;

(d) Need new or expanded entitlements to water supply;

(e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments;

(f) Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs; or

(g) Not comply with federal, State, and local statutes and regulations related to solid waste.

The proposed project would comply with all federal, State, and local statues and regulations related to solid waste. These regulations are described in the Draft EIR for the Comprehensive Plan Update, and the Comprehensive Plan includes mandated policies specific to recycling. Therefore, criterion (g) will not be discussed further in the EIR.

16.3.2 Impacts and Mitigation Measures

(1) Wastewater

Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board; require or result in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects; or result in a determination by the wastewater treatment provider that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments (Significance Criteria [a], [b], and [e])?

Palo Alto's wastewater is treated at the Palo Alto Regional Water Quality Control Plant (RWQCP), which also serves the five communities of East Palo Alto, Mountain View, Stanford, Los Altos, and Los Altos Hills. The Long-Range Facilities Plan for the RWQCP, adopted in

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[1] CEQA Guidelines, Appendix G, items XVIII (b) and (d).

2012, found that the existing facilities were operating within normal ranges. The existing secondary and tertiary treatment systems are adequately treating the wastewater to meet the existing discharge requirements. Construction and operation of the proposed project will be subject to applicable regional and local water quality standards and regulations.
The City estimates the average wastewater generation at the proposed Public Safety Building would be 3,040 gallons per day (gpd). The estimated wastewater generation at the proposed parking garage would average 240 gpd. The City of Palo Alto Utilities Department, Engineering, has issued a will-serve letter for the proposed Public Safety Building and California Avenue Parking Garage project, which states, "This letter serves as notice the City of Palo Alto will serve potable water and sanitary sewer connections to the above projects. The City of Palo Alto is the utility provider within the City Limits of Palo Alto. The City has the capacity to provide fire water, potable domestic water, gas and wastewater services to this project within the City of Palo Alto boundaries." (Jose Jovel, Development Services Supervisor, WGW Utilities Engineering, City of Palo Alto; July 7, 2017)

Based on the above assurances from the City Utilities Department, the proposed PSB project's impact on wastewater service is considered ***less than significant.***

Mitigation. No significant project or cumulative impact has been identified; no mitigation is required.

Construction Period Impacts. The construction of project-related local wastewater system modifications would be temporary and would occur under local streets in existing public rights of way and on the project development site. The construction mitigation measures and standard City conditions and regulatory requirements identified in this EIR (e.g., chapter 5 – Air Quality, chapter 8 – Geology and Soils, chapter 10 – Hazards and Hazardous Materials, chapter 11 – Hydrology and Water Quality, and chapter 13 – Noise) would apply. No significant environmental impact is anticipated with this construction activity. The potential environmental impacts associated with construction of the project wastewater system modifications would therefore be ***less than significant.***

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(2) Water

Would the project require or result in the construction of new water facilities or expansion of existing facilities, the construction of which could cause significant environmental effects; or need new or expanded entitlements to water supply (Significance Criteria [b] and [d])?

The City estimates the average water consumption at the proposed Public Safety Building would be 3,040 gallons per day (gpd), including both indoor and outdoor use, with a peak use of 7,600 gpd. The estimated water consumption at the proposed parking garage would average 240 gpd, for landscaping purposes, with a peak use of 560 gpd. The proposed project plans call for water-efficient landscaping and irrigation systems, including rain gardens, to be installed in site landscaping, as described in chapters 3 (Project Description) and 11 (Hydrology and Water Quality) of this EIR.

The City of Palo Alto Utilities Department, Engineering, has issued a will-serve letter for the proposed Public Safety Building and California Avenue Parking Garage project, which states, "This letter serves as notice the City of Palo Alto will serve potable water and sanitary sewer connections to the above projects. The City of Palo Alto is the utility provider within the City Limits of Palo Alto. The City has the capacity to provide fire water, potable domestic water, gas and wastewater services to this project within the City of Palo Alto boundaries." (Jose Jovel, Development Services Supervisor, WGW Utilities Engineering, City of Palo Alto; July 7, 2017)

Based on the above assurances from the City Utilities Department, the proposed PSB project's impact on water service is considered ***less than significant.***

Mitigation. No significant project or cumulative impact has been identified; no mitigation is required.

Construction Period Impacts. The construction of project-related local water delivery system modifications would be temporary and would occur under local streets in existing public rights of way and on the project development site. The construction mitigation measures and standard City conditions and regulatory requirements identified in this EIR (e.g., chapter 5 – Air Quality, chapter 8 – Geology and Soils, chapter 10 – Hazards and Hazardous Materials, chapter 11 – Hydrology and Water Quality, and chapter 13 – Noise) would apply. No significant environmental impact is anticipated with this construction activity. The potential environmental impacts associated with construction of the project water system modifications would therefore be ***less than significant.***

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(3) Storm Drainage

Potential *water quality* impacts are discussed in chapter 11 (Hydrology and Water Quality) of this EIR. This section focuses on storm drainage infrastructure and capacity.

Would the project require or result in the construction of new stormwater treatment facilities or expansion of the existing facilities, the construction of which could cause significant environmental effects (Significance Criterion [c])?

The project site consists of two paved parking lots totaling approximately 2.23 acres. Generally, the perimeters of the lots are planted with trees, bushes, and other plants. Overall, the project site is approximately 90 percent covered with impermeable pavement. The proposed PSB project does not propose changes to overall existing drainage patterns; it would include new landscaping, also along the project perimeter, resulting in a similar permeable surface coverage. However, the project would include rain gardens for stormwater treatment, trees with relatively low water requirements, a water-conserving demonstration garden, and a fully automated water-efficient irrigation system, which are expected to reduce surface runoff from the site over existing conditions. New connections to the local storm drainage system would be required, since the existing surface parking lots rely on surface drainage. The PSB project's impact on storm drainage infrastructure and capacity would be ***less than significant.***

Mitigation. No significant project or cumulative impact has been identified; no mitigation is required.

Construction Period Impacts. The construction of project-related local storm drainage system modifications would be temporary and would occur under local streets in existing public rights of way and on the project development site. The construction mitigation measures and standard City conditions and regulatory requirements identified in this EIR (e.g., chapter 5 – Air Quality, chapter 8 – Geology and Soils, chapter 10 – Hazards and Hazardous Materials, chapter 11 – Hydrology and Water Quality, and chapter 13 – Noise) would apply. No significant environmental impact is anticipated with this construction activity. The potential environmental impacts associated with construction of the project storm drainage system modifications would therefore be ***less than significant.***

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(4) Solid Waste

Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs (Significance Criterion [f])?

The project site currently comprises two paved parking lots with limited trees and landscaping; demolition would be limited to removal of the existing pavement and most landscaping. The proposed project would relocate police and emergency services to a new PSB, and construct a new public parking garage. Demolition for project construction would be minimal, and operation of the new buildings would generate typical amounts of additional solid waste for an office building and parking garage. Non-recyclable material would be transferred to the Kirby Canyon Landfill owned by Waste Management, Inc. Kirby Canyon has sufficient permitted landfill capacity, with a remaining capacity of approximately 21.6 million tons and a total projected capacity of approximately 29 million tons. The project impact on landfill capacity would be ***less than significant***.

Mitigation. No significant impact has been identified; no mitigation is required.

17. CEQA-REQUIRED ASSESSMENT CONSIDERATIONS

This chapter summarizes the EIR findings in terms of the various assessment categories suggested by the California Environmental Quality Act (CEQA) Guidelines for EIR content. The findings of this EIR are summarized below in terms of project-related potential "growth-inducing effects," "significant unavoidable impacts," "irreversible environmental changes," "cumulative impacts," and “effects found not to be significant.”

17.1 GROWTH-INDUCING EFFECTS

CEQA Guidelines section 15126.2(d) requires that the EIR discuss "...the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment."

The PSB project does not propose any housing. Project implementation would not result in a net increase in employment in the project area, since existing City employees would be moved from the 275 Forest Avenue location to the 250 Sherman Avenue location.

Based on these considerations, no substantial, detrimental, growth-inducing effect is expected.

17.2 SIGNIFICANT UNAVOIDABLE IMPACTS

CEQA Guidelines section 15126.2(b) requires that the EIR discuss "significant environmental effects which cannot be avoided if the proposed project is implemented." An impact could be identified as significant and unavoidable for one of four reasons: (1) no potentially feasible mitigation has been identified; (2) potential mitigation has been identified but may be found by the Lead Agency to be infeasible; (3) with implementation of feasible mitigation, the impact still would not, or might not, be reduced to a less-than-significant level; or (4) implementation of the mitigation measure would require approval of another jurisdictional agency, whose approval will be pursued by the City but cannot be guaranteed as of the publication of this EIR.

Based on the environmental impact evaluations and mitigation findings of this EIR, no significant unavoidable environmental impacts would result from the Public Safety Building and California Avenue Parking Garage project.

17.3 IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA Guidelines section 15126.2(c) requires that the EIR discuss "significant irreversible environmental changes which would be caused by the proposed project should it be implemented." Irreversible environmental changes caused by the proposed project would include the following:

- As discussed in chapter 12 (Land Use and Planning) of this EIR, the project would convert the project development site from parking lots to the proposed Public Service Building and California Avenue Parking Garage. The project would require amendments to the Municipal Code with respect to the public parking garage height, setbacks, FAR and site coverage, and to the height of the telecommunications (monopole) tower. Implementation of the project would result in a more dense development pattern on the site.

- The project would permanently alter on-site and off-site views of the project development site, as discussed in chapter 4 (Aesthetics) of this EIR.

- The project would add 326 net new parking spaces, create additional vehicle trips, and result in associated air pollution emissions (chapter 5), greenhouse gas emissions (chapter 9), energy use (chapter 9), and noise (chapter 13).

Implementation of the proposed project would result in an irreversible commitment of energy resources, primarily in the form of fossil fuels, including fuel oil, natural gas, and gasoline or diesel fuel for construction equipment and automobiles during project construction and ongoing use of the development site. Because development of the PSB project would be required by law to comply with California Code of Regulations Title 24 and adopted City energy conservation ordinances and regulations, the project would not be expected to use energy in a wasteful, inefficient, or unnecessary manner (see EIR chapter 9). In addition, the project would implement sustainability measures as described in EIR chapters 3 (Project Description), 16 (Transportation, Circulation, and Parking), and 9 (Climate Change), and would achieve a minimum LEED Silver certification, while pursuing LEED Gold Certification.

The consumption or destruction of other non-renewable or slowly renewable resources would also result during construction and operation the project. These resources would include, but would not be limited to, lumber, concrete, sand, gravel, asphalt, masonry, metals, and water. Project development would also irreversibly use water and solid waste landfill resources. However, development under the project would not involve a large commitment of those resources relative to supply, nor would it consume any of those resources wastefully, inefficiently, or unnecessarily, especially considering ongoing City conservation, recycling, and sustainability programs.

Project development would contribute both directly and indirectly to long-term increases in greenhouse gas emissions, albeit to a lesser extent than if the same development were to occur away from existing and planned transit services (including the existing nearby Caltrain station on California Avenue) or in a location where urban infrastructure and services are not already available.

For practical purposes, these environmental changes would be permanent and irreversible. Because the proposed project would incorporate the energy conservation and sustainability measures described in chapter 9 of this EIR, the identified irreversible commitment of resources is considered justified per CEQA Guidelines section 15126.2(c).

17.4 CUMULATIVE IMPACTS

Section 15130(a) of the CEQA Guidelines requires that the EIR "discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable...." The CEQA Guidelines (section 15355) define "cumulative impacts" as "...two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts."

Additional, approved development projects in the project vicinity, as of the date of the Notice of Preparation of this EIR, are identified in chapter 15 (Transportation, Traffic, and Parking). However, all these individual projects are included in the projections for the City's Comprehensive Plan, and none of these individual projects is near enough to the PSB project to combine with the PSB project's localized effects. Therefore, except where otherwise noted, the analyses of cumulative impacts in this EIR are based on the "summary of projections" method, rather than the "list of projects" method, as authorized by section 15130(b)(1)(B) of the CEQA Guidelines.

All potentially significant cumulative impacts are addressed in this chapter with the following exceptions. Cumulative transportation impacts are analyzed in chapter 15 (Transportation, Circulation, and Parking), using projections from the City's Comprehensive Plan Update and accompanying traffic model. As the BAAQMD CEQA Guidelines explain, all regional air pollutant emissions impacts and climate change impacts are inherently cumulative impacts. Accordingly, the analyses of these impacts in chapters 5 (Air Quality) and 9 (Climate Change) are analyses of cumulative impacts. These analyses are based on the projections used for the City's Comprehensive Plan Update and traffic model, as well as on the projections underlying BAAQMD's recently updated CEQA Guidelines. As explained in EIR section 16.1 (Utilities/Water), sufficiency of water supply is analyzed on a cumulative basis, and the proposed project's water supply sufficiency is analyzed on a cumulative basis consistent with the City's Urban Water Management Plan.

Additional cumulative effects are discussed below.

17.4.1 Cumulative Land Use and Planning Impacts

The proposed project would not make a cumulative considerable contribution to any significant cumulative land use impact, for the following reasons. First, with respect to physically dividing an established community, as described in EIR chapter 12, the proposed project's effect would be positive rather than negative because the project would create greater public connectivity than currently exists at the 250 and 350 Sherman Avenue location. In addition, other projects near the PSB project site that were considered in the traffic analysis are not of a size (all are less than 50,000 square feet) or type (e.g., requiring major infrastructure changes) that would physically divide the established community. Second, with respect to consistency with adopted City of Palo Alto land use plans and policies, both the proposed project and any cumulative projects are required by law to be consistent with those plans and policies. Because the City could not approve projects that were inconsistent with adopted City plans and policies, no significant cumulative impact would occur. Finally, with respect to habitat conservation plans and natural community conservation plans, as described above, no such plans apply to the project site or its vicinity. Accordingly, the proposed project would not make a cumulatively considerable contribution to any significant cumulative land use or planning impact.

Mitigation. No cumulatively considerable contribution to a significant cumulative impact has been identified; no mitigation is required.

17.4.2 Cumulative Aesthetic Impacts

The proposed project's building massing, landscaping, monopole, and public parking garage were evaluated, and aesthetic impacts were found to be less than significant. In addition, the EIR for the City's Comprehensive Plan Update found no significant cumulative aesthetic impacts citywide with implementation of Comprehensive Plan policies and mitigation measures. The proposed project is considered substantially consistent with the City's Comprehensive Plan. Accordingly, the proposed project would not make a cumulatively considerable contribution to any significant cumulative impact with respect to aesthetics.

Mitigation. No cumulatively considerable contribution to a significant cumulative impact has been identified; no mitigation is required.

17.4.3 Cumulative Biological Resource Impacts

Regarding biological issues relevant to the proposed PSB project, potential impacts on nesting birds and protected/designated trees would be mitigated on a site-specific basis for individual projects. With implementation of EIR Mitigation 6-1, the proposed project would not make a cumulatively considerable contribution to impacts on nesting birds. Related to protected and designated trees, with implementation of EIR Mitigation 6-2, the proposed project would not make a cumulatively considerable contribution to impacts on protected and designated trees.

Mitigation. No cumulatively considerable contribution to a significant cumulative impact has been identified; no mitigation is required.

17.4.4 Cumulative Local Air Quality Impacts

The EIR for the City's Comprehensive Plan Update found significant unavoidable impacts with regard to violating an air quality standard; contributing substantially to an existing or projected air quality violation; and/or resulting in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment. However, the air quality analysis for the PSB project did not find cumulative impacts for any of the significance thresholds evaluated. Therefore, the proposed project would not contribute considerably to a significant cumulative impact with respect to local air quality.

Mitigation. A cumulatively considerable contribution to a significant air quality cumulative impact would not occur; no mitigation measures apply.

17.4.5 Cumulative Storm Drainage and Water Quality Impacts

The EIR for the Comprehensive Plan Update found less-than-significant cumulative impacts regarding storm drainage and water quality. Therefore, the proposed project would make no contribution to any significant cumulative flooding impact. Cumulative development projects could cause soil erosion, contaminant spills, and long-term water quality effects, but would be subject to the same regulatory requirements as the proposed project. Compliance with these requirements would ensure that any cumulative impacts would be less than significant. The proposed project is required to cause no increase in off-site flooding compared to existing conditions, and no significant impacts were found, as discussed in subsection 11.3.3 of this EIR.

Mitigation. No cumulatively considerable contribution to a significant cumulative impact has been identified; no mitigation is required.

17.4.6 Cumulative Wastewater Service Impacts

(a) Regional Water Quality Control Board Wastewater Treatment Requirements. The EIR for the Comprehensive Plan Update did not find significant cumulative impacts regarding wastewater treatment requirements. Chapter 16 (Utilities and Service Systems) of this EIR did not find significant impacts regarding meeting wastewater treatment requirements. Therefore, impacts would not be cumulatively considerable and thus would be ***less than significant.***

(b) Wastewater Treatment Capacity. According to the EIR for the Comprehensive Plan Update there were less-than-significant impacts regarding wastewater treatment capacity. Chapter 16 of this EIR reached the same conclusion regarding the proposed PSB project. Therefore, cumulative wastewater treatment capacity impacts would be ***less than significant.***

(c) Wastewater Collection System. The projected cumulative development totals would place additional demand on the City’s wastewater collection system. The Comprehensive Plan Update includes several policies and implementation programs that would result in the continuation of ongoing monitoring, maintenance, and upgrades to the City’s wastewater collection system. Wastewater collection system improvement needs would be determined during the course of the City’s ongoing capital improvement programming and normal development review procedure for specific projects. Construction of the wastewater collection system improvements would occur within existing public rights-of-way. Construction-related traffic, noise, air quality and other potential impacts would be mitigated through standard City construction impact mitigation practices. Therefore, cumulative impacts related to the wastewater collection system would be ***less than significant.***

Mitigation. No cumulatively considerable contribution to a significant cumulative impact has been identified; no mitigation is required.

17.4.7 Cumulative Impacts on Solid Waste and Recycling Services Impacts

Like the proposed project, cumulative development projects in the City would be required to be consistent with adopted City of Palo Alto solid waste and recycling regulations. The EIR for the City’s Comprehensive Plan Update found less-than-significant cumulative impacts regarding capacity to meet solid waste demands. As indicated in chapter 16 (Utilities and Service Systems) of this EIR, the solid waste disposal and recycling facilities used by the City have ample capacity, and required consistency with the regulations and programs would serve to avoid solid waste/recycling impacts and mitigate potentially significant cumulative solid waste/recycling impacts. The overall cumulative solid waste/recycling impact of cumulative development is therefore expected to be ***less than significant.***

Mitigation. No cumulatively considerable contribution to a significant cumulative impact has been identified; no mitigation is required.

17.4.8 Cumulative Police Service Demand Impacts

Development of the proposed project, in combination with other anticipated cumulative development in Palo Alto, would cumulatively increase the demand for police services, including additional sworn police officers and requisite training, support staff, and equipment. The EIR for the City's Comprehensive Plan Update found less-than-significant cumulative impacts for maintaining acceptable service ratios, response times, and other performance objectives. Moreover, one of the objectives for this project is to relocate the Police Department from its currently undersized facility, which should have a positive impact on maintaining acceptable service ratios, response times, and other performance objectives for police services (including for emergencies and evacuations). Therefore, cumulative development would have a ***less-than-significant impact*** on police service.

Mitigation. No cumulatively considerable contribution to a significant cumulative impact has been identified; no mitigation is required.

17.4.9 Cumulative Fire Protection/EMS Service Demand Impacts

Development of the proposed project, in combination with other anticipated cumulative development in Palo Alto, would increase the demand for fire protection/EMS service, including additional firefighters and requisite training, support staff, equipment, or other resources in the future, to maintain acceptable service ratios, response times, and other performance objectives (including for emergency access and response). The EIR for the City's Comprehensive Plan Update found less-than-significant impacts for maintaining acceptable service ratios, response times, and other performance objectives (including for emergency access and response). Moreover, one of the objectives for this project is to relocate the Office of Emergency Services, Emergency Operations Center, Emergency Communications Center, and Fire Administration Division from their currently undersized facility, which should have a positive impact on maintaining acceptable service ratios, response times, and other performance objectives for fire protection/EMS service (including for emergencies and evacuations). Therefore, cumulative development would have a ***less-than-significant impact*** on fire protection/EMS service.

Mitigation. No cumulatively considerable contribution to a significant cumulative impact has been identified; no mitigation is required.

17.4.10 Cumulative Hazards and Hazardous Materials Impacts

Because of the applicable laws, standard policies and protocols, and mitigation measure described in chapter 10 (Hazards and Hazardous Materials) of this EIR, the proposed project would create very little risk from hazards and hazardous materials. For all potential exposure pathways other than transport of hazardous waste, the area of potential impact would be limited to the development site and its immediate vicinity. With respect to the hazardous waste facilities outside Palo Alto that would accept waste from the project's potential PSB uses, those facilities are subject to their own safety and environmental regulations, and the amounts of waste that those facilities would receive from the proposed project would be too small to represent a cumulatively considerable contribution to any cumulative impact.

Mitigation. No cumulatively considerable contribution to a significant cumulative impact has been identified; no mitigation is required.

17.4.11 Cumulative Noise Impacts

The projected cumulative traffic volume increases identified in chapter 15 (Transportation, Circulation, and Parking) of this EIR would cause increases in traffic noise along residential streets near the project site of less than 3 dBA. This is lower than the significance threshold of 3 dBA (see subsection 13.3.1 of the EIR), so the cumulative impact to which the project would contribute is considered ***less than significant***.

Mitigation. No cumulatively considerable contribution to a significant cumulative impact has been identified; no mitigation is required.

17.4.12 Cumulative Historic Resource Impacts

The EIR for the Comprehensive Plan Update found cumulative impacts to cultural resources. Other potential developments in the City could also result in impacts to local historic resources. The PSB project would have a less-than-significant impact on historic resources, as described in chapter 7 (Cultural and Historic Resources) of this EIR. Therefore, the proposed PSB project would not make a cumulative considerable contribution to a potential significant cumulative impact on historic resources. The impact would be ***less than significant.***

Mitigation. No cumulatively considerable contribution to a significant cumulative impact has been identified; no mitigation is required.

17.4.13 Cumulative Archaeological/Paleontological/Tribal Cultural Resource Impacts

The proposed project in combination with other future, citywide, cumulative development under the Comprehensive Plan would increase potential archaeological/paleontological/tribal cultural resource impacts. Other development projects would be required to implement mitigation measures imposing the same or similar requirements as the proposed project's Mitigation 7-1 and Mitigation 7-2. Implementation of this measure would reduce the cumulative impact on archaeological/paleontological resources to a ***less-than-significant*** level.

Mitigation. No cumulatively considerable contribution to a significant cumulative impact has been identified; no mitigation is required.

17.4.14 Cumulative Geology and Soils Impacts

The proposed project's impacts with respect to geology and soils would be site-specific and would not combine with the equally site-specific geology or soils impacts of other projects. The EIR for the Comprehensive Plan Update did not find cumulative impacts with regard to geology and soils. Although it might be possible for two adjacent improperly constructed projects to cumulatively affect a third facility (e.g., an underground utility line), the implementation of adopted and uniformly applicable City regulations, as well as goals and policies from the Comprehensive Plan, would not permit such improper construction.

Mitigation. No cumulatively considerable contribution to a significant cumulative impact has been identified; no mitigation is required.

17.5 EFFECTS FOUND NOT TO BE SIGNIFICANT

Section 15128 of the CEQA Guidelines requires that the EIR "contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR." This EIR discusses all of the environmental topic areas included in CEQA Guidelines Appendix G (Environmental Checklist Form), with the potential significance of each impact evaluated in the appropriate EIR chapter (e.g., chapter 4 - Aesthetics, chapter 5 – Air Quality, etc.), with the exception of the following environmental topics, which do not require their own EIR chapter because there were no potentially significant environmental impacts associated with the environmental topic upon completion of the Initial Study:

- ***Agricultural Resources (item II in CEQA Appendix G):*** No agricultural uses are located on the project site or in the vicinity. According to the Department of Conservation Farmland Mapping and Monitoring Program, the project site is designated “Urban and Built Up Land.” No portion of the project site or vicinity is zoned for agricultural use, nor is any portion of the area under a Williamson Act contract. Likewise, there are no lands in the project vicinity planned, used, or managed for forestry. Therefore, the proposed project would not result in any impact on agricultural or forestry resources.

- ***Mineral Resources (item XI in CEQA Appendix G):*** The California Geological Survey identifies no locally important mineral resources in Palo Alto. Therefore, the proposed project would not result in any impact on mineral resources.

- ***Population and Housing (item XIII in CEQA Appendix G):*** The proposed PSB project would relocate and expand space for the City’s Police Department, Fire Administration, Emergency Services, and Emergency Operations Center, as well as provide a new public parking garage, on a site now used as public surface parking. The project would not induce substantial population or housing growth, displace any housing, or create a substantial employed residents-jobs imbalance.

- ***Recreation (item XV in CEQA Appendix G):*** The proposed PSB project would relocate and expand space available for police and emergency services for the City. Since the proposed project would not increase residential uses, it is not expected to noticeably increase use of existing neighborhood or regional parks. Therefore, the proposed project would result in no impact on recreation.

18. ALTERNATIVES TO THE PROPOSED PROJECT

This chapter summarizes the alternatives to the proposed project. Section 15126.6 of the CEQA Guidelines requires an EIR to "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives.” The section also states that the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if those alternatives would impede to some degree the attainment of the basic project objectives, or would be more costly.

Pursuant to section 15126.6, this chapter describes three alternatives to the Palo Alto Public Service Building and Parking Garage project and compares their impacts to those of the proposed project. Pursuant to the CEQA Guidelines, the ability of the alternatives to meet the project objectives is also described, and the “environmentally superior” alternative among the alternatives analyzed is identified. Also, the chapter discusses an alternative project location, pursuant to CEQA Guidelines section 15126.6, and concludes that the possibility of locating the proposed project on an alternative site that would avoid or substantially lessen potentially significant environmental impacts, while attaining most of the project objectives, is remote. Therefore, an alternative project location is discussed in this chapter (section 18.4) but is not included in the alternatives’ comparisons (e.g., Tables 18-1 and 18-2).

Under CEQA, the analysis of alternatives needs only to evaluate how an alternative could avoid or reduce significant impacts. Environmental impacts identified as “less-than-significant” do not require mitigation and, therefore, do not need to be further reduced under the analysis of alternatives. Similarly, potentially significant impacts that would be reduced to less-than-significant levels after mitigation could require less mitigation under an alternative. For a more thorough comparison, however, the evaluation below includes all 13 impact categories included in this EIR (aesthetics, air quality, biological resources, etc.).

Based on CEQA criteria, all the potential environmental impacts evaluated in this EIR have been determined to be either less than significant or less than significant after mitigation..

In accordance with CEQA Guidelines section 15126.6(a), this EIR does not evaluate every conceivable alternative. A feasible range of alternatives that will allow decision-makers to make a reasoned choice and that meet most of the project objectives has been evaluated. Also, the Lead Agency may choose to adopt a combination of the alternatives described below.

In this EIR, these objectives are referred to under the CEQA term “basic project objectives” (CEQA Guidelines section 15124[b]). These same objectives are also listed in chapter 3, section 3.3 (Basic Project Objectives) of this EIR, with more detail provided.

The project objectives, as identified by the City of Palo Alto, are described below. These objectives are displayed in this chapter to help compare project alternatives.

1. To locate and operate the City's Police Department, Office of Emergency Services, Emergency Operations Center, Emergency Communications (911 Dispatch) Center, and Fire Administration Division in one centralized facility that is adequately sized to meet the programmatic needs of these public safety functions.

2. To locate the City's Police Department, Office of Emergency Services, Emergency Operations Center, Emergency Communications (911 Dispatch) Center, and Fire Administration Division operations within a facility that meets the standards of an essential services facility to substantially increase the probability of maintaining operation after a major earthquake, natural disaster, or other substantial disruption or disaster.

3. To provide more parking in the California Avenue area of Palo Alto.

4. Ensure that project construction proceeds in a manner that would minimize disruption of existing parking for current users of the surface parking lots on the project site.

The proposed California Avenue Parking Garage and PSB will require amendments to the City of Palo Alto Municipal Code (PAMC) to revise the Public Facilities (PF) zone parking and development standards to allow encroachments into the Minimum Setbacks, and a public parking garage that would exceed Maximum Floor Area Ratio (FAR), Maximum Site Coverage, and Maximum Height (including within 150 feet of a residential district) in the Public Facilities zone. The PAMC currently limits the PSB monopole height to 65 feet; therefore, the proposed monopole, at 135 feet, would exceed City height restrictions. The same PF zone regulations being processed for the public parking garage include zoning text changes to allow for the planned monopole and alley setback encroachment by the PSB. Table 18-1 introduces a comparison of these amendments among the alternatives, including the alternatives' effects on neighborhood character and walkability; the table accompanies the text under the "(i) Land Use and Planning" heading for each alternative.

Table 18-1
ALTERNATIVES COMPARISON

Alternative	**PAMC amendments required for Land Use Consistency?**	**Enhances neighborhood character and walkability?**
Palo Alto PSB Project	*Yes – for garage, PSB monopole, and PSB alley setback encroachment*	*Yes - with plaza and streetscape improvements*
Alternative 1: No Project	No	No - but retains all 11 protected/designated trees on-site
Alternative 2: PSB as Proposed, Smaller Parking Garage on Lot C-7	Yes – only for PSB monopole and alley setback encroachment	Yes- with plaza and streetscape improvements, plus retains 3 of 11 protected/designated trees on-site
Alternative 3: Renovation and Expansion of 275 Forest Avenue, Smaller Parking Garage on Lot C-7	No	Yes – with streetscape improvements only along parking garage. Saves all 11 protected/designated trees on Lots C-6 and C-7

18.1 ALTERNATIVE 1: NO PROJECT - EXISTING PARKING LOTS REMAIN AT 250 AND 350 SHERMAN AVENUE

18.1.1 Alternative 1 Characteristics

CEQA Guidelines section 15126.6(e)(1) requires that one project alternative to be analyzed is the No Project alternative. Under Alternative 1 (No Project), there would be no change in the current location or size of the Palo Alto Police Department building. There would be no development on the parking lots at 250 and 350 Sherman Avenue. The Police Department, Emergency Operations Center (EOC) and Emergency Communications Center (911) would remain at the Police Department building, and Fire Administration would remain at 250 Hamilton Avenue, both at the Palo Alto Civic Center. The current 25,000 square-foot Police Department facility was constructed in 1970 and would remain too small by approximately 20,000 square feet to allow other public safety operations such as the Office of Emergency Services and Fire Administration to be located in the same building. The current Police Department facility would continue to not meet current seismic, security, survivability, accessibility, and regulatory code requirements applicable to an “essential services facility” under State law.

18.1.2 Comparative Impacts and Mitigating Effects

The No Project Alternative would not result in any significant unavoidable environmental impacts, nor would it result in any potentially significant impacts, as defined by CEQA. However, the No Project alternative would potentially affect the ongoing operation of public services, particularly public safety, in the City of Palo Alto in the event of a significant earthquake or other natural disaster because staff performing these critical services would remain in a building that does not meet current requirements for an essential services facility.

(a) Aesthetics. The No Project alternative would have fewer impacts on aesthetic and visual resources compared with the proposed PSB project. The No Project alternative would not result in enhanced visual character, identity, and cohesion at the 250 and 350 Sherman Avenue location, which is currently two surface parking lots; however, the alternative would result in fewer visual intrusions resulting from the new buildings and the monopole, as well as fewer lighting and shadow effects.

(b) Air Quality. The No Project alternative would result in lower air pollutant emissions compared to proposed project since no development of the PSB and parking garage would occur, resulting in no new construction (i.e., short-term emissions) and no additional vehicle trips (the predominant source of operational emissions).

(c) Biological Resources. With no development under the No Project alternative, there would be no potential for disturbance of nesting birds during construction and no existing trees removed from the project site. Compared to the proposed project, impacts on biological resources would be less under the No Project alternative.

(d) Cultural and Historic Resources. Because it would involve no new development, the No Project alternative would have fewer potential physical impacts on cultural and historical resources compared to the proposed PSB project.

(e) Geology and Soils. Under the No Project alternative, no new development would occur at the project site. The project site would not be occupied by employees on a continual basis. Therefore, there would be less risk associated with the exposure of people to earthquakes, liquefaction, and other geologic hazards. As a result, impacts associated with geology and soils would be less under the No Project alternative compared to the proposed project.

(f) Greenhouse Gas Emissions and Energy. The No Project alternative would not result in any new development or new vehicle trips. The No Project alternative would have fewer impacts from GHG emissions and energy compared to the proposed project.

(g) Hazards and Hazardous Materials. Under the No Project alternative, no development of the project site would occur, and there would be no potential exposure to or handling of hazardous materials resulting from on-site soil and groundwater contamination. Therefore, impacts associated with hazards and hazardous materials would be less compared to the proposed project.

(h) Hydrology and Water Quality. The proposed project would include on-site storm water treatment such as rain gardens, resulting in improved water quality compared to the No Project alternative.

(i) Land Use and Planning. The proposed PSB and parking garage would require amendments to the City of Palo Alto Municipal Code (PAMC) Title 18 (Zoning), Chapter 18.28 (Special Purpose [PF, OS and AC] Districts), Sections 18.28.050, 18.28.060, and 18.28.090 to revise the Public Facilities (PF) zone parking and development standards to allow encroachments into the Minimum Setbacks (front, rear, interior side, and street side setbacks), and a public parking garage that would exceed Maximum Floor Area Ratio (FAR), Maximum Site Coverage, and Maximum Height (including within 150 feet of a residential district) in the Public Facilities zone. Also, the PAMC currently limits the monopole height to 65 feet; therefore, the proposed monopole, at 135 feet, would exceed City height restrictions. The same PF zone regulations being processed for the public parking garage include zoning text changes to allow for the planned monopole and alley setback encroachment by the PSB. The No Project alternative would not involve new development and therefore would not require any of these amendments. However, the No Project alternative would not provide the beneficial pedestrian and neighborhood amenities and connections provided by the PSB project.

(j) Noise. No development would occur under the No Project alternative. Construction and operational noise (including from new vehicle trips) would increase under the proposed project. Therefore, the No Project alternative would have fewer noise impacts compared to the proposed project.

(k) Public Services. Compared to the proposed project, the No Project alternative would result in fewer impacts on police and fire protection/emergency service because the *construction* impacts of the new PSB project would not occur (the CEQA criterion for public services is specific to construction). However, the benefits of a new PSB and additional public parking would not occur. The No Project alternative would potentially affect the ongoing operation of public services, particularly public safety, in the City of Palo Alto in the event of a significant earthquake or other natural disaster because staff performing these critical services would remain in a building that does not meet current requirements for an essential services facility.

(l) Transportation, Traffic, and Parking. Under the No Project alternative, no new trip generation and traffic impacts from new development would occur. However, the No Project alternative would not implement the improvements proposed by the project for pedestrian spaces and streetscapes. Overall, the No Project alternative would result in fewer impacts on traffic and circulation compared to the No Project alternative.

(m) Utilities and Service Systems. The No Project alternative would not result in new water demand, wastewater generation, and solid waste generation compared to the proposed project. Therefore, impacts would be less under the No Project alternative.

18.1.3 Attainment of Basic Project Objectives

This alternative would not achieve the first three project objectives (see beginning of this chapter for a complete description). The fourth project objective, to schedule construction to avoid parking disruption, would be inapplicable.

18.2 ALTERNATIVE 2: PSB AS PROPOSED, SMALLER PARKING GARAGE ON LOT C-7

18.2.1 Alternative 2 Characteristics

This alternative would include the PSB as proposed (e.g., 45,000 to 50,000 square feet), but the public parking garage on Lot C-7 would be reduced from the proposed 636 spaces to 300 spaces. This reduction is assumed to result in the following: (1) the parking garage would be three levels above grade and one level below grade (approximately 40 feet in height), instead of four levels above grade and two levels below grade (approximately 49 feet in height); and (2) a redesign of the parking garage would retain three (3) of the eleven (11) protected/designated trees proposed to be removed for the PSB project. The parking garage total of 300 spaces for this alternative is based on a City Council approved 2014 Infrastructure Plan; the total approximates the number of existing spaces on the two surface parking lots that comprise the PSB project site.

18.2.2 Comparative Impacts and Mitigating Effects

Similar to the proposed PSB project, Alternative 2 would not result in any significant unavoidable environmental impacts, and all potentially significant impacts could be reduced to less than significant after mitigation. The City would receive the benefits of locating and operating the Police Department, Office of Emergency Services, Emergency Operations Center, Emergency Communications Center, and Fire Administration Division in one centralized facility.

(a) Aesthetics. Alternative 2 would have fewer impacts on aesthetic and visual resources compared with the proposed PSB project. Similar to the proposed PSB project, this alternative would result in enhanced visual character, identity, and cohesion at the 250 and 350 Sherman Avenue location, which is currently two surface parking lots. The smaller parking garage also would result in fewer visual intrusions, as well as fewer lighting and shadow effects.

(b) Air Quality. This alternative would result in fewer construction air pollutant emissions and similar operational emissions compared to proposed project. However, daily emissions of operational criteria pollutants would still be beneath limits established by BAAQMD.

(c) Biological Resources. Alternative 2 would retain three (3) of the eleven (11) protected/ designated trees proposed to be removed for the PSB project. Therefore, impacts on biological resources would be less compared to the proposed project.

(d) Cultural and Historic Resources. Alternative 2 would have the same amount of ground disturbance as the proposed project. Therefore, potential impacts on cultural and historic resources would be similar compared to the proposed project.

(e) Geology and Soils. Alternative 2 would still need to comply with the California Building Code, City of Palo Alto Municipal Code, and any other requirements related to geology and soils, including recommendations included in the geotechnical investigations for the project. Because the parking garage in Alternative 2 would have only one level below grade instead of two, impacts on geology and soils are considered less compared to the proposed project.

(f) Greenhouse Gas Emissions and Energy. Alternative 2 would result in a similar amount of GHG emissions and energy use. GHG emissions would still be within annual limits established by BAAQMD.

(g) Hazards and Hazardous Materials. This alternative would still need to comply with all federal, State, and local regulations pertaining to handling, transport, and disposal of hazardous materials, both during construction and operation. Because the parking garage in Alternative 2 would have only one level instead of two below grade instead (where existing contaminated soils and groundwater are located), impacts associated with hazards and hazardous materials are considered less compared to the proposed project.

(h) Hydrology and Water Quality. Alternative 2 would still include on-site storm water treatment, including rain gardens. Impacts on hydrology and water quality would be similar compared to the proposed project.

(i) Land Use and Planning. The proposed PSB and parking garage would require amendments to the City of Palo Alto Municipal Code (PAMC) Title 18 (Zoning), Chapter 18.28 (Special Purpose [PF, OS and AC] Districts), Sections 18.28.050, 18.28.060, and 18.28.090 to revise the Public Facilities (PF) zone parking and development standards to allow encroachments into the Minimum Setbacks (front, rear, interior side, and street side setbacks), and a public parking garage that would exceed Maximum Floor Area Ratio (FAR), Maximum Site Coverage, and Maximum Height (including within 150 feet of a residential district) in the Public Facilities zone, while increasing pedestrian and neighborhood amenities and connections compared to the proposed project. Also, the PAMC currently limits the monopole height to 65 feet; therefore, the proposed monopole, at 135 feet, would exceed City height restrictions. The same PF zone regulations being processed for the public parking garage include zoning text changes to allow for the planned monopole and alley setback encroachment by the PSB. Alternative 2 would reduce the parking garage height and massing, and is assumed to not require any of the garage-related zoning amendments. Therefore, Alternative 2 would have fewer impacts related on land use and planning compared to the proposed project.

(j) Noise. Alternative 2 would result in the same number of vehicle trips as the proposed project, so traffic noise would be similar. However, construction noise would be reduced because the parking garage would be smaller. Therefore, Alternative 2 would have fewer noise impacts compared to the proposed project.

(k) Public Services. Compared to the proposed project, Alternative 2 would result in similar impacts on police and fire protection/emergency service because the *construction* impacts of the new PSB component of the project would be the same (the CEQA criterion for public services is specific to construction). The benefits of a new PSB still would occur. Therefore, under Alternative 2, impacts on public services would be comparable to the proposed project.

(l) Transportation, Traffic, and Parking. Under Alternative 2, the same number of PSB-generated vehicle trips would occur. Although this alternative would include a smaller public parking garage, it would replace the parking spaces lost by construction of the proposed PSB project. Therefore, the impact of Alternative 2 on transportation, traffic, and parking is considered similar to the proposed project.

(m) Utilities and Service Systems. With the same PSB component under Alternative 2, similar water demand, wastewater generation, and solid waste disposal needs would result compared to the proposed project.

18.2.3 Attainment of Basic Project Objectives

This alternative would fully achieve three of the four basic project objectives (see beginning of this chapter for a complete description):

- Locate and operate the City's Police Department, Office of Emergency Services, Emergency Operations Center, Emergency Communications Center, and Fire Administration Division in a centralized, adequately sized facility.
- Construct a facility that meets the standards of an essential services facility.
- Ensure that project construction proceeds in a manner that would minimize disruption of existing parking.

Alternative 2 would not meet the objective of providing more parking spaces in the California Avenue area of Palo Alto. The alternative would replace the same amount of parking that currently exists.

18.3 ALTERNATIVE 3: RENOVATION AND EXPANSION OF 275 FOREST AVENUE, SMALLER PARKING GARAGE ON LOT C-7

Similar to the proposed PSB project, Alternative 3 would not result in any significant unavoidable environmental impacts, and all potentially significant impacts could be reduced to less than significant after mitigation. The City would receive the benefits of locating and operating the Police Department, Office of Emergency Services, Emergency Operations Center, Emergency Communications Center, and Fire Administration Division in one centralized facility, but, based on the feasibility study prepared by Hohbach-Lewin Structural Engineers to renovate and expand the existing Police Department building at 275 Forest Avenue at the Palo Alto Civic Center (Feasibility Study: Palo Alto Public Safety Building, 275 Forest Avenue, Palo Alto, CA; Hohbach-Lewin, Inc., Structural Engineers; May 18, 2010), the design would not be expected to be as integrated and efficient as the proposed PSB.

18.3.1 Alternative 3 Characteristics

This alternative would revisit and revise the feasibility study prepared by Hohbach-Lewin Structural Engineers to renovate and expand the existing Police Department building at 275 Forest Avenue at the Palo Alto Civic Center (Feasibility Study: Palo Alto Public Safety Building, 275 Forest Avenue, Palo Alto, CA; Hohbach-Lewin, Inc., Structural Engineers; May 18, 2010).The study evaluated eight options, which included: (A) an essential services building within the existing Police Department building with new off-site buildings for the EOC and 911 dispatch facility, plus improvements to the 2nd floor and entire A-level under the Civic Center tower; (B) an essential services building with all functions on-site in the existing Civic Center, with improvements to the 2nd floor, plus expansion into the Council Chambers and entire A-level under the Civic Center tower; and (C) an essential services building within the existing Police Department building with a one- or two-story expansion at the Civic Center, Forest Avenue or Downtown Library sites. This alternative would include one of these options – remain in place with renovation and expansion at the Civic Center – for the PSB component of the project. In addition for this alternative, a public parking garage would be constructed on Lot C-7 on Sherman Avenue, but its size would be reduced from the project-proposed 636 spaces to 300 spaces. Similar to Alternative 2, this garage reduction is assumed to result in the following: (1) the garage would be three levels above grade and one level below grade (approximately 40 feet in height), instead of four levels above grade and two levels below grade (approximately 49 feet in height); and (2) a redesign of the parking garage would retain the three (3) protected/ designated trees proposed to be removed for the parking garage component of the PSB project. The parking garage total of 300 spaces for this alternative is based on a City Council approved 2014 Infrastructure Plan; the total approximates the number of existing spaces on the two surface parking lots that comprise the PSB project site.

Because Alternative 3 would not construct a new PSB on Sherman Avenue, the eight (8) protected/designated trees on Lot C-6 also would be retained.

The Feasibility Study was presented to the City Council in June 2010. No renovation or expansion has been undertaken at 275 Forest Avenue subsequent to the 2010 Feasibility Study. The study and the Police Department identified operational issues with the options evaluated in the study related to the following topics: public parking loss at the Civic Center garage (up to 96 spaces); ADA accessibility; City department relocation (e.g., print shop, central filing room, mail room, cafeteria); police operations split onto different levels; functional inefficiency; floor-to-floor heights; insufficient floor space; seismic upgrading and performance; temporary relocation of police services; loss of space at Civic Center for other functions; blast vulnerability; and space allocation. However, for the purposes of this EIR alternatives evaluation, Alternative 3 assumes that these issues could be resolved.

18.3.2 Comparative Impacts and Mitigating Effects

(a) Aesthetics. Overall, Alternative 3 would have fewer impacts on aesthetic and visual resources compared with the proposed PSB project. Similar to the proposed PSB project, this alternative - with high-quality, contextual design - would be expected to result in enhanced visual character, identity, and cohesion, but at the Civic Center location. The smaller parking garage, and no PSB, on Sherman Avenue would result in fewer visual intrusions, as well as fewer lighting and shadow effects at that location.

(b) Air Quality. This alternative would result in fewer construction air pollutant emissions and similar operational emissions compared to proposed project. However, daily emissions of operational criteria pollutants would still be beneath limits established by BAAQMD.

(c) Biological Resources. Alternative 3 would retain all eleven (11) protected/designated trees proposed to be removed for the PSB project. Impacts on biological resources would be less compared to the proposed project.

(d) Cultural and Historic Resources. Alternative 3 would involve less ground disturbance than the proposed project. Therefore, potential impacts on cultural and historic resources would be less compared to the proposed project.

(e) Geology and Soils. Alternative 3 would still need to comply with the California Building Code, City of Palo Alto Municipal Code, and any other requirements related to geology and soils, including recommendations included in the geotechnical investigations that would be required for the renovation and expansion. Because the parking garage in Alternative 3 would have only one level below grade instead of two, impacts on geology and soils are considered less compared to the proposed project.

(f) Greenhouse Gas Emissions and Energy. Alternative 3 would result in a similar amount of GHG emissions and energy use. GHG emissions would still be within annual limits established by BAAQMD.

(g) Hazards and Hazardous Materials. This alternative would still need to comply with all federal, State, and local regulations pertaining to handling, transport, and disposal of hazardous materials, both during construction and operation. Because the parking garage in Alternative 3 would have only one level instead of two below grade instead (where existing contaminated soils and groundwater are located), impacts associated with hazards and hazardous materials are considered less compared to the proposed project.

(h) Hydrology and Water Quality. Alternative 3 would be expected to include on-site storm water treatment similar to the proposed project. Therefore, impacts on hydrology and water quality would be similar compared to the proposed project.

(i) Land Use and Planning. The proposed PSB and parking garage would require amendments to the City of Palo Alto Municipal Code (PAMC) Title 18 (Zoning), Chapter 18.28 (Special Purpose [PF, OS and AC] Districts), Sections 18.28.050, 18.28.060, and 18.28.090 to revise the Public Facilities (PF) zone parking and development standards to allow encroachments into the Minimum Setbacks (front, rear, interior side, and street side setbacks), and a public parking garage that would exceed Maximum Floor Area Ratio (FAR), Maximum Site Coverage, and Maximum Height (including within 150 feet of a residential district) in the Public Facilities zone, while increasing pedestrian and neighborhood amenities and connections compared to the proposed project. Also, the PAMC currently limits the monopole height to 65 feet; therefore, the proposed monopole, at 135 feet, would exceed City height restrictions. The same PF zone regulations being processed for the public parking garage include zoning text changes to allow for the planned monopole and alley setback encroachment by the PSB. Alternative 3 would reduce the Sherman Avenue parking garage height and massing, and is assumed to not require any of the garage-related zoning amendments. The Civic Center renovation and expansion might require zoning amendments. Alternative 3 would have fewer impacts related on land use and planning compared to the proposed project.

(j) Noise. Alternative 3 is expected to result in the same number of vehicle trips as the proposed project, so additional traffic noise would be similar, except it would be near the Civic Center location. At the Sherman Avenue parking garage location, construction noise would be reduced because the parking garage would be smaller. Therefore, Alternative 3 would have fewer noise impacts compared to the proposed project.

(k) Public Services. Compared to the proposed project, Alternative 3 would result in fewer impacts on police and fire protection/emergency service because the *construction* impacts of the new PSB project would be reduced (the CEQA criterion for public services is specific to construction). The benefits of a new PSB still would occur, assuming the operational issues identified by the Police Department and in the Feasibility Study are resolved. Therefore, under Alternative 3, impacts on public services would be less compared to the proposed project.

(l) Transportation, Traffic, and Parking. Under Alternative 3, the same number of PSB-generated vehicle trips would occur. This alternative would include a smaller public parking garage on Lot C-7, but it would retain surface Lot C-6. Therefore, the impact of Alternative 3 on transportation, traffic, and parking is considered similar to the proposed project.

(m) Utilities and Service Systems. With similar PSB components under Alternative 3, similar water demand, wastewater generation, and solid waste disposal needs would result compared to the proposed project.

18.3.3 Attainment of Basic Project Objectives

This alternative would partially achieve three of the four basic project objectives and fully meet one objective (see beginning of this chapter for a complete description):

- Locate and operate the City's Police Department, Office of Emergency Services, Emergency Operations Center, Emergency Communications Center, and Fire Administration Division in a centralized, adequately size facility. *(The City would receive the benefits of locating and operating the Police Department, Office of Emergency Services, Emergency Operations Center, Emergency Communications Center, and Fire Administration Division in one centralized facility, but, based on the Feasibility Study, the design would not be expected to be as integrated and efficient as the proposed PSB.)*

- Construct a facility that meets the standards of an essential services facility. *(The Feasibility Study identified potential structural issues under renovation and expansion which would not occur with construction of a new PSB.)*

- Ensure that project construction proceeds in a manner that would minimize disruption of existing parking. *(There might be street closures between the existing Police Department facility and library during construction of this alternative.)*

Alternative 3 would meet the objective of providing more parking spaces in the California Avenue area of Palo Alto, by adding approximately 148 net new public parking spaces to Lot C-7 while maintaining Lot C-6 as a surface parking lot.

18.4 ALTERNATIVE 4: ALTERNATIVE PROJECT LOCATION

18.4.1 Description of Alternative

Section 15126.6 of the CEQA Guidelines indicates that the EIR evaluation of alternatives may include alternatives to the project's proposed location. CEQA Guidelines section 15126.6(f)(2)(A) states, "[T]he key question and first step in the analysis is whether any of the significant effects of the project would be avoided or substantially lessened by putting the project in another location. Only locations that would avoid or substantially lessen any of the significant effects of the project need to be considered for inclusion in the EIR."

Twenty-two locations were considered for a new PSB before selecting 250 and 350 Sherman Avenue as the proposed project site. From 1999 to 2000, extensive site assessments were conducted for potential new locations for a public safety building (PSB) at Park Boulevard, California Avenue, Page Mill/El Camino Real, the Downtown Library, and the existing location at 275 Forest Avenue. In 2005, the City Council appointed a community-based Blue Ribbon Task Force (BRTF) to evaluate the need, size, cost, and site location for a new PSB. In 2006, the BRTF concluded the most cost-effective means of upgrading and modernizing the PSB would be to construct a new building with a minimum size of 49,600 square feet, and the most feasible location identified at that time was the site at 2747 and 2785 Park Boulevard. In 2007, the City Council certified an EIR for a PSB project at this location. In that EIR, five alternatives were considered, including one that evaluated three alternative sites, among them the site at 250 and 350 Sherman Avenue; the Park Boulevard location was deemed the most centrally located, least physically complex and encumbered, and most amenable to a timely construction schedule. At the time the City Council certified the 2007 EIR, it also approved a purchase option agreement to acquire the 2785 Park Boulevard property. However, in 2009, the City terminated the purchase option agreements for the two sites, and the sites were purchased by the Jay Paul Company in 2013. A new development project is currently under construction on one of the sites, rendering development of this site as a PSB and public garage infeasible.

At a May 6, 2015 study session, City staff presented three City-owned candidate sites to the City Council. Based on feedback from the Council, the 250 Sherman Avenue location was the only one that met the City Council's siting criteria; the other two candidate sites were located in the tidal flood zone and could be subject to seismic liquefaction. Subsequently, the City entered into an agreement with RossDrulisCusenbery Architecture (RDC) to verify programming requirements for the PSB building and conduct a detailed site evaluation of the current project site on Sherman Avenue (Palo Alto Public Safety Building Site Evaluation Study; December 14, 2015). The Sherman Avenue site can accommodate the program requirements of the proposed PSB while increasing public parking in the California Avenue business district.

In addition, the CEQA Guidelines note that alternatives evaluated in an EIR should be selected based on their ability to avoid or substantially lessen any of the significant impacts of the proposed project. Even if an alternative location for the PSB project could implement the basic project objectives, only those locations that would avoid or substantially lessen significant impacts need to be considered in the EIR. In the case of identified significant impacts under the proposed PSB project: (1) feasible mitigation measures are available to reduce all impacts to less-than-significant levels; and (2) transferring the potentially significant impacts to an alternative location still could similarly affect the environment.

Another site considered as an alternative location was 3045 Park Boulevard, which is approximately 0.4-mile southeast of the proposed Sherman Avenue project site. This site had not been evaluated in the past as part of any of the evaluations described above, but had been considered in 2013 when the Jay Paul Company offered to construct a PSB at this site as a public benefit in connection with the permitting of a large office development within and adjacent to the California Avenue Business District. The offer was subsequently withdrawn, and there is currently a pending office development application for 3045 Park Boulevard. When the site was under consideration, however, the Department of Public Works and the Police Department evaluated 3045 Park Boulevard and determined there were some geographical features that made the site less desirable based on the specific program and operational needs of an essential services facility, including:

- The site has access to only one street frontage, which makes the site more vulnerable in a situation where Park Boulevard is blocked.
- The site is directly adjacent to the Caltrain right-of-way, which makes the site vulnerable to incidents on the rail line (e.g., hazardous freight spills or explosions).
- An apartment complex is directly adjacent at 195 Page Mill Road.
- Incidents of flooding in the basement of the adjacent property are most likely the result of heavy surface runoff being blocked and channeled by the adjacent railroad tracks. The potential for flooding to occur at the PSB could impact police operations that would be located in the basement.
- The site is near the high-pressure PG&E gas transmission line that runs along Alma Street.

For the reasons described above, the possibility of locating the proposed PSB project on an alternative site that would avoid or substantially lessen potentially significant environmental impacts identified in this EIR, while attaining most of the project objectives, is remote, and has been eliminated from further detailed consideration. No other suitable site for the PSB has been located. No further environmental analysis of alternative sites is required under CEQA.

18.5 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The CEQA Guidelines section 15126[e][2] states, "If the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives." As defined by CEQA, including recognition that the environmental baseline is “the existing environmental setting” (see section 1.2.2, Impact Assessment Baseline, of this EIR), the No Project alternative is the environmentally superior alternative. Of the identified alternatives other than the No Project alternative, Alternative 2: PSB as Proposed, Smaller Parking Garage on Lot C-7 would result in the least adverse overall environmental impacts, and would therefore be the “environmentally superior alternative.” This conclusion is based on the overall similarity or reduction in the severity of impacts, as well as the attainment of basic project objectives. Table 18-2 provides a simplified comparison of impacts between the alternatives and the proposed PSB project.

Table 18-2
ALTERNATIVES IMPACT COMPARISON TO THE PROPOSED PROJECT

	Alternatives[1]		
Impact Area	Alternative 1: No Project—No Development at 250 and 350 Sherman Avenue	Alternative 2: PSB as Proposed, Smaller Parking Garage on Lot C-7	Alternative 3: Renovation and Expansion of 275 Forest Avenue, Smaller Parking Garage on Lot C-7
(a) Aesthetics	Reduced impacts.	Reduced impacts.	Reduced impacts.
(b) Air Quality	Reduced impacts.	Reduced construction impacts, similar operational impacts.	Reduced construction impacts, similar operational impacts.
(c) Biological Resources	Reduced impacts.	Reduced impacts.	Reduced impacts.
(d) Cultural and Historic Resources	Reduced impacts.	Similar impacts.	Similar impacts.
(e) Geology and Soils	Reduced impacts.	Reduced impacts.	Reduced impacts.
(f) Greenhouse Gas Emissions and Energy	Reduced impacts.	Similar impacts.	Similar impacts.
(g) Hazards and Hazardous Materials	Reduced impacts.	Reduced impacts.	Reduced impacts.
(h) Hydrology and Water Quality	Greater impacts.	Similar impacts.	Similar impacts.
(i) Land Use and Planning	Reduced impacts but no pedestrian improvements.	Reduced impacts.	Reduced impacts.
(j) Noise	Reduced impacts.	Reduced construction impacts, similar operational impacts.	Reduced impacts.
(k) Public Services	Reduced construction impacts but no new PSB.	Similar PSB construction impacts, similar public service benefits.	Reduced construction impacts, similar public service benefits, but potential operational issues.
(l) Transportation, Traffic, and Parking	Reduced impacts but no pedestrian improvements.	Similar impacts.	Similar impacts.
(m) Utilities and Service Systems	Reduced impacts.	Similar impacts.	Similar impacts.
Attainment of Project Objectives	No attainment.	Similar attainment.	Less attainment.

19. MITIGATION MONITORING

19.1 MITIGATION MONITORING REQUIREMENTS

CEQA section 21081.6 of the Public Resources Code requires all public agencies to adopt reporting or monitoring programs when they approve projects subject to environmental impact reports or mitigated negative declarations. A mitigation monitoring program would therefore be required for implementation subsequent to certification of the Palo Alto Public Safety Building and California Avenue Parking Garage EIR. Most of the environmental mitigation needs that have been identified in this EIR would be subject to effective monitoring through the City's standard development review and approval procedures, as well as during associated plan check and field inspection procedures. However, to satisfy CEQA statute section 21081.6 and CEQA Guidelines section 15097 (Mitigation Monitoring and Reporting), a documented record of implementation will be necessary.

19.2 MITIGATION MONITORING CHECKLIST FORMAT

While adoption of a mitigation monitoring program would not occur until this EIR is certified, the mitigation monitoring framework to be followed can be described. The attached checklist format (Table 19-1) includes individual columns for identifying the following, pursuant to CEQA Guidelines section 15097:

19.1.1 Identified Impact

This column would include each identified significant adverse impact as it is described in the EIR summary table (Table 2-1 in EIR chapter 2).

19.1.2 Related Mitigation Measure (Performance Criteria)

This column would include each mitigation measure as it is described in the EIR summary table (Table 2-1 in EIR chapter 2). The description could be supplemented by applicable performance criteria (i.e., the criteria by which the success of the mitigation can be gauged).

19.1.3 Monitoring

This column would describe (1) the "implementation entity" responsible for carrying out each mitigation measure; (2) the "monitoring and verification entity" responsible for performing the monitoring of each mitigation (e.g., a City department, another public agency, or some other entity); and (3) specific implementation timing requirements (e.g., at the completion of a particular future individual project development review or construction phase, prior to individual future development project occupancy, or when some other specific threshold is reached).

19.1.4 Verification

The verification column would provide a space for the signature and date of the "monitoring and verification" entity when a monitoring milestone is reached.

Table 19-1

MITIGATION MONITORING CHECKLIST-- PALO ALTO PUBLIC SAFETY BUILDING AND PARKING GARAGE

The environmental mitigation measures listed in column two below have been incorporated into the conditions of approval for the Palo Alto Public Safety Building and Parking Garage in order to mitigate identified environmental impacts. A completed and signed chart will indicate that each mitigation requirement has been complied with, and that City and state monitoring requirements have been fulfilled with respect to Public Resources Code section 21081.6.

		MONITORING			**VERIFICATION**	
IDENTIFIED IMPACT	**RELATED MITIGATION MEASURE (Performance Criteria)**	**Implementation Entity**	**Monitoring and Verification Entity**	**Timing Requirements**	**Signature**	**Date**
AIR QUALITY						
Impact 5-1.						
BIOLOGICAL RESOURCES						
Impact 6-1.						
CULTURAL AND HISTORIC RESOURCES						
Impact 7-1.						
GEOLOGY AND SOILS						
Impact 8-1.						
HAZARDS AND HAZARDOUS MATERIALS						
Impact 10-1.						
NOISE						
Impact 13-1.						

20. ORGANIZATIONS AND PERSONS CONTACTED

20.1 CITY OF PALO ALTO

Colette Chew, Engineer, City of Palo Alto Public Works, Engineering Services Division
Amy French, Chief Planning Official, City of Palo Alto Planning and Community Environment Department
Matt Raschke, PE, Senior Engineer, City of Palo Alto Public Works, Engineering Services Division

20.2 OTHERS

Meaghan Cavanah, Project Manager, NOVA Partners Incorporated
Mallory Scott Cusenbery, AIA, Principal, RossDrulisCusenbery Architecture, Inc.
Thomas Larson, AIA, Senior Associate, RossDrulisCusenbery Architecture, Inc.
Hans de Roos, Construction Manager, NOVA Partners Incorporated
Michael B. Ross, AIA, Architect, RossDrulisCusenbery Architecture, Inc.

21. APPENDICES

APPENDIX 21.1

NOTICE OF PREPARATION, INITIAL STUDY, AND RESPONSES

City of Palo Alto

Department of Planning & Community Environment

California Environmental Quality Act

NOTICE OF PREPARATION

TO: Responsible Agencies, Trustee Agencies, and Other Interested Parties

FROM: City of Palo Alto
250 Hamilton Avenue
Palo Alto, CA 94301

SUBJECT: Notice of Preparation (NOP) of a Draft Environmental Impact Report (EIR) for a proposed City of Palo Alto Public Safety Building at 250 Sherman and Parking Structure at 350 Sherman Avenue (AKA California Avenue Parking Garage).

The City of Palo Alto will be the lead agency under the California Environmental Quality Act (CEQA) and will prepare a project EIR for the proposed project, identified below.

AGENCIES: The City of Palo Alto requests that public agencies provide comments regarding the scope and content of the EIR as it relates to an agency's statutory responsibilities in connection with the proposed project in accordance with California Code of Regulation, Title 14, Section 15082(b), if the agency will need to use the EIR prepared by the City of Palo Alto when considering any permit or other approval for the project.

ORGANIZATION AND INTERESTED PARTIES: The City of Palo Alto requests comments and concerns from organizations and interested parties regarding the environmental issues associated with construction and operation of the proposed project.

PROJECT TITLE: City of Palo Alto Public Safety Building and California Avenue Parking Garage

PROJECT LOCATION: 250 and 350 Sherman Avenue; two City blocks fronting Sherman Avenue on the southeast and bounded by Jacaranda Lane to the northwest, Ash Street to the southwest and Park Boulevard to the northeast, and bisected by Birch Street, within the city of Palo Alto, Santa Clara County, California.

PROJECT DESCRIPTION: The City of Palo Alto (City/project applicant) proposes to relocate the City's Police Department, Fire Administration, Emergency Communications Center (911), Office of Emergency Services, Emergency Operations Center (EOC), and associated parking and other support spaces from their current downtown location at the Palo Alto Civic Center at 275 Forest Avenue, Palo Alto, California, to 250 Sherman Avenue in a new adequately sized Public Safety Building (PSB) facility designed to meet the operational and essential facility standards for police and emergency service providers. The City also proposes to construct a new public

parking garage at 350 Sherman Avenue to provide a net increase of 150 to 330 public parking stalls for the California Avenue commercial area.
The project site includes two City-owned surface parking lots designated as Lot C-6 and Lot C-7 on Sherman Avenue between Jacaranda Lane, Ash Street and Park Boulevard in the California Avenue commercial area in Palo Alto.

The construction of the PSB on the 1.2-acre Lot C-6 (at 250 Sherman Avenue) will displace approximately 160 existing public parking stalls. Redevelopment of the adjoining 0.93-acre surface parking Lot C-7 (at 350 Sherman Avenue) for a new parking garage will displace approximately 150 existing parking stalls and will contain 460 to 640 stalls (an increase in the number of parking spaces on-site). The construction of the 350 Sherman garage must be complete prior to the start of construction of the new PSB, in order to minimize construction disruption to the neighborhood and loss of parking to local merchants.

The Project includes three primary elements:

- A new three-story PSB ranging in size from 45,500 square feet (SF) to 50,000 SF, over two levels of secure basement parking providing approximately 170 to 190 total secure parking spaces at 250 Sherman Avenue (Lot C-6), and associated site improvements.
- A new three- to four-level public parking garage over one to two basement parking levels, providing approximately 460 to 640 spaces at 350 Sherman Avenue (Lot C-7), and associated site improvements.
- An approximately 4,200 SF to 4,700 SF multi- or single-tenant commercial shell space building fronting Birch Street, to be used as commercial retail space for new or existing businesses. This retail component is an option that would accompany the public parking garage of 460 to 640 spaces at 350 Sherman Avenue. Without the retail component, the parking garage would accommodate 522 to 640 parking spaces.

Further details about the project design are included in the Initial Study, which is available for review at the City of Palo Alto website: http://www.cityofpaloalto.org/planningprojects
The two blocks that comprise the site are both zoned as Public Facilities (PF) and are located in the California Avenue Business District. The Comprehensive Plan land use designation of the PSB project site is Public Facilities (PF). The parking garage site's Comprehensive Plan land use designation is Community Commercial.

Implementation of the proposed project will require approval from the City Council. As currently planned, the proposed parking garage will require changes to the zoning district (from Public Facilities to another zone) or changes to the text of the zoning ordinance to allow for the planned lot coverage, Floor Area Ratio (FAR), height, and setbacks in the Public Facilities zone.

POTENTIAL ENVIRONMENTAL EFFECTS: The following areas of potentially significant environmental impact will be analyzed in the Draft EIR: Aesthetics, Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Noise, Public Services, Transportation/Traffic, Utilities and Service Systems, and Energy. Potential cumulative impacts and alternatives, including the No Project Alternative, will be evaluated. An Initial Study evaluating the project's environmental effects in other resource areas is available for review at the City of Palo Alto website, as noted above.

SCOPING MEETING: The City of Palo Alto will hold a scoping meeting as part of the Planning and Transportation Commission (PTC)'s regularly scheduled meeting on April 12, 2017. The meeting will start at 6:00 PM and will be held at the City of Palo Alto Council Chambers, located in City Hall at 250 Hamilton Avenue. The meeting agenda will be posted to the City's website: http://www.cityofpaloalto.org/gov/boards/ptc/default.asp.

Interested parties are welcome to attend and present environmental information or concerns that you believe should be addressed in the EIR.

The NOP and related CEQA documents for this project will be available for review on the web. You can view this NOP and the Initial Study electronically at:
http://www.cityofpaloalto.org/planningprojects

If you require additional project information, please contact Matt Raschke, Senior Engineer, Department of Public Works, at Matt.Raschke@cityofpaloalto.org

PUBLIC REVIEW PERIOD: This Notice of Preparation is available for public review and comment pursuant to California Code of Regulations, Title 14, Section 15082(b), for 30 days. The comment period for the NOP begins March 24, 2017 and ends on April 24, 2017. Due to the limits mandated by state law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

RESPONSES AND COMMENTS: Please indicate a contact person for your agency and send your responses and comments to:

Amy French, Chief Planning Official
Planning & Community Environment Department
City of Palo Alto
250 Hamilton Avenue
Palo Alto, California 94301
Telephone: (650) 329-2442
Fax: (650) 329-2154
Email: Amy.French@cityofpaloalto.org

Project Planner

3/22/17
Date

City of Palo Alto

Department of Planning & Community Environment

California Environmental Quality Act

INITIAL STUDY AND ENVIRONMENTAL CHECKLIST FORM

1.	**Project Title:**	City of Palo Alto Public Safety Building (PSB) at 250 Sherman and Parking Structure at 350 Sherman (aka California Avenue Parking Garage)
2.	**Lead Agency Name and Address:**	City of Palo Alto 250 Hamilton Avenue Palo Alto, California 94301
3.	**Contact Person and Phone Number:**	Matt Raschke, Senior Engineer Department of Public Works Telephone: (650) 329-2151 Fax: (650) 329-2154 Email: Matt.Raschke@cityofpaloalto.org
4.	**Project Location:**	250 and 350 Sherman, in the California Avenue Business District, bound by Sherman Avenue to the southeast, Jacaranda Lane to the northwest, Ash Street to the southwest, and Park Boulevard to the northeast, and bisected by Birch Street, within the city of Palo Alto, Santa Clara County, California. See Figures 1 and 2.
5.	**Project Sponsor's Name and Address:**	City of Palo Alto 250 Hamilton Avenue Palo Alto, California 94301
6.	**General Plan Designation:**	350 Sherman: Regional Community Commercial 250 Sherman: Public Facilities
7.	**Zoning:**	350 Sherman: Public Facilities (PF) 250 Sherman: Public Facilities (PF)
8.	**Existing Plan Area Land Uses:**	The project site is comprised of two city blocks fronting Sherman Avenue. Across Sherman Avenue from the proposed PSB is the Santa Clara County Courthouse and parking lot. Properties fronting Ash Avenue between Grant Avenue and Sherman Avenue include multiple-family residential uses and Sarah Wallis Park. Land uses along Park Boulevard from Grant Avenue to Sherman Avenue include office/commercial uses, including several restaurants.

Figure 1. Public Safety Building Site at 250 Sherman Avenue

Figure 2. Parking Garage Site at 350 Sherman Avenue

9. Description of Project:

(a) Proposed Public Safety Building. The City of Palo Alto (City/project applicant) proposes to relocate the City's Police Department, Fire Administration, Emergency Communications Center (911), Office of Emergency Services, Emergency Operations Center (EOC), and associated parking and other support spaces from their current downtown location at the Palo Alto Civic Center at 275 Forest Avenue, Palo Alto, California, to a new adequately sized Public Safety Building (PSB) facility at 250 Sherman Avenue, designed to meet the operational and essential facility standards for police and emergency service providers. The City also proposes to construct a new public parking garage at 350 Sherman Avenue, to provide 150 to 330 net new public parking stalls for the California Avenue commercial area. The construction of the Public Safety Building and adjacent parking garage comprise the project. (It is assumed that space vacated in the civic center will be backfilled with new City employees, and no substantive change in use will occur at that location.)

The project site is comprised of two City-owned surface parking lots designated as Lot C-6 and Lot C-7 on Sherman

Avenue between Ash Street and Park Boulevard in the California Avenue commercial area in Palo Alto. The construction of the PSB on the 1.2-acre Lot C-6 (250 Sherman Avenue) will displace approximately 160 existing public parking spaces. Redevelopment of the adjoining 0.93-acre surface parking Lot C-7 (350 Sherman Avenue) for a new garage will displace approximately 150 existing parking spaces. The new parking garage will contain 460 to 640 stalls to replace and increase the parking spaces on-site, for a net increase of 150 to 330 public parking stalls. The construction of the new public parking garage must be complete prior to the start of construction of the new PSB in order to minimize construction disruption to the neighborhood and loss of parking to local merchants.

The project includes three primary elements:

- A new three-story PSB ranging in size from 45,500 square feet (SF) to 50,000 SF, over two levels of secure basement parking providing approximately 170 to 190 total secure parking spaces on Lot C-6 (250 Sherman Avenue), and associated site improvements.

- A new three- to four-level public parking garage over one to two basement parking levels, providing 460 to 640 spaces on Lot C-7 (350 Sherman Avenue), and associated site improvements.

- An approximately 4,200 SF to 4,700 SF multi- or single-tenant commercial shell space building fronting Birch Street, to be used as commercial retail space for new or existing businesses. This retail component is an option that would accompany a public parking garage of 460 to 640 spaces. Without the retail component, the parking garage would accommodate 522 to 640 parking spaces.

The principal components of the project are listed below.

- **Demolition and Site Preparation:** The existing site improvements on parking Lots C-6 and C-7 will be demolished and removed, including all existing landscaping and trees. Combined, approximately 2.13 acres of existing site improvements will be demolished and removed. Both sites will be excavated to allow for basement construction and all excavation spoils off-hauled and legally disposed of. Additional demolition, patching, and repair under all City streets bounding the project will be required for the potential relocation or connection of the project to City utilities.

- **Public Safety Building (PSB):** The PSB is planned to be a three-story, 45,500 SF to 50,000 SF building, approximately 50 feet tall, over two levels of secure below-grade parking. The PSB will be approximately rectangular in shape with an articulated façade, constructed with an interior light well, and set back from the property line by an approximately 25-foot security standoff distance. Per City zoning guidelines, building equipment penthouse spaces (e.g., for elevators and stairs) may exceed the 50-foot building height limit.

- **Public Safety Building Basement Garage:** The PSB will include an approximately 101,000 SF secure parking basement with 170 to 190 parking spaces for police and staff. In addition to parking of police and staff vehicles, a variety of programmatic functions associated with police operations will also be located in the basement. The PSB basement will be served by two vehicle ramps. The primary two-way ramp will be located on Sherman Avenue, approximately 85 feet to the center of the ramp from the corner of Park Boulevard. The secondary ramp will be located on Birch Street, approximately 136 feet from the corner of Sherman Avenue. Visitor parking for the PSB will be available in the project's new public parking garage across the street from the main entry on Birch Street.

- **Public Safety Building Exterior Operations Yard:** The PSB will include an approximately 10,000 SF to 15,000 SF visually screened, secure exterior vehicle parking and staging area and associated one-story site support buildings. The PSB's emergency generator, chiller plant, and other building systems will be located in an accessory structure(s) at this location.

- **California Avenue Parking Garage:** The approximately 166,200 SF California Avenue Parking Garage will be a three- to four-level parking structure over one to two levels of underground parking, providing an estimated 460 to 640 spaces to replace and increase the approximately 310 parking spaces on-site, for a net increase of

150 to 330 public parking stalls. The overall height of the building will range from approximately 35 to 45 feet including building equipment penthouse spaces (e.g., for elevators and stairs). As currently planned, the garage will require changes to the zoning district (from Public Facilities to another zone) or changes to the text of the zoning ordinance to allow for the planned lot coverage, Floor Area Ratio (FAR), height, and setbacks in the Public Facilities zone. The top level of the garage may include carport shade structures supporting photovoltaic panels (PV) feeding to the PSB's electrical system. The height of the carport support system above the top parking deck will be approximately 8 feet to 10 feet above finish deck. The garage will have one (1) two-way entry/exit onto Sherman Avenue, approximately 90 feet to center of ramp west from the corner of Birch Street.

- **Commercial Shell Space Building:** A new single- or multi-tenant 16-foot to 24-foot tall, 4,200 SF to 4,700 SF single-story commercial building will be located adjacent to the new parking garage fronting Birch Street. This project element will be used as retail space for new or existing businesses to be leased out by the City of Palo Alto. The retail space will be designed to integrate the public garage façade into the commercial fabric of the neighborhood. This retail component is an option that would accompany a public parking garage of 460 to 640 spaces. Without the retail component, the parking garage would accommodate 522 to 640 parking spaces.

- **Communications Tower:** The PSB will include an approximately 135-feet above finish grade communications tower on which will be mounted a mixed array of whip antennas and parabolic antenna dishes. The communications tower may be attached to the PSB or ground mounted.

- **Site Circulation and On-Street Parking:** The PSB and California Avenue Parking Garage lots are bounded on all sides by City streets. There are no anticipated changes in the existing site's vehicular or pedestrian circulation except at Jacaranda Lane. Jacaranda Lane is a service alley located on what will be the north edge of both buildings. Vehicular access to the portion of Jacaranda Lane adjacent to the PSB will be restricted to authorized entry and business owners only. Public parking will be prohibited on a portion of Jacaranda Lane and Sherman Avenue directly adjacent to the PSB. Parking spaces for oversized emergency vehicles, including fire engines, will be provided adjacent to the PSB on Sherman Avenue and Jacaranda Lane.

- **Parking and Deliveries:** All public parking will be located in the new public parking garage. All police vehicle and staff parking will be in the PSB basement or in the surface exterior operations yard. PSB trash pick-up and deliveries will be in the operations yard. Trash pick-up for the garage and commercial building will be in a service apron on Sherman Avenue between those two structures. Authorized small truck deliveries could take place in the PSB basement.

- **Architectural Design:** The project features contemporary architectural design carefully focusing on appropriate site planning, context, massing, scale, style, and materials and finishes, and subject to review and a recommendation by the City of Palo Alto Architectural Review Board (ARB). The City Council will receive the ARB's recommendation and make a final decision on the architectural design of the parking garage, the PSB, and associated landscaping and site improvements.

- **Sustainable LEED Silver or Higher Certified Design:** The PSB portion of the project will be designed and built in conformance with the City's Green Building Policy, which requires LEED Silver or higher, and will be registered and certified with the United States Green Building Council as LEED Silver or higher.

- **Public Plazas:** The project will include a new exterior public plaza including hardscape, street furniture, and landscape plantings on Birch Street in front of the PSB, and a small public plaza space at the parking garage pedestrian entry on Birch Street on the property corner closest to California Avenue.

- **Landscaping:** The City proposes to provide partial replacement of trees removed from the existing lots on-site and planted landscape areas for both sites. Street tree bulb-outs will be provided for tree planting areas along Sherman Avenue in the current parking zone adjacent to the proposed new parking garage. The street-level roof deck of the PSB basement garage will be landscaped. Planted areas on both sites may function as bio-filtration and storm water retention systems for the project.

- **Storm Water:** The project will remain connected to the City's storm drain system and may include a system to capture, store, and reuse rainwater to support landscape irrigation.

- **Water Supply:** Potable water will be provided to the project through the existing City system.

- **Sanitary Sewer:** Sanitary sewer service will be provided through the existing City system.

- **Utilities and Services:** Electricity and natural gas will be provided through the City's grid. Solid waste recycling and trash removal will be provided through City contracted haulers.

(b) Background. The current 25,000 SF Palo Alto Police Department facility was originally constructed in 1970. Numerous City-sponsored studies beginning in 1997, through the City's 2014 City Council Infrastructure Plan, identified and substantiated the need for a new PSB facility. The current facility is undersized by approximately 20,000 SF and does not meet current seismic, security, survivability, accessibility, and regulatory code requirements applicable to an essential facility. A variety of sites were considered for the project over the past 17 years, including renovating and expanding the current police facilities at the City Hall location. None of these options proved feasible or were completed. The project meets the projected long-term facility requirements of the Palo Alto Police Department.

(c) Objectives. The objectives of the project are to provide 150 to 250 new public parking stalls for the California Avenue commercial area and to relocate the City of Palo Alto Police Department, Fire Administration, Emergency Communications Center (911), Office of Emergency Services, and Emergency Operations Center (EOC) from their current downtown Civic Center location at 275 Forest Avenue. The existing facility's size, security, and safety have become increasingly inadequate over the past 47 years. The current facility no longer meets the standards for an essential facility and lacks the necessary redundancy, hardening, and survivability necessary to support the mission of the City of Palo Alto's emergency service providers. The project will provide a new facility designed for Immediate Occupancy (IO) per the California Building Code (CBC).

10. Required Approvals:

The proposed project is within the City's jurisdiction and will require approval from the City Council. As currently planned, the proposed parking garage will require changes to the zoning district (from Public Facilities to another zone) or changes to the text of the zoning ordinance to allow for the planned lot coverage, Floor Area Ratio (FAR), height, and setbacks in the Public Facilities zone.

11. Tribal Consultation:

Pursuant to Public Resources Code section 21080.3.1, California Native American tribes traditionally and culturally affiliated with the project will be contacted during the EIR preparation process.

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

DETERMINATION:

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, if the effect is a "potentially significant impact" or "potentially significant unless mitigated impact." 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 (1) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (2) 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.

Prepared by:

Signature: ______________________ Date: March 20, 2017

Ray Pendro, CEQA Project Manager
MIG, Inc.

Reviewed by:

Signature: ______________________ Date: 3/22/17

Amy French
Chief Planning Official
City of Palo Alto

ENVIRONMENTAL IMPACTS:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
I. AESTHETICS. *Would the project:*				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
The project site and immediate vicinity are flat. Existing views are of a built environment that include mixed use/commercial buildings, parking lots, and several residences. There are no views of scenic vistas from the project site. This issue will not be evaluated in the EIR.				
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
There are no designated or eligible Santa Clara County scenic roads within one mile of the project site. This issue will not be evaluated in the EIR.				
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐	☐	☐
Changes associated with the Public Safety Building (PSB) and parking garage could affect the visual character of specific locations and adjacent buildings at the edges of the project site, including the potential for shadow impacts. The EIR will evaluate the impacts of the proposed project on the visual character and quality of the project site and its surroundings, including the presentation of visual simulations.				
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☒	☐	☐	☐
Existing sources of nighttime light within and around the project site include those common to urban areas, including street lights, parking lot lighting, building lighting, signs, vehicle headlamps, and interior lighting visible through windows. Glare is created by the reflection of sunlight and artificial light off windows, buildings, and other surfaces in the day, and from inadequately shielded and improperly directed light sources at night. Development of the PSB project in				

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
accordance with the City of Palo Alto's Comprehensive Plan and the California Avenue Concept Plan could cause substantial spill light, glare, and sky glow that may create a nuisance for adjacent sensitive residential uses or adversely affect community character. The EIR will evaluate potential light and glare impacts.				
e) *Substantially shadow public open space (other than public streets and adjacent sidewalks) between 9:00 a.m. and 3:00 p.m. from September 21 to March 21?*	☐	☐	☐	☒
There are no public spaces immediately adjacent to the project site. The nearest public space is Sarah Wallis Park, located at Grant and Ash Streets, approximately one-half block to the south and obscured from the project site by existing buildings. This issue will not be evaluated in the EIR.				
II. **AGRICULTURAL AND FORESTRY 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 Dept. 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:*				
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?*	☐	☐	☐	☒
The California Department of Conservation Farmland Mapping and Monitoring Program monitors the conversion of agricultural land to urban uses throughout the state, using classifications of important farmlands. Lands designated as Prime Farmland, Unique				

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Farmland, or Farmland of Statewide Importance are considered important farmlands for purposes of the California Environmental Quality Act (CEQA). The project site is designated Urban and Built Up Land by the Department of Conservation. The proposed project would have no impact on important farmlands. This issue will not be evaluated in the EIR.				
b) *Conflict with existing zoning for agricultural use, or a Williamson Act contract?*	☐	☐	☐	☒
The project site and the surrounding area are urbanized, not zoned for agricultural use, and do not contain any lands under Williamson Act contracts. The proposed project would have no impact on agricultural zoning or Williamson Act contracts. This issue will not be evaluated in the EIR.				
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))?*	☐	☐	☐	☒
The project site and the surrounding area are urbanized and not zoned for forest land or timberland. There are no lands in the vicinity of the project site that are planned, used, or managed for forest land or timber production. The proposed project would have no impact on timberland or forest resources. This issue will not be evaluated in the EIR.				
d) *Result in the loss of forest land or conversion of forest land to non-forest use?*	☐	☐	☐	☒
There is no forest land within or near the project site. The proposed project would have no impact on timberland or forest resources. This issue will not be evaluated in the EIR.				
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?*	☐	☐	☐	☒
There is no farmland or forest land within or near the project site. The proposed project does not involve any changes which could directly or indirectly result in conversion of				

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
farmland to non-agricultural use or conversion of forest land to non-forest use. This issue will not be evaluated in the EIR.				
III. **AIR QUALITY.** *(Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.) Would the project:*				
a) Conflict with or obstruct implementation of the applicable air quality plan? (such as the Bay Area Clean Air Plan)	☒	☐	☐	☐
The consistency of the proposed PSB project with adopted, applicable air quality plans will be evaluated in the EIR.				
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
Development of the proposed project could generate emissions of criteria air pollutants from mobile sources (increases in motor vehicle trips and changes in traffic congestion), area sources (water heaters, architectural coatings, landscaping maintenance equipment) and stationary sources (boilers, fueling stations) that exceed Bay Area Air Quality Management District (BAAQMD) significance thresholds. The regulated regional air pollutants of greatest concern and potential impact are fugitive dust or particulate matter 10 microns or smaller in diameter (PM_{10}) and 2.5 microns or smaller in diameter ($PM_{2.5}$), and the precursors to ozone, which are reactive organic gases (ROG) and nitrogen oxides (NO_X). Construction activities generate dust, exhaust emissions, and certain construction materials can evaporate and contribute to urban ozone. Operational activities could generate additional vehicle trips relative to use of the existing PSB at 275 Forest Avenue. This issue will be evaluated in the EIR.				
c) 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 (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐

See item III.b above.

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
d) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐

See item III.b above.

e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

The PSB project is not expected to generate objectionable odors that affect a substantial number of people. There are not any planned uses (e.g., manufacturing processes) that would create objectionable odors. This issue will not be analyzed in the EIR.

IV. **BIOLOGICAL RESOURCES.** *Would the project:*

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 Wildlife or U.S. Fish and Wildlife Service?	☒	☐	☐	☐

Special-status species are plants and animals that are legally protected under the State and/or federal Endangered Species Acts or other regulations, as well as other species that are considered rare enough by the scientific community and trustee agencies to warrant special consideration. Species with legal protection under the Endangered Species Acts may represent constraints to development, particularly when they are wide-ranging or highly sensitive to habitat disturbance and where proposed development would result in a "take" of these species. Bird nests in active use are protected under the federal Migratory Bird Treaty Act, and raptor nests are further protected under Section 3503.5 of the California Fish and Game Code when in active use.

There are multiple trees that surround the two surface parking areas that comprise the project site. These trees could provide nesting habitat for raptor species and habitat for sensitive bat species. Some raptor species, like Cooper's hawk (*Accipiter cooperii*, a state species of special concern on its nesting sites) are specifically listed as sensitive, and all raptor species are protected while nesting by Fish and Game Code Section 3503.5. Sensitive bat species with potential for occurrence in large trees and groves include the pallid bat (*Antrozous pallidus*, a State species of special concern), Townsend's big-eared bat (*Plecotus townsendii*), and Myotis species. These bat species have no legal protection under federal or State Endangered Species Act, but may meet the criteria of section 15380 of the CEQA Guidelines. Therefore, this issue will be evaluated in the EIR.

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☐	☒

The State of California recognizes some plant communities as sensitive natural communities if they are uncommon, regionally declining, or vulnerable. Among these communities are riparian habitat, coast live oak forest, freshwater seeps, freshwater marshes, and coastal salt marsh. However, there is no riparian habitat or other sensitive natural community within or adjacent to the project area. The project would have no impact on riparian habitat or other sensitive natural community. This issue will not be evaluated in the EIR.

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒

Although definitions vary, wetlands are generally considered to be areas that are periodically or permanently inundated by surface or groundwater, and support vegetation adapted to life in saturated soil. Wetlands are recognized as important features on a regional and national level due to their inherent value to fish and wildlife; use as storage areas for storm water and floodwaters; and water recharge, filtration, and purification functions.

The U.S. Army Corps of Engineers (Corps), Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW) have jurisdiction over modifications to wetlands and other "waters of the United States." Corps jurisdiction is established through provisions of Section 404 of the Clean Water Act, which prohibits the discharge of dredged or fill material into "waters of the United States" without a permit. RWQCB jurisdiction is established through Section 401 of the Clean Water Act, which requires certification or waiver for water quality whenever a Corps permit is required under Section 404 of the Clean Water Act. CDFW jurisdiction is established under Sections 1600-1607 of the State Fish and Game Code, which pertains to activities that would substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake. Any such activities require a Streambed Alteration Agreement to by issued by CDFW prior to project construction.

According to the U.S. Fish and Wildlife Service Wetlands Mapper, there are no wetlands or jurisdictional waters in or near the project site. There is a creek that bisects John Boulware Park, about one mile southeast of the project site. The proposed project would not involve the direct removal or fill of wetlands or indirectly affect the hydrology, soil, vegetation, or wildlife of wetlands. This issue will not be evaluated in the EIR.

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?* ☐ ☐ ☒ ☐

Wildlife use on the project site is expected to be relatively low due to the absence of natural habitat, the proximity to streets in a mostly built environment adjacent to the project site, and the lack of protective cover. Birds (e.g., house sparrow, starling, crow) and wildlife such as opossums and small rodents typically associated with developed commercial properties would be expected to occur. The project site is surrounded by the built environment, and therefore is limited as a potential wildlife movement corridor. Trees on the project site could potentially provide nesting habitat for small songbirds; nesting birds are protected by the Migratory Bird Treaty Act and the California Fish and Game Code. The project would have a less-than-significant impact on wildlife movement or native wildlife nursery sites. This issue will not be evaluated in the EIR.

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
e) *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?*	☐	☐	☒	☐
No portion of the project site is located in the following land use designation categories: Open Space/Controlled Development, Streamside Open Space, or Publicly-owned Conservation Land (Palo Alto Comprehensive Plan, Land Use Designation Map). In addition, the proposed project will be subject to the City's Heritage Tree Ordinance. The findings of the site-specific tree survey report prepared for the project (David L. Babby, 2016) will be reported and applicable tree preservation/ replacement regulations explained.				
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?*	☐	☐	☐	☒
There is no Habitat Conservation Plan, Natural Community Conservation Plan, or other adopted habitat conservation plan applicable to the project site. This issue will not be evaluated in the EIR.				
V. **CULTURAL RESOURCES.** *Would the project:*				
a) *Adversely affect a historic resource listed or eligible for listing on the National and/or California Register, or listed on the City's Historic Inventory?*	☒	☐	☐	☐
The State Office of Historic Preservation has determined that buildings, structures, and objects 45 years or older may be of historical value. The 1979 Historic Resources Inventory of the City of Palo Alto shows two historic properties on 1795 and 2110 Park Boulevard; these properties are located about one mile north of the project site. One historic property was identified adjacent to the project site in the most recent historic resources survey of 1998; the proposed project will be studied for impacts on this historic resource. Other adjacent buildings constructed in the 1950s have not been studied for potential historic eligibility since the 1998 survey was completed; the EIR will assess the proposed project's compatibility with these adjacent buildings.				

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
b) Eliminate important examples of major periods of California history or prehistory?	☒	☐	☐	☐

See V.a above regarding historic resources.

At the time of Euro-American contact, Native Americans in the Bay Area typically lived along alluvial terraces and the historic margins of San Francisco Bay. The project site was historically along the San Francisco Bay margin, and is therefore a location of high archaeological sensitivity. Ground-disturbing activities during previous development of the site would likely have disturbed archaeological resources that may have existed. Despite the history of site disturbance, the proposed project could potentially disrupt, alter, or eliminate as-yet undiscovered archaeological sites, potentially including Native American remains. This issue will be evaluated in the EIR.

c) Cause a substantial adverse change in the significant of an archaeological resource pursuant to 15064.5?	☒	☐	☐	☐

See V.a and V.b above.

The Holocene Formation, the geologic formation which underlies the project site, is a relatively recent formation (about 12,000 years old). The Holocene Formation is likely to contain only occasional small marine and non-marine invertebrate fossils. Ground-disturbing activities during previous development of the site would likely have disturbed, altered, or eliminated archaeological resources that may have existed. Despite the history of site disturbance, the proposed project could potentially disrupt, alter, or eliminate as-yet undiscovered archaeological resources. This issue will be evaluated in the EIR.

d) Disturb any human remains, including those interred outside of dedicated cemeteries?	☒	☐	☐	☐

There are no dedicated cemeteries located on the project site. However, the project site was historically along the San Francisco Bay margin, and is therefore a location of high archaeological sensitivity. Despite the history of site disturbance, the project could potentially disrupt, alter, or eliminate as-yet undiscovered archaeological resources, potentially including Native American remains. This issue will be evaluated in the EIR.

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
e) *Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*	☒	☐	☐	☐
The Holocene Formation, the geologic formation which underlies the project site, is a relatively recent formation (about 12,000 years old). The Holocene Formation is likely to contain only occasional small marine and non-marine invertebrate fossils. Ground-disturbing activities during previous development of the site would likely have disturbed, altered, or eliminated paleontological resources that may have existed. Despite the history of disturbance, the proposed project could potentially disrupt, alter, or eliminate as-yet undiscovered paleontological resources. This issue will be evaluated in the EIR.				
f) *Directly or indirectly destroy a local cultural resource that is recognized by City Council resolution?*	☒	☐	☐	☐
See V.a and V.b above.				
g) *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, or 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:* *1) Listed or eligible for listing on 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* *2) A resource determined by a lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to the criteria set forth in subdivision (c) of Public Resource Code section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.*	☒	☐	☐	☐
See V.b and V.d above. The proposed project has the potential to impact Tribal Cultural Resources. This issue will be discussed in depth in the EIR. Pursuant to				

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*

Public Resources Code section 21080.3.1, California Native American tribes traditionally and culturally affiliated with the project will be contacted during the EIR preparation process.

VI. **GEOLOGY AND SOILS.** *Would the project:*

a) *Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:*

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.)*	☐	☐	☐	☒

There are no mapped through-going faults within or adjacent to the project site, nor is the project site within an Alquist-Priolo Fault zone. The closest fault is the San Andreas Fault, located about 5.5 miles southwest of the project site. This issue will not be evaluated in the EIR.

ii) *Strong seismic ground shaking?*	☐	☒	☐	☐

Ground shaking is the most widespread cause of earthquake damage. Most loss of life and injuries during an earthquake are related to the collapse of buildings and structures. The intensity of the ground shaking at a particular site depends on characteristics of the earthquake source (e.g., magnitude, location, and area of causative fault surface), distance from the fault, and amplification effects of local geologic deposits. Project improvements could be exposed to strong seismic ground shaking and related risk of loss or injury in the event of an earthquake on one of the active or potentially active faults in the region. Potential risks to life and property from these seismic hazards would be adequately mitigated by existing laws, regulations, and polices, including the California Building Code and the City's development review procedures.

Based on the geotechnical report prepared for the proposed project (Romig Engineers, 2016), the primary geotechnical concerns for the proposed project are: (1) the need for temporary shoring of the basement excavations; (2)

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
the likelihood that ground water will be present above the depth of the basement excavations, requiring dewatering; (3) the need to design and waterproof the floors and walls of the basement and access tunnel; and (4) the likelihood of severe ground shaking during a major earthquake. The geotechnical report's site-specific mitigation recommendations will be described.				
iii) Seismic-related ground failure, including liquefaction?	☐	☒	☐	☐
Soil liquefaction is a process that occurs in water-saturated, unconsolidated sediment due to ground shaking. During liquefaction, soils lose strength and ground failure may occur, affecting structures and improvements. Soils most susceptible to liquefaction are loose to medium dense, saturated granular soils with poor drainage, including Bay mud and artificial fill.				
According to the geotechnical report prepared for the proposed project (Romig Engineers, 2016), some portions (sand and sandy silt strata) of the soil could experience liquefaction during an earthquake. However, risks to life and property from these seismic hazards would be adequately mitigated by existing laws, regulations, and polices, including the California Building Code and the City's development review procedures, which require a site-specific geotechnical investigation be prepared by a licensed professional for proposed developments for seismic design categories C, D, E, and F. The geotechnical investigation would be reviewed by City staff prior to issuance of building permits to ensure compliance. The geotechnical report's site-specific mitigation recommendations will be described.				
iv) Landslides?	☐	☐	☐	☒
The project site is flat and is not subject to landslides. This issue will not be evaluated in the EIR.				
v) Expansive soils?	☐	☒	☐	☐
Expansive soils possess a "shrink-swell" characteristic, the cyclic expansion and contraction that occurs in fine-grained clay				

sediments from the process of wetting and drying. Structural damage may result over a long period of time, usually the result of inadequate soil and foundation engineering or the placement of structures directly on expansive soils.

Expansive soils are likely to be encountered on the project site, given the underlying Holocene Formation and the presence of clayey soils noted in the geotechnical report prepared for the proposed project (Romig Engineers, 2016). However, review and permitting of specific development projects would involve characterization and consideration of site-specific geologic and soils conditions, and implementation of individual project mitigations, where needed. State and local planning, building, and engineering regulations also address structures, excavation, foundations, retaining walls, and grading activities. The geotechnical report's site-specific mitigation recommendations will be described.

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
b) *Result in substantial soil erosion or the loss of topsoil?*	☐	☒	☐	☐

The potential for erosion during construction would be subject to the best management practices routinely implemented by the City and required as a condition of project approval for new development. Project construction would involve grading, excavation, or other activities that could temporarily expose disturbed soils to erosion. Construction erosion and water quality impacts are addressed in item IX.a below. The EIR will evaluate potential soil erosion impacts.

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?*	☐	☒	☐	☐

The project site is generally underlain by the Holocene Formation, a geologic unit of Pleistocene age. According to the project geotechnical report (Romig Engineers, 2016), the potential for lateral spreading is low, but there is some potential for liquefaction. The geotechnical report's site-specific mitigation recommendations will be described. See

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
	VI.a.iii above.				
	d)	*Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?* Expansive soils are likely to be encountered on the project site, given the underlying Holocene Formation and the presence of clayey soils noted in the geotechnical report prepared for the proposed project (Romig Engineers, 2016). The geotechnical report's site-specific mitigation recommendations will be described.	☐	☒	☐	☐
	e)	*Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?* No use of septic tanks or alternative wastewater disposal systems are proposed for the project site. Therefore, the proposed project would have no impact related to the capacity of local soils to effectively accommodate septic systems. This issue will not be evaluated in the EIR.	☐	☐	☐	☒
	f)	*Expose people or property to major geologic hazards that cannot be mitigated through the use of standard engineering design and seismic safety techniques?* See VI.a.ii, iii, and v; and VI.b, c, and d, above. The geotechnical report's site-specific mitigation recommendations will be described.	☐	☒	☐	☐
VII.	**GREENHOUSE GAS EMISSIONS.** *Would the project:*				
	a)	*Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?* Future development of the proposed project could result in an increase in greenhouse gas emissions due primarily to potential increases in vehicle miles traveled, energy use, consumer product use, and solid waste. The greenhouse gas emissions increase may exceed the BAAQMD significance thresholds. The EIR will evaluate greenhouse gas emissions impacts.	☒	☐	☐	☐

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
b) *Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*	☒	☐	☐	☐

Future development under the proposed project could result in an increase in greenhouse gas emissions that would conflict with or impede the achievement of the California Global Warming Solutions Act of 2006 (AB 32) greenhouse gas reduction goals. The EIR will evaluate greenhouse gas emissions impacts.

VIII. **HAZARDS AND HAZARDOUS MATERIALS.** *Would the project:*

a) *Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*	☒	☐	☐	☐

Hazardous substances may be generated, stored, transported, used, or disposed of in association with future activities allowed under the proposed project. The proposed project is to construct a new PSB and public parking garage. Uses of the new PSB could involve use of firearms, explosives, and hazardous chemicals. These uses could result in potentially significant impacts, and therefore this issue will be evaluated in the EIR. Departmental protocols for handling, storing, transporting, and disposing of these substances will be described.

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?*	☒	☐	☐	☐

See VIII.a above.

c) *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?*	☐	☐	☐	☒

There are no schools within one quarter mile of the project site. The EIR will not evaluate this issue.

d) *Create a significant hazard to the public or the environment from existing hazardous materials contamination by exposing future occupants or users of the site to contamination either in excess of ground soil*	☒	☐	☐	☐

		Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
	and groundwater cleanup goals developed for the site or from the location on listed hazardous materials sites complied pursuant to Government Code section 65962.5?				

Given the long history of development within the project vicinity, there may be locations adjacent to the project site that are included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 (Cortese List).

According to the Phase I ESA, the project site is located within the California-Olive-Emerson (COE) groundwater study area. Groundwater containing releases of Volatile Organic Compounds (VOCs) have migrated into this area from releases from the former Hewlett Packard (HP) site at 640 Page Mill Road. Existing hazardous materials contamination sites could pose a risk to human health or the environment. The EIR will evaluate this potential impact.

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 for people residing or working in the project area?*	☐	☐	☒	☐

The project site is not located within two miles of the Palo Alto Airport, or within the Palo Alto Airport Land Use Plan area. Impacts to people working on the project site would be less than significant. This issue will not be evaluated in the EIR.

f)	*For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?*	☐	☐	☐	☒

No private airstrip exists in the project vicinity. This issue will not be evaluated in the EIR.

g)	*Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?*	☒	☐	☐	☐

Traffic from future development under the proposed project would shift existing vehicle trips for emergency police calls from 275 Forest Avenue to the new PSB project site. Traffic congestion associated with the new PSB could potentially interfere with an adopted emergency response plan or evacuation plan. This issue will be more fully evaluated in the EIR.

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
h) *Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?*	☐	☐	☒	☐

According to the Santa Clara County Fire Hazards Map, the City of Palo Alto is not in a moderate, high, or very high fuel hazard zone. Moreover, the project site and vicinity are a built environment largely devoid of wildfire-prone vegetation (e.g., expanses of grasses and shrubs). This issue will not be evaluated in the EIR.

IX. **HYDROLOGY AND WATER QUALITY.** *Would the project:*

a) *Violate any water quality standards or waste discharge requirements?*	☒	☐	☐	☐

Storm water runoff from impervious surfaces on the project site could degrade water quality in downstream receiving waters and San Francisco Bay. The San Francisco Bay Regional Water Quality Control Board (RWQCB) Municipal Regional Permit Provision C.3 requirements apply to projects that create or replace more than 10,000 square feet of impervious area (5,000 square feet for certain types of projects). Project applicants must prepare and implement a Stormwater Control Plan containing treatment and source control measures that meet the "maximum extent practicable" standard as specified in the NPDES permit and the C.3 Guidebook. Project applicants must also prepare a Stormwater Facility Operation and Maintenance Plan and execute agreements to ensure the storm water treatment and flow-control facilities are maintained in perpetuity.

Construction activities disturbing more than one acre would be required to submit a Notice of Intent (NOI) to the RWQCB to be covered by the State's General Construction Permit before beginning construction, which would require the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) containing Best Management Practices (BMPs) that would be implemented during construction. The EIR will evaluate potential construction and operational water

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
quality impacts of the proposed PSB and public parking garage.				
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
According to the City of Palo Alto Urban Water Management Plan, the City does not use groundwater during normal water years. Therefore, impacts to groundwater supplies or recharge would be less-than-significant. The EIR will not evaluate this issue.				
c) Substantially alter the existing drainage pattern (increase the rate, volume, or flow duration of storm water runoff) of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in new or increased flooding on or off-site?	☒	☐	☐	☐
The proposed project does not propose changes to existing drainage patterns. The area to be developed consists of two surface parking areas that are impervious surfaces. The proposed project would disturb more than one acre and would be required to submit a Notice of Intent (NOI) to the RWQCB to be covered by the State's General Construction Permit before beginning construction, which would require the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) containing Best Management Practices (BMPs) that would be implemented during construction. The EIR will evaluate the potential impacts of needed drainage improvements as well as the potential construction and operational water quality impacts.				
d) Result in stream bank instability?	☐	☐	☐	☒
The project site is not located near a stream. The EIR will not evaluate this issue.				
e) Significantly alter the existing drainage pattern (increase the rate, volume, or flow duration) of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of	☒	☐	☐	☐

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
surface runoff in a manner which would result in flooding on- or off-site?				
See IX.c above. The EIR will evaluate the potential impacts of needed drainage improvements and potential for on- or off-site flooding. Also see IX.h below.				
f) 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?	☒	☐	☐	☐
See IX.a and IX.c above.				
g) Provide substantial additional sources of pollutants associated with urban runoff or otherwise substantially degrade water quality?	☒	☐	☐	☐
See IX.a and IX.c above.				
h) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☒	☐	☐	☐
Although Palo Alto contains no areas within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map, portions of the project area occasionally flood during combined high tides and heavy rain, due to inadequate storm drains, low elevation, and silt and debris obstruction of the storm drain system. Additionally, regional sea level rise predictions for the San Francisco Bay region predict a 16-inch rise in sea level by mid-century and a 55-inch rise by the end of the century. Portions of the project area are subject to flooding due to sea level rise associated with global climate change. However, for sea level rise to impact the project site, it would have to first inundate most of Palo Alto Airport, and regional mitigation strategies directed at the airport may also protect Palo Alto. The EIR will evaluate potential flood hazard impacts.				
i) Place within a 100-year flood hazard area structures which would impede or redirect flood flows	☒	☐	☐	☐
See IX.h above.				
j) Expose people or structures to a significant risk of loss, injury or death involving flooding,	☒	☐	☐	☐

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
including flooding as a result of the failure of a levee or dam?				

Based on Figure 7-5: Dam Inundation, from the Palo Alto Comprehensive Plan Update Existing Conditions report, the project area is located within a Dam Inundation Area for Lake Lagunita, and possibly Searsville Lake. This issue will be analyzed in the EIR.

k) Result in inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

A seiche is a tidal change in an enclosed or semi-enclosed water body caused by sustained high winds or an earthquake. The project site is not located close enough to San Francisco Bay to be affected by a seiche. A tsunami is a series of waves created when a body of water such as an ocean is rapidly displaced on a massive scale, most commonly as the result of an earthquake. Palo Alto is not in a tsunami/seiche area. The EIR will not address this issue.

X. LAND USE AND PLANNING. *Would the project:*

a) Physically divide an established community?	☒	☐	☐	☐

Development of the proposed project was anticipated in the California Avenue Area Concept Plan (refer to Policy CAP-1.9). The proposed project will need to be integrated into its surrounding environment without disrupting commercial and residential uses. The EIR will evaluate potential impacts on the physical arrangement of the community.

b) Conflict with any applicable City land use plan, policy, or regulation (including but not limited to the Comprehensive Plan, CAP, or the City's Zoning Ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☒	☐	☐	☐

i) Substantially adversely change the type or intensity of existing or planned land use patterns in the area?

ii) Be incompatible with adjacent land uses or with the general character of the surrounding area, including density and building height?

iii) Conflict with established residential, recreational, educational, religious, or scientific uses of an area?

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
The California Avenue Area Concept Plan (Policy CAP-1.9) anticipated the development of the proposed project. The EIR will evaluate consistency with the Comprehensive Plan, the California Avenue Concept Plan, and other applicable plans adopted for the purpose of avoiding or mitigating an environmental effect.				
c) *Conflict with any applicable habitat conservation plan or natural community conservation plan?*	☐	☐	☐	☒
No habitat conservation plan or natural community conservation plan is applicable to the project site. The project would have no impact related to conflicts with any applicable habitat conservation plan or natural community conservation plan. The EIR will not evaluate this issue.				
XI. **MINERAL RESOURCES.** *Would the project:*				
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?*	☐	☐	☐	☒
The California Geological Survey (CGS) has classified lands within the San Francisco-Monterey Bay region into Mineral Resource Zones (MRZs) based on guidelines adopted by the California State Mining and Geology Board, as mandated by the Surface Mining and Reclamation Act (SMARA) of 1975. The CGS classified urbanizing lands within the South San Francisco Bay Production-Consumption Region according to the presence or absence of significant sand, gravel, or stone deposits that are suitable as sources of aggregate. Areas classified as MRZ-1 are areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little or no likelihood exists for their presence. There are no locally important mineral resource recovery sites delineated in the City of Palo Alto. The proposed project would have no impact related to the availability of mineral resources. This issue will not be discussed in the EIR.				
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?*	☐	☐	☐	☒

Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

See XI.a above.

XII. **NOISE.** *Would the project result in:*

a) *Exposure of persons to or generation of excessive ground borne vibrations or ground borne noise levels?* ☒ ☐ ☐ ☐

Demolition and construction activities associated with future development under the proposed project could generate excessive ground borne vibration. During construction, employees that work in the project vicinity could be exposed to excessive ground borne vibration. Employees could also possibly be exposed to ground borne vibration limits exceeding Federal Transit Administration thresholds of significance for frequent events due to Caltrain operations. The EIR will evaluate this issue.

b) *Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or the municipal code, State standards, or applicable standards of other agencies, including but not limited to:* ☒ ☐ ☐ ☐

i) *Result in indoor noise levels for residential development to exceed an Ldn of 45 dB?*

The proposed project does not involve residential development, so this issue will not be evaluated in the EIR.

ii) *Result in instantaneous noise levels of 50dB or more in a bedroom or 55 dB or more measures from other rooms inside a house?*

See XII.b.i above.

The EIR will examine if the proposed PSB project would be exposed to other standards relevant to the project – for example, noise standards for outdoor public places, such as the new public plazas proposed by the project.

c) *A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project, including:* ☒ ☐ ☐ ☐

i) *Cause the average 24-hour noise level (Ldn) to increase by 5.0 decibels (dB) or more in an existing residential area, even if the Ldn would remain below 60 dB?*

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
ii) Cause the Ldn to increase by three dB or more in an existing residential area, thereby causing the Ldn in the area to exceed 60 dB?				
iii) Cause an increase of three dB or more in an existing residential area where the Ldn currently exceeds 60 dB?				
Traffic generated by development in accordance with the proposed project could increase traffic noise levels along certain streets and thereby affect residential or other noise-sensitive uses.				
The proposed project would generate short-term temporary construction noise. The effects of noise resulting from construction depend on the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance between construction noise sources and noise-sensitive receptors. The EIR will evaluate construction and operation related noise impacts.				
d) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.	☒	☐	☐	☐
Traffic generated by development in accordance with the proposed project could increase traffic noise levels along certain streets and thereby affect residential or other noise-sensitive uses. The EIR will evaluate operations related noise impacts.				
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 expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
The project site is not located within two miles of the Palo Alto Airport. The EIR will not evaluate this issue.				
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
No private airstrip exists in the project vicinity. This issue will not be evaluated in the EIR.				

XIII. **POPULATION AND HOUSING.** *Would the project:*

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) *Induce substantial 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)?*	☐	☐	☐	☒
The proposed project does not involve new home construction or substantial new business-related construction (as part of the project, approximately 4,200 to 4,700 SF of commercial space is proposed for existing or new businesses). The project would not extend infrastructure to support substantial population growth. The proposed project would relocate and expand the space available for the City's Police Department, Fire Administration, Emergency Communications Center (911), Office of Emergency Services, and Emergency Operations Center, as well as provide a new public parking garage. No further evaluation is needed.				
b) *Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?*	☐	☐	☐	☒
The proposed project would be constructed on two lots currently used for surface parking. Existing housing would not be displaced. No further evaluation is needed.				
c) *Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?*	☐	☐	☐	☒
See item XIII.b above.				
d) *Create a substantial imbalance between employed residents and jobs?*	☐	☐	☐	☒
The proposed project would relocate and expand space available for police and emergency services, as well as provide a new public parking garage. The PSB is being designed to support approximately 158 jobs by 2032, a proportion of which could be Palo Alto residents. Since the Census Bureau estimates that Palo Alto's workforce is more than 35,000 people, it is not likely that a substantial imbalance would result between employed residents of Palo Alto and jobs. This issue will not be evaluated in the EIR.				

XIV. PUBLIC SERVICES.

Would the project result in substantial adverse

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
physical impacts associated with the provision of new or physically altered governmental facilities, or the 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:				
a) Result in an adverse physical impact from the construction of additional school facilities in order to maintain acceptable performance standards?	☐	☐	☐	☒
The proposed project is to relocate and expand space available for police and emergency services for the City. Construction and operation of a new PSB and parking garage would not require the construction of new school facilities, parks, recreational facilities, or library facilities. This issue will not be evaluated in the EIR. The proposed project would include two new public plazas as part of the overall project development and construction.				
b) Result in an adverse physical impact from the construction of additional fire protection facilities in order to maintain acceptable performance standards?	☒	☐	☐	☐
The proposed project would relocate the City's Police Department, Fire Administration, Emergency Communications Center (911), Office of Emergency Services, Emergency Operations Center (EOC), and associated parking and other support spaces. Construction impacts associated with the project will be described, along with standard City regulations that minimize those impacts (e.g., construction traffic plan) and mitigations already included in other EIR chapters (e.g., construction air quality and noise). These potential impacts will be evaluated in the EIR.				
c) Result in an adverse physical impact from the construction of additional police protection facilities in order to maintain acceptable performance standards?	☐	☐	☐	☒
See XIV.b above.				
d) Result in an adverse physical impact from the construction of additional parks and recreation facilities in order to maintain acceptable performance standards?	☐	☐	☐	☒

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
See item XIV.a above.				
e) Result in an adverse physical impact from the construction of additional library facilities in order to maintain acceptable performance standards?	☐	☐	☐	☒
See item XIV.a above.				
XV. RECREATION.				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
The proposed project would relocate and expand space available for police and emergency services for the City. Since the proposed project would not increase residential uses, it is not expected to noticeably increase use of existing neighborhood or regional parks. The EIR will not evaluate this issue.				
The proposed project would include two new public plazas as part of the overall project development and construction.				
b) Does the project include recreational facilities, or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒
See XIV.a and XIV.b above.				
XVI. TRANSPORTATION/TRAFFIC. *Would the project:*				
a) Cause an intersection to drop below its level of service standard, or if it is already operating at a substandard level of service, deteriorate by more than a specified amount?	☒			
	☐	☐	☐	
Construction and operation of the PSB project could increase traffic congestion and cause intersections to operate below the desired Level of Service (LOS). The EIR will evaluate potential traffic impacts following guidelines of the City Santa Clara Valley Transportation Authority (VTA). Specifically, the EIR will analyze AM and PM peak hour traffic conditions under Existing Conditions, Existing Plus Project Conditions, Background No Project Conditions, Background Plus Project Conditions, Cumulative (2035) No Project				

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
Conditions, and Cumulative Plus Project Conditions at the following intersections: 1. Park Boulevard / Sherman Avenue* 2. Park Boulevard / Page Mill Road* 3. Birch Street / Sherman Avenue* 4. Birch Street / Grant Street* 5. Birch Street / Sheridan Avenue* 6. Ash Street / California Avenue* 7. El Camino Real / Cambridge Avenue 8. El Camino Real / California Avenue 9. El Camino Real / Page Mill Road 10. Middlefield Road / Oregon Expressway **Refers to unsignalized intersections.*				
b) Cause a roadway segment to drop below its level of service standard, or deteriorate operations that already operate at a substandard level of service?	☒	☐	☐	☐
See item XVI.a above. Any related impacts on roadway segments also will be evaluated in the EIR.				
c) Cause a freeway segment or ramp to operate at LOS F or contribute traffic in excess of 1 percent of segment capacity to a freeway segment or ramp already operating at LOS F?	☒	☐	☐	☐
See item XVI.a above. Any related impacts on freeway segments or ramps also will be evaluated in the EIR.				
d) Impede the development or function of planned pedestrian or bicycle facilities.	☒	☐	☐	☐
The traffic analysis will evaluate the proposed project's impact on existing and any planned pedestrian and bicycle facilities in the project vicinity. This issue will be evaluated in the EIR.				
e) Increase demand for pedestrian and bicycle facilities that cannot be met by current or planned services.	☐	☒	☐	☐
See item XVI.d above.				
f) Impede the operation of a transit system as a result of congestion or otherwise decrease the performance of safety of such facilities?	☒	☐	☐	☐
See item XVI.a above. The EIR will evaluate the effects of project-generated traffic on the operation of the transit system.				

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
g) Create demand for transit services that cannot be met by current or planned services? The EIR will evaluate whether the employees at the new PSB location would create a substantial demand for transit services.	☒	☐	☐	☐
h) Create the potential demand for through traffic to use local residential streets? The EIR traffic analysis will model changes in LOS at 10 intersections, some of which involve local residential streets. See item XVI.a above.	☒	☐	☐	☐
i) Cause any change in traffic that would increase the Traffic Infusion on Residential Environment (TIRE) index by 0.1 or more? See item XVI.a above.				
j) Create an operational safety hazard? The proposed project would relocate and provide additional space for police and emergency services for the City. Vehicular circulation on the project site and in relation to the surrounding community is a primary design consideration. The issue will be evaluated in the EIR.	☒	☐	☐	☐
k) Result in inadequate emergency access? The proposed project would relocate and expand space available for police and emergency services for the City. Depending on how trips are distributed, they could potentially interfere with an existing emergency response plan or an emergency evacuation plan. This issue will be evaluated in the EIR.	☒	☐	☐	☐
l) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks? The project site is not located within the Palo Alto Airport Land Use Plan area. The project would not generate air travel. This issue will not be evaluated in the EIR.	☐	☐	☐	☒

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
m) Cause queuing impacts based on a comparative analysis between the design queue length and the available queue storage capacity? Queuing impacts include, but are not limited to, spillback queues at project access locations; queues at turn lanes at intersections that block through traffic; queues at lane drops; queues at one intersection that extend back to impact other intersections, and spillback queues on ramps.	☒	☐	☐	☐

See item XVI.a above.

XVII. **UTILITIES AND SERVICE SYSTEMS.** *Would the project:*

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Need new or expanded entitlements to water supply?	☒	☐	☐	☐

Palo Alto receives 100 percent of its potable water from the San Francisco Public Utilities Commission (SFPUC). The proposed project's relationship to the City of Palo Alto 2015 Urban Water Management Plan (June 2016) will be evaluated in the EIR.

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
b) Result in adverse physical impacts from new or expanded utility facilities due to increased use as a result of the project?	☒	☐	☐	☐

The utility infrastructure requirements (e.g., water, wastewater, storm drainage), design solutions, and construction protocols of the proposed PSB project will be described in the EIR. Any additional, necessary mitigation will be described.

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
c) Result in a substantial physical deterioration of a utility facility due to increased use as a result of the project?	☒	☐	☐	☐

See item XVII.b above.

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
d) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐

Palo Alto's wastewater is treated at the Palo Alto Regional Water Quality Control Plant (RWQCP), which also serves the five communities of East Palo Alto, Mountain View, Stanford, Los Altos, and Los Altos Hills. The Long-Range Facilities Plan for the RWQCP, adopted in 2012, found that the existing facilities were operating within normal ranges. The existing secondary and tertiary treatment systems are adequately treating the wastewater to meet the existing discharge

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
requirements. Construction and operation of the proposed project will be subject to applicable regional and local water quality standards and regulations. No further evaluation in the EIR is necessary.				
e) *Result in a determination by the wastewater treatment provider that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments?*	☐	☐	☒	☐
See item XVII.d above.				
f) *Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?*	☐	☐	☒	☐
See item XVII.d above.				
g) *Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?*	☒	☐	☐	☐
The storm water infrastructure requirements, design solutions, and construction protocols of the proposed PSB project will be described in the EIR. Any additional, necessary mitigation will be described.				
h) *Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?*	☐	☐	☒	☐
The proposed project would relocate police and emergency services to a new PSB. The new building would generate typical amounts of additional solid waste. Non-recyclable material is transferred to the Kirby Canyon Landfill owned by Waste Management, Inc. Kirby Canyon has sufficient permitted landfill capacity, with a remaining capacity of approximately 21.6 million tons and a total projected capacity of approximately 29 million tons. The project impact would be less-than-significant. The EIR will not evaluate potential impacts related to solid waste disposal capacity.				
i) *Comply with federal, state, and local statutes and regulations related to solid waste?*	☐	☐	☒	☐
The proposed project would comply with all federal, State, and local statues and				

regulations related to solid waste. These regulations are described in the Draft EIR for the Comprehensive Plan Update. The final version of the Comprehensive Plan Update is contemplating adding new policies pertaining to the City's recycling requirements. Should new policies be adopted, the proposed project would need to comply with these additional policies. This issue will not be evaluated in the EIR.

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
j) Result in a substantial increase in natural gas and electrical service demands that would require the new construction of energy supply facilities and distribution infrastructure or capacity enhancing alterations to existing facilities?	☒	☐	☐	☐

The project's natural gas, electrical, and fuel demands will be evaluated in the EIR, including actions and design solutions for reducing any potential for wasteful, inefficient, and unnecessary consumption of energy, per CEQA Guidelines Appendix F (Energy Conservation).

XVIII. ENERGY

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Have an energy impact? Energy impacts may include:	☒	☐	☐	☐

- *i) Impacts resulting from amount and fuel type used for each stage of the project*
- *ii) Impacts on local and regional energy supplies and on requirements for additional capacity*
- *iii) Impacts on peak and base period demands for electricity and other forms of energy*
- *iv) Impacts to energy resources*
- *v) Impacts resulting from the project's projected transportation energy use requirements*

See item XVII.j above.

XIX. MANDATORY FINDINGS OF SIGNIFICANCE.

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Does the project have the potential to 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, reduce	☒	☐	☐	☐

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
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?				
Pertaining to the quality of the environment, biological resources, and California history/ prehistory, this Initial Study has determined that impacts in the following environmental areas could be significant: aesthetics, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, public services, transportation/traffic, utilities and service systems, and energy.				
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)?*	☒	☐	☐	☐
This Initial Study has determined that some project impacts (e.g., air quality, traffic) could be cumulatively considerable. The EIR will evaluate the potential cumulative impacts of the proposed project in conjunction with other pending and anticipated development in Palo Alto.				
c) *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?*	☒	☐	☐	☐
Project effects identified in this Initial Study as having possible substantial adverse impacts on human beings, either directly or indirectly, include aesthetics, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, public services, transportation/traffic, utilities and service systems, and energy.				

1850

Regina Alcomendras
Santa Clara County
Clerk-Recorder
(408) 299-5688
https://www.sccgov.org

Receipt: 17-59449

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Product	**Name**	**Extended**
CEQA	ENVIRONMENTAL FILING	$0.00
	# Pages	5
	Document #	ENV20727
	Document Info:	CITY OF PALO ALTO
	Filing Type	P
Total		$0.00
Change (Cash)		$0.00

CITY OF PALO ALTO, CA
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3/28/17 9:04 AM mlouie

State of California - Department of Fish and Wildlife

2016 ENVIRONMENTAL FILING FEE CASH RECEIPT

DFW 753.5a (Rev. 12/15/15) Previously DFG 753.5a

RECEIPT NUMBER:
ENV20727

STATE CLEARINGHOUSE NUMBER *(If applicable)*

SEE INSTRUCTIONS ON REVERSE. TYPE OR PRINT CLEARLY.

LEAD AGENCY
CITY OF PALO ALTO

LEADAGENCY EMAIL

DATE
03/28/2017

COUNTY/STATE AGENCY OF FILING
SANTA CLARA

DOCUMENT NUMBER

PROJECT TITLE
PALO ALTO PUBLIC SAFETY BUILDING AND PARKING STRUCTURE AT 250 AND 350 SHERMAN AVENUE, PALO

PROJECT APPLICANT NAME
CITY OF PALO ALTO; MATT RASCHKE, PROJECT

PROJECT APPLICANT EMAIL

PHONE NUMBER
(650) 496-5937

PROJECT APPLICANT ADDRESS
250 HAMILTON AVE

CITY
PALO ALTO

STATE
CA

ZIP CODE
94301

PROJECT APPLICANT *(Check appropriate box)*

☒ Local Public Agency ☐ School District ☐ Other Special District ☐ State Agency ☐ Private Entity

CHECK APPLICABLE FEES:

☐ Environmental Impact Report (EIR)	$3,070.00	$	
☐ Mitigated/Negative Declaration (MND)(ND)	$2,210.25	$	
☐ Certified Regulatory Program document (CRP)	$1,043.75	$	

☐ Exempt from fee
  ☐ Notice of Exemption (attach)
  ☐ CDFW No Effect Determination (attach)
☐ Fee previously paid (attach previously issued cash receipt copy)

☐ Water Right Application or Petition Fee (State Water Resources Control Board only)	$850.00	$	
☐ County documentary handling fee		$	
☐ Other		$	

PAYMENT METHOD:

☐ Cash ☐ Credit ☐ Check ☒ Other

TOTAL RECEIVED $ $0.00

SIGNATURE
x Mike Louie

AGENCY OF FILING PRINTED NAME AND TITLE
Mike Louie, Deputy County Clerk-Recorder

County of Santa Clara
Office of the County Clerk-Recorder
Business Division

County Government Center
70 West Hedding Street, E. Wing, 1st Floor
San Jose, California 95110 (408) 299-5688

1850

Santa Clara County - Clerk-Recorder Office
State of California

File Number: ENV20727
ENVIRONMENTAL FILING
No. of Pages: 5
Total Fees: $0.00
File Date: 03/28/2017
Expires: 04/27/2017

REGINA ALCOMENDRAS, Clerk-Recorder
By: Mike Louie, Deputy Clerk-Recorder

CEQA DOCUMENT DECLARATION

ENVIRONMENTAL FILING FEE RECEIPT

PLEASE COMPLETE THE FOLLOWING:

1. **LEAD AGENCY:** City of Palo Alto
2. **PROJECT TITLE:** Palo Alto Public Safety Building and Parking Structure at 250 and 350 Sherman Avenue, Palo Alto, CA 94301
3. **APPLICANT NAME:** City of Palo Alto; Matt Raschke, project manager **PHONE:** (650) 496-5937
4. **APPLICANT ADDRESS:** 250 Hamilton Avenue, Palo Alto, CA 94301
5. **PROJECT APPLICANT IS A:** ☒ Local Public Agency ☐ School District ☐ Other Special District ☐ State Agency ☐ Private Entity
6. **NOTICE TO BE POSTED FOR** 30 **DAYS.**
7. **CLASSIFICATION OF ENVIRONMENTAL DOCUMENT**

a. **PROJECTS THAT ARE SUBJECT TO DFG FEES**

☐ 1. **ENVIRONMENTAL IMPACT REPORT** (PUBLIC RESOURCES CODE §21152)	$ 3,078.25	$ 0.00
☐ 2. **NEGATIVE DECLARATION** (PUBLIC RESOURCES CODE §21080(C)	$ 2,216.25	$ 0.00
☐ 3. **APPLICATION FEE WATER DIVERSION** (STATE WATER RESOURCES CONTROL BOARD ONLY)	$ 850.00	$ 0.00
☐ 4. **PROJECTS SUBJECT TO CERTIFIED REGULATORY PROGRAMS**	$ 1,046.50	$ 0.00
☐ 5. **COUNTY ADMINISTRATIVE FEE** (REQUIRED FOR a-1 THROUGH a-4 ABOVE) Fish & Game Code §711.4(e)	$ 50.00	$ 0.00

b. **PROJECTS THAT ARE EXEMPT FROM DFG FEES**

☐ 1. **NOTICE OF EXEMPTION** ($50.00 COUNTY ADMINISTRATIVE FEE REQUIRED)	$ 50.00	$ 0.00
☐ 2. **A COMPLETED "CEQA FILING FEE NO EFFECT DETERMINATION FORM" FROM THE DEPARTMENT OF FISH & GAME, DOCUMENTING THE DFG'S DETERMINATION THAT THE PROJECT WILL HAVE NO EFFECT ON FISH, WILDLIFE AND HABITAT, OR AN OFFICIAL, DATED RECEIPT / PROOF OF PAYMENT SHOWING PREVIOUS PAYMENT OF THE DFG FILING FEE FOR THE ****SAME*** **PROJECT IS ATTACHED** ($50.00 COUNTY ADMINISTRATIVE FEE REQUIRED)		
DOCUMENT TYPE: ☐ ENVIRONMENTAL IMPACT REPORT ☐ NEGATIVE DECLARATION	$ 50.00	$ 0.00

c. **NOTICES THAT ARE *NOT* SUBJECT TO DFG FEES *OR* COUNTY ADMINISTRATIVE FEES**

☒ **NOTICE OF PREPARATION** ☐ **NOTICE OF INTENT**	NO FEE	$ NO FEE

8. **OTHER:** ________ **FEE (IF APPLICABLE): $**______
9. **TOTAL RECEIVED**.. $ 0.00

*NOTE: "***SAME PROJECT***" MEANS NO CHANGES. IF THE DOCUMENT SUBMITTED IS NOT THE SAME (OTHER THAN DATES), A "NO EFFECT DETERMINATION" LETTER FROM THE DEPARTMENT OF FISH AND GAME FOR THE SUBSEQUENT FILING OR THE APPROPRIATE FEES ARE REQUIRED.

THIS FORM MUST BE COMPLETED AND ATTACHED TO THE FRONT OF ALL CEQA DOCUMENTS LISTED ABOVE (*INCLUDING COPIES*) SUBMITTED FOR FILING. WE WILL NEED AN ORIGINAL (WET SIGNATURE) AND TWO (2) COPIES. *(YOUR ORIGINAL WILL BE RETURNED TO YOU AT THE TIME OF FILING.)*

CHECKS FOR ALL FEES SHOULD BE MADE PAYABLE TO: SANTA CLARA COUNTY CLERK-RECORDER

PLEASE NOTE: FEES ARE ANNUALLY ADJUSTED (Fish & Game Code §711.4(b); PLEASE CHECK WITH THIS OFFICE AND THE DEPARTMENT OF FISH AND GAME FOR THE LATEST FEE INFORMATION.

". . . NO PROJECT SHALL BE OPERATIVE, VESTED, OR FINAL, NOR SHALL LOCAL GOVERNMENT PERMITS FOR THE PROJECT BE VALID, UNTIL THE FILING FEES REQUIRED PURSUANT TO THIS SECTION ARE PAID." Fish & Game Code §711.4(c)(3)

(Fees Effective 01-01-2017)

City of Palo Alto

Department of Planning & Community Environment

California Environmental Quality Act

NOTICE OF PREPARATION

TO: Responsible Agencies, Trustee Agencies, and Other Interested Parties

FROM: City of Palo Alto
250 Hamilton Avenue
Palo Alto, CA 94301

SUBJECT: Notice of Preparation (NOP) of a Draft Environmental Impact Report (EIR) for a proposed City of Palo Alto Public Safety Building at 250 Sherman and Parking Structure at 350 Sherman Avenue (AKA California Avenue Parking Garage).

The City of Palo Alto will be the lead agency under the California Environmental Quality Act (CEQA) and will prepare a project EIR for the proposed project, identified below.

AGENCIES: The City of Palo Alto requests that public agencies provide comments regarding the scope and content of the EIR as it relates to an agency's statutory responsibilities in connection with the proposed project in accordance with California Code of Regulation, Title 14, Section 15082(b), if the agency will need to use the EIR prepared by the City of Palo Alto when considering any permit or other approval for the project.

ORGANIZATION AND INTERESTED PARTIES: The City of Palo Alto requests comments and concerns from organizations and interested parties regarding the environmental issues associated with construction and operation of the proposed project.

PROJECT TITLE: City of Palo Alto Public Safety Building and California Avenue Parking Garage

PROJECT LOCATION: 250 and 350 Sherman Avenue; two City blocks fronting Sherman Avenue on the southeast and bounded by Jacaranda Lane to the northwest, Ash Street to the southwest and Park Boulevard to the northeast, and bisected by Birch Street, within the city of Palo Alto, Santa Clara County, California.

PROJECT DESCRIPTION: The City of Palo Alto (City/project applicant) proposes to relocate the City's Police Department, Fire Administration, Emergency Communications Center (911), Office of Emergency Services, Emergency Operations Center (EOC), and associated parking and other support spaces from their current downtown location at the Palo Alto Civic Center at 275 Forest Avenue, Palo Alto, California, to 250 Sherman Avenue in a new adequately sized Public Safety Building (PSB) facility designed to meet the operational and essential facility standards for police and emergency service providers. The City also proposes to construct a new public

parking garage at 350 Sherman Avenue to provide a net increase of 150 to 330 public parking stalls for the California Avenue commercial area.
The project site includes two City-owned surface parking lots designated as Lot C-6 and Lot C-7 on Sherman Avenue between Jacaranda Lane, Ash Street and Park Boulevard in the California Avenue commercial area in Palo Alto.

The construction of the PSB on the 1.2-acre Lot C-6 (at 250 Sherman Avenue) will displace approximately 160 existing public parking stalls. Redevelopment of the adjoining 0.93-acre surface parking Lot C-7 (at 350 Sherman Avenue) for a new parking garage will displace approximately 150 existing parking stalls and will contain 460 to 640 stalls (an increase in the number of parking spaces on-site). The construction of the 350 Sherman garage must be complete prior to the start of construction of the new PSB, in order to minimize construction disruption to the neighborhood and loss of parking to local merchants.

The Project includes three primary elements:

- A new three-story PSB ranging in size from 45,500 square feet (SF) to 50,000 SF, over two levels of secure basement parking providing approximately 170 to 190 total secure parking spaces at 250 Sherman Avenue (Lot C-6), and associated site improvements.
- A new three- to four-level public parking garage over one to two basement parking levels, providing approximately 460 to 640 spaces at 350 Sherman Avenue (Lot C-7), and associated site improvements.
- An approximately 4,200 SF to 4,700 SF multi- or single-tenant commercial shell space building fronting Birch Street, to be used as commercial retail space for new or existing businesses. This retail component is an option that would accompany the public parking garage of 460 to 640 spaces at 350 Sherman Avenue. Without the retail component, the parking garage would accommodate 522 to 640 parking spaces.

Further details about the project design are included in the Initial Study, which is available for review at the City of Palo Alto website: http://www.cityofpaloalto.org/planningprojects
The two blocks that comprise the site are both zoned as Public Facilities (PF) and are located in the California Avenue Business District. The Comprehensive Plan land use designation of the PSB project site is Public Facilities (PF). The parking garage site's Comprehensive Plan land use designation is Community Commercial.

Implementation of the proposed project will require approval from the City Council. As currently planned, the proposed parking garage will require changes to the zoning district (from Public Facilities to another zone) or changes to the text of the zoning ordinance to allow for the planned lot coverage, Floor Area Ratio (FAR), height, and setbacks in the Public Facilities zone.

POTENTIAL ENVIRONMENTAL EFFECTS: The following areas of potentially significant environmental impact will be analyzed in the Draft EIR: Aesthetics, Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Noise, Public Services, Transportation/Traffic, Utilities and Service Systems, and Energy. Potential cumulative impacts and alternatives, including the No Project Alternative, will be evaluated. An Initial Study evaluating the project's environmental effects in other resource areas is available for review at the City of Palo Alto website, as noted above.

SCOPING MEETING: The City of Palo Alto will hold a scoping meeting as part of the Planning and Transportation Commission (PTC)'s regularly scheduled meeting on April 12, 2017. The meeting will start at 6:00 PM and will be held at the City of Palo Alto Council Chambers, located in City Hall at 250 Hamilton Avenue. The meeting agenda will be posted to the City's website: http://www.cityofpaloalto.org/gov/boards/ptc/default.asp.

Interested parties are welcome to attend and present environmental information or concerns that you believe should be addressed in the EIR.

The NOP and related CEQA documents for this project will be available for review on the web. You can view this NOP and the Initial Study electronically at:
http://www.cityofpaloalto.org/planningprojects

If you require additional project information, please contact Matt Raschke, Senior Engineer, Department of Public Works, at Matt.Raschke@cityofpaloalto.org

PUBLIC REVIEW PERIOD: This Notice of Preparation is available for public review and comment pursuant to California Code of Regulations, Title 14, Section 15082(b), for 30 days. The comment period for the NOP begins March 24, 2017 and ends on April 24, 2017. Due to the limits mandated by state law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

RESPONSES AND COMMENTS: Please indicate a contact person for your agency and send your responses and comments to:

Amy French, Chief Planning Official
Planning & Community Environment Department
City of Palo Alto
250 Hamilton Avenue
Palo Alto, California 94301
Telephone: (650) 329-2442
Fax: (650) 329-2154
Email: Amy.French@cityofpaloalto.org

Amy
Project Planner

3/22/17
Date

DETERMINATION:

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, if the effect is a "potentially significant impact" or "potentially significant unless mitigated impact." 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 (1) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (2) 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.

Prepared by:

Signature: Ray Pendro Date: March 20, 2017
Ray Pendro, CEQA Project Manager
MIG, Inc.

Reviewed by:

Signature: Date: 3/22/17
Amy French
Chief Planning Official
City of Palo Alto

County of Santa Clara
Clerk-Recorder
County Government Center, East Wing
70 West Hedding Street
San Jose, California 95110

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City of Palo Alto
250 Hamilton Ave
Palo Alto, CA. 94301

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STATE OF CALIFORNIA
GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH
STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

Notice of Preparation

March 23, 2017

To: Reviewing Agencies

Re: City of Palo Alto Public Safety building and California Avenue Parking Garage
SCH# 2017032066

Attached for your review and comment is the Notice of Preparation (NOP) for the City of Palo Alto Public Safety building and California Avenue Parking Garage draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Matt Raschke
City of Palo Alto
250 Hamilton Avenue
Palo Alto, CA 94301

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH#	**2017032066**
Project Title	City of Palo Alto Public Safety building and California Avenue Parking Garage
Lead Agency	Palo Alto, City of

Type **NOP** Notice of Preparation

Description The City of Palo Alto proposes to relocate the City's Police Dept., Fire Administration, Emergency Communications Center (911), Office of Emergency Services Operations Center (EOC), and associated parking and other support spaces from their current downtown location at the Palo Alto Civic Center 275 Forest Ave., Palo Alto, CA , to a new adequately sized Public Safety Building (PSB) facility designed to meet the operational and essential facility standards for police and emergency service providers. The City also proposes to construct a new public parking garage to provide a net increase of 150 to 330 public parking stalls for the CA Ave commercial area. The construction of the Public Safety Building and CA Ave. Parking Garage comprise the project.

Lead Agency Contact

Name Matt Raschke
Agency City of Palo Alto
Phone 650-329-2151 ***Fax***
email
Address 250 Hamilton Avenue
City Palo Alto ***State*** CA ***Zip*** 94301

Project Location

County Santa Clara
City Palo Alto
Region
Cross Streets Sherman Ave. between Ash St. & Park Blvd.
Lat / Long
Parcel No. multiple
Township ***Range*** ***Section*** ***Base***

Proximity to:

Highways 101, 82, 280
Airports Moffett Federal Airfield
Railways Caltrain
Waterways SF Bay, Francisquito Creek, Matadero Creek
Schools Palo Alto USD, Stanford
Land Use Surface parking lots/Public Facilities (PF)/Major Institutional Special Facility (MISF), Community Commercial (CC)

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Drainage/Absorption; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Toxic/Hazardous; Sewer Capacity; Septic System; Solid Waste; Soil Erosion/Compaction/Grading; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Landuse; Other Issues

---

Reviewing Agencies Resources Agency; Cal Fire; Department of Parks and Recreation; San Francisco Bay Conservation and Development Commission; Department of Fish and Wildlife, Region 3; Office of Emergency Services, California; Native American Heritage Commission; Public Utilities Commission; State Lands Commission; Caltrans, Division of Aeronautics; California Highway Patrol; Caltrans, District 4; Regional Water Quality Control Board, Region 2

Date Received 03/23/2017 ***Start of Review*** 03/23/2017 ***End of Review*** 04/21/2017

Note: Blanks in data fields result from insufficient information provided by lead agency.

Print Form

Appendix C

201703206

Notice of Completion & Environmental Document Transmittal

SCH # 2017032066

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

Project Title: City of Palo Alto Public Safety Building and California Avenue Parking Garage

Lead Agency: City of Palo Alto
Contact Person: Matt Raschke, Sr. Eng., DPW
Mailing Address: 250 Hamilton Avenue
Phone: (650) 329-2151
City: Palo Alto, CA
Zip: 94301
County: Santa Clara

Project Location: County: Santa Clara
City/Nearest Community: Palo Alto
Cross Streets: Sherman Ave. between Ash St. & Park Blvd.
Zip Code: 94306
Longitude/Latitude (degrees, minutes and seconds): ____° ____′ ____″ N / ____° ____′ ____″ W Total Acres: ____
Assessor's Parcel No.: multiple
Section: ____ Twp.: ____ Range: ____ Base: ____
Within 2 Miles: State Hwy #: 101, 82, 280
Waterways: San Francisco Bay, Francisquito Crk., Matadero Crk.
Airports: Moffett Federal Airfield
Railways: Caltrain
Schools: Palo Alto USD, Stanford

Document Type:

CEQA:
☒ NOP
☐ Early Cons
☐ Neg Dec
☐ Mit Neg Dec
☐ Draft EIR
☐ Supplement/Subsequent EIR
(Prior SCH No.) ____
Other: ____

NEPA:
☐ NOI
☐ EA
☐ Draft EIS
☐ FONSI

Other:
☐ Joint Document
☐ Final Document
☐ Other: ____

Governor's Office of Planning & Research

MAR 23 2017

STATE CLEARINGHOUSE

Local Action Type:

☐ General Plan Update
☐ General Plan Amendment
☐ General Plan Element
☐ Community Plan
☐ Specific Plan
☐ Master Plan
☐ Planned Unit Development
☒ Site Plan
☐ Rezone
☐ Prezone
☐ Use Permit
☐ Land Division (Subdivision, etc.)
☐ Annexation
☐ Redevelopment
☐ Coastal Permit
☐ Other: Pub. Safety Bldg

Development Type:

☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational: ____
☐ Recreational: ____
☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type ____
☐ Mining: Mineral ____
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☒ Other: Pub. Safety Bldg. 50K sq.ft. + 640-space pkg. garage

Project Issues Discussed in Document:

☒ Aesthetic/Visual
☒ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☒ Biological Resources
☐ Coastal Zone
☒ Drainage/Absorption
☐ Economic/Jobs
☐ Fiscal
☒ Flood Plain/Flooding
☒ Forest Land/Fire Hazard
☒ Geologic/Seismic
☒ Minerals
☒ Noise
☒ Population/Housing Balance
☒ Public Services/Facilities
☒ Recreation/Parks
☒ Schools/Universities
☒ Septic Systems
☒ Sewer Capacity
☒ Soil Erosion/Compaction/Grading
☒ Solid Waste
☒ Toxic/Hazardous
☒ Traffic/Circulation
☒ Vegetation
☒ Water Quality
☒ Water Supply/Groundwater
☒ Wetland/Riparian
☐ Growth Inducement
☒ Land Use
☐ Cumulative Effects
☒ Other: GHGs

Present Land Use/Zoning/General Plan Designation:

Surface parking lots/Public Facilities (PF)/Major Institutional Special Facility (MISF), Community Commercial (CC)

Project Description: *(please use a separate page if necessary)*

The City of Palo Alto proposes to relocate the City's Police Department, Fire Administration, Emergency Communications Center (911), Office of Emergency Services, Emergency Operations Center (EOC), and associated parking and other support spaces from their current downtown location at the Palo Alto Civic Center at 275 Forest Avenue, Palo Alto, California, to a new adequately sized Public Safety Building (PSB) facility designed to meet the operational and essential facility standards for police and emergency service providers. The City also proposes to construct a new public parking garage to provide a net increase of 150 to 330 public parking stalls for the California Avenue commercial area. The construction of the Public Safety Building and California Avenue Parking Garage comprise the project.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

NOP Distribution List

County: Santa Clara

SCH#2017032066

esources Agency

Resources Agency
Nadell Gayou

☐ **Dept. of Boating & Waterways**
Denise Peterson

☐ **California Coastal Commission**
Elizabeth A. Fuchs

☐ **Colorado River Board**
Lisa Johansen

☐ **Dept. of Conservation**
Crina Chan

☐ **California Energy Commission**
Eric Knight

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☐ **Central Valley Flood Protection Board**
James Herota

☐ **Office of Historic Preservation**
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Dept of Parks & Recreation
Environmental Stewardship Section

☐ **California Department of Resources, Recycling & Recovery**
Sue O'Leary

☒ **S.F. Bay Conservation & Dev't. Comm.**
Steve Goldbeck

☐ **Dept. of Water Resources**
Resources Agency
Nadell Gayou

Fish and Game

☐ **Depart. of Fish & Wildlife**
Scott Flint
Environmental Services Division

☐ **Fish & Wildlife Region 1**
Curt Babcock

☐ **Fish & Wildlife Region 1E**
Laurie Harnsberger

☐ **Fish & Wildlife Region 2**
Jeff Drongesen

☒ **Fish & Wildlife Region 3**
Craig Weightman

☐ **Fish & Wildlife Region 4**
Julie Vance

☐ **Fish & Wildlife Region 5**
Leslie Newton-Reed
Habitat Conservation Program

☐ **Fish & Wildlife Region 6**
Tiffany Ellis
Habitat Conservation Program

☐ **Fish & Wildlife Region 6 I/M**
Heidi Calvert
Inyo/Mono, Habitat Conservation Program

☐ **Dept. of Fish & Wildlife M**
William Paznokas
Marine Region

Other Departments

☐ **Food & Agriculture**
Sandra Schubert
Dept. of Food and Agriculture

☐ **Dept. of General Services**
Cathy Buck
Environmental Services Section

☐ **Delta Stewardship Council**
Kevan Samsam

☐ **Housing & Comm. Dev.**
CEQA Coordinator
Housing Policy Division

Independent Commissions,Boards

☐ **Delta Protection Commission**
Erik Vink

☒ **OES (Office of Emergency Services)**
Monique Wilber

■ **Native American Heritage Comm.**
Debbie Treadway

☒ **Public Utilities Commission**
Supervisor

☐ **Santa Monica Bay Restoration**
Guangyu Wang

☒ **State Lands Commission**
Jennifer Deleong

☐ **Tahoe Regional Planning Agency (TRPA)**
Cherry Jacques

Cal State Transportation Agency CalSTA

☒ **Caltrans - Division of Aeronautics**
Philip Crimmins

☐ **Caltrans – Planning HQ LD-IGR**
Christian Bushong

☒ **California Highway Patrol**
Suzann Ikeuchi
Office of Special Projects

Dept. of Transportation

☐ **Caltrans, District 1**
Rex Jackman

☐ **Caltrans, District 2**
Marcelino Gonzalez

☐ **Caltrans, District 3**
Eric Federicks – South
Susan Zanchi - North

☒ **Caltrans, District 4**
Patricia Maurice

☐ **Caltrans, District 5**
Larry Newland

☐ **Caltrans, District 6**
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☐ **Caltrans, District 7**
Dianna Watson

☐ **Caltrans, District 8**
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☐ **Caltrans, District 9**
Gayle Rosander

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☐ **Caltrans, District 11**
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☐ **Caltrans, District 12**
Maureen El Harake

Cal EPA

Air Resources Board

☐ Airport & Freight
Jack Wursten

☐ Transportation Projects
Nesamani Kalandiyur

☐ Industrial/Energy Projects
Mike Tollstrup

☐ **State Water Resources Control Board**
Regional Programs Unit
Division of Financial Assistance

☐ **State Water Resources Control Board**
Cindy Forbes – Asst Deputy
Division of Drinking Water

☐ **State Water Resources Control Board**
Div. Drinking Water #________

☐ **State Water Resources Control Board**
Student Intern, 401 Water Quality Certification Unit
Division of Water Quality

☐ **State Water Resouces Control Board**
Phil Crader
Division of Water Rights

☐ **Dept. of Toxic Substances Control**
CEQA Tracking Center

☐ **Department of Pesticide Regulation**
CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

☐ **RWQCB 1**
Cathleen Hudson
North Coast Region (1)

☒ **RWQCB 2**
Environmental Document Coordinator
San Francisco Bay Region (2)

☐ **RWQCB 3**
Central Coast Region (3)

☐ **RWQCB 4**
Teresa Rodgers
Los Angeles Region (4)

☐ **RWQCB 5S**
Central Valley Region (5)

☐ **RWQCB 5F**
Central Valley Region (5)
Fresno Branch Office

☐ **RWQCB 5R**
Central Valley Region (5)
Redding Branch Office

☐ **RWQCB 6**
Lahontan Region (6)

☐ **RWQCB 6V**
Lahontan Region (6)
Victorville Branch Office

☐ **RWQCB 7**
Colorado River Basin Region (7)

☐ **RWQCB 8**
Santa Ana Region (8)

☐ **RWQCB 9**
San Diego Region (9)

☐ **Other** ________________
____
____

☐ ________________
Conservancy

Last Updated 2/3/17

STATE OF CALIFORNIA Edmund G. Brown Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION

Environmental and Cultural Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone (916) 373-3710
Fax (916) 373-5471
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

April 14, 2017

Matt Raschke
City of Palo Alto
250 Hamilton Avenue
Palo Alto, CA 94301

RE: SCH#2017032066 City of Palo Alto Safety Building and California Avenue Parking Garage, Santa Clara County

Dear Mr. Raschke:

The Native American Heritage Commission has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code § 21000 et seq.), specifically Public Resources Code section 21084.1, states that a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, § 15064.5 (b) (CEQA Guidelines Section 15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an environmental impact report (EIR) shall be prepared. (Pub. Resources Code § 21080 (d); Cal. Code Regs., tit. 14, § 15064 subd.(a)(1) (CEQA Guidelines § 15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources with the area of project effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code § 21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code § 21084.3 (a)). **AB 52 applies to any project for which a notice of preparation or a notice of negative declaration or mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. § 800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments. **Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.**

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
    - **a.** A brief description of the project.
    - **b.** The lead agency contact information.
    - **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code § 21080.3.1 (d)).
    - **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code § 21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code § 21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or environmental impact report. (Pub. Resources Code § 21080.3.1(b)).
    - **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code § 65352.4 (SB 18). (Pub. Resources Code § 21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
    - **a.** Alternatives to the project.
    - **b.** Recommended mitigation measures.
    - **c.** Significant effects. (Pub. Resources Code § 21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
    - **a.** Type of environmental review necessary.
    - **b.** Significance of the tribal cultural resources.
    - **c.** Significance of the project's impacts on tribal cultural resources.
    - **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code § 21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code sections 6254 (r) and 6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code § 21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
    - **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
    - **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code section 21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code § 21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
    a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
    b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code § 21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code section 21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code section 21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code § 21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code section 21084.3 (b). (Pub. Resources Code § 21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code § 21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a nonfederally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code § 815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code § 5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An environmental impact report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code sections 21080.3.1 and 21080.3.2 and concluded pursuant to Public Resources Code section 21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code section 21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code § 21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code § 65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code § 65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code section 65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code sections 5097.9 and 5097.993 that are within the city's or county's jurisdiction. (Gov. Code § 65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    - a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    - b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    - a. If part or all of the APE has been previously surveyed for cultural resources.
    - b. If any known cultural resources have been already been recorded on or adjacent to the APE.
    - c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    - d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    - a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.

- **b.** The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
- **a.** A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
- **b.** A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
- **a.** Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, section 15064.5(f) (CEQA Guidelines section 15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
- **b.** Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
- **c.** Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code section 7050.5, Public Resources Code section 5097.98, and Cal. Code Regs., tit. 14, section 15064.5, subdivisions (d) and (e) (CEQA Guidelines section 15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions, please contact me at my email address: frank.lienert@nahc.ca.gov

Sincerely,

Frank Lienert
Associate Governmental Program Analyst

cc: State Clearinghouse

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
P.O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5528
FAX (510) 286-5559
TTY 711
www.dot.ca.gov

Serious Drought.
Help save water!

April 21, 2017

04-SCL-2017-000186
SCL/82/PM 24.19
SCH # 2017032066

Mr. Matt Raschke
Department of Public Works
City of Palo Alto
250 Hamilton Avenue
Palo Alto, CA 94301

Dear Mr. Raschke:

City of Palo Alto Public Safety Building and California Avenue Parking Garage – Notice of Preparation

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above-referenced project. In tandem with the Metropolitan Transportation Commission's (MTC) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), Caltrans new mission signals a modernization of our approach to evaluating and mitigating impacts to the State Transportation Network (STN). Caltrans Strategic Management Plan aims to reduce vehicle miles traveled (VMT) by tripling bicycle and doubling both pedestrian and transit travel by 2020. Our comments are based on the above-referenced Notice of Preparation (NOP).

Project Understanding
The proposed project is located approximately 600 feet northeast of the State Route (SR) 82 (El Camino Real)/Sherman Avenue intersection. The project is located in the California Avenue Priority Development Area (PDA) and proposes relocating the City of Palo Alto (City) Police Department, Fire Administration, Emergency Communications Center (911), Office of Emergency Services, Emergency Operations Center (EOC), and associated parking and other support spaces from their current downtown location at the Palo Alto Civic Center at 275 Forest Avenue to 250 Sherman Avenue. A new adequately sized Public Safety Building (PSB) facility is needed to meet the operation and essential facility standards for police and emergency service providers. The City also proposes to construct a new public parking garage at 350 Sherman Avenue to provide a net increase of between 150 to 330 public parking stalls for the California Avenue commercial area. The two sites are currently occupied by surface parking lots.

The project includes three primary elements:

- A new 3-story PSB ranging in size from 45,500 square feet (sf) to 50,000 sf, over two levels of secure basement parking.
- A new 3- to 4-level public parking garage over one to two basement parking levels.
- An approximately 4,000-4,700 sf multi- or single-tenant commercial shell space building fronting Birch Street.

Lead Agency
As the lead agency, the City is responsible for all project mitigation, including any needed improvements to the STN and for VMT reduction. The project's fair share contribution, financing, scheduling, implementation responsibilities and lead agency monitoring should be fully discussed for all proposed mitigation measures.

Travel Demand Analysis
Please submit a travel demand analysis that provides VMT resulting from the proposed project. With the enactment of Senate Bill (SB) 743, Caltrans is focusing on transportation infrastructure that supports smart growth and efficient development to ensure alignment with State policies through the use of efficient development patterns, innovative travel demand reduction strategies, multimodal improvements, and VMT as the primary transportation impact metric. For projects reviewed under the California Environmental Quality Act (CEQA), Caltrans uses VMT as the metric for evaluating transportation impacts and mitigation. Please ensure that the travel demand analysis includes:

1. A vicinity map, regional location map, and site plan clearly showing project access in relation to nearby State roadways. Ingress and egress for all project components should be clearly identified. Clearly identify the State right-of-way (ROW). Project driveways, local roads and intersections, car/bike parking, and transit facilities should be mapped.

2. A VMT analysis pursuant to the City's guidelines or, if the City has no guidelines, the Office of Planning and Research's Draft Guidelines. Projects that result in automobile VMT per capita greater than 15% below existing (i.e. baseline) citywide or regional values for similar land use types may indicate a significant impact.

3. Mitigation for increasing VMT should be identified and mitigated in a manner that does not further raise VMT. Mitigation may include contributions to the Santa Clara Valley Transportation Authority's (VTA) voluntary contribution program, and should support the use of transit and active transportation modes. Potential mitigation measures that include the requirements of other agencies such as Caltrans are fully enforceable through permit conditions, agreements, or other legally-binding instruments under the control of the City.

4. Schematic illustrations of walking, biking and auto traffic conditions at the project site and study area roadways, trip distribution percentages and volumes as well as intersection geometrics (i.e., lane configurations for AM and PM peak periods). Operational concerns for all road users that may increase the potential for future collisions should be identified and

fully mitigated in a manner that does not further raise VMT.

5. The project's primary and secondary effects on pedestrians, bicycles, disabled travelers and transit performance should be evaluated, including countermeasures and trade-offs resulting from mitigating VMT increases. Access to pedestrians, bicycle, and transit facilities must be maintained.

Vehicle Trip Reduction

To reduce VMT the project should include:

- Membership in a transportation management association.
- Transit subsidies and/or EcoPasses on a permanent basis to all employees.
- Ten percent vehicle parking reduction.
- Transit and trip planning resources.
- Carpool and vanpool ride-matching support.
- Carpool and clean-fuel parking spaces.
- Secured bicycle storage facilities.
- Bicycles for employees to access nearby destinations.
- Showers, changing rooms and clothing lockers.
- Fix-it bicycle repair station(s).
- Transportation and commute information kiosk.
- Outdoor patios, outdoor areas, furniture, pedestrian pathways, picnic and recreational areas.
- Nearby walkable amenities.
- Kick-off commuter event at full occupancy.
- Employee transportation coordinator.
- Emergency Ride Home program.
- Bicycle route mapping resources and bicycle parking incentives,
- Decreased headway times and improved way-finding on bus lines by working with VTA to provide a better connection between the project, the California Avenue Train Station, and regional destinations.

Transportation Demand Management (TDM) programs should be documented with annual monitoring reports by an onsite TDM coordinator to demonstrate effectiveness. These smart growth approaches are consistent with the MTC's RTP/SCS goals and would meet Caltrans Strategic Management Plan. Reducing parking supply can encourage active forms of transportation, reduce regional VMT, and lessen future transportation impacts on SR 82 and other nearby State facilities.

Transportation Impact Fees

Please identify project-generated traffic and estimate the costs of public transportation improvements necessitated by the proposed project; viable funding sources such as development, transportation impact fees, and VTA's voluntary contribution program should also be identified. Caltrans encourages a sufficient allocation of fair share contributions toward multi-modal and regional transit improvements to fully mitigate cumulative impacts to regional transportation. Also, Caltrans strongly supports measures to increase sustainable mode shares, thereby reducing VMT.

Traffic Control Plan
A Caltrans-approved Traffic Control Plan (TCP) is required to avoid project-related impacts to the STN, if it is anticipated that vehicular, bicycle, and pedestrian traffic will be impacted during the construction of the proposed project requiring traffic restrictions and detours. The TCP must also comply with the requirements of corresponding jurisdictions.

In addition, pedestrian access through the construction zone must be in accordance with the Americans with Disabilities Act (ADA) regulations (see Caltrans *Temporary Pedestrian Facilities Handbook* for maintaining pedestrian access and meeting ADA requirements during construction at:
www.dot.ca.gov/hq/construc/safety/Temporary_Pedestrian_Facilities_Handbook.pdf) (see also Caltrans Traffic Operations Policy Directive 11-01 "Accommodating Bicyclists in Temporary Traffic Control Zones" at: www.dot.ca.gov/trafficops/policy/11-01.pdf). All curb ramps and pedestrian facilities located within the limits of the project are required to be brought up to current ADA standards as part of this project.

For further TCP assistance, please contact the Caltrans District 4 Office of Traffic Management Operations at (510) 286-4579. Further transportation management information is available at the following website: www.dot.ca.gov/hq/traffops/trafmgmt/tmp_lcs/index.htm.

Should you have any questions regarding this letter, please contact Brian Ashurst at (510) 286-5505 or brian.ashurst@dot.ca.gov.

Sincerely,

for

PATRICIA MAURICE
District Branch Chief
Local Development - Intergovernmental Review

c: Scott Morgan, State Clearinghouse – electronic copy
Robert Swierk, VTA – electronic copy

APPENDIX 21.2

SUPPLEMENTAL AIR QUALITY INFORMATION

PaloAlto_LotC6_PSB

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government Office Building	48.00	1000sqft	0.00	48,000.00	0
Enclosed Parking with Elevator	147.00	Space	1.27	104,690.00	0
Parking Lot	10.00	Space	0.00	16,617.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2021
Utility Company	City of Palo Alto Public Utilities				
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

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					
2019	0.1784	2.3626	1.1506	4.1400e-003	0.2635	0.0777	0.3412	0.1256	0.0721	0.1977	0.0000	385.9030	385.9030	0.0543	0.0000	387.2601
2020	0.4529	4.0290	3.2217	6.3300e-003	0.0955	0.1896	0.2852	0.0260	0.1773	0.2033	0.0000	552.7560	552.7560	0.1185	0.0000	555.7175
2021	0.3534	0.6921	0.6121	1.2200e-003	0.0188	0.0313	0.0501	5.1200e-003	0.0293	0.0344	0.0000	106.0096	106.0096	0.0222	0.0000	106.5638
Maximum	**0.4529**	**4.0290**	**3.2217**	**6.3300e-003**	**0.2635**	**0.1896**	**0.3412**	**0.1256**	**0.1773**	**0.2033**	**0.0000**	**552.7560**	**552.7560**	**0.1185**	**0.0000**	**555.7175**

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					
2019	0.1012	1.4071	1.2532	4.1400e-003	0.1537	0.0334	0.1871	0.0661	0.0315	0.0976	0.0000	385.9028	385.9028	0.0543	0.0000	387.2599
2020	0.2413	1.4964	3.5351	6.3300e-003	0.0955	0.0562	0.1518	0.0260	0.0550	0.0810	0.0000	552.7555	552.7555	0.1185	0.0000	555.7170
2021	0.3185	0.2745	0.6742	1.2200e-003	0.0188	9.4000e-003	0.0282	5.1200e-003	9.2100e-003	0.0143	0.0000	106.0095	106.0095	0.0222	0.0000	106.5637
Maximum	**0.3185**	**1.4964**	**3.5351**	**6.3300e-003**	**0.1537**	**0.0562**	**0.1871**	**0.0661**	**0.0550**	**0.0976**	**0.0000**	**552.7555**	**552.7555**	**0.1185**	**0.0000**	**555.7170**

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	0.2230	2.0000e-005	1.8900e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.6600e-003	3.6600e-003	1.0000e-005	0.0000	3.9100e-003
Energy	4.2600e-003	0.0387	0.0325	2.3000e-004		2.9400e-003	2.9400e-003		2.9400e-003	2.9400e-003	0.0000	42.1361	42.1361	8.1000e-004	7.7000e-004	42.3865
Mobile	0.3260	1.2772	3.3805	0.0104	0.9103	9.2100e-003	0.9195	0.2437	8.6000e-003	0.2523	0.0000	953.3497	953.3497	0.0356	0.0000	954.2405
Stationary	7.7500e-003	0.0217	0.0198	4.0000e-005		1.1400e-003	1.1400e-003		1.1400e-003	1.1400e-003	0.0000	3.5963	3.5963	5.0000e-004	0.0000	3.6089
Waste						0.0000	0.0000		0.0000	0.0000	9.0615	0.0000	9.0615	0.5355	0.0000	22.4495
Water						0.0000	0.0000		0.0000	0.0000	0.3168	0.0000	0.3168	0.0325	7.7000e-004	1.3593
Total	**0.5611**	**1.3376**	**3.4347**	**0.0107**	**0.9103**	**0.0133**	**0.9236**	**0.2437**	**0.0127**	**0.2564**	**9.3783**	**999.0857**	**1,008.4640**	**0.6050**	**1.5400e-003**	**1,024.0485**

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	0.2230	2.0000e-005	1.8900e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.6600e-003	3.6600e-003	1.0000e-005	0.0000	3.9100e-003
Energy	4.2600e-003	0.0387	0.0325	2.3000e-004		2.9400e-003	2.9400e-003		2.9400e-003	2.9400e-003	0.0000	42.1361	42.1361	8.1000e-004	7.7000e-004	42.3865
Mobile	0.3260	1.2772	3.3805	0.0104	0.9103	9.2100e-003	0.9195	0.2437	8.6000e-003	0.2523	0.0000	953.3497	953.3497	0.0356	0.0000	954.2405
Stationary	7.7500e-003	0.0217	0.0198	4.0000e-005		1.1400e-003	1.1400e-003		1.1400e-003	1.1400e-003	0.0000	3.5963	3.5963	5.0000e-004	0.0000	3.6089
Waste						0.0000	0.0000		0.0000	0.0000	9.0615	0.0000	9.0615	0.5355	0.0000	22.4495
Water						0.0000	0.0000		0.0000	0.0000	0.3168	0.0000	0.3168	0.0325	7.7000e-004	1.3593
Total	**0.5611**	**1.3376**	**3.4347**	**0.0107**	**0.9103**	**0.0133**	**0.9236**	**0.2437**	**0.0127**	**0.2564**	**9.3783**	**999.0857**	**1,008.4640**	**0.6050**	**1.5400e-003**	**1,024.0485**

	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

APPENDIX 21.3

SUPPLEMENTAL NOISE INFORMATION

Palo Alto Public Safety Building EIR
Appendix: N-1
Summary of Ambient Noise Monitoring Data
Prepared by MIG, Inc.

Table N-1.1: LT-1

Meter 1 - Long-term meter located at the northeast corner of Birch and Sherman

Date	*Hour*	*Leq*	*L(5)*	*L(10)*	*L(33)*	*L(50)*	*L(66)*	*L(90)*	*Lmin*	*Lmax*
5-Sep-17	2 PM	58.8	62.5	60.5	56.7	55.1	53.7	50.9	47.8	80.9
5-Sep-17	3 PM	59.8	63.4	61.4	57.4	55.8	54.3	51.6	48.1	83.2
5-Sep-17	4 PM	58.3	62.6	60.7	57.6	56.1	54.8	52.2	49.2	77.7
5-Sep-17	5 PM	60.7	62.8	60.7	57.5	56.1	54.6	52.0	48.9	85.6
5-Sep-17	6 PM	57.4	62.0	60.2	56.7	55.3	53.8	50.9	47.8	74.5
5-Sep-17	7 PM	56.2	60.7	59.1	55.6	53.8	51.9	49.2	46.5	75.2
5-Sep-17	8 PM	55.1	59.4	58.0	54.3	52.4	50.7	49.2	46.6	77.9
5-Sep-17	9 PM	55.5	59.4	57.3	53.0	51.0	49.4	47.8	46.0	83.7
5-Sep-17	10 PM	53.1	57.8	55.6	50.3	48.2	47.1	46.1	44.8	75.9
5-Sep-17	11 PM	54.1	57.8	54.9	47.6	46.6	46.2	45.8	44.2	76.2
5-Sep-17	12 AM	60.6	67.7	62.6	51.5	48.0	46.8	46.1	45.1	83.7
6-Sep-17	1 AM	60.6	67.4	60.3	51.5	49.1	47.4	46.4	43.7	79.7
6-Sep-17	2 AM	46.4	48.1	46.7	46.0	45.6	45.2	44.6	42.3	63.2
6-Sep-17	3 AM	51.5	50.7	46.8	44.3	44.0	43.8	43.3	41.6	82.6
25-Jul-17	4 AM	50.7	52.2	48.7	45.0	44.7	44.3	43.9	42.6	76.4
25-Jul-17	5 AM	53.4	59.1	55.2	49.3	47.5	45.9	43.8	42.7	74.6
25-Jul-17	6 AM	56.8	59.8	56.5	51.2	48.6	46.6	44.5	42.4	81.7
25-Jul-17	7 AM	62.2	64.7	62.0	58.0	56.6	55.4	52.6	43.5	87.6
25-Jul-17	8 AM	60.7	64.3	61.5	58.3	57.1	55.9	53.4	47.5	82.9
25-Jul-17	9 AM	60.6	65.6	63.1	57.7	56.1	54.8	51.5	46.8	78.8
25-Jul-17	10 AM	59.9	64.0	61.0	57.0	55.5	54.2	51.9	47.7	79.8
25-Jul-17	11 AM	59.6	63.2	60.8	56.9	55.2	53.8	51.2	47.8	84.4
25-Jul-17	12 PM	58.9	63.1	60.4	56.8	55.4	54.0	51.6	48.5	78.7
25-Jul-17	1 PM	59.7	63.7	60.7	57.0	55.4	54.0	51.5	48.6	84.5
Meter 1 Average:		58.4	62.8	59.7	55.3	53.7	52.3	49.9	41.6	87.6

Hourly Leq Range from 8AM to 6PM: 57.4 - 60.7 dBA

Ldn: 63.2 dBA

Table N-1.2: ST-1

Meter 2 - North corner of Sherman and Ash

Date	*Hour*	*Leq*	*L(5)*	*L(10)*	*L(33)*	*L(50)*	*L(66)*	*L(90)*	*Lmin*	*Lmax*
5-Sep-17	2:10 PM	58.0	61.4	60.1	57.1	55.8	54.4	52.7	51.1	73.8
5-Sep-17	2:20 PM	61.2	69.0	65.7	57.9	56.0	54.1	51.9	50.1	72.7

Table N-1.3: ST-2

Meter 2 - Parking lot entrance on Park Blvd between Sherman and California

Date	*Hour*	*Leq*	*L(5)*	*L(10)*	*L(33)*	*L(50)*	*L(66)*	*L(90)*	*Lmin*	*Lmax*
5-Sep-17	2:40 PM	56.8	60.9	59.6	56.9	56.0	54.1	50.4	48.7	67.0
5-Sep-17	2:50 PM	57.0	61.2	60.3	57.2	55.2	53.1	50.3	48.0	67.3

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/18/2017
Case Description: Palo Alto Public Service Building: PSB (Arch Coating)

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
5212 Birch Street (90ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	130	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		69.4	65.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	69.4	65.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residence Across Park Blvd (50 ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	90	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		72.6	68.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	72.6	68.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date:	9/21/2017
Case Description:	Palo Alto Public Service Building: PSB (Foundation Construction)

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
5212 Birch Street (90ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Vacuum Street Sweeper	No	10		81.6	100	0
Front End Loader	No	40		79.1	100	0
Backhoe	No	40		77.6	100	0
Welder / Torch	No	40		74	100	0
Auger Drill Rig	No	20		84.4	100	0
Concrete Mixer Truck	No	40		78.8	100	0
Concrete Mixer Truck	No	40		78.8	100	0
Concrete Mixer Truck	No	40		78.8	100	0

				Results											
		Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Vacuum Street Sweeper		75.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		73.1	69.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		71.5	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		68	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Auger Drill Rig		78.3	71.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck		72.8	68.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck		72.8	68.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck		72.8	68.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	78.3	77.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residence Across Park Blvd (50 ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Vacuum Street Sweeper	No	10		81.6	60	0
Front End Loader	No	40		79.1	60	0
Backhoe	No	40		77.6	60	0
Welder / Torch	No	40		74	60	0
Auger Drill Rig	No	20		84.4	60	0
Concrete Mixer Truck	No	40		78.8	60	0
Concrete Mixer Truck	No	40		78.8	60	0
Concrete Mixer Truck	No	40		78.8	60	0

				Results											
		Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Vacuum Street Sweeper		80	70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		77.5	73.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		76	72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Auger Drill Rig		82.8	75.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck		77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck		77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck		77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	82.8	81.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/21/2017
Case Description: Palo Alto Public Service Building: PSB (Grading)

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
5212 Birch Street (90ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		130	0
Dozer	No	40		81.7	130	0
Vacuum Street Sweeper	No	10		81.6	130	0
Backhoe	No	40		77.6	130	0
Excavator	No	40		80.7	130	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		76.7	72.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper		73.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		69.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	76.7	76	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residence Across Park Blvd (50 ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		90	0
Dozer	No	40		81.7	90	0
Vacuum Street Sweeper	No	10		81.6	90	0
Backhoe	No	40		77.6	90	0
Excavator	No	40		80.7	90	0

				Results											
		Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		79.9	75.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		76.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper		76.5	66.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		72.5	68.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		75.6	71.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	79.9	79.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/21/2017
Case Description: Palo Alto Public Service Building: PSB (Site Prep)

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
5212 Birch Street (90ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		130	0
Dozer	No	40		81.7	130	0
Backhoe	No	40		77.6	130	0
Vacuum Street Sweeper	No	10		81.6	130	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		76.7	72.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		69.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper		73.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	76.7	75.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residence Across Park Blvd (50 ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		90	0
Dozer	No	40		81.7	90	0
Backhoe	No	40		77.6	90	0
Vacuum Street Sweeper	No	10		81.6	90	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		79.9	75.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		76.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		72.5	68.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper		84.5	77.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	84.5	80.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date:	9/18/2017
Case Description:	Palo Alto Public Service Building: PSB (Utility Trenching)

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
5212 Birch Street (90ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Slurry Trenching Machine	No	50		80.4	130	0
All Other Equipment > 5 HP	No	50	85		130	0
Compactor (ground)	No	20		83.2	130	0
Vacuum Street Sweeper	No	10		81.6	130	0
Welder / Torch	No	40		74	130	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Slurry Trenching Machine	72.1	69.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	70.8	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	74.9	67.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Vacuum Street Sweeper		73.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		65.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	74.9	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residence Across Park Blvd (50 ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Slurry Trenching Machine	No	50		80.4	90	0
All Other Equipment > 5 HP	No	50	85		90	0
Compactor (ground)	No	20		83.2	90	0
Vacuum Street Sweeper	No	10		81.6	90	0
Welder / Torch	No	40		74	90	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Slurry Trenching Machine		75.3	72.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP		79.9	76.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)		78.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper		76.5	66.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		68.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	79.9	79.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/21/2017
Case Description: Palo Alto Public Service Building: PSB (Vertical Building Construction)

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
5212 Birch Street (90ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	100	0
Front End Loader	No	40		79.1	100	0
Welder / Torch	No	40		74	100	0
Welder / Torch	No	40		74	100	0
Welder / Torch	No	40		74	100	0
Concrete Mixer Truck	No	40		78.8	100	0
Concrete Mixer Truck	No	40		78.8	100	0
Concrete Mixer Truck	No	40		78.8	100	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	74.5	66.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	73.1	69.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	68	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	68	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	68	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	72.8	68.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	72.8	68.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	72.8	68.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	74.5	76.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residence Across Park Blvd (50 ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	60	0
Front End Loader	No	40		79.1	60	0
Welder / Torch	No	40		74	60	0
Welder / Torch	No	40		74	60	0
Welder / Torch	No	40		74	60	0
Concrete Mixer Truck	No	40		78.8	60	0
Concrete Mixer Truck	No	40		78.8	60	0
Concrete Mixer Truck	No	40		78.8	60	0

				Results											
		Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		79	71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		77.5	73.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck		77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck		77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck		77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	79	80.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/18/2017
Case Description: Palo Alto Public Service Building: Parking Garage (Arch Coating)

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
2458 Ash Street (60ft from Project Site)	Residential	59.9	55.6	56.2

			Equipment			
Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	100	0

				Results											
		Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		71.6	67.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	71.6	67.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/21/2017
Case Description: Palo Alto Public Service Building: Parking Garage (Arch Coating w/ PSB Site Prep)

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
5212 Birch Street (45ft from Project Site)	Residential	59.9	55.6	56.2

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	85	0
Grader	No	40	85		130	0
Dozer	No	40		81.7	130	0
Backhoe	No	40		77.6	130	0
Vacuum Street Sweeper	No	10		81.6	130	0

			Results												
	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night		
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Compressor (air)	73.1	69.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Grader	76.7	72.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Dozer	73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Backhoe	69.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Vacuum Street Sweeper	73.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Total	76.7	76.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/21/2017
Case Description: Palo Alto Public Service Building: Parking Garage (Foundation Construction)

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
2458 Ash Street	Residential	59.9	55.6	56.2
(60ft from Project Site)				

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Vacuum Street Sweeper	No	10		81.6	70	0
Front End Loader	No	40		79.1	70	0
Front End Loader	No	40		79.1	70	0
Backhoe	No	40		77.6	70	0
Backhoe	No	40		77.6	70	0
Auger Drill Rig	No	20		84.4	70	0
Concrete Mixer Truck	No	40		78.8	70	0
Concrete Mixer Truck	No	40		78.8	70	0
Concrete Mixer Truck	No	40		78.8	70	0

Results

	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Vacuum Street Sweeper	78.7	68.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	76.2	72.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	76.2	72.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	74.6	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	74.6	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Auger Drill Rig	81.4	74.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	75.9	71.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	75.9	71.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	75.9	71.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	81.4	81.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
5212 Birch Street (4	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Vacuum Street Sweeper	No	10		81.6	60	0
Front End Loader	No	40		79.1	60	0
Front End Loader	No	40		79.1	60	0
Backhoe	No	40		77.6	60	0
Backhoe	No	40		77.6	60	0
Auger Drill Rig	No	20		84.4	60	0
Concrete Mixer Truck	No	40		78.8	60	0
Concrete Mixer Truck	No	40		78.8	60	0
Concrete Mixer Truck	No	40		78.8	60	0

			Results											
	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Vacuum Street Sweeper	80	70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	77.5	73.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	77.5	73.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	76	72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	76	72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Auger Drill Rig	82.8	75.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	82.8	82.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/21/2017
Case Description: Palo Alto Public Service Building: Parking Garage (Grading)

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
2458 Ash Street (60ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	100	0
Excavator	No	40		80.7	100	0
Backhoe	No	40		77.6	100	0
Backhoe	No	40		77.6	100	0
Vacuum Street Sweeper	No	10		81.6	100	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	75.6	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	74.7	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	71.5	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	71.5	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper	75.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	75.6	76.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
5212 Birch Street (4	Residential	59.9	55.6	56.2

			Equipment			
Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	85	0
Excavator	No	40		80.7	85	0
Backhoe	No	40		77.6	85	0
Backhoe	No	40		77.6	85	0
Vacuum Street Sweeper	No	10		81.6	85	0

			Results											
	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	77.1	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	76.1	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	73	69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	73	69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper	77	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	77.1	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/21/2017

Case Description: Palo Alto Public Service Building: Parking Garage (Site Prep)

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
2458 Ash Street (60ft from Project Site)	Residential	59.9	55.6	56.2

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		100	0
Backhoe	No	40		77.6	100	0
Vacuum Street Sweeper	No	10		81.6	100	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	79	75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	71.5	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper	75.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	79	76.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
5212 Birch Street (4	Residential	59.9	55.6	56.2

	Impact		Equipment Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		85	0
Backhoe	No	40		77.6	85	0
Vacuum Street Sweeper	No	10		81.6	85	0

				Results												
		Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night		
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Grader		80.4	76.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Backhoe		73	69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Vacuum Street Sweeper		77	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Total	80.4	77.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/18/2017
Case Description: Palo Alto Public Service Building: Parking Garage (Utility Trenching)

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
2458 Ash Street (60ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Slurry Trenching Machine	No	50		80.4	100	0
All Other Equipment > 5 HP	No	50	85		100	0
Compactor (ground)	No	20		83.2	100	0
Vacuum Street Sweeper	No	10		81.6	100	0
Welder / Torch	No	40		74	100	0

Results

	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Slurry Trenching Machine	74.3	71.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	79	76	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	77.2	70.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper	75.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	68	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	79	78.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
5212 Birch Street (4!	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Slurry Trenching Machine	No	50		80.4	85	0
All Other Equipment > 5 HP	No	50	85		85	0
Compactor (ground)	No	20		83.2	85	0
Vacuum Street Sweeper	No	10		81.6	85	0
Welder / Torch	No	40		74	85	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Slurry Trenching Machine	75.8	72.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	80.4	77.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	78.6	71.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper	77	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	69.4	65.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.4	79.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/21/2017
Case Description: Palo Alto Public Service Building: Parking Garage (Vert Building Construction)

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
5212 Birch Street (45ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	60	0
Front End Loader	No	40		79.1	60	0
Front End Loader	No	40		79.1	60	0
Backhoe	No	40		77.6	60	0
Backhoe	No	40		77.6	60	0
Concrete Pump Truck	No	20		81.4	60	0
Concrete Pump Truck	No	20		81.4	60	0
Concrete Pump Truck	No	20		81.4	60	0
Grader	No	40	85		130	0
Dozer	No	40		81.7	130	0
Vacuum Street Sweeper	No	10		81.6	130	0
Backhoe	No	40		77.6	130	0

			Results											
	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	79	71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	77.5	73.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	77.5	73.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	76	72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	76	72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Pump Truck	79.8	72.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Pump Truck	79.8	72.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Pump Truck	79.8	72.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	76.7	72.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacuum Street Sweeper	73.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	69.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	79.8	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/21/2017
Case Description: Palo Alto Public Service Building: Parking Garage (Vert Building Construction)

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
2458 Ash Street (60ft from Project Site)	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	70	0
Front End Loader	No	40		79.1	70	0
Front End Loader	No	40		79.1	70	0
Backhoe	No	40		77.6	70	0
Backhoe	No	40		77.6	70	0
Concrete Pump Truck	No	20		81.4	70	0
Concrete Pump Truck	No	20		81.4	70	0
Concrete Pump Truck	No	20		81.4	70	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	77.6	69.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	76.2	72.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	76.2	72.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	74.6	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	74.6	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Pump Truck	78.5	71.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Pump Truck	78.5	71.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Pump Truck	78.5	71.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	78.5	80.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
5212 Birch Street (	Residential	59.9	55.6	56.2

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	60	0
Front End Loader	No	40		79.1	60	0
Front End Loader	No	40		79.1	60	0
Backhoe	No	40		77.6	60	0
Backhoe	No	40		77.6	60	0
Concrete Pump Truck	No	20		81.4	60	0
Concrete Pump Truck	No	20		81.4	60	0
Concrete Pump Truck	No	20		81.4	60	0

			Results											
	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	79	71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	77.5	73.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	77.5	73.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	76	72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	76	72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Pump Truck	79.8	72.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Pump Truck	79.8	72.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Pump Truck	79.8	72.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	79.8	81.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Palo Alto Public Safety Building EIR
Appendix: N-3
Vibration Estimate
Prepared by MIG, Inc.

Groundborne Vibration Calculations

Estimated PPV calculated as: PPV(D)= PPVref*(25/D)^1.1
Where:
PPV(D) = Estimated PPV @ Distance
PPVref = Reference PPV @ 25 feet
D = Distance from equipment to receiver
1.1 = ground attenuation rate

Estimated Lv calculated as: Lv(D)=Lv(25 feet)-30log(D/25)
Where:
Lv(D) = velocity level in decibels
Lv(25 feet) = RMS velocity amplitude @ 25 feet
D = Distance from equipment to reciever

Distance 1	20
Distance 2	45
Distance 3	65

Distance 1

Equipment	Reference PPV @ 25 ft	Reference Lv at 25 ft	Estimated PPV at 20ft	Estimated Lv at 20 ft
Roller	0.21	94	0.268	96.9
Large Bulldozer	0.089	87	0.114	89.9
Small Bulldozer	0.03	58	0.038	60.9
Loaded Truck	0.076	86	0.097	88.9
Jackhammer	0.035	79	0.045	81.9
Auger Drill	0.089	87	0.114	89.9

Distance 2

Equipment	Reference PPV @ 25 ft	Reference Lv at 25 ft	Estimated PPV at 45ft	Estimated Lv at 45 ft
Roller	0.21	94	0.110	86.3
Large Bulldozer	0.089	87	0.047	79.3
Small Bulldozer	0.03	58	0.016	50.3
Loaded Truck	0.076	86	0.040	78.3
Jackhammer	0.035	79	0.018	71.3
Auger Drill	0.089	87	0.047	79.3

Distance 3

Equipment	Reference PPV @ 25 ft	Reference Lv at 25 ft	Estimated PPV at 65ft	Estimated Lv at 65 ft
Roller	0.21	94	0.073	81.6
Large Bulldozer	0.089	87	0.031	74.6
Small Bulldozer	0.03	58	0.010	45.6
Loaded Truck	0.076	86	0.027	73.6
Jackhammer	0.035	79	0.012	66.6
Auger Drill	0.089	87	0.031	74.6

Palo Alto Public Safety Building EIR
Appendix: N-4
Parking Garage Calculations
Prepared by MIG, Inc.

Parking Garage Noise Calculation

(FHWA Transit Noise and Vibration Impact Assessment 2006; pg. 5-11 and 5-12)

$$Leq(h) = SEL + Cn - 35.6$$

where

$$Cn = 10\log[N(a)/1000]$$

Leq(h) = hourly Leq
SEL = Source Reference Level @ 50 ft
Cn = Volume Adjustment
N(a) = Number of Automobiles

Reference SEL	92

(See next page for calculations)

Time	Parking Provided	Rate (trips / space)[1]	Trips
Daily	636	4.21	2677.6
Hourly AM Peak		0.19	120.8
Hourly PM Peak		0.42	267.1

[1] Draft TIA Table 7

Total Daily Trips		2677.6
Total AM Peak Trips	-	241.7
Total PM Peak Trips	-	534.2
Remaining for Day		1901.6

Even Hourly Split (20hrs)
95.1

Hours	Avg Hourly Trips	Cn	Hourly Leq @ 50ft	Ldn Penalty	Adjusted Hourly Leq	Total Energy	Avg Hourly Energy	Ldn
0-7	95.1	-10.2	46.2	10.0	56.2	4530686	188778.6	52.8
7-9	120.8	-9.2	47.2	0.0	47.2			
9-4	95.1	-10.2	46.2	0.0	46.2			
4-6	267.1	-5.7	50.7	0.0	50.7			
6-10	95.1	-10.2	46.2	0.0	46.2			
10-12	95.1	-10.2	46.2	10.0	56.2			

APPENDIX 21.4

TRANSPORTATION IMPACT ANALYSIS (FEHR & PEERS, TRANSPORTATION CONSULTANTS)

FEHR PEERS

Palo Alto Public Safety Building and Public Parking Structure

Draft Transportation Impact Analysis

November 14, 2017
Prepared for the
City of Palo Alto
SD16-0223

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EXECUTIVE SUMMARY

This report presents the results of the Transportation Impact Analysis (TIA) conducted for the proposed Public Safety Building (PSB) and Public Parking Structure to be located on Sherman Avenue in the City of Palo Alto, California. The existing site currently comprises public parking Lots C-6 and C-7. The PSB would be developed on Lot C-6 and the Public Parking Structure on Lot C-7. The proposed project would remove the existing surface parking lots (which totals approximately 310 parking spaces) to construct: a new three-story Public Safety Building that would range in size from 45,000 to 50,000 square feet (s.f.) and a new Parking Structure with approximately 460 to 640 parking spaces (i.e. 160 to 340 net new spaces).

The impacts of the proposed project were evaluated following guidelines of the City of Palo Alto, the Santa Clara Valley Transportation Authority (VTA), and the congestion management agency for Santa Clara County.

PROJECT TRAFFIC ESTIMATES

Project-generated trips were estimated using for the proposed PSB were based on trip generation studies conducted by Portland State University and at the Central Police precinct of Vancouver, Washington.

Vehicle trip estimates for the net new parking spaces were estimated based on parking surveys conducted at the two existing parking lots (Lots C-6 and C-7) during the AM and PM peak period. Parking facilities are not typically traffic generators by themselves. Trips are actually generated by the nearby retail, office and residential uses, and parking lots or structures simply provide vehicle storage. The Parking Structure trips are generally going to be existing vehicles that currently park at adjacent facilities (e.g. street parking, Lot C-8, etc.), but now park in the new Parking Structure.

The proposed project is estimated to generate 2,822 net new daily trips, 129 net new AM peak hour trips (74 inbound and 55 outbound), 238 net new PM peak hour trips (116 inbound and 122 outbound).

PROJECT IMPACTS

This analysis identified potentially significant impacts of the proposed project on the surrounding transportation system and recommends measures to mitigate significant impacts for environmental clearance.

INTERSECTION IMPACTS

Intersection impacts were evaluated for "Plus Project" scenarios under Existing, Background, and Cumulative Conditions by comparing the results to the appropriate "No Project" scenario.

Based on the significance impact criteria by the City of Palo Alto and Valley Transportation Authority (VTA) Congestion Management Program, the Project is expected to have a ***less-than-significant impact*** at all 10 study intersections under Plus Project conditions for the Existing, Background, and Cumulative scenarios. Accordingly, no traffic mitigation measures are needed.

PEDESTRIAN, BICYCLE, AND TRANSIT IMPACTS

While the project is expected to generate new non-auto trips, the existing pedestrian, bicycle, and transit facilities would accommodate the additional demand. Furthermore, the *City of Palo Alto Bicycle + Pedestrian Transportation Plan* (May 2012), includes the identification of a bicycle boulevard on Park Boulevard. This project does not conflict with that planned bicycle facility. Therefore, the Project's impact to the pedestrian, bicycle, and transit facilities is considered **less-than-significant,** and no off-site mitigation is needed to support multi-modal travel to and from the site.

SITE ACCESS AND ON-SITE CIRCULATION

The general on-site circulation patterns and site access for the PSB and Parking Structure are considered adequate. The PSB would be served by one primary inbound and outbound secured driveway on Sherman Avenue, approximately 85 feet west of Park Avenue. A secondary inbound and outbound driveway would be provided on Birch Street, adjacent to Jacaranda Lane. These two driveways would provide direct access to the PSB's basement parking that would include 170 to 190 parking spaces for police department service vehicles or PSB staff. To accommodate all turning movements at the PSB's Birch Street outbound driveway, it is recommended that the westbound left-turn movement on Jacaranda Lane be prohibited to reduce vehicle potential conflicts and right-of-way confusion for drivers.

The Public Parking Structure's driveway is recommended to be located on Sherman Avenue, near the Birch Street intersection. This location provides adequate queuing storage on Sherman Avenue for inbound vehicles. The Parking Structure could potentially be gated at the entrance if a payment system was implemented; however, given the ample capacity available on Sherman Avenue and the relatively low peak hour volumes, it is anticipated that gating the entrance would only result in short temporary vehicle queues on Sherman Avenue and traffic flow would not be substantially affected.

Key Project site improvements are recommended to accommodate all modes of travel:

- Class I long-term bicycle parking such as lockers or secured room should be provided for employee use.
- Provide Class II short-term bicycle parking racks such as inverted u-style bicycle parking racks.
- To enhance safety for pedestrians, it is recommended that signage and or warning systems be installed at all driveways to notify pedestrians of approaching vehicles and to make drivers aware of potential conflicts with pedestrians.

OTHER TRANSPORTATION CONSIDERATIONS

The Project's PSB related traffic is expected to add minimal traffic to the adjacent residential streets on Birch Street and Park Boulevard. However, due to the nominal increase in traffic from the Project and the ample capacity on those roadways, it is not anticipated that the Project will result in any impacts to the adjacent neighborhoods.

The vehicle miles traveled (VMT) for a new development project is estimated by adding the VMT for all vehicles generated by a site or use. VMT was only calculated for the PSB and not the Parking Structure as the PSB would be generating new traffic to the site and parking facilities would not. The VMT was calculated for years 2020 and 2040, which are the two future years of the MTC MPO Travel Demand Model. Based on the project's trip generation and the trip lengths from MTC's travel demand model, the Project's average weekday VMT (generated by the PSB) would be approximately 2,250 VMT under 2020 Conditions, which equates to 15 VMT per employee, and 2,700 VMT under 2040 Conditions, which equates to 18 VMT per employee. The average trip length for employees at the proposed Project is estimated to be more than 15 percent below the regional averages, which would result in a less-than-significant impact for VMT.

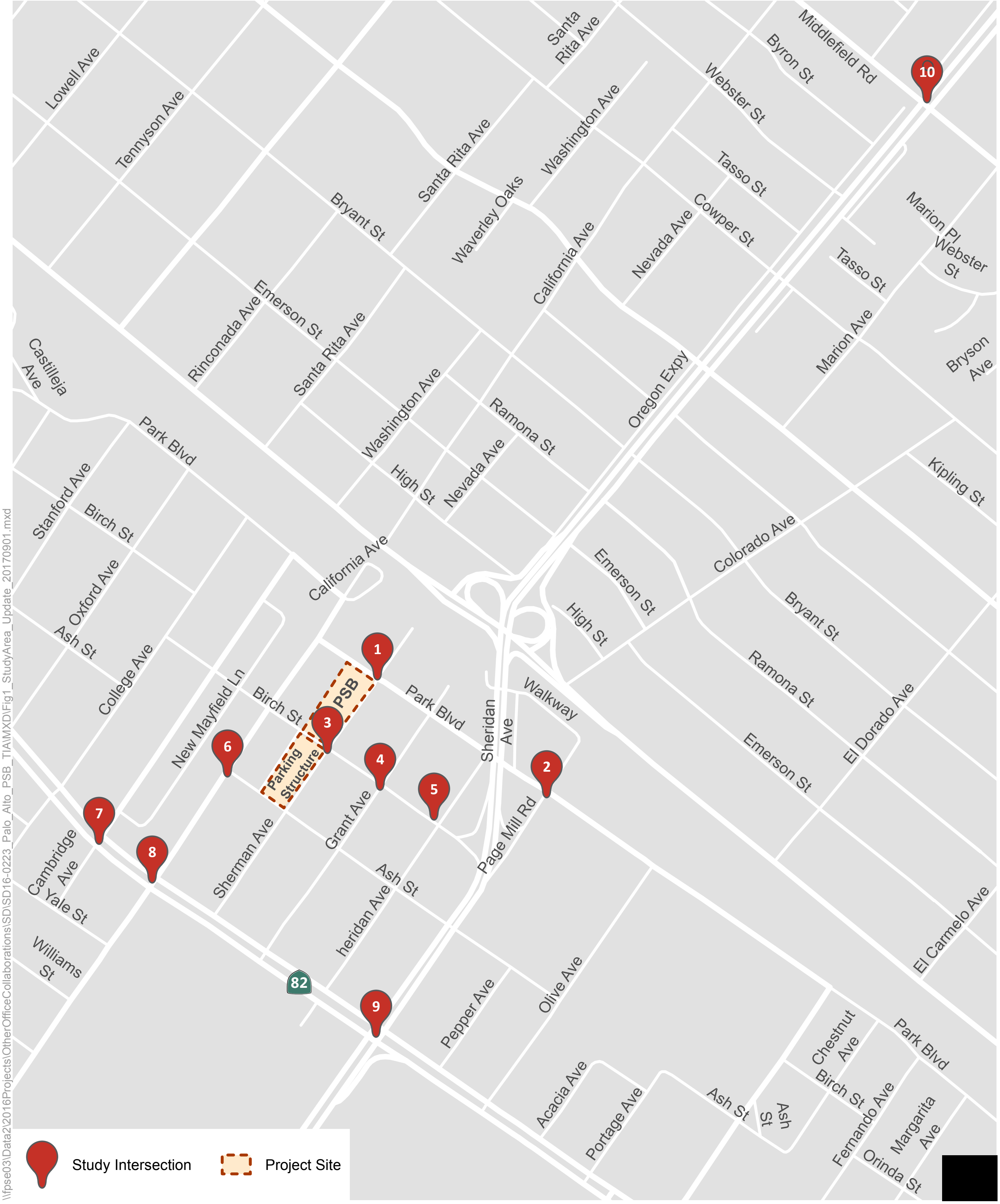
Lastly, a queueing analysis was conducted for critical left-turn movements at study signalized intersections. Based on the analysis, there would be no significant impact to queueing at the study intersections.

1.0 INTRODUCTION

This report presents results of the Transportation Impact Analysis (TIA) conducted for the proposed Public Safety Building (PSB) and Public Parking Structure on Sherman Avenue in the City of Palo Alto, California. The analysis was conducted to evaluate the effects of the Project on the surrounding transportation system and to identify measures to mitigate any significant mobility impacts. The TIA was prepared following guidelines of the City of Palo Alto and Santa Clara Valley Transportation Authority (VTA), the congestion management agency for Santa Clara County. This chapter provides a detailed project description and outlines the Project Study area, analysis methodologies, and significance criteria.

PROJECT DESCRIPTION

The proposed project is located in the Evergreen Park neighborhood of Palo Alto at the corner of Sherman Avenue and Birch Street. The existing site currently comprises of public parking Lots C-6 and C-7. The PSB would be developed on Lot C-6 and the Public Parking Structure on Lot C-7. The sites are generally bounded by Jacaranda Lane to the north, Sherman Avenue to the south, Park Boulevard to the east, and Ash Street to the west. The proposed project would remove the existing surface parking lots (which totals approximately 310 parking spaces) to construct a new three-story Public Safety Building that would range in size from 45,000 to 50,000 square feet, a new Public Parking Structure with approximately 460 to 640 parking spaces (i.e. 160 to 340 net new spaces). The site location is shown on **Figure 1** and the proposed site plans are shown on **Figure 2a** and **Figure 2b-1**. **Figure 2b-2** depicts the parking structure floor details.



[redacted]

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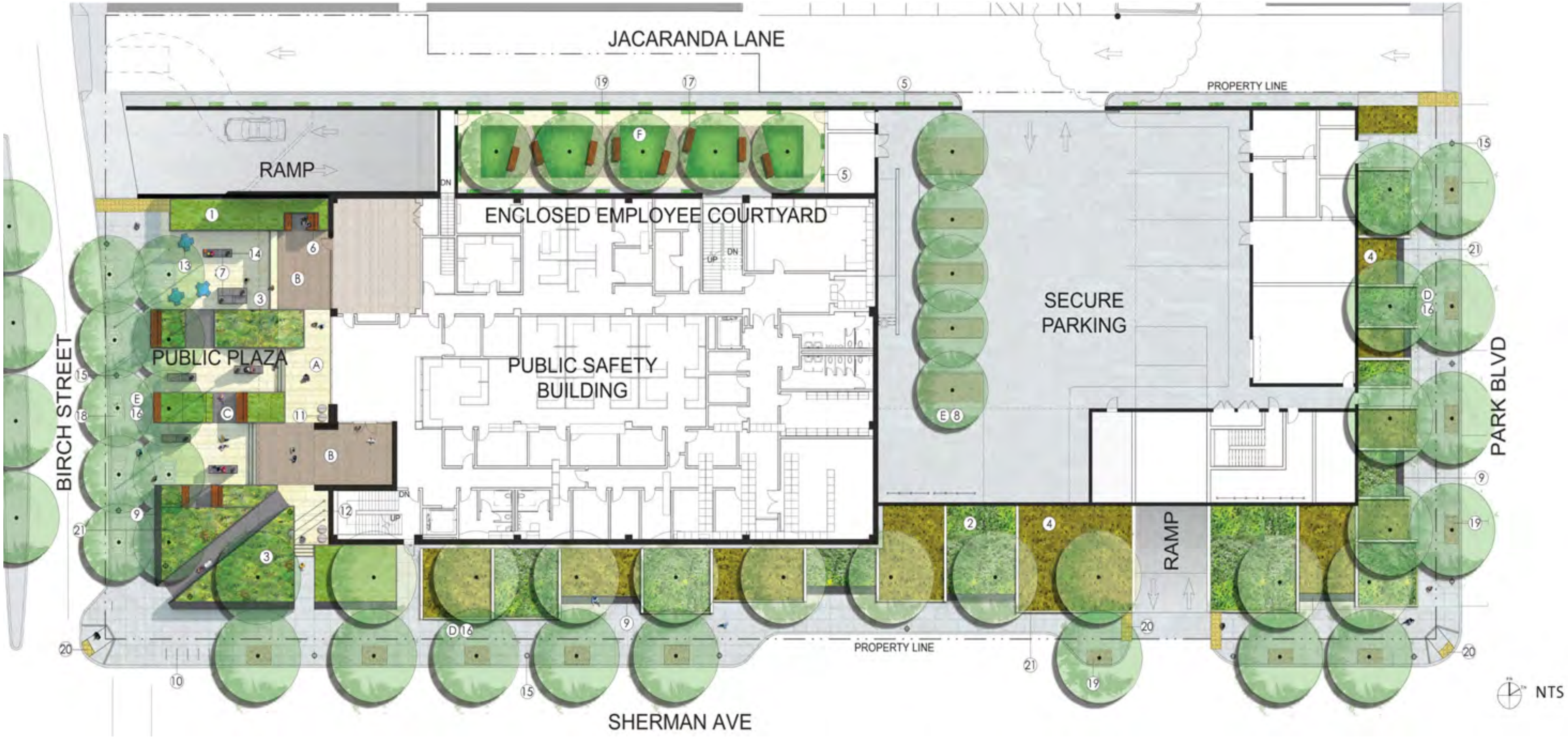
[redacted]

Figure 1

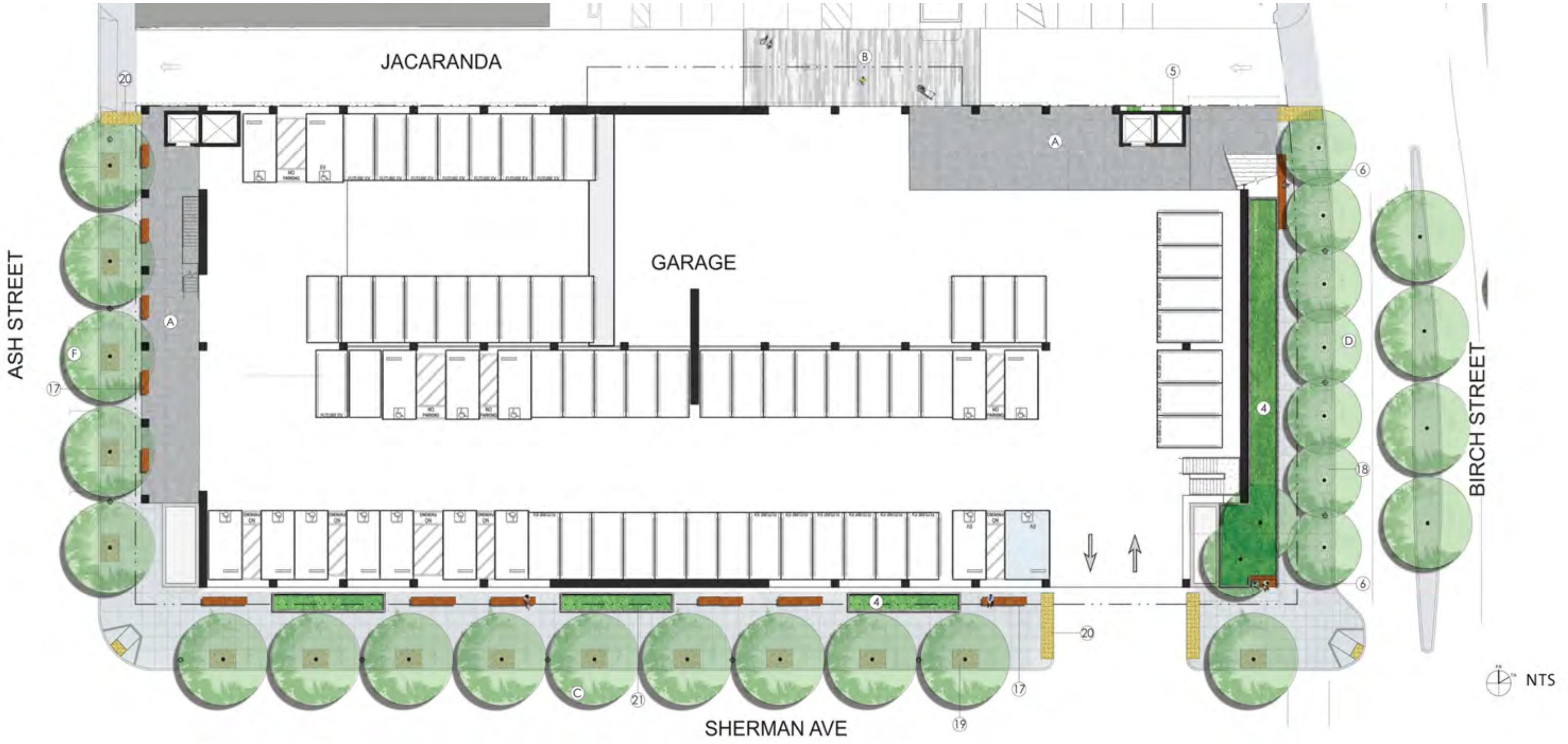
Project Site and Study Intersections



Source: Ross Drulis Cusenbery, 2017

Figure 2a

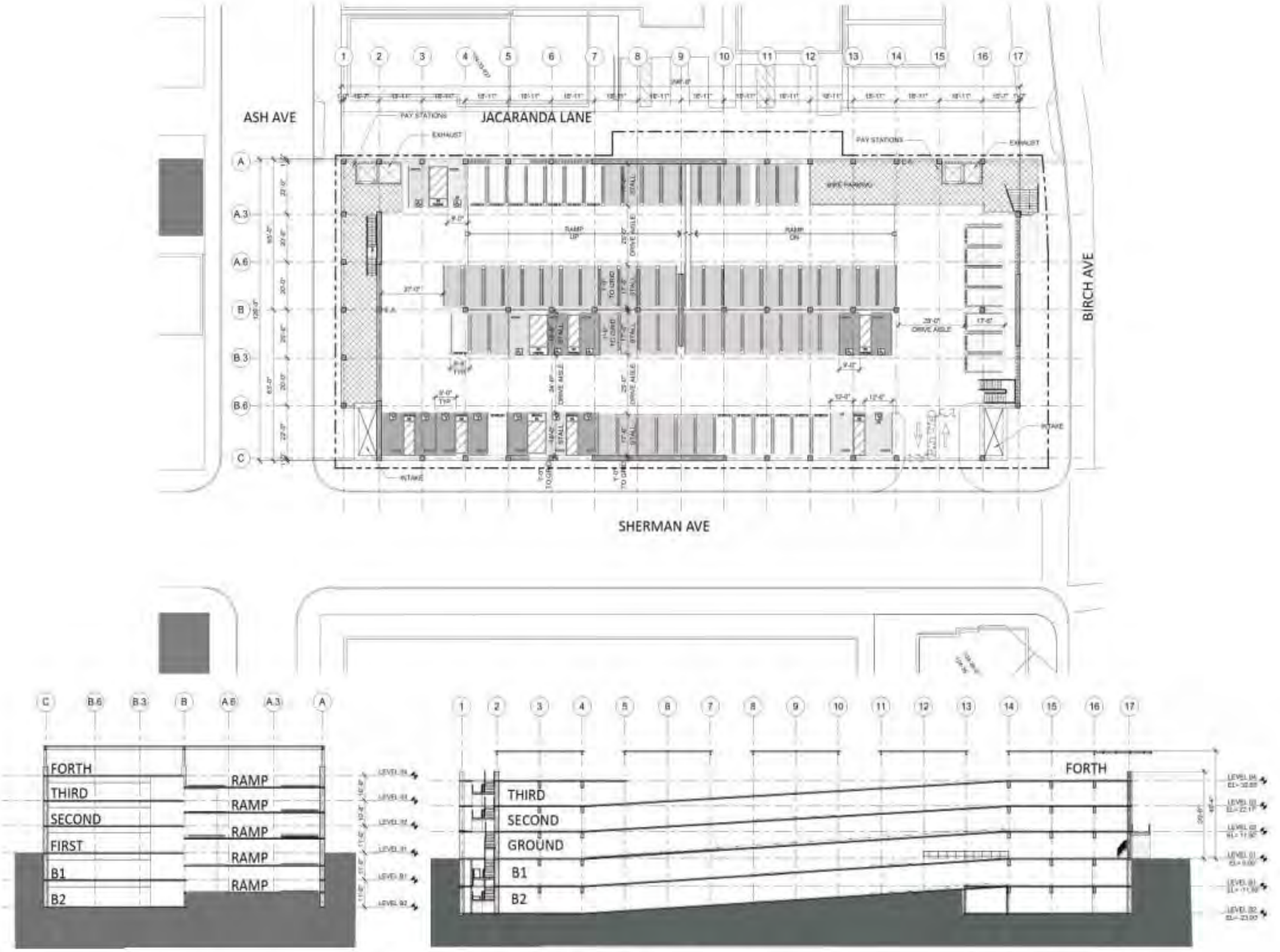
Public Safety Building Site Plan



Source: Ross Drulis Cusenbery, 2017

Figure 2b-1

Parking Structure Site Plan



PALO ALTO PUBLIC SAFETY GARAGE												
LEVEL	ADA VAN	ADA	UNISTALL	EV ADA VAN	EV ADA	EV AMBULATORY	EV UNISTALL	DESIGNATED/ FUTURE EV	FUTURE EV	TOTAL	AREA	EFFICIENCY
FOURTH	0	0	67	0	0	0	0	14	20	**101**	**30,400**	**301**
THIRD	0	0	89	0	0	0	14	16	0	**119**	**36,300**	**305**
SECOND	0	0	75	0	0	0	15	3	26	**119**	**36,300**	**305**
GROUND	3	10	53	1	1	1	0	0	22	**91**	**36,300**	**399**
B1	0	0	107	0	0	0	0	8	2	**117**	**38,500**	**329**
B2	0	0	73	0	0	0	0	4	13	**90**	**32,800**	**364**
TOTAL	**3**	**10**	**464**	**1**	**1**	**1**	**29**	**45**	**83**	**637**	**210,600**	**331**

Figure 2b-2

Parking Structure Floor Details

STUDY AREA

Project impacts on the study area roadway facilities were determined by measuring the effect Project traffic would have on intersection operations during the morning (6:00 to 9:00 AM) and evening (4:00 to 7:00 PM) peak periods. A total of 10 intersections, as shown in **Figure 1**, were selected as study locations. These locations include:

Study Intersections

1. Park Boulevard / Sherman Avenue
2. Park Boulevard / Page Mill Road
3. Birch Street / Sherman Avenue
4. Birch Street / Grant Street
5. Birch Street / Sheridan Avenue
6. Ash Street / California Street
7. El Camino Real / Cambridge Avenue
8. El Camino Real / California Avenue
9. El Camino Real / Page Mill Road
10. Middlefield Road / Oregon Expressway

VTA's TIA guidelines indicates that intersections should be included if the proposed Project adds 10 or more peak hour vehicles per lane to any intersection movement. In consultation with the City of Palo Alto staff, the listed intersections were selected based on VTA's ten trip per lane guideline.

Freeway Segments

According to VTA's *Transportation Impact Analysis Guidelines* (VTA, 2014) a freeway segment analysis should be included if the Project meets one of the following requirements:

1. The proposed development Project is expected to add traffic equal to at least one percent of a freeway segment's capacity.

2. The proposed development Project is adjacent to one of the freeway segment's access or egress points

3. Based on engineering judgment, Lead Agency staff determines that the freeway segment should be included in the analysis.

The nearest freeways to the Project site are I-280 and US 101, which are approximately three miles and two miles away, respectively. The capacity for a freeway mixed-flow lane for freeway facilities greater than two lanes in one direction is 2,300 vehicles per hour per lane (vphpl), 2,200 vphpl for freeway facilities with two lanes or less in one direction, and 1,650 vphpl for HOV lanes. The segments of I-280 between Alpine Road and El Monte Road has a direction capacity of 9,200 vphpl, and the segments of US 101 between San Antonio Avenue and Embarcadero Road has a one direction capacity of 8,550 vphpl.

The Project is not anticipated to meet any of the three criteria listed above; therefore, no freeway segment analysis was conducted for the proposed Project.

ANALYSIS SCENARIOS

The operations of the study intersections were evaluated during the weekday morning (AM) and weekday evening (PM) peak hours for the following scenarios as presented in **Chapters 2, 3, 4, and 5**:

Scenario 1: *Existing Conditions* – Existing volumes obtained from counts.

Scenario 2: *Existing plus Project Conditions* – Scenario 1 volumes plus traffic generated by the proposed Project.

Scenario 3: *Background No Project Conditions* – Existing volumes plus traffic from "approved but not yet built" and "unoccupied" developments in the area.

Scenario 4: *Background plus Project Conditions* – Scenario 3 volumes plus traffic generated by the proposed Project.

Scenario 5: *Cumulative (2035) No Project Conditions* – Cumulative (2035) traffic volumes from the City of Palo Alto's updated travel demand forecast, which is based on *City of Palo Alto Comprehensive Plan* land uses and funded transportation improvements.

Scenario 6: *Cumulative (2035) plus Project Conditions* – Scenario 5 volumes plus traffic generated by the proposed Project.

ANALYSIS METHODS

The operations of roadway facilities are described with the term *level of service*. Level of Service (LOS) is a qualitative description of traffic flow based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, the best operating conditions, to LOS F, the worst operating conditions. LOS E represents "at-capacity" operations. When traffic volumes exceed the intersection capacity, stop-and-go conditions result, and operations are designated as LOS F.

SIGNALIZED INTERSECTIONS

The method described in Chapter 16 of the 2000 *Highway Capacity Manual* (HCM) (Special report 209, Transportation Research Board) was used to prepare the level of service calculation for the study intersections. This level of service method, which is approved by the City of Palo Alto and VTA, analyzes a signalized intersection's operation based on average control delay per vehicle. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay for signalized intersections is calculated using TRAFFIX traffic analysis software and is correlated to a LOS designation as shown in **Table 1.** In addition, critical delay is also a factor for determining the intersection's operation. Critical delay represents the delay associated with the critical movements of the intersection, or the movements that require the most "green time" and have the greatest effect on overall intersection operations. The changes in critical delay and critical volume-to-capacity (V/C) ratio between baseline (i.e. "No Project") and "Plus Project" conditions are used to identify significant impacts.

TABLE 1: SIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service	Description	Average Control Delay per Vehicle (seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B+ B B-	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 12.0 12.1 to 18.0 18.1 to 20.0
C+ C C-	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 23.0 23.1 to 32.0 32.1 to 35.0
D+ D D-	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 39.0 39.1 to 51.0 51.1 to 55.0
E+ E E-	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	55.1 to 60.0 60.1 to 75.0 75.1 to 80.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0

Source: *Traffic Level of Service Analysis Guidelines,* October 2014, VTA Congestion Management Program, June 2003; and *Highway Capacity Manual*, Transportation Research Board, 2000.

UNSIGNALIZED INTERSECTIONS

Operations of the unsignalized intersections (e.g. stop-sign controlled) were evaluated using the methods contained in Chapter 17 of the *2000 HCM* and calculated using TRAFFIX analysis software. LOS ratings for stop-sign controlled intersections are based on the average control delay expressed in seconds per vehicle. At two-way or side-street-stop controlled intersections, control delay is calculated for each movement, not for the intersection as a whole. For approached composed of a single lane, control delay is computed as the average of all movements in that lane. For all-way-stop-controlled locations, a weighted average delay for the entire intersection is presented. **Table 2** summaries the relationship between delay and LOS for unsignalized intersections.

TABLE 2: UNSIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service (v/c ≤ 1.0)	Description	Average Control Delay Per Vehicle (Seconds)
A	Little or no delay.	≤ 10.0
B	Short traffic delay.	> 10.0 to 15.0
C	Average traffic delays.	> 15.0 to 25.0
D	Long traffic delays.	> 25.0 to 35.0
E	Very long traffic delays.	> 35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded.	> 50.0

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

LEVEL OF SERVICE (LOS) STANDARDS AND IMPACT CRITERIA

The determination of significance for project impacts is based on applicable policies, regulations, goals, and guidelines defined by the City of Palo Alto and the Santa Clara County Congestion Management Plan. The LOS standard for the City of Palo Alto intersections is LOS D. The Page Mill Road/El Camino Real (intersection 9) and the Middlefield Road/El Camino Real (intersection 10) intersections are designated as a Congestion Management Program (CMP) intersection. The threshold for CMP intersections is LOS E. The impacts of the Project were evaluated by comparing the results of the level of service calculations under the "Plus Project" scenarios to the baseline "No Project" scenarios. The detailed impact criteria for this study are presented below.

TRAFFIC OPERATIONS IMPACT CRITERIA

The following LOS standards and impact criteria were applied to the intersection analysis.

Signalized Intersections

Significant impacts at signalized City of Palo Alto intersections are defined to occur when the addition of Project traffic causes one of the following:

- Intersection operations to degrade from an acceptable level (LOS D or better for City of Palo Alto, and LOS E or better for regionally significant roadways and CMP intersections) under "No Project" conditions to an unacceptable level (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) for "Plus Project" conditions; or
- Exacerbate unacceptable "No Project" operations (LOS E or F for City of Palo Alto intersections, and LOS F for regionally significant roadways and CMP intersections) by increasing the critical delay by more than four (4) seconds and increasing the volume-to-capacity (V/C) ration by 0.01 or more; or
- An increase in the V/C ratio of 0.01 or more at an intersection with unacceptable operations (LOS E or F for City of Palo Alto intersections and LOS F for regionally significant roadways and CMP intersections) when the change in critical delay between No Project and Plus Project conditions is negative (i.e. decreases). Decreases in critical delay can occur if the critical movements change.

Unsignalized Intersections

LOS analysis at unsignalized intersections is generally used to determine the need for modifying intersection control type (i.e. all-way stop or signalization). As part of this evaluation, traffic volumes, delays, and peak hour traffic signal warrants are evaluated to determine if the existing intersection control is appropriate.

The City has generally used LOS D as the minimum acceptable operating level at unsignalized intersections. Significant impacts are defined to occur when the addition of Project traffic degrades operations to LOS E or LOS F and the intersection satisfies the peak hour signal warrants from the *California Manual of Uniform Traffic Control Devices (MUTCD)*.

PEDESTRIAN AND BICYCLE IMPACT CRITERIA

The City of Palo Alto *Comprehensive Plan* describes related policies necessary to ensure that pedestrian and bicycle facilities are safe and effective for City residents. Using the *Comprehensive Plan* as a guide, significant impacts to these facilities would occur when a Project or an element of a Project:

- Creates a hazardous condition that currently does not exist for pedestrians and bicyclists, or otherwise interferes with pedestrian or bicycle accessibility to the site and adjoining areas; or

- Conflicts with an existing or planned pedestrian or bicycle facility; or
- Conflicts with policies related to bicycle and pedestrian activity adopted by the City of Palo Alto, Santa Clara County, VTA, or Caltrans for their respective facilities in the study area.

TRANSIT IMPACT CRITERIA

Significant impacts to transit service would occur if the Project or any part of the Project:

- creates demand for public transit services above the capacity which is provided or planned;
- disrupts existing transit services or facilities.[1]; or
- conflicts with an existing or planned transit facility; or
- conflicts with transit policies adopted by the City of Palo Alto, Santa Clara County, VTA, or Caltrans for their respective facilities in the study area.

REPORT ORGANIZATION

The remainder of this report is divided into the following chapters:

- **Chapter 2 – Existing Conditions** describes the transportation system near the Project, including the surrounding roadway network, morning and evening peak period driveway and intersection turning movement volumes, existing bicycle, pedestrian, transit, and parking facilities, intersection levels of service.
- **Chapter 3 – Existing with Project Conditions** addresses the Existing with Project Conditions, and discusses Project vehicular, pedestrian, bicycle, and transit impacts. The relevant Project information, such as the Project components and Project trip generation, distribution, and assignment, is also discussed in this chapter.
- **Chapter 4 – Background Traffic Conditions** addresses the conditions with approved, but not yet constructed projects. The chapter discusses these conditions, both without and with the Project, and discusses Project vehicular impacts.
- **Chapter 5 – Cumulative Traffic Conditions** addresses the 2035 cumulative conditions, both without and with the Project, and discusses cumulative Project vehicular impacts.
- **Chapter 6 – Site Access, Circulation and Parking** describes Project access and circulation for all travel modes.

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[1] This includes disruptions caused by proposed-project driveways on transit streets and impacts to transit stops/shelters, as well as impacts to transit operations from traffic improvements proposed or resulting from a project.

2.0 EXISTING CONDITIONS

This chapter describes the Existing Conditions of the roadway facilities, pedestrian, and bicycle facilities, as well as parking and transit services near the Project site. It also presents existing traffic volumes and operations for the study intersections with the results of LOS calculations.

EXISTING TRANSPORTATION FACILITIES

EXISTING STREET SYSTEM

Access to and from the Project site is provided by the following roads: Page Mill Road, El Camino Real, Oregon Expressway, Bryant Street, Park Boulevard, Birch Street, Ash Street, Cambridge Avenue, California Avenue, Sherman Avenue, Grant Avenue, and Sheridan Avenue. Each facility is described below in more detail.

Page Mill Road is a two to four lane east-west divided arterial road that extends west to Los Altos Hills and connects with Oregon Expressway at El Camino Real. Within the study area, the roadway provides four travel lanes (two in each direction) with exclusive left-turns at all intersections. The posted speed limit ranges between 35 and 50 miles per hour (mph). Page Mill Road provides access to local commercial and industrial areas as well as access to I-280. East of Ash Street, Page Mill Road transitions into Oregon Expressway, and another short street segment designated as Page Mill Road connects the expressway with the California Avenue Transit Station parking lot.

El Camino Real (also identified as State Route 82) is a major north-south arterial that connects San Francisco to San Jose. El Camino Real provides access to local and regional commercial areas. Direct access to the site from El Camino Real is provided via Sherman Avenue. The posted speed limit is 35 mph.

Oregon Expressway is a four-lane, east-west expressway that extends between Alma Street and US 101. Oregon Expressway provides access to local residential areas, as well as access to US 101. West of El Camino Real, the roadway becomes Page Mill Road. Eastbound and westbound traffic is divided by a raised median with enhanced landscaping. Westbound traffic accesses the Project site via ramps at Birch Street. Eastbound traffic accesses the Project site via Sherman Avenue by turning left on El Camino Real or via the Page Mill Road ramps connecting to Park Boulevard. The posted speed limit is 35 mph.

Park Boulevard is a two-lane, north-south road that extends from Whitclem Drive in the south to El Camino Real in the north. The roadway is primarily a local road, however in the vicinity of the Project site, it is designated as a collector road. The posted speed limit is 25 mph.

Birch Street is a north-south road that extends from Park Boulevard in the north to Oregon Expressway in the south. The road has four lanes between Oregon Expressway and California Avenue and two lanes between California Avenue and Park Boulevard. Birch Street is a collector street between Oregon Expressway and California Avenue, and a local street between California Avenue and Park Boulevard. The posted speed limit is 25 mph.

California Avenue is a two-lane east-west collector road that extends from Amherst Street (to the west) to Park Boulevard (east of the site). California Avenue is fronted by retail and restaurants and includes angled parking on both sides of the street. The posted speed limit is 25 mph.

Sherman Avenue is a two-lane east-west local road that connects El Camino Real in the west to Park Boulevard in the east. The posted speed limit is 25 mph and on-street parking is provided on both sides of the roadway.

Grant Avenue is an east-west local road that extends from El Camino Real in the west to Park Boulevard in the east. The road includes two lanes from El Camino Real to Birch Street and becomes a one-way eastbound road east of Birch Street.

EXISTING PEDESTRIAN FACILITIES

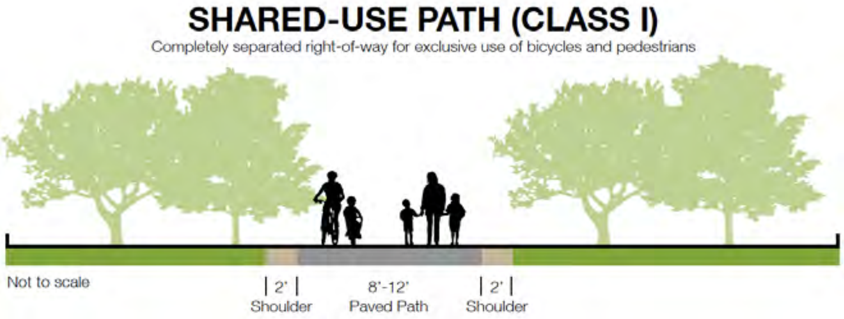
Pedestrian facilities comprise sidewalks, crosswalks, and pedestrian signals at signalized intersections. The majority of streets in the vicinity of the Project site have sidewalks on both sides of the street. Marked crosswalks are provided across all legs of study signalized intersections. A Rectangular Rapid Flashing Beacon (RRFB) pedestrian signal is present at the south crosswalk across the Park Boulevard/Page Mill Road intersection. The Project site is located immediately south of the commercial corridor along California Avenue, where there is a high amount of pedestrian traffic. Within the commercial corridor, pedestrian enhancements include wide sidewalks, curb extensions (also known as bulb-outs), and ample amount of landscaped buffers. **Figure 3** presents study locations with pedestrian crosswalks.

EXISTING BICYCLE FACILITIES

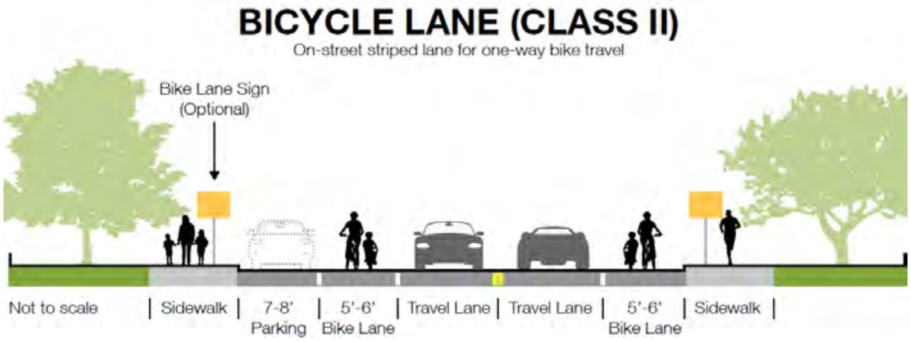
Guidelines and design standards for bikeway planning and design in California are established by California Department of Transportation (Caltrans) and presented in the *Highway Design Manual* (Chapter 1000: Bikeway Planning and Design). For local reference, the *City of Palo Alto Bicycle + Pedestrian Transportation*

Plan (May 2012) provide a bikeway planning and design tool. Bicycle facilities comprise paths (Class I), lanes (Class II), routes (Class III), and boulevards (Class III) as described below and shown on the accompanying figures.

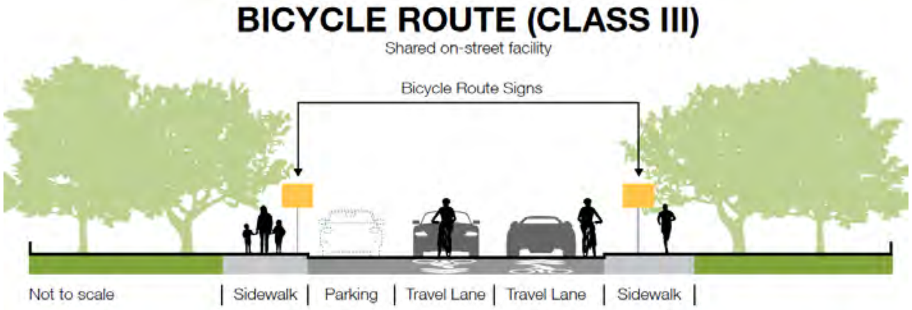
- Class I Bikeway (Bicycle Path) provides a completely separate right-of-way and is designated for the exclusive use of bicycles and pedestrians with vehicle and pedestrian cross-flow minimized.



- *Class II Bikeway (Bicycle Lane)* provides a restricted right-of-way and is designated for the use of bicycles with a striped lane on a street or highway. Bicycle lanes are generally four to six feet wide. Adjacent vehicle parking and vehicle/pedestrian cross-flow are permitted.



- *Class III Bikeway (Bicycle Route)* provides for a right-of-way designated by signs or pavement markings (sharrows) for shared use with pedestrians or motor vehicles. Sharrows are a type of pavement marking (bike and arrow stencil) placed to guide bicyclists to the best place to ride on the road, avoid car doors, and remind drivers to share the road with cyclists.



- *Class IIIA Bikeway (Bicycle Boulevard)* is a modified bicycle route providing convenient and efficient through route for cycles of all skill levels. A bike boulevard includes signage, pavement markings, and in some cases, traffic calming (e.g., mid-block closures to vehicles), and bike lanes.

Figure 3 presents existing bicycle facilities within the vicinity of the Project site. These facilities include:

- Bicycle lanes on:
    - Park Boulevard between El Camino Real and Lambert Avenue
    - Page Mill Road west of El Camino Real
    - California Avenue west of El Camino Real and east of Alma Street
- Bicycle routes on:
    - California Avenue between Park Boulevard and El Camino Real
    - Bryant Street between Palo Alto Ave and Los Robles Avenue

CITY OF PALO ALTO BICYCLE + PEDESTRIAN TRANSPORTATION PLAN

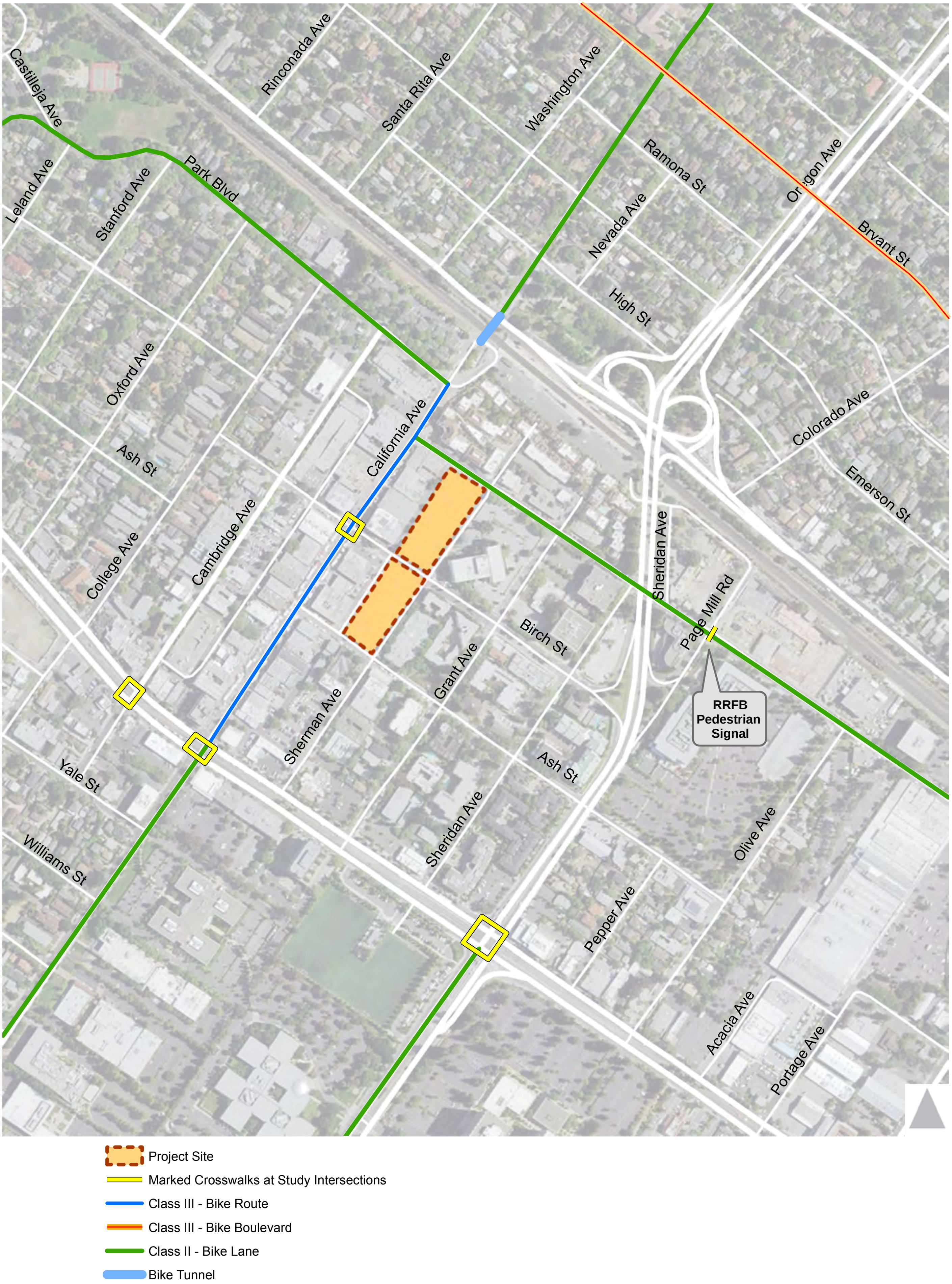
The *City of Palo Alto Bicycle + Pedestrian Transportation Plan* (May 2012) contains the policy vision, design guidance, and specific recommendations to guide public and private investments in active transportation (pedestrian and bicycle) facilities and related programs in the City of Palo Alto. In addition to the bicycle boulevard on Park Boulevard near the Project site, planned bicycle improvements include:

Bicycle lanes on:

- El Camino Real south of Page Mill Road
- California Avenue between El Camino Real and Park Boulevard

Bicycle routes on:

- El Camino Real north of Page Mill Road
- Page Mill Road/Oregon Expressway east of El Camino Real


Castilleja Ave
Rinconada Ave
Santa Rita Ave
Washington Ave
Leland Ave
Stanford Ave
Park Blvd
Ramona St
Oregon Ave
Bryant St
Nevada Ave
High St
Oxford Ave
Ash St
California Ave
Colorado Ave
Emerson St
Cambridge Ave
College Ave
Sheridan Ave
Page Mill Rd
Birch St
Grant Ave
RRFB
Pedestrian
Signal
Sherman Ave
Ash St
Yale St
Williams St
Sheridan Ave
Olive Ave
Pepper Ave
Acacia Ave
Portage Ave
Project Site
Marked Crosswalks at Study Intersections
Class III - Bike Route
Class III - Bike Boulevard
Class II - Bike Lane
Bike Tunnel

SANTA CLARA COUNTYWIDE BICYCLE PLAN

The adopted Santa Clara Countywide Bicycle Plan synthesizes other local and County plans into a comprehensive 20-year cross-county bicycle corridor network and expenditure plan (May 2008). The long-range countywide transportation plan and the means by which projects compete for funding and prioritization are documented in the Valley Transportation Plan (VTP) 2035 (adopted in January 2009). The Santa Clara Countywide Bicycle Plan includes a planned bicycle network of 16 routes of countywide or intercity significance. Several of these proposed facilities travel through the study area, including (listing street with cross county bicycle corridor number and name):

- Bryant Street (#1 US 101 Corridor)
- Park Boulevard (#2 Alma Street/Caltrain Corridor)
- California Avenue (#3 Dumbarton – East-West Connector Corridor)
- El Camino Real (#4 El Camino Real – Grand Boulevard Corridor)

The bicycle plan is currenty being updated and there have been several outreach meetings to present the developed plans and obtain feedback from the community. The draft Countywide Bicycle Plan is anticipated to be completed by Summer 2017.

BAY AREA BIKE SHARE

The Bay Area Bike Share is the region's bike sharing system with 700 bikes and 70 stations across the region launching in August 2013, with locations in San Francisco, Redwood City, Mountain View, Palo Alto, and San Jose. It is intended to provide Bay Area residents and visitors with an additional transportation option for getting around the region. Bay Area bikes can be rented from and returned to any station in the system, creating a network with many possible combinations of start and end point.

Palo Alto has two Bike Share stations near the Project site at the following locations:

- California Avenue Caltrain Station
- Park Boulevard and Olive Avenue

Three additional Bike Share stations are located in downtown Palo Alto at the following locations:

- Alma Street and Lytton Avenue
- University Avenue and Emerson Street
- Cowper Street and University Avenue

In October 2016, City Council approved a citywide Bike Share system with Social Bicycles (SoBi) that would replace the City's existing 35 bike share bikes with 350 new SoBi "smart bikes". The new Palo Alto bike share system will launch in June 2017.

EXISTING TRANSIT SERVICE

Bus service in Palo Alto is operated by the VTA. Commuter rail service (Caltrain) is provided from San Francisco to Gilroy by the Peninsula Joint Powers Board. **Figure 4** shows the existing transit service near the Project site. The Project site is served by VTA local, express and rapid transit routes, Caltrain, Deer Creek Caltrain shuttle, Stanford Marguerite shuttle, and AC Transit Dumbarton Express bus service. **Table 3** describes the span of services and frequency of service during the week with average weekday load factors for VTA buses and Caltrain.

TABLE 3 EXISTING TRANSIT SERVICES

Route[1]	From	To	Weekdays		Weekends	
			Operating Hours	Headways[2] (minutes)	Operating Hours	Headways[2] (minutes)
VTA						
22	Palo Alto Transit Center	Eastridge Transit Center	24-hour service	15	24-hour service	15
89	California Avenue Caltrain Station	Palo Alto Veterans Hospital	9:36 AM – 6:39 PM	30	No service	No service
101	Camden and Highway 85	Palo Alto	6:17 AM – 6:44 PM	60	No service	No service
102	South San Jose	Palo Alto	5:50 AM – 6:55 PM	15	No service	No service
103	Eastridge Transit Center	Palo Alto	5:08 AM – 6:37 PM	45		
104	Penitencia Creek Transit Center	Palo Alto	5:56 AM – 6:15 PM	30	No service	No service
182	Palo Alto	IBM/Bailey Avenue	7:29 AM – 6:14 PM	N/A: one peak hour trip	No service	No service
522	Palo Alto Transit Center	Eastridge Transit Center	4:39 AM – 11:26 PM	15	7:46 AM – 11:15 PM	15

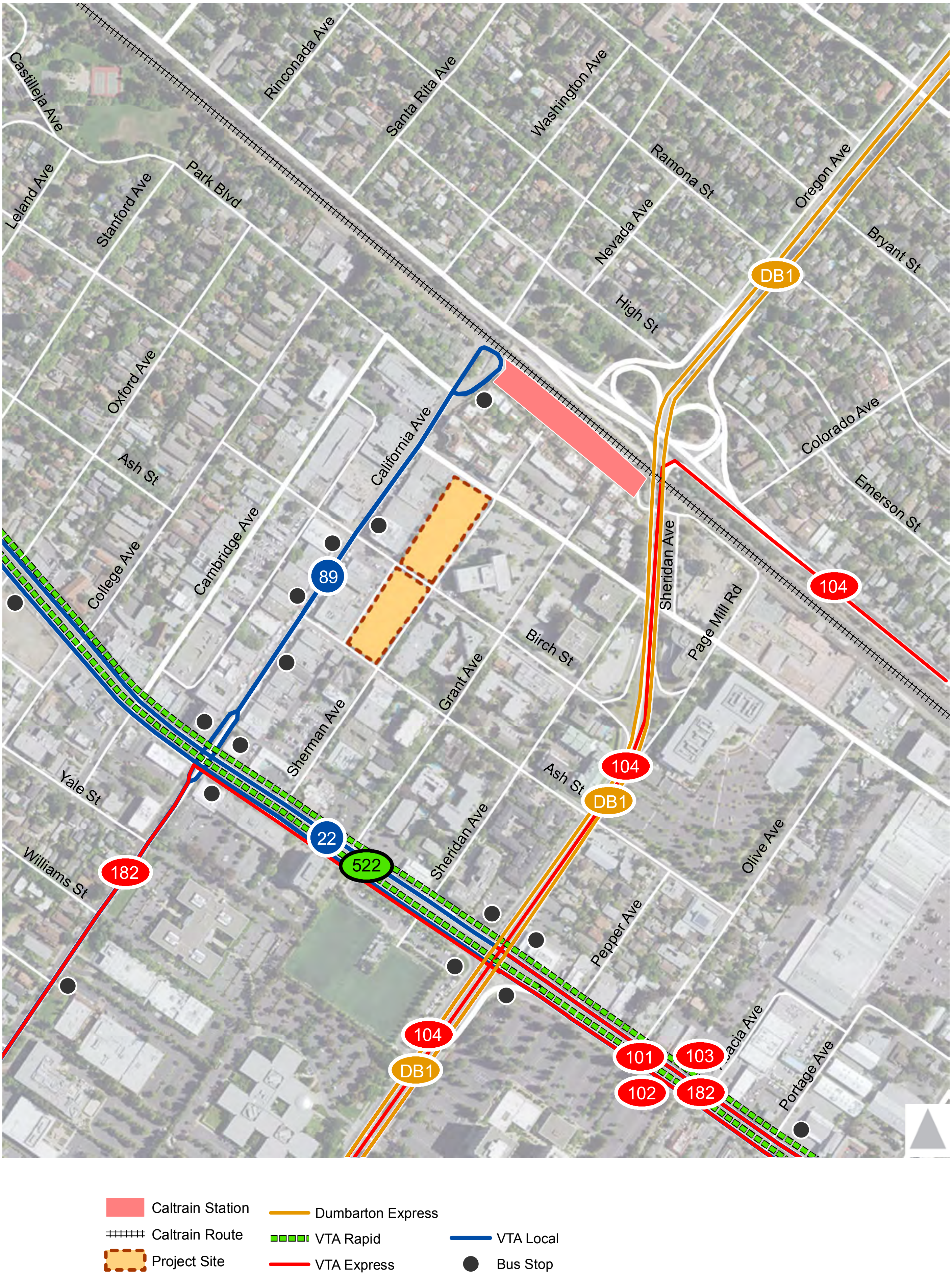
TABLE 3 EXISTING TRANSIT SERVICES

Route[1]	From	To	Weekdays		Weekends	
			Operating Hours	Headways[2] (minutes)	Operating Hours	Headways[2] (minutes)
Caltrain						
Caltrain California Avenue	San Francisco	Gilroy	4:30 AM – 1:34 AM	20-40	7:00 AM – 12:08 AM	60
AC Transit						
Dumbarton Express (DB1)	Union City BART	3475 Deer Creek Road	5:26 AM – 8:43 PM	20	No service	No service
Stanford Marguerite Shuttle System						
1050 Arastradero (1050 A)	Li Ka Shing Center	1050/1070 Arastradero Road	7:00 AM – 7:10 PM	20-25	No service	No service
Research Park (RP)	Palo Alto Transit Center	3475/3500 Deer Creek Road	6:31 AM – 7:33 PM	20-40	No service	No service
Shopping Express (SE)	Palo Alto Transit Center	Showers Drive @ Walmart	3:15 PM – 4:15 PM	50-60	9:35 AM – 11:08 PM	50-60

Notes:

1. Weekday and weekend services of November 2016.
2. Headways are defined as the time between transit vehicles on the same route (e.g. time between two Route 22 buses stopping at the Page Mill Road and El Camino Real intersection bus stops.

Sources: VTA, 2017; Caltrain, 2017; Stanford University, 2017.



Castilleja Ave
Rinconada Ave
Santa Rita Ave
Washington Ave
Leland Ave
Stanford Ave
Park Blvd
Ramona St
Oregon Ave
Nevada Ave
Bryant St
High St
DB1
Oxford Ave
California Ave
Colorado Ave
Ash St
Emerson St
Cambridge Ave
College Ave
Sheridan Ave
89
104
Page Mill Rd
Birch St
Grant Ave
Sherman Ave
Ash St
104
DB1
Yale St
22
Olive Ave
Williams St
182
522
Sheridan Ave
Pepper Ave
104
101
103
Acacia Ave
DB1
102
182
Portage Ave
🟥 Caltrain Station
Caltrain Route
Project Site
Dumbarton Express
VTA Rapid
VTA Express
VTA Local
● Bus Stop

EXISTING INTERSECTION VOLUMES AND LANE CONFIGURATIONS

Weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak period intersection turning movement counts were conducted at the study locations on September 2016 on clear days with area schools in-session. During the periods that counts were conducted, construction was on-going at 385 Sherman Avenue, which resulted in the following road closures near the Project site:

- Eastbound closure of Sherman Avenue between Ash Street and Birch Street
- Northbound closure of Ash Street between Grant Ave and Sherman Ave

These closures caused minor rerouting for vehicles, particularly at the Birch Street / Sherman Avenue (study intersection 3), Ash Street / Sherman Avenue, and Ash Street / Grant Street intersections. To ensure that the traffic volumes in the area used were not substantially skewed due to the road closures, the 2016 counts at the Park Boulevard, Birch Street, and Ash Street intersections were compared to 2013 counts to determine if there were any substantial count discrepancies in data between the two years. The comparison revealed that traffic volumes and patterns were similar between 2013 and 2016, and thus, were not greatly affected by the closures. However, several turning movements at the Birch Street / Sherman Avenue intersection were closed in 2016 and the volumes were slightly lower than three years prior. Thus, 2013 counts were used for this location.

For the study intersections, the single (i.e., peak) hour with the highest traffic volumes during the count period was identified. Existing lane configurations and signal timings were obtained through field observations. The peak hour volumes are presented on **Figure 5** along with the existing lane configurations and traffic controls. Detailed traffic count data are contained in **Appendix A**.

EXISTING PARKING

The existing parking lots (Lots C-6 and C-7) on the Project site currently provides approximately 310 total parking spaces. These lots are open to the public and include a two-hour limit. Parking occupancy counts were also conducted at the site in October 2016 for purposes of estimating vehicle trip generation rates for Lots C-6 and C-7. More information about these counts is presented in Chapter 3.

On-street parking with two-hour time limits between 8 AM and 5 PM are also provided on Cambridge Avenue, California Avenue, Sherman Avenue, and Ash Street. Non-time regulated on-street parking is provided on residential streets near the Project site, such as Grant Avenue and Sheridan Avenue.

Figure 5
Traffic Volumes and Lane Configurations
Existing (2016) Conditions - AM & PM Peak Hours

The City is currently proposing a new Residential Preferential Parking (RPP) program in the Evergreen Park and Mayfield neighborhoods. This program would allow residents or employees in the Evergreen Park and Mayfield neighborhoods to purchase permits that would provide them with unrestricted parking on the streets. Vehicles parked on the residential streets without a permit would be subject to the signed time-limits and would be cited if they are parked beyond that period. In May 2016, City Council directed staff to proceed with the implantation of the RPP program.

EXISTING INTERSECTION LEVELS OF SERVICE

Existing intersection lane configurations, signal timings, and turning movement volumes were used to calculate the levels of service for the key intersections during each peak hour. The results of the LOS analysis using the TRAFFIX software program for Existing Conditions are presented in **Table 4**. **Appendix C** contains the corresponding LOS calculation sheets. The results of the LOS calculations indicate that all study intersections operate at acceptable service levels (LOS D or better for City intersections and LOS E or better for CMP intersections) during the AM and PM peak hours.

FIELD OBSERVATIONS

Field observations of the study intersections were conducted during the morning and evening peak periods in September 2016. The purpose of this effort was (1) to identify any existing traffic problems that may not be directly related to intersection LOS and (2) to identify any locations where the LOS calculation does not accurately reflect actual operations in the field. In most cases, the intersections were observed to operate at the calculated levels of service for each peak hour. However, in a few locations, a few differences were identified between the observed and calculated intersection operations.

El Camino Real serves heavy traffic volumes during both peak hours and long vehicle queues were observed in both the northbound and southbound directions. The El Camino Real and Page Mill Road intersection is very congested on all approaches during both peak periods.

During the PM peak hour, the southbound queue on El Camino Real vehicle queue can extend from Page Mill Road all the way past Stanford Avenue. The southbound queues on Cambridge Avenue, California Avenue, and Page Mill Road intersections on El Camino Real would need multiple cycles to clear the intersection. The northbound approach on El Camino Real and Page Mill Road also has long vehicle queues; however, the queues were observed to disperse more quickly than the southbound queues.

Page Mill Road/Oregon Expressway also experiences long vehicle queues during the peak periods at the El Camino Real intersection. The southbound queues on Page Mill Road can extend from El Camino Real to

Bryant Street during both AM and PM peak periods, and the northbound queue can extend as far back to the HP office driveway during the PM peak period.

TABLE 4: EXISTING INTERSECTIONS LEVEL OF SERVICE

Intersection		Control[1]	Peak Hour	Delay[2]	LOS[3]
1	Park Boulevard / Sherman Avenue	SSSC	AM PM	10.3 12.2	B B
2	Park Boulevard / Page Mill Road	SSSC	AM PM	18.4 15.1	C C
3	Birch Street / Sherman Avenue	AWSC	AM PM	9.3 8.6	A A
4	Birch Street / Grant Street	AWSC	AM PM	13.1 11.4	B B
5	Birch Street / Sheridan Avenue	SSSC	AM PM	27.5 16.9	D C
6	Ash Street / California Avenue	AWSC	AM PM	8.1 8.4	A A
7	El Camino Real / Cambridge Avenue	Signal	AM PM	14.5 17.0	B B
8	El Camino Real / California Avenue	Signal	AM PM	21.6 28.5	C+ C
9	El Camino Real / Page Mill Road*	Signal	AM PM	60.1 47.0	E D
10	Middlefield Road / Oregon Expressway*	Signal	AM PM	49.7 54.7	D D-

Notes:

1. SSSC = Side-Street-Stop Controlled; AWSC = All-Way-Stop Controlled
2. Whole intersection weighted average control delay expressed in second per vehicle for signalized intersections and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop controlled intersections. Signalized intersections include adjusted saturation flow rates to reflect Santa Clara County conditions per VTA guidelines.
3. LOS = Level of Service. LOS calculations conducted using the TRAFFIX level of service analysis software package, which applies the method described in the 2000 Highway Capacity Manual.

Bold text indicates deficient intersection operations.

* Denotes Congestion Management Program (CMP) intersection.
Source: Fehr & Peers, 2017

3.0 EXISTING PLUS PROJECT CONDITIONS

This chapter presents the impacts of the proposed Project on the surrounding roadway system under Existing plus Project Conditions. First, the method used to estimate the amount of traffic generated by the Project is described. Then, the results of the LOS calculations for Existing plus Project Conditions are presented. Existing plus Project Conditions are defined as Existing Conditions plus traffic generated by the proposed Project. A comparison of intersection operations under Existing plus Project and Existing Conditions is presented and the immediate-term impacts of the Project on the study intersections are discussed.

PROJECT TRAFFIC ESTIMATES

The proposed Project is located at the corner of Sherman Avenue and Birch Street, and would remove the existing surface parking lots (i.e. Lots C-6 and C-7) with a total of 310 spaces to construct a new three-story Public Safety Building (PSB) that would range in size between 45,000 to 50,000 square feet on Lot C-6 and, and a new public parking structure with approximately 460 to 640 parking spaces (i.e., 160 to 340 net new spaces). The maximum quantities of building area and parking spaces for the PSB and Parking Structure, respectively, were analyzed to provide a conservative analysis. A summary of the existing and proposed development on the Project site is shown in **Table 5.**

TABLE 5: EXISTING AND PROPOSED DEVELOPMENT

Use	Existing	Proposed	Net Change
Lots C-6 & C-7	-310 spaces	-	-310 spaces
Public Safety Building (PSB)	-	50,000 s.f.	50,000 s.f.
Parking Structure	-	640 spaces	640 spaces
		Net New Total	**50,000 s.f. of PSB** **330 spaces**

Source: City of Palo Alto, 2017
s.f. = square feet

TRIP GENERATION ESTIMATES

The vehicle trip estimates for the proposed Public Safety Building (PSB) were developed based on trip generation studies for similar facilities conducted by Portland State University (PSU) and at the Central Police precinct of Vancouver, Washington. The weekday PM peak hour rate is based on surveys conducted at four police stations in the Portland Metro Area, and average weekday and AM peak hour trip generation rates are based on surveys conducted in Vancouver. A 50/50 split for inbound and outbound trips was used for PSB-generated traffic. **Appendix B** contains the trip generation information for the described police stations.

Vehicle trip estimates for the net new parking spaces were estimated based on parking surveys conducted at the two existing parking lots (Lots C-6 and C-7) during the AM and PM peak periods. The parking surveys were used to determine the existing parking turnover rates. During the time the parking surveys were conducted, building construction immediately adjacent to the parking lots at 385 Sherman Avenue occurred, which resulted in some contractors parking in the two lots. The parking surveys and field observations revealed that during the AM peak period, a maximum of 10 percent of the total parking spaces in the two lots were occupied by contractors. Given the relatively low contractor parking occupancy, the contractor parking was included in the trip calculation to provide a conservative analysis.

The parking surveys were conducted on Wednesday, October 19, 2016 from 6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM. The number of parked vehicles and the last four digits of each license plate were recorded once per hour to determine the timing of inbound and outbound trips. The total number of peak hour trips was divided by the total number of parking spaces to determine a trips/space rate. **Table 6** shows the existing vehicle trip rates and the inbound and outbound split of the parking lots based on the surveyed rates. These parking rates were used to calculate the net new trips for the proposed parking structure.

The parking structure is not expected to create a mode shift from non-auto modes to vehicles since the number of additional parking spaces is not that substantial. For example, if a person is currently biking to their destination in Evergreen Park, they will unlikely shift their transportation mode to driving just because the Project adds additional parking spaces. Therefore, the rates presented in Table 7 of the existing vehicle trip rates are appropriate to use in this study since the parking structure is not expected to induce vehicle travel.

TABLE 6: VEHICLE TRIP RATES AT EXISTING PARKING LOTS

		Vehicle Trips Per Parking Space					
		AM			PM		
Lot	**Supply**	**Rate**	**In %**	**Out %**	**Rate**	**In %**	**Out %**
C-6	162	0.11	88%	12%	0.34	52%	48%
C-7	158	0.29	60%	40%	0.50	59%	41%
OVERALL	**310**	**0.19**	**67%**	**33%**	**0.42**	**56%**	**44%**

Source: Fehr & Peers, 2017

TRIP GENERATION

Table 7 summarizes the Project's estimated trip generation. The proposed Project is estimated to generate 2,822 net new daily trips, 129 net new AM peak hour trips (74 inbound and 55 outbound), and 238 net new PM peak hour trips (116 inbound and 122 outbound).

TABLE 7: PROJECT VEHICLE TRIP GENERATION ESTIMATES

Land Use	Trip Generation Source	Quantity[1]	Weekday		AM Peak Hour				PM Peak Hour			
			Rate	Trips	Rate	In	Out	Total	Rate	In	Out	Total
Public Safety Building	Supporting Studies[2]	50 ksf	29.74	1,487	1.48	37	37	74	1.90	47	48	95
Parking Structure (New Spaces Only)	Parking Surveys[3]	330 spaces	4.21	1,391	0.19	43	21	64	0.42	69	70	139
TOTAL NET NEW TRIPS				**2,878**		**80**	**58**	**138**		**116**	**118**	**234**

Source: Fehr & Peers, 2017

Notes:

[1] ksf = 1,000 ksf

[2] Portland State University (PSU) study of four existing police stations in the Portland metropolitan area, Fall 2009

[3] Parking surveys conducted on lots C-6 and C-7 during the AM and PM peak periods. Daily parking surveys were not conducted, thus, assumed that the PM rate represents 10% of the daily.

TRIP DISTRIBUTION AND ASSIGNMENT

The direction of approach and departure of the Project trips were based on the locations of complementary land uses (e.g. areas of the City to be patrolled, PSB employee residential areas, existing police station), existing travel patterns in the area, and patterns used in other studies. The trip distribution pattern is shown in **Figure 6.** The general direction of approach and departure are listed in **Table 8**.

Given that parking facilities are not typically traffic generators by themselves, the trip distribution in Table 9 was only applied to the PSB-related trips. Trips are actually generated by the nearby retail, office and residential uses, and parking lots or structures simply provide vehicle storage. The Parking Structure trips are generally going to be existing vehicles that currently park at adjacent facilities (e.g. street parking, Lot C-8, etc.), but now park in the new Parking Structure. Therefore, the parking structure trips were only added to the adjacent intersections in the immediate vicinity of the site (i.e. Sherman Ave/Birch St [Int. 3], California Avenue/Ash Street [Int. 6], Sherman Ave/Ash St, and California Ave/Birch St) to account for the re-routing of the existing parking trips.

TABLE 8: TRIP DISTRIBUTION

Direction	Percentage
Middlefield Road north	7%
Middlefield Road south	8%
Oregon Expressway east	20%
Alma Street north	10%
Alma Street south	10%
El Camino Real north	15%
El Camino Real south	20%
Page Mill Road west	10%
Total	**100%**

Source: Fehr & Peers, 2017

Project trips were assigned to the roadway network based on the trip distribution patterns discussed above. **Figure 7** shows the AM and PM peak hour Project trips assigned to each turning movement at the study intersections. The trip assignment was added to the existing volumes to establish volumes under Existing plus Project Conditions, as shown in **Figure 8.**

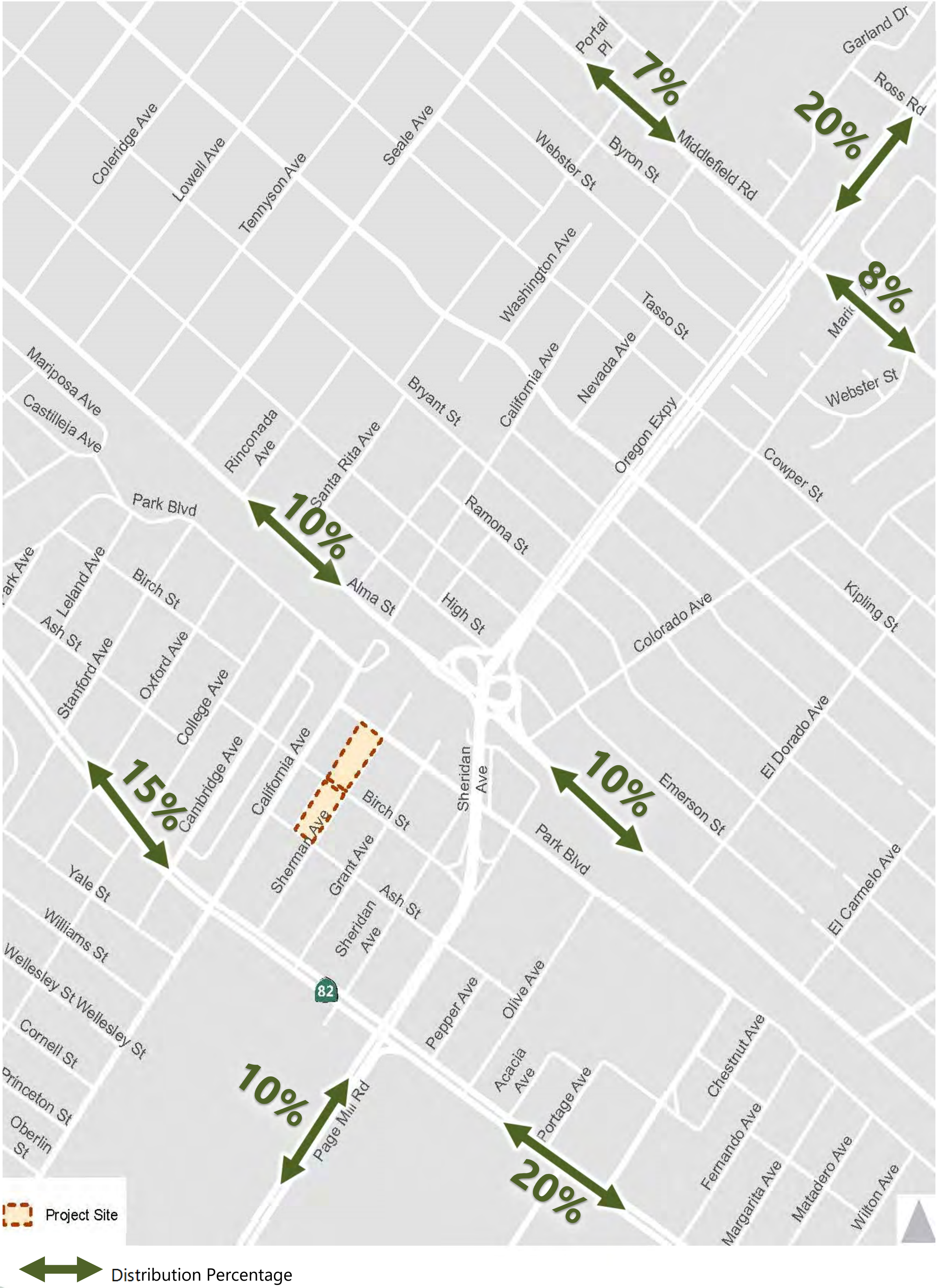


Figure 6

Project Trip Distribution

Figure 7
Traffic Volumes and Lane Configurations
Project Trip Assignment - AM & PM Peak Hours

Figure 8
Traffic Volumes and Lane Configurations
Existing (2016) plus Project Conditions - AM & PM Peak Hours

EXISTING PLUS PROJECT INTERSECTION LEVELS OF SERVICE

Intersection LOS was calculated with the new traffic added by the proposed Project to evaluate intersections operating conditions of the and identify potential impacts to the roadway system. The results of the intersection LOS calculations for Existing plus Project Conditions are presented in **Table 10. Appendix C** contains the corresponding calculation sheets. The results for Existing Conditions are included for comparison purposes. **Table 9** also reports the change in critical delay and critical volume-to-capacity (V/C) ratios. The changes in critical delay and critical V/C ratios between Existing and Existing plus Project Conditions are used to identify significant impacts.

The results of the LOS calculations indicate that all study intersections are projected to operate at acceptable service levels (LOS D or better for City intersections and LOS E or better for CMP intersections) during the AM and PM peak hours under Existing plus Project Conditions.

EXISTING PLUS PROJECT INTERSECTION IMPACTS AND MITIGATION MEASURES

This section of the report evaluates the intersection LOS results presented in **Table 9** against the City of Palo Alto and VTA's criteria for significant intersection impacts and presents mitigation measures for identified impacts.

Given that the LOS calculations indicate that all study intersections are projected to operate at acceptable service levels based on the City of Palo Alto and VTA's criteria, the Project has a **less-than-significant impact at all study intersections under the Existing plus Project scenario,** and no traffic mitigation measures are needed.

TABLE 9: EXISTING WITH PROJECT INTERSECTIONS LEVEL OF SERVICE

Intersection		Control	Peak Hour[1]	Existing Conditions		Existing with Project Conditions			
				Delay[2]	LOS[3]	Delay[2]	LOS[3]	Δ in Crit. V/C[4]	Δ in Crit. Delay[5]
1	Park Boulevard / Sherman Avenue	SSSC	AM PM	10.3 12.2	B B	10.5 13.2	B B	N/A – Unsignalized Intersection	
2	Park Boulevard / Page Mill Road	SSSC	AM PM	18.4 15.1	C C	18.6 15.3	C C	N/A – Unsignalized Intersection	
3	Birch Street / Sherman Avenue	AWSC	AM PM	9.3 8.6	A A	9.7 9.4	A A	N/A – Unsignalized Intersection	
4	Birch Street / Grant Street	SSSC	AM PM	13.1 11.4	B B	13.5 11.8	B B	N/A – Unsignalized Intersection	
5	Birch Street / Sheridan Avenue	SSSC	AM PM	27.5 16.9	D C	28.8 17.7	D C	N/A – Unsignalized Intersection	
6	Ash Street / California Avenue	AWSC	AM PM	8.1 8.4	A A	8.3 8.8	A A	N/A – Unsignalized Intersection	
7	El Camino Real / Cambridge Avenue	Signal	AM PM	14.5 17.0	B B	14.4 17.0	B B	0.001 0.001	0.0 0.0
8	El Camino Real / California Avenue	Signal	AM PM	21.6 28.5	C+ C	22.3 29.1	C+ C	0.007 0.005	1.0 0.6
9	El Camino Real / Page Mill Road*	Signal	AM PM	60.1 47.0	E D	60.7 47.4	E D	0.002 0.009	0.5 0.7 +
10	Middlefield Road / Oregon Expressway*	Signal	AM PM	49.7 54.7	D D-	49.9 54.9	D D-	0.007 0.008	0.5 0.4

Notes:

1. SSSC = Side-Street-Stop Controlled; AWSC = All-Way-Stop Controlled
2. Whole intersection weighted average control delay expressed in second per vehicle for signalized intersections and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop controlled intersections. Signalized intersections include adjusted saturation flow rates to reflect Santa Clara County conditions per VTA guidelines.
3. LOS = Level of Service. LOS calculations conducted using the TRAFFIX level of service analysis software package, which applies the method described in the 2000 Highway Capacity Manual.
4. Change in critical movement delay between Existing and Project Conditions for signalized intersections. N/A = Not applicable for unsignalized intersections.
5. Change in critical movement delay between Existing and Project Conditions for signalized intersections. N/A = Not applicable for unsignalized intersections.

Bold text indicates deficient intersection operations.

PEDESTRIAN, BICYCLE, AND TRANSIT IMPACTS AND MITIGATION

Project impacts to off-site pedestrian, bicycle, and transit facilities and services based on the criteria presented in Chapter 1 are discussed in this section. Project pedestrian, bicycle, and transit impacts regarding site access are discussed in Chapter 6: Site Access and On-Site Circulation.

The Project, particularly the PSB, will generate some new pedestrian and bicyclists. The site is located approximately 700 feet from the Caltrain California Avenue train station, and within 200 feet of two bus stops on California Avenue. Thus, the Project is expected to generate pedestrian demand that will require sidewalks or paths for safe and convenient travel to and from these destinations, as well as the retail, offices and service opportunities located on California Avenue and other streets. Existing sidewalks are provided adjacent to and near the Project site and could accommodate the additional pedestrians generated by the Project. In addition, crosswalks and pedestrian signals are provided at all signalized study intersections in the study area. Thus, the impact to pedestrian facilities is considered **less-than-significant,** and no mitigation measures are needed.

The Project is not expected to create a hazardous condition that currently does not exist for pedestrians and bicyclists, and would not interfere with pedestrian or bicycle accessibility to the site and adjoining areas. Bicycle travel around the site is on lower volume and lower speed streets, and therefore, it is more conducive to bicycling. Furthermore, the Project does not conflict with existing and planned bicycle facilities; thus, the impact to bicycle facilities is considered **less-than-significant** and no mitigation measures are needed.

The Project is expected to generate some new demand for transit services and facilities. The Project site is served by VTA and Stanford Marguerite bus stops located at the El Camino Real/Page Mill Road intersection and along California Avenue. The PSB portion of the proposed Project is estimated to generate a small number of new transit passengers, which would be distributed across multiple bus routes, shuttles, and Caltrain. Accordingly, the existing transit service is expected to accommodate the additional demand generated by the Project, and therefore, is expected to be **less-than-significant.**

4.0 BACKGROUND CONDITIONS

This chapter presents the results of the LOS calculations under Background Conditions with and without the Project. Traffic volumes for Background No Project Conditions comprise existing volumes *plus* traffic generated by "approved but not yet constructed" and "unoccupied" development near the site *plus* growth from development in the greater study area. Background plus Project Conditions are defined as Background No Project Conditions plus net new traffic generated by the proposed Project.

BACKGROUND NO PROJECT TRAFFIC VOLUMES

Staff from the City of Palo Alto provided a list of development projects in the study area that are expected to add traffic to the study intersections in the near future. Trip generation estimates were obtained from their respective traffic reports or estimated based on trip generation rates published in the Institute of Transportation Engineers *Trip Generation* (9th Edition). The trips for each of the background projects were then assigned to the roadway network based on population and employment data, existing and future travel patterns, and recent TIA's completed in the area.

The approved projects include:

- 2555 Park Boulevard (23,269 square feet of office space)
- 2500 & 2600 El Camino Real (70 apartments, 6,253 square feet of retail, and 747 square feet of coffee shop)
- 2747 Park Boulevard (33,300 square feet of office)
- 3045 Park Boulevard (29,120 square feet of office)
- 385 Sherman Avenue (55,560 square feet of office and 4 dwelling units)
- 2515 & 2585 El Camino Real (13 Condominiums, 10,122 square feet of retail, 9,825 square feet of office)
- 2209 El Camino Real (2,000 square feet of walk-in bank, 3,400 square feet of office, 4 dwelling units)

Furthermore, an annual growth rate was applied to the through movements on El Camino Real to represent the increase in regional traffic from future developments outside of the study area. The El Camino Real annual growth rate was obtained from the City's Travel Demand Model and applied to existing traffic counts to account for regional growth. This growth rate was compounded over five-year timeframe (2016 to 2021) up to full development of the proposed Project.

Figure 9 presents the AM and PM peak-hour turning movement volumes at the study intersections under this scenario.

BACKGROUND ROADWAY IMPROVEMENTS

The following study intersections are expected to be modified prior to completion of the proposed Project due to planned and funded improvements:

- *Park Boulevard / Page Mill Road (Intersection #2)* – New traffic signal.[2]

No other approved and funded transportation network improvements were identified that would be constructed and operational prior to Project completion. **Figure 9** also presents the lane configurations and traffic control devices at the study intersections under this scenario.

BACKGROUND WITH PROJECT INTERSECTION VOLUMES

Trips generated from the proposed Project (**Figure 6**) were added to the Background traffic projects to develop traffic volumes for Background plus Project Conditions. The resulting volumes are shown on **Figure 10.**

BACKGROUND INTERSECTION LEVELS OF SERVICE

Table 10 presents the delay and LOS calculation results for the study intersections under Background No Project and Background plus Project Conditions. **Appendix C** contains the corresponding calculation sheets.

The El Camino Real/Cambridge Avenue intersection shows a reduction in average delay with the addition of Project traffic. This is because the average delay values presented in the table are intersection weighted averages. Weighted average delays will be reduced when traffic is added to a movement with a high volume and low to moderate delays, such as through movements on El Camino Real. Conversely, relatively small volume increase to movements with high delays can substantially increase the weighted average.

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[2] Project improvement associated with 2747 Park Boulevard project.

Figure 9
Traffic Volumes and Lane Configurations
Background Conditions - AM & PM Peak Hours

Figure 10
Traffic Volumes and Lane Configurations
Background plus Project Conditions - AM & PM Peak Hours

TABLE 10: BACKGROUND AND BACKGROUND PLUS PROJECT INTERSECTIONS LEVEL OF SERVICE

Intersection		Control	Peak Hour[1]	Background Conditions		Background plus Project Conditions			
				Delay[2]	LOS[3]	Delay[2]	LOS[3]	Δ in Crit. V/C[4]	Δ in Crit. Delay[5]
1	Park Boulevard / Sherman Avenue	SSSC	AM PM	10.3 12.4	B B	10.6 13.4	B B	N/A – Unsignalized Intersection	
2	Park Boulevard / Page Mill Road	Signal	AM PM	26.3 27.2	C C	26.3 28.4	C C	0.001 0.021	0.1 0.7
3	Birch Street / Sherman Avenue	AWSC	AM PM	9.5 8.7	A A	9.9 9.6	A A	N/A – Unsignalized Intersection	
4	Birch Street / Grant Street	SSSC	AM PM	14.1 11.8	B B	14.6 12.2	B B	N/A – Unsignalized Intersection	
5	Birch Street / Sheridan Avenue	SSSC	AM PM	31.0 20.8	D C	32.6 22.3	D C	N/A – Unsignalized Intersection	
6	Ash Street / California Avenue	AWSC	AM PM	8.2 8.5	A A	8.3 8.8	A A	N/A – Unsignalized Intersection	
7	El Camino Real / Cambridge Avenue	Signal	AM PM	14.1 16.6	B B	14.1 16.5	B B	0.001 0.001	0.0 0.0
8	El Camino Real / California Avenue	Signal	AM PM	22.1 28.5	C+ C	22.8 29.2	C+ C	0.007 0.005	1.0 0.6
9	El Camino Real / Page Mill Road*	Signal	AM PM	64.3 48.9	E D	64.6 49.3	E D	-0.001 0.009	-0.3 0.8
10	Middlefield Road / Oregon Expressway*	Signal	AM PM	53.7 53.4	D- D-	54.0 53.7	D- D-	0.007 0.007	0.5 0.4

Notes:

1. SSSC = Side-Street-Stop Controlled; AWSC = All-Way-Stop Controlled
2. Whole intersection weighted average control delay expressed in second per vehicle for signalized intersections and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop controlled intersections. Signalized intersections include adjusted saturation flow rates to reflect Santa Clara County conditions per VTA guidelines.
3. LOS = Level of Service. LOS calculations conducted using the TRAFFIX level of service analysis software package, which applies the method described in the 2000 Highway Capacity Manual.
4. Change in critical movement delay between Background and Project Conditions. N/A = Not applicable for unsignalized intersections.
5. Change in critical movement delay between Background and Project Conditions. N/A = Not applicable for unsignalized intersections.

Bold text indicates deficient intersection operations.

* Denotes Congestion Management Program (CMP) intersection.
Source: Fehr & Peers, 2017

BACKGROUND INTERSECTION IMPACTS AND MITIGATION MEASURES

This section of the report evaluates the intersection LOS results presented in **Table 10** against the City of Palo Alto and VTA's criteria for significant impacts and presents mitigation measures for identified impacts.

Given that the LOS calculations indicate that all study intersections are projected to operate at acceptable service levels based on the City of Palo Alto and VTA's criteria, the Project has a **less-than-significant impact at all study intersections under the Background plus Project scenario,** and no mitigation measures are needed.

PEDESTRIAN, BICYCLE, AND TRANSIT IMPACTS AND MITIGATION

The Project impact to pedestrian, bicycle, and transit facilities are discussed in the Existing plus Project Conditions Chapter, and similar results are expected under the Background plus Project scenario. While the Project is expected to generate new non-auto trips, the existing pedestrian, bicycle, and transit facilities could accommodate the anticipated additional demand. Furthermore, the *City of Palo Alto Bicycle + Pedestrian Transportation Plan* (May 2012), includes the identification of a bicycle boulevard on Park Boulevard. This Project does not conflict with that planned bicycle facility. Therefore, the Project's impact to the pedestrian, bicycle, and transit facilities is considered **less-than-significant,** and no mitigation is needed.

5.0 CUMULATIVE CONDITIONS

This chapter presents the results of the intersection LOS calculations under Cumulative Conditions with and without the Project. Cumulative No Project Conditions are defined as existing volumes plus traffic generated by all foreseen development projects that would affect the transportation system in the study area, including "approved but not yet constructed", as well as pending development projects that have not yet been approved. Cumulative with Project Conditions are defined as Cumulative without Project Conditions plus traffic generated by the proposed Project.

CUMULATIVE NO PROJECT TRAFFIC VOLUMES

Traffic projections for Cumulative Conditions were estimated based on the City's Travel Demand Forecasting Model, which uses land use and socioeconomic attributes in Traffic Analysis Zones (TAZs) to generate and assign traffic across the roadway network. This model accounts for traffic growth both in the City and in the greater Peninsula region. Per the City's direction, the future year model with the Comprehensive Plan's Alternative 1 land use was used to estimate future year growth. **Figure 11** presents the AM and PM peak-hour turning movement volumes at the study intersection under Cumulative No Project Conditions.

CUMULATIVE ROADWAY IMPPROVEMENTS

The following approved and funded improvements are included at the study intersections under Cumulative Conditions:

- *Park Boulevard / Page Mill Road (Intersection #2)* – New traffic signal.[3]
- *El Camino Real / Page Mill Road (Intersection #9)* – The addition of a westbound right-turn lane.[4]

No other approved and funded transportation network improvements were identified that would be constructed under Cumulative Conditions.

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[3] Project Improvement associated with 2747 Park Boulevard project.

[4] City of Palo Alto – California Avenue Streetscape project.

CUMULATIVE PLUS PROJECT TRAFFIC VOLUMES

Trips generated from the proposed Project (**Figure 6**) were added to the Cumulative No Project traffic projections (**Figure 11**) to develop traffic volumes for Cumulative plus Project Conditions. The resulting volumes are shown in **Figure 12**.

CUMULATIVE INTERSECTION LEVELS OF SERVICE

Table 11 presents the level of service calculations for the study intersection under Cumulative No Project and Cumulative plus Project Conditions. **Appendix C** contains the corresponding calculation sheets.

The results indicate that all study intersections are projected to operate at acceptable service levels during the AM and PM peak hours, except for the Birch Street/Sheridan Avenue intersection, where the side-street approach is anticipated to operate at unacceptable LOS E during the AM peak hour.

Figure 11
Traffic Volumes and Lane Configurations
Cumulative (2035) Conditions - AM & PM Peak Hours

Figure 12
Traffic Volumes and Lane Configurations
Cumulative plus Project Conditions - AM & PM Peak Hours

TABLE 11: CUMULATIVE AND CUMULATIVE PLUS PROJECT INTERSECTIONS LEVEL OF SERVICE

Intersection		**Control**	**Peak Hour[1]**	**Cumulative Conditions**		**Cumulative plus Project Conditions**			
				Delay[2]	**LOS[3]**	**Delay[2]**	**LOS[3]**	**Δ in Crit. V/C[4]**	**Δ in Crit. Delay[5]**
1	Park Boulevard / Sherman Avenue	SSSC	AM PM	12.1 13.6	B B	12.6 14.8	B B	N/A – Unsignalized Intersection	
2	Park Boulevard / Page Mill Road	Signal	AM PM	28.6 36.8	C D+	28.7 39.7	C D	0.001 0.022	0.1 4.0
3	Birch Street / Sherman Avenue	AWSC	AM PM	10.1 9.3	B A	10.7 10.4	B B	N/A – Unsignalized Intersection	
4	Birch Street / Grant Street	SSSC	AM PM	15.6 12.6	C B	16.2 13.1	C B	N/A – Unsignalized Intersection	
5	Birch Street / Sheridan Avenue	SSSC	AM PM	**43.7** 30.4	**E** D	**46.8** 33.7	**E** D	N/A – Unsignalized Intersection	
6	Ash Street / California Avenue	AWSC	AM PM	8.5 9.0	A A	8.7 9.4	A A	N/A – Unsignalized Intersection	
7	El Camino Real / Cambridge Avenue	Signal	AM PM	15.1 18.7	B B-	15.1 18.7	B B-	0.001 0.001	0.0 0.0
8	El Camino Real / California Avenue	Signal	AM PM	23.8 29.4	C C	24.5 30.1	C C	0.007 0.005	0.9 0.6
9	El Camino Real / Page Mill Road*	Signal	AM PM	74.5 56.4	E D	75.3 57.4	E- E+	0.005 0.009	1.8 2.0
10	Middlefield Road / Oregon Expressway*	Signal	AM PM	59.3 61.8	E+ E	59.6 62.1	E+ E	0.007 0.006	0.6 0.5

Notes:

1. SSSC = Side-Street-Stop Controlled; AWSC = All-Way-Stop Controlled
2. Whole intersection weighted average control delay expressed in second per vehicle for signalized intersections and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop controlled intersections. Signalized intersections include adjusted saturation flow rates to reflect Santa Clara County conditions per VTA guidelines.
3. LOS = Level of Service. LOS calculations conducted using the TRAFFIX level of service analysis software package, which applies the method described in the 2000 Highway Capacity Manual.
4. Change in critical movement delay between Cumulative and Project Conditions. N/A = Not applicable for unsignalized intersections.
5. Change in critical movement delay between Cumulative and Project Conditions. N/A = Not applicable for unsignalized intersections.

Bold text indicates deficient intersection operations according to agency standards.

* Denotes Congestion Management Program (CMP) intersection.
Source: Fehr & Peers, 2017

SIGNAL WARRANT ANALYSIS

As noted in Table 11, the Birch Street / Sheridan Avenue intersection is projected to operate unacceptably and would be impacted with the addition of traffic from the proposed Project. To determine if the potential impact is significant, the peak-hour signal warrant from the *Manual of Uniform Traffic Control Devices* (MUTCD) was evaluated for this location to determine if a traffic signal may be warranted. Application of the MUTCD criteria shows that the peak hour warrant is not met at the Birch Street / Sheridan Avenue intersection under Cumulative plus Project Conditions.

CUMULATIVE INTERSECTION IMPACTS AND MITIGATION MEASURES

This section of the report evaluates the intersection LOS results presented in **Table 11** against the City of Palo Alto and VTA's criteria for significant impacts and presents mitigation measures for identified impacts.

As discussed above, the results of the LOS calculations indicate that all study intersection would operate at acceptable service levels under Cumulative plus Project Conditions, except the Birch Street/Sheridan Avenue intersection, which operates at LOS E in the AM peak hour without and with the Project. However, while the intersection is anticipated to operate unacceptably, the unsignalized intersection does not satisfy the signal warrant. It is not uncommon for one or more approaches at an unsignalized intersection to operate at LOS E or F without meeting the warrant criteria for a signal. Therefore, based on the City of Palo Alto's criteria, the Project has a **less-than-significant impact at all study intersections under the Cumulative plus Project Condition** at all intersections, and no mitigation measures are needed.

PEDESTRIAN, BICYCLE, AND TRANSIT IMPACTS AND MITIGATION

The Project impact to pedestrian, bicycle, and transit facilities are discussed in the Existing plus Project Conditions Chapter, and similar results are expected under the Cumulative plus Project scenario. While the Project is expected to generate new non-auto trips, the existing pedestrian, bicycle, and transit facilities could accommodate the additional demand. Furthermore, the *City of Palo Alto Bicycle + Pedestrian Transportation Plan* (May 2012), includes the identification of a bicycle boulevard on Park Boulevard. This Project does not conflict with that planned bicycle facility. Therefore, the Project's impact to the pedestrian, bicycle, and transit facilities is considered **less-than-significant** and no mitigation is needed.

6.0 SITE ACCESS AND ON-SITE CIRCULATION

This chapter analyzes site access and internal circulation for vehicles, pedestrians, bicycles, and transit based on the site plans presented on **Figures 2a and 2b.** The PSB site plan shows the location of the Project driveways, but not the internal circulation system for auto, pedestrian, and bicycle traffic. The final Parking Structure site plan was being developed during the time of this study; therefore, due to the lack of a detailed site plan, more specific site circulation could not be evaluated. However, Fehr & Peers coordinated with the parking structure designers, Watry Design, Inc., to determine the ideal location for the parking structure driveway. Below is more detail on the access and circulation for the PSB and Parking Structure.

SITE ACCESS AND CIRCULATION

Public Safety Building (PSB)

The PSB site plan, developed by Ross Drulis Cusenbery Architecture, presents three access points to the site:

- *Primary inbound/outbound driveway on Sherman Avenue* – This driveway would be located approximately 85 feet west of Park Avenue and would provide access to the below-grade parking.

- *Secondary inbound/outbound driveway on Birch Street* – This driveway would be located immediately adjacent to the Jacaranda Lane alley driveway. This adjacent driveway configuration would result in potential turning movement conflicts for the vehicles leaving the Project driveway or Jacaranda Lane. For example, if a vehicle is trying to turn right out of the Project driveway while another vehicle on Jacaranda Lane is trying to turn left, the two vehicles could potentially conflict due to the close proximity and potential confusion over vehicle right-of-way. Portions of the existing median on Birch Street would need to be removed to allow left-turns out of the Project driveway.
    - Recommendation: Prohibit left-turns out of the Jacaranda Lane alley and provide full-access at the Project's gated driveway. The vehicles on Jacaranda Lane that are destined for areas to the south would need to circulate around the block onto California Avenue, then Ash Street in order to access their southern destination. With the removal of the on-site parking lots as part of the Project, the volumes on Jacaranda Lane would be substantially reduced and the restricted left-turn movement would only affect a small number of vehicles.

Public Parking Structure

The parking structure would consist of five-to-six-levels total: three-to four- levels above grade and one-to-two basement floors. The parking structure internal ramps would be on the north side with access to the up ramp on the west and the down ramp on the east side.

The structure would be supported by one full access driveway on Sherman Avenue, approximately 90 feet to center of ram west from the corner of Birch Street. Similar to the PSB primary driveway, having the driveway closer to the adjacent east intersecting street (i.e. Park Boulevard for the PSB driveway and Birch Street for the Parking Structure Driveway) reduces the potential for queue spillback into the adjacent intersections (i.e. Birch Street and Ash Street). For an eastbound vehicle on Sherman Avenue trying to turn left into the structure, they must yield to westbound traffic, but they would have ample queuing storage on Sherman Avenue to make the movement without impeding traffic on Ash Street. For a westbound vehicle on Sherman Avenue that needs to turn right into the structure, they are not required to stop for conflicting movements (except for pedestrians walking on the sidewalk crossing the parking structure driveway), so the queues would be negligible.

If the parking structure is operated with a payment system, gates may be required at the entrance where each driver would receive a ticket upon entering. As discussed in the trip generation section, the parking structure is anticipated to generate approximately 116 inbound trips in the PM peak hour, which would equate to an average of approximately two vehicles per minute entering the structure. Even at the maximum anticipated queue of twice the average or four vehicles, the gating the entrance to the parking structure is not anticipated to adversely affect operations given the ample capacity available on Sherman Avenue.

Recommendations:

As the site plan refinements proceed, the following recommendations should be considered to enhance the vehicle circulation and reduce vehicle conflicts in the parking structure:

- The parking layout should avoid perpendicular parking spaces at the end of the aisles so that drivers can back in and out of the space easily and reduce potential conflicts.
- Stripe all driveways with double yellow centerline to delineate the separation of entering and exiting traffic.

PEDESTRIAN AND BICYCLE ACCESS AND CIRCULATION

Pedestrian

The Project site is supported by sidewalks on all adjacent roadways, except along Jacaranda Lane, which is an alley and will primarily serve only delivery trucks and police vehicles once the Project is built and operational. The Project site is adjacent to multiple restaurants and retail shops on California Avenue, and it is expected that PSB employees and people parking in the structure will walk to California Avenue to eat, shop or obtain services. Currently, two pedestrian walkways between buildings connect California Avenue to Jacaranda Lane, and would provide direct access to the PSB and Parking Structure.

Recommendations:

As the site plan refinements proceed, the following recommendations should be considered to enhance the pedestrian circulation and reduce conflicts in the parking structure:

- The Parking Structure will include stairwells on the northeast and northwest corners of the structure, adjacent to Jacaranda Lane. A clear pedestrian crosswalk should be provided on Jacaranda Lane to connect patrons between the structure to the walkway to California Avenue.

- Pedestrian and vehicle conflicts could potentially occur at Project driveways, when a car is exiting and pedestrians using the sidewalk that crosses the driveway. To enhance safety for pedestrians, it is recommended that signage and/or warning systems be installed at the entry/exit point of the parking garage (both on Sherman Avenue for the Parking Structure, the Birch Street gated driveway for the PSB, and the Jacaranda Lane gated driveway for the police department vehicles) to alert motorists of potential pedestrian conflicts. These signs or systems should also inform pedestrians that they should exercise caution when crossing the driveway.

Bicycles

PAMC Section 18.52.040 stipulates that one bicycle parking space per 2,500 feet of gross floor area is required with a mix of 80 percent for long-term parking and 20 percent for short-term parking. As a result, the PSB would need to provide 18 parking spaces for bikes (14 long-term bike spaces and 4 short-term spaces). These spaces should be conveniently located at building entrances or in visible areas for guests and employees. The applicant should ensure the following measures are integrated into the final site design:

- Class I long-term bicycle parking such as lockers or secured room be provided for employee use and long-term parking.
- Inverted u-style bicycle parking be provided for the bicycle racks for short-term parking.

In addition, PAMC Section 18.54.060 requires signs be posted at the building entrance to direct cyclists to parking facilities. Where feasible, we recommend that *Manual on Uniform Traffic Control Devices* (MUTCD) signage standards are followed.

TRANSIT ACCESS

The Project is located adjacent to existing transit lines and bus stops operating along El Camino Real, California Avenue, Page Mill Road-Oregon Expressway, and Caltrain railroad. While the increase in passenger demand may not exceed capacity, it is recommended that signage be provided at the PSB entrance indicating the direction of bus stops or coordinated wayfinding with the Caltrain Station. Signage could be placed on or adjacent to the Park Structure, as appropriate.

PARKING REQUIREMENTS

The PSB would provide between 170 to 190 underground spaces for police vehicles and staff. Visitor parking for the PSB will be available in the Project's new parking structure across the street. According to Section 18.52.040 (parking supply) and 18.54.030 (accessible parking supply) of the City's Municipal Code, the parking requirement for office uses is one space per 250 gross floor area. As a result, the PSB is required to supply 179 regular parking spaces and 6 accessible parking spaces, which equates to 185 total parking spaces. Accordingly, if the PSB provides the maximum proposed spaces (i.e. 190 spaces), it would provide sufficient on-site parking spaces to meet the City's parking supply requirements.

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7.0 OTHER TRANSPORTATION CONSIDERATIONS

This chapter presents a variety of other information relating to neighborhood impacts, vehicle miles of travel, and left-turn queues at key study intersections.

NEIGHBORHOOD IMPACTS

Since the proposed Project is located in the Mayfield neighborhood, it would add some Project trips to the residential streets, such as Birch Street and Park Boulevard. It is estimated that trips associated with the PSB would add a maximum of 40 trips during the PM peak hour on Birch Street between Sheridan Avenue and Oregon Expressway. Given that Birch Street is uncontrolled along this segment, the minimal traffic volume increase related to the Project would result in nominal increase in traffic delay on Birch Street.

Additionally, the El Camino Real/Page Mill Expressway would increase in average delay as a result of the Project. However, the increase would be negligible (i.e. less than 2 seconds) and is not expected to result in any new cut-through traffic in the Mayfield neighborhood or in the adjacent neighborhoods (i.e. College Terrace, Evergreen Park, and Ventura.

VEHICLE MILES TRAVELED (VMT)

This section describes the methodology used to calculate the average weekday Vehicle Miles of Travel (VMT) associated with the proposed Project. VMT is presented for informational purposes in this study. However, the values shown here are typically used as inputs to other technical studies such as air quality and greenhouse gas emissions.

VMT is considered a useful metric in understanding the overall impacts of a project on the transportation system. VMT is often expressed on a per unit basis "per capita" or "per employee" basis to understand the relative efficiency of one project versus another. By definition, one VMT occurs when a single vehicle is driven one mile. The VMT for a new development project is estimated by adding the VMT for all vehicles generated by a site or use. In addition, the VMT values in this report represent vehicular miles of travel for an entire weekday. Lastly, VMT values in this report represent the full length of a given trip, and are not truncated at city, county, or region boundaries.

VMT ESTIMATE

Many factors affect travel behavior, such as density, diversity of land uses, design of the transportation network, distance to high-quality transit, and demographics (the "D"s). Typically, low-density development at great distance from other land uses, located in areas with poor access to transit, generate more automobile travel compared to development located in urban areas.

VMT measurement has one primary limitation: it is not directly observed and therefore cannot be easily measured. The amount of VMT can be estimated based on extensive surveys of residents, visitors, and employees, or by using a validated travel demand model that estimates vehicle demand and identifies the origin and destination of every trip (providing the travel distance for each trip). Travel demand model estimation is typically done for larger-scale projects than the proposed PSB/Parking Structure project.

To estimate the VMT for this project, we used our MainStreet tool, which is a web application developed by Fehr & Peers and the Environmental Protection Agency (EPA). The model recognizes that traffic generation by mixed-use and other forms of sustainable development relate closely to the density, diversity, design, destination accessibility, travel proximity, and scale of development. The model estimates the percentage of daily and peak hour trips that remain to the project site, as well as external transit, walk and vehicle mode splits.

In addition to calculating a project's trip generation, MainStreet is also designed with the flexibility to use custom trip data from travel surveys from a variety of sources including the 2013 California Household Travel Survey [CHTS], which provides average trip lengths by trip purpose and geographic area, or regional travel demand model's trip lengths to calculate a project's VMT.

VMT was only calculated for the PSB and not the Parking Structure. As described in the *Trip Generation Estimates* section, parking facilities are not typically traffic generators by themselves. Trips are actually generated by the nearby retail, office and residential uses, and parking lots or structures simply provide vehicle storage The Parking Structure "trips" are going to be made by existing vehicles that currently park at adjacent facilities (e.g. adjacent street parking or parking lots), but would now park in the new structure. Consequently, the Parking Structure would at worst generate a negligible amount of VMT, and it is likely that it would actually reduce VMT in the area since it will reduce the need for vehicles to circulate around the study area trying to find an available parking space on the street. Furthermore, since the PSB portion of the Project would relocate employees from the existing PSB in downtown to the new location on Sherman Avenue, the Project is not expected to generate significant additional regional trips, rather redistribute them to a new location within the City.

The VMT was calculated for years 2020 and 2040, which are the two future years of the MTC MPO Travel Demand Model. Based on the project's trip generation and the trip lengths from MTC's travel demand model, the Project's average weekday VMT (generated by the PSB) would be approximately 2,250 VMT under 2020 Conditions, which equates to 15 VMT per employee, and 2,700 VMT under 2040 Conditions, which equates to 18 VMT per employee.

SENATE BILL (SB) 743 ASSESSMENT

On September 27, 2013, Governor Jerry Brown signed SB 743 into law, starting a process that is expected to fundamentally change the way transportation impact analysis is conducted under CEQA. Within the State's CEQA Guidelines, these changes will include elimination of auto delay, level of service (LOS), and similar measurements of vehicular roadway capacity and traffic congestion as the basis for determining significant impacts. In January 2016, OPR issued the Draft Guidance, which provided initial recommendations for updating the State's CEQA Guidelines in response to SB 743 and contained recommended specifications for VMT analysis in an accompanying "Technical Advisory on Evaluating Transportation Impacts in CEQA" ("Technical Advisory"). The guidance recommended use of *automobile* Vehicle Miles Traveled, or VMT, as the preferred CEQA transportation metric, along with the elimination of auto delay/LOS for CEQA purposes statewide. For land use projects, the Technical Advisory specifies that automobile VMT be measured by land use type for specific trip purposes or tours depending on the type of forecasting model being used. The OPR Draft Guidance is presently being revised in response to comments and OPR plans to submit new materials to the Resources Agency for formal rulemaking in early 2017. The Resources Agency will then provide the revised CEQA Guidelines for public review and comment with formal approval expected sometime in mid- to late 2017. Based on the Draft OPR Guidance, lead agencies will have up to two years to implement the revised CEQA Guidelines upon their formal approval.

OPR's Technical Advisory contains specifications for VMT analysis methodology and recommendations for significance thresholds. The Draft OPR Guidance contains sufficient information to inform lead agencies about how to prepare for the upcoming transition to VMT. However, the final implementation steps for SB 743 have not yet been completed and, therefore, compliance with the OPR Draft Guidance is not mandatory.

As noted above, the results of this analysis are for informational purposes because the City has yet to adopt VMT thresholds; therefore, there is no formal significance criteria set for the VMT analysis. However, in order to understand the Project's contribution to the transportation network, the Governor's Office of Planning and Research (OPR) Technical Advisory recommendations was used. OPR's *Revised Proposed Changes to the CEQA Guidelines* (January 2016) and proposed *Technical Advisory on Evaluating Transportation Impacts in CEQA* identifies the following significance criteria to assess VMT:

1. The Project will be considered to result in a significant impact to VMT if project-related VMT exceeds the following numeric thresholds:
    - **Workers Per Capita VMT:** A project exceeding a level of 15 percent below existing regional VMT per employee.

VMT Impact Results

For this analysis, VMT per employee results were compared to the Project Transportation Analysis Zone (TAZ) from the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) regional model. Existing VMT data by TAZ was not available, so the Projected VMT estimates for Year 2020 and 2040 were used.

TABLE 12: DAILY VEHICLE MILES TRAVELED PER CAPITA

Land Use	Bay Area				Project			
	2020		2040		2020		2040	
	Regional Average	85% of Regional Average	Regional Average	85% of Regional Average	VMT	VMT < 85% Regional Average	VMT	VMT < 85% Regional Average
Employee (VMT per Capita)[1]	25.3	21.5	23.2	19.7	15	YES	18	YES

1. MTC Model results at analytics.mtc.ca.gov/foswiki/Main/PlanBayAreaVmtPerWorker and accessed in June 2017.
Source: Fehr & Peers, 2017.

As shown in **Table 12**, the average trip length for employees at the proposed Project is estimated to be more than 15 percent below the regional averages. Therefore, the proposed Project's VMT impact would result in **less-than-significant impacts.**

QUEUING ANALYSIS

The addition of Project traffic along the roadway network has the potential to add vehicles to left-turn movements causing the left-turn queue to exceed the turn pocket storage length. Queues that exceed the turn pocket storage length have the potential to impede through traffic movement along an approach. Potentially affected signalized intersections were selected for this evaluation based on where the Project would add at least five (5) vehicles to a study intersection with a left-turn pocket, which include the following three movements at two intersections:

- Int. 8 El Camino Real/California Avenue – Westbound left-turn pocket

- Int. 9 El Camino Real/Page Mill Road – Southbound left-turn pocket
- Int. 9 El Camino Real/Page Mill Road – Westbound left-turn pocket

The 95th percentile queues from the TRAFFIX LOS analysis (Appendix B) was used to evaluate the projected queues at the identified left-turn movements. The results of the left-turn queue analysis are presented in **Table 13**.

For purposes of this analysis, operational deficiencies were considered to occur under conditions where Project traffic causes the queue in a left turn pocket to extend beyond the turn pocket length by 25 feet or more (i.e., the length of one vehicle). Where the vehicle queue already exceeds the turn pocket storage under No Project conditions, a queuing deficiency would occur if Project traffic extends the queue by 25 feet or more.

Based on the queue analysis presented in **Table 13**, the southbound and westbound left turn pockets at El Camino Real/Page Mill Road are projected to serve queues that exceed capacity under Cumulative Conditions without and with the Project. However, the addition of Project trips for this movement would not extend the queue more than the No Project Conditions, so there would be no queuing deficiency considered at the El Camino Real/Page Mill Road intersection.

The southbound left-turn pocket at El Camino Real/California Avenue is also expected to exceed the available storage under Existing, Background, and Cumulative Conditions without and with the Project. Under Existing and Background Conditions, the southbound queue remains the same without and with the Project, so there would be no queuing deficiency for those two scenarios. Under Cumulative Conditions, the southbound left-turn queue increases by one vehicle (less than 25 feet increase), which is considered as a deficiency under Cumulative Plus Project Conditions. However, this increase in queue length is insignificant and could likely be accommodated by adjusting the signal timings and/or the signal phases.

TABLE 13: LEFT-TURN QUEUES

	Intersection	Pocket	Available Pocket Length (feet)	Peak Hour	# of Trips Added	Projected Queue Length (feet)[3]					
						Existing		Background		Cumulative	
						No Project	Plus Project	No Project	Plus Project	No Project	Plus Project
8	El Camino Real / California Avenue	SBL	135	AM	6	125	125	**175**	**175**	**175**	**200**
				PM	7	**175**	**175**	**200**	**200**	**200**	**225**
9	El Camino Real / Page Mill Road	SBL[1]	700	AM	6	450	475	500	525	625	625
				PM	8	525	550	575	575	**750**	**750**
		WBL	490	AM	7	300	325	325	325	375	375
				PM	10	400	425	425	450	**550**	**550**

Notes:

1. SBL has two lanes; each lane has 350 feet of storage, so the total pocket length is 700 feet.
2. Each vehicle in queue is assumed to occupy 25 feet.

Bold indicates the queue exceeds the storage length.

Source: Fehr & Peers, 2017.

APPENDIX A: TRAFFIC COUNTS

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Groups Printed- Vehicles

	BRYANT ST Southbound					OREGON EXPY Westbound					BRYANT ST Northbound					OREGON EXPY Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	4	4	3	0	11	1	371	0	1	373	1	0	4	0	5	1	144	2	0	147	536
07:15 AM	7	3	5	3	18	4	356	1	2	363	4	1	7	0	12	3	180	1	0	184	577
07:30 AM	7	2	7	1	17	1	366	0	3	370	1	3	6	0	10	1	243	3	0	247	644
07:45 AM	16	0	12	3	31	2	430	0	2	434	0	0	20	0	20	2	328	5	0	335	820
Total	34	9	27	7	77	8	1523	1	8	1540	6	4	37	0	47	7	895	11	0	913	2577
08:00 AM	33	3	12	4	52	3	459	3	2	467	1	1	22	0	24	5	380	7	0	392	935
08:15 AM	17	0	10	0	27	1	440	4	1	446	3	4	17	0	24	3	333	7	0	343	840
08:30 AM	35	2	11	3	51	1	433	4	2	440	2	3	16	0	21	5	293	6	0	304	816
08:45 AM	37	1	5	0	43	6	429	1	1	437	3	3	9	0	15	4	281	3	0	288	783
Total	122	6	38	7	173	11	1761	12	6	1790	9	11	64	0	84	17	1287	23	0	1327	3374
Grand Total	156	15	65	14	250	19	3284	13	14	3330	15	15	101	0	131	24	2182	34	0	2240	5951
Apprch %	62.4	6	26	5.6		0.6	98.6	0.4	0.4		11.5	11.5	77.1	0		1.1	97.4	1.5	0		
Total %	2.6	0.3	1.1	0.2	4.2	0.3	55.2	0.2	0.2	56	0.3	0.3	1.7	0	2.2	0.4	36.7	0.6	0	37.6	

	BRYANT ST Southbound				OREGON EXPY Westbound				BRYANT ST Northbound				OREGON EXPY Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	16	0	**12**	28	2	430	0	432	0	0	20	20	2	328	5	335	815
08:00 AM	33	**3**	12	**48**	**3**	**459**	3	**465**	1	1	**22**	**24**	**5**	**380**	**7**	**392**	**929**
08:15 AM	17	0	10	27	1	440	**4**	445	**3**	**4**	17	24	3	333	7	343	839
08:30 AM	**35**	2	11	48	1	433	4	438	2	3	16	21	5	293	6	304	811
Total Volume	101	5	45	151	7	1762	11	1780	6	8	75	89	15	1334	25	1374	3394
% App. Total	66.9	3.3	29.8		0.4	99	0.6		6.7	9	84.3		1.1	97.1	1.8		
PHF	.721	.417	.938	.786	.583	.960	.688	.957	.500	.500	.852	.927	.750	.878	.893	.876	.913

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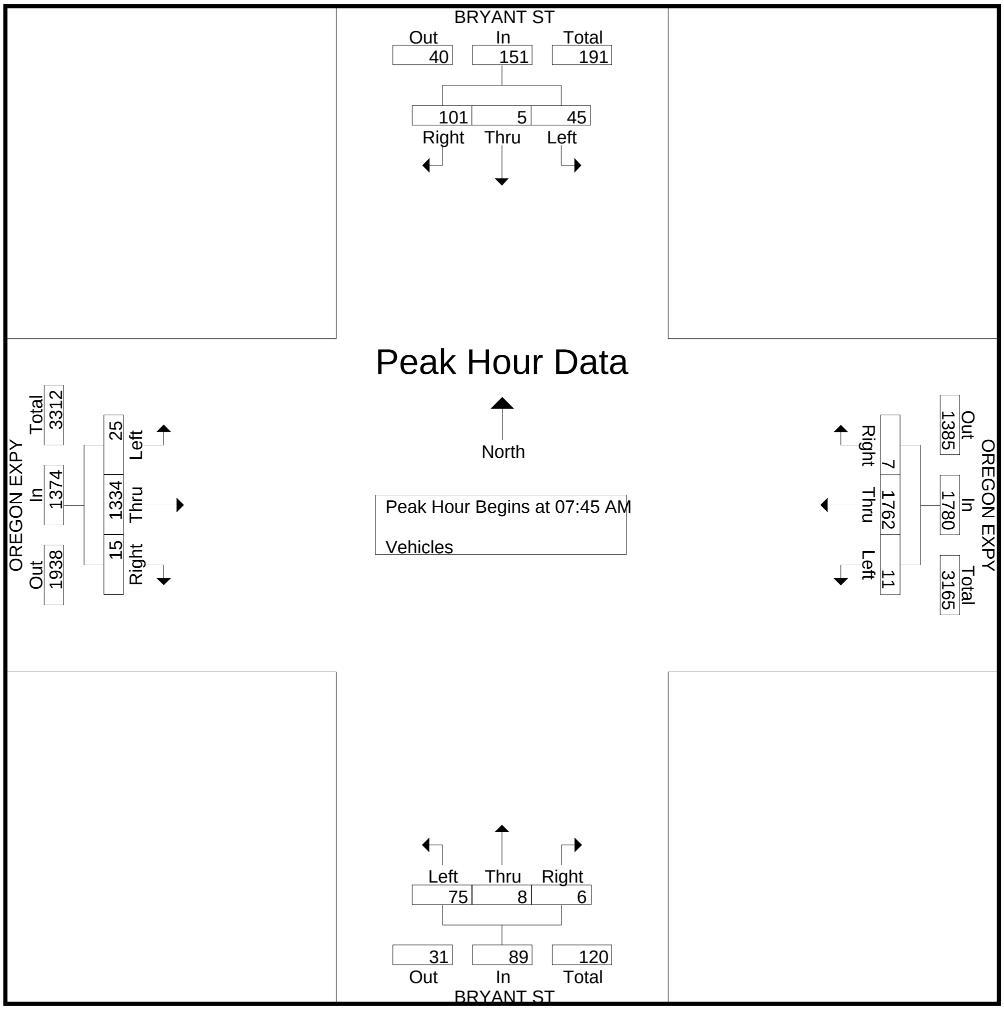

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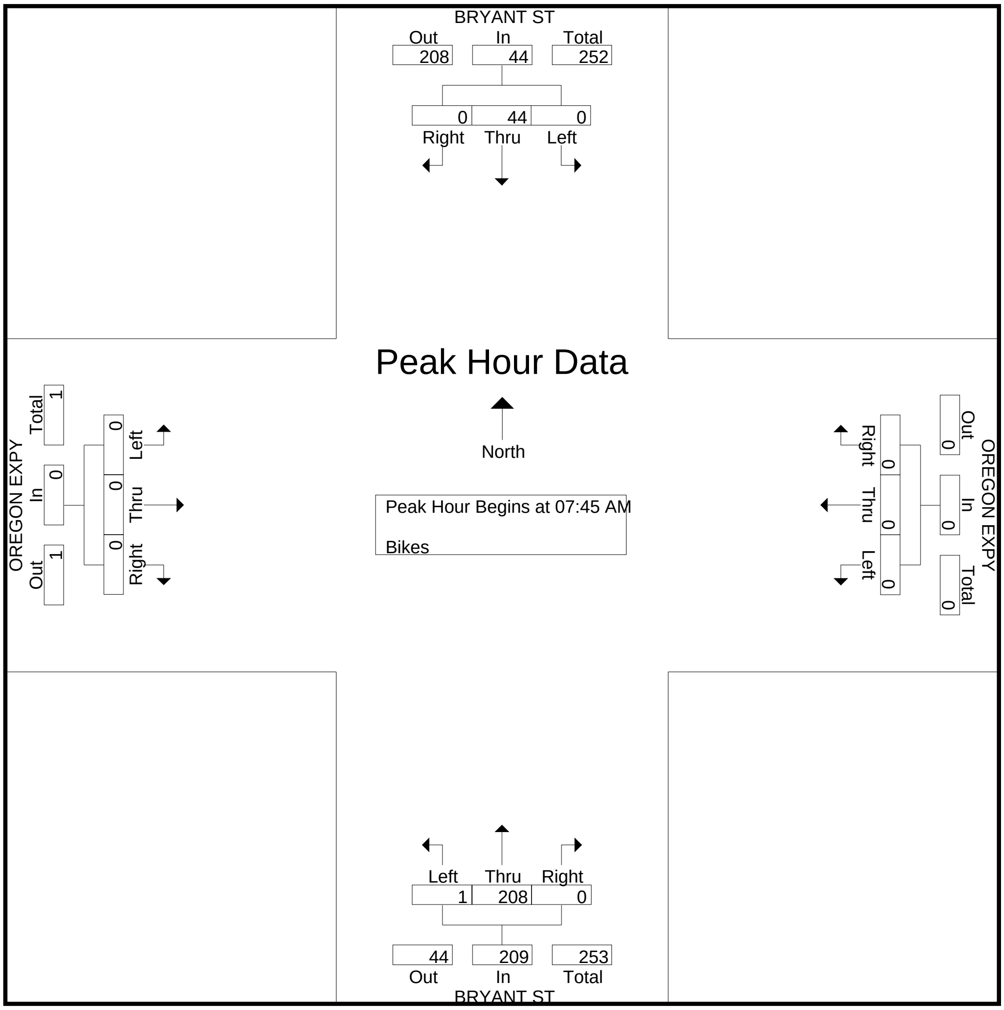
Groups Printed- Bikes

	BRYANT ST Southbound					OREGON EXPY Westbound					BRYANT ST Northbound					OREGON EXPY Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	6	0	0	6	0	0	0	0	0	0	11	0	0	11	0	1	0	0	1	18
07:15 AM	0	6	1	0	7	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	21
07:30 AM	0	9	0	0	9	0	0	0	0	0	0	17	1	0	18	0	0	0	0	0	27
07:45 AM	0	20	0	0	20	0	0	0	0	0	0	116	0	0	116	0	0	0	0	0	136
Total	0	41	1	0	42	0	0	0	0	0	0	158	1	0	159	0	1	0	0	1	202
08:00 AM	0	12	0	0	12	0	0	0	0	0	0	43	0	0	43	0	0	0	0	0	55
08:15 AM	0	5	0	0	5	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	27
08:30 AM	0	7	0	0	7	0	0	0	0	0	0	27	1	0	28	0	0	0	0	0	35
08:45 AM	0	10	0	0	10	0	2	0	0	2	0	26	0	0	26	0	0	0	0	0	38
Total	0	34	0	0	34	0	2	0	0	2	0	118	1	0	119	0	0	0	0	0	155
Grand Total	0	75	1	0	76	0	2	0	0	2	0	276	2	0	278	0	1	0	0	1	357
Apprch %	0	98.7	1.3	0		0	100	0	0		0	99.3	0.7	0		0	100	0	0		
Total %	0	21	0.3	0	21.3	0	0.6	0	0	0.6	0	77.3	0.6	0	77.9	0	0.3	0	0	0.3	

	BRYANT ST Southbound				OREGON EXPY Westbound				BRYANT ST Northbound				OREGON EXPY Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	**20**	0	**20**	0	0	0	0	0	**116**	0	**116**	0	0	0	0	**136**
08:00 AM	0	12	0	12	0	0	0	0	0	43	0	43	0	0	0	0	55
08:15 AM	0	5	0	5	0	0	0	0	0	22	0	22	0	0	0	0	27
08:30 AM	0	7	0	7	0	0	0	0	0	27	**1**	28	0	0	0	0	35
Total Volume	0	44	0	44	0	0	0	0	0	208	1	209	0	0	0	0	253
% App. Total	0	100	0		0	0	0		0	99.5	0.5		0	0	0		
PHF	.000	.550	.000	.550	.000	.000	.000	.000	.000	.448	.250	.450	.000	.000	.000	.000	.465


BRYANT ST
Out 208
In 44
Total 252
Right 0
Thru 44
Left 0
Peak Hour Data
North
Peak Hour Begins at 07:45 AM
Bikes
OREGON EXPY
Total 1
In 0
Out 1
Left 0
Thru 0
Right 0
OREGON EXPY
Out 0
In 0
Total 0
Right 0
Thru 0
Left 0
Left 1
Thru 208
Right 0
Out 44
In 209
Total 253
BRYANT ST

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Groups Printed- Vehicles

	BRYANT ST Southbound					OREGON EXPY Westbound					BRYANT ST Northbound					OREGON EXPY Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	14	4	6	0	24	6	263	2	1	272	1	1	2	0	4	7	427	17	0	451	751
04:15 PM	12	6	9	0	27	7	268	5	0	280	3	1	2	0	6	9	424	11	0	444	757
04:30 PM	13	3	3	0	19	6	217	4	0	227	0	0	5	0	5	16	386	13	0	415	666
04:45 PM	14	3	4	2	23	5	238	1	1	245	0	2	5	0	7	6	421	16	0	443	718
Total	53	16	22	2	93	24	986	12	2	1024	4	4	14	0	22	38	1658	57	0	1753	2892
05:00 PM	12	6	7	2	27	7	247	9	1	264	4	0	3	0	7	13	462	27	0	502	800
05:15 PM	17	6	7	2	32	5	246	11	4	266	1	1	4	0	6	13	425	9	0	447	751
05:30 PM	12	2	4	0	18	3	281	6	0	290	4	4	6	0	14	14	394	16	0	424	746
05:45 PM	14	5	10	1	30	9	309	4	1	323	2	2	13	0	17	12	384	15	0	411	781
Total	55	19	28	5	107	24	1083	30	6	1143	11	7	26	0	44	52	1665	67	0	1784	3078
Grand Total	108	35	50	7	200	48	2069	42	8	2167	15	11	40	0	66	90	3323	124	0	3537	5970
Apprch %	54	17.5	25	3.5		2.2	95.5	1.9	0.4		22.7	16.7	60.6	0		2.5	93.9	3.5	0		
Total %	1.8	0.6	0.8	0.1	3.4	0.8	34.7	0.7	0.1	36.3	0.3	0.2	0.7	0	1.1	1.5	55.7	2.1	0	59.2	

	BRYANT ST Southbound				OREGON EXPY Westbound				BRYANT ST Northbound				OREGON EXPY Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	12	**6**	7	25	7	247	9	263	**4**	0	3	7	13	**462**	**27**	**502**	**797**
05:15 PM	**17**	6	7	**30**	5	246	**11**	262	1	1	4	6	13	425	9	447	745
05:30 PM	12	2	4	18	3	281	6	290	4	**4**	6	14	**14**	394	16	424	746
05:45 PM	14	5	**10**	29	**9**	**309**	4	**322**	2	2	**13**	**17**	12	384	15	411	779
Total Volume	55	19	28	102	24	1083	30	1137	11	7	26	44	52	1665	67	1784	3067
% App. Total	53.9	18.6	27.5		2.1	95.3	2.6		25	15.9	59.1		2.9	93.3	3.8		
PHF	.809	.792	.700	.850	.667	.876	.682	.883	.688	.438	.500	.647	.929	.901	.620	.888	.962

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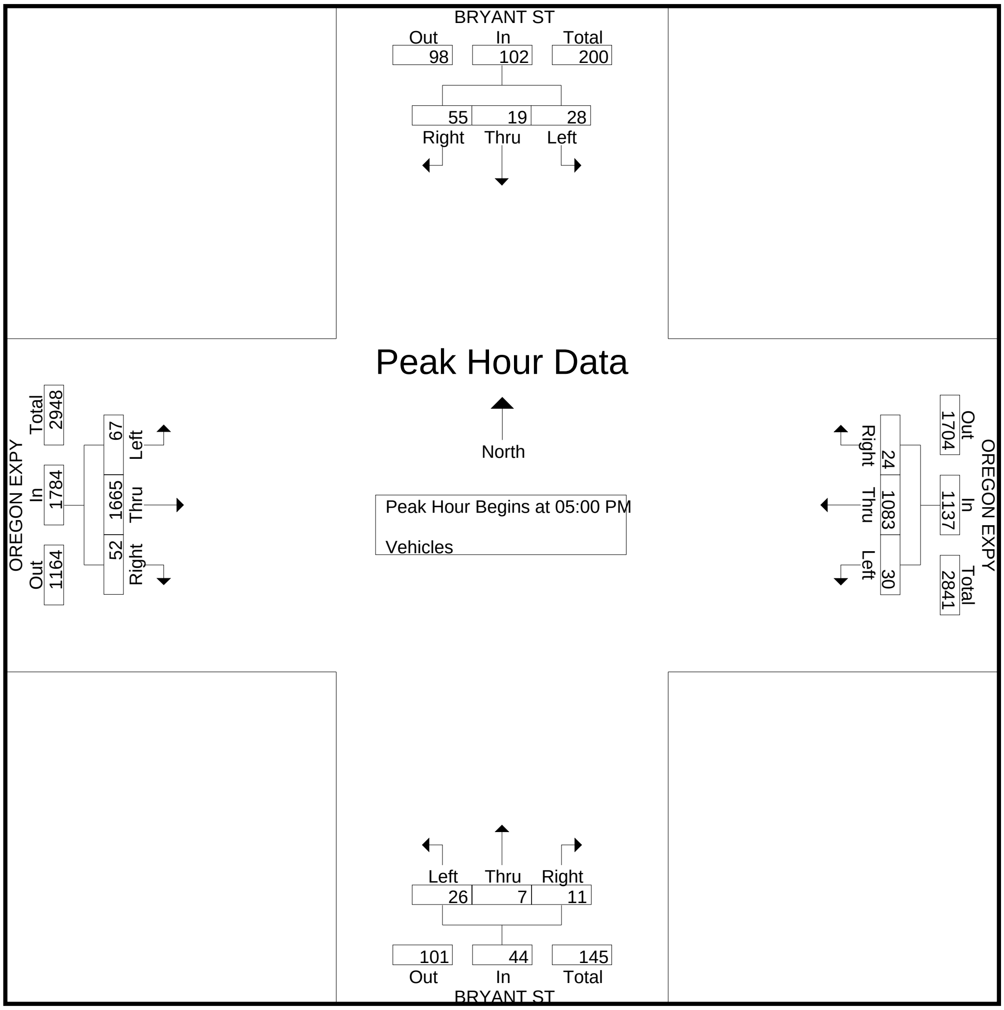

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Groups Printed- Bikes

	BRYANT ST Southbound					OREGON EXPY Westbound					BRYANT ST Northbound					OREGON EXPY Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	14	0	0	14	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	17
04:15 PM	1	15	0	0	16	0	0	0	0	0	0	7	0	0	7	0	1	0	0	1	24
04:30 PM	1	15	0	0	16	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	21
04:45 PM	0	17	0	0	17	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	20
Total	2	61	0	0	63	0	0	0	0	0	0	18	0	0	18	0	1	0	0	1	82
05:00 PM	0	19	0	0	19	0	1	0	0	1	0	3	0	0	3	0	0	0	0	0	23
05:15 PM	0	16	1	0	17	0	0	0	0	0	0	6	0	0	6	0	1	0	0	1	24
05:30 PM	0	13	0	0	13	0	0	0	0	0	0	4	0	0	4	0	1	0	0	1	18
05:45 PM	0	32	0	0	32	0	0	0	0	0	0	1	0	0	1	0	2	0	0	2	35
Total	0	80	1	0	81	0	1	0	0	1	0	14	0	0	14	0	4	0	0	4	100
Grand Total	2	141	1	0	144	0	1	0	0	1	0	32	0	0	32	0	5	0	0	5	182
Apprch %	1.4	97.9	0.7	0		0	100	0	0		0	100	0	0		0	100	0	0		
Total %	1.1	77.5	0.5	0	79.1	0	0.5	0	0	0.5	0	17.6	0	0	17.6	0	2.7	0	0	2.7	

	BRYANT ST Southbound				OREGON EXPY Westbound				BRYANT ST Northbound				OREGON EXPY Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	19	0	19	0	**1**	0	**1**	0	3	0	3	0	0	0	0	23
05:15 PM	0	16	**1**	17	0	0	0	0	0	**6**	0	**6**	0	1	0	1	24
05:30 PM	0	13	0	13	0	0	0	0	0	4	0	4	0	1	0	1	18
05:45 PM	0	**32**	0	**32**	0	0	0	0	0	1	0	1	0	**2**	0	**2**	**35**
Total Volume	0	80	1	81	0	1	0	1	0	14	0	14	0	4	0	4	100
% App. Total	0	98.8	1.2		0	100	0		0	100	0		0	100	0		
PHF	.000	.625	.250	.633	.000	.250	.000	.250	.000	.583	.000	.583	.000	.500	.000	.500	.714

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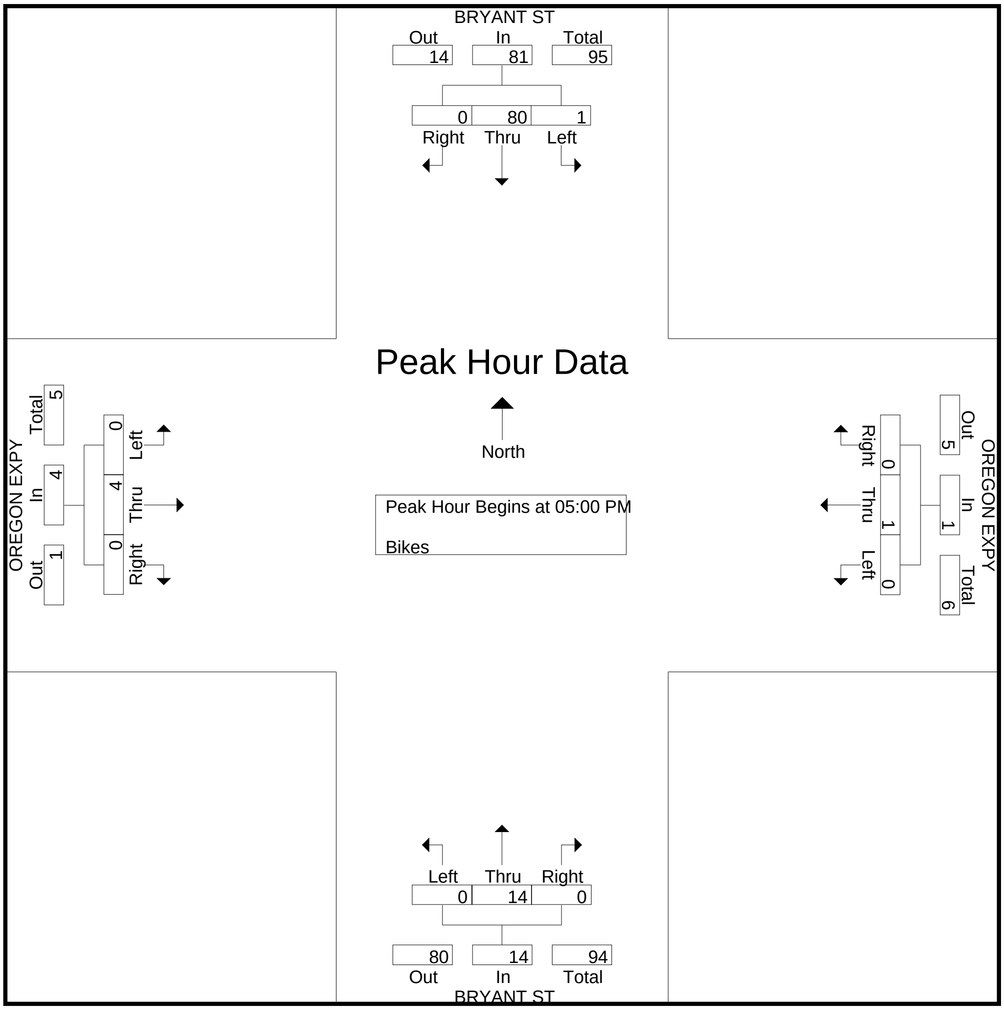

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Groups Printed- Vehicles

	PARK BLVD Southbound					SHERMAN AVE Westbound					PARK BLVD Northbound					SHERMAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	1	13	0	1	15	0	0	0	3	3	1	7	3	0	11	4	1	0	4	9	38
07:15 AM	1	16	0	0	17	0	0	1	5	6	2	13	4	0	19	8	0	3	1	12	54
07:30 AM	1	20	1	1	23	1	0	1	10	12	1	17	7	1	26	9	0	3	5	17	78
07:45 AM	0	32	0	2	34	1	0	3	2	6	1	22	7	0	30	8	0	1	4	13	83
Total	3	81	1	4	89	2	0	5	20	27	5	59	21	1	86	29	1	7	14	51	253
08:00 AM	2	43	0	1	46	2	0	1	2	5	1	33	4	1	39	3	0	1	2	6	96
08:15 AM	2	35	2	0	39	2	1	1	4	8	1	24	8	0	33	9	0	4	0	13	93
08:30 AM	0	36	0	1	37	4	0	2	5	11	1	35	13	1	50	11	0	1	4	16	114
08:45 AM	0	37	2	0	39	0	0	2	3	5	0	42	9	1	52	11	0	1	3	15	111
Total	4	151	4	2	161	8	1	6	14	29	3	134	34	3	174	34	0	7	9	50	414
Grand Total	7	232	5	6	250	10	1	11	34	56	8	193	55	4	260	63	1	14	23	101	667
Apprch %	2.8	92.8	2	2.4		17.9	1.8	19.6	60.7		3.1	74.2	21.2	1.5		62.4	1	13.9	22.8		
Total %	1	34.8	0.7	0.9	37.5	1.5	0.1	1.6	5.1	8.4	1.2	28.9	8.2	0.6	39	9.4	0.1	2.1	3.4	15.1	

	PARK BLVD Southbound				SHERMAN AVE Westbound				PARK BLVD Northbound				SHERMAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	**2**	**43**	0	**45**	2	0	1	3	**1**	33	4	38	3	0	1	4	90
08:15 AM	2	35	**2**	39	2	**1**	1	4	1	24	8	33	9	0	**4**	**13**	89
08:30 AM	0	36	0	36	**4**	0	**2**	**6**	1	35	**13**	49	**11**	0	1	12	103
08:45 AM	0	37	2	39	0	0	2	2	0	**42**	9	**51**	11	0	1	12	**104**
Total Volume	4	151	4	159	8	1	6	15	3	134	34	171	34	0	7	41	386
% App. Total	2.5	95	2.5		53.3	6.7	40		1.8	78.4	19.9		82.9	0	17.1		
PHF	.500	.878	.500	.883	.500	.250	.750	.625	.750	.798	.654	.838	.773	.000	.438	.788	.928

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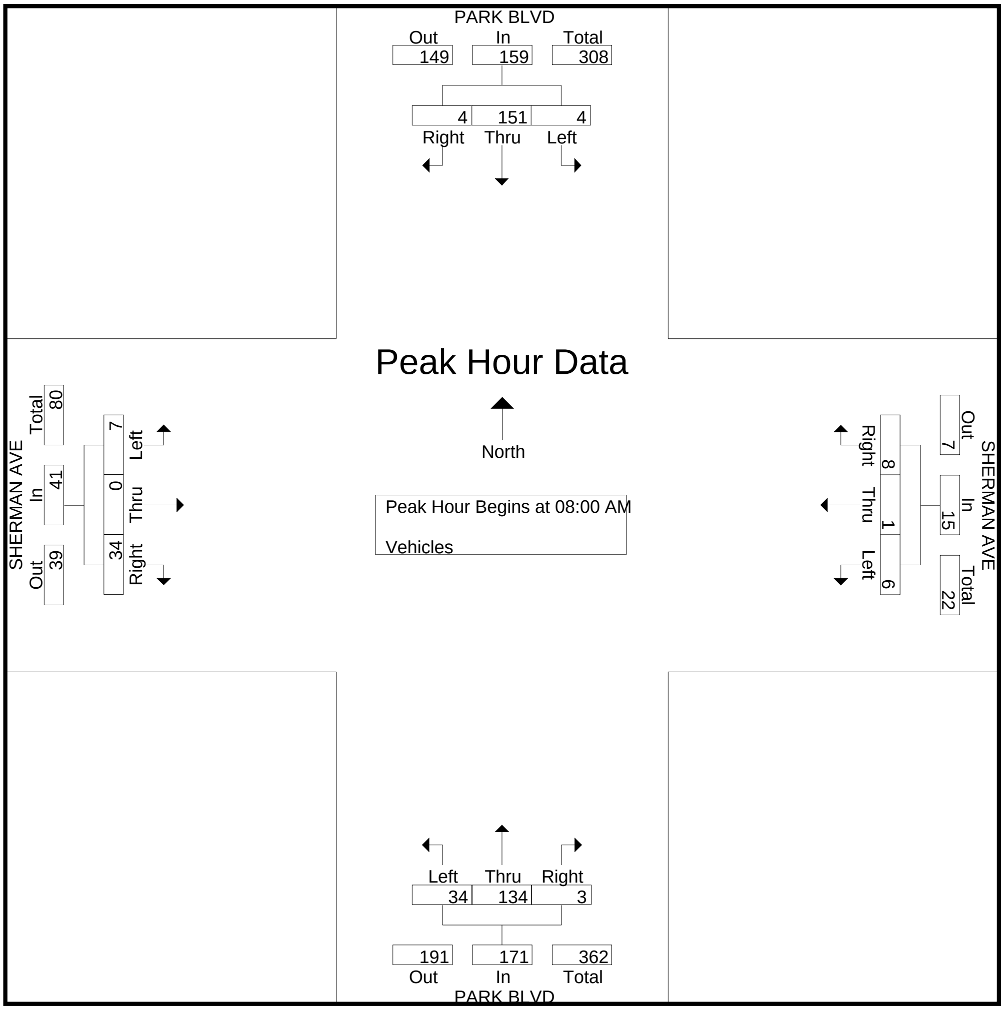

File Name : 2AM FINAL
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Groups Printed- Bikes

	PARK BLVD Southbound					SHERMAN AVE Westbound					PARK BLVD Northbound					SHERMAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	2	0	0	2	0	1	0	0	1	0	11	0	0	11	0	0	0	0	0	14
07:15 AM	0	3	0	0	3	0	0	0	0	0	0	11	0	0	11	0	0	1	0	1	15
07:30 AM	0	10	0	0	10	0	0	0	0	0	0	28	0	0	28	0	0	0	0	0	38
07:45 AM	0	11	0	0	11	1	0	0	0	1	0	37	2	0	39	0	0	0	0	0	51
Total	0	26	0	0	26	1	1	0	0	2	0	87	2	0	89	0	0	1	0	1	118
08:00 AM	0	10	0	0	10	0	0	0	0	0	0	52	0	0	52	0	0	0	0	0	62
08:15 AM	0	20	0	0	20	0	0	0	0	0	0	75	0	0	75	0	0	0	0	0	95
08:30 AM	0	12	0	0	12	0	0	0	0	0	0	61	1	0	62	0	0	0	0	0	74
08:45 AM	1	12	0	0	13	0	0	0	0	0	0	65	0	0	65	0	0	0	0	0	78
Total	1	54	0	0	55	0	0	0	0	0	0	253	1	0	254	0	0	0	0	0	309
Grand Total	1	80	0	0	81	1	1	0	0	2	0	340	3	0	343	0	0	1	0	1	427
Apprch %	1.2	98.8	0	0		50	50	0	0		0	99.1	0.9	0		0	0	100	0		
Total %	0.2	18.7	0	0	19	0.2	0.2	0	0	0.5	0	79.6	0.7	0	80.3	0	0	0.2	0	0.2	

	PARK BLVD Southbound				SHERMAN AVE Westbound				PARK BLVD Northbound				SHERMAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	10	0	10	0	0	0	0	0	52	0	52	0	0	0	0	62
08:15 AM	0	**20**	0	**20**	0	0	0	0	0	**75**	0	**75**	0	0	0	0	**95**
08:30 AM	0	12	0	12	0	0	0	0	0	61	**1**	62	0	0	0	0	74
08:45 AM	**1**	12	0	13	0	0	0	0	0	65	0	65	0	0	0	0	78
Total Volume	1	54	0	55	0	0	0	0	0	253	1	254	0	0	0	0	309
% App. Total	1.8	98.2	0		0	0	0		0	99.6	0.4		0	0	0		
PHF	.250	.675	.000	.688	.000	.000	.000	.000	.000	.843	.250	.847	.000	.000	.000	.000	.813

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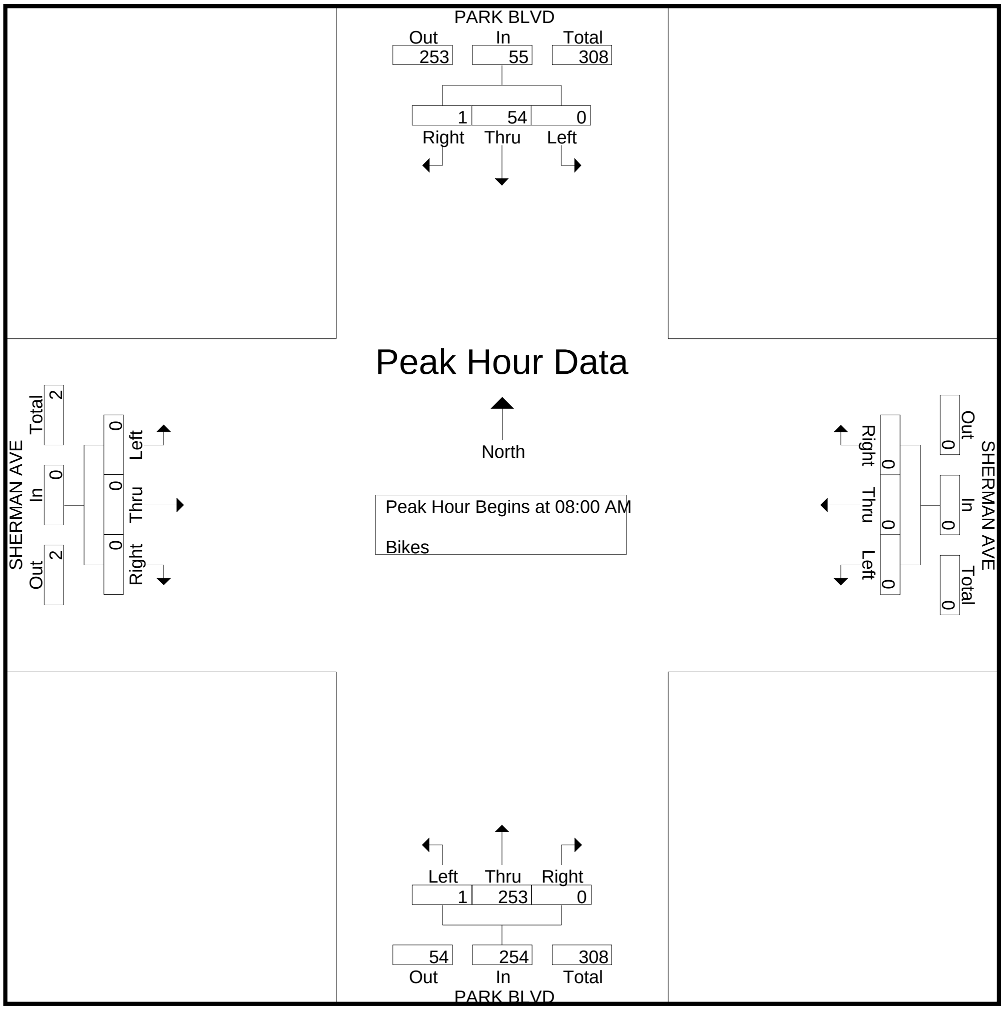

File Name : 2PM FINAL
Site Code : 00000002
Start Date : 9/27/2016
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Groups Printed- Vehicles

	PARK BLVD Southbound					SHERMAN AVE Westbound					PARK BLVD Northbound					SHERMAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	2	52	3	1	58	0	3	3	6	12	1	22	4	2	29	12	0	1	8	21	120
04:15 PM	2	47	0	1	50	2	1	2	1	6	2	24	3	1	30	17	0	1	10	28	114
04:30 PM	0	58	0	0	58	0	0	2	0	2	0	17	7	0	24	15	0	3	4	22	106
04:45 PM	0	50	0	1	51	1	1	2	5	9	0	21	5	0	26	13	0	1	2	16	102
Total	4	207	3	3	217	3	5	9	12	29	3	84	19	3	109	57	0	6	24	87	442
05:00 PM	1	65	1	5	72	0	1	0	5	6	2	36	8	2	48	29	0	4	8	41	167
05:15 PM	2	67	1	0	70	0	0	2	9	11	1	15	4	0	20	24	0	5	8	37	138
05:30 PM	3	56	0	0	59	1	1	1	6	9	0	24	6	1	31	22	2	4	16	44	143
05:45 PM	0	68	2	1	71	0	0	0	9	9	1	28	8	1	38	24	0	1	3	28	146
Total	6	256	4	6	272	1	2	3	29	35	4	103	26	4	137	99	2	14	35	150	594
Grand Total	10	463	7	9	489	4	7	12	41	64	7	187	45	7	246	156	2	20	59	237	1036
Apprch %	2	94.7	1.4	1.8		6.2	10.9	18.8	64.1		2.8	76	18.3	2.8		65.8	0.8	8.4	24.9		
Total %	1	44.7	0.7	0.9	47.2	0.4	0.7	1.2	4	6.2	0.7	18.1	4.3	0.7	23.7	15.1	0.2	1.9	5.7	22.9	

	PARK BLVD Southbound				SHERMAN AVE Westbound				PARK BLVD Northbound				SHERMAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	1	65	1	67	0	**1**	0	1	**2**	**36**	**8**	**46**	**29**	0	4	**33**	**147**
05:15 PM	2	67	1	**70**	0	0	**2**	2	1	15	4	20	24	0	**5**	29	121
05:30 PM	**3**	56	0	59	**1**	1	1	**3**	0	24	6	30	22	**2**	4	28	120
05:45 PM	0	**68**	**2**	70	0	0	0	0	1	28	8	37	24	0	1	25	132
Total Volume	6	256	4	266	1	2	3	6	4	103	26	133	99	2	14	115	520
% App. Total	2.3	96.2	1.5		16.7	33.3	50		3	77.4	19.5		86.1	1.7	12.2		
PHF	.500	.941	.500	.950	.250	.500	.375	.500	.500	.715	.813	.723	.853	.250	.700	.871	.884

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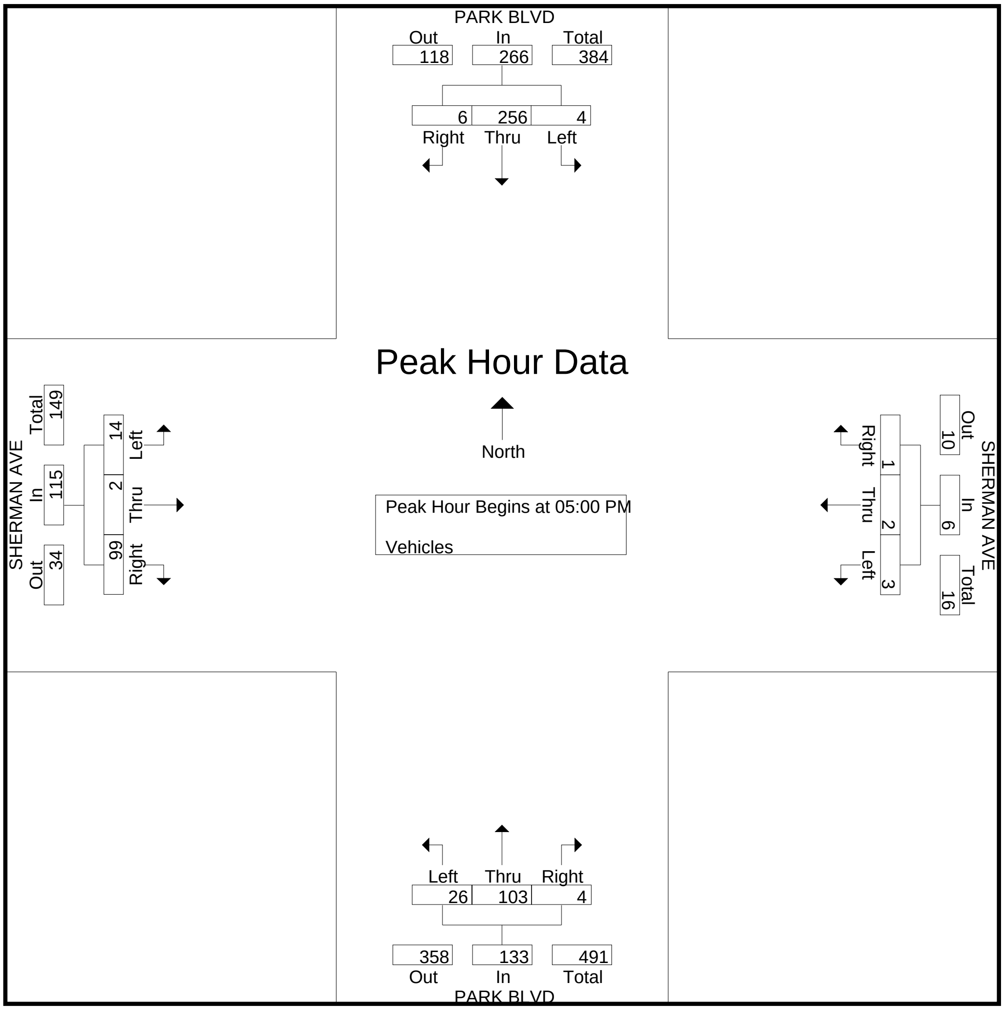

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Groups Printed- Bikes

	PARK BLVD Southbound					SHERMAN AVE Westbound					PARK BLVD Northbound					SHERMAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	10	0	0	10	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	20
04:15 PM	0	23	0	0	23	0	0	0	0	0	0	7	1	0	8	0	0	0	0	0	31
04:30 PM	0	11	0	0	11	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	18
04:45 PM	0	14	0	0	14	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	20
Total	0	58	0	0	58	0	0	0	0	0	0	30	1	0	31	0	0	0	0	0	89
05:00 PM	0	17	0	0	17	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	30
05:15 PM	0	31	0	0	31	0	0	0	0	0	0	16	0	0	16	0	0	0	0	0	47
05:30 PM	1	37	0	0	38	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	51
05:45 PM	1	31	0	0	32	0	0	0	0	0	0	20	1	0	21	0	0	0	0	0	53
Total	2	116	0	0	118	0	0	0	0	0	0	62	1	0	63	0	0	0	0	0	181
Grand Total	2	174	0	0	176	0	0	0	0	0	0	92	2	0	94	0	0	0	0	0	270
Apprch %	1.1	98.9	0	0		0	0	0	0		0	97.9	2.1	0		0	0	0	0		
Total %	0.7	64.4	0	0	65.2	0	0	0	0	0	0	34.1	0.7	0	34.8	0	0	0	0	0	

	PARK BLVD Southbound				SHERMAN AVE Westbound				PARK BLVD Northbound				SHERMAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	17	0	17	0	0	0	0	0	13	0	13	0	0	0	0	30
05:15 PM	0	31	0	31	0	0	0	0	0	16	0	16	0	0	0	0	47
05:30 PM	**1**	**37**	0	**38**	0	0	0	0	0	13	0	13	0	0	0	0	51
05:45 PM	1	31	0	32	0	0	0	0	0	**20**	**1**	**21**	0	0	0	0	**53**
Total Volume	2	116	0	118	0	0	0	0	0	62	1	63	0	0	0	0	181
% App. Total	1.7	98.3	0		0	0	0		0	98.4	1.6		0	0	0		
PHF	.500	.784	.000	.776	.000	.000	.000	.000	.000	.775	.250	.750	.000	.000	.000	.000	.854

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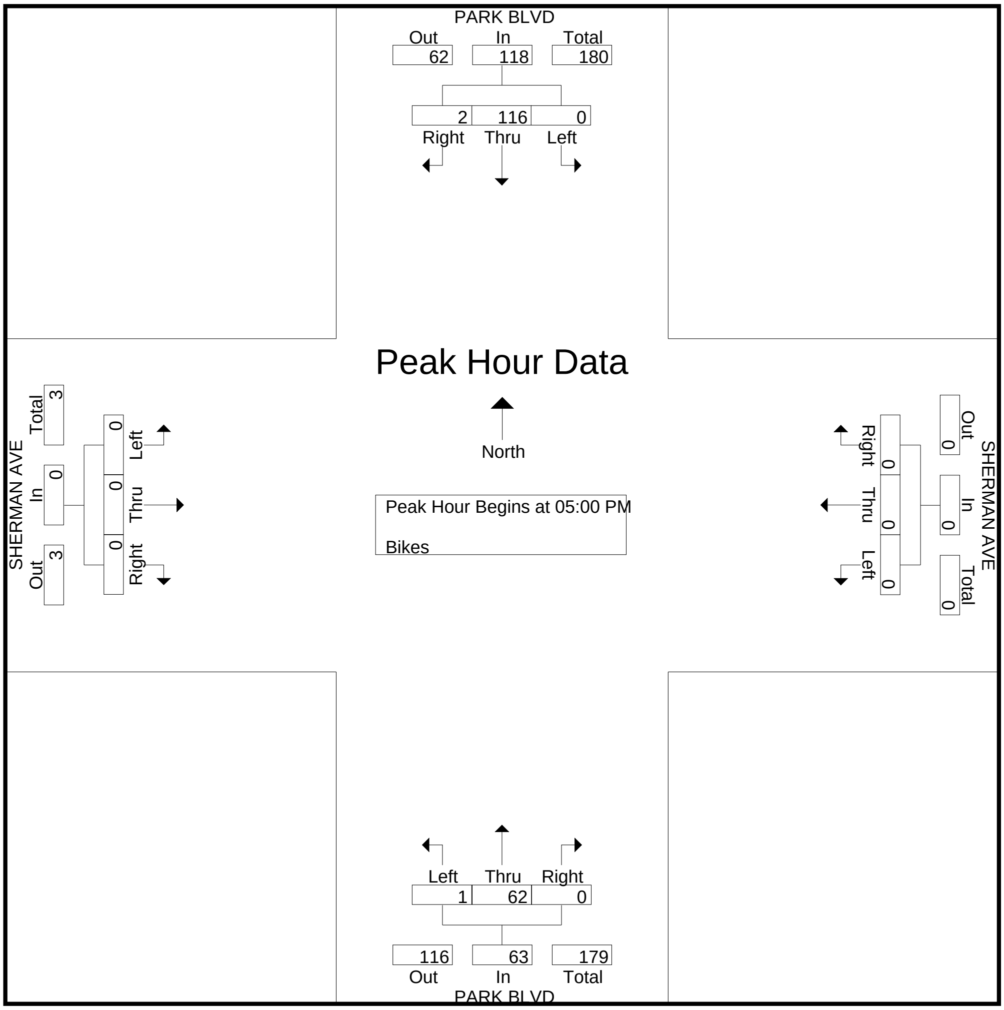

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Groups Printed- Vehicles

	PARK BLVD Southbound					PAGE MILL RD Westbound					PARK BLVD Northbound					PAGE MILL RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	18	17	0	0	35	0	0	1	6	7	0	8	8	4	20	1	1	8	7	17	79
07:15 AM	31	29	1	0	61	0	0	0	9	9	0	10	11	5	26	7	2	10	0	19	115
07:30 AM	38	39	1	1	79	1	0	2	54	57	0	16	17	39	72	7	1	13	6	27	235
07:45 AM	59	33	1	0	93	1	0	2	3	6	0	29	34	1	64	8	1	9	6	24	187
Total	146	118	3	1	268	2	0	5	72	79	0	63	70	49	182	23	5	40	19	87	616
08:00 AM	47	52	2	0	101	0	0	1	3	4	1	32	41	2	76	14	1	9	2	26	207
08:15 AM	52	53	1	3	109	0	3	1	20	24	2	23	29	9	63	12	1	17	0	30	226
08:30 AM	49	64	0	0	113	0	0	1	99	100	4	38	37	82	161	17	0	21	4	42	416
08:45 AM	58	52	0	0	110	1	1	0	23	25	0	41	46	18	105	8	3	18	6	35	275
Total	206	221	3	3	433	1	4	3	145	153	7	134	153	111	405	51	5	65	12	133	1124
Grand Total	352	339	6	4	701	3	4	8	217	232	7	197	223	160	587	74	10	105	31	220	1740
Apprch %	50.2	48.4	0.9	0.6		1.3	1.7	3.4	93.5		1.2	33.6	38	27.3		33.6	4.5	47.7	14.1		
Total %	20.2	19.5	0.3	0.2	40.3	0.2	0.2	0.5	12.5	13.3	0.4	11.3	12.8	9.2	33.7	4.3	0.6	6	1.8	12.6	

	PARK BLVD Southbound				PAGE MILL RD Westbound				PARK BLVD Northbound				PAGE MILL RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	47	52	**2**	101	0	0	**1**	1	1	32	41	74	14	1	9	24	200
08:15 AM	52	53	1	106	0	**3**	1	**4**	2	23	29	54	12	1	17	30	194
08:30 AM	49	**64**	0	**113**	0	0	1	1	**4**	38	37	79	**17**	0	**21**	**38**	**231**
08:45 AM	**58**	52	0	110	**1**	1	0	2	0	**41**	**46**	**87**	8	**3**	18	29	228
Total Volume	206	221	3	430	1	4	3	8	7	134	153	294	51	5	65	121	853
% App. Total	47.9	51.4	0.7		12.5	50	37.5		2.4	45.6	52		42.1	4.1	53.7		
PHF	.888	.863	.375	.951	.250	.333	.750	.500	.438	.817	.832	.845	.750	.417	.774	.796	.923

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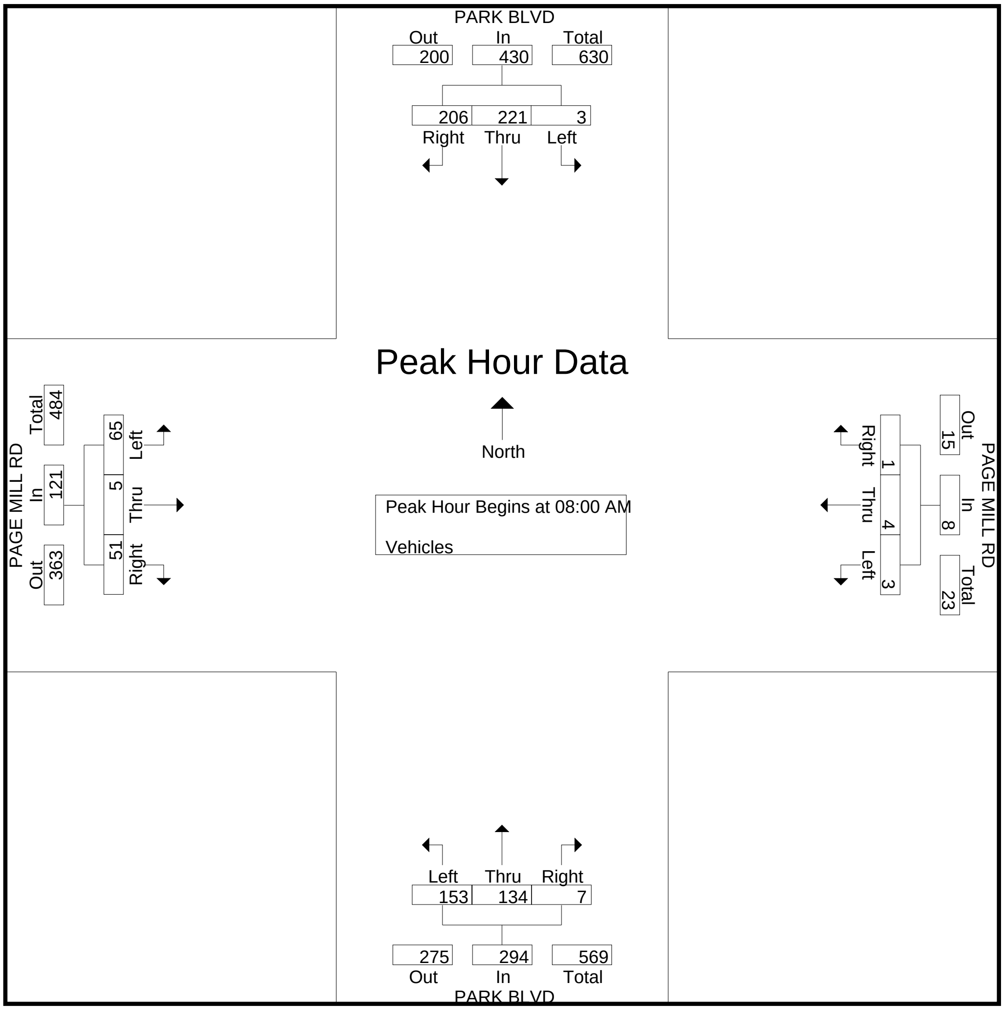

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Groups Printed- Bikes

	PARK BLVD Southbound					PAGE MILL RD Westbound					PARK BLVD Northbound					PAGE MILL RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	5	0	0	5	0	0	0	0	0	1	15	0	0	16	0	0	0	0	0	21
07:15 AM	0	3	0	0	3	0	0	0	0	0	1	12	0	0	13	0	0	0	0	0	16
07:30 AM	0	13	1	0	14	0	0	0	0	0	2	26	1	0	29	0	0	0	0	0	43
07:45 AM	0	11	0	0	11	0	0	0	0	0	0	31	0	0	31	0	0	0	0	0	42
Total	0	32	1	0	33	0	0	0	0	0	4	84	1	0	89	0	0	0	0	0	122
08:00 AM	0	10	0	0	10	0	0	0	0	0	0	50	0	0	50	0	0	0	0	0	60
08:15 AM	0	20	0	0	20	0	0	1	0	1	0	64	1	0	65	0	0	0	0	0	86
08:30 AM	0	16	0	0	16	0	0	0	0	0	1	78	0	0	79	0	0	0	0	0	95
08:45 AM	0	13	0	0	13	0	0	0	0	0	1	63	0	0	64	0	0	0	0	0	77
Total	0	59	0	0	59	0	0	1	0	1	2	255	1	0	258	0	0	0	0	0	318
Grand Total	0	91	1	0	92	0	0	1	0	1	6	339	2	0	347	0	0	0	0	0	440
Apprch %	0	98.9	1.1	0		0	0	100	0		1.7	97.7	0.6	0		0	0	0	0		
Total %	0	20.7	0.2	0	20.9	0	0	0.2	0	0.2	1.4	77	0.5	0	78.9	0	0	0	0	0	

	PARK BLVD Southbound				PAGE MILL RD Westbound				PARK BLVD Northbound				PAGE MILL RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	10	0	10	0	0	0	0	0	50	0	50	0	0	0	0	60
08:15 AM	0	**20**	0	**20**	0	0	**1**	**1**	0	64	**1**	65	0	0	0	0	86
08:30 AM	0	16	0	16	0	0	0	0	**1**	**78**	0	**79**	0	0	0	0	**95**
08:45 AM	0	13	0	13	0	0	0	0	1	63	0	64	0	0	0	0	77
Total Volume	0	59	0	59	0	0	1	1	2	255	1	258	0	0	0	0	318
% App. Total	0	100	0		0	0	100		0.8	98.8	0.4		0	0	0		
PHF	.000	.738	.000	.738	.000	.000	.250	.250	.500	.817	.250	.816	.000	.000	.000	.000	.837

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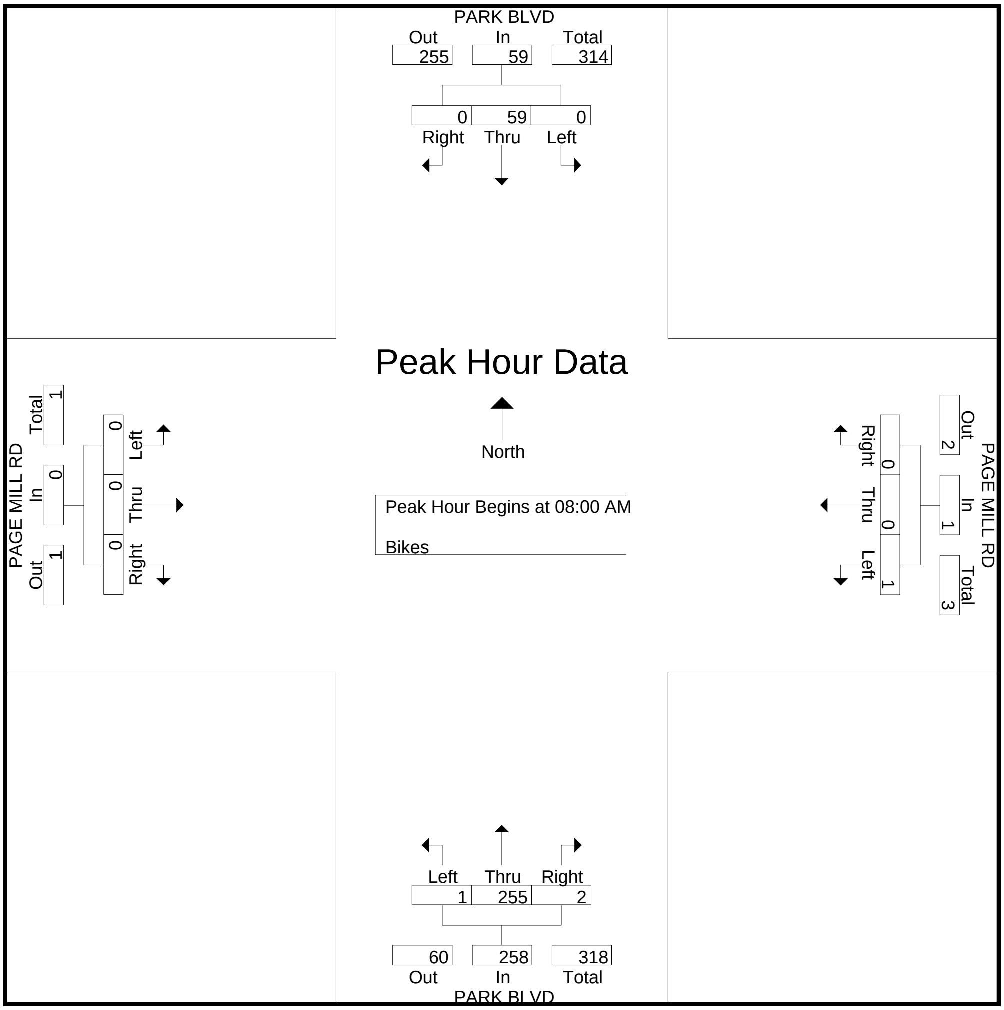

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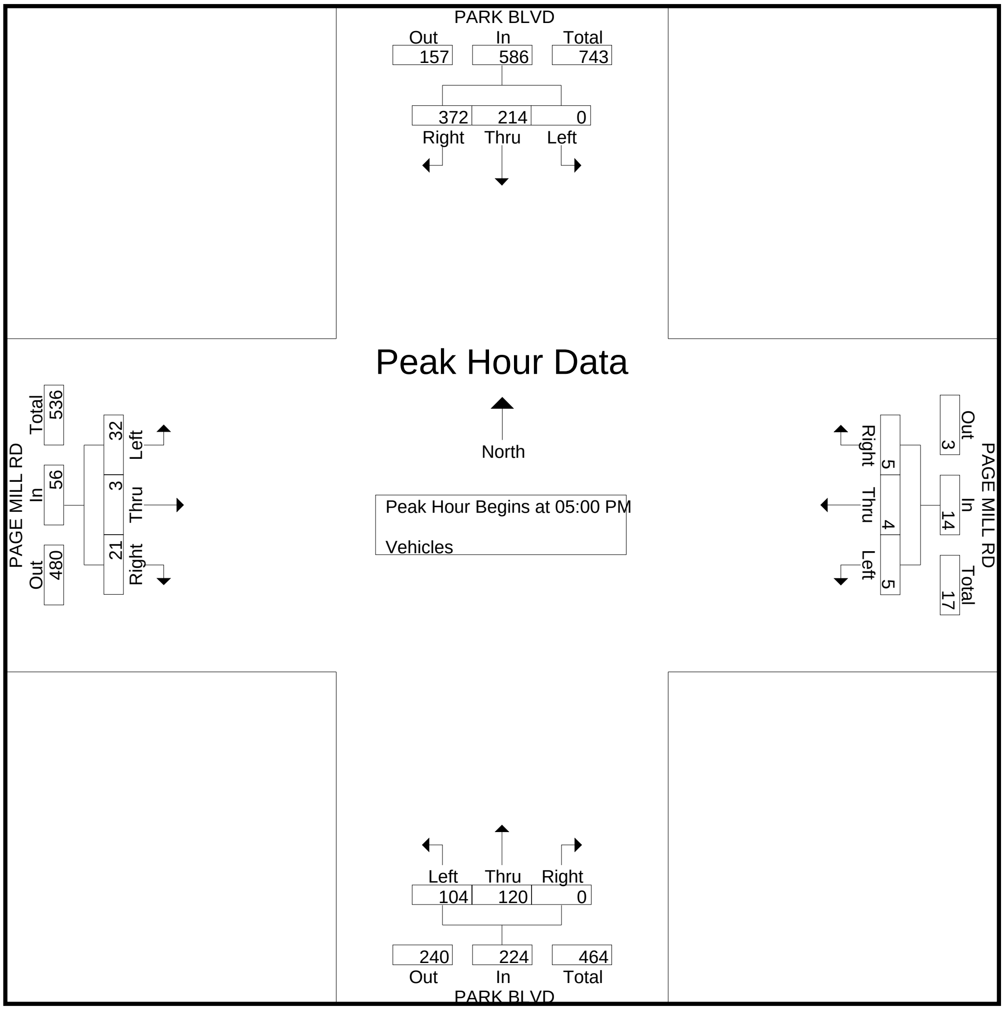
Groups Printed- Vehicles

	PARK BLVD Southbound					PAGE MILL RD Westbound					PARK BLVD Northbound					PAGE MILL RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	72	29	0	9	110	0	5	0	34	39	1	21	26	23	71	5	1	13	8	27	247
04:15 PM	71	28	0	0	99	0	3	0	4	7	0	22	29	6	57	3	0	7	10	20	183
04:30 PM	80	35	1	0	116	0	1	0	10	11	0	22	25	7	54	1	0	6	4	11	192
04:45 PM	75	41	0	2	118	1	0	0	13	14	1	20	38	7	66	4	0	10	2	16	214
Total	298	133	1	11	443	1	9	0	61	71	2	85	118	43	248	13	1	36	24	74	836
05:00 PM	101	60	0	5	166	2	0	2	89	93	0	23	25	84	132	1	0	9	4	14	405
05:15 PM	90	57	0	2	149	0	0	2	15	17	0	30	23	9	62	6	0	6	5	17	245
05:30 PM	86	41	0	1	128	0	2	1	30	33	0	33	28	20	81	2	1	9	5	17	259
05:45 PM	95	56	0	2	153	3	2	0	18	23	0	34	28	15	77	12	2	8	4	26	279
Total	372	214	0	10	596	5	4	5	152	166	0	120	104	128	352	21	3	32	18	74	1188
Grand Total	670	347	1	21	1039	6	13	5	213	237	2	205	222	171	600	34	4	68	42	148	2024
Apprch %	64.5	33.4	0.1	2		2.5	5.5	2.1	89.9		0.3	34.2	37	28.5		23	2.7	45.9	28.4		
Total %	33.1	17.1	0	1	51.3	0.3	0.6	0.2	10.5	11.7	0.1	10.1	11	8.4	29.6	1.7	0.2	3.4	2.1	7.3	

	PARK BLVD Southbound				PAGE MILL RD Westbound				PARK BLVD Northbound				PAGE MILL RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**101**	**60**	0	**161**	2	0	**2**	4	0	23	25	48	1	0	**9**	10	223
05:15 PM	90	57	0	147	0	0	2	2	0	30	23	53	6	0	6	12	214
05:30 PM	86	41	0	127	0	**2**	1	3	0	33	**28**	61	2	1	9	12	203
05:45 PM	95	56	0	151	**3**	2	0	**5**	0	**34**	28	**62**	**12**	**2**	8	**22**	**240**
Total Volume	372	214	0	586	5	4	5	14	0	120	104	224	21	3	32	56	880
% App. Total	63.5	36.5	0		35.7	28.6	35.7		0	53.6	46.4		37.5	5.4	57.1		
PHF	.921	.892	.000	.910	.417	.500	.625	.700	.000	.882	.929	.903	.438	.375	.889	.636	.917

File Name : 3PM FINAL
Site Code : 00000003
Start Date : 9/27/2016



File Name : 3PM FINAL
Site Code : 00000003
Start Date : 9/27/2016

Groups Printed- Bikes

	PARK BLVD Southbound					PAGE MILL RD Westbound					PARK BLVD Northbound					PAGE MILL RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	13	0	0	13	0	0	0	0	0	0	9	0	0	9	0	0	1	0	1	23
04:15 PM	0	20	0	0	20	0	0	0	0	0	2	9	0	0	11	0	0	1	0	1	32
04:30 PM	0	11	0	0	11	0	0	0	0	0	0	8	0	0	8	0	0	2	0	2	21
04:45 PM	0	15	0	0	15	0	0	0	0	0	0	5	0	0	5	0	0	1	0	1	21
Total	0	59	0	0	59	0	0	0	0	0	2	31	0	0	33	0	0	5	0	5	97
05:00 PM	0	19	0	0	19	0	0	0	0	0	2	18	0	0	20	0	1	4	0	5	44
05:15 PM	1	33	0	0	34	0	0	1	0	1	0	10	0	0	10	0	0	1	0	1	46
05:30 PM	1	28	0	0	29	0	0	0	0	0	0	14	0	0	14	0	0	4	0	4	47
05:45 PM	1	40	0	0	41	0	0	0	0	0	1	17	0	0	18	0	0	2	0	2	61
Total	3	120	0	0	123	0	0	1	0	1	3	59	0	0	62	0	1	11	0	12	198
Grand Total	3	179	0	0	182	0	0	1	0	1	5	90	0	0	95	0	1	16	0	17	295
Apprch %	1.6	98.4	0	0		0	0	100	0		5.3	94.7	0	0		0	5.9	94.1	0		
Total %	1	60.7	0	0	61.7	0	0	0.3	0	0.3	1.7	30.5	0	0	32.2	0	0.3	5.4	0	5.8	

	PARK BLVD Southbound				PAGE MILL RD Westbound				PARK BLVD Northbound				PAGE MILL RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	19	0	19	0	0	0	0	**2**	**18**	0	**20**	0	**1**	**4**	**5**	44
05:15 PM	**1**	33	0	34	0	0	**1**	**1**	0	10	0	10	0	0	1	1	46
05:30 PM	1	28	0	29	0	0	0	0	0	14	0	14	0	0	4	4	47
05:45 PM	1	**40**	0	**41**	0	0	0	0	1	17	0	18	0	0	2	2	**61**
Total Volume	3	120	0	123	0	0	1	1	3	59	0	62	0	1	11	12	198
% App. Total	2.4	97.6	0		0	0	100		4.8	95.2	0		0	8.3	91.7		
PHF	.750	.750	.000	.750	.000	.000	.250	.250	.375	.819	.000	.775	.000	.250	.688	.600	.811

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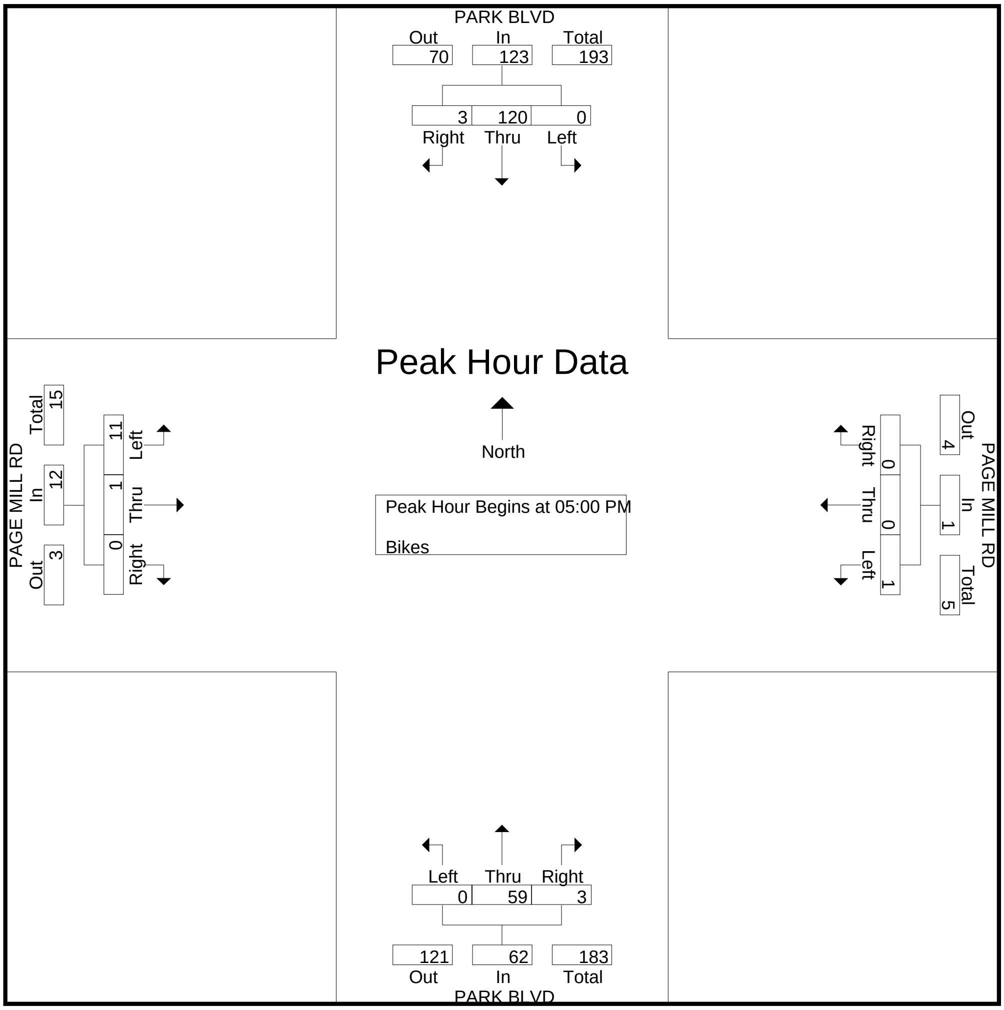

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File Name : 4AM FINAL
Site Code : 00000004
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Groups Printed- Vehicles

	BIRCH ST Southbound					CAMBRIDGE AVE Westbound					BIRCH ST Northbound					CAMBRIDGE AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	1	2	0	3	6	0	4	2	2	8	2	9	7	2	20	0	5	0	2	7	41
07:15 AM	3	3	0	0	6	1	5	2	1	9	5	13	15	0	33	1	5	2	6	14	62
07:30 AM	1	6	2	1	10	2	8	6	2	18	0	13	14	3	30	1	1	1	3	6	64
07:45 AM	2	12	2	3	19	2	10	1	2	15	1	22	38	4	65	2	4	0	2	8	107
Total	7	23	4	7	41	5	27	11	7	50	8	57	74	9	148	4	15	3	13	35	274
08:00 AM	6	17	3	2	28	1	7	2	6	16	8	28	46	2	84	3	10	0	4	17	145
08:15 AM	4	16	3	4	27	4	7	2	7	20	16	26	17	8	67	2	4	1	9	16	130
08:30 AM	5	30	5	8	48	2	10	2	6	20	12	39	26	5	82	9	8	1	3	21	171
08:45 AM	6	20	4	1	31	0	6	1	13	20	12	29	29	7	77	7	7	2	1	17	145
Total	21	83	15	15	134	7	30	7	32	76	48	122	118	22	310	21	29	4	17	71	591
Grand Total	28	106	19	22	175	12	57	18	39	126	56	179	192	31	458	25	44	7	30	106	865
Apprch %	16	60.6	10.9	12.6		9.5	45.2	14.3	31		12.2	39.1	41.9	6.8		23.6	41.5	6.6	28.3		
Total %	3.2	12.3	2.2	2.5	20.2	1.4	6.6	2.1	4.5	14.6	6.5	20.7	22.2	3.6	52.9	2.9	5.1	0.8	3.5	12.3	

	BIRCH ST Southbound				CAMBRIDGE AVE Westbound				BIRCH ST Northbound				CAMBRIDGE AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	**6**	17	3	26	1	7	**2**	10	8	28	**46**	**82**	3	**10**	0	13	131
08:15 AM	4	16	3	23	**4**	7	2	13	**16**	26	17	59	2	4	1	7	102
08:30 AM	5	**30**	**5**	**40**	2	**10**	2	**14**	12	**39**	26	77	**9**	8	1	**18**	**149**
08:45 AM	6	20	4	30	0	6	1	7	12	29	29	70	7	7	**2**	16	123
Total Volume	21	83	15	119	7	30	7	44	48	122	118	288	21	29	4	54	505
% App. Total	17.6	69.7	12.6		15.9	68.2	15.9		16.7	42.4	41		38.9	53.7	7.4		
PHF	.875	.692	.750	.744	.438	.750	.875	.786	.750	.782	.641	.878	.583	.725	.500	.750	.847

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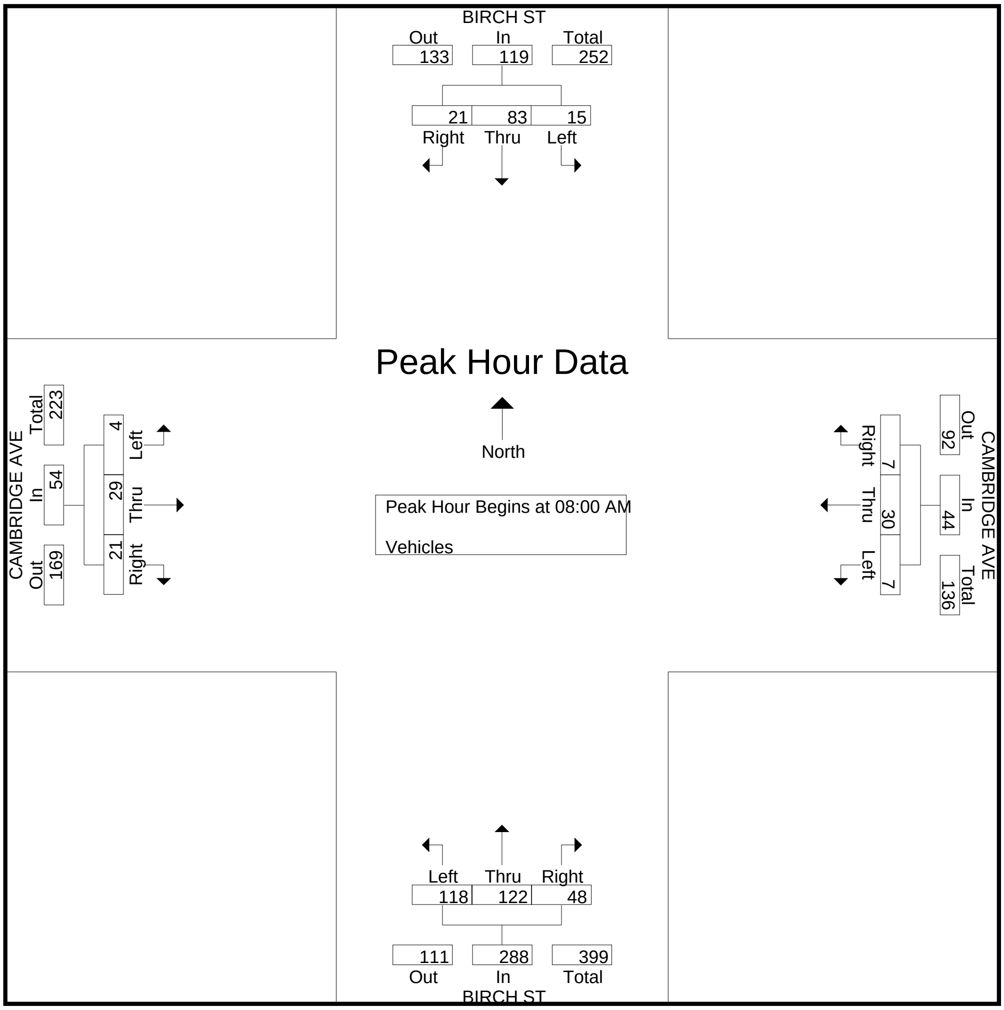

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Start Date : 9/27/2016
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Groups Printed- Bikes

	BIRCH ST Southbound					CAMBRIDGE AVE Westbound					BIRCH ST Northbound					CAMBRIDGE AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
07:15 AM	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
07:30 AM	0	0	0	0	0	0	1	1	0	2	0	2	0	0	2	0	0	0	0	0	4
07:45 AM	0	3	0	0	3	0	1	0	0	1	0	1	0	0	1	0	4	0	0	4	9
Total	0	4	2	0	6	1	2	1	0	4	0	3	0	0	3	0	4	0	0	4	17
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
08:15 AM	0	4	1	0	5	1	0	1	0	2	2	1	0	0	3	0	2	0	0	2	12
08:30 AM	1	2	0	0	3	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	6
08:45 AM	1	1	0	0	2	0	3	0	0	3	0	5	0	0	5	0	2	0	0	2	12
Total	2	7	1	0	10	1	5	1	0	7	2	8	0	0	10	0	4	0	0	4	31
Grand Total	2	11	3	0	16	2	7	2	0	11	2	11	0	0	13	0	8	0	0	8	48
Apprch %	12.5	68.8	18.8	0		18.2	63.6	18.2	0		15.4	84.6	0	0		0	100	0	0		
Total %	4.2	22.9	6.2	0	33.3	4.2	14.6	4.2	0	22.9	4.2	22.9	0	0	27.1	0	16.7	0	0	16.7	

	BIRCH ST Southbound				CAMBRIDGE AVE Westbound				BIRCH ST Northbound				CAMBRIDGE AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
08:15 AM	0	**4**	**1**	**5**	**1**	0	**1**	2	**2**	1	0	3	0	**2**	0	**2**	**12**
08:30 AM	**1**	2	0	3	0	2	0	2	0	1	0	1	0	0	0	0	6
08:45 AM	1	1	0	2	0	**3**	0	**3**	0	**5**	0	**5**	0	2	0	2	12
Total Volume	2	7	1	10	1	5	1	7	2	8	0	10	0	4	0	4	31
% App. Total	20	70	10		14.3	71.4	14.3		20	80	0		0	100	0		
PHF	.500	.438	.250	.500	.250	.417	.250	.583	.250	.400	.000	.500	.000	.500	.000	.500	.646

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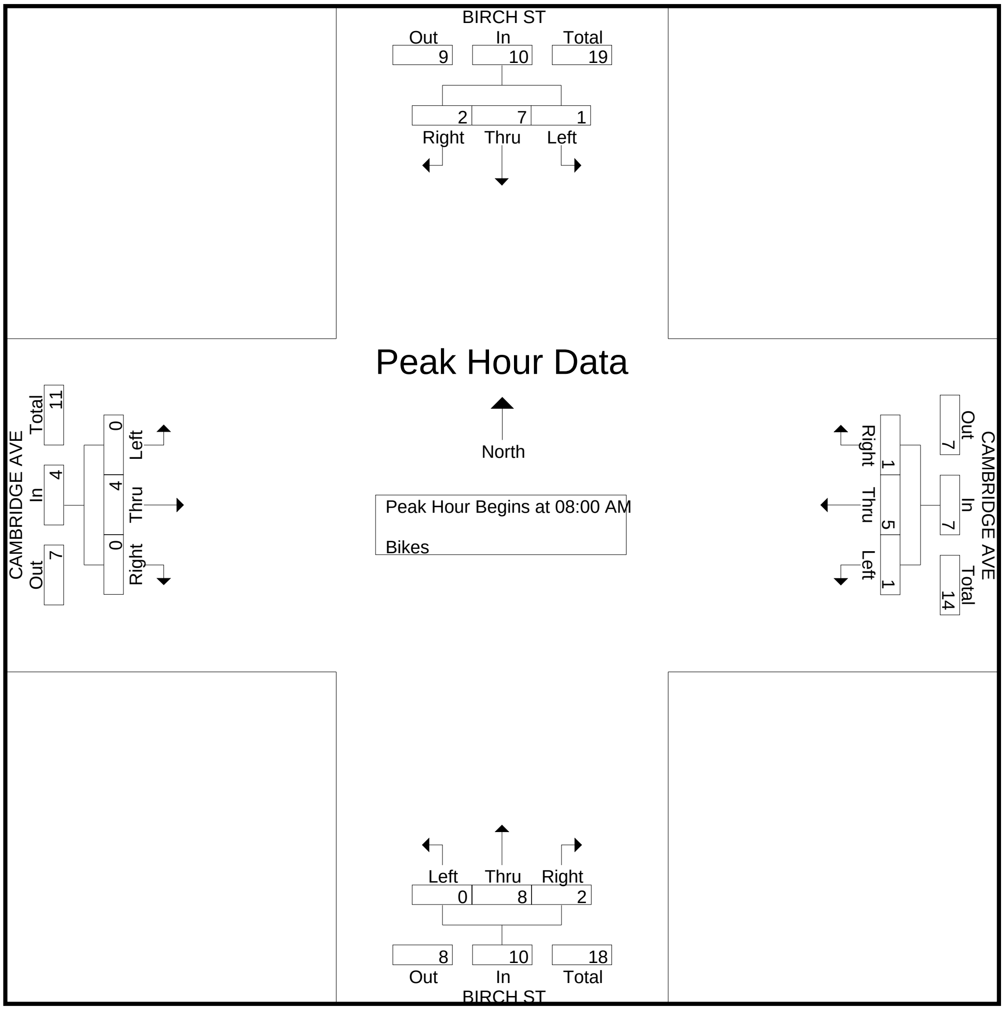

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File Name : 5AM FINAL
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Groups Printed- Vehicles

	BIRCH ST Southbound					SHERMAN AVE Westbound					BIRCH ST Northbound					SHERMAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	1	4	2	1	8	0	1	2	0	3	5	28	15	1	49	1	2	0	4	7	67
07:15 AM	1	1	3	2	7	3	0	0	1	4	3	38	12	4	57	0	5	1	7	13	81
07:30 AM	2	3	4	2	11	2	2	0	2	6	5	44	14	0	63	1	5	0	0	6	86
07:45 AM	0	5	9	9	23	4	1	0	1	6	6	67	12	3	88	0	0	2	3	5	122
Total	4	13	18	14	49	9	4	2	4	19	19	177	53	8	257	2	12	3	14	31	356
08:00 AM	1	6	4	0	11	1	1	1	2	5	6	100	13	9	128	1	0	0	4	5	149
08:15 AM	0	6	7	4	17	5	2	2	2	11	8	94	8	4	114	0	0	0	8	8	150
08:30 AM	1	14	7	3	25	4	1	4	2	11	12	100	9	3	124	2	0	2	5	9	169
08:45 AM	0	13	8	3	24	7	0	2	2	11	13	89	8	6	116	0	1	1	6	8	159
Total	2	39	26	10	77	17	4	9	8	38	39	383	38	22	482	3	1	3	23	30	627
Grand Total	6	52	44	24	126	26	8	11	12	57	58	560	91	30	739	5	13	6	37	61	983
Apprch %	4.8	41.3	34.9	19		45.6	14	19.3	21.1		7.8	75.8	12.3	4.1		8.2	21.3	9.8	60.7		
Total %	0.6	5.3	4.5	2.4	12.8	2.6	0.8	1.1	1.2	5.8	5.9	57	9.3	3.1	75.2	0.5	1.3	0.6	3.8	6.2	

	BIRCH ST Southbound				SHERMAN AVE Westbound				BIRCH ST Northbound				SHERMAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	**1**	6	4	11	1	1	1	3	6	**100**	**13**	119	1	0	0	1	134
08:15 AM	0	6	7	13	5	**2**	2	**9**	8	94	8	110	0	0	0	0	132
08:30 AM	1	**14**	7	**22**	4	1	**4**	9	12	100	9	**121**	**2**	0	**2**	**4**	**156**
08:45 AM	0	13	**8**	21	**7**	0	2	9	**13**	89	8	110	0	**1**	1	2	142
Total Volume	2	39	26	67	17	4	9	30	39	383	38	460	3	1	3	7	564
% App. Total	3	58.2	38.8		56.7	13.3	30		8.5	83.3	8.3		42.9	14.3	42.9		
PHF	.500	.696	.813	.761	.607	.500	.563	.833	.750	.958	.731	.950	.375	.250	.375	.438	.904

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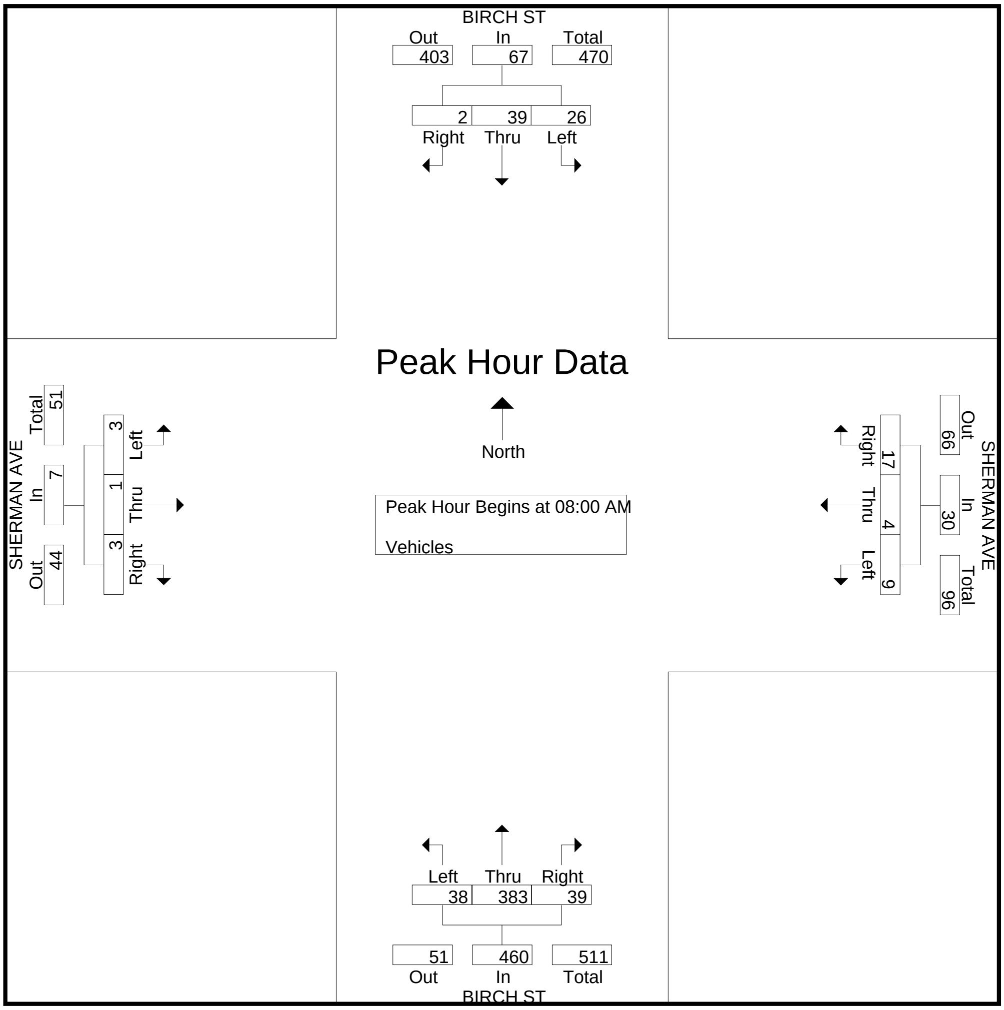

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File Name : 5AM FINAL
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Groups Printed- Bikes

	BIRCH ST Southbound					SHERMAN AVE Westbound					BIRCH ST Northbound					SHERMAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
07:45 AM	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
Total	0	1	0	0	1	2	0	0	0	2	1	2	0	0	3	0	0	0	0	0	6
08:00 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	2	0	0	2	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	4
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Total	0	2	0	0	2	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0	6
Grand Total	0	3	0	0	3	2	2	0	0	4	1	4	0	0	5	0	0	0	0	0	12
Apprch %	0	100	0	0		50	50	0	0		20	80	0	0		0	0	0	0		
Total %	0	25	0	0	25	16.7	16.7	0	0	33.3	8.3	33.3	0	0	41.7	0	0	0	0	0	

	BIRCH ST Southbound				SHERMAN AVE Westbound				BIRCH ST Northbound				SHERMAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	1	0	1	**1**	0	0	**1**	0	0	0	0	0	0	0	0	2
08:00 AM	0	0	0	0	0	**1**	0	1	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	**2**	0	**2**	0	1	0	1	0	**1**	0	**1**	0	0	0	0	**4**
Total Volume	0	3	0	3	1	2	0	3	0	1	0	1	0	0	0	0	7
% App. Total	0	100	0		33.3	66.7	0		0	100	0		0	0	0		
PHF	.000	.375	.000	.375	.250	.500	.000	.750	.000	.250	.000	.250	.000	.000	.000	.000	.438

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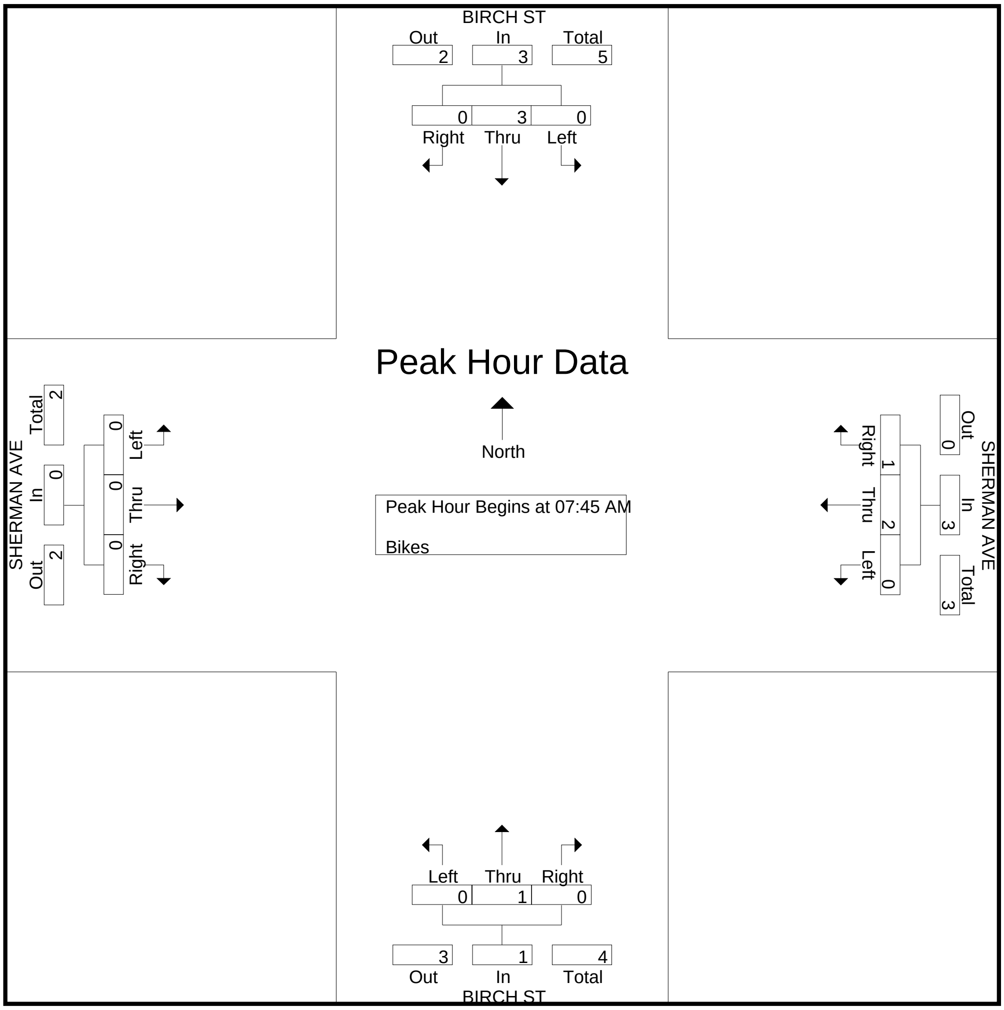

File Name : 5PM FINAL
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Groups Printed- Vehicles

	BIRCH ST Southbound					SHERMAN AVE Westbound					BIRCH ST Northbound					SHERMAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	19	7	2	28	6	0	2	2	10	9	66	11	0	86	0	0	0	5	5	129
04:15 PM	0	19	8	5	32	5	0	4	2	11	5	42	8	3	58	0	0	0	8	8	109
04:30 PM	0	5	8	3	16	5	2	6	1	14	9	49	4	2	64	0	0	1	0	1	95
04:45 PM	3	18	4	8	33	2	3	5	3	13	6	77	17	1	101	1	1	2	4	8	155
Total	3	61	27	18	109	18	5	17	8	48	29	234	40	6	309	1	1	3	17	22	488
05:00 PM	4	10	11	7	32	5	3	7	4	19	5	45	11	3	64	2	10	0	6	18	133
05:15 PM	2	12	12	2	28	1	2	4	1	8	5	39	10	2	56	5	14	0	3	22	114
05:30 PM	0	15	8	9	32	5	5	3	7	20	11	63	7	4	85	2	12	2	5	21	158
05:45 PM	3	15	12	4	34	2	8	6	5	21	6	51	9	4	70	2	12	2	5	21	146
Total	9	52	43	22	126	13	18	20	17	68	27	198	37	13	275	11	48	4	19	82	551
Grand Total	12	113	70	40	235	31	23	37	25	116	56	432	77	19	584	12	49	7	36	104	1039
Apprch %	5.1	48.1	29.8	17		26.7	19.8	31.9	21.6		9.6	74	13.2	3.3		11.5	47.1	6.7	34.6		
Total %	1.2	10.9	6.7	3.8	22.6	3	2.2	3.6	2.4	11.2	5.4	41.6	7.4	1.8	56.2	1.2	4.7	0.7	3.5	10	

	BIRCH ST Southbound				SHERMAN AVE Westbound				BIRCH ST Northbound				SHERMAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	3	**18**	4	25	2	3	5	10	6	**77**	**17**	**100**	1	1	**2**	4	**139**
05:00 PM	**4**	10	11	25	**5**	3	**7**	**15**	5	45	11	61	2	10	0	12	113
05:15 PM	2	12	**12**	**26**	1	2	4	7	5	39	10	54	**5**	**14**	0	**19**	106
05:30 PM	0	15	8	23	5	**5**	3	13	**11**	63	7	81	2	12	2	16	133
Total Volume	9	55	35	99	13	13	19	45	27	224	45	296	10	37	4	51	491
% App. Total	9.1	55.6	35.4		28.9	28.9	42.2		9.1	75.7	15.2		19.6	72.5	7.8		
PHF	.563	.764	.729	.952	.650	.650	.679	.750	.614	.727	.662	.740	.500	.661	.500	.671	.883

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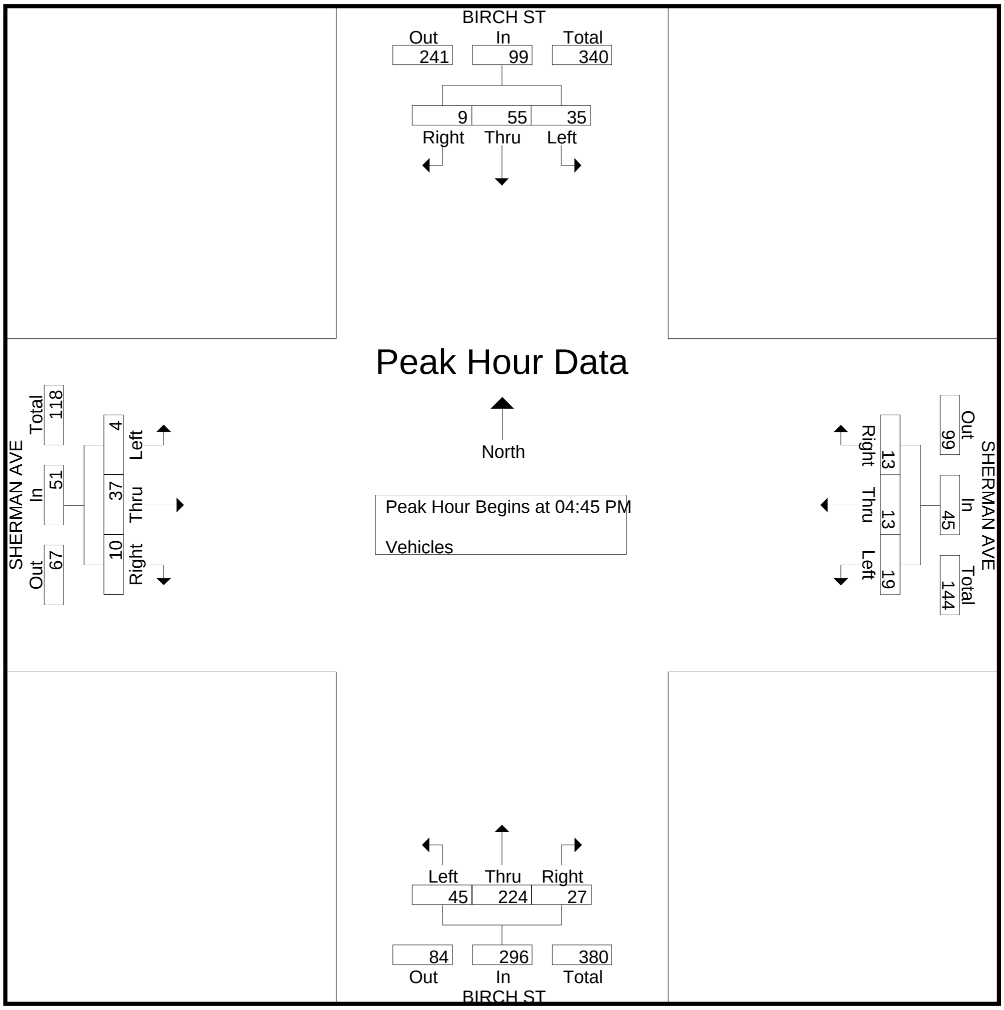

File Name : 5PM FINAL
Site Code : 00000005
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Groups Printed- Bikes

	BIRCH ST Southbound					SHERMAN AVE Westbound					BIRCH ST Northbound					SHERMAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
05:15 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	3
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	2	3	0	5	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	7
Grand Total	0	3	3	0	6	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	8
Apprch %	0	50	50	0		0	0	0	0		0	0	0	0		0	100	0	0		
Total %	0	37.5	37.5	0	75	0	0	0	0	0	0	0	0	0	0	0	25	0	0	25	

	BIRCH ST Southbound				SHERMAN AVE Westbound				BIRCH ST Northbound				SHERMAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	**1**	**1**	**2**	0	0	0	0	0	0	0	0	0	0	0	0	2
05:15 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	**2**	0	**2**	**3**
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Total Volume	0	2	3	5	0	0	0	0	0	0	0	0	0	2	0	2	7
% App. Total	0	40	60		0	0	0		0	0	0		0	100	0		
PHF	.000	.500	.750	.625	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.583

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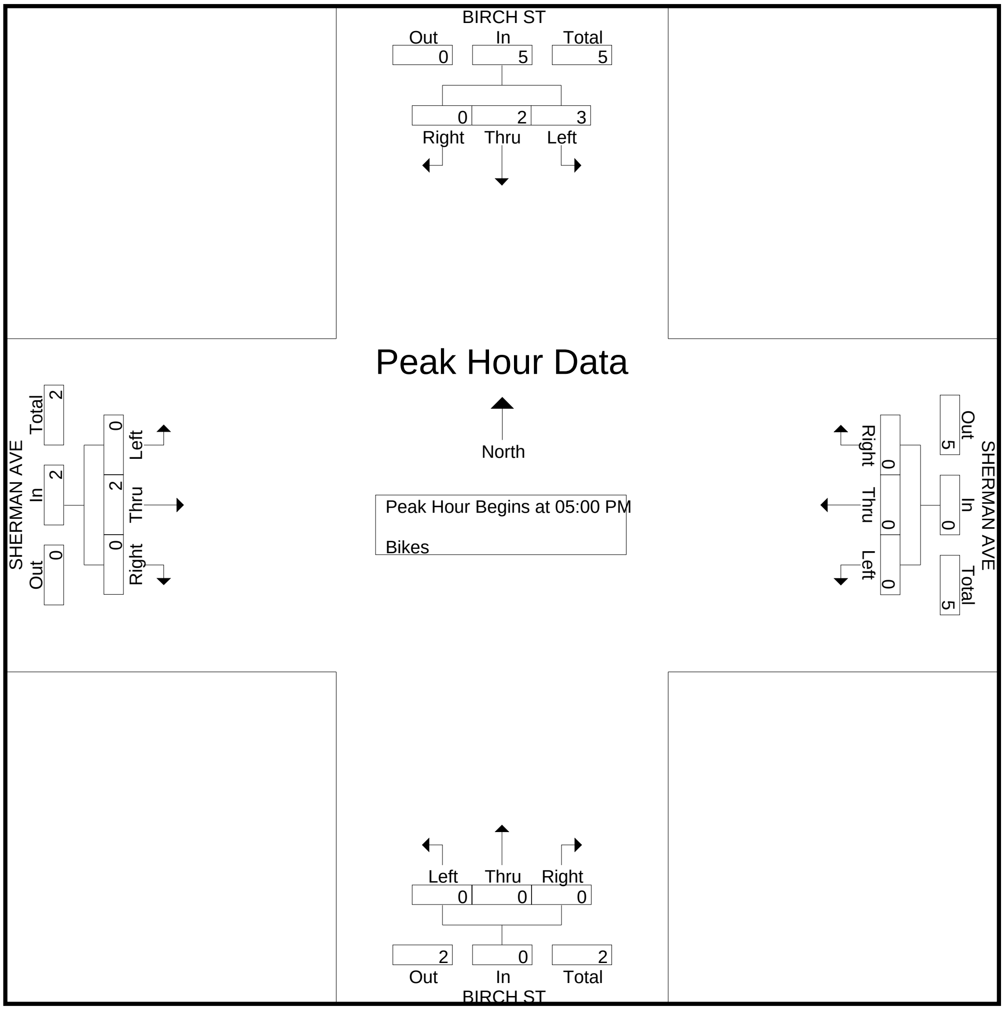

File Name : 6AM FINAL
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Start Date : 9/27/2016
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Groups Printed- Vehicles

	BIRCH ST Southbound					GRANT AVE Westbound					BIRCH ST Northbound					GRANT AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	2	4	1	1	8	0	0	0	1	1	6	47	3	2	58	2	4	2	0	8	75
07:15 AM	0	0	1	2	3	0	0	0	5	5	5	49	3	0	57	0	7	6	1	14	79
07:30 AM	1	3	0	0	4	0	0	0	4	4	7	60	4	0	71	2	7	2	0	11	90
07:45 AM	0	4	1	0	5	0	0	0	4	4	6	82	16	1	105	0	9	5	1	15	129
Total	3	11	3	3	20	0	0	0	14	14	24	238	26	3	291	4	27	15	2	48	373
08:00 AM	3	6	2	0	11	0	0	0	3	3	8	113	8	0	129	4	8	6	2	20	163
08:15 AM	1	5	1	0	7	0	0	0	1	1	9	105	9	0	123	1	8	5	5	19	150
08:30 AM	6	8	8	0	22	0	0	0	1	1	8	105	7	1	121	1	12	12	1	26	170
08:45 AM	3	8	4	0	15	0	0	0	5	5	7	94	15	3	119	5	7	8	3	23	162
Total	13	27	15	0	55	0	0	0	10	10	32	417	39	4	492	11	35	31	11	88	645
Grand Total	16	38	18	3	75	0	0	0	24	24	56	655	65	7	783	15	62	46	13	136	1018
Apprch %	21.3	50.7	24	4		0	0	0	100		7.2	83.7	8.3	0.9		11	45.6	33.8	9.6		
Total %	1.6	3.7	1.8	0.3	7.4	0	0	0	2.4	2.4	5.5	64.3	6.4	0.7	76.9	1.5	6.1	4.5	1.3	13.4	

	BIRCH ST Southbound				GRANT AVE Westbound				BIRCH ST Northbound				GRANT AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	3	6	2	11	0	0	0	0	8	**113**	8	**129**	4	8	6	18	158
08:15 AM	1	5	1	7	0	0	0	0	**9**	105	9	123	1	8	5	14	144
08:30 AM	**6**	**8**	**8**	**22**	0	0	0	0	8	105	7	120	1	**12**	**12**	**25**	**167**
08:45 AM	3	8	4	15	0	0	0	0	7	94	**15**	116	**5**	7	8	20	151
Total Volume	13	27	15	55	0	0	0	0	32	417	39	488	11	35	31	77	620
% App. Total	23.6	49.1	27.3		0	0	0		6.6	85.5	8		14.3	45.5	40.3		
PHF	.542	.844	.469	.625	.000	.000	.000	.000	.889	.923	.650	.946	.550	.729	.646	.770	.928

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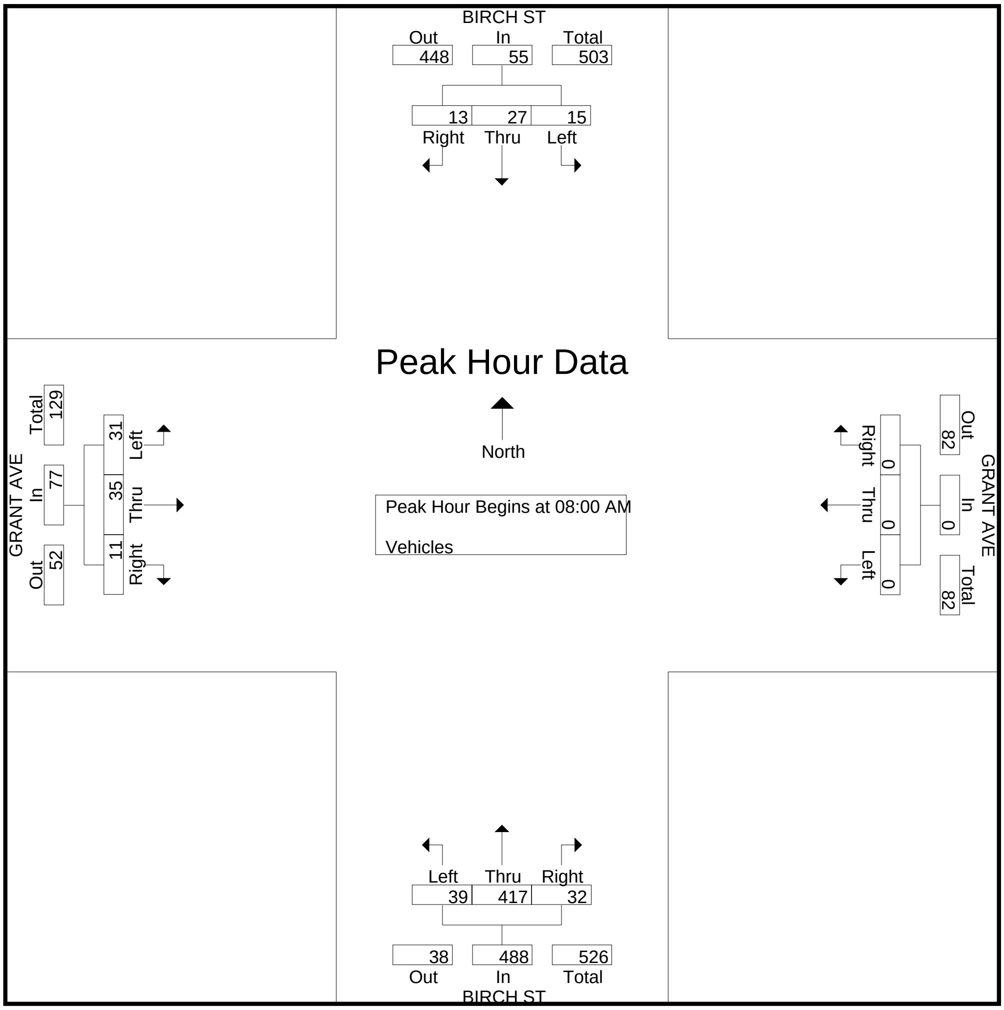

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File Name : 6AM FINAL
Site Code : 00000006
Start Date : 9/27/2016
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Groups Printed- Bikes

	BIRCH ST Southbound					GRANT AVE Westbound					BIRCH ST Northbound					GRANT AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	2
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	2
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
Total	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	2	2	0	4	6
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	3
08:30 AM	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3
08:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3	4
Total	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	0	7	2	0	9	12
Grand Total	0	2	1	0	3	0	0	0	0	0	0	2	0	0	2	0	9	4	0	13	18
Apprch %	0	66.7	33.3	0		0	0	0	0		0	100	0	0		0	69.2	30.8	0		
Total %	0	11.1	5.6	0	16.7	0	0	0	0	0	0	11.1	0	0	11.1	0	50	22.2	0	72.2	

	BIRCH ST Southbound				GRANT AVE Westbound				BIRCH ST Northbound				GRANT AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**	0	**3**	3
08:30 AM	0	**1**	**1**	**2**	0	0	0	0	0	0	0	0	0	0	**1**	1	3
08:45 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	2	1	3	**4**
Total Volume	0	2	1	3	0	0	0	0	0	0	0	0	0	7	2	9	12
% App. Total	0	66.7	33.3		0	0	0		0	0	0		0	77.8	22.2		
PHF	.000	.500	.250	.375	.000	.000	.000	.000	.000	.000	.000	.000	.000	.583	.500	.750	.750

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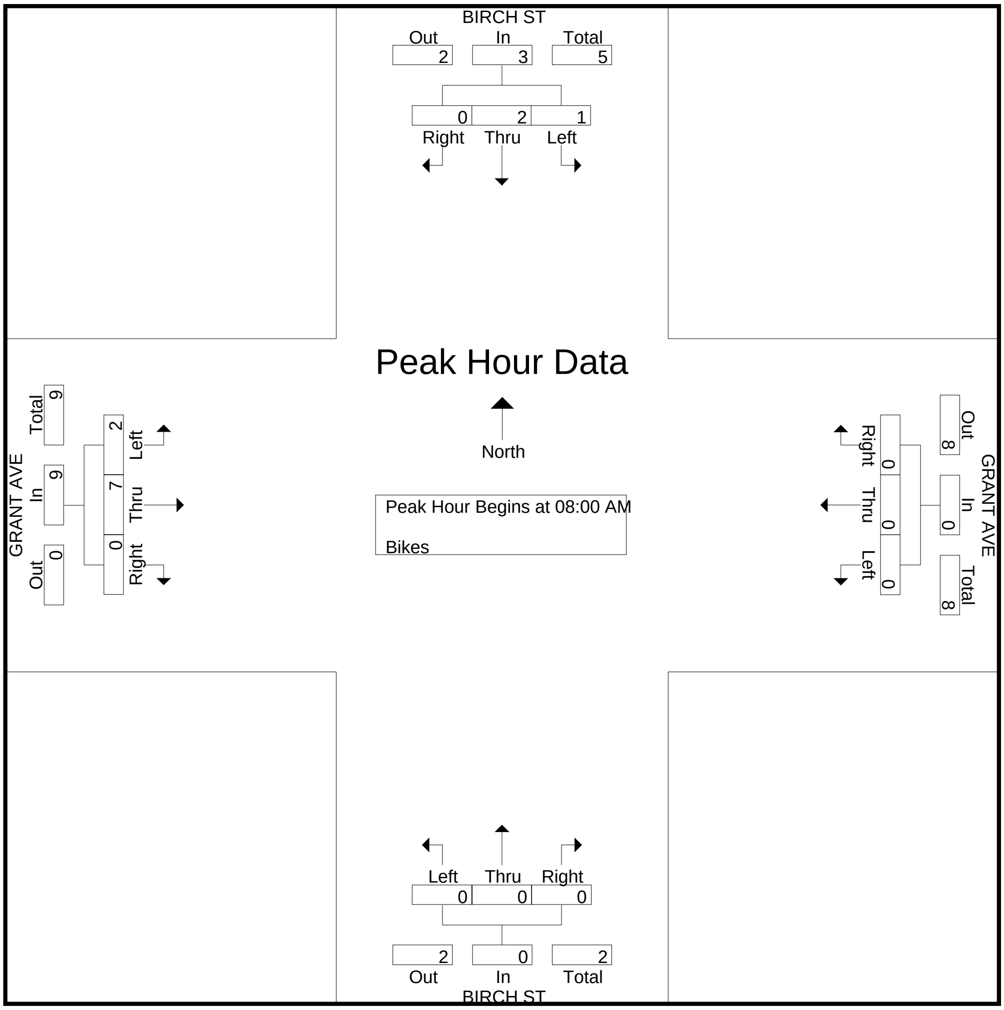

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Groups Printed- Vehicles

	BIRCH ST Southbound					GRANT AVE Westbound					BIRCH ST Northbound					GRANT AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	5	16	2	0	23	0	0	0	2	2	6	76	2	1	85	3	4	7	1	15	125
04:15 PM	7	16	3	2	28	0	0	0	3	3	9	56	4	3	72	1	7	0	2	10	113
04:30 PM	1	12	1	2	16	0	0	0	2	2	2	57	4	0	63	5	11	4	2	22	103
04:45 PM	2	22	2	0	26	0	0	0	2	2	4	88	3	1	96	1	11	11	2	25	149
Total	15	66	8	4	93	0	0	0	9	9	21	277	13	5	316	10	33	22	7	72	490
05:00 PM	1	16	2	0	19	0	0	0	6	6	5	56	4	1	66	2	10	5	1	18	109
05:15 PM	0	19	1	0	20	0	0	0	3	3	2	53	6	0	61	5	9	3	3	20	104
05:30 PM	1	19	3	1	24	0	0	0	7	7	2	81	6	0	89	2	6	2	5	15	135
05:45 PM	1	19	3	1	24	0	0	0	2	2	6	66	7	0	79	4	6	1	2	13	118
Total	3	73	9	2	87	0	0	0	18	18	15	256	23	1	295	13	31	11	11	66	466
Grand Total	18	139	17	6	180	0	0	0	27	27	36	533	36	6	611	23	64	33	18	138	956
Apprch %	10	77.2	9.4	3.3		0	0	0	100		5.9	87.2	5.9	1		16.7	46.4	23.9	13		
Total %	1.9	14.5	1.8	0.6	18.8	0	0	0	2.8	2.8	3.8	55.8	3.8	0.6	63.9	2.4	6.7	3.5	1.9	14.4	

	BIRCH ST Southbound				GRANT AVE Westbound				BIRCH ST Northbound				GRANT AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	5	16	2	23	0	0	0	0	6	76	2	84	3	4	7	14	121
04:15 PM	**7**	16	**3**	**26**	0	0	0	0	**9**	56	**4**	69	1	7	0	8	103
04:30 PM	1	12	1	14	0	0	0	0	2	57	4	63	**5**	**11**	4	20	97
04:45 PM	2	**22**	2	26	0	0	0	0	4	**88**	3	**95**	1	11	**11**	**23**	**144**
Total Volume	15	66	8	89	0	0	0	0	21	277	13	311	10	33	22	65	465
% App. Total	16.9	74.2	9		0	0	0		6.8	89.1	4.2		15.4	50.8	33.8		
PHF	.536	.750	.667	.856	.000	.000	.000	.000	.583	.787	.813	.818	.500	.750	.500	.707	.807

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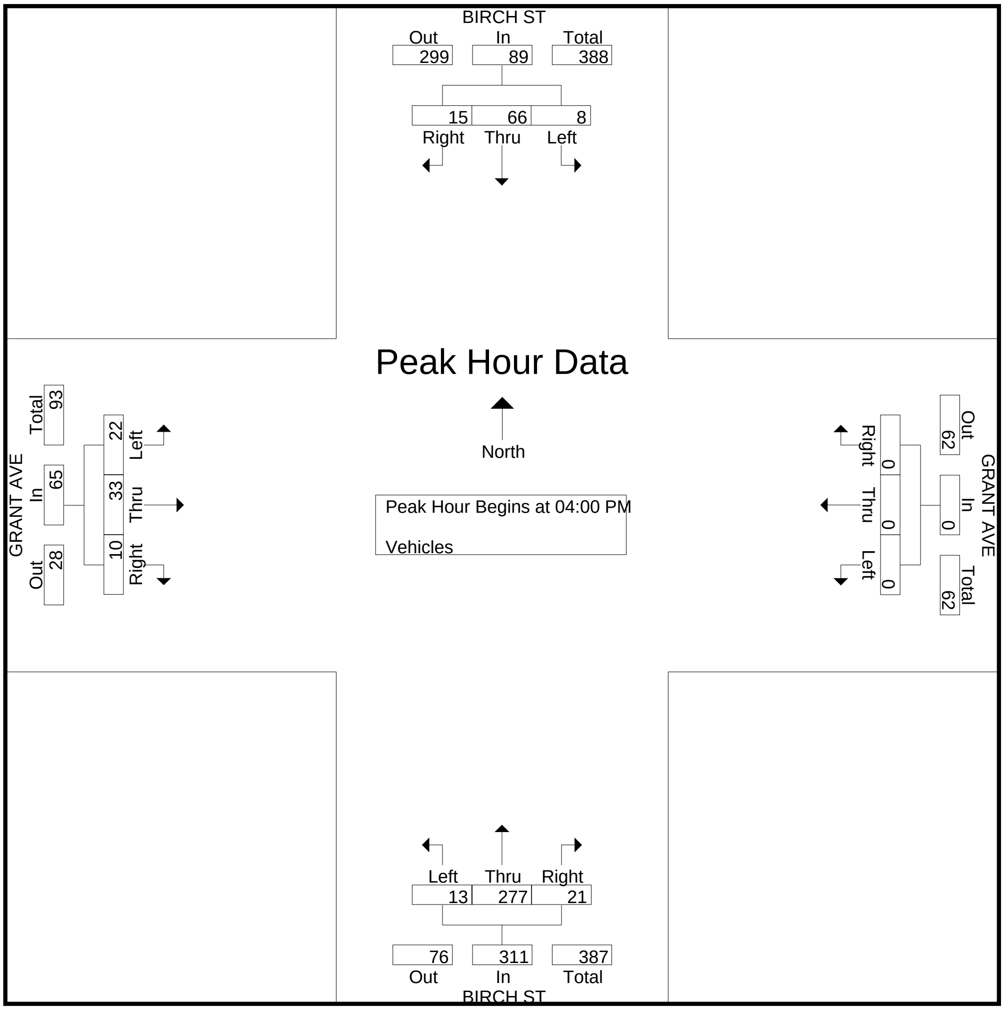

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Groups Printed- Bikes

	BIRCH ST Southbound					GRANT AVE Westbound					BIRCH ST Northbound					GRANT AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
05:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	2
05:15 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	1	0	2	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	4
Grand Total	0	1	1	0	2	0	1	0	0	1	0	0	0	0	0	0	1	1	0	2	5
Apprch %	0	50	50	0		0	100	0	0		0	0	0	0		0	50	50	0		
Total %	0	20	20	0	40	0	20	0	0	20	0	0	0	0	0	0	20	20	0	40	

	BIRCH ST Southbound				GRANT AVE Westbound				BIRCH ST Northbound				GRANT AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	**1**	0	1	**2**
05:15 PM	0	0	**1**	**1**	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	0	1	1	0	1	0	1	0	0	0	0	0	1	1	2	4
% App. Total	0	0	100		0	100	0		0	0	0		0	50	50		
PHF	.000	.000	.250	.250	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.250	.500	.500

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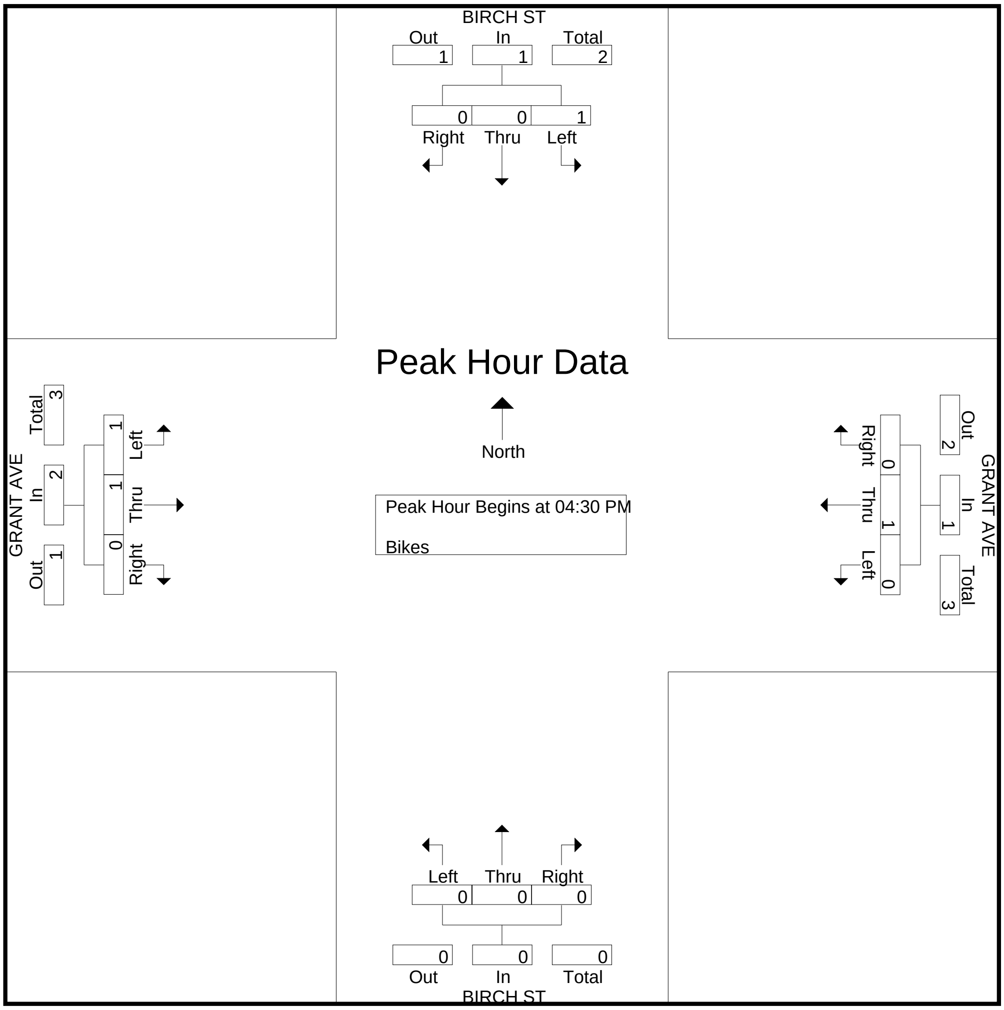

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Groups Printed- Vehicles

	BIRCH ST Southbound					SHERIDAN AVE Westbound					BIRCH ST Northbound					SHERIDAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	1	4	1	4	10	1	0	3	0	4	25	54	13	1	93	1	6	1	1	9	116
07:15 AM	0	0	0	1	1	3	1	2	3	9	39	51	13	2	105	1	6	2	0	9	124
07:30 AM	1	2	1	0	4	1	3	5	2	11	35	66	15	0	116	1	12	0	0	13	144
07:45 AM	0	3	2	1	6	0	7	4	3	14	39	101	38	0	178	0	12	1	0	13	211
Total	2	9	4	6	21	5	11	14	8	38	138	272	79	3	492	3	36	4	1	44	595
08:00 AM	2	2	5	6	15	1	2	3	1	7	60	124	50	3	237	0	9	0	0	9	268
08:15 AM	0	2	3	1	6	3	3	2	0	8	56	124	29	0	209	0	7	2	0	9	232
08:30 AM	0	5	6	3	14	2	4	1	1	8	60	112	35	1	208	1	13	5	0	19	249
08:45 AM	2	4	6	3	15	0	5	2	4	11	70	117	30	3	220	1	7	2	0	10	256
Total	4	13	20	13	50	6	14	8	6	34	246	477	144	7	874	2	36	9	0	47	1005
Grand Total	6	22	24	19	71	11	25	22	14	72	384	749	223	10	1366	5	72	13	1	91	1600
Apprch %	8.5	31	33.8	26.8		15.3	34.7	30.6	19.4		28.1	54.8	16.3	0.7		5.5	79.1	14.3	1.1		
Total %	0.4	1.4	1.5	1.2	4.4	0.7	1.6	1.4	0.9	4.5	24	46.8	13.9	0.6	85.4	0.3	4.5	0.8	0.1	5.7	

	BIRCH ST Southbound				SHERIDAN AVE Westbound				BIRCH ST Northbound				SHERIDAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	**2**	2	5	9	1	2	**3**	6	60	**124**	**50**	**234**	0	9	0	9	**258**
08:15 AM	0	2	3	5	**3**	3	2	**8**	56	124	29	209	0	7	2	9	231
08:30 AM	0	**5**	**6**	11	2	4	1	7	60	112	35	207	**1**	**13**	**5**	**19**	244
08:45 AM	2	4	6	**12**	0	**5**	2	7	**70**	117	30	217	1	7	2	10	246
Total Volume	4	13	20	37	6	14	8	28	246	477	144	867	2	36	9	47	979
% App. Total	10.8	35.1	54.1		21.4	50	28.6		28.4	55	16.6		4.3	76.6	19.1		
PHF	.500	.650	.833	.771	.500	.700	.667	.875	.879	.962	.720	.926	.500	.692	.450	.618	.949

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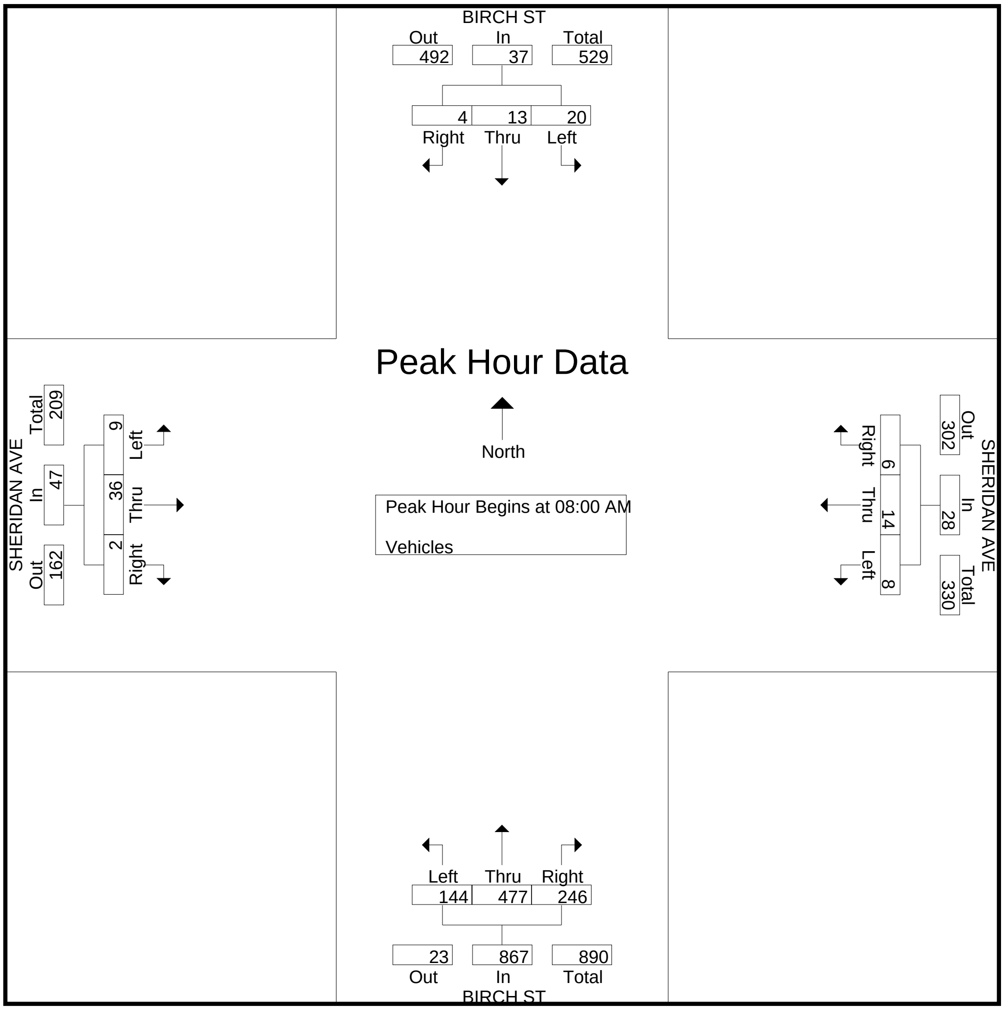

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File Name : 7AM FINAL
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Groups Printed- Bikes

	BIRCH ST Southbound					SHERIDAN AVE Westbound					BIRCH ST Northbound					SHERIDAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	1	0	1	3
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	2
08:30 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	1	0	1	0	2	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	4
Total	1	0	1	0	2	0	3	1	0	4	0	0	1	0	1	0	0	0	0	0	7
Grand Total	1	0	1	0	2	1	3	1	0	5	1	0	1	0	2	0	0	1	0	1	10
Apprch %	50	0	50	0		20	60	20	0		50	0	50	0		0	0	100	0		
Total %	10	0	10	0	20	10	30	10	0	50	10	0	10	0	20	0	0	10	0	10	

	BIRCH ST Southbound				SHERIDAN AVE Westbound				BIRCH ST Northbound				SHERIDAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	**1**	0	1	0	0	**1**	**1**	0	0	0	0	2
08:30 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
08:45 AM	**1**	0	**1**	**2**	0	1	**1**	**2**	0	0	0	0	0	0	0	0	**4**
Total Volume	1	0	1	2	0	3	1	4	0	0	1	1	0	0	0	0	7
% App. Total	50	0	50		0	75	25		0	0	100		0	0	0		
PHF	.250	.000	.250	.250	.000	.750	.250	.500	.000	.000	.250	.250	.000	.000	.000	.000	.438

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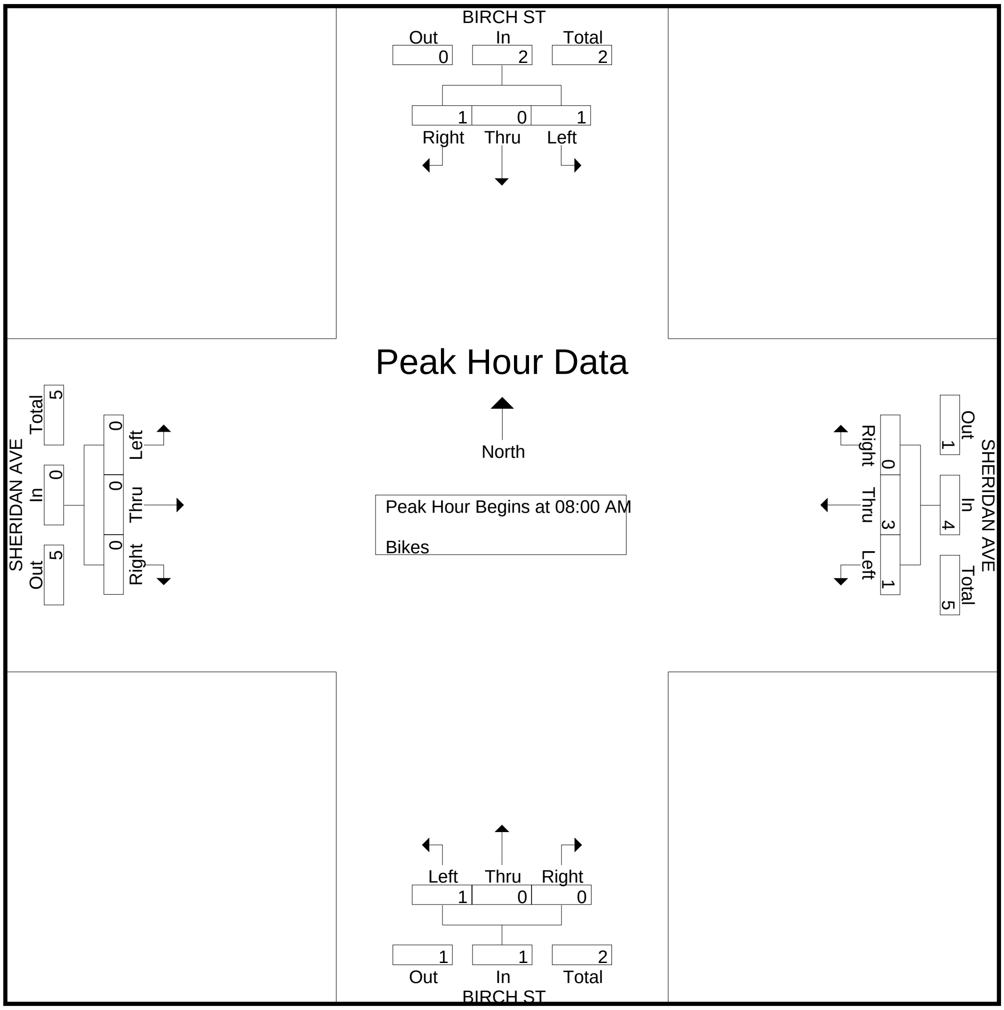

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File Name : 7PM FINAL
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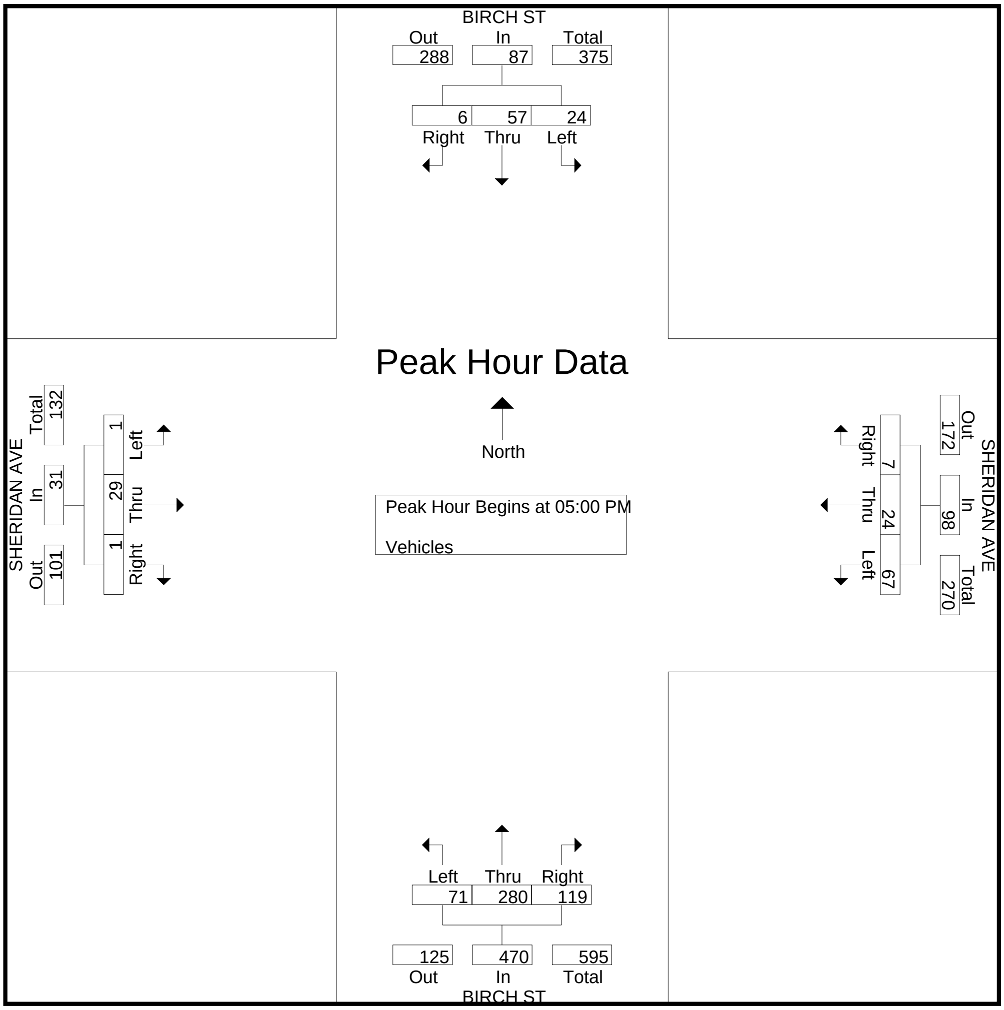
Groups Printed- Vehicles

	BIRCH ST					SHERIDAN AVE					BIRCH ST					SHERIDAN AVE					
	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	4	11	5	2	22	4	8	16	1	29	26	79	15	0	120	2	9	1	1	13	184
04:15 PM	0	11	3	2	16	2	5	10	1	18	29	65	16	1	111	1	4	1	0	6	151
04:30 PM	0	14	6	4	24	1	6	7	0	14	23	59	15	0	97	0	7	0	1	8	143
04:45 PM	1	15	5	3	24	2	6	6	1	15	25	87	17	0	129	0	11	4	0	15	183
Total	5	51	19	11	86	9	25	39	3	76	103	290	63	1	457	3	31	6	2	42	661
05:00 PM	0	15	4	2	21	0	4	11	0	15	34	65	18	0	117	0	8	1	2	11	164
05:15 PM	1	18	6	2	27	2	7	15	1	25	30	53	24	1	108	1	2	0	0	3	163
05:30 PM	3	10	6	2	21	1	9	18	0	28	25	86	21	0	132	0	4	0	1	5	186
05:45 PM	2	14	8	1	25	4	4	23	1	32	30	76	8	1	115	0	15	0	0	15	187
Total	6	57	24	7	94	7	24	67	2	100	119	280	71	2	472	1	29	1	3	34	700
Grand Total	11	108	43	18	180	16	49	106	5	176	222	570	134	3	929	4	60	7	5	76	1361
Apprch %	6.1	60	23.9	10		9.1	27.8	60.2	2.8		23.9	61.4	14.4	0.3		5.3	78.9	9.2	6.6		
Total %	0.8	7.9	3.2	1.3	13.2	1.2	3.6	7.8	0.4	12.9	16.3	41.9	9.8	0.2	68.3	0.3	4.4	0.5	0.4	5.6	

	BIRCH ST				SHERIDAN AVE				BIRCH ST				SHERIDAN AVE				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	15	4	19	0	4	11	15	**34**	65	18	117	0	8	**1**	9	160
05:15 PM	1	**18**	6	**25**	2	7	15	24	30	53	**24**	107	**1**	2	0	3	159
05:30 PM	**3**	10	6	19	1	**9**	18	28	25	**86**	21	**132**	0	4	0	4	183
05:45 PM	2	14	**8**	24	**4**	4	**23**	**31**	30	76	8	114	0	**15**	0	**15**	**184**
Total Volume	6	57	24	87	7	24	67	98	119	280	71	470	1	29	1	31	686
% App. Total	6.9	65.5	27.6		7.1	24.5	68.4		25.3	59.6	15.1		3.2	93.5	3.2		
PHF	.500	.792	.750	.870	.438	.667	.728	.790	.875	.814	.740	.890	.250	.483	.250	.517	.932


BIRCH ST
Out 288
In 87
Total 375
Right 6
Thru 57
Left 24
Peak Hour Data
North
Peak Hour Begins at 05:00 PM
Vehicles
SHERIDAN AVE
Total 132
In 31
Out 101
Left 1
Thru 29
Right 1
SHERIDAN AVE
Out 172
In 98
Total 270
Right 7
Thru 24
Left 67
Left 71
Thru 280
Right 119
Out 125
In 470
Total 595
BIRCH ST

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Groups Printed- Bikes

	BIRCH ST Southbound					SHERIDAN AVE Westbound					BIRCH ST Northbound					SHERIDAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	3
05:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	2
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	1	0	1	0	1	1	0	2	0	0	0	0	0	0	1	0	0	1	4
Grand Total	0	0	1	0	1	0	1	1	0	2	3	0	0	0	3	0	1	0	0	1	7
Apprch %	0	0	100	0		0	50	50	0		100	0	0	0		0	100	0	0		
Total %	0	0	14.3	0	14.3	0	14.3	14.3	0	28.6	42.9	0	0	0	42.9	0	14.3	0	0	14.3	

	BIRCH ST Southbound				SHERIDAN AVE Westbound				BIRCH ST Northbound				SHERIDAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	0	0	0	0	0	0	0	**2**	0	0	**2**	0	0	0	0	**2**
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
05:00 PM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	**1**	0	**1**	2
Total Volume	0	0	0	0	0	1	0	1	3	0	0	3	0	1	0	1	5
% App. Total	0	0	0		0	100	0		100	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.375	.000	.000	.375	.000	.250	.000	.250	.625

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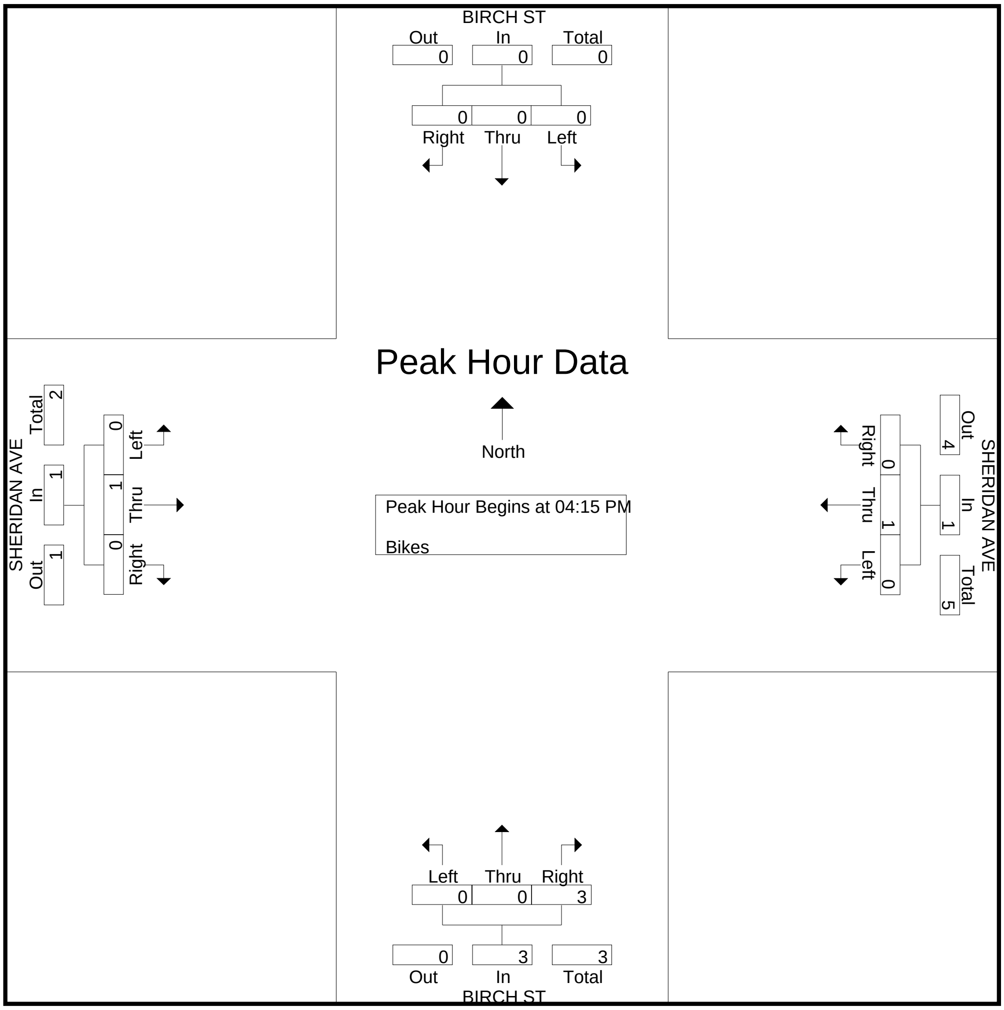

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Groups Printed- Vehicles

	Southbound					CALIFORNIA AVE Westbound					ASH ST Northbound					CALIFORNIA AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	16	1	0	17	3	0	4	9	16	2	11	0	1	14	47
07:15 AM	0	0	0	0	0	0	12	6	6	24	6	0	3	13	22	5	14	0	1	20	66
07:30 AM	0	0	0	0	0	0	34	3	3	40	8	0	5	17	30	4	22	0	5	31	101
07:45 AM	0	0	0	0	0	0	39	3	2	44	5	0	4	12	21	3	16	0	0	19	84
Total	0	0	0	0	0	0	101	13	11	125	22	0	16	51	89	14	63	0	7	84	298
08:00 AM	0	0	0	0	0	0	36	3	4	43	11	0	7	15	33	4	18	0	3	25	101
08:15 AM	0	0	0	0	0	0	51	3	6	60	5	0	11	29	45	14	21	0	9	44	149
08:30 AM	0	0	0	0	0	0	37	5	1	43	10	0	10	28	48	6	27	0	8	41	132
08:45 AM	0	0	0	0	0	0	48	2	3	53	7	0	8	34	49	4	19	0	7	30	132
Total	0	0	0	0	0	0	172	13	14	199	33	0	36	106	175	28	85	0	27	140	514
Grand Total	0	0	0	0	0	0	273	26	25	324	55	0	52	157	264	42	148	0	34	224	812
Apprch %	0	0	0	0		0	84.3	8	7.7		20.8	0	19.7	59.5		18.8	66.1	0	15.2		
Total %	0	0	0	0	0	0	33.6	3.2	3.1	39.9	6.8	0	6.4	19.3	32.5	5.2	18.2	0	4.2	27.6	

	Southbound				CALIFORNIA AVE Westbound				ASH ST Northbound				CALIFORNIA AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	0	36	3	39	**11**	0	7	18	4	18	0	22	79
08:15 AM	0	0	0	0	0	**51**	3	**54**	5	0	**11**	16	**14**	21	0	**35**	**105**
08:30 AM	0	0	0	0	0	37	**5**	42	10	0	10	**20**	6	**27**	0	33	95
08:45 AM	0	0	0	0	0	48	2	50	7	0	8	15	4	19	0	23	88
Total Volume	0	0	0	0	0	172	13	185	33	0	36	69	28	85	0	113	367
% App. Total	0	0	0		0	93	7		47.8	0	52.2		24.8	75.2	0		
PHF	.000	.000	.000	.000	.000	.843	.650	.856	.750	.000	.818	.863	.500	.787	.000	.807	.874

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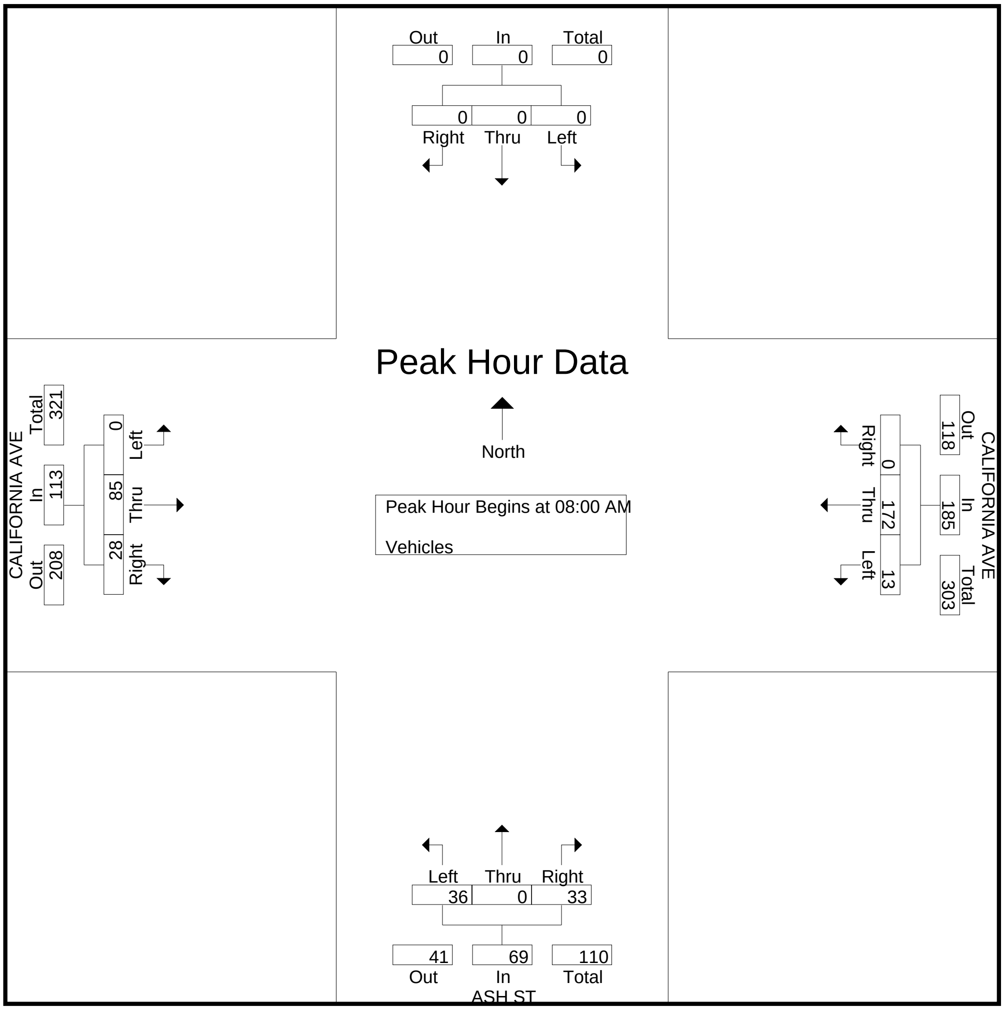

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Groups Printed- Bikes

						CALIFORNIA AVE					ASH ST					CALIFORNIA AVE					
	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	3	0	0	3	9
07:15 AM	0	0	0	0	0	0	8	0	0	8	0	0	1	0	1	0	2	0	0	2	11
07:30 AM	0	0	0	0	0	0	12	0	0	12	4	0	2	0	6	0	18	0	0	18	36
07:45 AM	0	0	0	0	0	0	6	1	0	7	4	0	0	0	4	0	14	0	0	14	25
Total	0	0	0	0	0	0	32	1	0	33	8	0	3	0	11	0	37	0	0	37	81
08:00 AM	0	0	0	0	0	0	11	1	0	12	1	0	2	0	3	0	7	0	0	7	22
08:15 AM	0	0	0	0	0	0	14	1	0	15	3	0	0	0	3	0	8	0	0	8	26
08:30 AM	0	0	0	0	0	0	17	3	0	20	0	0	3	0	3	0	6	0	0	6	29
08:45 AM	0	0	0	0	0	0	18	0	0	18	0	0	1	0	1	0	5	0	0	5	24
Total	0	0	0	0	0	0	60	5	0	65	4	0	6	0	10	0	26	0	0	26	101
Grand Total	0	0	0	0	0	0	92	6	0	98	12	0	9	0	21	0	63	0	0	63	182
Apprch %	0	0	0	0		0	93.9	6.1	0		57.1	0	42.9	0		0	100	0	0		
Total %	0	0	0	0	0	0	50.5	3.3	0	53.8	6.6	0	4.9	0	11.5	0	34.6	0	0	34.6	

					CALIFORNIA AVE				ASH ST				CALIFORNIA AVE				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	12	0	12	**4**	0	**2**	**6**	0	**18**	0	**18**	**36**
07:45 AM	0	0	0	0	0	6	**1**	7	4	0	0	4	0	14	0	14	25
08:00 AM	0	0	0	0	0	11	1	12	1	0	2	3	0	7	0	7	22
08:15 AM	0	0	0	0	0	**14**	1	**15**	3	0	0	3	0	8	0	8	26
Total Volume	0	0	0	0	0	43	3	46	12	0	4	16	0	47	0	47	109
% App. Total	0	0	0		0	93.5	6.5		75	0	25		0	100	0		
PHF	.000	.000	.000	.000	.000	.768	.750	.767	.750	.000	.500	.667	.000	.653	.000	.653	.757

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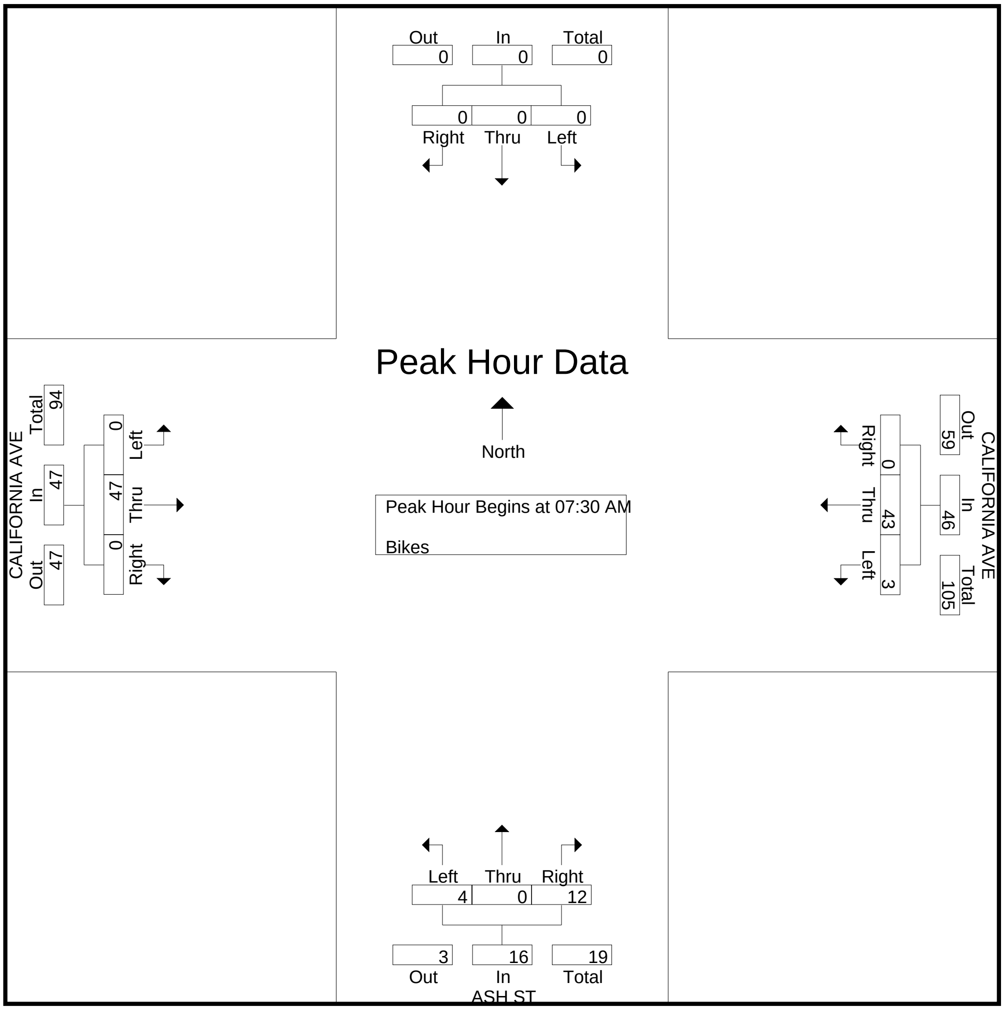

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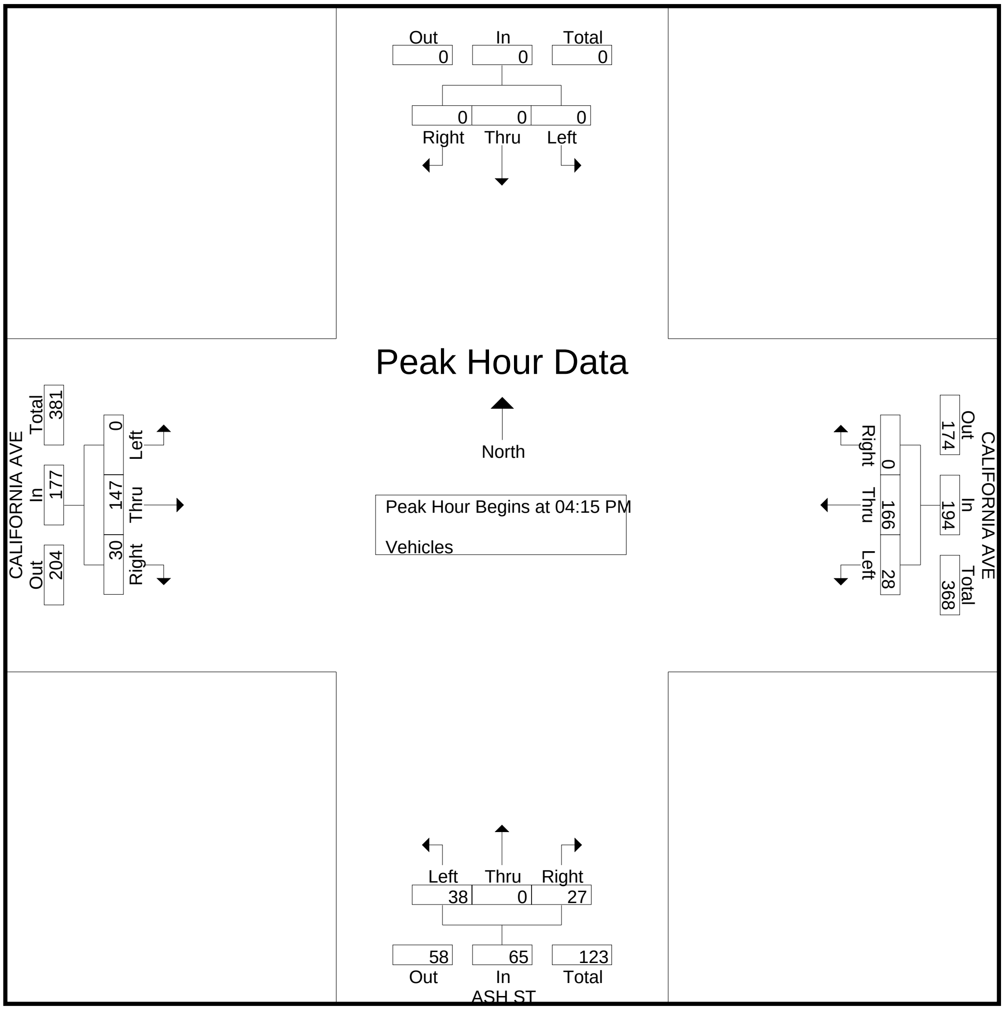
Groups Printed- Vehicles

	Southbound					CALIFORNIA AVE Westbound					ASH ST Northbound					CALIFORNIA AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	33	7	27	67	14	0	7	29	50	5	31	0	6	42	159
04:15 PM	0	0	0	0	0	0	46	8	13	67	8	0	10	35	53	6	35	0	5	46	166
04:30 PM	0	0	0	0	0	0	36	6	5	47	8	0	8	18	34	6	34	0	7	47	128
04:45 PM	0	0	0	0	0	0	42	4	16	62	6	0	9	30	45	8	38	0	6	52	159
Total	0	0	0	0	0	0	157	25	61	243	36	0	34	112	182	25	138	0	24	187	612
05:00 PM	0	0	0	0	0	0	42	10	10	62	5	0	11	39	55	10	40	0	8	58	175
05:15 PM	0	0	0	0	0	0	45	5	30	80	4	0	10	45	59	14	35	0	10	59	198
05:30 PM	0	0	0	0	0	0	37	7	13	57	1	0	4	62	67	12	36	0	5	53	177
05:45 PM	0	0	0	0	0	0	34	3	8	45	0	0	14	56	70	8	33	0	6	47	162
Total	0	0	0	0	0	0	158	25	61	244	10	0	39	202	251	44	144	0	29	217	712
Grand Total	0	0	0	0	0	0	315	50	122	487	46	0	73	314	433	69	282	0	53	404	1324
Apprch %	0	0	0	0		0	64.7	10.3	25.1		10.6	0	16.9	72.5		17.1	69.8	0	13.1		
Total %	0	0	0	0	0	0	23.8	3.8	9.2	36.8	3.5	0	5.5	23.7	32.7	5.2	21.3	0	4	30.5	

	Southbound				CALIFORNIA AVE Westbound				ASH ST Northbound				CALIFORNIA AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	0	0	0	0	**46**	8	**54**	**8**	0	10	**18**	6	35	0	41	113
04:30 PM	0	0	0	0	0	36	6	42	8	0	8	16	6	34	0	40	98
04:45 PM	0	0	0	0	0	42	4	46	6	0	9	15	8	38	0	46	107
05:00 PM	0	0	0	0	0	42	**10**	52	5	0	**11**	16	**10**	**40**	0	**50**	**118**
Total Volume	0	0	0	0	0	166	28	194	27	0	38	65	30	147	0	177	436
% App. Total	0	0	0		0	85.6	14.4		41.5	0	58.5		16.9	83.1	0		
PHF	.000	.000	.000	.000	.000	.902	.700	.898	.844	.000	.864	.903	.750	.919	.000	.885	.924


Out
0
In
0
Total
0
0
0
0
Right
Thru
Left
Peak Hour Data
North
Peak Hour Begins at 04:15 PM
Vehicles
CALIFORNIA AVE
Total
381
In
177
Out
204
0
Left
147
Thru
30
Right
Right
0
Thru
166
Left
28
Out
174
In
194
Total
368
CALIFORNIA AVE
Left
Thru
Right
38
0
27
58
Out
65
In
123
Total
ASH ST

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Groups Printed- Bikes

	Southbound					CALIFORNIA AVE Westbound					ASH ST Northbound					CALIFORNIA AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	4
04:15 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	4	0	0	4	6
04:30 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	1	3	0	0	4	6
04:45 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	12	0	0	12	15
Total	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	1	21	0	0	22	31
05:00 PM	0	0	0	0	0	0	3	0	0	3	1	0	0	0	1	0	7	0	0	7	11
05:15 PM	0	0	0	0	0	0	8	2	0	10	0	0	0	0	0	1	5	0	0	6	16
05:30 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	21	0	0	21	24
05:45 PM	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	2	13	0	0	15	25
Total	0	0	0	0	0	0	24	2	0	26	1	0	0	0	1	3	46	0	0	49	76
Grand Total	0	0	0	0	0	0	33	2	0	35	1	0	0	0	1	4	67	0	0	71	107
Apprch %	0	0	0	0		0	94.3	5.7	0		100	0	0	0		5.6	94.4	0	0		
Total %	0	0	0	0	0	0	30.8	1.9	0	32.7	0.9	0	0	0	0.9	3.7	62.6	0	0	66.4	

	Southbound				CALIFORNIA AVE Westbound				ASH ST Northbound				CALIFORNIA AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	3	0	3	**1**	0	0	**1**	0	7	0	7	11
05:15 PM	0	0	0	0	0	8	**2**	**10**	0	0	0	0	1	5	0	6	16
05:30 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	**21**	0	**21**	24
05:45 PM	0	0	0	0	0	**10**	0	10	0	0	0	0	**2**	13	0	15	**25**
Total Volume	0	0	0	0	0	24	2	26	1	0	0	1	3	46	0	49	76
% App. Total	0	0	0		0	92.3	7.7		100	0	0		6.1	93.9	0		
PHF	.000	.000	.000	.000	.000	.600	.250	.650	.250	.000	.000	.250	.375	.548	.000	.583	.760

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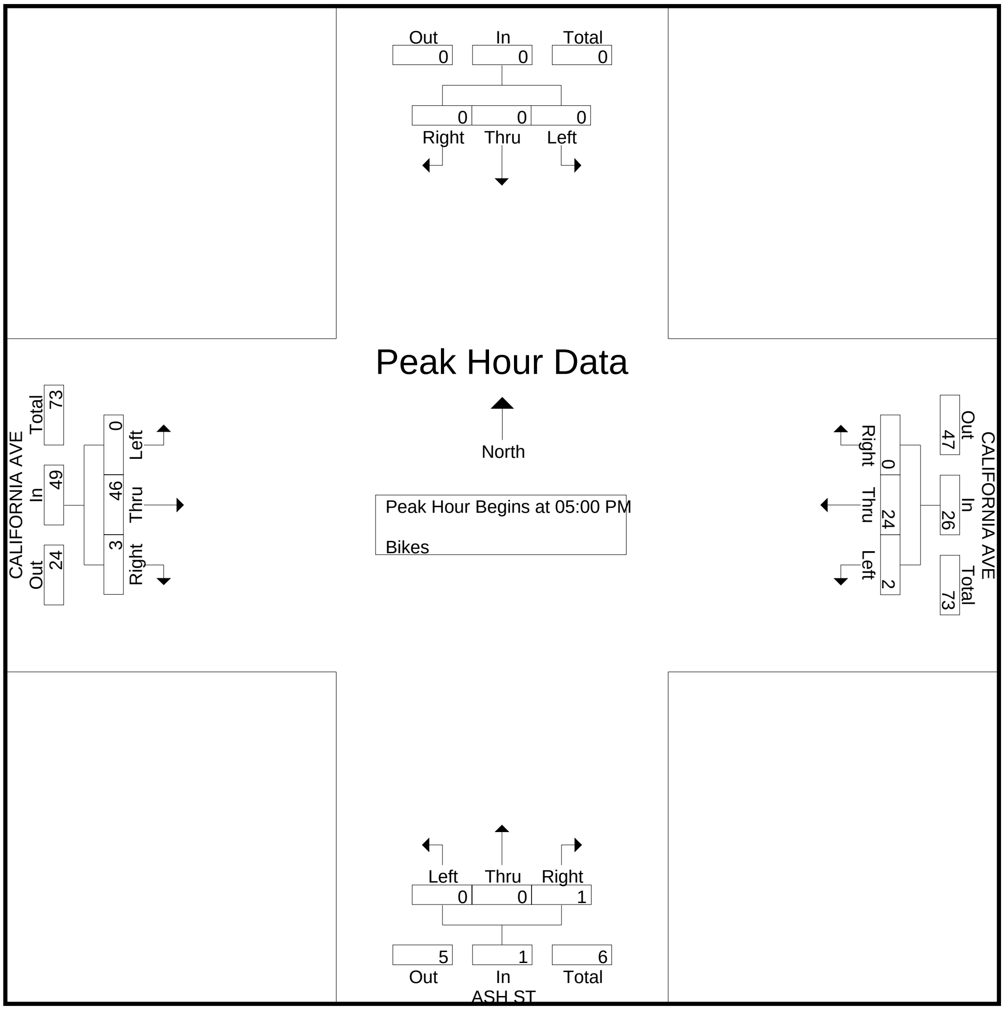

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Groups Printed- Vehicles

	ASH ST Southbound					SHERMAN AVE Westbound					ASH ST Northbound					SHERMAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	2	0	1	3	1	4	3	4	12	0	2	0	3	5	0	4	2	3	9	29
07:15 AM	3	2	5	1	11	3	3	2	1	9	1	0	1	0	2	2	2	7	5	16	38
07:30 AM	1	3	1	3	8	3	5	1	2	11	0	1	1	6	8	1	2	6	11	20	47
07:45 AM	2	4	0	2	8	0	1	0	0	1	0	4	0	2	6	4	1	5	4	14	29
Total	6	11	6	7	30	7	13	6	7	33	1	7	2	11	21	7	9	20	23	59	143
08:00 AM	8	3	0	2	13	0	0	0	8	8	0	1	0	0	1	0	1	8	12	21	43
08:15 AM	5	8	0	1	14	0	0	0	0	0	0	2	0	0	2	4	0	4	13	21	37
08:30 AM	10	4	1	5	20	0	0	0	1	1	0	1	0	0	1	1	1	8	11	21	43
08:45 AM	8	5	0	6	19	0	0	0	3	3	0	0	0	0	0	0	0	8	18	26	48
Total	31	20	1	14	66	0	0	0	12	12	0	4	0	0	4	5	2	28	54	89	171
Grand Total	37	31	7	21	96	7	13	6	19	45	1	11	2	11	25	12	11	48	77	148	314
Apprch %	38.5	32.3	7.3	21.9		15.6	28.9	13.3	42.2		4	44	8	44		8.1	7.4	32.4	52		
Total %	11.8	9.9	2.2	6.7	30.6	2.2	4.1	1.9	6.1	14.3	0.3	3.5	0.6	3.5	8	3.8	3.5	15.3	24.5	47.1	

	ASH ST Southbound				SHERMAN AVE Westbound				ASH ST Northbound				SHERMAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	3	2	**5**	10	**3**	3	**2**	8	**1**	0	**1**	2	2	**2**	7	**11**	**31**
07:30 AM	1	3	1	5	3	**5**	1	**9**	0	1	1	2	1	2	6	9	25
07:45 AM	2	**4**	0	6	0	1	0	1	0	**4**	0	**4**	**4**	1	5	10	21
08:00 AM	**8**	3	0	**11**	0	0	0	0	0	1	0	1	0	1	**8**	9	21
Total Volume	14	12	6	32	6	9	3	18	1	6	2	9	7	6	26	39	98
% App. Total	43.8	37.5	18.8		33.3	50	16.7		11.1	66.7	22.2		17.9	15.4	66.7		
PHF	.438	.750	.300	.727	.500	.450	.375	.500	.250	.375	.500	.563	.438	.750	.813	.886	.790

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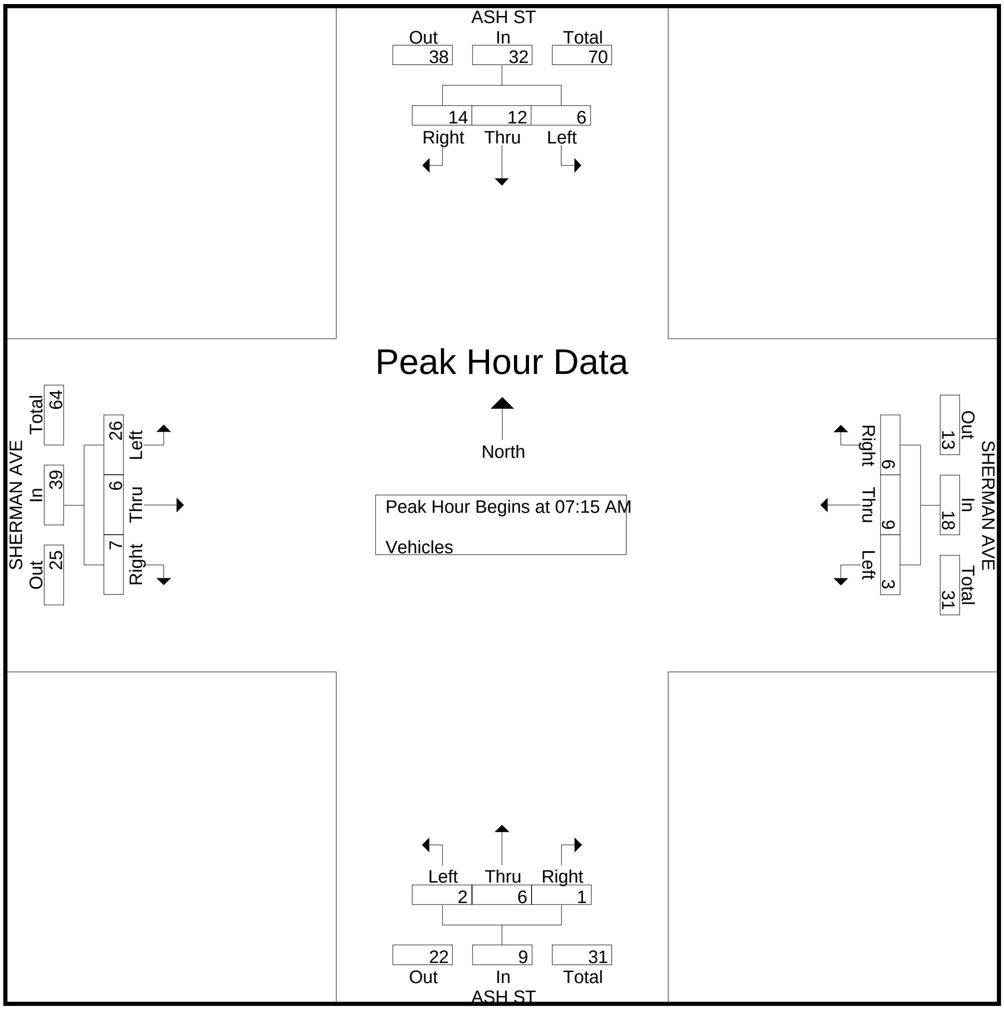

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Groups Printed- Bikes

	ASH ST Southbound					SHERMAN AVE Westbound					ASH ST Northbound					SHERMAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	1	0	0	1	0	4	0	0	4	0	0	1	0	1	6
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	4
Total	0	0	0	0	0	0	1	0	0	1	0	8	0	0	8	0	0	1	0	1	10
08:00 AM	1	0	0	0	1	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	6
08:15 AM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
08:30 AM	1	0	0	0	1	0	0	0	0	0	0	2	1	0	3	0	0	0	0	0	4
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	1	0	0	3	0	0	0	0	0	0	9	1	0	10	0	0	0	0	0	13
Grand Total	2	1	0	0	3	0	1	0	0	1	0	17	1	0	18	0	0	1	0	1	23
Apprch %	66.7	33.3	0	0		0	100	0	0		0	94.4	5.6	0		0	0	100	0		
Total %	8.7	4.3	0	0	13	0	4.3	0	0	4.3	0	73.9	4.3	0	78.3	0	0	4.3	0	4.3	

	ASH ST Southbound				SHERMAN AVE Westbound				ASH ST Northbound				SHERMAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	**1**	0	**1**	0	4	0	4	0	0	**1**	**1**	**6**
07:45 AM	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	4
08:00 AM	**1**	0	0	**1**	0	0	0	0	0	**5**	0	**5**	0	0	0	0	6
08:15 AM	0	**1**	0	1	0	0	0	0	0	2	0	2	0	0	0	0	3
Total Volume	1	1	0	2	0	1	0	1	0	15	0	15	0	0	1	1	19
% App. Total	50	50	0		0	100	0		0	100	0		0	0	100		
PHF	.250	.250	.000	.500	.000	.250	.000	.250	.000	.750	.000	.750	.000	.000	.250	.250	.792

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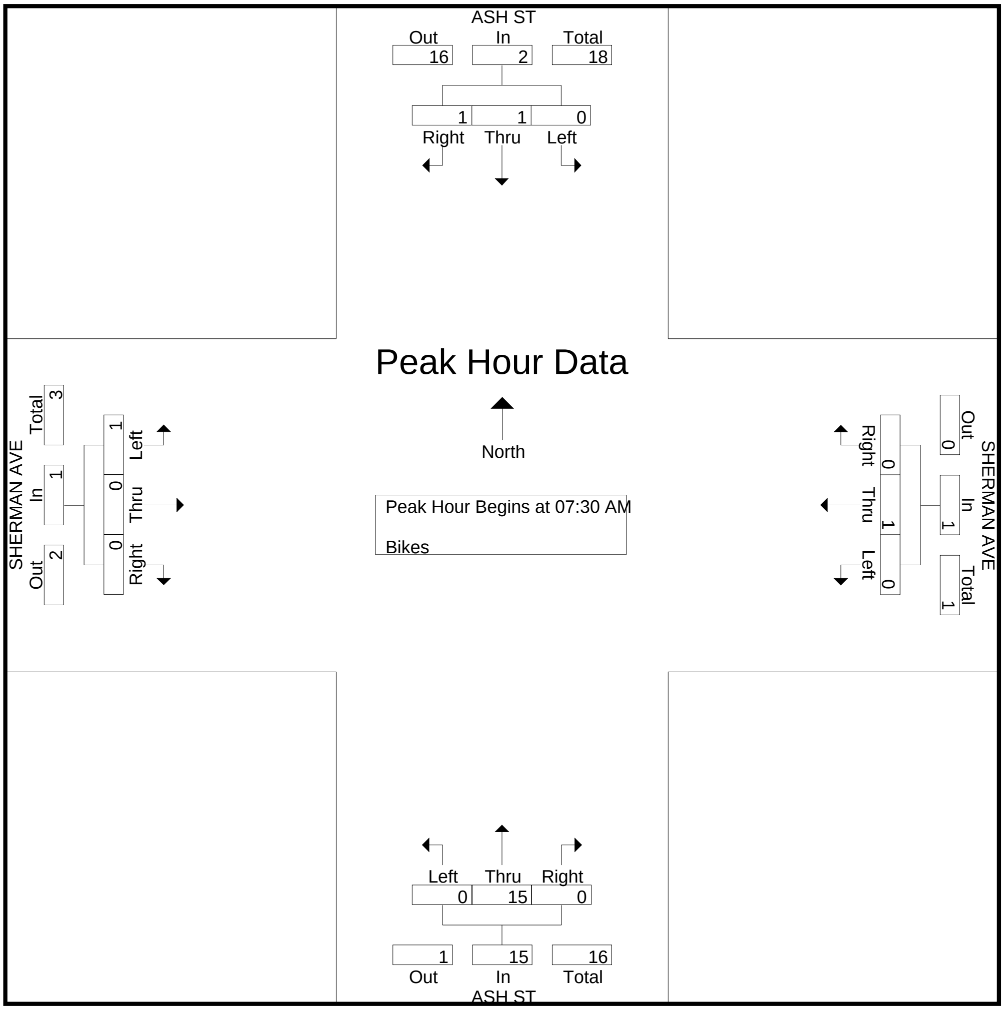

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Groups Printed- Vehicles

	ASH ST Southbound					SHERMAN AVE Westbound					ASH ST Northbound					SHERMAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	8	2	1	7	18	0	1	0	4	5	0	0	0	9	9	0	0	12	16	28	60
04:15 PM	10	4	1	6	21	0	0	0	3	3	0	0	0	3	3	6	0	5	21	32	59
04:30 PM	3	10	1	2	16	0	0	0	12	12	0	1	0	13	14	4	1	8	7	20	62
04:45 PM	8	8	1	6	23	0	0	1	6	7	1	0	0	4	5	6	0	6	10	22	57
Total	29	24	4	21	78	0	1	1	25	27	1	1	0	29	31	16	1	31	54	102	238
05:00 PM	3	6	9	10	28	4	6	2	1	13	0	4	1	4	9	12	5	5	11	33	83
05:15 PM	2	5	9	3	19	1	3	4	3	11	1	3	2	3	9	4	13	2	11	30	69
05:30 PM	4	9	6	5	24	1	10	1	3	15	2	0	4	4	10	5	11	0	12	28	77
05:45 PM	2	2	5	8	17	3	7	4	1	15	0	3	1	4	8	5	11	3	10	29	69
Total	11	22	29	26	88	9	26	11	8	54	3	10	8	15	36	26	40	10	44	120	298
Grand Total	40	46	33	47	166	9	27	12	33	81	4	11	8	44	67	42	41	41	98	222	536
Apprch %	24.1	27.7	19.9	28.3		11.1	33.3	14.8	40.7		6	16.4	11.9	65.7		18.9	18.5	18.5	44.1		
Total %	7.5	8.6	6.2	8.8	31	1.7	5	2.2	6.2	15.1	0.7	2.1	1.5	8.2	12.5	7.8	7.6	7.6	18.3	41.4	

	ASH ST Southbound				SHERMAN AVE Westbound				ASH ST Northbound				SHERMAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	3	6	**9**	18	**4**	6	2	12	0	**4**	1	5	**12**	5	**5**	**22**	**57**
05:15 PM	2	5	9	16	1	3	**4**	8	1	3	2	**6**	4	**13**	2	19	49
05:30 PM	**4**	**9**	6	**19**	1	**10**	1	12	**2**	0	**4**	6	5	11	0	16	53
05:45 PM	2	2	5	9	3	7	4	**14**	0	3	1	4	5	11	3	19	46
Total Volume	11	22	29	62	9	26	11	46	3	10	8	21	26	40	10	76	205
% App. Total	17.7	35.5	46.8		19.6	56.5	23.9		14.3	47.6	38.1		34.2	52.6	13.2		
PHF	.688	.611	.806	.816	.563	.650	.688	.821	.375	.625	.500	.875	.542	.769	.500	.864	.899

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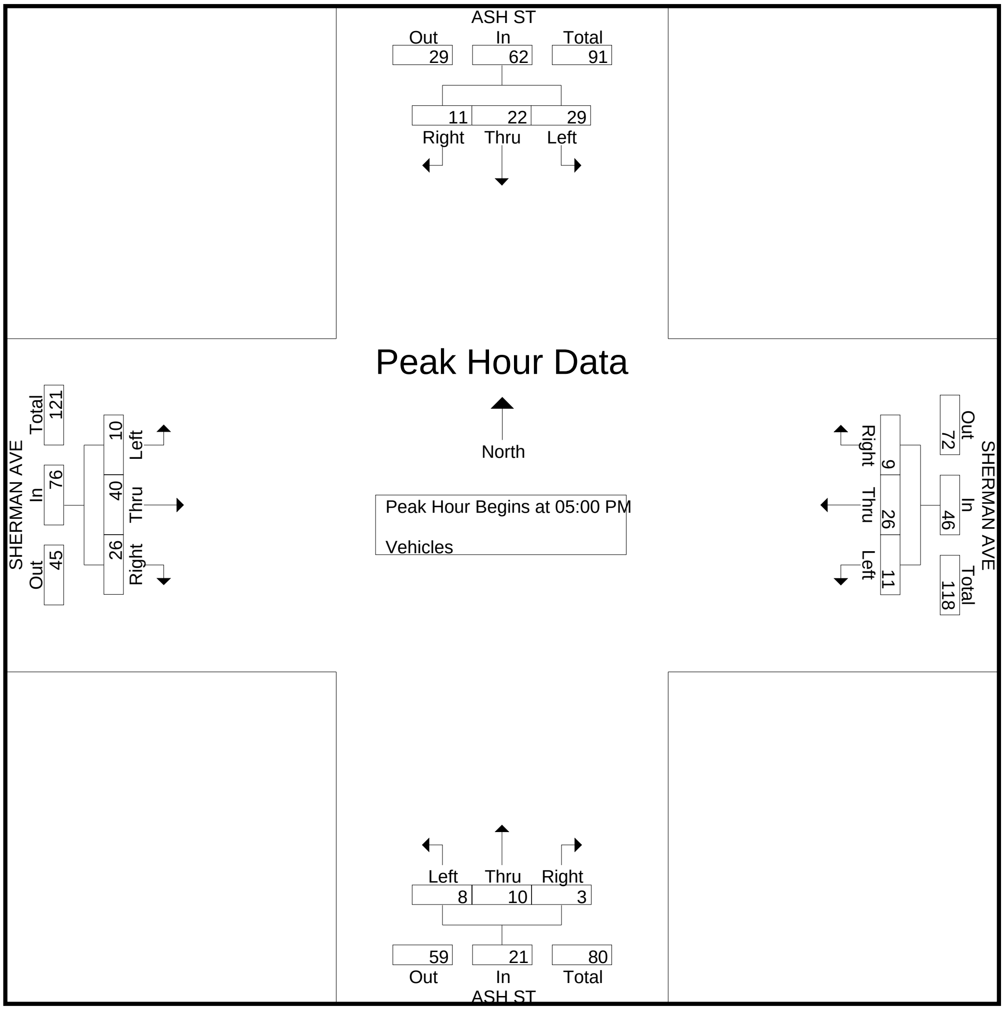

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Groups Printed- Bikes

	ASH ST Southbound					SHERMAN AVE Westbound					ASH ST Northbound					SHERMAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
05:15 PM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
Total	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	4
Grand Total	0	3	0	0	3	0	0	0	0	0	0	1	0	0	1	1	0	1	0	2	6
Apprch %	0	100	0	0		0	0	0	0		0	100	0	0		50	0	50	0		
Total %	0	50	0	0	50	0	0	0	0	0	0	16.7	0	0	16.7	16.7	0	16.7	0	33.3	

	ASH ST Southbound				SHERMAN AVE Westbound				ASH ST Northbound				SHERMAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**	1
05:15 PM	0	**2**	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	**2**
Total Volume	0	3	0	3	0	0	0	0	0	0	0	0	0	0	1	1	4
% App. Total	0	100	0		0	0	0		0	0	0		0	0	100		
PHF	.000	.375	.000	.375	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.500

File Name : 9PM FINAL
Site Code : 00000009
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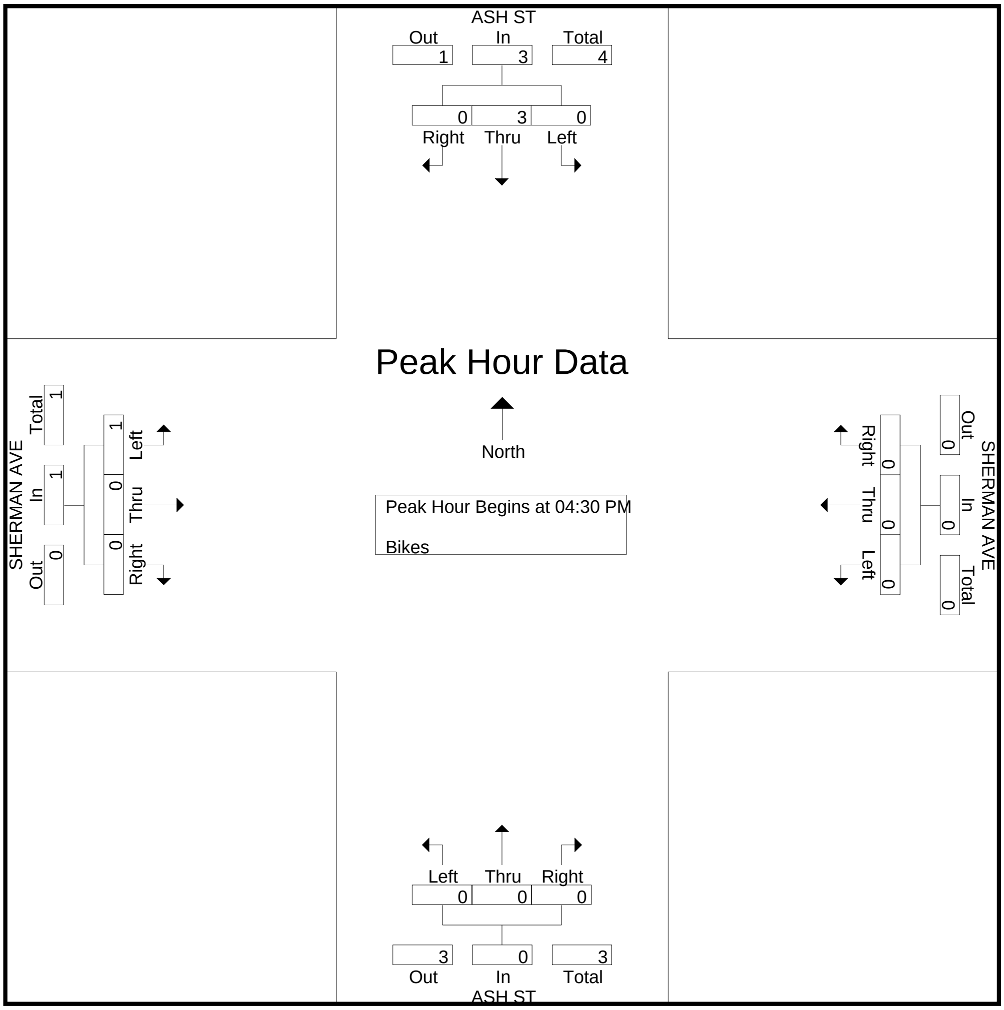

Traffic Data Service

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File Name : 10AM FINAL
Site Code : 00000010
Start Date : 9/29/2016
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Groups Printed- Vehicles

	ASH ST Southbound					GRANT AVE Westbound					ASH ST Northbound					GRANT AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	1	3	1	3	8	0	3	1	1	5	0	0	1	1	2	1	2	2	2	7	22
07:15 AM	0	3	1	2	6	0	2	0	2	4	0	0	4	0	4	0	2	3	5	10	24
07:30 AM	0	2	1	10	13	1	6	1	2	10	5	4	2	2	13	1	7	3	5	16	52
07:45 AM	1	1	1	7	10	0	11	0	2	13	3	5	6	0	14	6	8	3	7	24	61
Total	2	9	4	22	37	1	22	2	7	32	8	9	13	3	33	8	19	11	19	57	159
08:00 AM	0	3	5	4	12	0	16	3	2	21	3	0	5	1	9	3	15	0	7	25	67
08:15 AM	0	5	4	1	10	0	6	2	0	8	2	1	1	0	4	4	6	0	6	16	38
08:30 AM	0	1	0	2	3	0	13	2	1	16	3	0	1	4	8	4	23	0	3	30	57
08:45 AM	0	2	0	1	3	0	4	1	2	7	3	0	1	2	6	3	21	0	8	32	48
Total	0	11	9	8	28	0	39	8	5	52	11	1	8	7	27	14	65	0	24	103	210
Grand Total	2	20	13	30	65	1	61	10	12	84	19	10	21	10	60	22	84	11	43	160	369
Apprch %	3.1	30.8	20	46.2		1.2	72.6	11.9	14.3		31.7	16.7	35	16.7		13.8	52.5	6.9	26.9		
Total %	0.5	5.4	3.5	8.1	17.6	0.3	16.5	2.7	3.3	22.8	5.1	2.7	5.7	2.7	16.3	6	22.8	3	11.7	43.4	

	ASH ST Southbound				GRANT AVE Westbound				ASH ST Northbound				GRANT AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	**1**	1	1	3	0	11	0	11	**3**	**5**	**6**	**14**	**6**	8	**3**	17	45
08:00 AM	0	3	**5**	8	0	**16**	**3**	**19**	3	0	5	8	3	15	0	18	**53**
08:15 AM	0	**5**	4	**9**	0	6	2	8	2	1	1	4	4	6	0	10	31
08:30 AM	0	1	0	1	0	13	2	15	3	0	1	4	4	**23**	0	**27**	47
Total Volume	1	10	10	21	0	46	7	53	11	6	13	30	17	52	3	72	176
% App. Total	4.8	47.6	47.6		0	86.8	13.2		36.7	20	43.3		23.6	72.2	4.2		
PHF	.250	.500	.500	.583	.000	.719	.583	.697	.917	.300	.542	.536	.708	.565	.250	.667	.830

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File Name : 10AM FINAL
Site Code : 00000010
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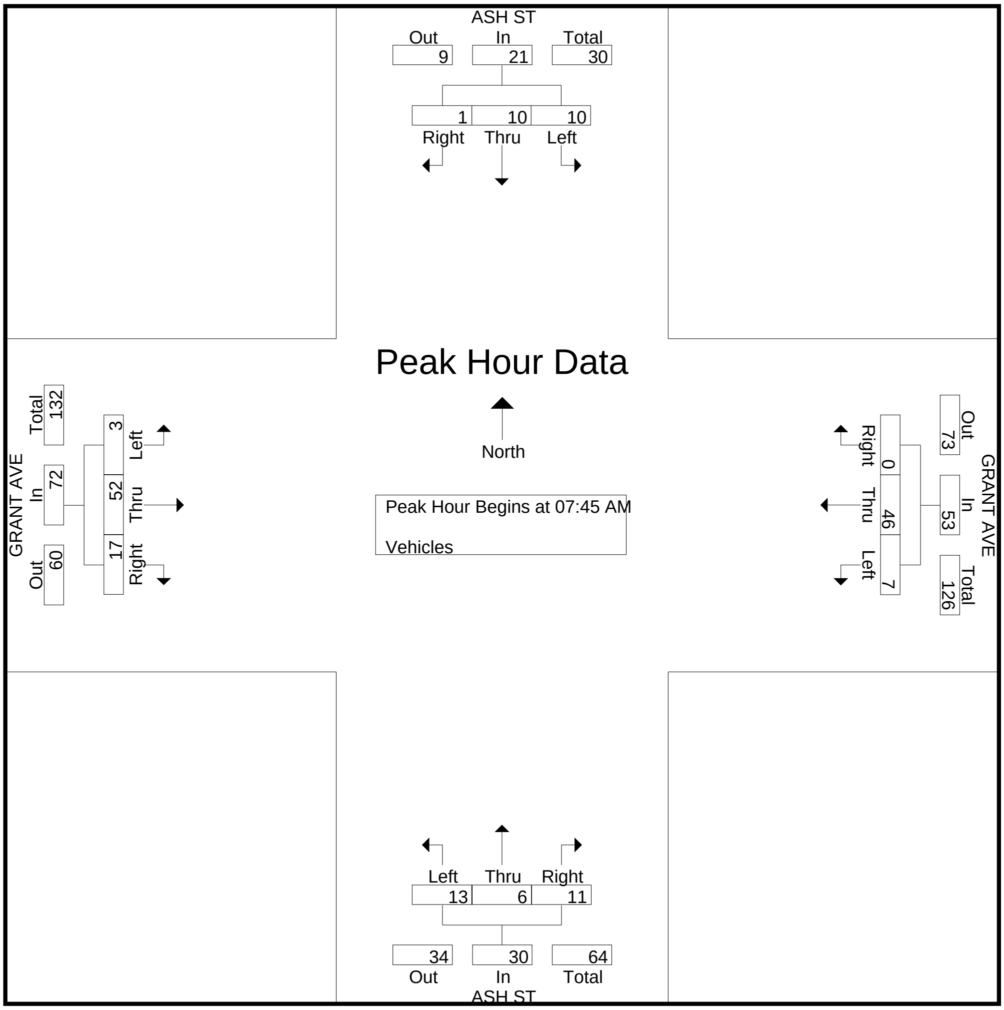

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File Name : 10AM FINAL
Site Code : 00000010
Start Date : 9/29/2016
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Groups Printed- Bikes

	ASH ST Southbound					GRANT AVE Westbound					ASH ST Northbound					GRANT AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	1	4	0	0	5	0	0	0	0	0	5
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	1	2	0	3	9
Total	0	1	0	0	1	0	0	0	0	0	1	10	0	0	11	0	1	2	0	3	15
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
08:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	3
Grand Total	0	2	0	0	2	0	0	0	0	0	1	10	0	0	11	0	3	2	0	5	18
Apprch %	0	100	0	0		0	0	0	0		9.1	90.9	0	0		0	60	40	0		
Total %	0	11.1	0	0	11.1	0	0	0	0	0	5.6	55.6	0	0	61.1	0	16.7	11.1	0	27.8	

	ASH ST Southbound				GRANT AVE Westbound				ASH ST Northbound				GRANT AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	0	0	0	**1**	4	0	5	0	0	0	0	5
07:45 AM	0	0	0	0	0	0	0	0	0	**6**	0	**6**	0	**1**	**2**	**3**	**9**
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:15 AM	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	1	0	1	0	0	0	0	1	10	0	11	0	2	2	4	16
% App. Total	0	100	0		0	0	0		9.1	90.9	0		0	50	50		
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.250	.417	.000	.458	.000	.500	.250	.333	.444

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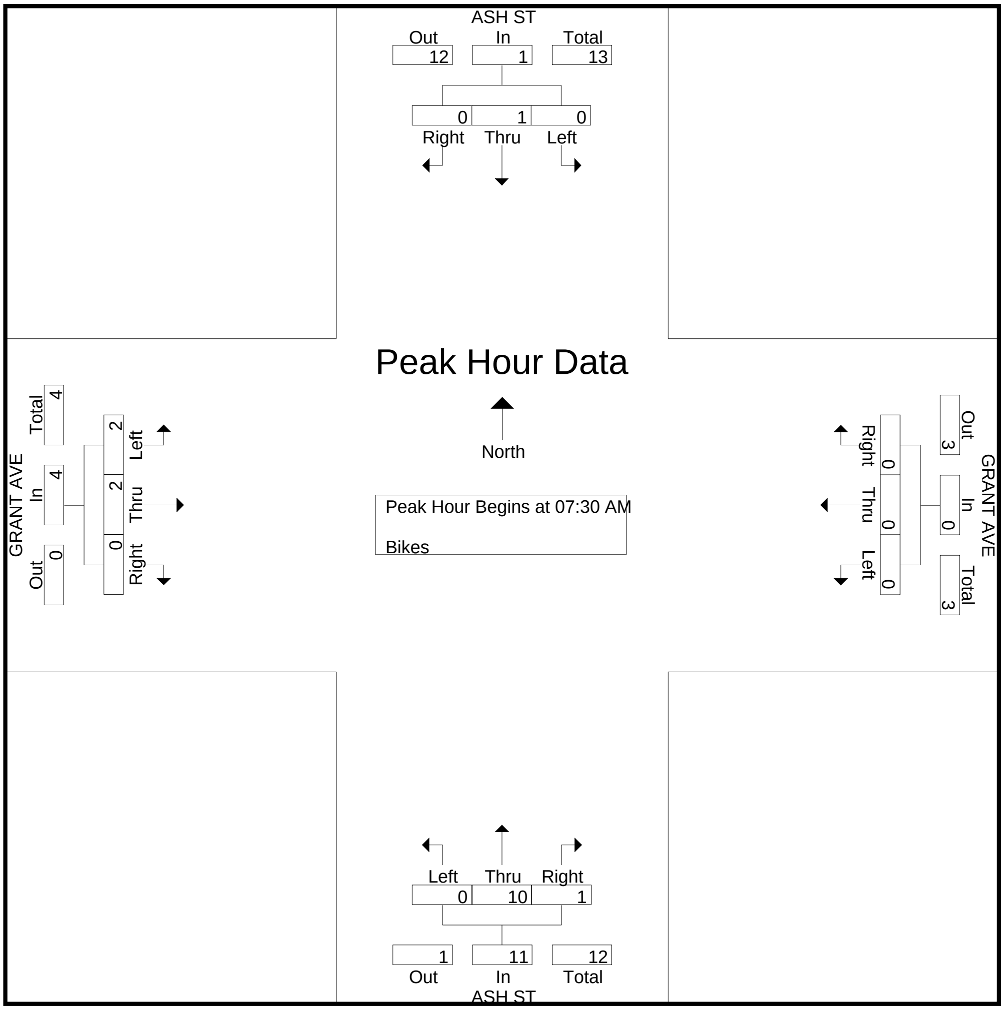

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File Name : 10PM FINAL
Site Code : 00000010
Start Date : 9/29/2016
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Groups Printed- Vehicles

	ASH ST Southbound					GRANT AVE Westbound					ASH ST Northbound					GRANT AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	6	12	0	18	1	3	1	0	5	2	5	0	1	8	0	5	1	6	12	43
04:15 PM	0	9	2	3	14	1	3	0	1	5	0	2	0	1	3	2	8	2	7	19	41
04:30 PM	0	7	4	3	14	1	1	3	3	8	3	4	1	0	8	5	5	1	3	14	44
04:45 PM	1	5	0	2	8	0	3	4	2	9	2	2	0	0	4	3	7	3	5	18	39
Total	1	27	18	8	54	3	10	8	6	27	7	13	1	2	23	10	25	7	21	63	167
05:00 PM	0	8	3	5	16	1	3	0	2	6	1	2	2	3	8	3	5	0	10	18	48
05:15 PM	1	8	3	1	13	1	4	0	1	6	0	3	0	0	3	4	15	0	8	27	49
05:30 PM	3	14	1	3	21	2	10	2	0	14	2	4	0	1	7	4	10	3	8	25	67
05:45 PM	0	11	0	0	11	1	10	1	0	12	2	2	5	0	9	4	13	4	8	29	61
Total	4	41	7	9	61	5	27	3	3	38	5	11	7	4	27	15	43	7	34	99	225
Grand Total	5	68	25	17	115	8	37	11	9	65	12	24	8	6	50	25	68	14	55	162	392
Apprch %	4.3	59.1	21.7	14.8		12.3	56.9	16.9	13.8		24	48	16	12		15.4	42	8.6	34		
Total %	1.3	17.3	6.4	4.3	29.3	2	9.4	2.8	2.3	16.6	3.1	6.1	2	1.5	12.8	6.4	17.3	3.6	14	41.3	

	ASH ST Southbound				GRANT AVE Westbound				ASH ST Northbound				GRANT AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	8	**3**	11	1	3	0	4	1	2	2	5	3	5	0	8	28
05:15 PM	1	8	3	12	1	4	0	5	0	3	0	3	**4**	**15**	0	19	39
05:30 PM	**3**	**14**	1	**18**	**2**	**10**	**2**	**14**	**2**	**4**	0	6	4	10	3	17	**55**
05:45 PM	0	11	0	11	1	10	1	12	2	2	**5**	**9**	4	13	**4**	**21**	53
Total Volume	4	41	7	52	5	27	3	35	5	11	7	23	15	43	7	65	175
% App. Total	7.7	78.8	13.5		14.3	77.1	8.6		21.7	47.8	30.4		23.1	66.2	10.8		
PHF	.333	.732	.583	.722	.625	.675	.375	.625	.625	.688	.350	.639	.938	.717	.438	.774	.795

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File Name : 10PM FINAL
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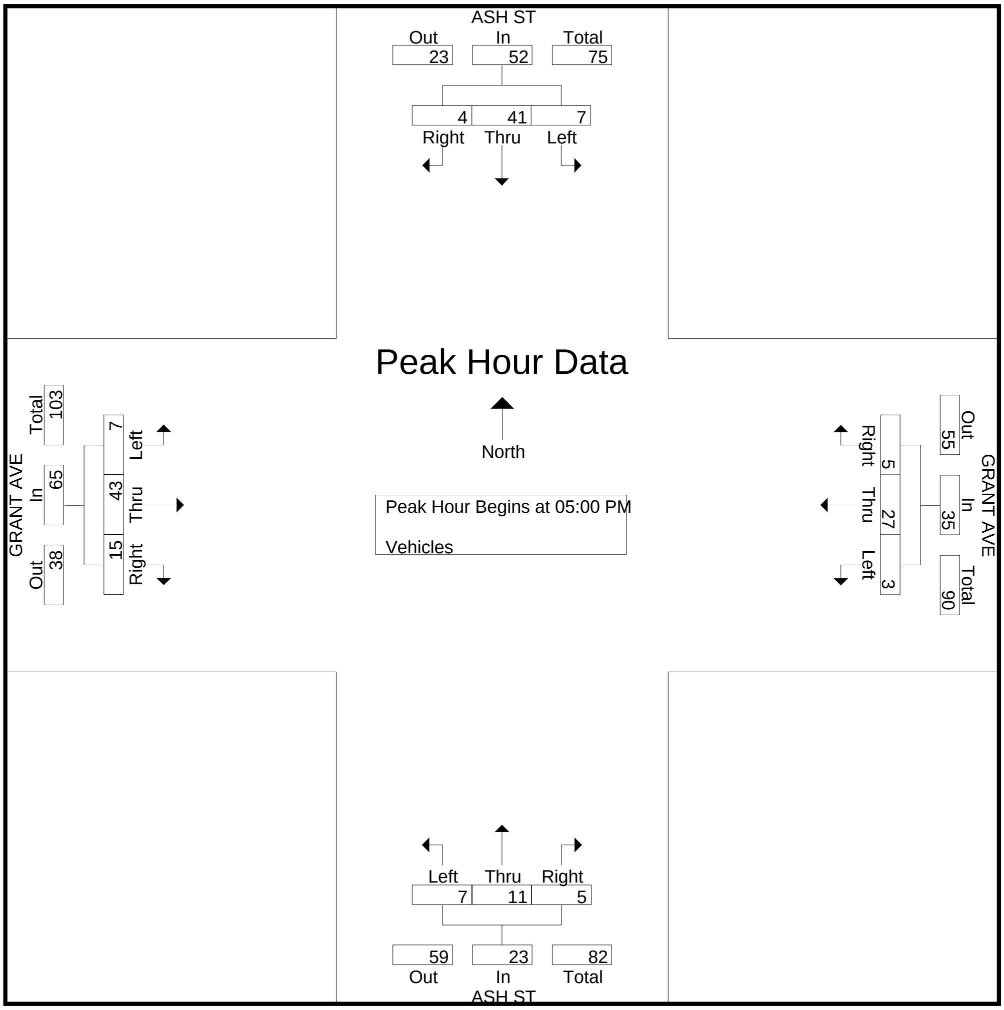

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File Name : 10PM FINAL
Site Code : 00000010
Start Date : 9/29/2016
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Groups Printed- Bikes

	ASH ST Southbound					GRANT AVE Westbound					ASH ST Northbound					GRANT AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
04:30 PM	0	1	0	0	1	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	3
04:45 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	3	0	0	3	0	1	0	0	1	1	1	0	0	2	0	1	0	0	1	7
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	1	5	0	0	6	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	7
05:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
Total	1	7	0	0	8	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	10
Grand Total	1	10	0	0	11	0	1	0	0	1	1	3	0	0	4	0	1	0	0	1	17
Apprch %	9.1	90.9	0	0		0	100	0	0		25	75	0	0		0	100	0	0		
Total %	5.9	58.8	0	0	64.7	0	5.9	0	0	5.9	5.9	17.6	0	0	23.5	0	5.9	0	0	5.9	

	ASH ST Southbound				GRANT AVE Westbound				ASH ST Northbound				GRANT AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	1	0	1	0	0	0	0	**1**	**1**	0	**2**	0	0	0	0	3
04:45 PM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	**1**	**5**	0	**6**	0	0	0	0	0	1	0	1	0	0	0	0	**7**
Total Volume	1	6	0	7	0	1	0	1	1	2	0	3	0	0	0	0	11
% App. Total	14.3	85.7	0		0	100	0		33.3	66.7	0		0	0	0		
PHF	.250	.300	.000	.292	.000	.250	.000	.250	.250	.500	.000	.375	.000	.000	.000	.000	.393

Traffic Data Service

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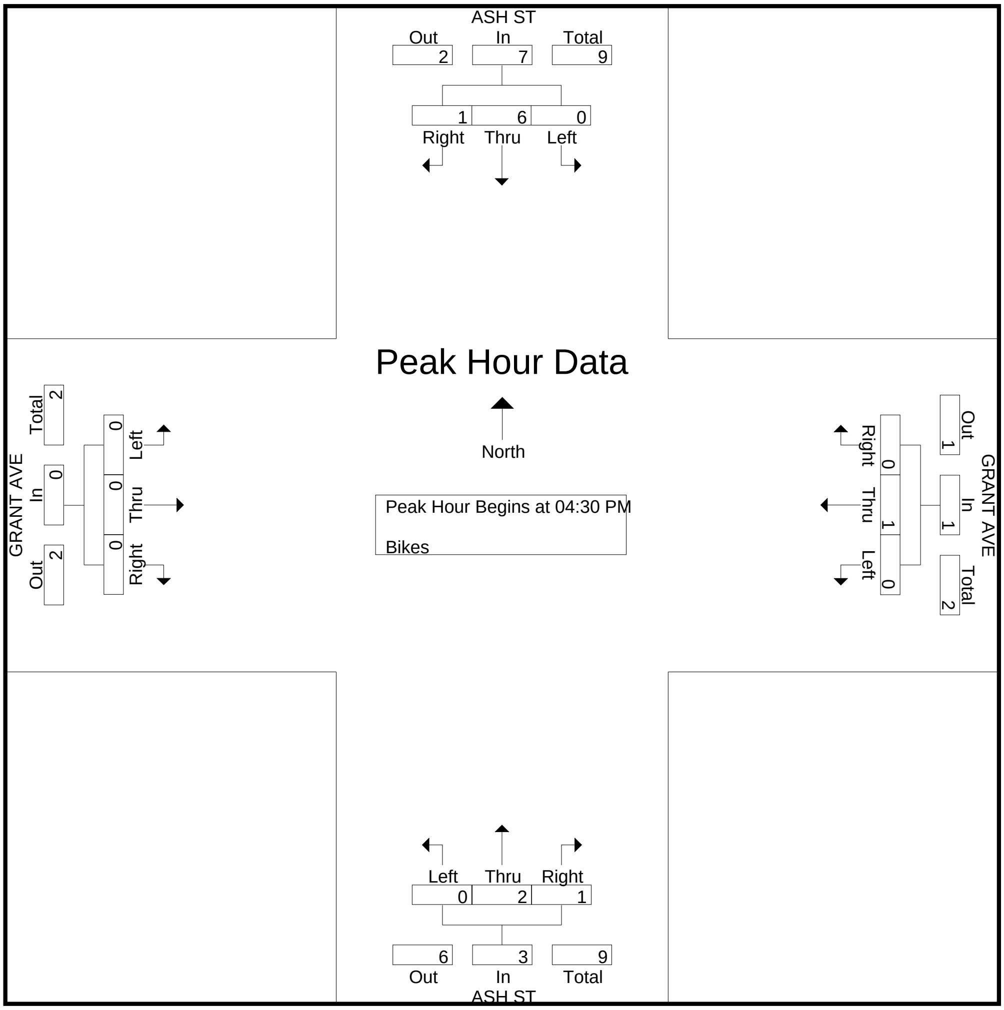

Traffic Data Service

San Jose, CA
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File Name : 11AM FINAL
Site Code : 00000011
Start Date : 9/27/2016
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Groups Printed- Vehicles

	ASH ST Southbound					SHERIDAN AVE Westbound					ASH ST Northbound					SHERIDAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	1	5	1	7	1	11	0	1	13	0	2	2	1	5	1	2	0	0	3	28
07:15 AM	2	2	2	2	8	0	12	1	1	14	2	1	2	0	5	2	5	1	0	8	35
07:30 AM	2	2	0	1	5	0	21	0	0	21	1	2	1	0	4	0	6	1	0	7	37
07:45 AM	4	3	5	0	12	5	47	2	0	54	0	4	6	0	10	2	7	0	1	10	86
Total	8	8	12	4	32	6	91	3	2	102	3	9	11	1	24	5	20	2	1	28	186
08:00 AM	0	7	3	1	11	6	49	2	0	57	1	3	6	2	12	0	4	2	3	9	89
08:15 AM	3	5	5	5	18	1	30	1	0	32	2	3	6	0	11	3	7	1	3	14	75
08:30 AM	1	1	1	1	4	2	35	0	0	37	1	1	3	0	5	2	8	3	2	15	61
08:45 AM	4	4	1	2	11	6	31	2	0	39	1	1	3	1	6	0	10	2	3	15	71
Total	8	17	10	9	44	15	145	5	0	165	5	8	18	3	34	5	29	8	11	53	296
Grand Total	16	25	22	13	76	21	236	8	2	267	8	17	29	4	58	10	49	10	12	81	482
Apprch %	21.1	32.9	28.9	17.1		7.9	88.4	3	0.7		13.8	29.3	50	6.9		12.3	60.5	12.3	14.8		
Total %	3.3	5.2	4.6	2.7	15.8	4.4	49	1.7	0.4	55.4	1.7	3.5	6	0.8	12	2.1	10.2	2.1	2.5	16.8	

	ASH ST Southbound				SHERIDAN AVE Westbound				ASH ST Northbound				SHERIDAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	**4**	3	**5**	12	5	47	**2**	54	0	**4**	**6**	10	2	7	0	9	**85**
08:00 AM	0	**7**	3	10	**6**	**49**	2	**57**	1	3	6	10	0	4	2	6	83
08:15 AM	3	5	5	**13**	1	30	1	32	**2**	3	6	**11**	**3**	7	1	11	67
08:30 AM	1	1	1	3	2	35	0	37	1	1	3	5	2	**8**	**3**	**13**	58
Total Volume	8	16	14	38	14	161	5	180	4	11	21	36	7	26	6	39	293
% App. Total	21.1	42.1	36.8		7.8	89.4	2.8		11.1	30.6	58.3		17.9	66.7	15.4		
PHF	.500	.571	.700	.731	.583	.821	.625	.789	.500	.688	.875	.818	.583	.813	.500	.750	.862

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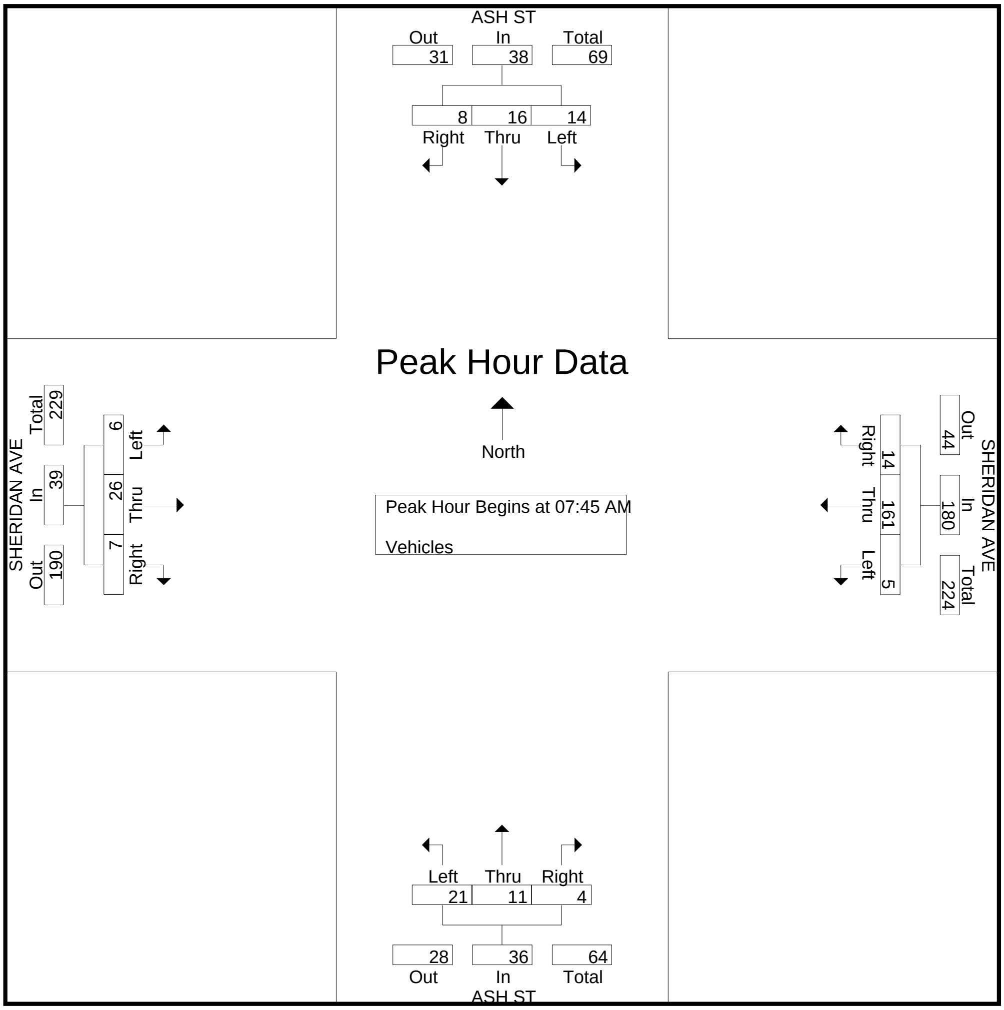

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File Name : 11AM FINAL
Site Code : 00000011
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Groups Printed- Bikes

	ASH ST Southbound					SHERIDAN AVE Westbound					ASH ST Northbound					SHERIDAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	2	0	1	0	3	0	0	0	0	0	0	1	3	0	4	7
07:45 AM	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Total	0	0	0	0	0	4	0	1	0	5	0	0	0	0	0	0	1	3	0	4	9
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
08:15 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:30 AM	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	2
08:45 AM	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	2
Total	0	0	0	0	0	2	1	2	0	5	0	0	0	0	0	0	1	0	0	1	6
Grand Total	0	0	0	0	0	6	1	3	0	10	0	0	0	0	0	0	2	3	0	5	15
Apprch %	0	0	0	0		60	10	30	0		0	0	0	0		0	40	60	0		
Total %	0	0	0	0	0	40	6.7	20	0	66.7	0	0	0	0	0	0	13.3	20	0	33.3	

	ASH ST Southbound				SHERIDAN AVE Westbound				ASH ST Northbound				SHERIDAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	**2**	0	**1**	**3**	0	0	0	0	0	**1**	**3**	**4**	**7**
07:45 AM	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	2
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:15 AM	0	0	0	0	0	**1**	0	1	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	4	1	1	6	0	0	0	0	0	2	3	5	11
% App. Total	0	0	0		66.7	16.7	16.7		0	0	0		0	40	60		
PHF	.000	.000	.000	.000	.500	.250	.250	.500	.000	.000	.000	.000	.000	.500	.250	.313	.393

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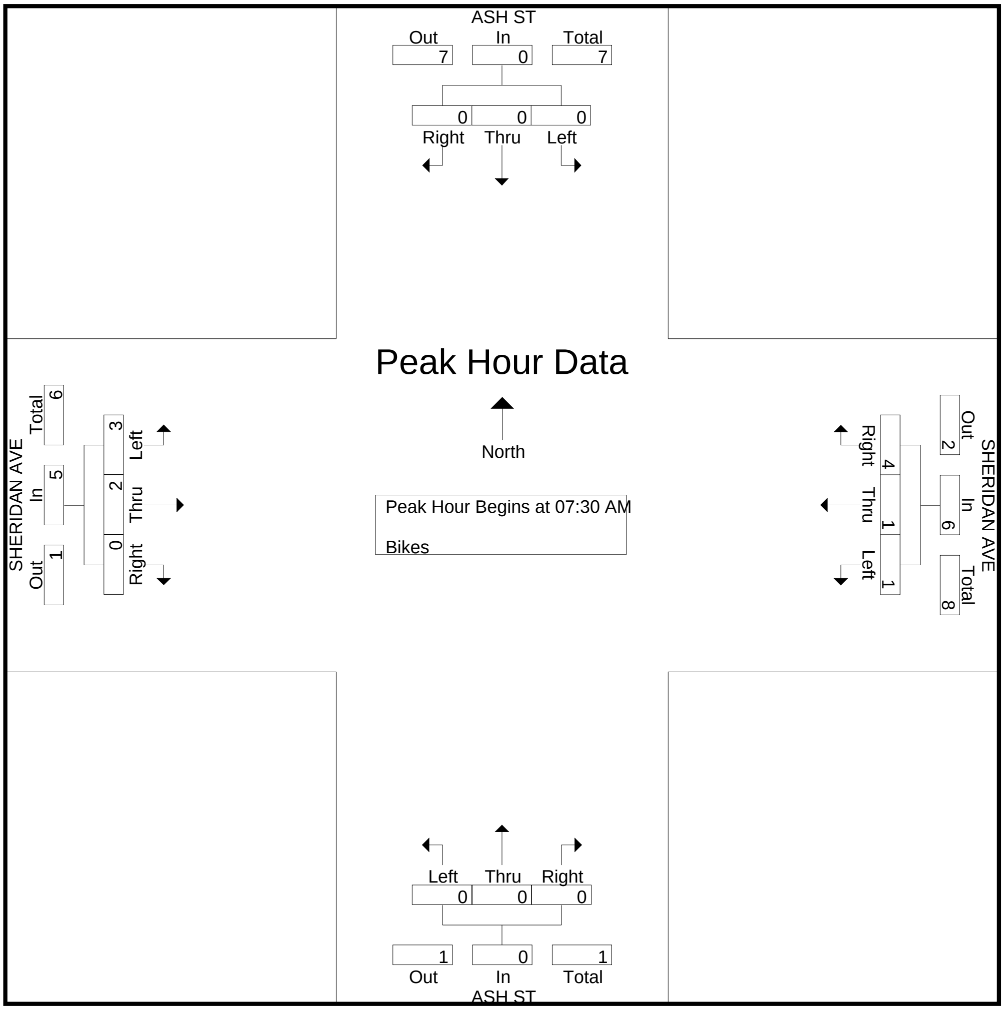

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File Name : 11PM FINAL
Site Code : 00000011
Start Date : 9/27/2016
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Groups Printed- Vehicles

	ASH ST Southbound					SHERIDAN AVE Westbound					ASH ST Northbound					SHERIDAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	1	1	2	1	5	2	17	3	0	22	2	3	2	2	9	0	5	1	2	8	44
04:15 PM	0	9	2	1	12	1	17	0	0	18	0	0	1	2	3	1	4	0	0	5	38
04:30 PM	3	7	3	2	15	2	19	0	0	21	0	1	1	0	2	2	5	0	3	10	48
04:45 PM	3	7	4	0	14	0	17	1	0	18	2	1	5	0	8	3	5	0	1	9	49
Total	7	24	11	4	46	5	70	4	0	79	4	5	9	4	22	6	19	1	6	32	179
05:00 PM	1	11	1	1	14	3	18	1	0	22	0	3	2	0	5	1	7	1	1	10	51
05:15 PM	0	4	3	1	8	2	26	2	0	30	0	6	2	0	8	3	3	0	0	6	52
05:30 PM	2	9	0	2	13	3	29	1	0	33	0	3	2	2	7	0	0	0	2	2	55
05:45 PM	0	8	3	3	14	0	14	1	0	15	2	2	6	2	12	1	5	0	1	7	48
Total	3	32	7	7	49	8	87	5	0	100	2	14	12	4	32	5	15	1	4	25	206
Grand Total	10	56	18	11	95	13	157	9	0	179	6	19	21	8	54	11	34	2	10	57	385
Apprch %	10.5	58.9	18.9	11.6		7.3	87.7	5	0		11.1	35.2	38.9	14.8		19.3	59.6	3.5	17.5		
Total %	2.6	14.5	4.7	2.9	24.7	3.4	40.8	2.3	0	46.5	1.6	4.9	5.5	2.1	14	2.9	8.8	0.5	2.6	14.8	

	ASH ST Southbound				SHERIDAN AVE Westbound				ASH ST Northbound				SHERIDAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**3**	7	**4**	**14**	0	17	1	18	**2**	1	**5**	**8**	**3**	5	0	8	48
05:00 PM	1	**11**	1	13	**3**	18	1	22	0	3	2	5	1	**7**	**1**	**9**	49
05:15 PM	0	4	3	7	2	26	**2**	30	0	**6**	2	8	3	3	0	6	**51**
05:30 PM	2	9	0	11	3	**29**	1	**33**	0	3	2	5	0	0	0	0	49
Total Volume	6	31	8	45	8	90	5	103	2	13	11	26	7	15	1	23	197
% App. Total	13.3	68.9	17.8		7.8	87.4	4.9		7.7	50	42.3		30.4	65.2	4.3		
PHF	.500	.705	.500	.804	.667	.776	.625	.780	.250	.542	.550	.813	.583	.536	.250	.639	.966

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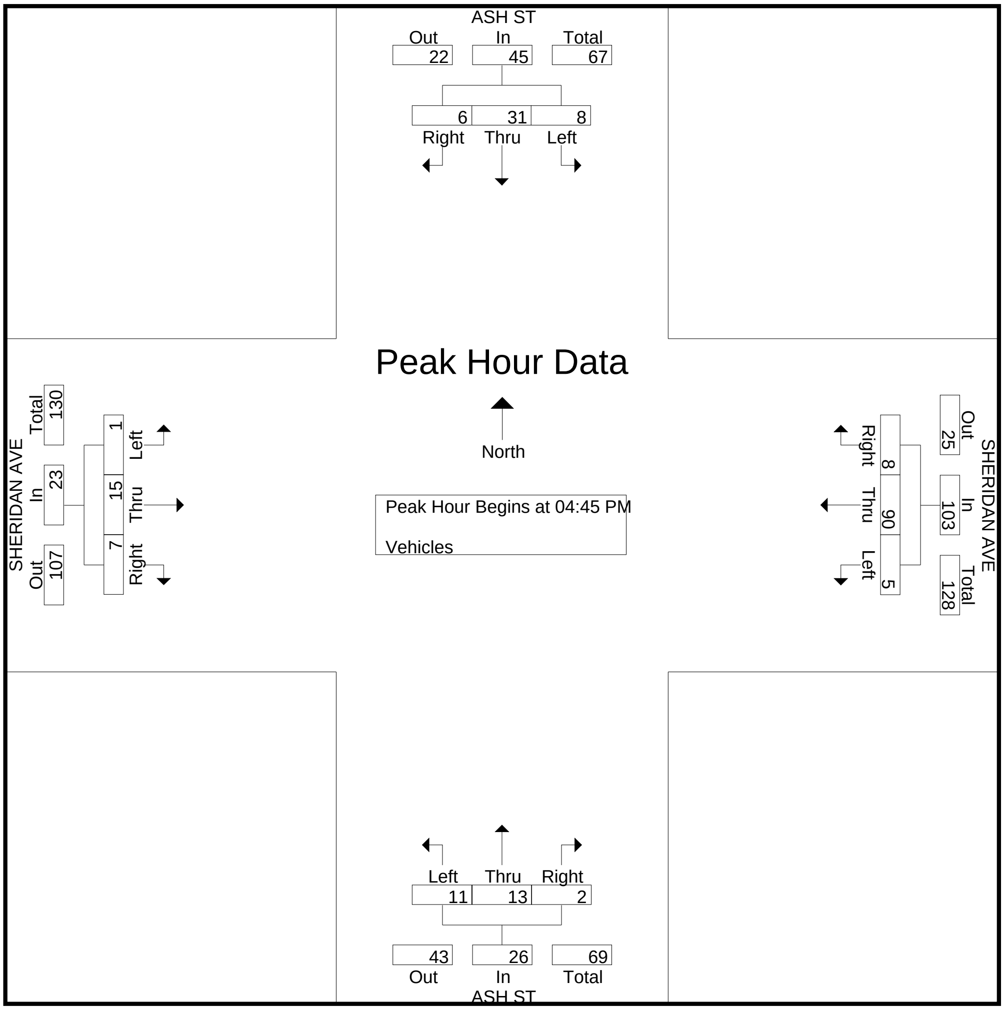

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Groups Printed- Bikes

	ASH ST Southbound					SHERIDAN AVE Westbound					ASH ST Northbound					SHERIDAN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	2
Grand Total	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	1	0	0	1	3
Apprch %	0	0	0	0		0	50	50	0		0	0	0	0		0	100	0	0		
Total %	0	0	0	0	0	0	33.3	33.3	0	66.7	0	0	0	0	0	0	33.3	0	0	33.3	

	ASH ST Southbound				SHERIDAN AVE Westbound				ASH ST Northbound				SHERIDAN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	**1**	**1**	0	0	0	0	0	0	0	0	**1**
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	**1**	0	1	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	2
% App. Total	0	0	0		0	50	50		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.250	.250	.500	.000	.000	.000	.000	.000	.000	.000	.000	.500

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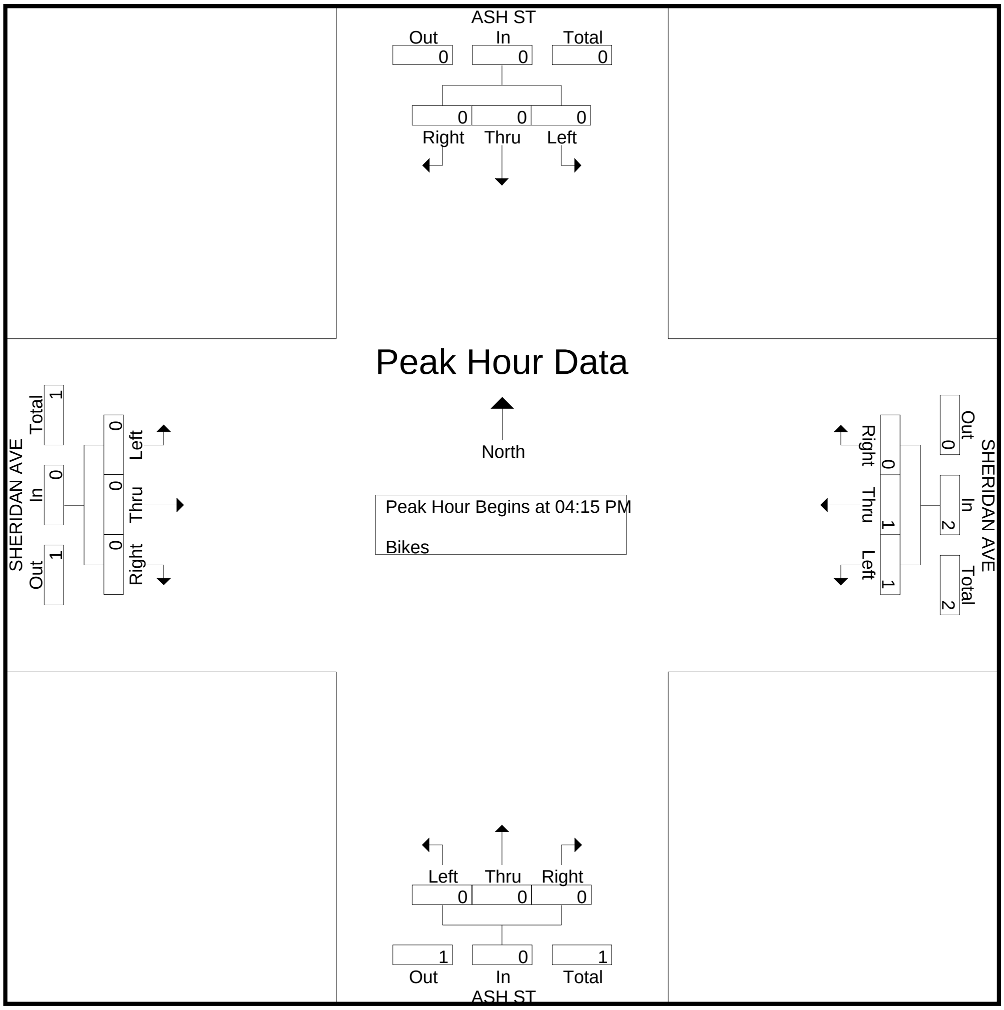

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File Name : 12AM FINAL
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Groups Printed- Vehicles

	EL CAMINO REAL Southbound					CAMBRIDGE AVE Westbound					EL CAMINO REAL Northbound					CAMBRIDGE AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	6	132	6	1	145	10	2	1	1	14	2	204	3	2	211	1	0	4	1	6	376
07:15 AM	3	165	4	0	172	16	1	3	2	22	9	261	2	2	274	1	0	2	1	4	472
07:30 AM	4	221	5	1	231	14	2	3	1	20	3	313	4	1	321	3	0	7	1	11	583
07:45 AM	6	271	8	0	285	33	7	4	2	46	1	370	1	2	374	2	0	5	1	8	713
Total	19	789	23	2	833	73	12	11	6	102	15	1148	10	7	1180	7	0	18	4	29	2144
08:00 AM	6	312	12	0	330	32	8	2	1	43	3	462	6	5	476	3	5	9	2	19	868
08:15 AM	11	311	7	0	329	21	3	5	0	29	7	372	6	5	390	5	1	12	1	19	767
08:30 AM	9	269	15	1	294	19	1	13	1	34	10	348	3	4	365	2	1	3	3	9	702
08:45 AM	16	332	15	0	363	22	4	8	2	36	6	347	2	0	355	4	2	9	2	17	771
Total	42	1224	49	1	1316	94	16	28	4	142	26	1529	17	14	1586	14	9	33	8	64	3108
Grand Total	61	2013	72	3	2149	167	28	39	10	244	41	2677	27	21	2766	21	9	51	12	93	5252
Apprch %	2.8	93.7	3.4	0.1		68.4	11.5	16	4.1		1.5	96.8	1	0.8		22.6	9.7	54.8	12.9		
Total %	1.2	38.3	1.4	0.1	40.9	3.2	0.5	0.7	0.2	4.6	0.8	51	0.5	0.4	52.7	0.4	0.2	1	0.2	1.8	

	EL CAMINO REAL Southbound				CAMBRIDGE AVE Westbound				EL CAMINO REAL Northbound				CAMBRIDGE AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	6	312	12	330	**32**	**8**	2	**42**	3	**462**	**6**	**471**	3	**5**	9	17	**860**
08:15 AM	11	311	7	329	21	3	5	29	7	372	6	385	**5**	1	**12**	**18**	761
08:30 AM	9	269	**15**	293	19	1	**13**	33	**10**	348	3	361	2	1	3	6	693
08:45 AM	**16**	**332**	15	**363**	22	4	8	34	6	347	2	355	4	2	9	15	767
Total Volume	42	1224	49	1315	94	16	28	138	26	1529	17	1572	14	9	33	56	3081
% App. Total	3.2	93.1	3.7		68.1	11.6	20.3		1.7	97.3	1.1		25	16.1	58.9		
PHF	.656	.922	.817	.906	.734	.500	.538	.821	.650	.827	.708	.834	.700	.450	.688	.778	.896

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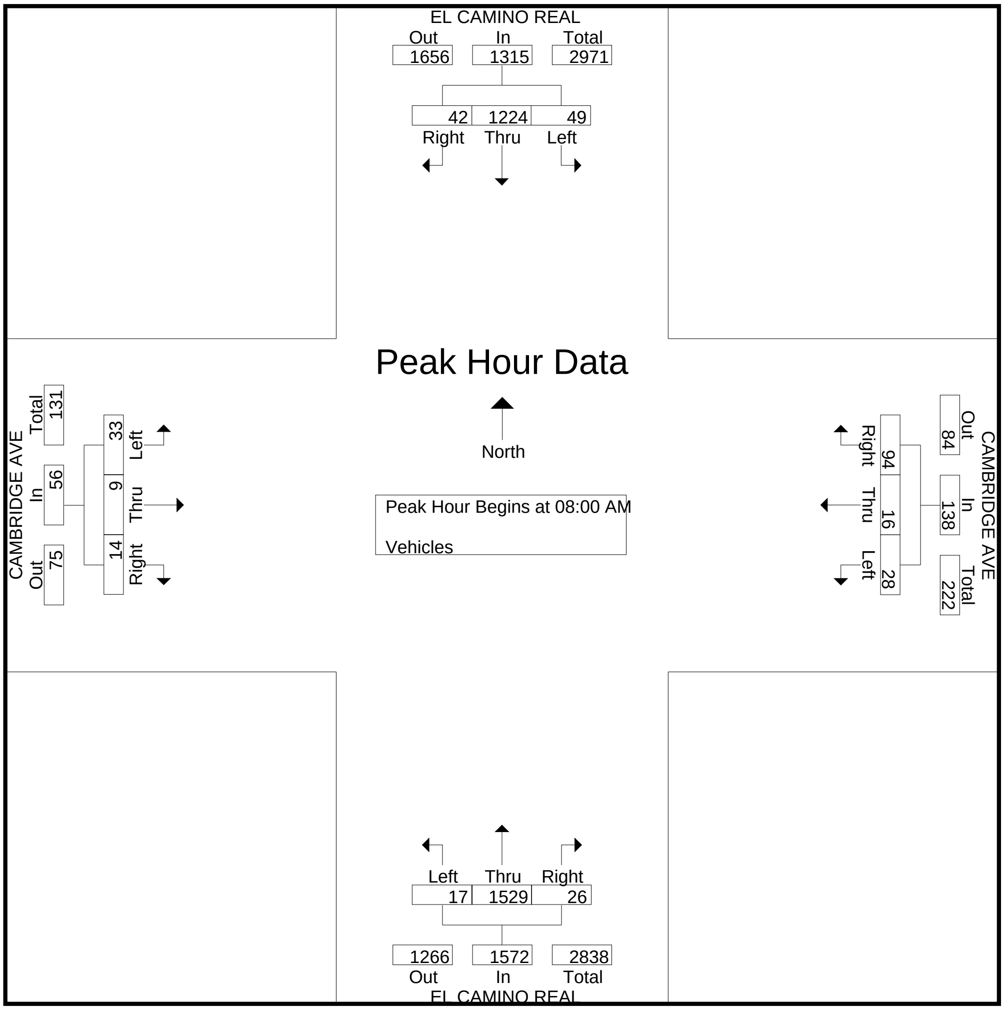

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File Name : 12AM FINAL
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Groups Printed- Bikes

	EL CAMINO REAL Southbound					CAMBRIDGE AVE Westbound					EL CAMINO REAL Northbound					CAMBRIDGE AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
07:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	6
Total	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	6	0	0	6	9
08:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
Total	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	2	0	0	2	5
Grand Total	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	0	8	0	0	8	14
Apprch %	0	100	0	0		0	0	0	0		0	100	0	0		0	100	0	0		
Total %	0	21.4	0	0	21.4	0	0	0	0	0	0	21.4	0	0	21.4	0	57.1	0	0	57.1	

	EL CAMINO REAL Southbound				CAMBRIDGE AVE Westbound				EL CAMINO REAL Northbound				CAMBRIDGE AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	1
07:30 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**6**	0	**6**	**6**
Total Volume	0	2	0	2	0	0	0	0	0	1	0	1	0	6	0	6	9
% App. Total	0	100	0		0	0	0		0	100	0		0	100	0		
PHF	.000	.500	.000	.500	.000	.000	.000	.000	.000	.250	.000	.250	.000	.250	.000	.250	.375

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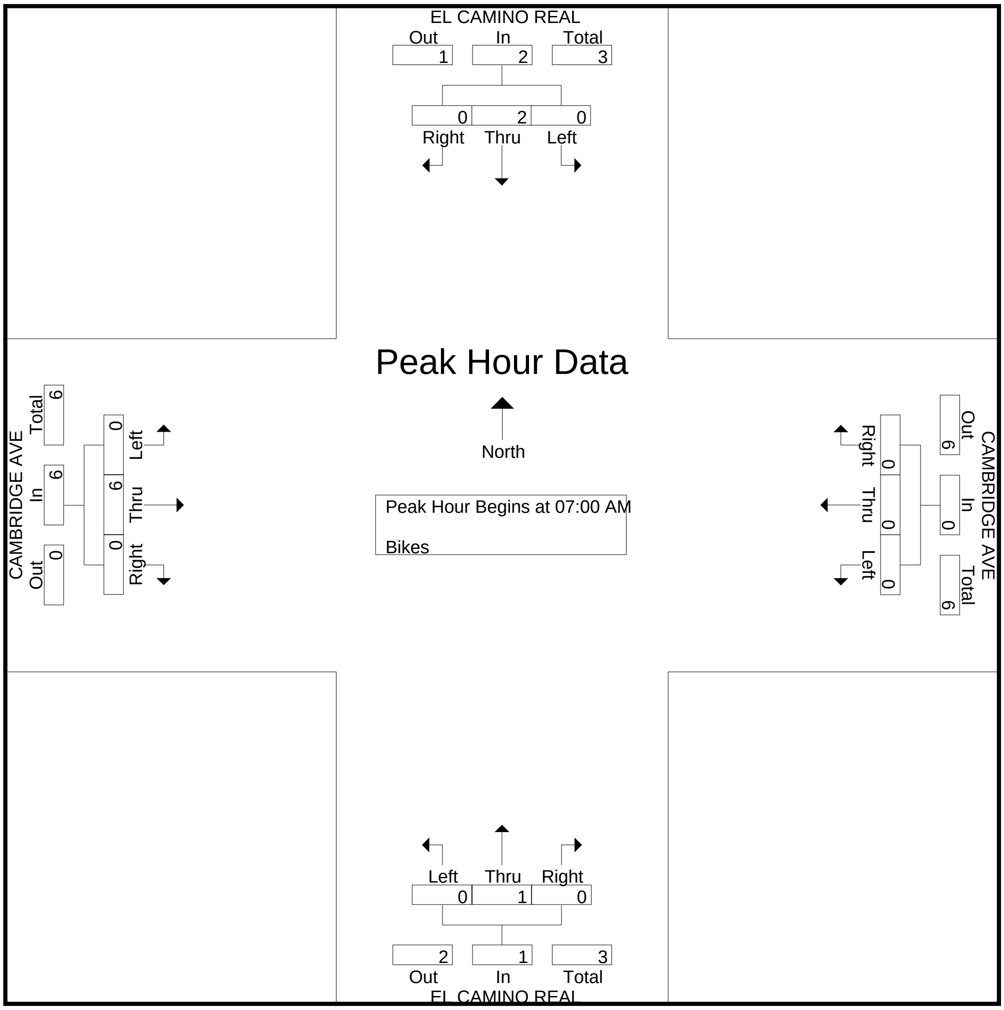

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File Name : 12PM FINAL
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Groups Printed- Vehicles

	EL CAMINO REAL Southbound					CAMBRIDGE AVE Westbound					EL CAMINO REAL Northbound					CAMBRIDGE AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	5	368	16	1	390	28	7	24	4	63	9	327	9	0	345	4	3	15	5	27	825
04:15 PM	10	430	17	5	462	36	9	14	3	62	14	302	5	0	321	5	4	10	4	23	868
04:30 PM	5	455	18	0	478	21	5	18	2	46	10	294	2	0	306	3	0	21	0	24	854
04:45 PM	8	463	14	4	489	24	4	19	5	52	14	313	4	1	332	4	2	18	2	26	899
Total	28	1716	65	10	1819	109	25	75	14	223	47	1236	20	1	1304	16	9	64	11	100	3446
05:00 PM	6	429	19	3	457	35	3	21	8	67	10	315	2	1	328	8	4	20	2	34	886
05:15 PM	13	472	14	9	508	32	10	16	2	60	12	306	11	0	329	7	7	29	3	46	943
05:30 PM	4	416	13	6	439	31	13	14	1	59	5	372	2	0	379	6	2	18	6	32	909
05:45 PM	5	413	15	10	443	31	11	16	5	63	10	354	7	6	377	5	4	19	1	29	912
Total	28	1730	61	28	1847	129	37	67	16	249	37	1347	22	7	1413	26	17	86	12	141	3650
Grand Total	56	3446	126	38	3666	238	62	142	30	472	84	2583	42	8	2717	42	26	150	23	241	7096
Apprch %	1.5	94	3.4	1		50.4	13.1	30.1	6.4		3.1	95.1	1.5	0.3		17.4	10.8	62.2	9.5		
Total %	0.8	48.6	1.8	0.5	51.7	3.4	0.9	2	0.4	6.7	1.2	36.4	0.6	0.1	38.3	0.6	0.4	2.1	0.3	3.4	

	EL CAMINO REAL Southbound				CAMBRIDGE AVE Westbound				EL CAMINO REAL Northbound				CAMBRIDGE AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	6	429	**19**	454	**35**	3	**21**	**59**	10	315	2	327	**8**	4	20	32	872
05:15 PM	**13**	**472**	14	**499**	32	10	16	58	**12**	306	**11**	329	7	**7**	**29**	**43**	**929**
05:30 PM	4	416	13	433	31	**13**	14	58	5	**372**	2	**379**	6	2	18	26	896
05:45 PM	5	413	15	433	31	11	16	58	10	354	7	371	5	4	19	28	890
Total Volume	28	1730	61	1819	129	37	67	233	37	1347	22	1406	26	17	86	129	3587
% App. Total	1.5	95.1	3.4		55.4	15.9	28.8		2.6	95.8	1.6		20.2	13.2	66.7		
PHF	.538	.916	.803	.911	.921	.712	.798	.987	.771	.905	.500	.927	.813	.607	.741	.750	.965

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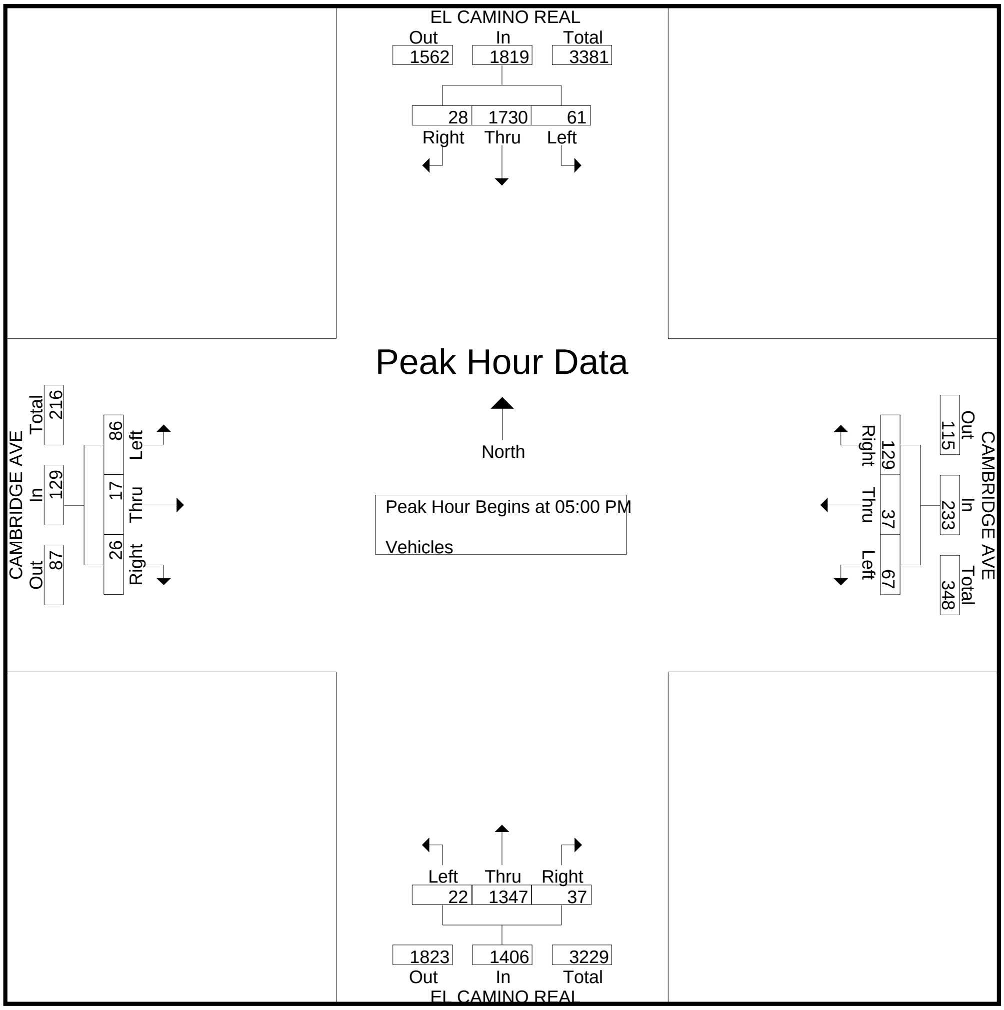

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File Name : 12PM FINAL
Site Code : 00000012
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Groups Printed- Bikes

	EL CAMINO REAL Southbound					CAMBRIDGE AVE Westbound					EL CAMINO REAL Northbound					CAMBRIDGE AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
05:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	1	0	0	1	4
Grand Total	0	2	0	0	2	0	1	0	0	1	0	2	0	0	2	0	1	0	0	1	6
Apprch %	0	100	0	0		0	100	0	0		0	100	0	0		0	100	0	0		
Total %	0	33.3	0	0	33.3	0	16.7	0	0	16.7	0	33.3	0	0	33.3	0	16.7	0	0	16.7	

	EL CAMINO REAL Southbound				CAMBRIDGE AVE Westbound				EL CAMINO REAL Northbound				CAMBRIDGE AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	**2**	0	**2**	0	0	0	0	**2**
05:30 PM	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	1	0	1	0	1	0	1	0	2	0	2	0	0	0	0	4
% App. Total	0	100	0		0	100	0		0	100	0		0	0	0		
PHF	.000	.250	.000	.250	.000	.250	.000	.250	.000	.250	.000	.250	.000	.000	.000	.000	.500

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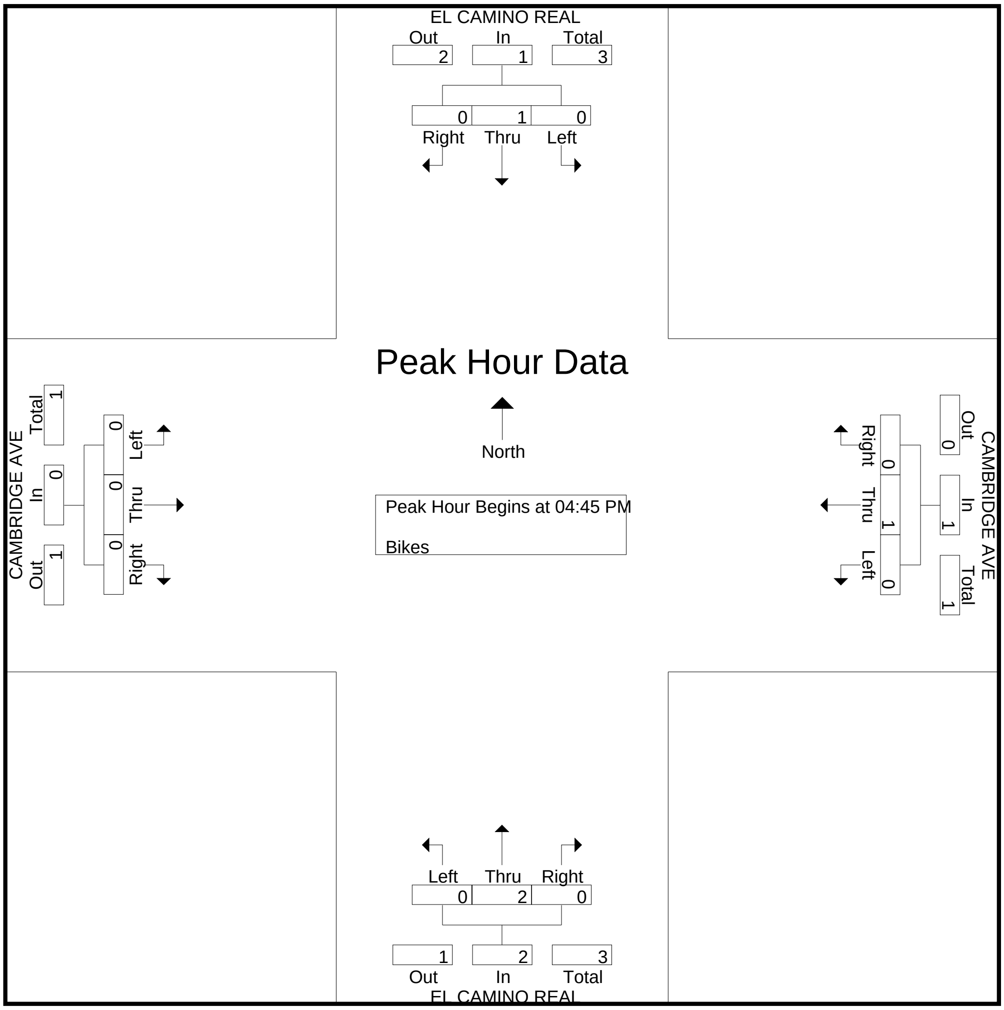

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Groups Printed- Vehicles

	EL CAMINO REAL Southbound					CALIFORNIA AVE Westbound					EL CAMINO REAL Northbound					CALIFORNIA AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	13	115	7	6	141	6	9	7	1	23	15	204	15	6	240	6	0	3	1	10	414
07:15 AM	23	136	15	3	177	4	4	4	1	13	13	249	16	12	290	4	1	1	1	7	487
07:30 AM	20	194	12	12	238	9	13	13	3	38	14	282	12	21	329	13	5	11	4	33	638
07:45 AM	20	224	6	3	253	16	16	9	0	41	14	346	14	23	397	15	8	5	3	31	722
Total	76	669	40	24	809	35	42	33	5	115	56	1081	57	62	1256	38	14	20	9	81	2261
08:00 AM	28	248	13	11	300	22	18	11	0	51	15	452	21	10	498	7	5	12	4	28	877
08:15 AM	40	276	14	11	341	8	18	21	1	48	13	375	22	16	426	15	9	6	6	36	851
08:30 AM	33	225	14	4	276	14	15	13	6	48	13	346	30	15	404	19	8	8	4	39	767
08:45 AM	43	274	19	13	349	21	23	15	3	62	13	340	27	27	407	12	5	7	7	31	849
Total	144	1023	60	39	1266	65	74	60	10	209	54	1513	100	68	1735	53	27	33	21	134	3344
Grand Total	220	1692	100	63	2075	100	116	93	15	324	110	2594	157	130	2991	91	41	53	30	215	5605
Apprch %	10.6	81.5	4.8	3		30.9	35.8	28.7	4.6		3.7	86.7	5.2	4.3		42.3	19.1	24.7	14		
Total %	3.9	30.2	1.8	1.1	37	1.8	2.1	1.7	0.3	5.8	2	46.3	2.8	2.3	53.4	1.6	0.7	0.9	0.5	3.8	

	EL CAMINO REAL Southbound				CALIFORNIA AVE Westbound				EL CAMINO REAL Northbound				CALIFORNIA AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	28	248	13	289	**22**	18	11	51	**15**	**452**	21	**488**	7	5	**12**	24	**852**
08:15 AM	40	**276**	14	330	8	18	**21**	47	13	375	22	410	15	**9**	6	30	817
08:30 AM	33	225	14	272	14	15	13	42	13	346	**30**	389	**19**	8	8	**35**	738
08:45 AM	**43**	274	**19**	**336**	21	**23**	15	**59**	13	340	27	380	12	5	7	24	799
Total Volume	144	1023	60	1227	65	74	60	199	54	1513	100	1667	53	27	33	113	3206
% App. Total	11.7	83.4	4.9		32.7	37.2	30.2		3.2	90.8	6		46.9	23.9	29.2		
PHF	.837	.927	.789	.913	.739	.804	.714	.843	.900	.837	.833	.854	.697	.750	.688	.807	.941

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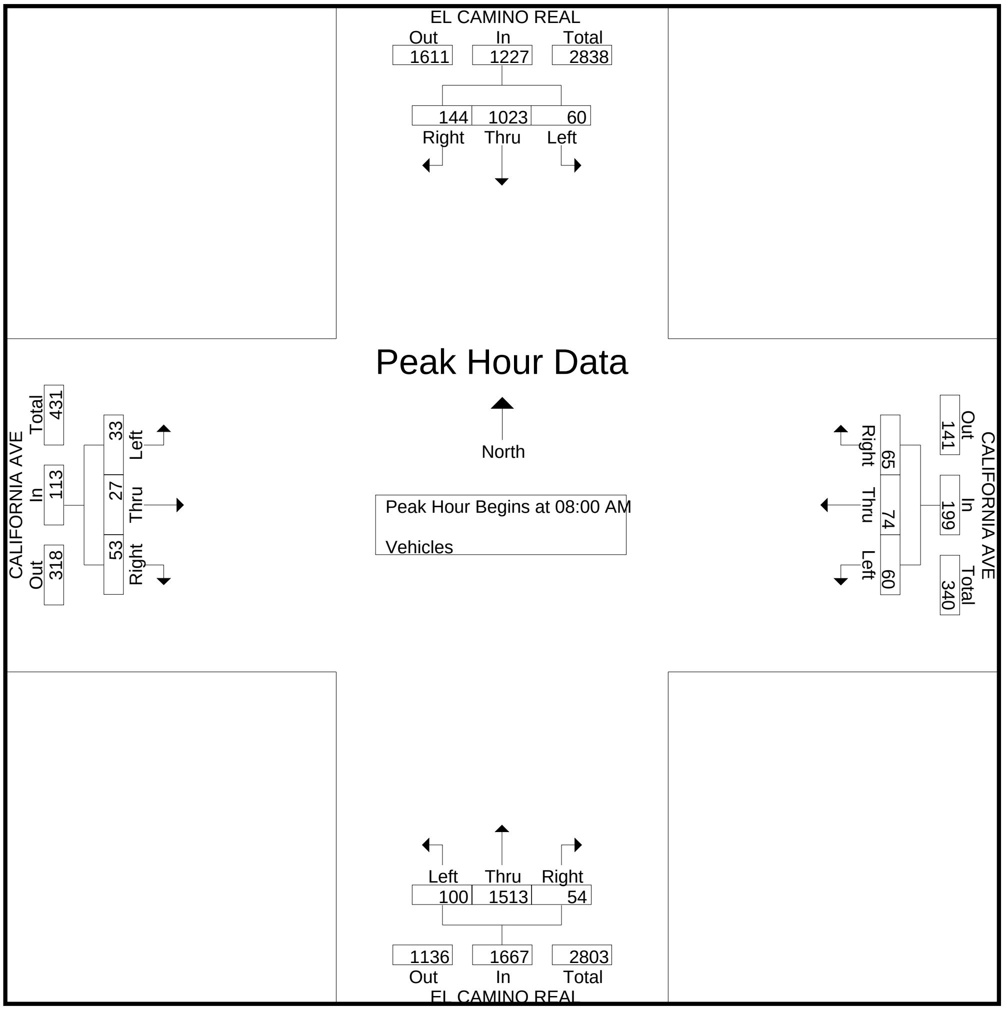

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Groups Printed- Bikes

	EL CAMINO REAL Southbound					CALIFORNIA AVE Westbound					EL CAMINO REAL Northbound					CALIFORNIA AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	3	0	0	3	1	2	0	1	4	0	4	0	0	4	11
07:15 AM	0	0	0	0	0	0	7	0	0	7	0	1	0	0	1	0	1	0	0	1	9
07:30 AM	0	0	0	0	0	0	10	1	0	11	0	4	0	0	4	0	18	0	0	18	33
07:45 AM	0	0	0	0	0	0	6	0	0	6	0	1	0	0	1	0	13	0	0	13	20
Total	0	0	0	0	0	0	26	1	0	27	1	8	0	1	10	0	36	0	0	36	73
08:00 AM	1	0	0	0	1	0	10	0	0	10	0	2	0	0	2	0	4	0	0	4	17
08:15 AM	0	0	0	0	0	1	11	0	0	12	0	1	0	0	1	0	7	0	0	7	20
08:30 AM	0	0	0	0	0	1	15	0	0	16	0	1	0	0	1	0	5	0	0	5	22
08:45 AM	0	0	0	0	0	0	18	0	0	18	0	1	0	0	1	0	6	0	0	6	25
Total	1	0	0	0	1	2	54	0	0	56	0	5	0	0	5	0	22	0	0	22	84
Grand Total	1	0	0	0	1	2	80	1	0	83	1	13	0	1	15	0	58	0	0	58	157
Apprch %	100	0	0	0		2.4	96.4	1.2	0		6.7	86.7	0	6.7		0	100	0	0		
Total %	0.6	0	0	0	0.6	1.3	51	0.6	0	52.9	0.6	8.3	0	0.6	9.6	0	36.9	0	0	36.9	

	EL CAMINO REAL Southbound				CALIFORNIA AVE Westbound				EL CAMINO REAL Northbound				CALIFORNIA AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	10	**1**	11	0	**4**	0	**4**	0	**18**	0	**18**	**33**
07:45 AM	0	0	0	0	0	6	0	6	0	1	0	1	0	13	0	13	20
08:00 AM	**1**	0	0	**1**	0	10	0	10	0	2	0	2	0	4	0	4	17
08:15 AM	0	0	0	0	**1**	**11**	0	**12**	0	1	0	1	0	7	0	7	20
Total Volume	1	0	0	1	1	37	1	39	0	8	0	8	0	42	0	42	90
% App. Total	100	0	0		2.6	94.9	2.6		0	100	0		0	100	0		
PHF	.250	.000	.000	.250	.250	.841	.250	.813	.000	.500	.000	.500	.000	.583	.000	.583	.682

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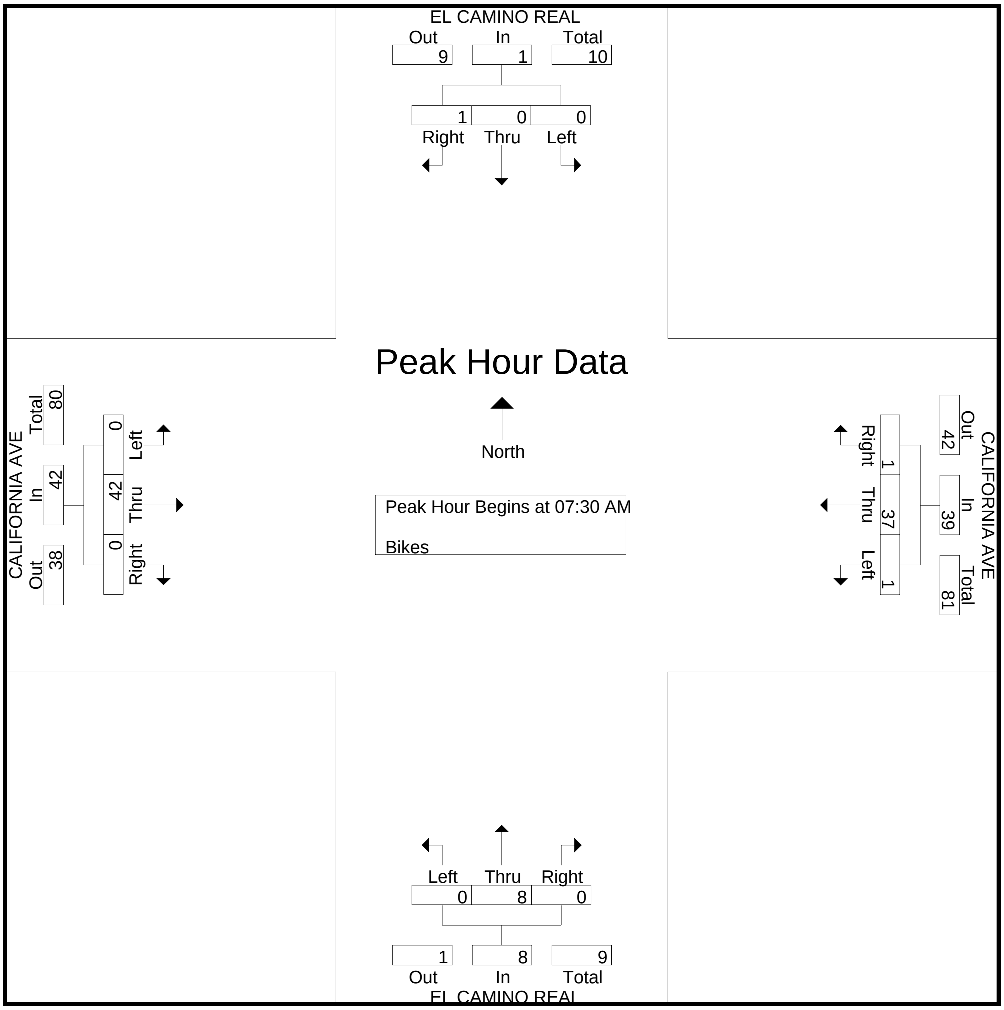

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Groups Printed- Vehicles

	EL CAMINO REAL Southbound					CALIFORNIA AVE Westbound					EL CAMINO REAL Northbound					CALIFORNIA AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	10	341	1	12	364	21	11	23	1	56	18	312	23	17	370	30	8	15	12	65	855
04:15 PM	9	425	0	16	450	22	6	18	6	52	20	288	19	18	345	28	11	20	7	66	913
04:30 PM	18	441	2	15	476	10	10	26	2	48	23	283	27	17	350	34	11	17	4	66	940
04:45 PM	9	452	1	9	471	28	8	15	5	56	18	302	17	21	358	35	18	25	8	86	971
Total	46	1659	4	52	1761	81	35	82	14	212	79	1185	86	73	1423	127	48	77	31	283	3679
05:00 PM	14	424	23	10	471	17	5	24	3	49	22	289	24	21	356	43	20	23	5	91	967
05:15 PM	12	482	15	16	525	23	12	19	2	56	20	274	12	21	327	41	19	29	6	95	1003
05:30 PM	13	399	19	19	450	13	4	20	5	42	25	329	17	25	396	26	19	38	7	90	978
05:45 PM	12	407	17	15	451	14	10	22	2	48	18	349	16	32	415	20	15	32	3	70	984
Total	51	1712	74	60	1897	67	31	85	12	195	85	1241	69	99	1494	130	73	122	21	346	3932
Grand Total	97	3371	78	112	3658	148	66	167	26	407	164	2426	155	172	2917	257	121	199	52	629	7611
Apprch %	2.7	92.2	2.1	3.1		36.4	16.2	41	6.4		5.6	83.2	5.3	5.9		40.9	19.2	31.6	8.3		
Total %	1.3	44.3	1	1.5	48.1	1.9	0.9	2.2	0.3	5.3	2.2	31.9	2	2.3	38.3	3.4	1.6	2.6	0.7	8.3	

	EL CAMINO REAL Southbound				CALIFORNIA AVE Westbound				EL CAMINO REAL Northbound				CALIFORNIA AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**14**	424	**23**	461	17	5	**24**	46	22	289	**24**	335	**43**	**20**	23	86	928
05:15 PM	12	**482**	15	**509**	**23**	**12**	19	**54**	20	274	12	306	41	19	29	**89**	**958**
05:30 PM	13	399	19	431	13	4	20	37	**25**	329	17	371	26	19	**38**	83	922
05:45 PM	12	407	17	436	14	10	22	46	18	**349**	16	**383**	20	15	32	67	932
Total Volume	51	1712	74	1837	67	31	85	183	85	1241	69	1395	130	73	122	325	3740
% App. Total	2.8	93.2	4		36.6	16.9	46.4		6.1	89	4.9		40	22.5	37.5		
PHF	.911	.888	.804	.902	.728	.646	.885	.847	.850	.889	.719	.911	.756	.913	.803	.913	.976

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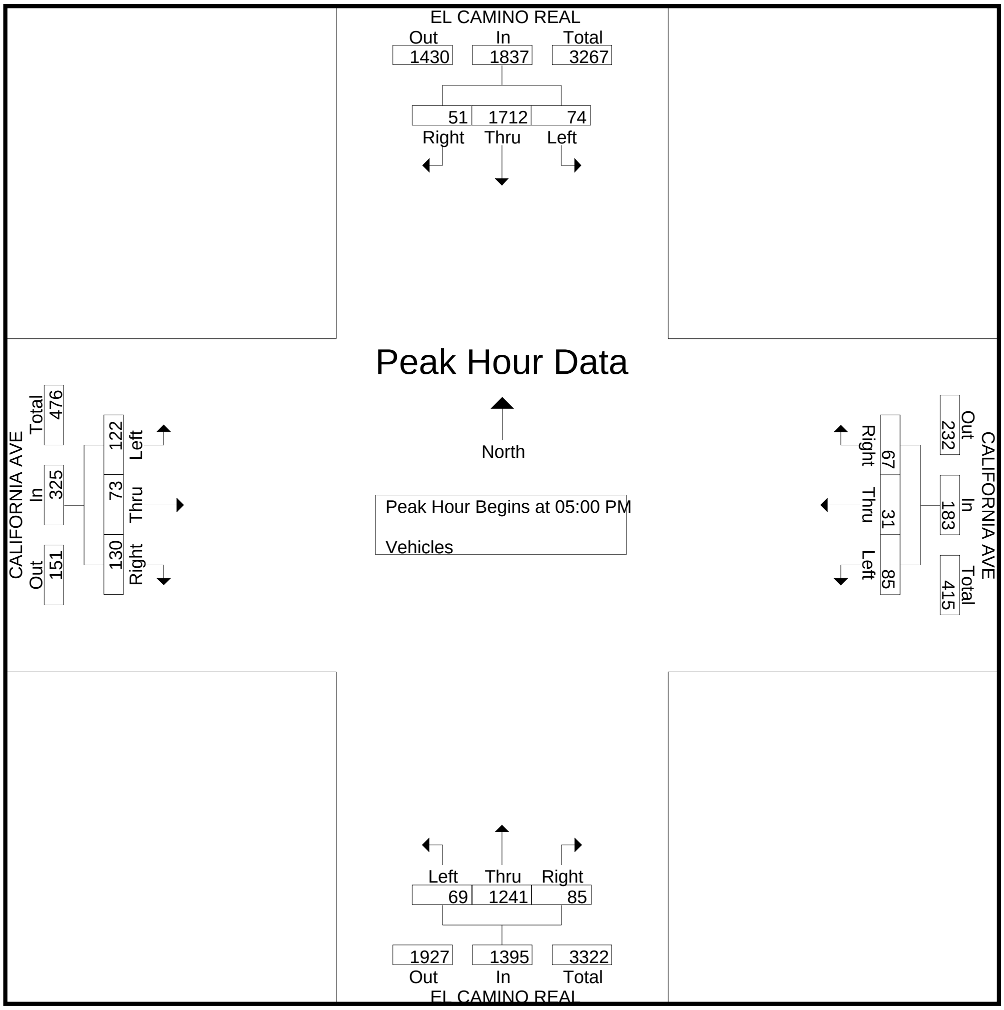

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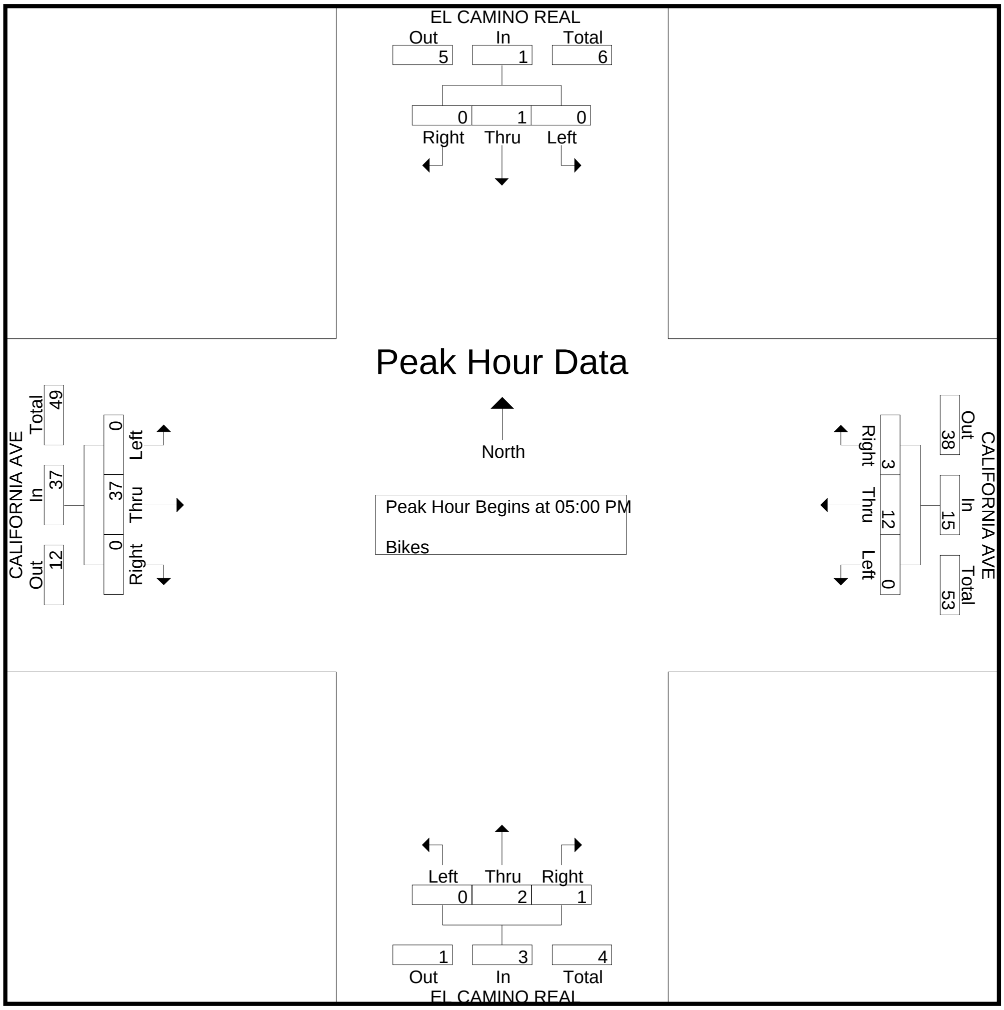
Groups Printed- Bikes

	EL CAMINO REAL Southbound					CALIFORNIA AVE Westbound					EL CAMINO REAL Northbound					CALIFORNIA AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	3
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2
04:30 PM	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	4
04:45 PM	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	5
Total	0	1	0	0	1	0	7	0	0	7	0	5	0	0	5	0	1	0	0	1	14
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	6
05:15 PM	0	0	0	0	0	3	2	0	0	5	1	0	0	0	1	0	2	0	0	2	8
05:30 PM	0	1	0	0	1	0	4	0	0	4	0	1	0	0	1	0	19	0	0	19	25
05:45 PM	0	0	0	0	0	0	6	0	0	6	0	1	0	0	1	0	10	0	0	10	17
Total	0	1	0	0	1	3	12	0	0	15	1	2	0	0	3	0	37	0	0	37	56
Grand Total	0	2	0	0	2	3	19	0	0	22	1	7	0	0	8	0	38	0	0	38	70
Apprch %	0	100	0	0		13.6	86.4	0	0		12.5	87.5	0	0		0	100	0	0		
Total %	0	2.9	0	0	2.9	4.3	27.1	0	0	31.4	1.4	10	0	0	11.4	0	54.3	0	0	54.3	

	EL CAMINO REAL Southbound				CALIFORNIA AVE Westbound				EL CAMINO REAL Northbound				CALIFORNIA AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6	6
05:15 PM	0	0	0	0	**3**	2	0	5	**1**	0	0	**1**	0	2	0	2	8
05:30 PM	0	**1**	0	**1**	0	4	0	4	0	**1**	0	1	0	**19**	0	**19**	**25**
05:45 PM	0	0	0	0	0	**6**	0	**6**	0	1	0	1	0	10	0	10	17
Total Volume	0	1	0	1	3	12	0	15	1	2	0	3	0	37	0	37	56
% App. Total	0	100	0		20	80	0		33.3	66.7	0		0	100	0		
PHF	.000	.250	.000	.250	.250	.500	.000	.625	.250	.500	.000	.750	.000	.487	.000	.487	.560

File Name : 13PM FINAL
Site Code : 00000013
Start Date : 9/27/2016
Page No : 2



File Name : 14PM FINAL
Site Code : 00000014
Start Date : 9/27/2016
Page No : 1

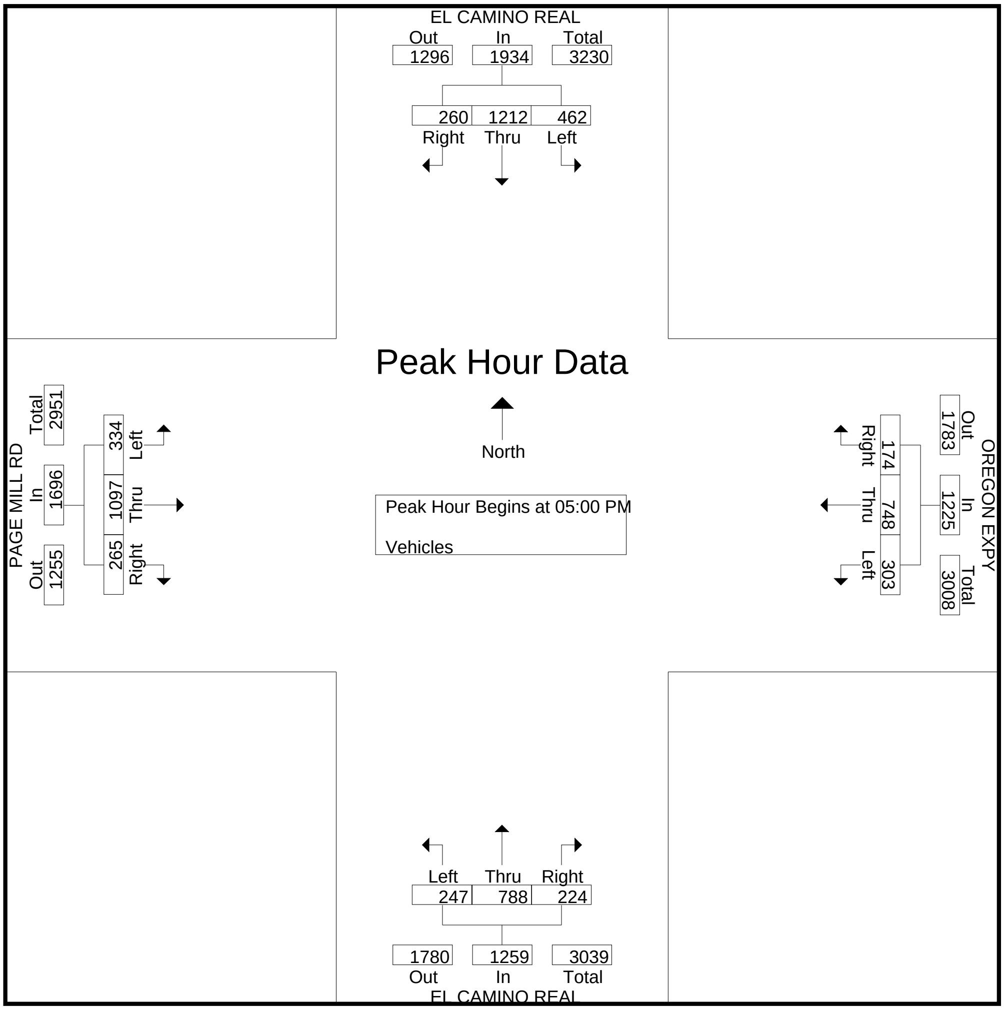
Groups Printed- Vehicles

	EL CAMINO REAL Southbound					OREGON EXPY Westbound					EL CAMINO REAL Northbound					PAGE MILL RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	76	267	96	3	442	66	158	59	2	285	50	188	68	1	307	60	298	92	3	453	1487
04:15 PM	56	288	121	0	465	43	160	84	8	295	46	175	57	4	282	63	273	75	2	413	1455
04:30 PM	80	314	93	2	489	35	133	85	3	256	55	216	58	1	330	67	270	84	3	424	1499
04:45 PM	77	314	133	2	526	38	150	61	1	250	53	187	63	11	314	68	295	76	1	440	1530
Total	289	1183	443	7	1922	182	601	289	14	1086	204	766	246	17	1233	258	1136	327	9	1730	5971
05:00 PM	64	289	119	2	474	40	154	68	4	266	72	191	55	8	326	72	273	85	9	439	1505
05:15 PM	55	309	132	11	507	50	194	76	6	326	58	167	70	2	297	64	278	65	1	408	1538
05:30 PM	63	322	113	2	500	40	188	77	2	307	56	207	68	6	337	73	273	88	5	439	1583
05:45 PM	78	292	98	2	470	44	212	82	6	344	38	223	54	9	324	56	273	96	3	428	1566
Total	260	1212	462	17	1951	174	748	303	18	1243	224	788	247	25	1284	265	1097	334	18	1714	6192
Grand Total	549	2395	905	24	3873	356	1349	592	32	2329	428	1554	493	42	2517	523	2233	661	27	3444	12163
Apprch %	14.2	61.8	23.4	0.6		15.3	57.9	25.4	1.4		17	61.7	19.6	1.7		15.2	64.8	19.2	0.8		
Total %	4.5	19.7	7.4	0.2	31.8	2.9	11.1	4.9	0.3	19.1	3.5	12.8	4.1	0.3	20.7	4.3	18.4	5.4	0.2	28.3	

	EL CAMINO REAL Southbound				OREGON EXPY Westbound				EL CAMINO REAL Northbound				PAGE MILL RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	64	289	119	472	40	154	68	262	**72**	191	55	318	72	273	85	430	1482
05:15 PM	55	309	**132**	496	**50**	194	76	320	58	167	**70**	295	64	**278**	65	407	1518
05:30 PM	63	**322**	113	**498**	40	188	77	305	56	207	68	**331**	**73**	273	88	**434**	**1568**
05:45 PM	**78**	292	98	468	44	**212**	**82**	**338**	38	**223**	54	315	56	273	**96**	425	1546
Total Volume	260	1212	462	1934	174	748	303	1225	224	788	247	1259	265	1097	334	1696	6114
% App. Total	13.4	62.7	23.9		14.2	61.1	24.7		17.8	62.6	19.6		15.6	64.7	19.7		
PHF	.833	.941	.875	.971	.870	.882	.924	.906	.778	.883	.882	.951	.908	.987	.870	.977	.975

Traffic Data Service
San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 14PM FINAL
Site Code : 00000014
Start Date : 9/27/2016
Page No : 2



Traffic Data Service

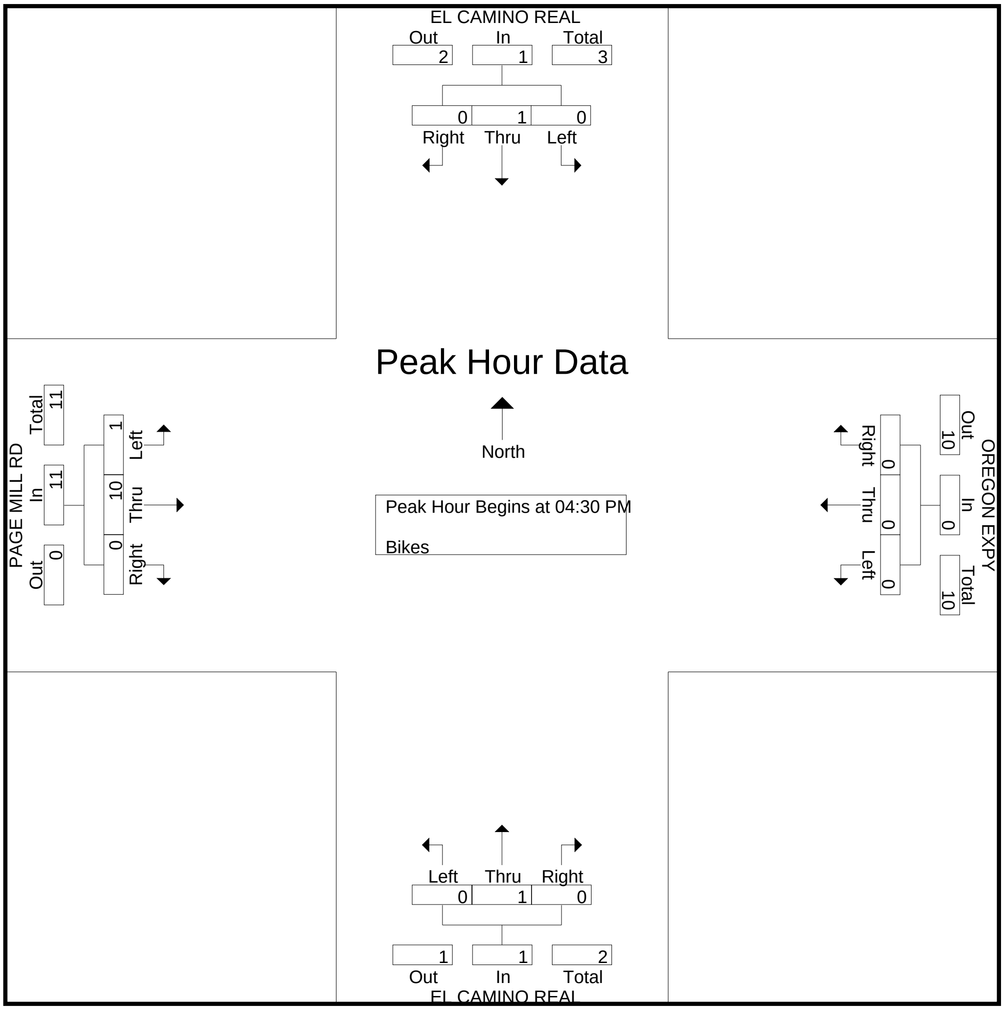
San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 14PM FINAL
Site Code : 00000014
Start Date : 9/27/2016
Page No : 1

Groups Printed- Bikes

	EL CAMINO REAL Southbound					OREGON EXPY Westbound					EL CAMINO REAL Northbound					PAGE MILL RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	2
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
04:30 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	3
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	4
Total	0	1	0	0	1	0	0	0	0	0	1	1	0	0	2	0	8	0	0	8	11
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	3
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3	3
05:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	2
05:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	3
Total	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	8	1	0	9	11
Grand Total	0	2	0	0	2	0	1	0	0	1	1	1	0	0	2	0	16	1	0	17	22
Apprch %	0	100	0	0		0	100	0	0		50	50	0	0		0	94.1	5.9	0		
Total %	0	9.1	0	0	9.1	0	4.5	0	0	4.5	4.5	4.5	0	0	9.1	0	72.7	4.5	0	77.3	

	EL CAMINO REAL Southbound				OREGON EXPY Westbound				EL CAMINO REAL Northbound				PAGE MILL RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	**1**	0	**1**	0	0	0	0	0	**1**	0	**1**	0	1	0	1	3
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**	0	**4**	**4**
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	**1**	3	3
Total Volume	0	1	0	1	0	0	0	0	0	1	0	1	0	10	1	11	13
% App. Total	0	100	0		0	0	0		0	100	0		0	90.9	9.1		
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250	.000	.625	.250	.688	.813


EL CAMINO REAL
Out 2
In 1
Total 3
Right 0
Thru 1
Left 0
Peak Hour Data
North
Peak Hour Begins at 04:30 PM
Bikes
PAGE MILL RD
Total 11
In 11
Out 0
Left 1
Thru 10
Right 0
OREGON EXPY
Out 10
In 0
Total 10
Right 0
Thru 0
Left 0
Left 0
Thru 1
Right 0
Out 1
In 1
Total 2
EL CAMINO REAL

APPENDIX B: TRIP GENERATION SURVEYS

GROUP
MACKENZIE
CELEBRATING 50 YEARS

RiverEast Center | PO Box 14310 | Portland, OR 97293
1515 SE Water Ave, Suite 100 | Portland, OR 97214
Tel: 503.224.9560 **Web:** www.grpmack.com **Fax:** 503.228.1285

Group Mackenzie, Incorporated

Architecture
Interiors
Structural Engineering
Civil Engineering
Land Use Planning
Transportation Planning
Landscape Architecture

Locations:
Portland, Oregon
Seattle, Washington
Vancouver, Washington

May 11, 2010

City of Sandy
Attention: Tracy Brown
39250 Pioneer Boulevard
Sandy, Oregon 97055

Re: **Sandy Police Facility**
Traffic Analysis Letter
Project Number 2090113.00

Dear Mr. Brown:

Group Mackenzie has prepared this traffic analysis letter addressing Development Code Section 17.100 (Land Division) requirements relating to the proposed Sandy Police Facility along US 26 in Sandy, Oregon.

PROPOSED DEVELOPMENT

The proposed Sandy Police facility consists of a new 9,450 square foot building located on the now defunct Ford Dealership site bordering the north side of US 26 and the south side of Pleasant Street, just east of SE Ten Eyck Road. The site consists of three existing tax lots totaling approximately 0.55 acres. A site plan is provided in Appendix A of this letter. As shown on the site plan figure, the proposed development will have two full-access driveways to Pleasant Street. The western driveway will provide access to six parking spaces designated for public use, and the eastern driveway will provide access to 17 parking spaces designated for police vehicles within a secured parking lot. No direct access is proposed to US 26; therefore, the existing US 26 access will be removed.

TRIP GENERATION

Typically, the Institute of Transportation Engineers (ITE) *Trip Generation* manual is used as a resource to estimate site trip generation for land uses. However, in this case, the ITE manual contains no suitable land use category matching the unique police station trip-generating characteristics. Instead, development trip generation was based on trip generation studies prepared for comparable police station sites in the Portland metropolitan area.

Table 1 presents estimated Sandy Police station trip generation for the average weekday, weekday AM peak hour, and weekday PM peak hour. The section following this table explains assumptions and resources used to support these estimates.

TABLE 1 – SITE TRIP GENERATION

Proposed Land Use	Size	ADT	AM Peak Hour	PM Peak Hour
Police Station	9,450 SF	281	14	18

Trip Generation Assumptions

The weekday PM peak hour site trip generation is based on a Portland State University (PSU) study of four existing police stations in the Portland metropolitan area. The PSU study is attached to this letter as Appendix B for reference. This study is considered a suitable resource given the sample size of four sites, the compatible range of building sizes (1,200 SF to 13,375 SF), and the fact that the surveyed stations are stand-alone facilities. The trip generation equation documented in this study was used to estimate trip generation for the proposed Sandy Police facility.

The average weekday and AM peak hour trip generation estimates are based on survey results conducted at the Central Police Precinct of Vancouver, Washington, which are attached for reference in Appendix C. As identified in the survey, the ratio of vehicle trips occurring during the average weekday relative to the PM peak hour is 15.6 (312 trips/20 trips), and the ratio between the trips occurring between the AM and PM peak hours is 0.775 (15.5 trips/20 trips). These ratios were applied to the PM peak hour vehicle trips summarized in Table 1 for the Sandy Police facility to estimate trips for the average weekday and the weekday AM peak hour.

TRIP DISTRIBUTION

Given the site location on the eastern city fringe, most site trips will have an origin or destination to US 26 west on the one-way couplet system through downtown. A nominal amount of site traffic is expected to utilize SE Ten Eyck Road to the north, Wolf Drive to the south, and US 26 to the east.

VEHICLE ACCESS

As shown in the attached site plan figure, two driveways will access Pleasant Street, with public traffic using the western driveway and police traffic using the eastern driveway. No direct access is proposed to US 26.

DRIVEWAY WIDTHS

Per the site plan figure, the Pleasant Street driveways will be 25 feet in width and designed according to City of Sandy Standard Detail 208A.

DRIVEWAY SPACING

The Pleasant Street driveways will be 145 feet apart (measured centerline-to-centerline). The west site access driveway will be approximately 60 feet from another property driveway to the west, with the east site access driveway approximately 110 feet from another property driveway to the east. There are no driveways on the north side of Pleasant Street across from the site frontage, except for a driveway to a developed property approximately 70 feet east of the eastern site access driveway, and in line with the eastern site property line.

The City's Transportation System Plan (TSP) classifies Pleasant Street as a Local street with no access spacing standards. Given no standards apply, the number and location of proposed site access driveways are adequate and in compliance with City standards.

DRIVEWAY SIGHT DISTANCE

Based on a review of the City's existing street map, aerial photos, and a windshield survey, there are no horizontal or vertical curves that limit driveway sight distance along Pleasant Street. Drivers exiting both site access driveways will be able to see along the entire length of Pleasant Street, from where it begins at SE Ten Eyck Road (approximately 190 feet west of the western site access driveway) to where it terminates as a dead-end (approximately 270 feet east of the eastern site access driveway). Because drivers can see along the entire length of road, adequate sight distance exists.

DRIVER SAFETY

Based on limited site trip generation, the separation of public trips and police trips via two separate site access driveways, and the review for conformance with the City's driveway width, spacing, and sight distance standards, the proposed development is not anticipated to adversely impact the safety or operating conditions of the surrounding street network.

COMPLIANCE WITH TRANSPORTATION SYSTEM PLAN

The proposed site development is in compliance with the applicable standards specified in the City's Transportation System Plan and Development Code. The proposed Pleasant Street driveways and the proposed Pleasant Street and US 26 frontage improvements are consistent with the respective roadway functional classifications, applicable street design sections, access management policies, and sight distance standards.

If you have any questions or need further information, please contact me at 503-224-9560.

Sincerely,

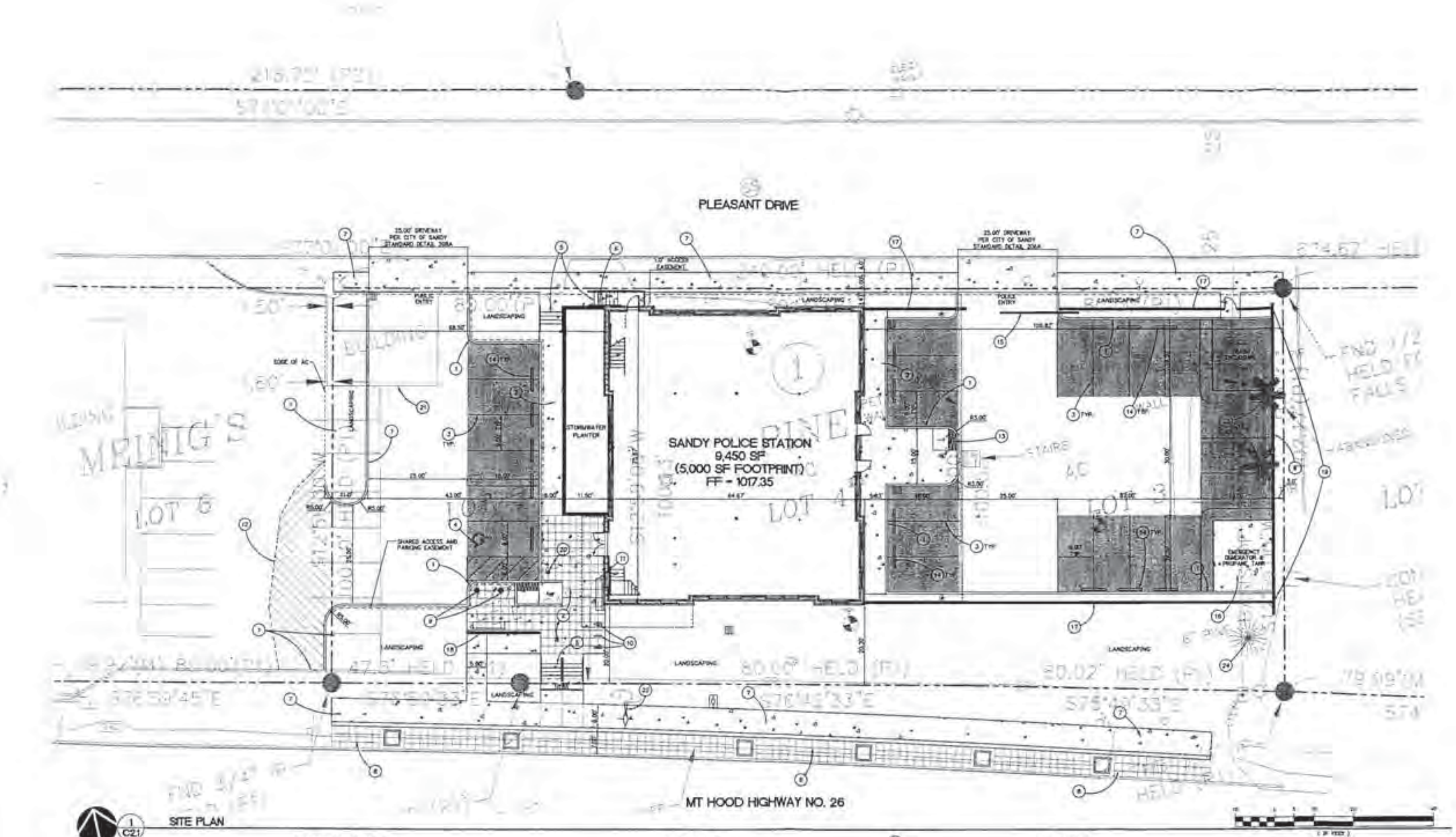
Brian J. Dunn, P.E.
Traffic Engineer

Enclosures: Appendix A – Site Plan (Figure C2.1)
Appendix B – PSU Police Station Trip Generation Study
Appendix C – Trip Surveys for Vancouver Central Police Pre

REGISTERED PROFESSIONAL ENGINEER
60027PE
OREGON
July 13, 1999
BRIAN JOSEPH DUNN
EXPIRES: 12-31-2011

APPENDIX A

Site Plan



1
C2.1
SITE PLAN

GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE STANDARD SPECIFICATIONS AND THE REQUIREMENTS OF THE CITY OF SANDY AND THE CURRENT AMERICAN PUBLIC WORKS ASSOCIATION STANDARDS FOR PUBLIC WORKS CONSTRUCTION.
2. THE WORKING DRAWINGS ARE GENERALLY DIAGRAMMATIC. THEY DO NOT SHOW EVERY OFFSET, BEND OR ELBOW REQUIRED FOR INSTALLATION IN THE SPACE PROVIDED. THEY DO NOT SHOW EVERY DIMENSION, COMPONENT PIECE, SECTION, JOINT OR FITTING REQUIRED TO COMPLETE THE PROJECT. ALL LOCATIONS FOR WORK SHALL BE CHECKED AND COORDINATED WITH EXISTING CONDITIONS IN THE FIELD BEFORE BEGINNING CONSTRUCTION. EXISTING UNDERGROUND UTILITIES LAYING WITHIN THE LIMITS OF EXCAVATION SHALL BE VERIFIED AS TO CONDITION, SIZE AND LOCATION BY UNCOVERING, PROVIDING SUCH IS PERMITTED BY LOCAL PUBLIC AUTHORITIES WITH JURISDICTION, BEFORE BEGINNING CONSTRUCTION. CONTRACTOR TO NOTIFY ENGINEER IF THERE ARE ANY DISCREPANCIES.
3. EFFECTIVE EROSION CONTROL IS REQUIRED. EROSION CONTROL DEVICES MUST BE INSTALLED AND MAINTAINED TO MEET THE CITY OF SANDY REQUIREMENTS. THE GOVERNING JURISDICTION MAY, AT ANY TIME, ORDER CORRECTIVE ACTION AND STOPPAGE OF WORK TO ACCOMPLISH EFFECTIVE EROSION CONTROL.
4. EFFECTIVE DRAINAGE CONTROL IS REQUIRED. DRAINAGE SHALL BE CONTROLLED WITHIN THE WORK SITE AND SHALL BE ROUTED SO THAT ADJACENT PRIVATE PROPERTY, PUBLIC PROPERTY, AND THE RECEIVING SYSTEM ARE NOT ADVERSELY IMPACTED. THE GOVERNING JURISDICTION MAY, AT ANY TIME, ORDER CORRECTIVE ACTION AND STOPPAGE OF WORK TO ACCOMPLISH EFFECTIVE DRAINAGE CONTROL.
5. CONTRACTOR SHALL ADJUST ALL STRUCTURES IMPACTED BY CONSTRUCTION IMPROVEMENTS TO NEW FINISH GRADES.
6. EXCAVATION: EXCAVATE FOR SLABS, PAVING, AND OTHER IMPROVEMENTS TO SIZES AND LEVELS SHOWN OR REQUIRED. ALLOW FOR FORM CLEARANCE AND FOR PROPER COMPACTION OF REQUIRED BACKFILLING MATERIAL. EXCAVATOR(S) MUST COMPLY WITH O.R.S. 757.541 THROUGH 757.571. EXCAVATOR(S) SHALL NOTIFY ALL UTILITY COMPANIES FOR LINE LOCATIONS SEVENTY-TWO (72) HOURS (MINIMUM) PRIOR TO START OF WORK. DAMAGE TO UTILITIES SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE. (ONE CALL LOCATE UTILITY NOTIFICATION CENTER – PORTLAND METRO AREA 246-6699, OREGON 800-4848, ALL OTHER AREAS 1-800-332-2344).
7. WHERE CONNECTING TO AN EXISTING PIPE, AND PRIOR TO ORDERING MATERIALS, THE CONTRACTOR SHALL EXPOSE THE END OF THE EXISTING PIPE VERIFY THE LOCATION, SIZE, AND ELEVATION. NOTIFY ENGINEER OF ANY DISCREPANCIES.
8. REQUEST BY THE CONTRACTOR FOR CHANGES TO THE PLANS MUST BE APPROVED BY THE ENGINEER.
9. ALL CURB RADII ARE 3.5' UNLESS OTHERWISE NOTED.

KEYNOTES

1. VERTICAL CURB PER DETAIL 1/C8.1
2. CONCRETE SIDEWALK PER DETAIL 3/C8.1
3. 4" WHITE PARKING STRIPE
4. HANDICAP PARKING STALL PER DETAIL 3/C8.1
5. CONCRETE STAIRS PER DETAIL 6/C8.1
6. RETAINING WALL PER DETAIL 11/C8.1
7. SIDEWALK PER CITY OF SANDY STD. DETAIL 205
8. PAVER BAND PER LANDSCAPE DWGS
9. FLAG POLE PER ARCH. DWGS
10. BIKE RACK PER LANDSCAPE DWGS
11. BENCH PER LANDSCAPE DWGS
12. LIMITS OF ASPHALT REMOVAL
13. PEDESTRIAN RAMP PER DETAIL 15/C8.1
14. WHEELSTOP PER DETAIL 12/C8.1
15. 25' WIDE SECURITY GATE PER ARCH. DWGS
16. 6" CONCRETE PAD OVER 6" CRUSHED ROCK BASE W/ #4 @ 18" O.C. EACH WAY
17. SECURE PARKING WALL PER ARCH. DWGS
18. THICKENED SIDEWALK EDGE PER DETAIL 14/C8.1
19. 6' CHAIN LINK FENCE BETWEEN SECURITY WALLS
20. BOLLARD PER LANDSCAPE DWGS
21. EXIST. 24' X 28' BUILDING TO BE REMOVED
22. PROPOSED STREET LIGHT MOUNTED ON EXIST. UTILITY POLE
23. REMOVE EXIST. TREE
24. EXIST. TREE TO REMAIN

SITE LEGEND

PROPERTY LINE
6" VERTICAL CURB
CATCH BASIN

PAVEMENT LEGEND

PER GEOTECHNICAL REPORT/SPECIFICATIONS

▨ PARKING SECTION 2.5" PERVIOUS ASPHALT OVER 18" AGGREGATE BASE
☐ DRIVE AISLE SECTION 3" PERVIOUS ASPHALT OVER 18" AGGREGATE BASE
☐ AC PAVEMENT TO MATCH EXIST. SECTION OR 3" ASPHALT OVER 15" AGGREGATE BASE WHICHEVER IS GREATER

SITE DATA

EXISTING SITE AREA: 24,150 SF (0.554 AC)
PROPOSED BUILDING AREA: 9,450 SF (5,000 SF FOOTPRINT)
ROOF AREA: 5,000 SF
SIDEWALK AREA: 1,277 SF (DOES NOT INCLUDE CIVIC AREA)
CIVIC AREA: 1,014 SF
PARKING AREA: 9,942 SF (PERVIOUS ASPHALT) (41.17%)
TOTAL IMPERVIOUS AREA: 7,291 SF (30.19%)
TOTAL LANDSCAPE AREA: 6,917 SF (28.64%)

PARKING DATA

PUBLIC
STANDARD STALLS: 5
HANDICAP STALLS: 1
TOTAL: 6

POLICE
18' X 9' STALLS: 9
16.5' X 9' STALLS: 8
TOTAL: 17

BIKE
TOTAL: 2

GROUP MACKENZIE
Civil Engineering
Structural Engineering
Transportation Planning
Landscape Architecture
Architecture
Interior Design
Land Use Planning
Portland OR 503.224.9560
Vancouver WA 360.695.7879
Seattle WA 206.749.9993

Client
CITY OF SANDY
39250 Pioneer Blvd.
Sandy, OR 97055

Sandy
Gateway to Mt. Hood

Project
SANDY POLICE FACILITY

Mechanical/Electrical
SYSTEM DESIGN CONSULTANTS
1515 SE WATER AVE, STE 400
PORTLAND, OR 97214
Phone: (503)248-0227
FAX: (503)248-0240

Cost Estimator
DMC LLC
1515 SE WATER AVE, STE 402
PORTLAND, OR 97214
Phone: (503)517-8702
FAX: (503)517-6930

TIMOTHY B. MCGUIRE
EXP. DATE 12/31/10

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REVISIONS:

SHEET TITLE:
SITE PLAN

DRAWN BY: EVS
CHECKED BY: TMM
SHEET
C2.1

JOB NO. 2090113.00

DESIGN DEVELOPMENT SET: 5/10/2010

GROUP
MACKENZIE

0690 SW Bancroft St | PO Box 69039 | Portland OR 97239-0039
Tel: 503.224.9560 Web: www.grpmack.com Fax: 503.228.1285

Group Mackenzie, Incorporated
Architecture
Interiors
Land Use Planning

Group Mackenzie Engineering, Incorporated
Civil/Structural Engineering
Transportation Planning

Locations:
Portland, Oregon
Tacoma, Washington
Vancouver, Washington

January 31, 2005

City of Vancouver
Attention: Ahmad Qayoumi
PO Box 1995
210 East 13th Street
Vancouver, WA 98668

Re: **Vancouver East Precinct**
Updated Trip Generation
Project Number 2040384

Dear Mr. Qayoumi:

As was previously agreed, surveys were conducted at the existing Central Police Precinct and construction services office to best determine the future trip generation at the proposed location at Mill Plain and SE 155th Avenue. The Central Police Precinct was surveyed instead of the East Police Precinct because it is similar in building size and employees, and is able to be surveyed more accurately. The purpose of this letter is to provide you with the surveyed findings, proposed trip generation and proposed study area.

SURVEYS

Road tubes were placed at the Central Police Precinct driveway on Stapleton to collect three full days of data. Manual counts were also conducted at the driveway on one day of the week during the AM and PM peak hours of the roadways to corroborate the tube data. The Central Precinct is 7,800 SF and has 8 employees working 8:00 a.m. to 5:00 p.m. The East Precinct is also 7,600 SF and has 7 employees working 8:00 a.m. to 5:00 p.m. Both precincts have similar officer shift schedules.

The driveway does not have a clearly defined throat area, making it difficult to obtain accurate data. The first week of data was collected with an inappropriate layout, and thus was not useable. The second week of data was collected with the correct tube layout, but due to the parking lot layout there appeared to be many cars crossing the tubes at an angle. The manual count during this week was approximately 49% of the tube count. This percentage was applied to the daily volumes of the tube count to get an adjusted daily trip volume. Peak hour trips as presented below were an average of the two manual counts. The table below presents the average trips and trip rates from this site.

Surveyed Central Police Precinct			
	Daily	AM Peak	PM Peak
Number of Trips	312	15.5	20
Percentage Enter/Exit	50% / 50%	53% / 47%	47% / 53%

A manual trip survey was also conducted at the existing Construction Services office over a three-day period. A log at the front desk tracked all visitors, delivery and administrative staff, while the Construction Services employees kept individual logs of their departure and arrival times. The site currently has 24 employees. The table below presents the average trips and trip rates from the existing Construction Services site.

Surveyed Construction Services			
	Daily	AM Peak	PM Peak
Number of Trips	116	15	17
Percentage Enter/Exit	50% / 50%	93% / 7%	24% / 76%

PROPOSED SITE

The proposed East Precinct site will be 26,736 SF. Initially, Construction Services will occupy 9,200 SF of the new building and the existing East Police Precinct will occupy the remainder of the building. The increase in building space for the East Precinct is due to several new areas including an exercise room and training room, and some expanded areas including holding cells and evidence collection. These increased areas are designed for use by the current staff and will not generate new trips. In the future, the police precinct may expand in to the Construction Services space; however, the few additional police employees that would be expected are not anticipated to generate more trips than Construction Services. Therefore, the trip generation for analysis is proposed to include the two surveyed sites.

Proposed Trip Generation				
Scenario	Land Use	Daily	AM Peak	PM Peak
Combined Use	Police Precinct	312	16	20
	Construction Services	116	15	17
	Total	428	31	37

PROPOSED STUDY AREA

Intersection level of services analysis will be provided at the following intersections impacted by 10 or more AM trips:

- SE Mill Plain and SE 164th Avenue
- SE Mill Plain and SE 155th Avenue
- SE Mill Plain and Hearthwood Boulevard
- SE Mill Plain and SE 148th Avenue
- SE Mill Plain and SE 136th Avenue
- SE Mill Plain and SE 131st Avenue/Park Plaza Dr
- SE Mill Plain and SE 126th Avenue
- SE Mill Plain and SE 123rd Avenue
- SE Mill Plain and SE 120th Avenue

- SE Mill Plain and SE 117th Avenue
- SE Mill Plain and Chkalov/NE 112th Ave

Please confirm you acceptance of these assumptions for use in the traffic analysis for the Vancouver Police East Precinct project. If you have any questions, or need further information, please contact me at 503-224-9560.

Sincerely,

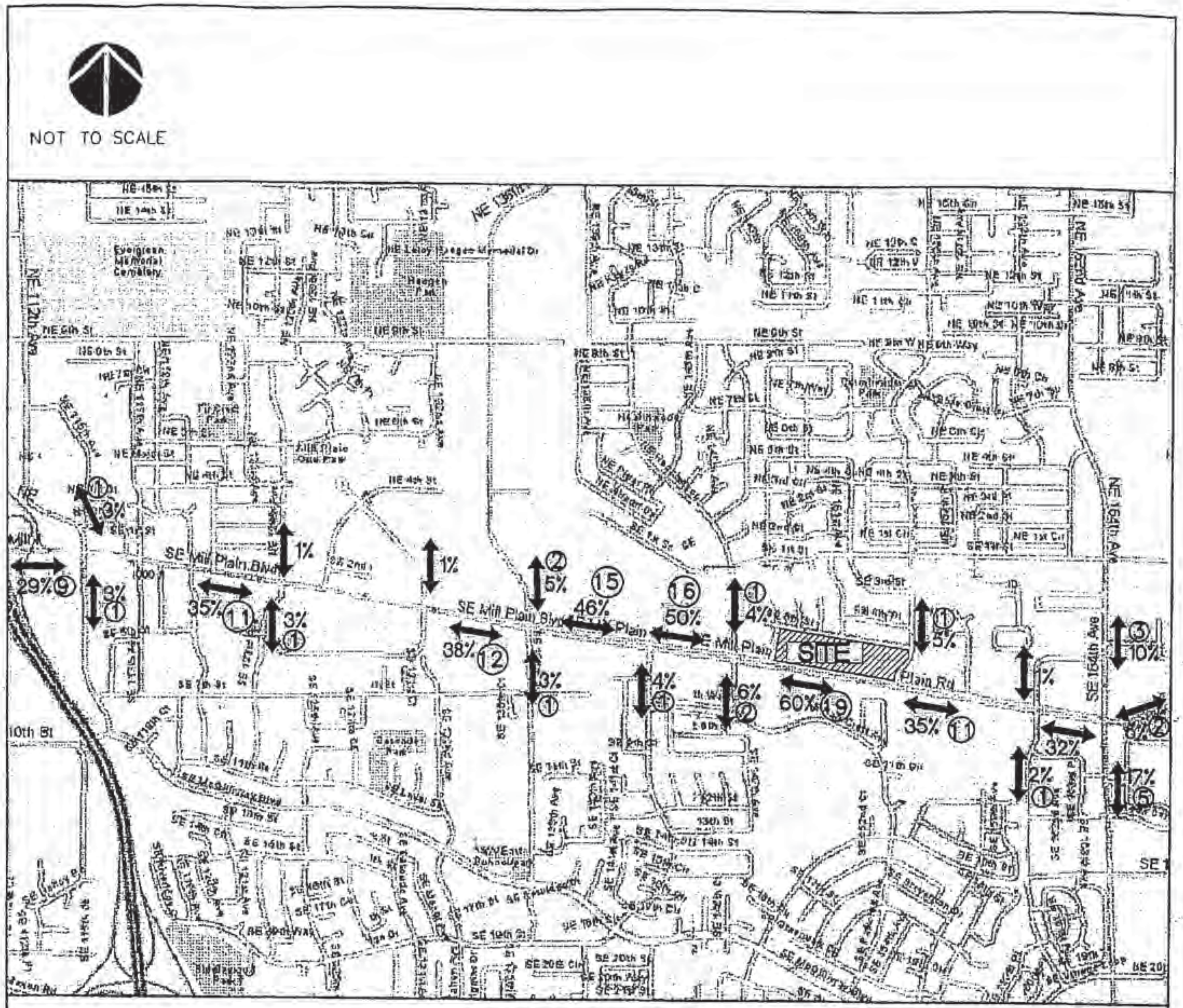
Elizabeth Busby

for Brent Ahrend, P.E.
Traffic Engineer

BTA/mpd

Enclosures: Trip Distribution and Assignment Figure

c: Jeff Humphreys, Brent Sanborn – Group Mackenzie



LEGEND	
29%	= TRIP DISTRIBUTION PERCENTAGE
④	= AM PEAK HOUR SITE TRIPS

AM PEAK HOUR TRIPS = 31

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JOB NO: 2040384.00

TRIP DISTRIBUTION AND ASSIGNMENT

EAST PRECINCT POLICE STATION
VANCOUVER, WA

FIGURE
1

Trip Generation Survey from 2007 Palo Alto Public Safety Building DEIR

Department and emergency dispatch operations from the City's downtown City Center complex to the project site would not be expected to impede the development or function of planned pedestrian or bicycle facilities.

(2) The project site vicinity is reasonably well served by transit: a multi-modal transit station is located on Park Boulevard at California Avenue and is served by Caltrain and all regional bus routes including Santa Clara County (VTA) lines, Sam Trans, Dumbarton Bridge services, and Stanford Marguerite. Relocation of the City's Police Department and emergency dispatch operations from the City's downtown City Center complex to the project site would reduce the level of transit accessibility for the project employees, but would not impede the operation of local transit system facilities as a result of congestion.

11.3.2 Proposed Project

(a) Option A. Under project Option A, the proposed new approximately 50,000-square-foot PSB facility would replace an existing, occupied 3,000-square-foot office building now on the project site. The Option A design includes a total of 161 on-site parking spaces, including 52 in the secured City vehicle underground parking area ("patrol parking"), 99 in the staff parking area, and 10 spaces at grade along the Sheridan Avenue frontage (90-degree spaces). On-street parallel parking would remain available along the project's Page Mill Road frontage.

(b) Option B. Under the project Option B design, the existing occupied 3,000-square-foot office building on the smaller 0.30-acre triangular-shaped parcel would remain. Only the larger 1.21-acre L-shaped parcel would be utilized to accommodate the new PSB facility. The Option B design includes on-site (offstreet) parking provisions for 161 vehicles, including 151 above-grade parking level spaces for secure patrol vehicle parking (52 spaces) and staff, volunteer and visitor parking (99 spaces), plus 12 90-degree spaces along the Sheridan Avenue frontage for visitor use.

11.3.3 Project Roadway System Impacts

(a) Project Trip Generation. Currently, the Police Department operations are located primarily within the City Center complex at 275 Forest Avenue, with patrol cars entering and existing the complex on a regular basis. The new PSB project would involve relocating City Police Department and emergency dispatch operations to the new Park Boulevard location, with patrol cars entering and exiting the relocated facility at a similar rate. In addition, as administrative center for the Police Department, the general public would be visiting the building for administrative and community business.

With the exception of administrative staff, many of the project employee trips would take place outside of the normal peak commute hour, because the work shifts for police and emergency dispatch workers do not correspond to the typical 9 AM to 5 PM business period. In addition, not all department members would be working at one time; a maximum of two-thirds of the police force is estimated to be working at one time. Therefore, the net increase in peak hour employee trips generated by the new PSB employees would be substantially less than for a more typical administrative use of a building of the proposed PSB size.

Peak Commute Period Trip Generation. Project trip generation projections were developed using detailed data supplied by the Palo Alto Police Department reflecting current and anticipated arrival/departure times for all employees, visitors, volunteers and deliveries for each hour of the day. City vehicle (i.e. patrol car, etc.) arrival/departure patterns were also provided on an hourly basis. Data was supplied for existing police services operations as well as for the increment of additional traffic that would be expected with the maximum planned expansion of police department employees. These detailed projections are tabulated in Appendix 16.3 of this EIR (Supplemental Traffic Information). Table 11.8 presents a summary of in and outbound traffic (after expansion) for the peak traffic hours during the morning and evening commute periods (7:00-8:00 AM, 8:00-9:00 AM, 4:00-5:00 PM, 5:00-6:00 PM). It should be noted that the police patrol shift schedule option producing the highest number of inbound and outbound vehicles during the commute peak traffic periods was used for evaluation purposes.

As shown in Table 11.8, the maximum peak project traffic generation during the weekday morning commute period would be expected to occur from 7:00-8:00 AM, with 39 (35+4) inbound and 28 (25+3) outbound vehicles. During the weekday evening commute period, the project's peak traffic generation would be expected to occur from 5:00-6:00 PM, with 28 (24+4) inbound and 33 outbound vehicles. In order to provide a conservative worst case analysis and with the approval of City staff, all project trip generation projections have been increased by a 20 percent factor to make sure that any changes in work shifts that may be required in the future and associated additional trip generation during the peak commute periods are accounted for in this EIR analysis. With a 20 percent safety factor added, the proposed project would generate 47 inbound and 34 outbound trips during the AM commute peak hour, with 34 inbound and 40 outbound trips during the PM commute peak traffic hour.

Community Room. The proposed project will contain a community room, which will be available to the citizens of Palo Alto for meetings and events as well as to the police and other City departments for meetings and training presentations. For EIR purposes, and based on the proposed room size (approximately 2,125 square feet), it is assumed that the maximum community room event attendee trip generation total would be limited to 50 vehicles , and would occur only during evenings when sufficient on-site parking would be available. For "worst case" EIR purposes, the evaluation also assumes arrival of the 50 vehicles for an evening meeting during the peak PM commute hour.

Net Change. For project Option A, the 3,000-square-foot office building now in use on the project site would be removed. As shown in Table 11.9, the exiting office building is projected to be generating 4 inbound and 1 outbound vehicles during the AM commute peak hour, with 1 inbound and 4 outbound vehicles during the PM commute peak hour.[1] Removal of these trips would represent less than a 10 percent reduction in the total AM and PM inbound and outbound peak hour trips generated by the PSB, and therefore would have a minimal effect on overall project traffic impacts.

It should also be noted, for both Options A and B, that some police-related traffic is already occurring on the local surface street system evaluated in this study (patrol cars, some employee home to work/work to home trips, etc.). In order to provide an additional level of conservative analysis, no adjustments were made in the new PSB building trip generation or distribution projections to reflect reassignment of these existing trips. Instead, there is an intentional double counting of some police-related vehicular trips from the PSB project in the EIR "with project" intersection traffic volume and LOS computations.

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[1] Office trip rates were obtained from the traffic engineering profession's standard source of trip rate data, *Trip Generation-7th Edition*, by the Institute of Transportation Engineers, 2003.

Table 11.8
PSB TRIP GENERATION SUMMARY

	AM Peak Hour Trips				PM Peak Hour Trips			
	7:00-8:00 AM		8:00-9:00 AM		4:00-5:00 PM		5:00-6:00 PM	
Description	In	Out	In	Out	In	Out	In	Out
Personal Vehicles:								
Patrol	2	6	2			5	6	3
Traffic & Parking	9 (+3)		1 (+2)					10
ISD & Crime Prevention	11		6 (+2)			11		6
TSD & Records	5		3			1		5
Communications & EOC	1 (+1)	1	1	1		1	1	1
Admin & P&T	2		1			3		3
Public Visits			5	5	2	2		
Volunteers			1			1		
Deliveries			2	2				
Subtotal Personal Vehicles	30 (+4)	7	22 (+4)	8	2	24	7	28
City Vehicles:								
Patrol	4	13	3	6	1	4	10	5
Traffic & Parking	1	5 (+3)	1	0 (+2)	9 (+3)	4	0 (+2)	
ISD & Crime Prevention				5	5		7 (+2)	
Subtotal City Vehicles	5	18 (+3)	4	11 (+2)	15 (+3)	8	17 (+4)	5
PSB Total	35 (+4)	25 (+3)	26 (+4)	19 (+2)	17 (+3)	32	24 (+4)	33
PSB Total + Growth + 20%	47	34	36	26	24	39	34	40
Safety Factor								
Community Room	0	0	0	0	0	0	50	

SOURCE: Palo Alto Police Department and Crane Transportation Group, April 2007

(XX) = Growth increment

Table 11.9
EXISTING TRIP GENERATION: OFFICE BUILDING NOW ON PSB PROJECT SITE

		Daily		AM Peak Hour Trips				PM Peak Hour Trips			
		2-Way Trips		Inbound		Outbound		Inbound		Outbound	
Use	Size	Rate	Vol	Rate	Vol	Rate	Vol	Rate	Vol	Rate	Vol
Office	3,000 sq. ft.	11.01	34	1.36	4	.19	1	.25	1	1.24	4

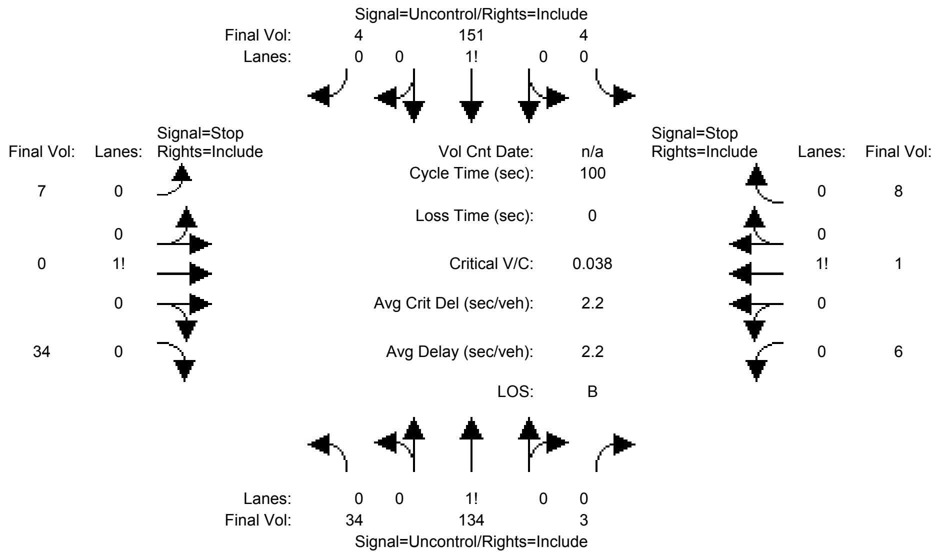
SOURCE: Trip Generation, 7th Edition, by the Institute of Transportation Engineers, 2003.
Compiled by: Crane Transportation Group

APPENDIX C: INTERSECTION TECHNICAL CALCULATIONS

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing AM

Intersection #1: Park Blvd & Sherman Ave



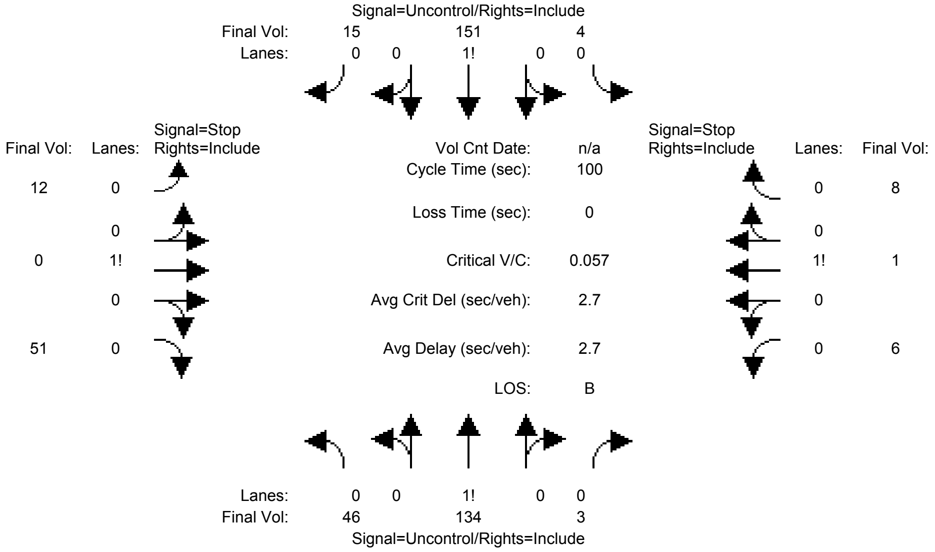
```
Street Name:               Park Blvd                            Sherman Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      34  134     3     4  151     4     7    0    34     6    1     8
Growth 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
Initial Bse:   34  134     3     4  151     4     7    0    34     6    1     8
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   34  134     3     4  151     4     7    0    34     6    1     8
User 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
PHF 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
PHF Volume:    34  134     3     4  151     4     7    0    34     6    1     8
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   34  134     3     4  151     4     7    0    34     6    1     8
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  155 xxxx xxxxx   137 xxxx xxxxx   369  366   153   382  367   136
Potent Cap.: 1438 xxxx xxxxx  1459 xxxx xxxxx   591  566   898   580  565   919
Move Cap.:   1438 xxxx xxxxx  1459 xxxx xxxxx   573  551   898   547  550   919
Volume/Cap:  0.02 xxxx  xxxx  0.00 xxxx  xxxx  0.01 0.00  0.04  0.01 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.6 xxxx xxxxx   7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  819 xxxxx  xxxx  698 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.2 xxxxx xxxxx  0.1 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.6 xxxxx xxxxx 10.3 xxxxx
Shared LOS:     *    *     *     *    *     *     *    A     *     *    B     *
ApproachDel:     xxxxxx           xxxxxx              9.6              10.3
ApproachLOS:        *                *                 A                 B
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   34  134     3     4  151     4     7    0    34     6    1     8
ApproachDel:    xxxxxx           xxxxxx              9.6             10.3
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=41]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=386]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=15]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=386]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   34  134     3     4  151     4     7    0    34     6    1     8
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             330
Minor Approach Volume:           41
Minor Approach Volume Threshold: 515
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing+Project AM

Intersection #1: Park Blvd & Sherman Ave



Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.057
Avg Crit Del (sec/veh): 2.7
Avg Delay (sec/veh): 2.7
LOS: B

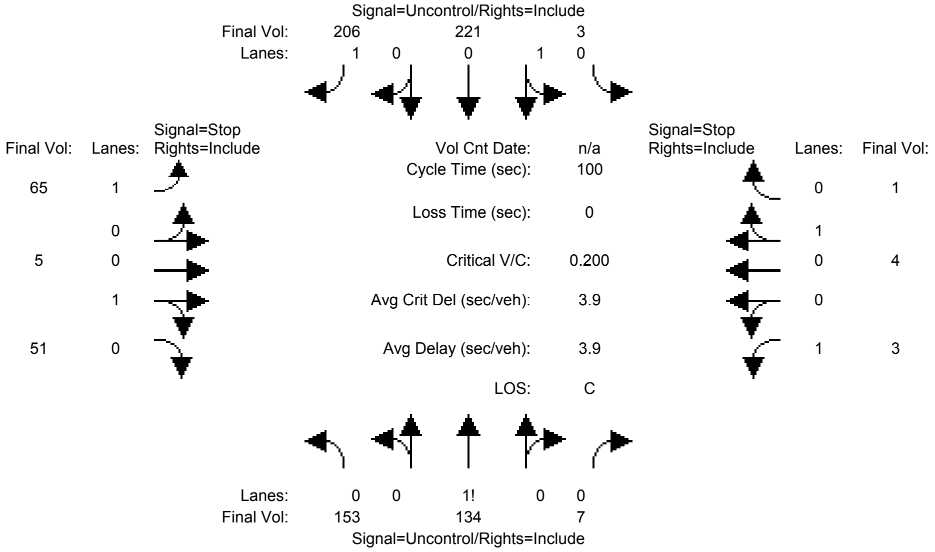
```
Street Name:            Park Blvd                        Sherman Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      34  134     3     4  151     4     7    0    34     6    1     8
Growth 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
Initial Bse:   34  134     3     4  151     4     7    0    34     6    1     8
Added Vol:     12    0     0     0    0    11     5    0    17     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   46  134     3     4  151    15    12    0    51     6    1     8
User 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
PHF 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
PHF Volume:    46  134     3     4  151    15    12    0    51     6    1     8
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   46  134     3     4  151    15    12    0    51     6    1     8
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  166 xxxx xxxxx   137 xxxx xxxxx   399  396   159   420  402   136
Potent Cap.: 1424 xxxx xxxxx  1459 xxxx xxxxx   565  545   892   548  540   919
Move Cap.:   1424 xxxx xxxxx  1459 xxxx xxxxx   544  525   892   502  521   919
Volume/Cap:  0.03 xxxx  xxxx  0.00 xxxx  xxxx  0.02 0.00  0.06  0.01 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.6 xxxx xxxxx   7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  795 xxxxx  xxxx  664 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.3 xxxxx xxxxx  0.1 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.9 xxxxx xxxxx 10.5 xxxxx
Shared LOS:     *    *     *     *    *     *     *    A     *     *    B     *
ApproachDel:    xxxxxx           xxxxxx              9.9             10.5
ApproachLOS:         *                *                A                B
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   46  134     3     4  151    15    12    0    51     6    1     8
ApproachDel:    xxxxxx           xxxxxx              9.9             10.5
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=63]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=431]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=15]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=431]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   46  134     3     4  151    15    12    0    51     6    1     8
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             353
Minor Approach Volume:           63
Minor Approach Volume Threshold: 497
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing AM

Intersection #2: Park Blvd & Page Mill Rd



Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.200
Avg Crit Del (sec/veh): 3.9
Avg Delay (sec/veh): 3.9
LOS: C

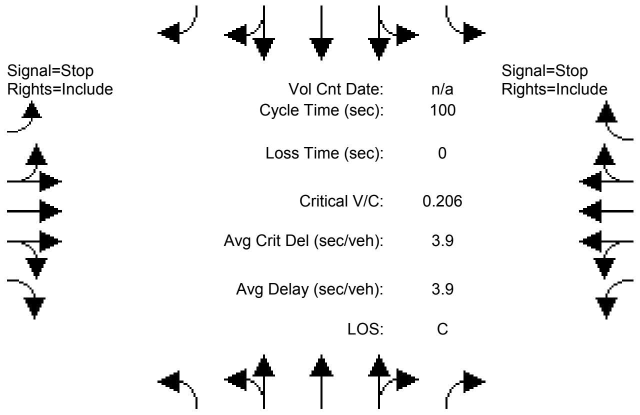
```
Street Name:            Park Blvd                         Page Mill Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     153  134     7     3  221   206    65     5    51     3    4     1
Growth 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
Initial Bse:  153  134     7     3  221   206    65     5    51     3    4     1
Added Vol:      0    0     0     0    0     0     0     0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0     0     0     0    0     0
Initial Fut:  153  134     7     3  221   206    65     5    51     3    4     1
User 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
PHF 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
PHF Volume:   153  134     7     3  221   206    65     5    51     3    4     1
Reduct Vol:     0    0     0     0    0     0     0     0     0     0    0     0
FinalVolume:  153  134     7     3  221   206    65     5    51     3    4     1
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  427 xxxx xxxxx   141 xxxx xxxxx   673  674   221   802  877   138
Potent Cap.: 1143 xxxx xxxxx  1455 xxxx xxxxx   372  379   824   305  289   916
Move Cap.:   1143 xxxx xxxxx  1455 xxxx xxxxx   325  323   824   251  246   916
Volume/Cap:  0.13 xxxx  xxxx  0.00 xxxx  xxxx  0.20 0.02  0.06  0.01 0.02  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.5 xxxx xxxxx   0.0 xxxx xxxxx   0.7 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:  8.6 xxxx xxxxx   7.5 xxxx xxxxx  18.8 xxxx xxxxx  19.5 xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     C    *     *     C    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   723  xxxx xxxx   289
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx   0.3 xxxxx xxxx   0.1
Shrd ConDel:xxxxx xxxx xxxxx   7.5 xxxx xxxxx xxxxx xxxx  10.4 xxxxx xxxx  17.7
Shared LOS:     *    *     *     A    *     *     *    *     B     *    *     C
ApproachDel:     xxxxxx           xxxxxx              14.9             18.4
ApproachLOS:        *                *                  B                C
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #2 Park Blvd & Page Mill Rd
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  0  1    1  0  0  1  0    1  0  0  1  0
Initial Vol:  153  134     7     3  221   206    65    5    51     3    4     1
ApproachDel:    xxxxxx           xxxxxx             14.9             18.4
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=2][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.5]
   FAIL - Vehicle-hours less than 5 for two or more lane approach.
Signal Warrant Rule #2: [approach volume=121]
   FAIL - Approach volume less than 150 for two or more lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=853]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=2][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 5 for two or more lane approach.
Signal Warrant Rule #2: [approach volume=8]
   FAIL - Approach volume less than 150 for two or more lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=853]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #2 Park Blvd & Page Mill Rd
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  0  1    1  0  0  1  0    1  0  0  1  0
Initial Vol:  153  134     7     3  221   206    65    5    51     3    4     1
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             724
Minor Approach Volume:           121
Minor Approach Volume Threshold: 513
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing+Project AM

Intersection #2: Park Blvd & Page Mill Rd



```
                         Signal=Uncontrol/Rights=Include
              Final Vol:    220         221          3
                 Lanes:       1    0      0      1    0

                Signal=Stop                                   Signal=Stop
Final Vol:  Lanes:  Rights=Include      Vol Cnt Date:         n/a    Rights=Include   Lanes:  Final Vol:
                                        Cycle Time (sec):     100
   67         1                                                                         0        1
                                        Loss Time (sec):      0
              0                                                                         1
    5         0                         Critical V/C:         0.206                     0        4
              1                         Avg Crit Del (sec/veh): 3.9                     0
   51         0                         Avg Delay (sec/veh):  3.9                       1        3
                                        LOS:                  C

                 Lanes:       0    0     1!      0    0
              Final Vol:    153         134          7
                         Signal=Uncontrol/Rights=Include
```

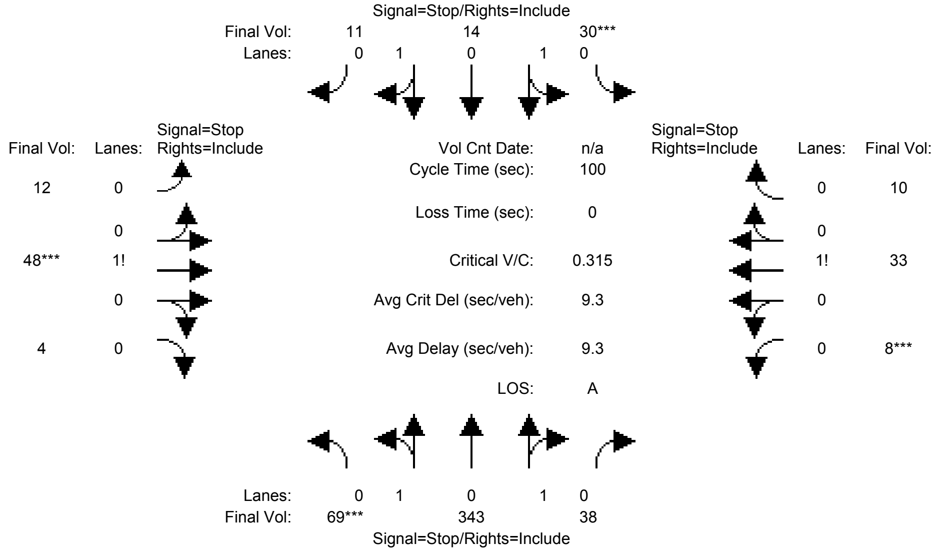
```
Street Name:              Park Blvd                         Page Mill Rd
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     153  134     7     3  221   206    65    5    51     3    4     1
Growth 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
Initial Bse:  153  134     7     3  221   206    65    5    51     3    4     1
Added Vol:      0    0     0     0    0    14     2    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  153  134     7     3  221   220    67    5    51     3    4     1
User 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
PHF 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
PHF Volume:   153  134     7     3  221   220    67    5    51     3    4     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  153  134     7     3  221   220    67    5    51     3    4     1
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  441 xxxx xxxxx   141 xxxx xxxxx   673  674   221   809  891   138
Potent Cap.: 1130 xxxx xxxxx  1455 xxxx xxxxx   372  379   824   302  284   916
Move Cap.:   1130 xxxx xxxxx  1455 xxxx xxxxx   325  322   824   247  241   916
Volume/Cap:  0.14 xxxx  xxxx  0.00 xxxx  xxxx  0.21 0.02  0.06  0.01 0.02  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.5 xxxx xxxxx   0.0 xxxx xxxxx   0.8 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:  8.7 xxxx xxxxx   7.5 xxxx xxxxx  19.0 xxxx xxxxx  19.7 xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     C    *     *     C    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   723  xxxx xxxx   283
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx   0.3 xxxxx xxxx   0.1
Shrd ConDel:xxxxx xxxx xxxxx   7.5 xxxx xxxxx xxxxx xxxx  10.4 xxxxx xxxx  17.9
Shared LOS:     *    *     *     A    *     *     *    *     B     *    *     C
ApproachDel:     xxxxxx           xxxxxx             15.1              18.6
ApproachLOS:        *                *                 C                 C
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #2 Park Blvd & Page Mill Rd
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  0  1    1  0  0  1  0    1  0  0  1  0
Initial Vol:  153  134     7     3  221   220    67     5    51     3    4     1
ApproachDel:    xxxxxx           xxxxxx             15.1             18.6
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=2][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.5]
   FAIL - Vehicle-hours less than 5 for two or more lane approach.
Signal Warrant Rule #2: [approach volume=123]
   FAIL - Approach volume less than 150 for two or more lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=869]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=2][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 5 for two or more lane approach.
Signal Warrant Rule #2: [approach volume=8]
   FAIL - Approach volume less than 150 for two or more lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=869]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #2 Park Blvd & Page Mill Rd
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  0  1    1  0  0  1  0    1  0  0  1  0
Initial Vol:  153  134     7     3  221   220    67     5    51     3    4     1
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             738
Minor Approach Volume:           123
Minor Approach Volume Threshold: 505
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing AM

Intersection #3: Birch St & Sherman Ave



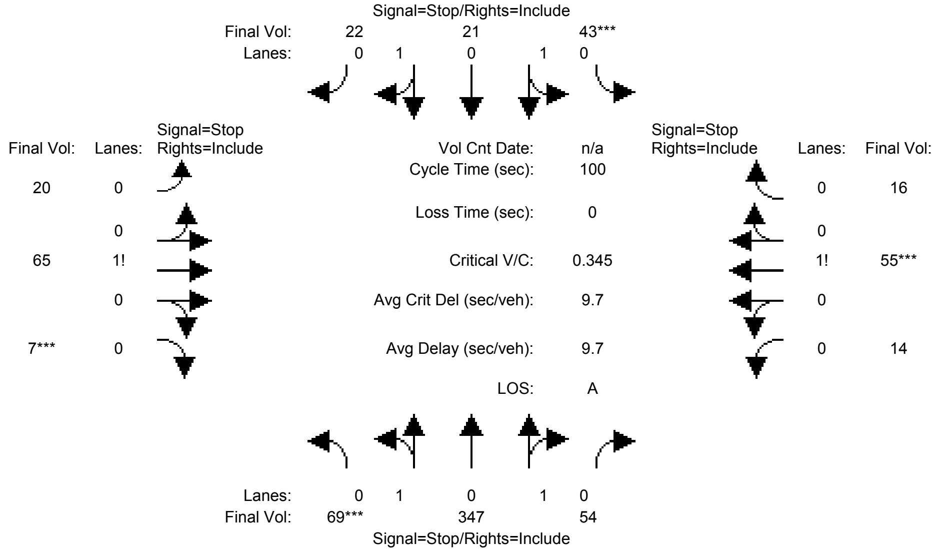
```
Street Name:                Birch St                        Sherman Ave
Approach:      North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      69  343    38    30   14    11    12   48     4     8   33    10
Growth 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
Initial Bse:   69  343    38    30   14    11    12   48     4     8   33    10
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   69  343    38    30   14    11    12   48     4     8   33    10
User 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
PHF 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
PHF Volume:    69  343    38    30   14    11    12   48     4     8   33    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   69  343    38    30   14    11    12   48     4     8   33    10
PCE 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
MLF 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
FinalVolume:   69  343    38    30   14    11    12   48     4     8   33    10
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.31 1.52  0.17  1.00 0.60  0.40  0.19 0.75  0.06  0.16 0.65  0.19
Final Sat.:   219 1120   127   615  426   284   126  504    42   107  439   133
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.32 0.31  0.30  0.05 0.03  0.04  0.10 0.10  0.10  0.08 0.08  0.08
Crit Moves:  ****              ****                    ****        ****
Delay/Veh:    9.9  9.6   9.4   8.7  7.8   7.8   8.5  8.5   8.5   8.4  8.4   8.4
Delay 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
AdjDel/Veh:   9.9  9.6   9.4   8.7  7.8   7.8   8.5  8.5   8.5   8.4  8.4   8.4
LOS by Move:    A    A     A     A    A     A     A    A     A     A    A     A
ApproachDel:       9.7               8.3               8.5               8.4
Delay Adj:        1.00              1.00              1.00              1.00
ApprAdjDel:        9.7               8.3               8.5               8.4
LOS by Appr:         A                 A                 A                 A
AllWayAvgQ:   0.4  0.4   0.4   0.0  0.0   0.0   0.1  0.1   0.1   0.1  0.1   0.1
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #3 Birch St & Sherman Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   69  343    38    30   14    11    12   48     4     8   33    10
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            505
Minor Approach Volume:          64
Minor Approach Volume Threshold: 520
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing+Project AM

Intersection #3: Birch St & Sherman Ave



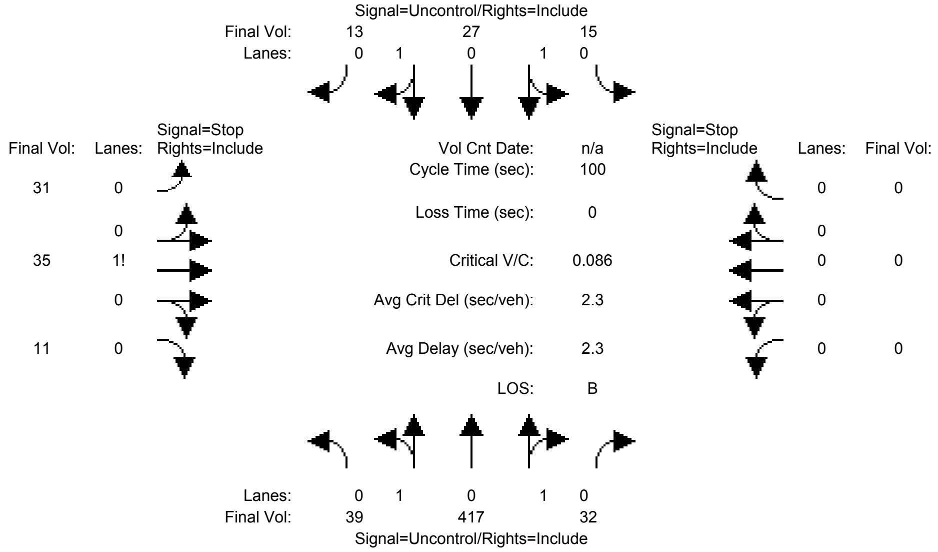
```
Street Name:                 Birch St                        Sherman Ave
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:    7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     69  343    38    30   14    11    12   48     4     8   33    10
Growth 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
Initial Bse:  69  343    38    30   14    11    12   48     4     8   33    10
Added Vol:     0    4    16    13    7    11     8   17     3     6   22     6
PasserByVol:   0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  69  347    54    43   21    22    20   65     7    14   55    16
User 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
PHF 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
PHF Volume:   69  347    54    43   21    22    20   65     7    14   55    16
Reduct Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  69  347    54    43   21    22    20   65     7    14   55    16
PCE 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
MLF 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
FinalVolume:  69  347    54    43   21    22    20   65     7    14   55    16
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.29 1.48  0.23  1.00 0.49  0.51  0.22 0.71  0.07  0.16 0.65  0.19
Final Sat.:   200 1039   166   586  333   349   141  457    49   108  423   123
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.34 0.33  0.32  0.07 0.06  0.06  0.14 0.14  0.14  0.13 0.13  0.13
Crit Moves:  ****              ****                             ****        ****
Delay/Veh:   10.5 10.2   9.9   9.1  8.1   8.1   9.0  9.0   9.0   8.9  8.9   8.9
Delay 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
AdjDel/Veh:  10.5 10.2   9.9   9.1  8.1   8.1   9.0  9.0   9.0   8.9  8.9   8.9
LOS by Move:    B    B     A     A    A     A     A    A     A     A    A     A
ApproachDel:      10.2              8.6              9.0              8.9
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:       10.2              8.6              9.0              8.9
LOS by Appr:         B                A                A                A
AllWayAvgQ:   0.5  0.5   0.5   0.1  0.1   0.1   0.1  0.1   0.1   0.1  0.1   0.1
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #3 Birch St & Sherman Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   69  347    54    43   21    22    20   65     7    14   55    16
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             556
Minor Approach Volume:           92
Minor Approach Volume Threshold: 487
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing AM

Intersection #4: Birch St & Grant Ave



Signal=Uncontrol/Rights=Include
Final Vol: 13 27 15
Lanes: 0 1 0 1 0

Signal=Stop
Rights=Include
Final Vol: 31 35 11
Lanes: 0 0 1! 0 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.086
Avg Crit Del (sec/veh): 2.3
Avg Delay (sec/veh): 2.3
LOS: B

Signal=Stop
Rights=Include
Lanes: 0 0 0 0 0
Final Vol: 0 0 0

Lanes: 0 1 0 1 0
Final Vol: 39 417 32
Signal=Uncontrol/Rights=Include

```
Street Name:                Birch St                          Grant Ave
Approach:       North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      39  417    32    15   27    13    31   35    11     0    0     0
Growth 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
Initial Bse:   39  417    32    15   27    13    31   35    11     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   39  417    32    15   27    13    31   35    11     0    0     0
User 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
PHF 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
PHF Volume:    39  417    32    15   27    13    31   35    11     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   39  417    32    15   27    13    31   35    11     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   40 xxxx xxxxx   449 xxxx xxxxx   350  591    20  xxxx xxxx xxxxx
Potent Cap.: 1583 xxxx xxxxx  1122 xxxx xxxxx   626  423  1060  xxxx xxxx xxxxx
Move Cap.:   1583 xxxx xxxxx  1122 xxxx xxxxx   608  406  1060  xxxx xxxx xxxxx
Volume/Cap:  0.02 xxxx  xxxx  0.01 xxxx  xxxx  0.05 0.09  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.3 xxxx xxxxx   8.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  522 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.5 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.3 xxxx xxxxx   8.3 xxxx xxxxx xxxxx 13.1 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     A    *     *     *    B     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx             13.1            xxxxxx
ApproachLOS:        *                *                 B                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

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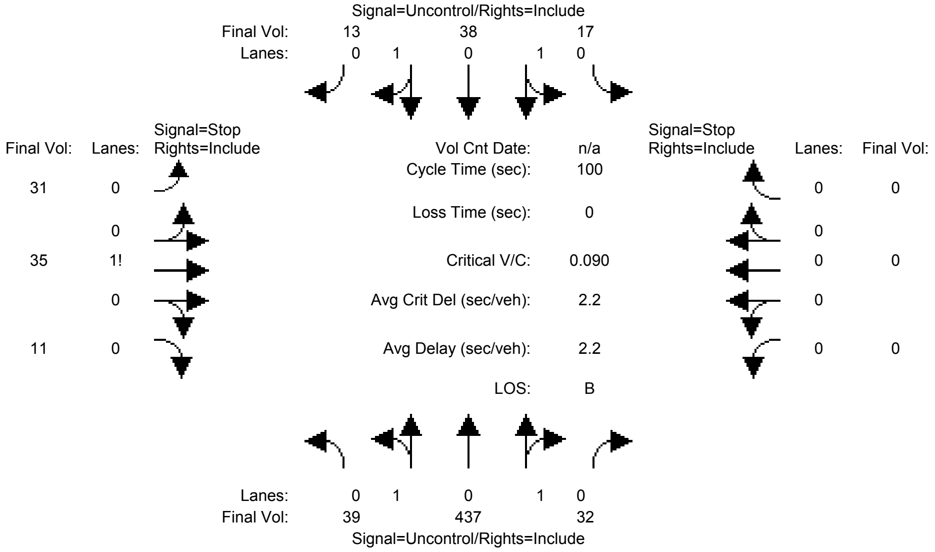
```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   39  417    32    15   27    13    31   35    11     0   0      0
ApproachDel:    xxxxxx           xxxxxx             13.1           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.3]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=77]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=620]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   39  417    32    15   27    13    31   35    11     0   0      0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             543
Minor Approach Volume:           77
Minor Approach Volume Threshold: 495
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing+Project AM

Intersection #4: Birch St & Grant Ave



Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.090
Avg Crit Del (sec/veh): 2.2
Avg Delay (sec/veh): 2.2
LOS: B

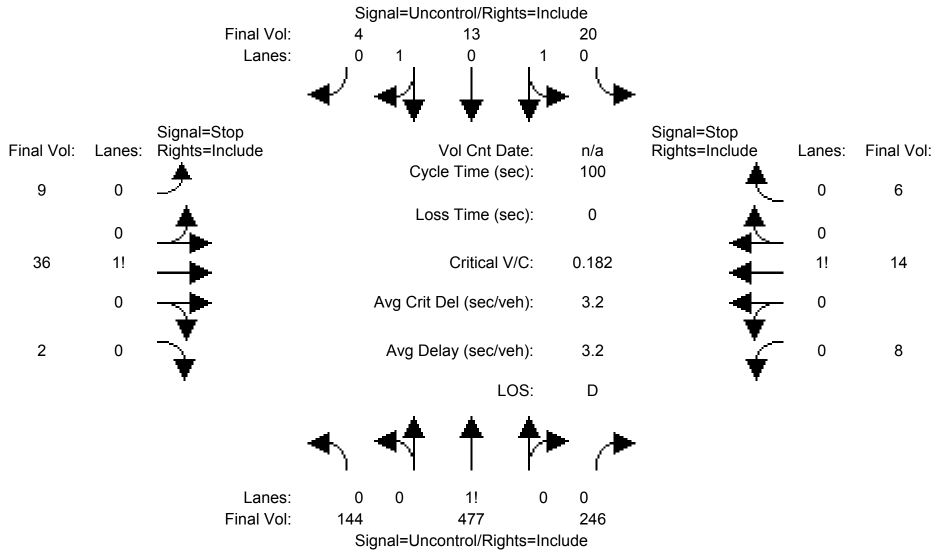
```
Street Name:                Birch St                          Grant Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      39  417    32    15   27    13    31   35    11     0    0     0
Growth 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
Initial Bse:   39  417    32    15   27    13    31   35    11     0    0     0
Added Vol:      0   20     0     2   11     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   39  437    32    17   38    13    31   35    11     0    0     0
User 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
PHF 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
PHF Volume:    39  437    32    17   38    13    31   35    11     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   39  437    32    17   38    13    31   35    11     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   51 xxxx xxxxx   469 xxxx xxxxx   375  626    26  xxxx xxxx xxxxx
Potent Cap.: 1568 xxxx xxxxx  1103 xxxx xxxxx   604  404  1051  xxxx xxxx xxxxx
Move Cap.:   1568 xxxx xxxxx  1103 xxxx xxxxx   585  387  1051  xxxx xxxx xxxxx
Volume/Cap:  0.02 xxxx  xxxx  0.02 xxxx  xxxx  0.05 0.09  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx   8.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  500 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.5 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx   8.3 xxxx xxxxx xxxxx 13.5 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     A    *     *     *    B     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx             13.5            xxxxxx
ApproachLOS:          *                *                B                 *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   39  437    32    17   38    13    31   35    11     0    0     0
ApproachDel:    xxxxxx           xxxxxx             13.5           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.3]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=77]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=653]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   39  437    32    17   38    13    31   35    11     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             576
Minor Approach Volume:           77
Minor Approach Volume Threshold: 475
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing AM

Intersection #5: Birch St & Sheridan Ave



```
                           Signal=Uncontrol/Rights=Include
                 Final Vol:    4          13          20
                    Lanes:     0    1      0       1   0

            Signal=Stop                                  Signal=Stop
Final Vol:  Lanes:  Rights=Include     Vol Cnt Date:    n/a   Rights=Include   Lanes:  Final Vol:
                                   Cycle Time (sec):    100
    9         0                                                                  0        6
                                    Loss Time (sec):      0
              0                                                                  0
   36         1!                       Critical V/C:  0.182                      1!      14
              0                   Avg Crit Del (sec/veh):  3.2                    0
    2         0                     Avg Delay (sec/veh):  3.2                    0        8
                                                  LOS:    D

                    Lanes:     0    0      1!      0   0
                 Final Vol:   144         477         246
                           Signal=Uncontrol/Rights=Include
```

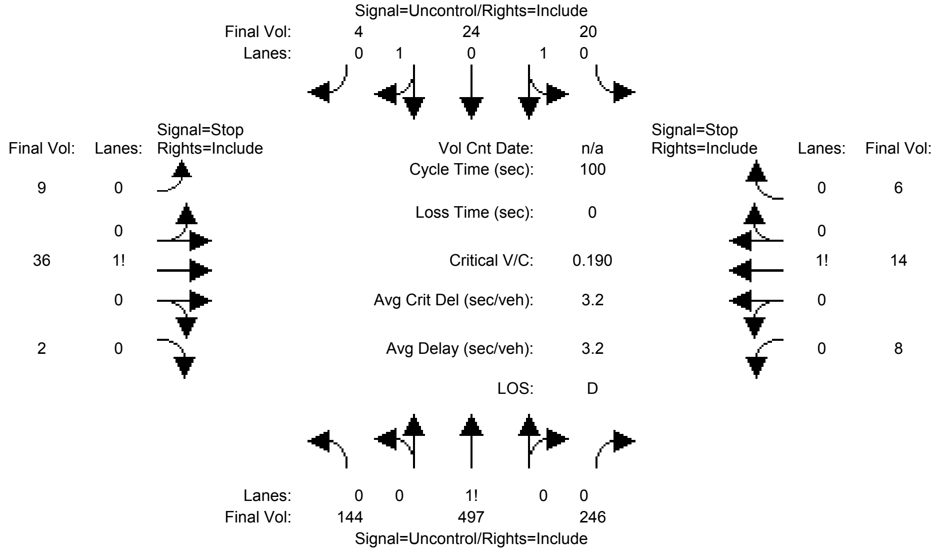
```
Street Name:                Birch St                        Sheridan Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     144  477   246    20   13     4     9   36     2     8   14     6
Growth 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
Initial Bse:  144  477   246    20   13     4     9   36     2     8   14     6
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  144  477   246    20   13     4     9   36     2     8   14     6
User 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
PHF 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
PHF Volume:   144  477   246    20   13     4     9   36     2     8   14     6
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  144  477   246    20   13     4     9   36     2     8   14     6
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   17 xxxx xxxxx   723 xxxx xxxxx   953 1066     9   953  945   600
Potent Cap.: 1613 xxxx xxxxx   889 xxxx xxxxx   241  224  1079   241  264   505
Move Cap.:   1613 xxxx xxxxx   889 xxxx xxxxx   207  198  1079   189  233   505
Volume/Cap:  0.09 xxxx  xxxx  0.02 xxxx  xxxx  0.04 0.18  0.00  0.04 0.06  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.3 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx   9.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  207 xxxxx  xxxx  245 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx  0.8 xxxxx xxxxx  0.4 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   9.1 xxxx xxxxx xxxxx 27.5 xxxxx xxxxx 21.6 xxxxx
Shared LOS:     *    *     *     A    *     *     *    D     *     *    C     *
ApproachDel:     xxxxxx           xxxxxx              27.5             21.6
ApproachLOS:         *                *                  D                C
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound      West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign       Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  144  477   246    20   13     4     9   36     2     8   14     6
ApproachDel:    xxxxxx           xxxxxx            27.5            21.6
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.4]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=47]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=979]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=28]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=979]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound      West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign       Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  144  477   246    20   13     4     9   36     2     8   14     6
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             904
Minor Approach Volume:           47
Minor Approach Volume Threshold: 320
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing+Project AM

Intersection #5: Birch St & Sheridan Ave



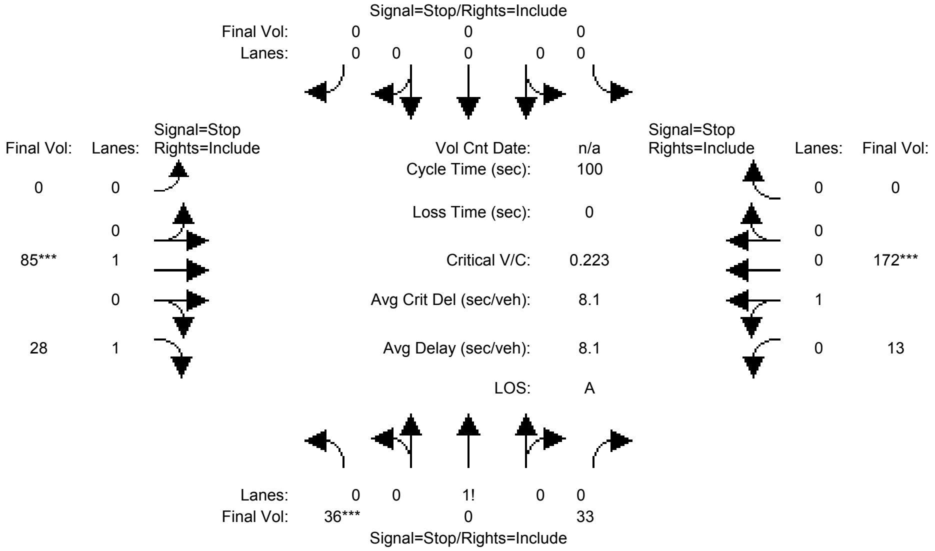
```
Street Name:             Birch St                        Sheridan Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     144  477   246    20   13     4     9   36     2     8   14     6
Growth 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
Initial Bse:  144  477   246    20   13     4     9   36     2     8   14     6
Added Vol:      0   20     0     0   11     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  144  497   246    20   24     4     9   36     2     8   14     6
User 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
PHF 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
PHF Volume:   144  497   246    20   24     4     9   36     2     8   14     6
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  144  497   246    20   24     4     9   36     2     8   14     6
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   28 xxxx xxxxx   743 xxxx xxxxx   984 1097    14   978  976   620
Potent Cap.: 1599 xxxx xxxxx   873 xxxx xxxxx   229  215  1072   232  253   492
Move Cap.:   1599 xxxx xxxxx   873 xxxx xxxxx   196  189  1072   180  223   492
Volume/Cap:  0.09 xxxx  xxxx  0.02 xxxx  xxxx  0.05 0.19  0.00  0.04 0.06  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.3 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.5 xxxx xxxxx   9.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  198 xxxxx  xxxx  234 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx  0.9 xxxxx xxxxx  0.4 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   9.2 xxxx xxxxx xxxxx 28.8 xxxxx xxxxx 22.4 xxxxx
Shared LOS:     *    *     *     A    *     *     *    D     *     *    C     *
ApproachDel:    xxxxxx           xxxxxx             28.8             22.4
ApproachLOS:         *                *                D                C
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  144  497   246    20   24     4     9   36     2     8   14     6
ApproachDel:    xxxxxx           xxxxxx             28.8             22.4
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.4]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=47]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1010]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=28]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1010]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  144  497   246    20   24     4     9   36     2     8   14     6
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             935
Minor Approach Volume:           47
Minor Approach Volume Threshold: 308
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing AM

Intersection #6: Ash St & California Ave



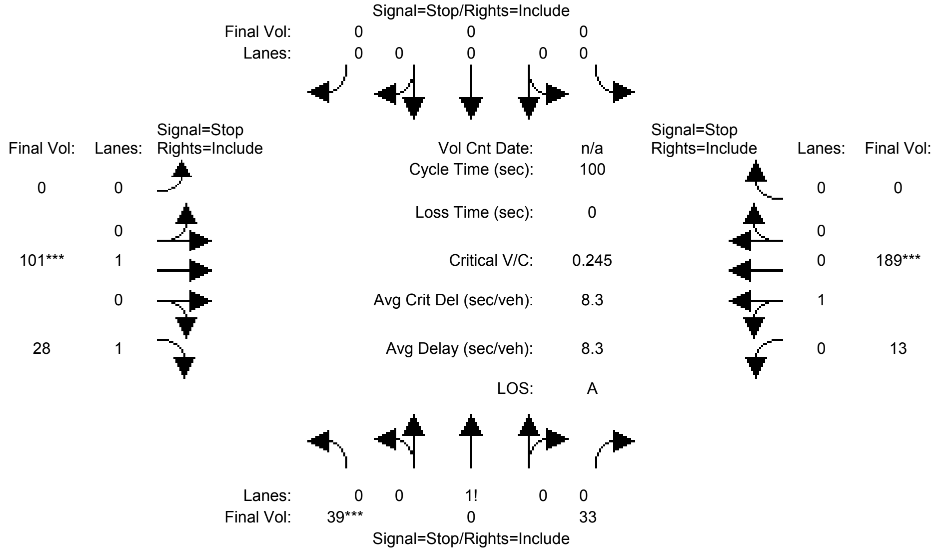
```
Street Name:              Ash St                        California Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      36    0    33     0    0     0     0   85    28    13  172     0
Growth 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
Initial Bse:   36    0    33     0    0     0     0   85    28    13  172     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   36    0    33     0    0     0     0   85    28    13  172     0
User 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
PHF 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
PHF Volume:    36    0    33     0    0     0     0   85    28    13  172     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   36    0    33     0    0     0     0   85    28    13  172     0
PCE 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
MLF 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
FinalVolume:   36    0    33     0    0     0     0   85    28    13  172     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.52 0.00  0.48  0.00 0.00  0.00  0.00 1.00  1.00  0.07 0.93  0.00
Final Sat.:   409    0   375     0    0     0     0  742   867    58  771     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.09 xxxx  0.09  xxxx xxxx  xxxx  xxxx 0.11  0.03  0.22 0.22  xxxx
Crit Moves:  ****                                   ****             ****
Delay/Veh:    7.7  0.0   7.7   0.0  0.0   0.0   0.0  8.1   6.9   8.5  8.5   0.0
Delay 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
AdjDel/Veh:   7.7  0.0   7.7   0.0  0.0   0.0   0.0  8.1   6.9   8.5  8.5   0.0
LOS by Move:    A    *     A     *    *     *     *    A     A     A    A     *
ApproachDel:       7.7           xxxxxx              7.8              8.5
Delay Adj:        1.00            xxxxx             1.00             1.00
ApprAdjDel:        7.7           xxxxxx              7.8              8.5
LOS by Appr:         A                *                A                A
AllWayAvgQ:   0.1  0.1   0.1   0.0  0.0   0.0   0.0  0.1   0.0   0.3  0.3   0.3
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #6 Ash St & California Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
Initial Vol:   36    0    33     0    0     0     0   85    28    13  172     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            298
Minor Approach Volume:          69
Minor Approach Volume Threshold: 702
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing+Project AM

Intersection #6: Ash St & California Ave



Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.245
Avg Crit Del (sec/veh): 8.3
Avg Delay (sec/veh): 8.3
LOS: A

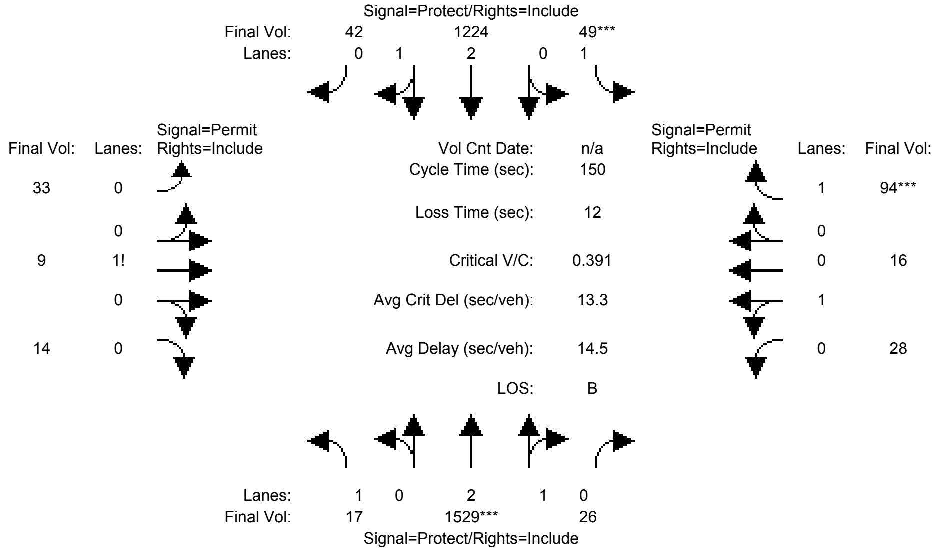
```
Street Name:                Ash St                         California Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10    7   10    10    7   10    10    7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      36    0    33    0    0     0    0   85    28   13  172     0
Growth 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
Initial Bse:   36    0    33    0    0     0    0   85    28   13  172     0
Added Vol:      3    0     0    0    0     0    0   16     0    0   17     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:   39    0    33    0    0     0    0  101    28   13  189     0
User 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
PHF 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
PHF Volume:    39    0    33    0    0     0    0  101    28   13  189     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   39    0    33    0    0     0    0  101    28   13  189     0
PCE 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
MLF 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
FinalVolume:   39    0    33    0    0     0    0  101    28   13  189     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       0.54 0.00  0.46 0.00 0.00  0.00 0.00 1.00  1.00 0.06 0.94  0.00
Final Sat.:   415    0   351    0    0     0    0  738   862   53  770     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.09 xxxx  0.09 xxxx xxxx  xxxx xxxx 0.14  0.03 0.25 0.25  xxxx
Crit Moves:  ****                                 ****                ****
Delay/Veh:    7.9  0.0   7.9  0.0  0.0   0.0  0.0  8.2   6.9  8.7  8.7   0.0
Delay 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
AdjDel/Veh:   7.9  0.0   7.9  0.0  0.0   0.0  0.0  8.2   6.9  8.7  8.7   0.0
LOS by Move:    A    *     A    *    *     *    *    A     A    A    A     *
ApproachDel:        7.9            xxxxxx              8.0               8.7
Delay Adj:         1.00             xxxxx             1.00              1.00
ApprAdjDel:         7.9            xxxxxx              8.0               8.7
LOS by Appr:          A                 *                A                 A
AllWayAvgQ:   0.1  0.1   0.1  0.0  0.0   0.0  0.0  0.2   0.0  0.3  0.3   0.3
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #6 Ash St & California Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
Initial Vol:   39    0    33     0    0     0     0  101    28    13  189     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             331
Minor Approach Volume:           72
Minor Approach Volume Threshold: 666
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #7: ECR & Cambridge Ave



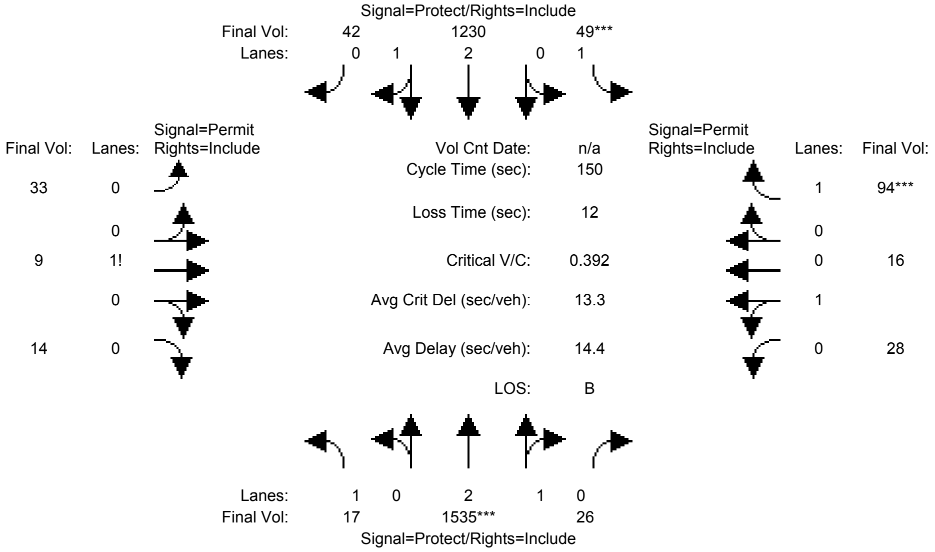
Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 0.391
Avg Crit Del (sec/veh): 13.3
Avg Delay (sec/veh): 14.5
LOS: B

```
Street Name:                    ECR                            Cambridge Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      17 1529    26    49 1224    42    33    9    14    28   16    94
Growth 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
Initial Bse:   17 1529    26    49 1224    42    33    9    14    28   16    94
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   17 1529    26    49 1224    42    33    9    14    28   16    94
User 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
PHF 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
PHF Volume:    17 1529    26    49 1224    42    33    9    14    28   16    94
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   17 1529    26    49 1224    42    33    9    14    28   16    94
PCE 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
MLF 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
FinalVolume:   17 1529    26    49 1224    42    33    9    14    28   16    94
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 0.98  0.95  0.92 0.98  0.95  0.92 0.92  0.92  0.95 0.95  0.92
Lanes:       1.00 2.95  0.05  1.00 2.90  0.10  0.59 0.16  0.25  0.64 0.36  1.00
Final Sat.:  1750 5506    94  1750 5414   186  1031  281   438  1145  655  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.28  0.28  0.03 0.23  0.23  0.03 0.03  0.03  0.02 0.02  0.05
Crit Moves:       ****        ****                                            ****
Green Time:  20.1  107 106.6  10.8 97.3  97.3  20.6 20.6  20.6  20.6 20.6  20.6
Volume/Cap:  0.07 0.39  0.39  0.39 0.35  0.35  0.23 0.23  0.23  0.18 0.18  0.39
Delay/Veh:   56.9  8.7   8.7  68.5 12.0  12.0  58.1 58.1  58.1  57.5 57.5  60.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  56.9  8.7   8.7  68.5 12.0  12.0  58.1 58.1  58.1  57.5 57.5  60.0
LOS by Move:   E+    A     A     E    B     B    E+   E+    E+    E+   E+     E
HCM2k95thQ:     1   18    18     5   16    16     5    5     5     4    4     9
Note: Queue reported is the number of cars per lane.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing+Project AM

Intersection #7: ECR & Cambridge Ave



Signal=Protect/Rights=Include
Final Vol: 42 1230 49***
Lanes: 0 1 2 0 1

Final Vol: Lanes: Signal=Permit Rights=Include
33 0
0
9 1!
0
14 0

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 0.392
Avg Crit Del (sec/veh): 13.3
Avg Delay (sec/veh): 14.4
LOS: B

Signal=Permit Rights=Include Lanes: Final Vol:
1 94***
0
0 16
1
0 28

Lanes: 1 0 2 1 0
Final Vol: 17 1535*** 26
Signal=Protect/Rights=Include

```
Street Name:                  ECR                          Cambridge Ave
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      17 1529    26    49 1224    42    33    9    14    28   16    94
Growth 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
Initial Bse:   17 1529    26    49 1224    42    33    9    14    28   16    94
Added Vol:      0    6     0     0    6     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   17 1535    26    49 1230    42    33    9    14    28   16    94
User 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
PHF 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
PHF Volume:    17 1535    26    49 1230    42    33    9    14    28   16    94
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   17 1535    26    49 1230    42    33    9    14    28   16    94
PCE 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
MLF 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
FinalVolume:   17 1535    26    49 1230    42    33    9    14    28   16    94
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 0.98  0.95  0.92 0.98  0.95  0.92 0.92  0.92  0.95 0.95  0.92
Lanes:       1.00 2.95  0.05  1.00 2.90  0.10  0.59 0.16  0.25  0.64 0.36  1.00
Final Sat.:  1750 5507    93  1750 5415   185  1031  281   438  1145  655  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.28  0.28  0.03 0.23  0.23  0.03 0.03  0.03  0.02 0.02  0.05
Crit Moves:       ****        ****                                            ****
Green Time:  20.0  107 106.7  10.7 97.4  97.4  20.6 20.6  20.6  20.6 20.6  20.6
Volume/Cap:  0.07 0.39  0.39  0.39 0.35  0.35  0.23 0.23  0.23  0.18 0.18  0.39
Delay/Veh:   57.0  8.7   8.7  68.6 12.0  12.0  58.2 58.2  58.2  57.6 57.6  60.1
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  57.0  8.7   8.7  68.6 12.0  12.0  58.2 58.2  58.2  57.6 57.6  60.1
LOS by Move:   E+    A     A     E   B+    B+    E+   E+    E+    E+   E+     E
HCM2k95thQ:     1   18    18     5   16    16     5    5     5     4    4     9
Note: Queue reported is the number of cars per lane.
```

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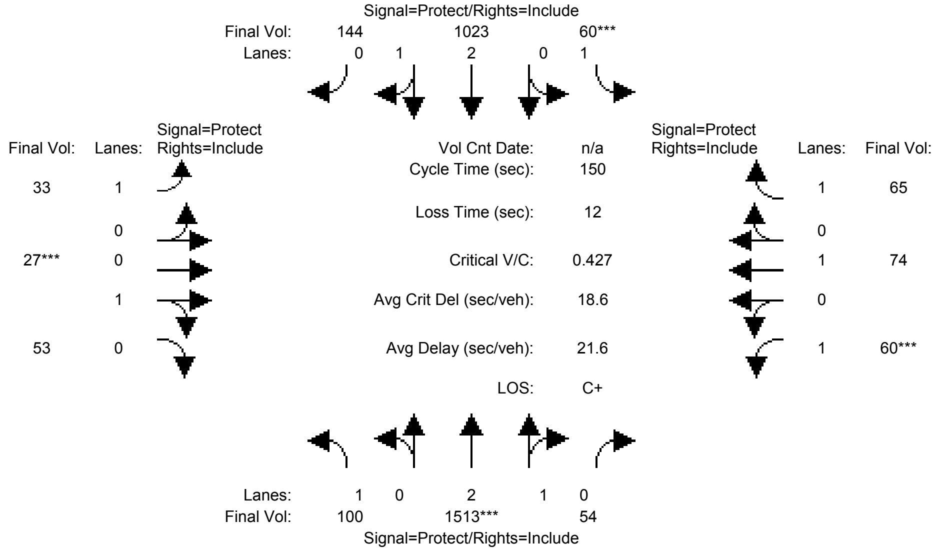
SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #8: ECR & California Ave



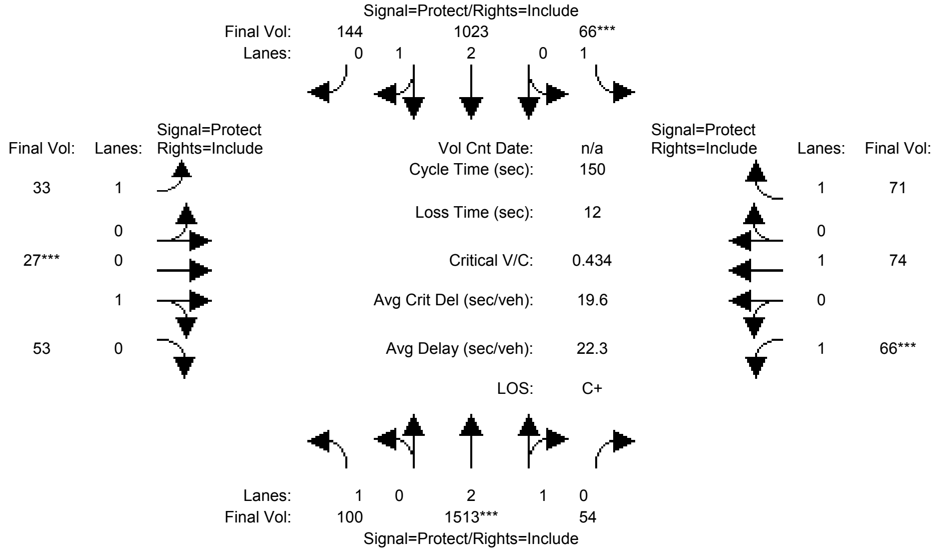
Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 0.427
Avg Crit Del (sec/veh): 18.6
Avg Delay (sec/veh): 21.6
LOS: C+

```
Street Name:                 ECR                            California Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     100 1513    54    60 1023   144    33   27    53    60   74    65
Growth 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
Initial Bse:  100 1513    54    60 1023   144    33   27    53    60   74    65
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  100 1513    54    60 1023   144    33   27    53    60   74    65
User 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
PHF 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
PHF Volume:   100 1513    54    60 1023   144    33   27    53    60   74    65
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  100 1513    54    60 1023   144    33   27    53    60   74    65
PCE 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
MLF 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
FinalVolume:  100 1513    54    60 1023   144    33   27    53    60   74    65
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 0.98  0.95  0.92 0.99  0.95  0.92 0.95  0.95  0.92 1.00  0.92
Lanes:       1.00 2.89  0.11  1.00 2.62  0.38  1.00 0.34  0.66  1.00 1.00  1.00
Final Sat.:  1750 5407   193  1750 4908   691  1750  607  1192  1750 1900  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.28  0.28  0.03 0.21  0.21  0.02 0.04  0.04  0.03 0.04  0.04
Crit Moves:       ****        ****                   ****        ****
Green Time:  23.7 98.3  98.3  12.0 86.6  86.6  11.4 15.6  15.6  12.0 16.3  16.3
Volume/Cap:  0.36 0.43  0.43  0.43 0.36  0.36  0.25 0.43  0.43  0.43 0.36  0.34
Delay/Veh:   57.2 12.5  12.5  67.8 17.0  17.0  66.3 64.6  64.6  67.8 63.1  63.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  57.2 12.5  12.5  67.8 17.0  17.0  66.3 64.6  64.6  67.8 63.1  63.0
LOS by Move:   E+    B     B     E    B     B     E    E     E     E    E     E
HCM2k95thQ:     9   21    21     5   17    17     4    8     8     7    7     6
Note: Queue reported is the number of cars per lane.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing+Project AM

Intersection #8: ECR & California Ave



Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 0.434
Avg Crit Del (sec/veh): 19.6
Avg Delay (sec/veh): 22.3
LOS: C+

```
Street Name:                    ECR                              California Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     100 1513    54    60 1023   144    33   27    53    60   74    65
Growth 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
Initial Bse:  100 1513    54    60 1023   144    33   27    53    60   74    65
Added Vol:      0    0     0     6    0     0     0    0     0     6    0     6
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  100 1513    54    66 1023   144    33   27    53    66   74    71
User 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
PHF 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
PHF Volume:   100 1513    54    66 1023   144    33   27    53    66   74    71
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  100 1513    54    66 1023   144    33   27    53    66   74    71
PCE 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
MLF 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
FinalVolume:  100 1513    54    66 1023   144    33   27    53    66   74    71
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 0.98  0.95  0.92 0.99  0.95  0.92 0.95  0.95  0.92 1.00  0.92
Lanes:       1.00 2.89  0.11  1.00 2.62  0.38  1.00 0.34  0.66  1.00 1.00  1.00
Final Sat.:  1750 5407   193  1750 4908   691  1750  607  1192  1750 1900  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.28  0.28  0.04 0.21  0.21  0.02 0.04  0.04  0.04 0.04  0.04
Crit Moves:       ****        ****                  ****        ****
Green Time:  23.6 96.6  96.6  13.0 86.0  86.0  11.7 15.3  15.3  13.0 16.7  16.7
Volume/Cap:  0.36 0.43  0.43  0.43 0.36  0.36  0.24 0.43  0.43  0.43 0.35  0.36
Delay/Veh:   57.3 13.3  13.3  67.0 17.3  17.3  65.9 64.9  64.9  67.0 62.6  62.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  57.3 13.3  13.3  67.0 17.3  17.3  65.9 64.9  64.9  67.0 62.6  62.9
LOS by Move:   E+    B     B     E    B     B     E    E     E     E    E     E
HCM2k95thQ:     9   21    21     5   17    17     4    8     8     7    7     7
Note: Queue reported is the number of cars per lane.
```

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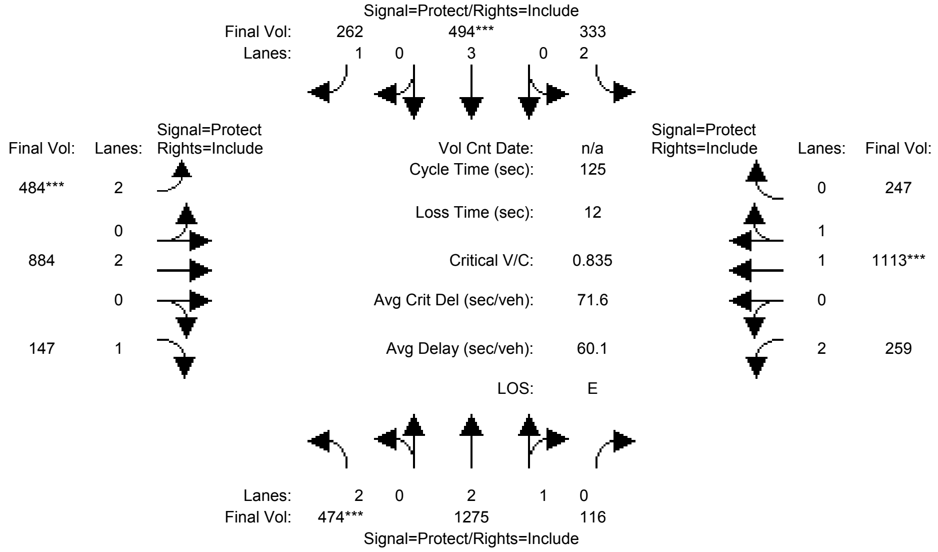
SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #9: El Camino Real & Page Mill Rd



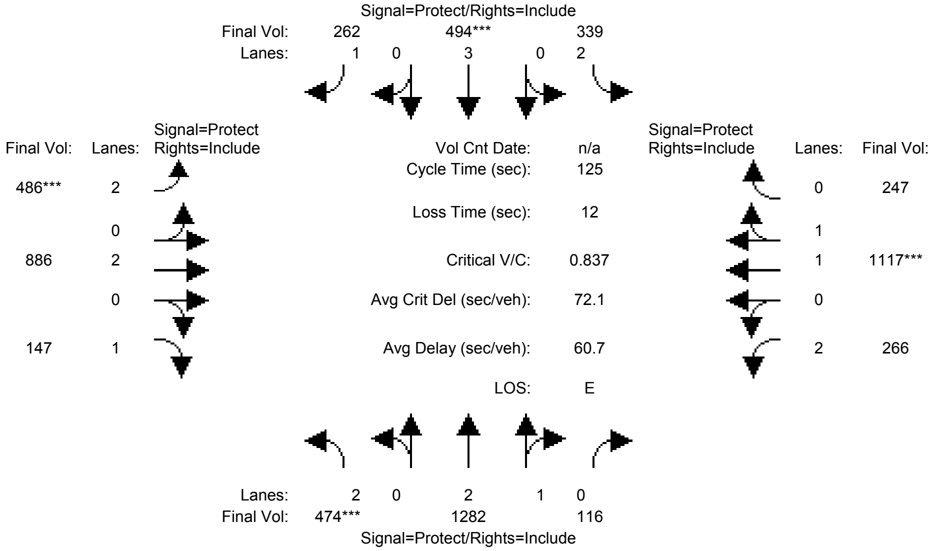
```
                    Signal=Protect/Rights=Include
          Final Vol:   262        494***        333
              Lanes:     1    0     3     0     2

               Signal=Protect                                           Signal=Protect
Final Vol: Lanes: Rights=Include        Vol Cnt Date:       n/a         Rights=Include   Lanes:  Final Vol:
                                     Cycle Time (sec):      125
 484***     2                                                                              0       247
                                      Loss Time (sec):      12
            0                                                                              1
  884       2                            Critical V/C:      0.835                          1      1113***
            0                     Avg Crit Del (sec/veh):   71.6                           0
  147       1                         Avg Delay (sec/veh):  60.1                           2       259
                                                  LOS:      E

              Lanes:     2    0     2     1     0
          Final Vol:   474***      1275        116
                    Signal=Protect/Rights=Include
```

```
Street Name:          El Camino Real                    Page Mill Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   30     0     7   30     0     7   28    28     7   30     0
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     474 1275   116   333  494   262   484  884   147   259 1113   247
Growth 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
Initial Bse:  474 1275   116   333  494   262   484  884   147   259 1113   247
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  474 1275   116   333  494   262   484  884   147   259 1113   247
User 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
PHF 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
PHF Volume:   474 1275   116   333  494   262   484  884   147   259 1113   247
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  474 1275   116   333  494   262   484  884   147   259 1113   247
PCE 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
MLF 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
FinalVolume:  474 1275   116   333  494   262   484  884   147   259 1113   247
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.83 0.99  1.00  0.83 1.00  0.97  0.83 1.00  0.92  0.69 0.98  1.00
Lanes:       2.00 2.75  0.25  2.00 3.00  1.00  2.00 2.00  1.00  2.00 1.64  0.36
Final Sat.:  3150 5156   469  3150 5700  1847  3150 3800  1750  2625 3058   679
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.15 0.25  0.25  0.11 0.09  0.14  0.15 0.23  0.08  0.10 0.36  0.36
Crit Moves:  ****                  ****        ****                   ****
Green Time:  18.7 34.1  34.1  14.6 30.0  30.0  19.1 45.2  45.2  19.2 45.2  45.2
Volume/Cap:  1.01 0.91  0.91  0.91 0.36  0.59  1.01 0.64  0.23  0.64 1.01  1.01
Delay/Veh:   96.2 53.2  53.2  82.9 40.3  47.8  95.6 35.6  28.7  57.4 65.9  65.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  96.2 53.2  53.2  82.9 40.3  47.8  95.6 35.6  28.7  57.4 65.9  65.9
LOS by Move:    F   D-    D-     F    D     D     F   D+     C    E+    E     E
HCM2k95thQ:    26   34    35    18   10    18    27   24     8    12   54    56
Note: Queue reported is the number of cars per lane.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing+Project AM

Intersection #9: El Camino Real & Page Mill Rd



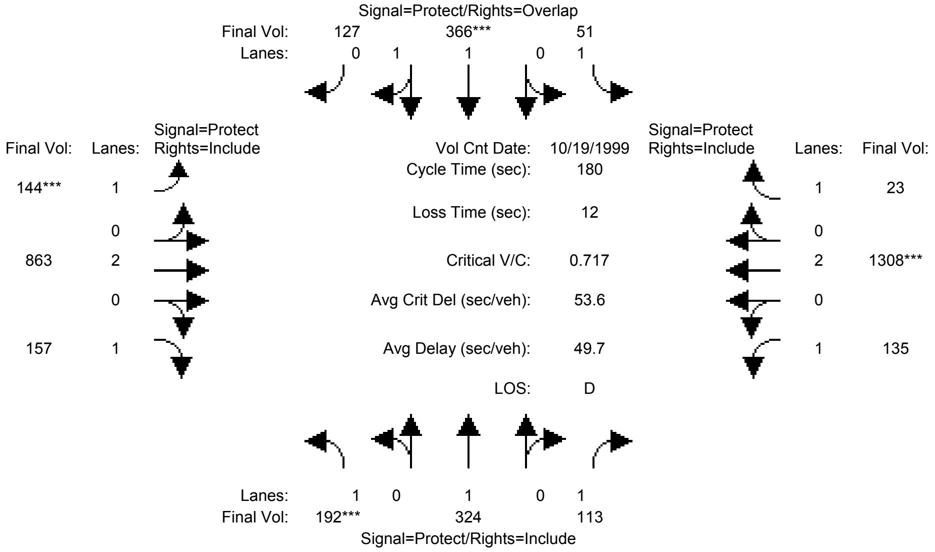
```
                         Signal=Protect/Rights=Include
             Final Vol:    262        494***        339
                 Lanes:      1   0      3      0   2

          Signal=Protect                                   Signal=Protect
Final Vol: Lanes: Rights=Include  Vol Cnt Date:     n/a    Rights=Include  Lanes:  Final Vol:
                                Cycle Time (sec):   125
  486***     2                                                               0       247
                                 Loss Time (sec):    12
             0                                                               1
   886       2                     Critical V/C:  0.837                      1     1117***
             0                Avg Crit Del (sec/veh): 72.1                   0
   147       1                   Avg Delay (sec/veh): 60.7                   2       266
                                               LOS:    E

                 Lanes:      2   0      2      1   0
             Final Vol:   474***      1282        116
                         Signal=Protect/Rights=Include
```

```
Street Name:          El Camino Real                  Page Mill Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   30     0     7   30     0     7   28    28     7   30     0
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     474 1275   116   333  494   262   484  884   147   259 1113   247
Growth 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
Initial Bse:  474 1275   116   333  494   262   484  884   147   259 1113   247
Added Vol:      0    7     0     6    0     0     2    2     0     7    4     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  474 1282   116   339  494   262   486  886   147   266 1117   247
User 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
PHF 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
PHF Volume:   474 1282   116   339  494   262   486  886   147   266 1117   247
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  474 1282   116   339  494   262   486  886   147   266 1117   247
PCE 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
MLF 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
FinalVolume:  474 1282   116   339  494   262   486  886   147   266 1117   247
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.83 0.99  1.00  0.83 1.00  0.97  0.83 1.00  0.92  0.69 0.98  1.00
Lanes:       2.00 2.75  0.25  2.00 3.00  1.00  2.00 2.00  1.00  2.00 1.64  0.36
Final Sat.:  3150 5158   467  3150 5700  1847  3150 3800  1750  2625 3059   677
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.15 0.25  0.25  0.11 0.09  0.14  0.15 0.23  0.08  0.10 0.37  0.37
Crit Moves:  ****                  ****        ****                   ****
Green Time:  18.6 33.9  33.9  14.7 30.0  30.0  19.1 44.9  44.9  19.5 45.2  45.2
Volume/Cap:  1.01 0.92  0.92  0.92 0.36  0.59  1.01 0.65  0.23  0.65 1.01  1.01
Delay/Veh:   96.9 54.2  54.2  84.1 40.3  47.8  96.2 35.9  28.9  57.3 66.5  66.5
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  96.9 54.2  54.2  84.1 40.3  47.8  96.2 35.9  28.9  57.3 66.5  66.5
LOS by Move:    F   D-    D-     F    D     D     F   D+     C    E+    E     E
HCM2k95thQ:    26   34    36    19   10    18    27   24     9    13   54    57
Note: Queue reported is the number of cars per lane.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing AM

Intersection #10: PAGEMILL-OREGON EXPWY/MIDDLEFIELD RD



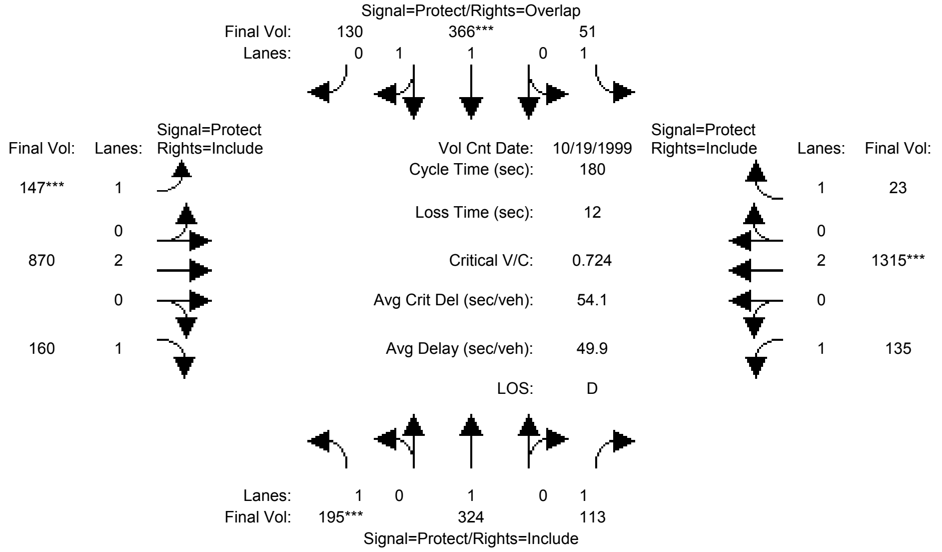
Vol Cnt Date: 10/19/1999
Cycle Time (sec): 180
Loss Time (sec): 12
Critical V/C: 0.717
Avg Crit Del (sec/veh): 53.6
Avg Delay (sec/veh): 49.7
LOS: D

```
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:    10   10    10    10   10    10     7   10    10     7   65    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 19 Oct 1999 << 7:00-9:00
Base Vol:     192  324   113    51  366   127   144  863   157   135 1308    23
Growth 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
Initial Bse:  192  324   113    51  366   127   144  863   157   135 1308    23
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  192  324   113    51  366   127   144  863   157   135 1308    23
User 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
PHF 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
PHF Volume:   192  324   113    51  366   127   144  863   157   135 1308    23
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  192  324   113    51  366   127   144  863   157   135 1308    23
PCE 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
MLF 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
FinalVolume:  192  324   113    51  366   127   144  863   157   135 1308    23
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 0.98  0.95  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 1.00  1.00  1.00 1.47  0.53  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.:  1750 1900  1750  1750 2746   953  1750 3800  1750  1750 3800  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.11 0.17  0.06  0.03 0.13  0.13  0.08 0.23  0.09  0.08 0.34  0.01
Crit Moves:  ****                  ****        ****                   ****
Green Time:  27.5 46.0  46.0  15.0 33.4  54.1  20.6 79.9  79.9  27.1 86.4  86.4
Volume/Cap:  0.72 0.67  0.25  0.35 0.72  0.44  0.72 0.51  0.20  0.51 0.72  0.03
Delay/Veh:   81.5 63.7  53.6  79.4 72.5  51.1  88.6 36.3  30.7  72.0 38.5  24.7
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  81.5 63.7  53.6  79.4 72.5  51.1  88.6 36.3  30.7  72.0 38.5  24.7
LOS by Move:    F    E    D-    E-    E    D-     F   D+     C     E   D+     C
HCM2k95thQ:    22   29    10     6   25    20    18   29    11    15   46     1
Note: Queue reported is the number of cars per lane.
```

SD16-0223
Palo Alto PSB TIA
Existing AM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing+Project AM

Intersection #10: PAGEMILL-OREGON EXPWY/MIDDLEFIELD RD



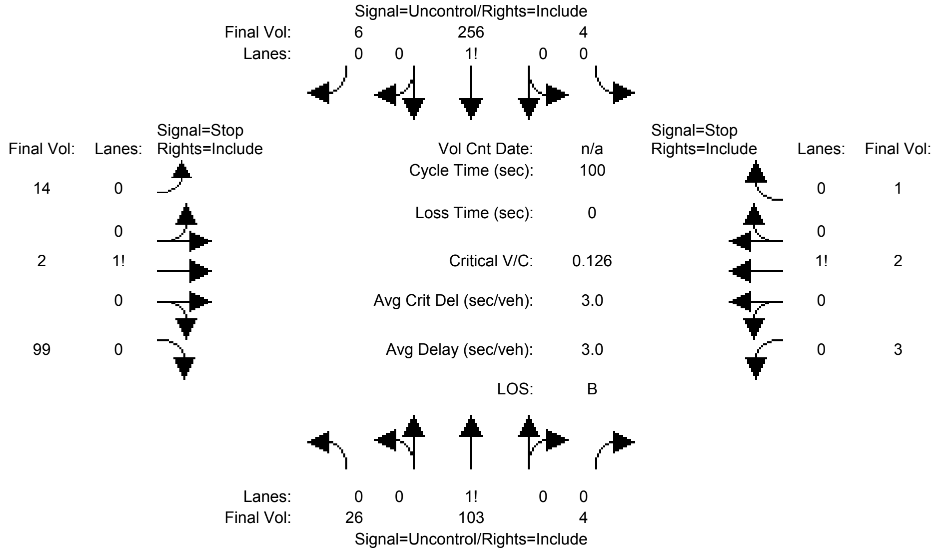
```
                      Signal=Protect/Rights=Overlap
          Final Vol:   130        366***        51
             Lanes:      0    1      1     0     1

                Signal=Protect                                   Signal=Protect
Final Vol:  Lanes:  Rights=Include   Vol Cnt Date:   10/19/1999  Rights=Include   Lanes:  Final Vol:
                                     Cycle Time (sec):  180
147***        1                                                                     1        23
                                     Loss Time (sec):   12
              0                                                                     0
870           2                      Critical V/C:      0.724                       2        1315***
              0                      Avg Crit Del (sec/veh): 54.1                   0
160           1                      Avg Delay (sec/veh):    49.9                   1        135
                                     LOS:               D

             Lanes:      1    0      1     0     1
          Final Vol:  195***        324          113
                      Signal=Protect/Rights=Include
```

```
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:    10   10    10    10   10    10     7   10    10     7   65    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 19 Oct 1999 << 7:00-9:00
Base Vol:     192  324   113    51  366   127   144  863   157   135 1308    23
Growth 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
Initial Bse:  192  324   113    51  366   127   144  863   157   135 1308    23
Added Vol:      3    0     0     0    0     3     3    7     3     0    7     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  195  324   113    51  366   130   147  870   160   135 1315    23
User 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
PHF 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
PHF Volume:   195  324   113    51  366   130   147  870   160   135 1315    23
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  195  324   113    51  366   130   147  870   160   135 1315    23
PCE 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
MLF 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
FinalVolume:  195  324   113    51  366   130   147  870   160   135 1315    23
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 0.98  0.95  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 1.00  1.00  1.00 1.46  0.54  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.:  1750 1900  1750  1750 2730   970  1750 3800  1750  1750 3800  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.11 0.17  0.06  0.03 0.13  0.13  0.08 0.23  0.09  0.08 0.35  0.01
Crit Moves:  ****                  ****        ****                   ****
Green Time:  27.7 46.1  46.1  15.0 33.3  54.2  20.9 80.0  80.0  27.0 86.1  86.1
Volume/Cap:  0.72 0.67  0.25  0.35 0.72  0.45  0.72 0.52  0.21  0.52 0.72  0.03
Delay/Veh:   81.8 63.6  53.6  79.3 72.8  51.0  88.9 36.3  30.7  72.3 39.0  24.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  81.8 63.6  53.6  79.3 72.8  51.0  88.9 36.3  30.7  72.3 39.0  24.9
LOS by Move:    F    E    D-    E-    E    D-     F   D+     C     E   D+     C
HCM2k95thQ:    22   29    10     6   25    20    18   29    11    15   47     1
Note: Queue reported is the number of cars per lane.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing PM

Intersection #1: Park Blvd & Sherman Ave



Signal=Uncontrol/Rights=Include
Final Vol: 6 256 4
Lanes: 0 0 1! 0 0

Signal=Stop
Rights=Include
Final Vol: 14, 2, 99
Lanes: 0, 0, 1!, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.126
Avg Crit Del (sec/veh): 3.0
Avg Delay (sec/veh): 3.0
LOS: B

Signal=Stop
Rights=Include
Lanes: 0, 0, 1!, 0, 0
Final Vol: 1, 2, 3

Lanes: 0 0 1! 0 0
Final Vol: 26 103 4
Signal=Uncontrol/Rights=Include

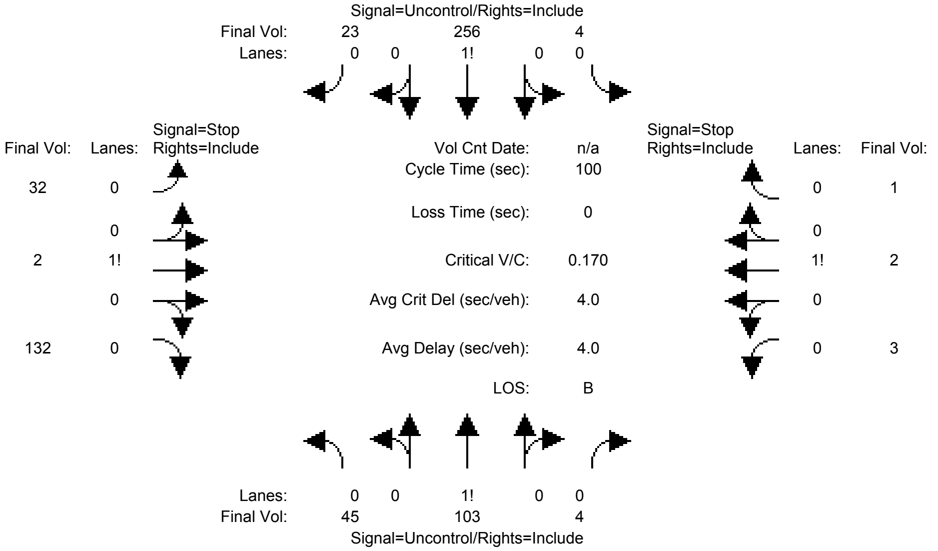
```
Street Name:            Park Blvd                        Sherman Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      26  103     4     4  256     6    14    2    99     3    2     1
Growth 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
Initial Bse:   26  103     4     4  256     6    14    2    99     3    2     1
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   26  103     4     4  256     6    14    2    99     3    2     1
User 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
PHF 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
PHF Volume:    26  103     4     4  256     6    14    2    99     3    2     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   26  103     4     4  256     6    14    2    99     3    2     1
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  262 xxxx xxxxx   107 xxxx xxxxx   426  426   259   475  427   105
Potent Cap.: 1314 xxxx xxxxx  1497 xxxx xxxxx   543  524   785   504  523   955
Move Cap.:   1314 xxxx xxxxx  1497 xxxx xxxxx   531  512   785   431  511   955
Volume/Cap:  0.02 xxxx  xxxx  0.00 xxxx  xxxx  0.03 0.00  0.13  0.01 0.00  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.8 xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  735 xxxxx  xxxx  503 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.6 xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.8 xxxxx xxxxx 12.2 xxxxx
Shared LOS:     *    *     *     *    *     *     *    B     *     *    B     *
ApproachDel:    xxxxxx           xxxxxx             10.8             12.2
ApproachLOS:         *                *                B                B
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   26  103     4     4  256     6    14    2    99     3    2     1
ApproachDel:    xxxxxx           xxxxxx              10.8             12.2
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.3]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=115]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=520]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=6]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=520]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   26  103     4     4  256     6    14    2    99     3    2     1
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             399
Minor Approach Volume:           115
Minor Approach Volume Threshold: 464
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing+Project PM

Intersection #1: Park Blvd & Sherman Ave



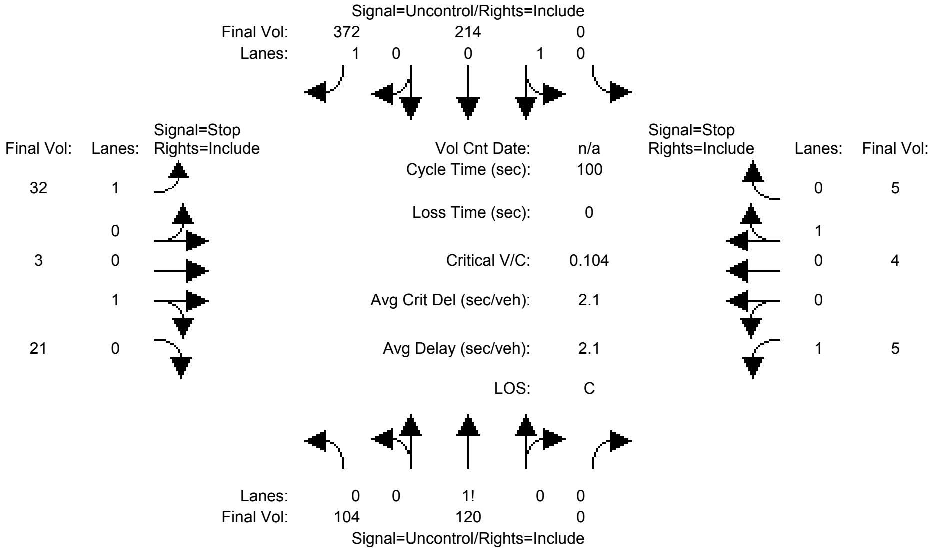
```
Street Name:            Park Blvd                        Sherman Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      26  103     4     4  256     6    14    2    99     3    2     1
Growth 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
Initial Bse:   26  103     4     4  256     6    14    2    99     3    2     1
Added Vol:     19    0     0     0    0    17    18    0    33     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   45  103     4     4  256    23    32    2   132     3    2     1
User 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
PHF 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
PHF Volume:    45  103     4     4  256    23    32    2   132     3    2     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   45  103     4     4  256    23    32    2   132     3    2     1
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  279 xxxx xxxxx   107 xxxx xxxxx   472  473   268   538  482   105
Potent Cap.: 1295 xxxx xxxxx  1497 xxxx xxxxx   506  493   776   458  487   955
Move Cap.:   1295 xxxx xxxxx  1497 xxxx xxxxx   489  474   776   367  468   955
Volume/Cap:  0.03 xxxx  xxxx  0.00 xxxx  xxxx  0.07 0.00  0.17  0.01 0.00  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.9 xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  692 xxxxx  xxxx  445 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.9 xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 11.8 xxxxx xxxxx 13.2 xxxxx
Shared LOS:     *    *     *     *    *     *     *    B     *     *    B     *
ApproachDel:    xxxxxx           xxxxxx                11.8             13.2
ApproachLOS:         *                *                B                B
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   45  103     4     4  256    23    32    2   132     3    2     1
ApproachDel:    xxxxxx           xxxxxx             11.8             13.2
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.5]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=166]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=607]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=6]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=607]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   45  103     4     4  256    23    32    2   132     3    2     1
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             435
Minor Approach Volume:           166
Minor Approach Volume Threshold: 441
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing PM

Intersection #2: Park Blvd & Page Mill Rd



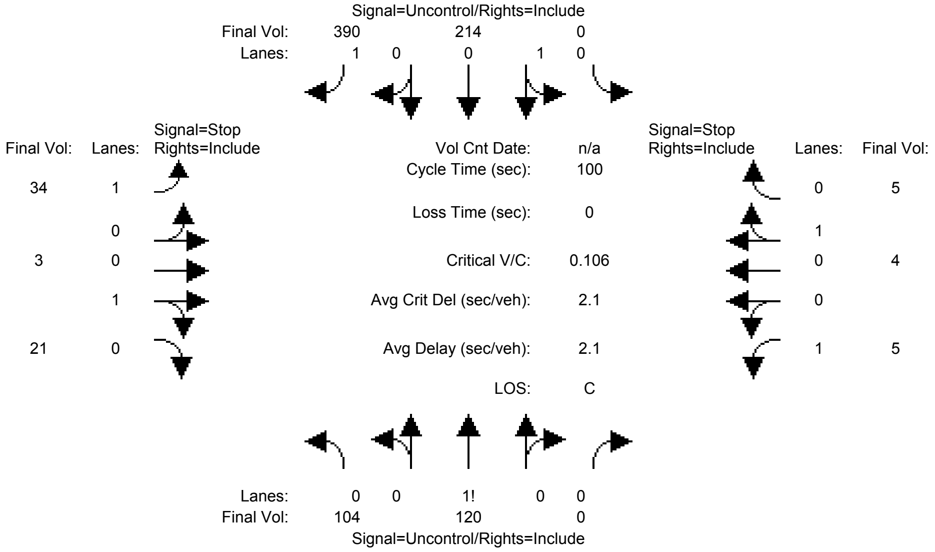
```
Street Name:            Park Blvd                         Page Mill Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     104  120     0     0  214   372    32    3    21     5    4     5
Growth 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
Initial Bse:  104  120     0     0  214   372    32    3    21     5    4     5
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  104  120     0     0  214   372    32    3    21     5    4     5
User 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
PHF 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
PHF Volume:   104  120     0     0  214   372    32    3    21     5    4     5
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  104  120     0     0  214   372    32    3    21     5    4     5
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  586 xxxx xxxxx  xxxx xxxx xxxxx   547  542   214   740  914   120
Potent Cap.:  999 xxxx xxxxx  xxxx xxxx xxxxx   451  450   831   335  275   937
Move Cap.:    999 xxxx xxxxx  xxxx xxxx xxxxx   406  401   831   297  245   937
Volume/Cap:  0.10 xxxx  xxxx  xxxx xxxx  xxxx  0.08 0.01  0.03  0.02 0.02  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.3 xxxx xxxxx  xxxx xxxx xxxxx   0.3 xxxx xxxxx   0.1 xxxx xxxxx
Control Del:  9.0 xxxx xxxxx xxxxx xxxx xxxxx  14.6 xxxx xxxxx  17.3 xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     B    *     *     C    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   733  xxxx xxxx   415
SharedQueue:  0.3 xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx   0.1 xxxxx xxxx   0.1
Shrd ConDel:  9.0 xxxx xxxxx   7.2 xxxx xxxxx xxxxx xxxx  10.1 xxxxx xxxx  13.9
Shared LOS:     A    *     *     A    *     *     *    *     B     *    *     B
ApproachDel:     xxxxxx           xxxxxx              12.7              15.1
ApproachLOS:          *                *                 B                 C
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #2 Park Blvd & Page Mill Rd
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  0  0    0  1  0  0  1    1  0  0  1  0    1  0  0  1  0
Initial Vol:  104  120      0     0  214   372    32    3    21     5    4     5
ApproachDel:    xxxxxx           xxxxxx             12.7             15.1
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=2][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 5 for two or more lane approach.
Signal Warrant Rule #2: [approach volume=56]
   FAIL - Approach volume less than 150 for two or more lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=880]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=2][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 5 for two or more lane approach.
Signal Warrant Rule #2: [approach volume=14]
   FAIL - Approach volume less than 150 for two or more lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=880]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #2 Park Blvd & Page Mill Rd
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  0  0    0  1  0  0  1    1  0  0  1  0    1  0  0  1  0
Initial Vol:  104  120      0     0  214   372    32    3    21     5    4     5
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             810
Minor Approach Volume:           56
Minor Approach Volume Threshold: 465
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing+Project PM

Intersection #2: Park Blvd & Page Mill Rd



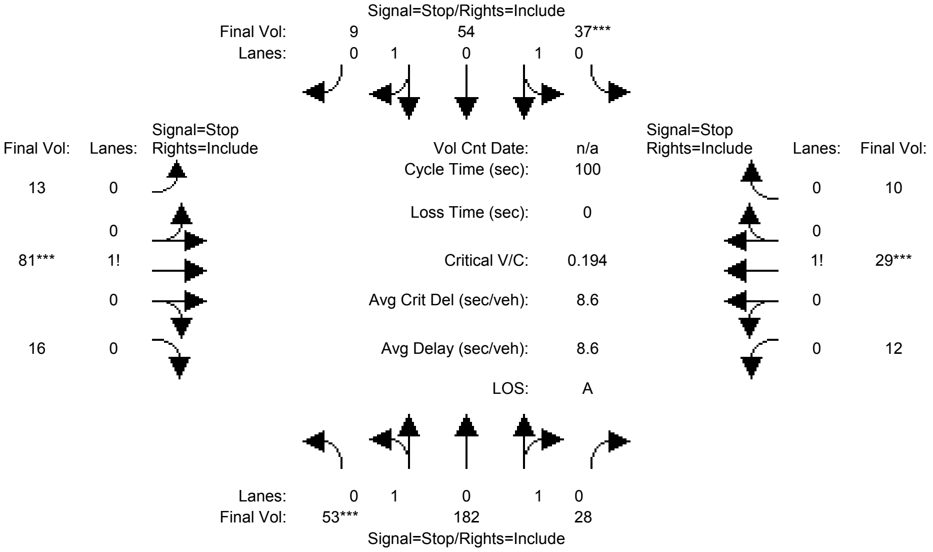
```
Street Name:            Park Blvd                        Page Mill Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     104  120     0     0  214   372    32    3    21     5    4     5
Growth 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
Initial Bse:  104  120     0     0  214   372    32    3    21     5    4     5
Added Vol:      0    0     0     0    0    18     2    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  104  120     0     0  214   390    34    3    21     5    4     5
User 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
PHF 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
PHF Volume:   104  120     0     0  214   390    34    3    21     5    4     5
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  104  120     0     0  214   390    34    3    21     5    4     5
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  604 xxxx xxxxx  xxxx xxxx xxxxx   547  542   214   749  932   120
Potent Cap.:  984 xxxx xxxxx  xxxx xxxx xxxxx   451  450   831   331  269   937
Move Cap.:    984 xxxx xxxxx  xxxx xxxx xxxxx   405  400   831   293  238   937
Volume/Cap:  0.11 xxxx  xxxx  xxxx xxxx  xxxx  0.08 0.01  0.03  0.02 0.02  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.4 xxxx xxxxx  xxxx xxxx xxxxx   0.3 xxxx xxxxx   0.1 xxxx xxxxx
Control Del:  9.1 xxxx xxxxx xxxxx xxxx xxxxx  14.7 xxxx xxxxx  17.5 xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     B    *     *     C    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   732  xxxx xxxx   407
SharedQueue:  0.4 xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx   0.1 xxxxx xxxx   0.1
Shrd ConDel:  9.1 xxxx xxxxx   7.2 xxxx xxxxx xxxxx xxxx  10.1 xxxxx xxxx  14.0
Shared LOS:     A    *     *     A    *     *     *    *     B     *    *     B
ApproachDel:    xxxxxx           xxxxxx             12.8             15.3
ApproachLOS:         *                *                B                C
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #2 Park Blvd & Page Mill Rd
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  0  0    0  1  0  0  1    1  0  0  1  0    1  0  0  1  0
Initial Vol:  104  120     0     0  214    390    34    3    21     5    4     5
ApproachDel:    xxxxxx           xxxxxx             12.8             15.3
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=2][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 5 for two or more lane approach.
Signal Warrant Rule #2: [approach volume=58]
   FAIL - Approach volume less than 150 for two or more lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=900]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=2][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 5 for two or more lane approach.
Signal Warrant Rule #2: [approach volume=14]
   FAIL - Approach volume less than 150 for two or more lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=900]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #2 Park Blvd & Page Mill Rd
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  0  0    0  1  0  0  1    1  0  0  1  0    1  0  0  1  0
Initial Vol:  104  120     0     0  214    390    34    3    21     5    4     5
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             828
Minor Approach Volume:           58
Minor Approach Volume Threshold: 455
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing PM

Intersection #3: Birch St & Sherman Ave



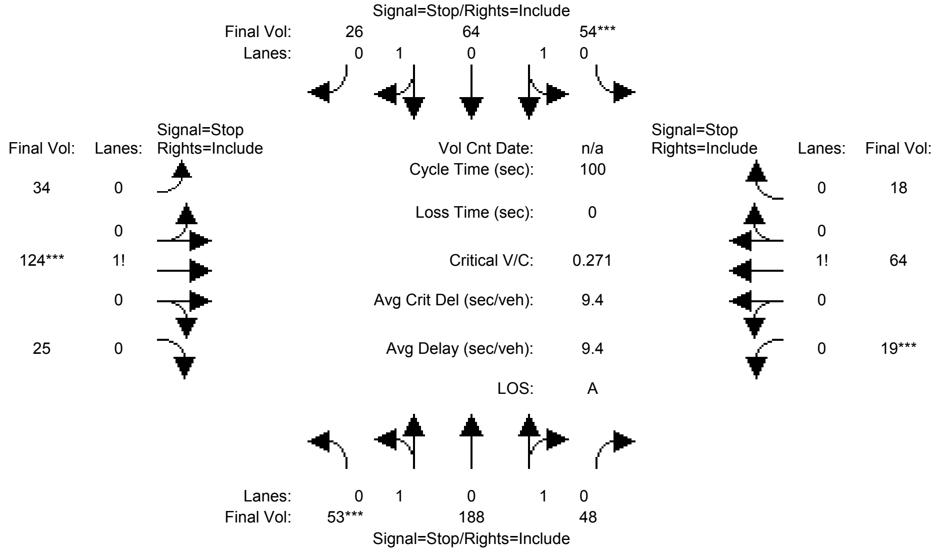
```
Street Name:             Birch St                        Sherman Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      53  182    28    37   54     9    13   81    16    12   29    10
Growth 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
Initial Bse:   53  182    28    37   54     9    13   81    16    12   29    10
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   53  182    28    37   54     9    13   81    16    12   29    10
User 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
PHF 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
PHF Volume:    53  182    28    37   54     9    13   81    16    12   29    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   53  182    28    37   54     9    13   81    16    12   29    10
PCE 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
MLF 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
FinalVolume:   53  182    28    37   54     9    13   81    16    12   29    10
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.40 1.39  0.21  0.74 1.08  0.18  0.12 0.74  0.14  0.23 0.57  0.20
Final Sat.:   274  978   155   470  736   125    85  530   105   166  400   138
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.19 0.19  0.18  0.08 0.07  0.07  0.15 0.15  0.15  0.07 0.07  0.07
Crit Moves:  ****             ****                  ****             ****
Delay/Veh:    9.1  8.8   8.6   8.6  8.2   8.1   8.5  8.5   8.5   8.2  8.2   8.2
Delay 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
AdjDel/Veh:   9.1  8.8   8.6   8.6  8.2   8.1   8.5  8.5   8.5   8.2  8.2   8.2
LOS by Move:    A    A     A     A    A     A     A    A     A     A    A     A
ApproachDel:       8.8              8.4              8.5              8.2
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:        8.8              8.4              8.5              8.2
LOS by Appr:         A                A                A                A
AllWayAvgQ:   0.2  0.2   0.2   0.1  0.1   0.1   0.2  0.2   0.2   0.1  0.1   0.1
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #3 Birch St & Sherman Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   53  182    28    37   54     9    13   81    16    12   29    10
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             363
Minor Approach Volume:           110
Minor Approach Volume Threshold: 634
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing+Project PM

Intersection #3: Birch St & Sherman Ave



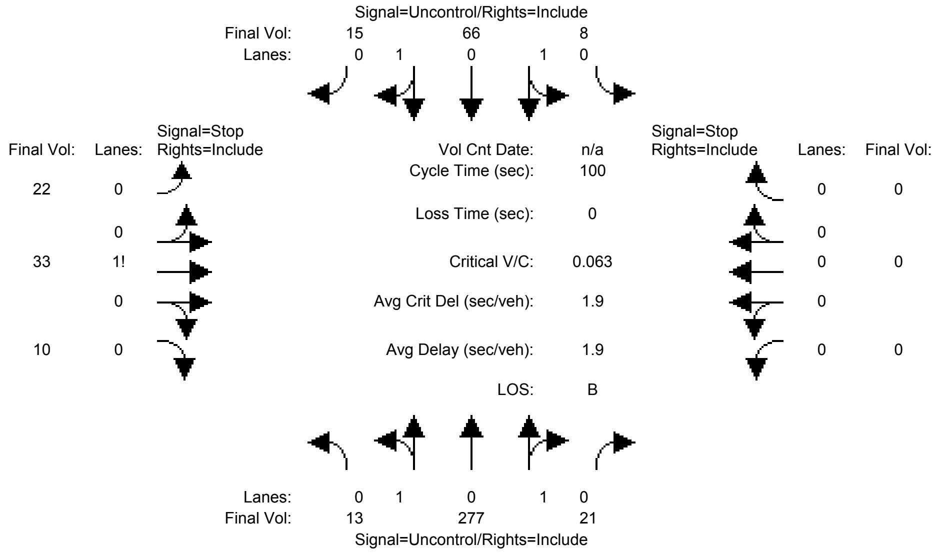
```
Street Name:             Birch St                        Sherman Ave
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      53  182    28    37   54     9    13   81    16    12   29    10
Growth 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
Initial Bse:   53  182    28    37   54     9    13   81    16    12   29    10
Added Vol:      0    6    20    17   10    17    21   43     9     7   35     8
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   53  188    48    54   64    26    34  124    25    19   64    18
User 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
PHF 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
PHF Volume:    53  188    48    54   64    26    34  124    25    19   64    18
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   53  188    48    54   64    26    34  124    25    19   64    18
PCE 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
MLF 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
FinalVolume:   53  188    48    54   64    26    34  124    25    19   64    18
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.37 1.30  0.33  0.75 0.89  0.36  0.18 0.68  0.14  0.19 0.63  0.18
Final Sat.:   229  846   224   436  559   234   126  458    92   123  414   117
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.23 0.22  0.21  0.12 0.11  0.11  0.27 0.27  0.27  0.15 0.15  0.15
Crit Moves:  ****             ****                  ****        ****
Delay/Veh:     9.9  9.5   9.2   9.4  8.8   8.6   9.8  9.8   9.8   9.0  9.0   9.0
Delay 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
AdjDel/Veh:    9.9  9.5   9.2   9.4  8.8   8.6   9.8  9.8   9.8   9.0  9.0   9.0
LOS by Move:    A    A     A     A    A     A     A    A     A     A    A     A
ApproachDel:       9.5              9.0              9.8              9.0
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:        9.5              9.0              9.8              9.0
LOS by Appr:         A                A                A                A
AllWayAvgQ:    0.3  0.2   0.2   0.1  0.1   0.1   0.3  0.3   0.3   0.2  0.2   0.2
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #3 Birch St & Sherman Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   53  188    48    54   64    26    34  124    25    19   64    18
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             433
Minor Approach Volume:           183
Minor Approach Volume Threshold: 573
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing PM

Intersection #4: Birch St & Grant Ave



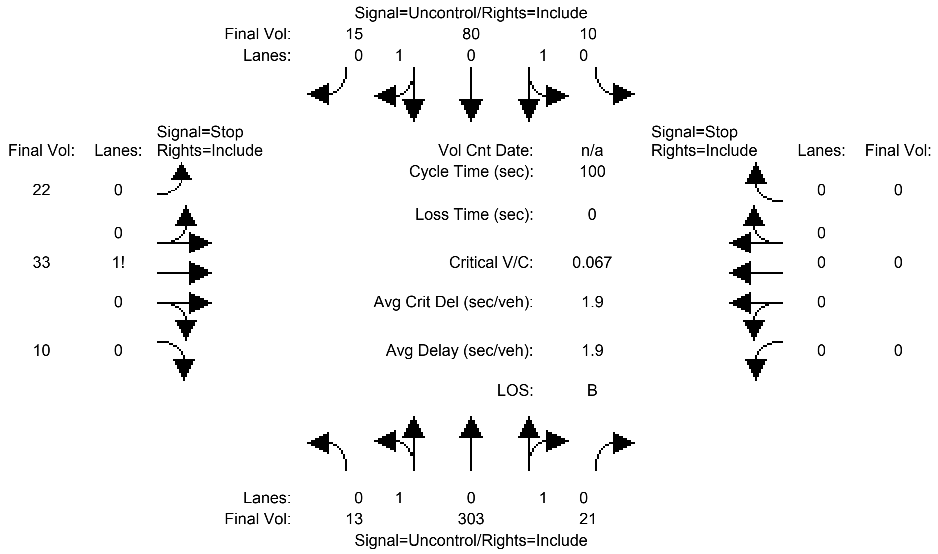
```
Street Name:                 Birch St                         Grant Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      13  277    21     8   66    15    22   33    10     0    0     0
Growth 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
Initial Bse:   13  277    21     8   66    15    22   33    10     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   13  277    21     8   66    15    22   33    10     0    0     0
User 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
PHF 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
PHF Volume:    13  277    21     8   66    15    22   33    10     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   13  277    21     8   66    15    22   33    10     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   81 xxxx xxxxx   298 xxxx xxxxx   254  414    41  xxxx xxxx xxxxx
Potent Cap.: 1529 xxxx xxxxx  1275 xxxx xxxxx   718  532  1028  xxxx xxxx xxxxx
Move Cap.:   1529 xxxx xxxxx  1275 xxxx xxxxx   710  524  1028  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  0.01 xxxx  xxxx  0.03 0.06  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx   7.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  627 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.3 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx   7.8 xxxx xxxxx xxxxx 11.4 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     A    *     *     *    B     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           11.4           xxxxxx
ApproachLOS:         *                *                B                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L - T - R        L - T - R        L - T - R        L - T - R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   13  277    21     8   66    15    22   33    10     0    0     0
ApproachDel:    xxxxxx           xxxxxx             11.4           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=65]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=465]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L - T - R        L - T - R        L - T - R        L - T - R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   13  277    21     8   66    15    22   33    10     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             400
Minor Approach Volume:           65
Minor Approach Volume Threshold: 601
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing+Project PM

Intersection #4: Birch St & Grant Ave



Signal=Uncontrol/Rights=Include
Final Vol: 15 80 10
Lanes: 0 1 0 1 0

Signal=Stop Rights=Include | Signal=Stop Rights=Include
Final Vol: Lanes: | Lanes: Final Vol:
22 0 | 0 0
0 | 0
33 1! | 0 0
0 | 0
10 0 | 0 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.067
Avg Crit Del (sec/veh): 1.9
Avg Delay (sec/veh): 1.9
LOS: B

Lanes: 0 1 0 1 0
Final Vol: 13 303 21
Signal=Uncontrol/Rights=Include

```
Street Name:                 Birch St                          Grant Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      13  277    21     8   66    15    22   33    10     0    0     0
Growth 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
Initial Bse:   13  277    21     8   66    15    22   33    10     0    0     0
Added Vol:      0   26     0     2   14     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   13  303    21    10   80    15    22   33    10     0    0     0
User 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
PHF 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
PHF Volume:    13  303    21    10   80    15    22   33    10     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   13  303    21    10   80    15    22   33    10     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   95 xxxx xxxxx   324 xxxx xxxxx   285  458    48  xxxx xxxx xxxxx
Potent Cap.: 1512 xxxx xxxxx  1247 xxxx xxxxx   687  503  1018  xxxx xxxx xxxxx
Move Cap.:   1512 xxxx xxxxx  1247 xxxx xxxxx   679  494  1018  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  0.01 xxxx  xxxx  0.03 0.07  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx   7.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  596 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.4 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx   7.9 xxxx xxxxx xxxxx 11.8 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     A    *     *     *    B     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx             11.8            xxxxxx
ApproachLOS:        *                *                 B                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
*******************************************************************************
Intersection #4 Birch St & Grant Ave
*******************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   13  303    21    10   80    15    22   33    10     0    0     0
ApproachDel:    xxxxxx           xxxxxx            11.8           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=65]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=507]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
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"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   13  303    21    10   80    15    22   33    10     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            442
Minor Approach Volume:          65
Minor Approach Volume Threshold: 566
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```
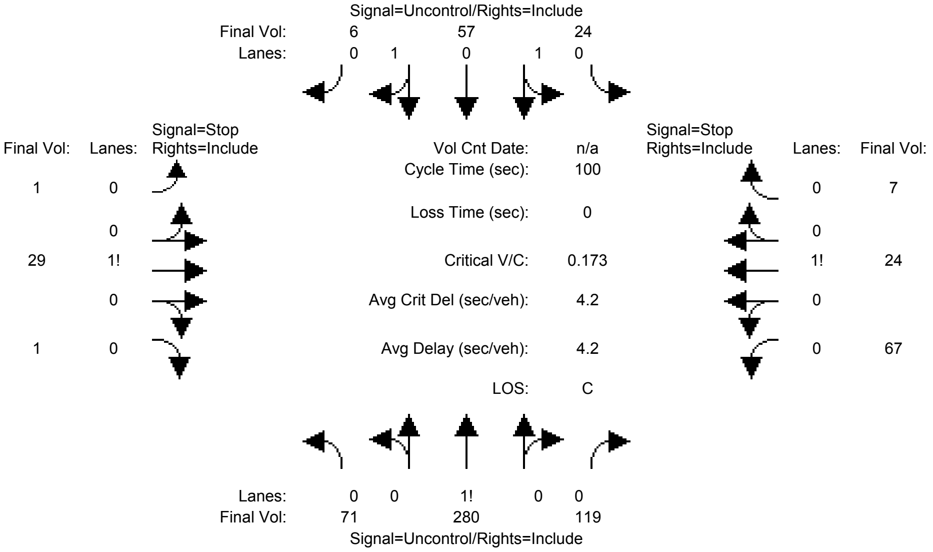

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing PM

Intersection #5: Birch St & Sheridan Ave



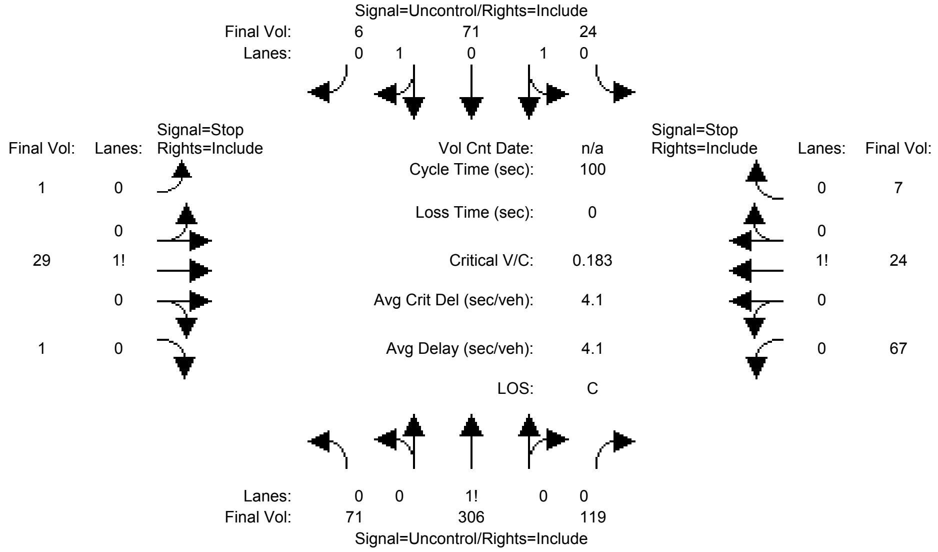
```
Street Name:                 Birch St                        Sheridan Ave
Approach:       North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      71  280   119    24   57     6     1   29     1    67   24     7
Growth 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
Initial Bse:   71  280   119    24   57     6     1   29     1    67   24     7
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   71  280   119    24   57     6     1   29     1    67   24     7
User 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
PHF 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
PHF Volume:    71  280   119    24   57     6     1   29     1    67   24     7
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   71  280   119    24   57     6     1   29     1    67   24     7
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   63 xxxx xxxxx   399 xxxx xxxxx   605  649    32   573  593   340
Potent Cap.: 1553 xxxx xxxxx  1171 xxxx xxxxx   413  391  1048   434  421   707
Move Cap.:   1553 xxxx xxxxx  1171 xxxx xxxxx   370  365  1048   386  393   707
Volume/Cap:  0.05 xxxx  xxxx  0.02 xxxx  xxxx  0.00 0.08  0.00  0.17 0.06  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  373 xxxxx  xxxx  401 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx  0.3 xxxxx xxxxx  0.9 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   8.1 xxxx xxxxx xxxxx 15.5 xxxxx xxxxx 16.9 xxxxx
Shared LOS:     *    *     *     A    *     *     *    C     *     *    C     *
ApproachDel:    xxxxxx           xxxxxx             15.5             16.9
ApproachLOS:         *                *                C                C
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   71  280   119    24   57     6     1   29     1    67   24     7
ApproachDel:    xxxxxx           xxxxxx              15.5             16.9
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=31]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=686]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.5]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=98]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=686]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   71  280   119    24   57     6     1   29     1    67   24     7
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             557
Minor Approach Volume:           98
Minor Approach Volume Threshold: 486
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Existing+Project PM

Intersection #5: Birch St & Sheridan Ave



Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.183
Avg Crit Del (sec/veh): 4.1
Avg Delay (sec/veh): 4.1
LOS: C

```
Street Name:                Birch St                            Sheridan Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      71  280   119    24   57     6     1   29     1    67   24     7
Growth 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
Initial Bse:   71  280   119    24   57     6     1   29     1    67   24     7
Added Vol:      0   26     0     0   14     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   71  306   119    24   71     6     1   29     1    67   24     7
User 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
PHF 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
PHF Volume:    71  306   119    24   71     6     1   29     1    67   24     7
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   71  306   119    24   71     6     1   29     1    67   24     7
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   77 xxxx xxxxx   425 xxxx xxxxx   645  689    39   606  633   366
Potent Cap.: 1535 xxxx xxxxx  1145 xxxx xxxxx   388  371  1039   412  400   684
Move Cap.:   1535 xxxx xxxxx  1145 xxxx xxxxx   346  346  1039   366  373   684
Volume/Cap:  0.05 xxxx  xxxx  0.02 xxxx  xxxx  0.00 0.08  0.00  0.18 0.06  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.5 xxxx xxxxx   8.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  353 xxxxx  xxxx  380 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx  0.3 xxxxx xxxxx  1.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   8.2 xxxx xxxxx xxxxx 16.2 xxxxx xxxxx 17.7 xxxxx
Shared LOS:     *    *     *     A    *     *     *    C     *     *    C     *
ApproachDel:     xxxxxx           xxxxxx             16.2             17.7
ApproachLOS:          *                *                C                C
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   71  306   119    24   71     6     1   29     1    67   24     7
ApproachDel:    xxxxxx           xxxxxx             16.2             17.7
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=31]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=726]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.5]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=98]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=726]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
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"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   71  306   119    24   71     6     1   29     1    67   24     7
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             597
Minor Approach Volume:           98
Minor Approach Volume Threshold: 463
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```
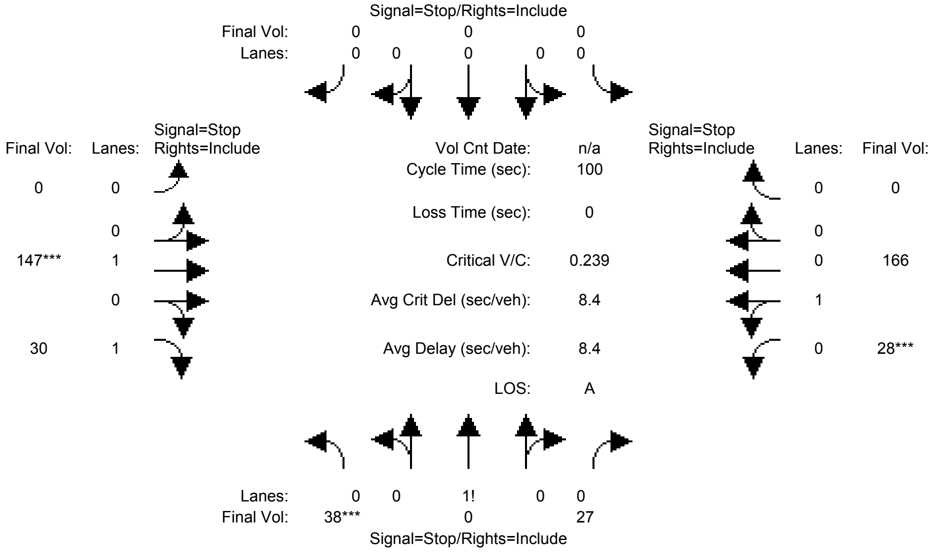

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing PM

Intersection #6: Ash St & California Ave



Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.239
Avg Crit Del (sec/veh): 8.4
Avg Delay (sec/veh): 8.4
LOS: A

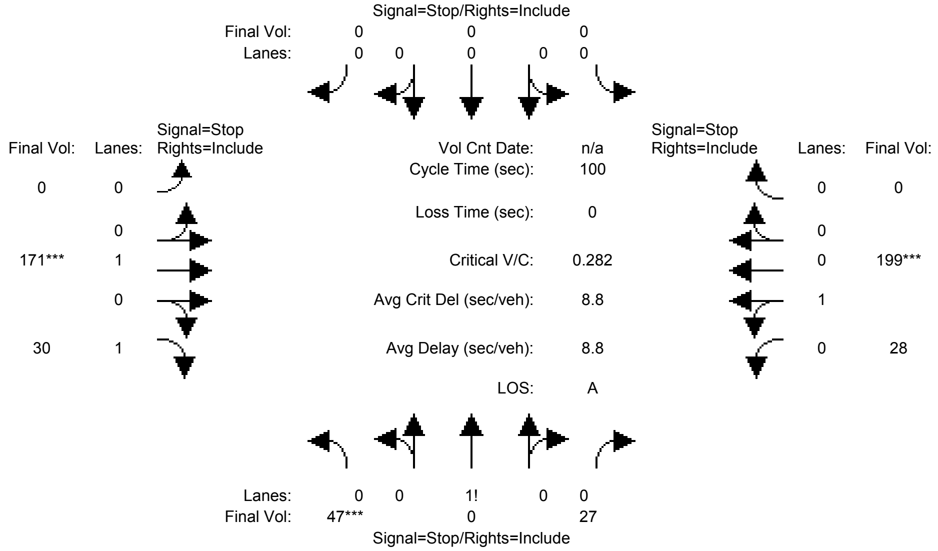
```
Street Name:                 Ash St                            California Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      38    0    27     0    0     0     0  147    30    28  166     0
Growth 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
Initial Bse:   38    0    27     0    0     0     0  147    30    28  166     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   38    0    27     0    0     0     0  147    30    28  166     0
User 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
PHF 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
PHF Volume:    38    0    27     0    0     0     0  147    30    28  166     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   38    0    27     0    0     0     0  147    30    28  166     0
PCE 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
MLF 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
FinalVolume:   38    0    27     0    0     0     0  147    30    28  166     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.58 0.00  0.42  0.00 0.00  0.00  0.00 1.00  1.00  0.14 0.86  0.00
Final Sat.:   434    0   308     0    0     0     0  743   867   117  696     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.09 xxxx  0.09  xxxx xxxx  xxxx  xxxx 0.20  0.03  0.24 0.24  xxxx
Crit Moves:  ****                                   ****        ****
Delay/Veh:    8.0  0.0   8.0   0.0  0.0   0.0   0.0  8.6   6.9   8.7  8.7   0.0
Delay 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
AdjDel/Veh:   8.0  0.0   8.0   0.0  0.0   0.0   0.0  8.6   6.9   8.7  8.7   0.0
LOS by Move:    A    *     A     *    *     *     *    A     A     A    A     *
ApproachDel:       8.0            xxxxxx              8.3               8.7
Delay Adj:        1.00             xxxxx             1.00              1.00
ApprAdjDel:        8.0            xxxxxx              8.3               8.7
LOS by Appr:         A                 *                A                 A
AllWayAvgQ:   0.1  0.1   0.1   0.0  0.0   0.0   0.0  0.2   0.0   0.3  0.3   0.3
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #6 Ash St & California Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
Initial Vol:   38    0    27     0    0     0     0  147    30    28  166     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            371
Minor Approach Volume:          65
Minor Approach Volume Threshold: 626
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Existing+Project PM

Intersection #6: Ash St & California Ave



Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.282
Avg Crit Del (sec/veh): 8.8
Avg Delay (sec/veh): 8.8
LOS: A

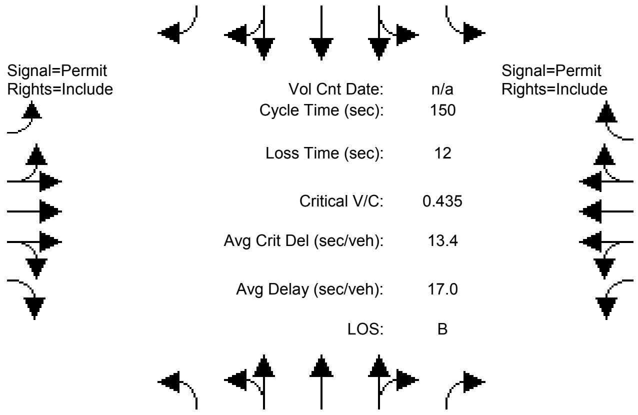
```
Street Name:                  Ash St                         California Ave
Approach:      North Bound      South Bound        East Bound        West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      38    0    27     0    0     0     0  147    30    28  166     0
Growth 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
Initial Bse:   38    0    27     0    0     0     0  147    30    28  166     0
Added Vol:      9    0     0     0    0     0     0   24     0     0   33     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   47    0    27     0    0     0     0  171    30    28  199     0
User 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
PHF 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
PHF Volume:    47    0    27     0    0     0     0  171    30    28  199     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   47    0    27     0    0     0     0  171    30    28  199     0
PCE 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
MLF 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
FinalVolume:   47    0    27     0    0     0     0  171    30    28  199     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.64 0.00  0.36  0.00 0.00  0.00  0.00 1.00  1.00  0.12 0.88  0.00
Final Sat.:   452    0   260     0    0     0     0  734   856    99  705     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.10 xxxx  0.10  xxxx xxxx  xxxx  xxxx 0.23  0.04  0.28 0.28  xxxx
Crit Moves:  ****                                   ****              ****
Delay/Veh:    8.2  0.0   8.2   0.0  0.0   0.0   0.0  9.0   7.0   9.1  9.1   0.0
Delay 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
AdjDel/Veh:   8.2  0.0   8.2   0.0  0.0   0.0   0.0  9.0   7.0   9.1  9.1   0.0
LOS by Move:    A    *     A     *    *     *     *    A     A     A    A     *
ApproachDel:       8.2            xxxxxx              8.7               9.1
Delay Adj:        1.00             xxxxx             1.00              1.00
ApprAdjDel:        8.2            xxxxxx              8.7               9.1
LOS by Appr:         A                 *                A                 A
AllWayAvgQ:   0.1  0.1   0.1   0.0  0.0   0.0   0.0  0.3   0.0   0.4  0.4   0.4
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
*******************************************************************************

Intersection #6 Ash St & California Ave
*******************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
Initial Vol:   47    0    27     0    0     0     0  171    30    28  199     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            428
Minor Approach Volume:          74
Minor Approach Volume Threshold: 577
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #7: ECR & Cambridge Ave



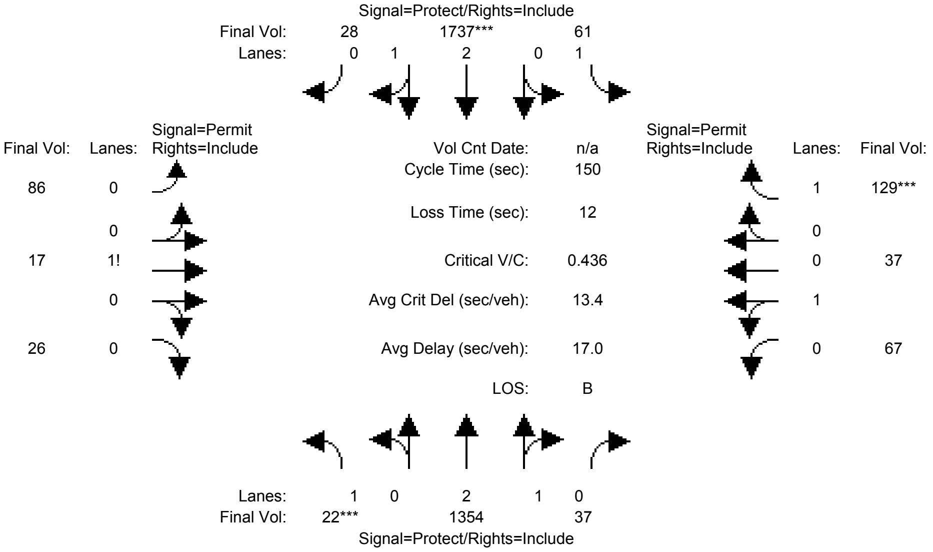
```
                          Signal=Protect/Rights=Include
                 Final Vol:    28       1730***      61
                     Lanes:     0   1      2      0   1

                 Signal=Permit                                      Signal=Permit
 Final Vol: Lanes: Rights=Include       Vol Cnt Date:      n/a      Rights=Include   Lanes:  Final Vol:
                                      Cycle Time (sec):    150
    86        0                                                                        1      129***
                                       Loss Time (sec):     12
              0                                                                        0
    17        1!                          Critical V/C:  0.435                         0       37
              0                  Avg Crit Del (sec/veh):  13.4                         1
    26        0                     Avg Delay (sec/veh):  17.0                         0       67
                                                   LOS:      B

                     Lanes:     1   0      2      1   0
                 Final Vol:   22***      1347        37
                          Signal=Protect/Rights=Include
```

```
Street Name:                  ECR                          Cambridge Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      22 1347    37    61 1730    28    86   17    26    67   37   129
Growth 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
Initial Bse:   22 1347    37    61 1730    28    86   17    26    67   37   129
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   22 1347    37    61 1730    28    86   17    26    67   37   129
User 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
PHF 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
PHF Volume:    22 1347    37    61 1730    28    86   17    26    67   37   129
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   22 1347    37    61 1730    28    86   17    26    67   37   129
PCE 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
MLF 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
FinalVolume:   22 1347    37    61 1730    28    86   17    26    67   37   129
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 0.98  0.95  0.92 0.98  0.95  0.92 0.92  0.92  0.95 0.95  0.92
Lanes:       1.00 2.92  0.08  1.00 2.95  0.05  0.67 0.13  0.20  0.64 0.36  1.00
Final Sat.:  1750 5450   150  1750 5511    89  1167  231   353  1160  640  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.25  0.25  0.03 0.31  0.31  0.07 0.07  0.07  0.06 0.06  0.07
Crit Moves:  ****                   ****                                     ****
Green Time:   7.0 95.1  95.1  18.0  106 106.1  24.9 24.9  24.9  24.9 24.9  24.9
Volume/Cap:  0.27 0.39  0.39  0.29 0.44  0.44  0.44 0.44  0.44  0.35 0.35  0.44
Delay/Veh:   70.8 13.4  13.4  61.0  9.4   9.4  57.4 57.4  57.4  56.1 56.1  57.4
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  70.8 13.4  13.4  61.0  9.4   9.4  57.4 57.4  57.4  56.1 56.1  57.4
LOS by Move:    E    B     B     E    A     A    E+   E+    E+    E+   E+    E+
HCM2k95thQ:     2   19    19     6   21    21    12   12    12     9    9    12
Note: Queue reported is the number of cars per lane.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing+Project PM

Intersection #7: ECR & Cambridge Ave



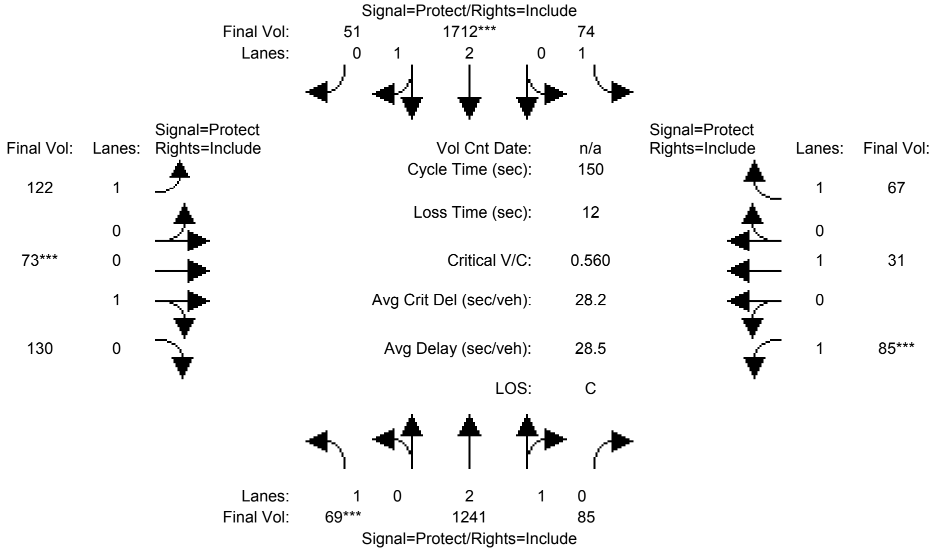
Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 0.436
Avg Crit Del (sec/veh): 13.4
Avg Delay (sec/veh): 17.0
LOS: B

```
Street Name:                ECR                              Cambridge Ave
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:    7   10     10     7   10     10     7   10     10     7   10     10
Y+R:         4.0  4.0    4.0   4.0  4.0    4.0   4.0  4.0    4.0   4.0  4.0    4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     22 1347     37    61 1730     28    86   17     26    67   37    129
Growth 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
Initial Bse:  22 1347     37    61 1730     28    86   17     26    67   37    129
Added Vol:     0    7      0     0    7      0     0    0      0     0    0      0
PasserByVol:   0    0      0     0    0      0     0    0      0     0    0      0
Initial Fut:  22 1354     37    61 1737     28    86   17     26    67   37    129
User 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
PHF 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
PHF Volume:   22 1354     37    61 1737     28    86   17     26    67   37    129
Reduct Vol:    0    0      0     0    0      0     0    0      0     0    0      0
Reduced Vol:  22 1354     37    61 1737     28    86   17     26    67   37    129
PCE 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
MLF 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
FinalVolume:  22 1354     37    61 1737     28    86   17     26    67   37    129
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900   1900  1900 1900   1900  1900 1900   1900  1900 1900   1900
Adjustment:  0.92 0.98   0.95  0.92 0.98   0.95  0.92 0.92   0.92  0.95 0.95   0.92
Lanes:       1.00 2.92   0.08  1.00 2.95   0.05  0.67 0.13   0.20  0.64 0.36   1.00
Final Sat.:  1750 5451    149  1750 5511     89  1167  231    353  1160  640   1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.25   0.25  0.03 0.32   0.32  0.07 0.07   0.07  0.06 0.06   0.07
Crit Moves:  ****                   ****                                      ****
Green Time:   7.0 95.3   95.3  17.9  106  106.2  24.8 24.8   24.8  24.8 24.8   24.8
Volume/Cap:  0.27 0.39   0.39  0.29 0.45   0.45  0.45 0.45   0.45  0.35 0.35   0.45
Delay/Veh:   70.8 13.4   13.4  61.1  9.4    9.4  57.5 57.5   57.5  56.1 56.1   57.5
User DelAdj: 1.00 1.00   1.00  1.00 1.00   1.00  1.00 1.00   1.00  1.00 1.00   1.00
AdjDel/Veh:  70.8 13.4   13.4  61.1  9.4    9.4  57.5 57.5   57.5  56.1 56.1   57.5
LOS by Move:    E    B      B     E    A      A    E+   E+     E+    E+   E+     E+
HCM2k95thQ:     2   19     19     6   21     21    12   12     12     9    9     12
Note: Queue reported is the number of cars per lane.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #8: ECR & California Ave



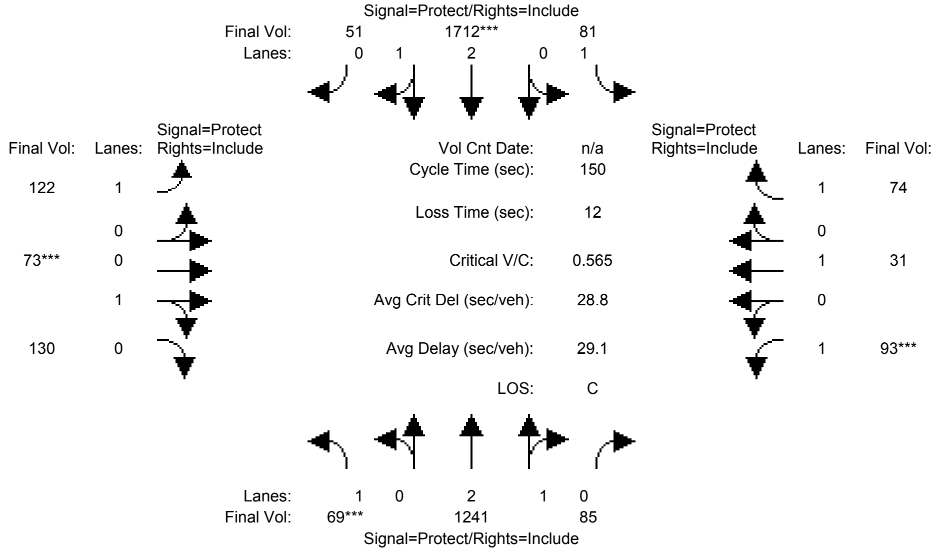
Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 0.560
Avg Crit Del (sec/veh): 28.2
Avg Delay (sec/veh): 28.5
LOS: C

```
Street Name:                  ECR                          California Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      69 1241    85    74 1712    51   122   73   130    85   31    67
Growth 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
Initial Bse:   69 1241    85    74 1712    51   122   73   130    85   31    67
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   69 1241    85    74 1712    51   122   73   130    85   31    67
User 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
PHF 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
PHF Volume:    69 1241    85    74 1712    51   122   73   130    85   31    67
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   69 1241    85    74 1712    51   122   73   130    85   31    67
PCE 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
MLF 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
FinalVolume:   69 1241    85    74 1712    51   122   73   130    85   31    67
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 0.98  0.95  0.92 0.98  0.95  0.92 0.95  0.95  0.92 1.00  0.92
Lanes:       1.00 2.80  0.20  1.00 2.91  0.09  1.00 0.36  0.64  1.00 1.00  1.00
Final Sat.:  1750 5241   359  1750 5438   162  1750  647  1153  1750 1900  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.04 0.24  0.24  0.04 0.31  0.31  0.07 0.11  0.11  0.05 0.02  0.04
Crit Moves:  ****                  ****              ****        ****
Green Time:  10.6 79.2  79.2  15.6 84.3  84.3  22.1 30.2  30.2  13.0 21.1  21.1
Volume/Cap:  0.56 0.45  0.45  0.41 0.56  0.56  0.47 0.56  0.56  0.56 0.12  0.27
Delay/Veh:   73.2 22.0  22.0  64.3 21.3  21.3  60.0 55.9  55.9  70.4 56.5  58.2
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  73.2 22.0  22.0  64.3 21.3  21.3  60.0 55.9  55.9  70.4 56.5  58.2
LOS by Move:    E   C+    C+     E   C+    C+     E   E+    E+     E   E+    E+
HCM2k95thQ:     8   22    22     7   30    30    11   17    17     9    3     6
Note: Queue reported is the number of cars per lane.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing+Project PM

Intersection #8: ECR & California Ave



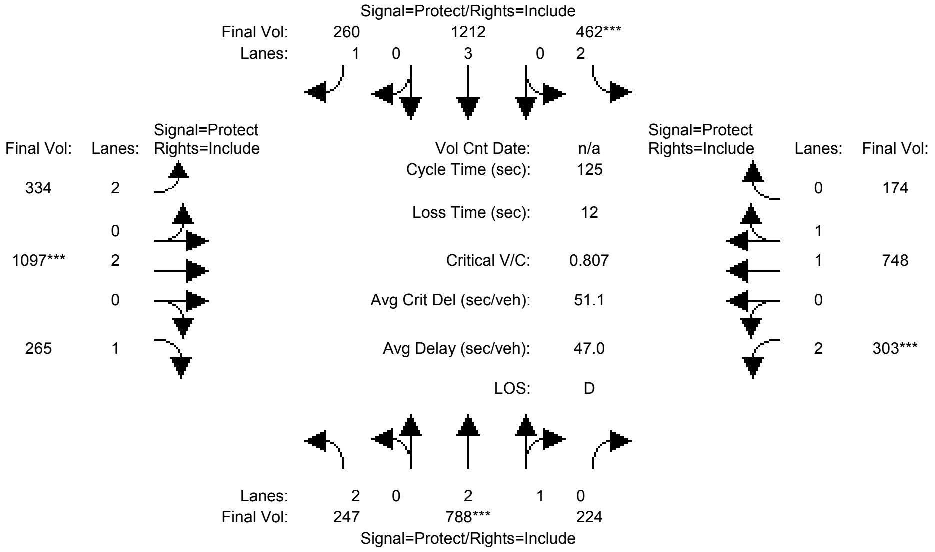
```
Vol Cnt Date:        n/a
Cycle Time (sec):    150
Loss Time (sec):     12
Critical V/C:        0.565
Avg Crit Del (sec/veh): 28.8
Avg Delay (sec/veh): 29.1
LOS:                 C
```

```
Street Name:               ECR                          California Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      69 1241    85    74 1712    51   122   73   130    85   31    67
Growth 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
Initial Bse:   69 1241    85    74 1712    51   122   73   130    85   31    67
Added Vol:      0    0     0     7    0     0     0    0     0     8    0     7
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   69 1241    85    81 1712    51   122   73   130    93   31    74
User 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
PHF 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
PHF Volume:    69 1241    85    81 1712    51   122   73   130    93   31    74
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   69 1241    85    81 1712    51   122   73   130    93   31    74
PCE 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
MLF 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
FinalVolume:   69 1241    85    81 1712    51   122   73   130    93   31    74
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 0.98  0.95  0.92 0.98  0.95  0.92 0.95  0.95  0.92 1.00  0.92
Lanes:       1.00 2.80  0.20  1.00 2.91  0.09  1.00 0.36  0.64  1.00 1.00  1.00
Final Sat.:  1750 5241   359  1750 5438   162  1750  647  1153  1750 1900  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.04 0.24  0.24  0.05 0.31  0.31  0.07 0.11  0.11  0.05 0.02  0.04
Crit Moves:  ****                  ****              ****        ****
Green Time:  10.5 78.5  78.5  15.5 83.5  83.5  22.5 29.9  29.9  14.1 21.5  21.5
Volume/Cap:  0.57 0.45  0.45  0.45 0.57  0.57  0.46 0.57  0.57  0.57 0.11  0.29
Delay/Veh:   73.6 22.4  22.4  65.0 21.7  21.7  59.6 56.3  56.3  69.5 56.1  58.1
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  73.6 22.4  22.4  65.0 21.7  21.7  59.6 56.3  56.3  69.5 56.1  58.1
LOS by Move:    E   C+    C+     E   C+    C+    E+   E+    E+     E   E+    E+
HCM2k95thQ:     8   23    23     7   30    30    11   17    17    10    3     7
Note: Queue reported is the number of cars per lane.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #9: El Camino Real & Page Mill Rd

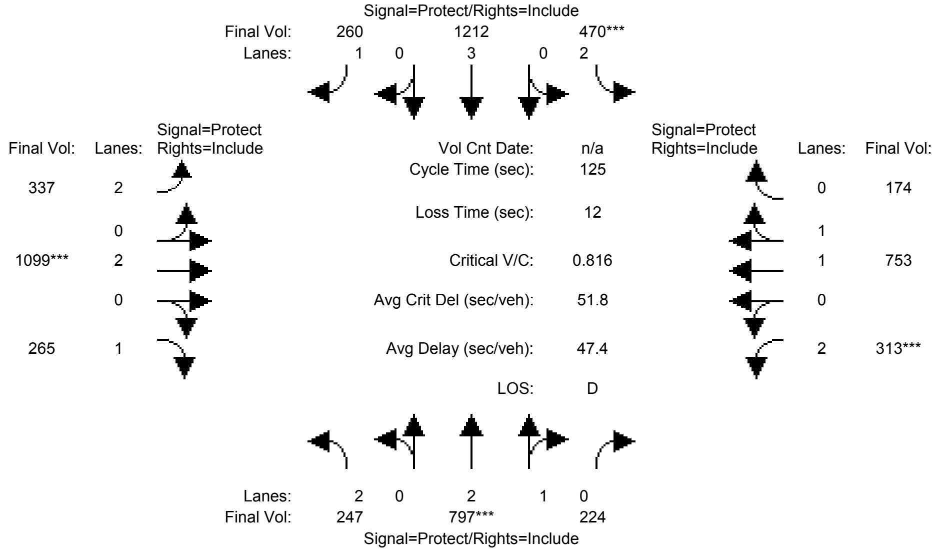


```
Street Name:          El Camino Real                    Page Mill Rd
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:    7   30     0    7   30     0    7   28    28    7   30     0
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     247  788   224   462 1212   260   334 1097   265   303  748   174
Growth 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
Initial Bse:  247  788   224   462 1212   260   334 1097   265   303  748   174
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  247  788   224   462 1212   260   334 1097   265   303  748   174
User 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
PHF 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
PHF Volume:   247  788   224   462 1212   260   334 1097   265   303  748   174
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  247  788   224   462 1212   260   334 1097   265   303  748   174
PCE 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
MLF 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
FinalVolume:  247  788   224   462 1212   260   334 1097   265   303  748   174
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.83 0.99  1.00  0.83 1.00  0.97  0.83 1.00  0.92  0.69 0.98  1.00
Lanes:       2.00 2.34  0.66  2.00 3.00  1.00  2.00 2.00  1.00  2.00 1.63  0.37
Final Sat.:  3150 4412  1254  3150 5700  1847  3150 3800  1750  2625 3032   705
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.08 0.18  0.18  0.15 0.21  0.14  0.11 0.29  0.15  0.12 0.25  0.25
Crit Moves:       ****        ****                   ****        ****
Green Time:  12.8 30.0  30.0  22.1 39.3  39.3  18.3 43.5  43.5  17.4 42.6  42.6
Volume/Cap:  0.76 0.74  0.74  0.83 0.68  0.45  0.72 0.83  0.44  0.83 0.72  0.72
Delay/Veh:   70.3 47.7  47.7  63.0 39.4  36.7  60.4 43.5  33.6  71.5 39.7  39.7
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  70.3 47.7  47.7  63.0 39.4  36.7  60.4 43.5  33.6  71.5 39.7  39.7
LOS by Move:    E    D     D     E    D    D+     E    D    C-     E    D     D
HCM2k95thQ:    13   22    23    21   23    15    16   34    15    16   27    28
Note: Queue reported is the number of cars per lane.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing+Project PM

Intersection #9: El Camino Real & Page Mill Rd

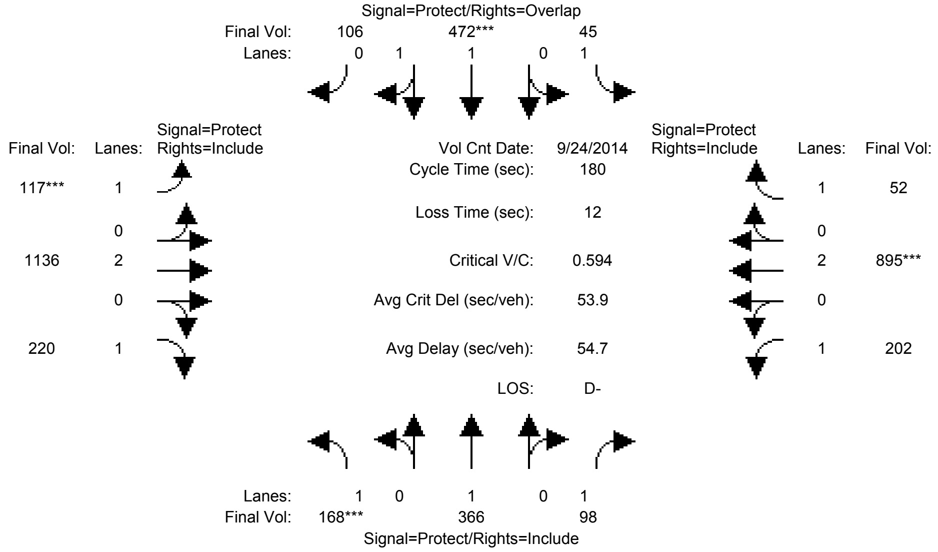


```
Street Name:          El Camino Real                     Page Mill Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   30     0     7   30     0     7   28    28     7   30     0
Y+R:          4.0 4.0   4.0    4.0 4.0   4.0    4.0 4.0   4.0    4.0 4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     247  788   224   462 1212   260   334 1097   265   303  748   174
Growth 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
Initial Bse:  247  788   224   462 1212   260   334 1097   265   303  748   174
Added Vol:      0    9     0     8    0     0     3    2     0    10    5     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  247  797   224   470 1212   260   337 1099   265   313  753   174
User 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
PHF 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
PHF Volume:   247  797   224   470 1212   260   337 1099   265   313  753   174
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  247  797   224   470 1212   260   337 1099   265   313  753   174
PCE 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
MLF 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
FinalVolume:  247  797   224   470 1212   260   337 1099   265   313  753   174
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.83 0.99  1.00  0.83 1.00  0.97  0.83 1.00  0.92  0.69 0.98  1.00
Lanes:       2.00 2.35  0.65  2.00 3.00  1.00  2.00 2.00  1.00  2.00 1.63  0.37
Final Sat.:  3150 4423  1243  3150 5700  1847  3150 3800  1750  2625 3036   701
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.08 0.18  0.18  0.15 0.21  0.14  0.11 0.29  0.15  0.12 0.25  0.25
Crit Moves:       ****        ****                  ****        ****
Green Time:  12.9 30.0  30.0  22.2 39.4  39.4  18.3 43.0  43.0  17.7 42.5  42.5
Volume/Cap:  0.76 0.75  0.75  0.84 0.68  0.45  0.73 0.84  0.44  0.84 0.73  0.73
Delay/Veh:   70.1 47.9  47.9  63.8 39.3  36.6  60.7 44.4  34.0  72.1 39.9  39.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  70.1 47.9  47.9  63.8 39.3  36.6  60.7 44.4  34.0  72.1 39.9  39.9
LOS by Move:    E    D     D     E    D    D+     E    D    C-     E    D     D
HCM2k95thQ:    13   23    24    22   23    15    16   35    15    17   27    29
Note: Queue reported is the number of cars per lane.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing PM

Intersection #10: PAGEMILL-OREGON EXPWY/MIDDLEFIELD RD

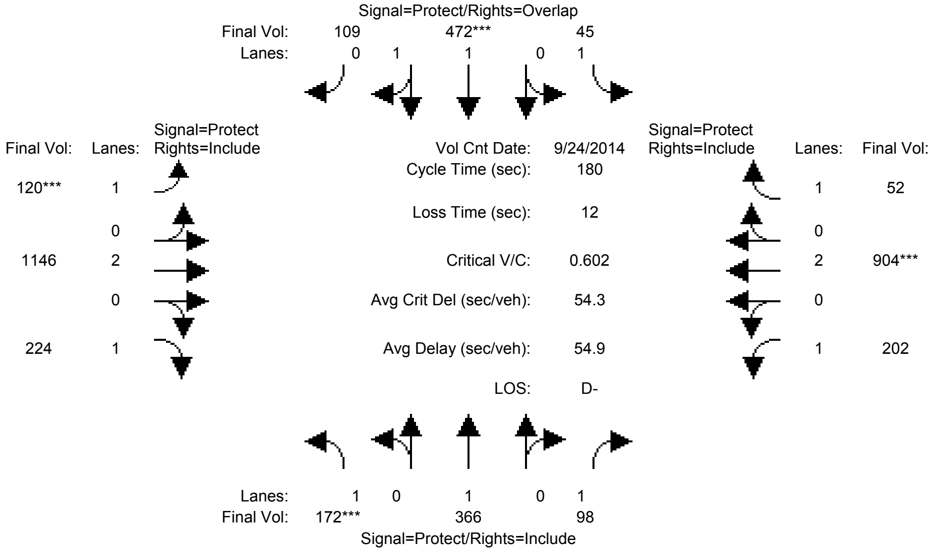


```
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:    10   10    10    10   10    10     7   10    10     7   65    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 24 Sep 2014 << 5:15-6:15 PM
Base Vol:     168  366    98    45  472   106   117 1136   220   202  895    52
Growth 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
Initial Bse:  168  366    98    45  472   106   117 1136   220   202  895    52
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  168  366    98    45  472   106   117 1136   220   202  895    52
User 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
PHF 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
PHF Volume:   168  366    98    45  472   106   117 1136   220   202  895    52
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  168  366    98    45  472   106   117 1136   220   202  895    52
PCE 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
MLF 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
FinalVolume:  168  366    98    45  472   106   117 1136   220   202  895    52
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 0.98  0.95  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 1.00  1.00  1.00 1.62  0.38  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.:  1750 1900  1750  1750 3021   678  1750 3800  1750  1750 3800  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.10 0.19  0.06  0.03 0.16  0.16  0.07 0.30  0.13  0.12 0.24  0.03
Crit Moves:  ****                  ****        ****                  ****
Green Time:  29.1 59.3  59.3  17.1 47.3  67.6  20.3 66.1  66.1  25.5 71.3  71.3
Volume/Cap:  0.59 0.58  0.17  0.27 0.59  0.42  0.59 0.81  0.34  0.81 0.59  0.07
Delay/Veh:   73.4 51.5  43.0  76.5 58.9  41.8  80.8 55.2  41.6  93.3 43.5  33.8
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  73.4 51.5  43.0  76.5 58.9  41.8  80.8 55.2  41.6  93.3 43.5  33.8
LOS by Move:    E   D-     D    E-   E+     D     F   E+     D     F    D    C-
HCM2k95thQ:    18   29     8     5   25    21    14   47    17    24   33     4
Note: Queue reported is the number of cars per lane.
```

SD16-0223
Palo Alto PSB TIA
Existing PM

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Existing+Project PM

Intersection #10: PAGEMILL-OREGON EXPWY/MIDDLEFIELD RD

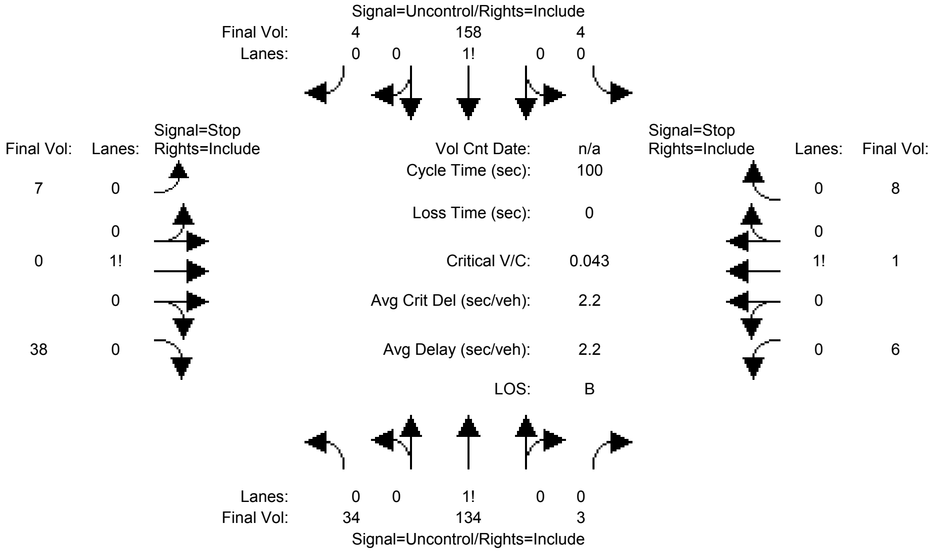


Vol Cnt Date: 9/24/2014
Cycle Time (sec): 180
Loss Time (sec): 12
Critical V/C: 0.602
Avg Crit Del (sec/veh): 54.3
Avg Delay (sec/veh): 54.9
LOS: D-

```
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:    10   10    10    10   10    10     7   10    10     7   65    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 24 Sep 2014 << 5:15-6:15 PM
Base Vol:     168  366    98    45  472   106   117 1136   220   202  895    52
Growth 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
Initial Bse:  168  366    98    45  472   106   117 1136   220   202  895    52
Added Vol:      4    0     0     0    0     3     3   10     4     0    9     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  172  366    98    45  472   109   120 1146   224   202  904    52
User 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
PHF 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
PHF Volume:   172  366    98    45  472   109   120 1146   224   202  904    52
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  172  366    98    45  472   109   120 1146   224   202  904    52
PCE 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
MLF 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
FinalVolume:  172  366    98    45  472   109   120 1146   224   202  904    52
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 0.98  0.95  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 1.00  1.00  1.00 1.61  0.39  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.:  1750 1900  1750  1750 3005   694  1750 3800  1750  1750 3800  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.10 0.19  0.06  0.03 0.16  0.16  0.07 0.30  0.13  0.12 0.24  0.03
Crit Moves:  ****                  ****        ****                  ****
Green Time:  29.4 59.3  59.3  17.1 47.0  67.5  20.5 66.3  66.3  25.4 71.1  71.1
Volume/Cap:  0.60 0.59  0.17  0.27 0.60  0.42  0.60 0.82  0.35  0.82 0.60  0.08
Delay/Veh:   73.5 51.6  43.0  76.5 59.4  41.9  81.0 55.4  41.5  94.1 43.9  34.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  73.5 51.6  43.0  76.5 59.4  41.9  81.0 55.4  41.5  94.1 43.9  34.0
LOS by Move:    E   D-     D    E-   E+     D     F   E+     D     F    D    C-
HCM2k95thQ:    19   29     8     5   26    21    14   48    17    24   33     4
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background AM

Intersection #1: Park Blvd & Sherman Ave

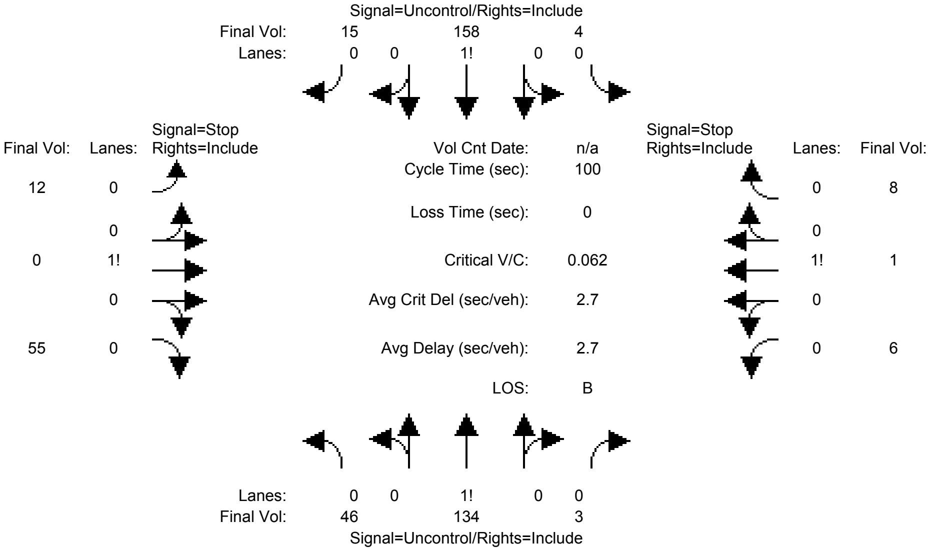


```
Street Name:              Park Blvd                        Sherman Ave
Approach:      North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      34  134     3     4  151     4     7    0    34     6    1     8
Growth 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
Initial Bse:   34  134     3     4  151     4     7    0    34     6    1     8
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    7     0     0    0     4     0    0     0
Initial Fut:   34  134     3     4  158     4     7    0    38     6    1     8
User 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
PHF 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
PHF Volume:    34  134     3     4  158     4     7    0    38     6    1     8
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   34  134     3     4  158     4     7    0    38     6    1     8
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  162 xxxx xxxxx   137 xxxx xxxxx   376  373   160   391  374   136
Potent Cap.: 1429 xxxx xxxxx  1459 xxxx xxxxx   585  561   890   572  560   919
Move Cap.:   1429 xxxx xxxxx  1459 xxxx xxxxx   567  545   890   537  545   919
Volume/Cap:  0.02 xxxx  xxxx  0.00 xxxx  xxxx  0.01 0.00  0.04  0.01 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.6 xxxx xxxxx   7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  818 xxxxx  xxxx  690 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.2 xxxxx xxxxx  0.1 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.7 xxxxx xxxxx 10.3 xxxxx
Shared LOS:     *    *     *     *    *     *     *    A     *     *    B     *
ApproachDel:     xxxxxx           xxxxxx              9.7              10.3
ApproachLOS:        *                *                 A                 B
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   34  134     3     4  158     4     7    0    38     6    1     8
ApproachDel:    xxxxxx           xxxxxx              9.7             10.3
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=45]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=397]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=15]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=397]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   34  134     3     4  158     4     7    0    38     6    1     8
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            337
Minor Approach Volume:          45
Minor Approach Volume Threshold: 509
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project AM

Intersection #1: Park Blvd & Sherman Ave



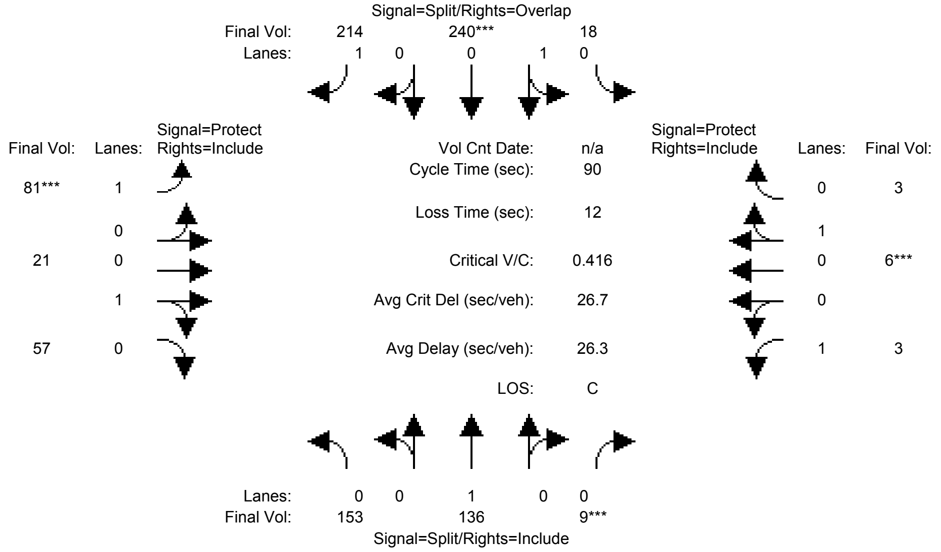
```
                              Signal=Uncontrol/Rights=Include
                   Final Vol:   15          158           4
                      Lanes:     0    0      1!     0     0

                      Signal=Stop                                     Signal=Stop
 Final Vol:  Lanes:   Rights=Include      Vol Cnt Date:     n/a       Rights=Include    Lanes:  Final Vol:
                                       Cycle Time (sec):    100
     12         0                                                                        0         8
                                        Loss Time (sec):      0
                0                                                                        0
      0        1!                          Critical V/C:    0.062                       1!         1
                0                     Avg Crit Del (sec/veh):   2.7                      0
     55         0                        Avg Delay (sec/veh):   2.7                      0         6
                                                    LOS:      B

                      Lanes:     0    0      1!     0     0
                   Final Vol:   46          134           3
                              Signal=Uncontrol/Rights=Include
```

```
Street Name:             Park Blvd                       Sherman Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      34  134     3     4  151     4     7    0    34     6    1     8
Growth 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
Initial Bse:   34  134     3     4  151     4     7    0    34     6    1     8
Added Vol:     12    0     0     0    0    11     5    0    17     0    0     0
PasserByVol:    0    0     0     0    7     0     0    0     4     0    0     0
Initial Fut:   46  134     3     4  158    15    12    0    55     6    1     8
User 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
PHF 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
PHF Volume:    46  134     3     4  158    15    12    0    55     6    1     8
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   46  134     3     4  158    15    12    0    55     6    1     8
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  173 xxxx xxxxx   137 xxxx xxxxx   406  403   166   429  409   136
Potent Cap.: 1416 xxxx xxxxx  1459 xxxx xxxxx   559  540   884   540  535   919
Move Cap.:   1416 xxxx xxxxx  1459 xxxx xxxxx   538  520   884   493  516   919
Volume/Cap:  0.03 xxxx  xxxx  0.00 xxxx  xxxx  0.02 0.00  0.06  0.01 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.6 xxxx xxxxx   7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  793 xxxxx  xxxx  657 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.3 xxxxx xxxxx  0.1 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.0 xxxxx xxxxx 10.6 xxxxx
Shared LOS:     *    *     *     *    *     *     *    A     *     *    B     *
ApproachDel:     xxxxxx           xxxxxx             10.0             10.6
ApproachLOS:        *                *                 A                B
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
*********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
*********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   46  134     3     4  158    15    12    0    55     6    1     8
ApproachDel:    xxxxxx           xxxxxx             10.0             10.6
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=67]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=442]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=15]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=442]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   46  134     3     4  158    15    12    0    55     6    1     8
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             360
Minor Approach Volume:           67
Minor Approach Volume Threshold: 492
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

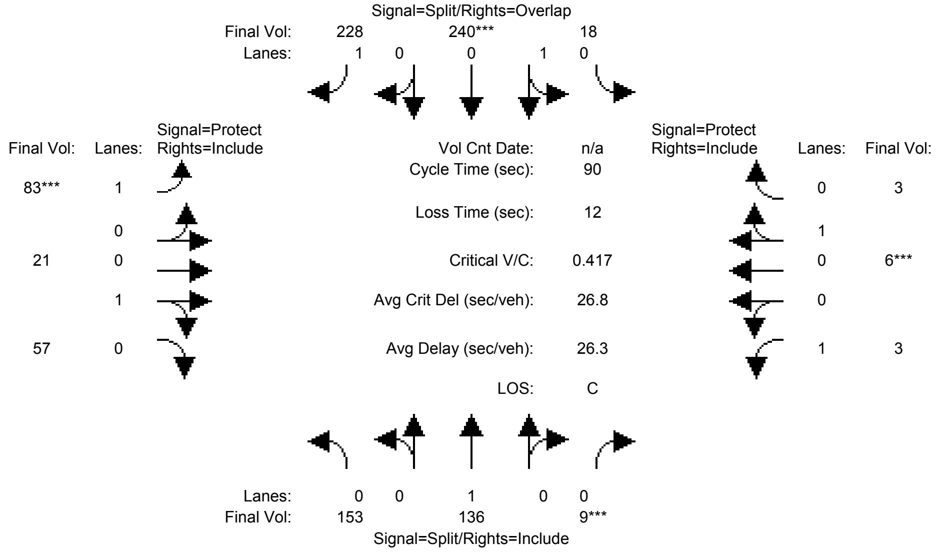
Intersection #2: Park Blvd & Page Mill Rd



```
Street Name:            Park Blvd                        Page Mill Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:    7   10    10     7   10    10     7   10    10     7   10    10
Y+R:         4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:    153  134     7     3  221   206    65    5    51     3    4     1
Growth 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
Initial Bse: 153  134     7     3  221   206    65    5    51     3    4     1
Added Vol:     0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:   0    2     2    15   19     8    16   16     6     0    2     2
Initial Fut: 153  136     9    18  240   214    81   21    57     3    6     3
User 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
PHF 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
PHF Volume:  153  136     9    18  240   214    81   21    57     3    6     3
Reduct Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol: 153  136     9    18  240   214    81   21    57     3    6     3
PCE 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
MLF 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
FinalVolume: 153  136     9    18  240   214    81   21    57     3    6     3
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment: 0.89 0.97  0.87  0.92 1.00  0.63  0.88 0.89  0.78  0.88 0.95  0.73
Lanes:      0.53 0.44  0.03  0.08 0.92  1.00  1.00 0.25  0.75  1.00 0.61  0.39
Final Sat.:  904  804    53   131 1752  1205  1663  415  1126  1663 1094   547
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.17 0.17  0.17  0.14 0.14  0.18  0.05 0.05  0.05  0.00 0.01  0.01
Crit Moves:            ****        ****       ****                   ****
Green Time: 32.4 32.4  32.4  26.3 26.3  35.6   9.3 11.4  11.4   8.0 10.0  10.0
Volume/Cap: 0.47 0.47  0.47  0.47 0.47  0.45  0.47 0.40  0.40  0.02 0.05  0.05
Uniform Del: 22.2 22.2  22.2  26.2 26.2  20.0  38.0 36.2  36.2  37.5 35.8  35.8
IncremntDel:  0.6  0.6   0.6   0.6  0.6   0.7   2.0  1.4   1.4   0.1  0.1   0.1
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   22.7 22.7  22.7  26.8 26.8  20.7  40.0 37.5  37.5  37.5 35.9  35.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  22.7 22.7  22.7  26.8 26.8  20.7  40.0 37.5  37.5  37.5 35.9  35.9
LOS by Move:   C+   C+    C+     C    C    C+     D   D+    D+    D+   D+    D+
HCM2kAvgQ:      7    7     7     6    6     5     3    3     3     0    0     0
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #2: Park Blvd & Page Mill Rd



```
Street Name:            Park Blvd                        Page Mill Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10     10      7   10     10      7   10     10      7   10     10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     153  134      7      3  221    206     65    5     51      3    4      1
Growth 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
Initial Bse:  153  134      7      3  221    206     65    5     51      3    4      1
Added Vol:      0    0      0      0    0     14      2    0      0      0    0      0
PasserByVol:    0    2      2     15   19      8     16   16      6      0    2      2
Initial Fut:  153  136      9     18  240    228     83   21     57      3    6      3
User 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
PHF 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
PHF Volume:   153  136      9     18  240    228     83   21     57      3    6      3
Reduct Vol:     0    0      0      0    0      0      0    0      0      0    0      0
Reduced Vol:  153  136      9     18  240    228     83   21     57      3    6      3
PCE 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
MLF 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
FinalVolume:  153  136      9     18  240    228     83   21     57      3    6      3
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.89 0.97  0.87  0.92 1.00  0.63  0.88 0.89  0.78  0.88 0.95  0.73
Lanes:       0.53 0.44  0.03  0.08 0.92  1.00  1.00 0.25  0.75  1.00 0.61  0.39
Final Sat.:   904  804     53    131 1752   1205   1663  415   1126   1663 1094    547
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.17 0.17  0.17  0.14 0.14  0.19  0.05 0.05  0.05  0.00 0.01  0.01
Crit Moves:               ****        ****        ****                    ****
Green Time:  32.3 32.3  32.3  26.2 26.2  35.7   9.5 11.5  11.5   8.0 10.0  10.0
Volume/Cap:  0.47 0.47  0.47  0.47 0.47  0.48  0.47 0.40  0.40  0.02 0.05  0.05
Uniform Del: 22.3 22.3  22.3  26.2 26.2  20.2  37.9 36.1  36.1  37.4 35.8  35.8
IncremntDel:  0.6  0.6   0.6   0.6  0.6   0.8   2.0  1.3   1.3   0.1  0.1   0.1
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   22.8 22.8  22.8  26.9 26.9  21.0  39.8 37.4  37.4  37.4 35.9  35.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  22.8 22.8  22.8  26.9 26.9  21.0  39.8 37.4  37.4  37.4 35.9  35.9
LOS by Move:   C+   C+    C+     C    C    C+     D   D+    D+    D+   D+    D+
HCM2kAvgQ:      7    7      7      6    6      5      3    3      3      0    0      0
Note: Queue reported is the number of cars per lane.
```

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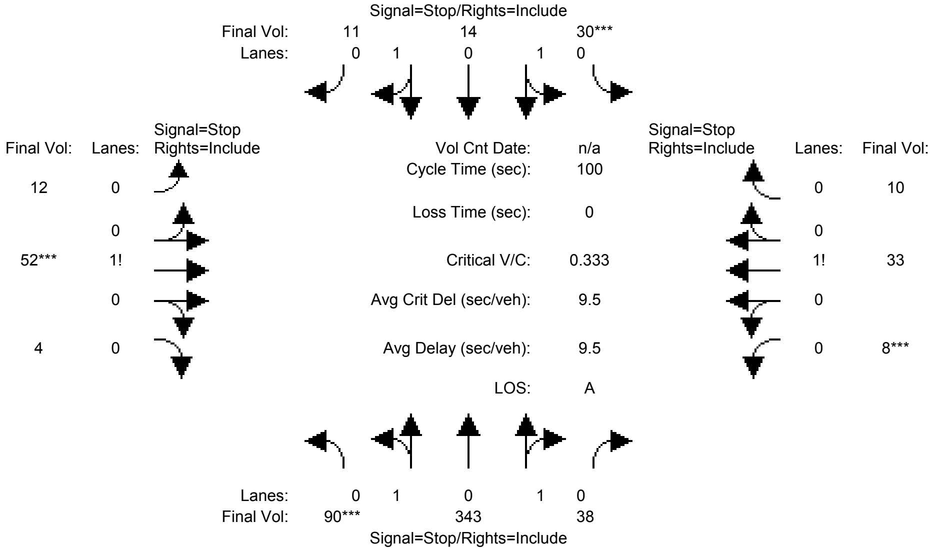
Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background AM

Intersection #3: Birch St & Sherman Ave



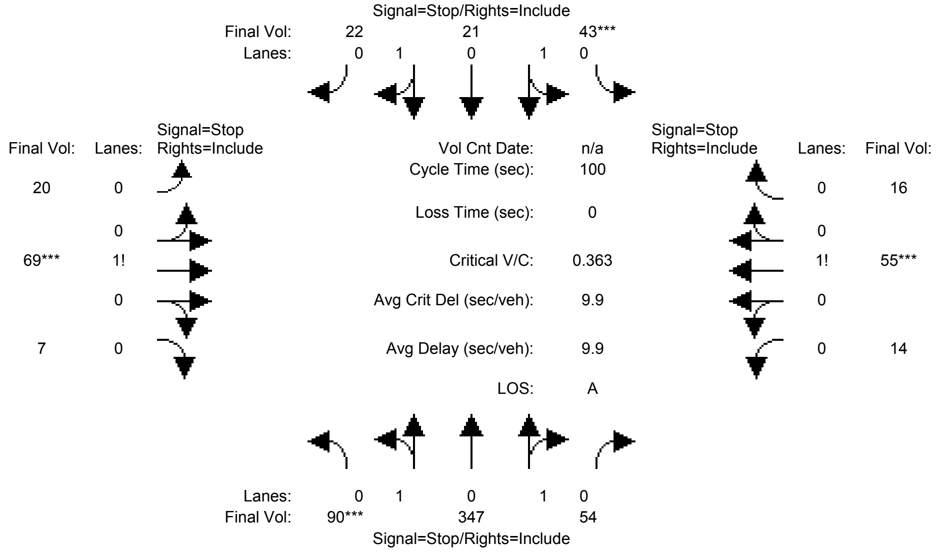
Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.333
Avg Crit Del (sec/veh): 9.5
Avg Delay (sec/veh): 9.5
LOS: A

```
Street Name:                Birch St                            Sherman Ave
Approach:       North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      69  343    38    30   14    11    12   48     4     8   33    10
Growth 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
Initial Bse:   69  343    38    30   14    11    12   48     4     8   33    10
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:   21    0     0     0    0     0     0    4     0     0    0     0
Initial Fut:   90  343    38    30   14    11    12   52     4     8   33    10
User 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
PHF 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
PHF Volume:    90  343    38    30   14    11    12   52     4     8   33    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   90  343    38    30   14    11    12   52     4     8   33    10
PCE 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
MLF 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
FinalVolume:   90  343    38    30   14    11    12   52     4     8   33    10
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.38 1.46  0.16  1.00 0.60  0.40  0.18 0.76  0.06  0.16 0.65  0.19
Final Sat.:   270 1065   121   611  422   281   118  510    39   105  435   132
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.33 0.32  0.31  0.05 0.03  0.04  0.10 0.10  0.10  0.08 0.08  0.08
Crit Moves:  ****              ****                   ****        ****
Delay/Veh:   10.2  9.8   9.6   8.7  7.8   7.8   8.6  8.6   8.6   8.4  8.4   8.4
Delay 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
AdjDel/Veh:  10.2  9.8   9.6   8.7  7.8   7.8   8.6  8.6   8.6   8.4  8.4   8.4
LOS by Move:    B    A     A     A    A     A     A    A     A     A    A     A
ApproachDel:        9.9              8.3               8.6               8.4
Delay Adj:         1.00             1.00              1.00              1.00
ApprAdjDel:         9.9              8.3               8.6               8.4
LOS by Appr:          A                A                 A                 A
AllWayAvgQ:   0.5  0.4   0.4   0.0  0.0   0.0   0.1  0.1   0.1   0.1  0.1   0.1
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #3 Birch St & Sherman Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   90  343    38    30   14    11    12   52     4     8   33    10
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            526
Minor Approach Volume:          68
Minor Approach Volume Threshold: 506
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background+Project AM

Intersection #3: Birch St & Sherman Ave



Signal=Stop/Rights=Include
Final Vol: 22 21 43***
Lanes: 0 1 0 1 0

Signal=Stop
Rights=Include
Final Vol: 20, 69***, 7
Lanes: 0, 0, 1!, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.363
Avg Crit Del (sec/veh): 9.9
Avg Delay (sec/veh): 9.9
LOS: A

Signal=Stop
Rights=Include
Lanes: 0, 0, 1!, 0, 0
Final Vol: 16, 55***, 14

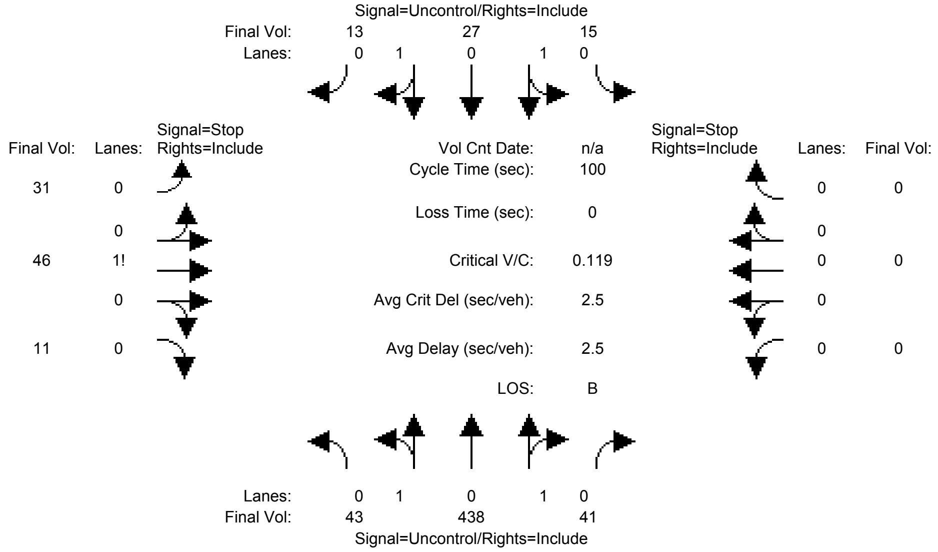
Lanes: 0 1 0 1 0
Final Vol: 90*** 347 54
Signal=Stop/Rights=Include

```
Street Name:                   Birch St                        Sherman Ave
Approach:       North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      69  343    38    30   14    11    12   48     4     8   33    10
Growth 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
Initial Bse:   69  343    38    30   14    11    12   48     4     8   33    10
Added Vol:      0    4    16    13    7    11     8   17     3     6   22     6
PasserByVol:   21    0     0     0    0     0     0    4     0     0    0     0
Initial Fut:   90  347    54    43   21    22    20   69     7    14   55    16
User 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
PHF 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
PHF Volume:    90  347    54    43   21    22    20   69     7    14   55    16
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   90  347    54    43   21    22    20   69     7    14   55    16
PCE 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
MLF 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
FinalVolume:   90  347    54    43   21    22    20   69     7    14   55    16
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.37 1.41  0.22  1.00 0.49  0.51  0.21 0.72  0.07  0.16 0.65  0.19
Final Sat.:   248  991   159   581  329   345   134  461    47   107  419   122
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.36 0.35  0.34  0.07 0.06  0.06  0.15 0.15  0.15  0.13 0.13  0.13
Crit Moves:  ****             ****                  ****             ****
Delay/Veh:   10.8 10.4  10.1   9.1  8.1   8.1   9.1  9.1   9.1   8.9  8.9   8.9
Delay 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
AdjDel/Veh:  10.8 10.4  10.1   9.1  8.1   8.1   9.1  9.1   9.1   8.9  8.9   8.9
LOS by Move:    B    B     B     A    A     A     A    A     A     A    A     A
ApproachDel:      10.4              8.6              9.1              8.9
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:       10.4              8.6              9.1              8.9
LOS by Appr:         B                A                A                A
AllWayAvgQ:   0.5  0.5   0.5   0.1  0.1   0.1   0.2  0.2   0.2   0.1  0.1   0.1
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #3 Birch St & Sherman Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   90  347    54    43   21    22    20   69     7    14   55    16
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            577
Minor Approach Volume:          96
Minor Approach Volume Threshold: 474
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background AM

Intersection #4: Birch St & Grant Ave



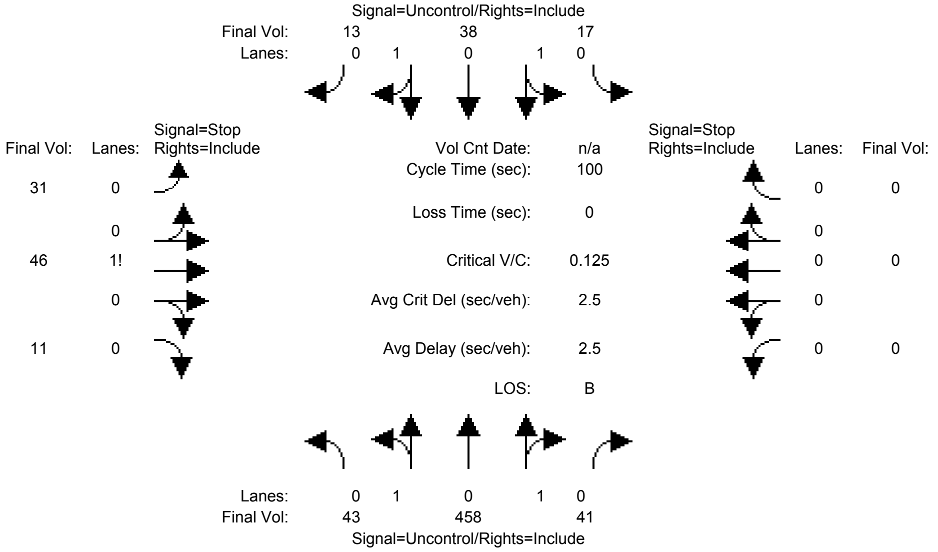
```
                               Signal=Uncontrol/Rights=Include
                   Final Vol:      13            27            15
                      Lanes:         0     1       0       1     0

                 Signal=Stop                                            Signal=Stop
Final Vol:  Lanes: Rights=Include          Vol Cnt Date:        n/a     Rights=Include     Lanes:   Final Vol:
                                         Cycle Time (sec):      100
   31        0                                                                               0          0
                                          Loss Time (sec):        0
             0                                                                               0
   46        1!                              Critical V/C:     0.119                         0          0

             0                        Avg Crit Del (sec/veh):    2.5                         0

   11        0                             Avg Delay (sec/veh):  2.5                         0          0

                                                     LOS:          B

                      Lanes:         0     1       0       1     0
                   Final Vol:      43           438            41
                               Signal=Uncontrol/Rights=Include
```

```
Street Name:                Birch St                         Grant Ave
Approach:       North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      39  417    32    15   27    13    31   35    11     0    0     0
Growth 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
Initial Bse:   39  417    32    15   27    13    31   35    11     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    4   21     9     0    0     0     0   11     0     0    0     0
Initial Fut:   43  438    41    15   27    13    31   46    11     0    0     0
User 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
PHF 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
PHF Volume:    43  438    41    15   27    13    31   46    11     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   43  438    41    15   27    13    31   46    11     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   40 xxxx xxxxx   479 xxxx xxxxx   369  629    20  xxxx xxxx xxxxx
Potent Cap.: 1583 xxxx xxxxx  1094 xxxx xxxxx   610  402  1060  xxxx xxxx xxxxx
Move Cap.:   1583 xxxx xxxxx  1094 xxxx xxxxx   591  385  1060  xxxx xxxx xxxxx
Volume/Cap:  0.03 xxxx  xxxx  0.01 xxxx  xxxx  0.05 0.12  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.3 xxxx xxxxx   8.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  483 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.7 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.3 xxxx xxxxx   8.3 xxxx xxxxx xxxxx 14.1 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     A    *     *     *    B     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx             14.1             xxxxxx
ApproachLOS:          *                *                B                  *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   43  438    41    15   27    13    31   46    11     0    0     0
ApproachDel:    xxxxxx           xxxxxx            14.1           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.3]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=88]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=665]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   43  438    41    15   27    13    31   46    11     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             577
Minor Approach Volume:           88
Minor Approach Volume Threshold: 474
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project AM

Intersection #4: Birch St & Grant Ave

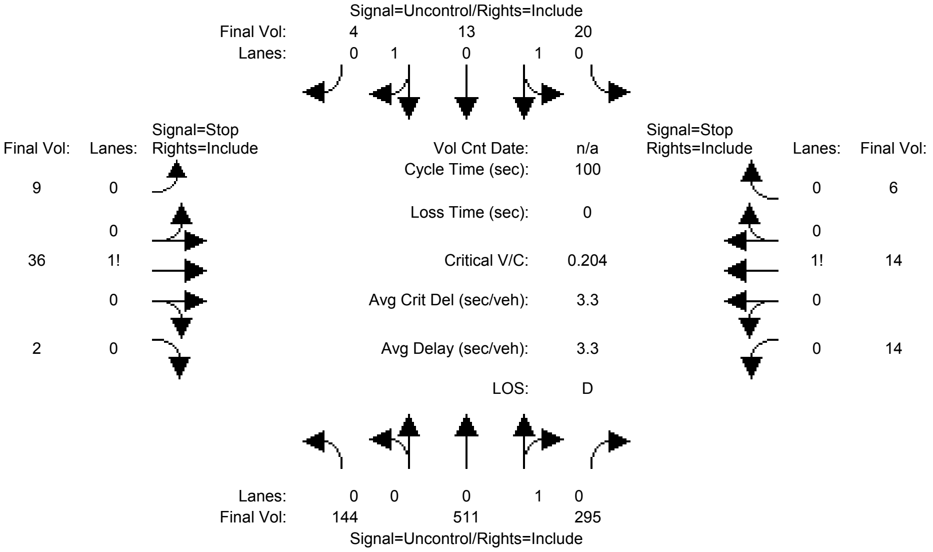


```
Street Name:                 Birch St                          Grant Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      39  417    32    15   27    13    31   35    11     0    0     0
Growth 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
Initial Bse:   39  417    32    15   27    13    31   35    11     0    0     0
Added Vol:      0   20     0     2   11     0     0    0     0     0    0     0
PasserByVol:    4   21     9     0    0     0     0   11     0     0    0     0
Initial Fut:   43  458    41    17   38    13    31   46    11     0    0     0
User 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
PHF 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
PHF Volume:    43  458    41    17   38    13    31   46    11     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   43  458    41    17   38    13    31   46    11     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   51 xxxx xxxxx   499 xxxx xxxxx   394  664    26  xxxx xxxx xxxxx
Potent Cap.: 1568 xxxx xxxxx  1075 xxxx xxxxx   589  384  1051  xxxx xxxx xxxxx
Move Cap.:   1568 xxxx xxxxx  1075 xxxx xxxxx   569  367  1051  xxxx xxxx xxxxx
Volume/Cap:  0.03 xxxx  xxxx  0.02 xxxx  xxxx  0.05 0.13  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx   8.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  462 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.7 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx   8.4 xxxx xxxxx xxxxx 14.6 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     A    *     *     *    B     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx              14.6             xxxxxx
ApproachLOS:          *                *                 B                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   43  458    41    17   38    13    31   46    11     0    0     0
ApproachDel:    xxxxxx           xxxxxx             14.6           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.4]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=88]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=698]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   43  458    41    17   38    13    31   46    11     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            610
Minor Approach Volume:          88
Minor Approach Volume Threshold: 455
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background AM

Intersection #5: Birch St & Sheridan Ave

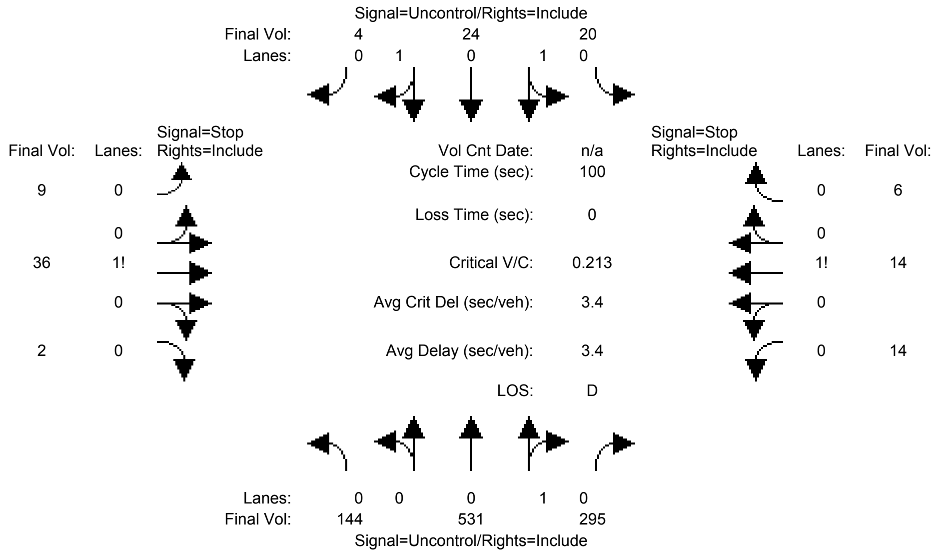


```
Street Name:             Birch St                        Sheridan Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     144  477   246    20   13     4     9   36     2     8   14     6
Growth 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
Initial Bse:  144  477   246    20   13     4     9   36     2     8   14     6
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0   34    49     0    0     0     0    0     0     6    0     0
Initial Fut:  144  511   295    20   13     4     9   36     2    14   14     6
User 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
PHF 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
PHF Volume:   144  511   295    20   13     4     9   36     2    14   14     6
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  144  511   295    20   13     4     9   36     2    14   14     6
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   17 xxxx xxxxx   806 xxxx xxxxx  1012 1149     9  1011 1004   659
Potent Cap.: 1613 xxxx xxxxx   828 xxxx xxxxx   220  200  1079   220  244   467
Move Cap.:   1613 xxxx xxxxx   828 xxxx xxxxx   188  176  1079   169  215   467
Volume/Cap:  0.09 xxxx  xxxx  0.02 xxxx  xxxx  0.05 0.20  0.00  0.08 0.07  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.3 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx   9.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  185 xxxxx  xxxx  211 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx  1.0 xxxxx xxxxx  0.6 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   9.5 xxxx xxxxx xxxxx 31.0 xxxxx xxxxx 25.3 xxxxx
Shared LOS:     *    *     *     A    *     *     *    D     *     *    D     *
ApproachDel:    xxxxxx           xxxxxx             31.0             25.3
ApproachLOS:         *                *                D                D
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  144  511   295    20   13    4     9   36     2    14   14     6
ApproachDel:    xxxxxx           xxxxxx             31.0             25.3
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.4]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=47]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1068]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=34]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1068]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  144  511   295    20   13    4     9   36     2    14   14     6
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             987
Minor Approach Volume:           47
Minor Approach Volume Threshold: 289
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project AM

Intersection #5: Birch St & Sheridan Ave

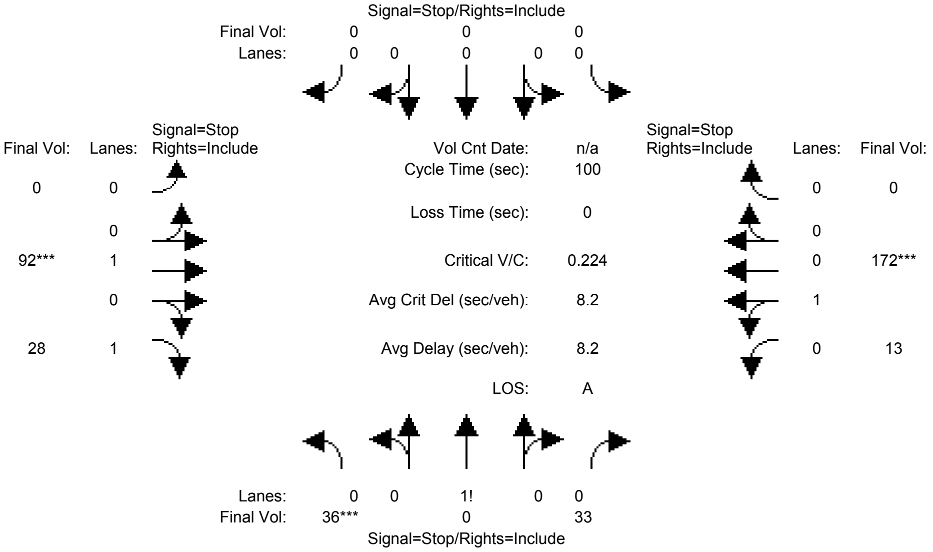


```
Street Name:                  Birch St                          Sheridan Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     144  477   246    20   13     4     9   36     2     8   14     6
Growth 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
Initial Bse:  144  477   246    20   13     4     9   36     2     8   14     6
Added Vol:      0   20     0     0   11     0     0    0     0     0    0     0
PasserByVol:    0   34    49     0    0     0     0    0     0     6    0     0
Initial Fut:  144  531   295    20   24     4     9   36     2    14   14     6
User 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
PHF 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
PHF Volume:   144  531   295    20   24     4     9   36     2    14   14     6
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  144  531   295    20   24     4     9   36     2    14   14     6
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   28 xxxx xxxxx   826 xxxx xxxxx  1043 1180    14  1037 1035   679
Potent Cap.: 1599 xxxx xxxxx   813 xxxx xxxxx   209  192  1072   211  234   455
Move Cap.:   1599 xxxx xxxxx   813 xxxx xxxxx   178  169  1072   161  206   455
Volume/Cap:  0.09 xxxx  xxxx  0.02 xxxx  xxxx  0.05 0.21  0.00  0.09 0.07  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.3 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.5 xxxx xxxxx   9.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  177 xxxxx  xxxx  202 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx  1.0 xxxxx xxxxx  0.6 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   9.5 xxxx xxxxx xxxxx 32.6 xxxxx xxxxx 26.4 xxxxx
Shared LOS:     *    *     *     A    *     *     *    D     *     *    D     *
ApproachDel:     xxxxxx           xxxxxx             32.6              26.4
ApproachLOS:        *                *                 D                 D
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  144  531   295    20   24     4     9   36     2    14   14     6
ApproachDel:    xxxxxx           xxxxxx             32.6             26.4
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.4]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=47]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1099]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=34]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1099]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  144  531   295    20   24     4     9   36     2    14   14     6
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1018
Minor Approach Volume:           47
Minor Approach Volume Threshold: 279
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background AM

Intersection #6: Ash St & California Ave



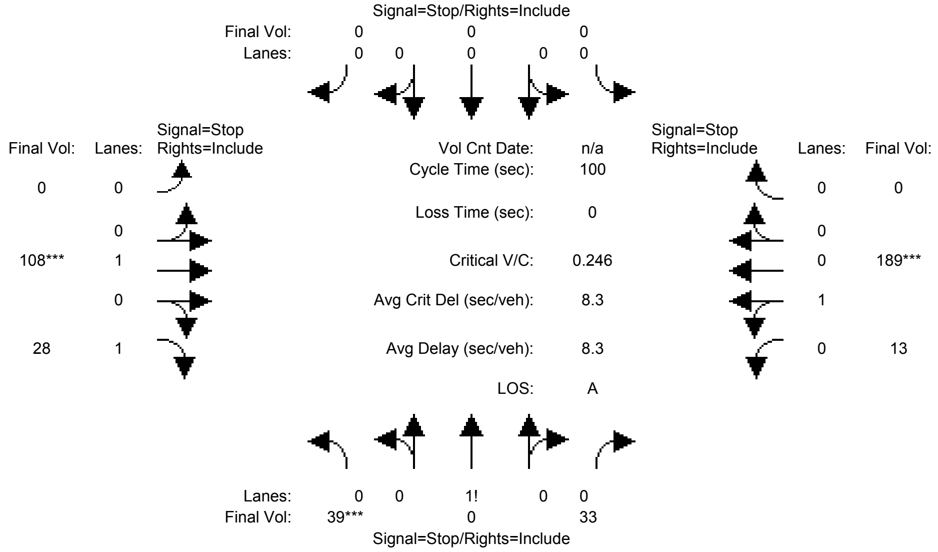
Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.224
Avg Crit Del (sec/veh): 8.2
Avg Delay (sec/veh): 8.2
LOS: A

```
Street Name:                Ash St                        California Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      36    0    33     0    0     0     0   85    28    13  172     0
Growth 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
Initial Bse:   36    0    33     0    0     0     0   85    28    13  172     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    7     0     0    0     0
Initial Fut:   36    0    33     0    0     0     0   92    28    13  172     0
User 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
PHF 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
PHF Volume:    36    0    33     0    0     0     0   92    28    13  172     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   36    0    33     0    0     0     0   92    28    13  172     0
PCE 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
MLF 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
FinalVolume:   36    0    33     0    0     0     0   92    28    13  172     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.52 0.00  0.48  0.00 0.00  0.00  0.00 1.00  1.00  0.07 0.93  0.00
Final Sat.:   408    0   374     0    0     0     0  742   867    58  769     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.09 xxxx  0.09  xxxx xxxx  xxxx  xxxx 0.12  0.03  0.22 0.22  xxxx
Crit Moves:  ****                                   ****              ****
Delay/Veh:    7.8  0.0   7.8   0.0  0.0   0.0   0.0  8.1   6.9   8.5  8.5   0.0
Delay 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
AdjDel/Veh:   7.8  0.0   7.8   0.0  0.0   0.0   0.0  8.1   6.9   8.5  8.5   0.0
LOS by Move:    A    *     A     *    *     *     *    A     A     A    A     *
ApproachDel:       7.8            xxxxxx              7.8              8.5
Delay Adj:        1.00             xxxxx             1.00             1.00
ApprAdjDel:        7.8            xxxxxx              7.8              8.5
LOS by Appr:         A                *                A                A
AllWayAvgQ:   0.1  0.1   0.1   0.0  0.0   0.0   0.0  0.1   0.0   0.3  0.3   0.3
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #6 Ash St & California Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
Initial Vol:   36    0    33     0    0     0     0   92    28    13  172     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             305
Minor Approach Volume:           69
Minor Approach Volume Threshold: 694
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background+Project AM

Intersection #6: Ash St & California Ave

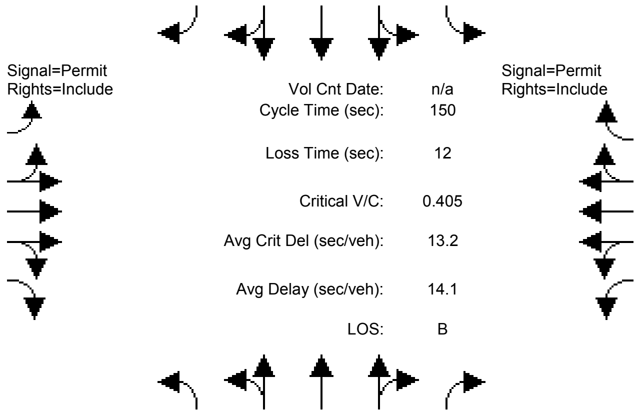


```
Street Name:                 Ash St                         California Ave
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:    7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     36    0    33     0    0     0     0   85    28    13  172     0
Growth 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
Initial Bse:  36    0    33     0    0     0     0   85    28    13  172     0
Added Vol:     3    0     0     0    0     0     0   16     0     0   17     0
PasserByVol:   0    0     0     0    0     0     0    7     0     0    0     0
Initial Fut:  39    0    33     0    0     0     0  108    28    13  189     0
User 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
PHF 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
PHF Volume:   39    0    33     0    0     0     0  108    28    13  189     0
Reduct Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  39    0    33     0    0     0     0  108    28    13  189     0
PCE 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
MLF 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
FinalVolume:  39    0    33     0    0     0     0  108    28    13  189     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.54 0.00  0.46  0.00 0.00  0.00  0.00 1.00  1.00  0.06 0.94  0.00
Final Sat.:  413    0   349     0    0     0     0  738   862    53  769     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.09 xxxx  0.09  xxxx xxxx  xxxx  xxxx 0.15  0.03  0.25 0.25  xxxx
Crit Moves:  ****                                   ****             ****
Delay/Veh:    7.9  0.0   7.9   0.0  0.0   0.0   0.0  8.3   6.9   8.7  8.7   0.0
Delay 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
AdjDel/Veh:   7.9  0.0   7.9   0.0  0.0   0.0   0.0  8.3   6.9   8.7  8.7   0.0
LOS by Move:    A    *     A     *    *     *     *    A     A     A    A     *
ApproachDel:       7.9            xxxxxx             8.0              8.7
Delay Adj:        1.00             xxxxx            1.00             1.00
ApprAdjDel:        7.9            xxxxxx             8.0              8.7
LOS by Appr:         A                 *               A                A
AllWayAvgQ:   0.1  0.1   0.1   0.0  0.0   0.0   0.0  0.2   0.0   0.3  0.3   0.3
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #6 Ash St & California Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
Initial Vol:   39    0    33     0    0     0     0  108    28    13  189     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             338
Minor Approach Volume:           72
Minor Approach Volume Threshold: 659
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #7: ECR & Cambridge Ave

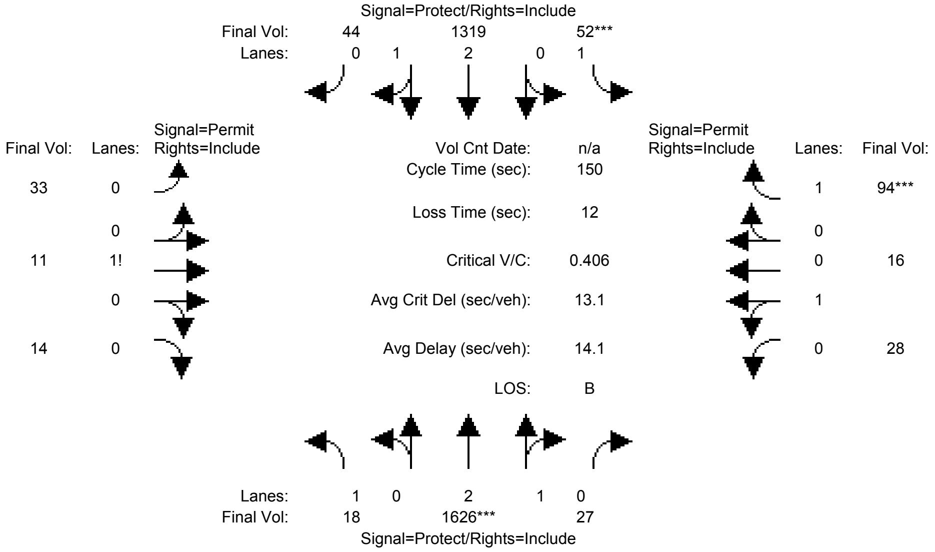


```
                      Signal=Protect/Rights=Include
            Final Vol:   44        1313        52***
                Lanes:    0    1     2     0    1

                  Signal=Permit                                      Signal=Permit
Final Vol:  Lanes:  Rights=Include      Vol Cnt Date:       n/a     Rights=Include   Lanes:  Final Vol:
                                        Cycle Time (sec):   150
    33        0                                                                        1       94***
                                        Loss Time (sec):    12
              0                                                                        0
    11        1!                        Critical V/C:       0.405                      0       16
              0                         Avg Crit Del (sec/veh): 13.2                   1
    14        0                         Avg Delay (sec/veh):    14.1                   0       28
                                        LOS:                B

                Lanes:    1    0     2     1    0
            Final Vol:   18        1620***      27
                      Signal=Protect/Rights=Include
```

```
Street Name:                 ECR                            Cambridge Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      17 1529    26    49 1224    42    33    9    14    28   16    94
Growth 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
Initial Bse:   17 1529    26    49 1224    42    33    9    14    28   16    94
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    1   91     1     3   89     2     0    2     0     0    0     0
Initial Fut:   18 1620    27    52 1313    44    33   11    14    28   16    94
User 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
PHF 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
PHF Volume:    18 1620    27    52 1313    44    33   11    14    28   16    94
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   18 1620    27    52 1313    44    33   11    14    28   16    94
PCE 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
MLF 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
FinalVolume:   18 1620    27    52 1313    44    33   11    14    28   16    94
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.95  0.05  1.00 2.89  0.11  0.58 0.18  0.24  0.66 0.34  1.00
Final Sat.:  1750 5599    93  1750 5500   184  1011  337   429  1147  655  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.29  0.29  0.03 0.24  0.24  0.03 0.03  0.03  0.02 0.02  0.05
Crit Moves:       ****        ****                                           ****
Green Time:  19.3  107 107.1  11.0 98.8  98.8  19.9 19.9  19.9  19.9 19.9  19.9
Volume/Cap:  0.08 0.41  0.41  0.41 0.36  0.36  0.25 0.25  0.25  0.18 0.18  0.41
Uniform Del: 57.5  8.6   8.6  66.4 11.5  11.5  58.3 58.3  58.3  57.8 57.8  59.6
IncremntDel:  0.2  0.1   0.1   2.1  0.1   0.1   0.5  0.5   0.5   0.4  0.4   1.2
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   57.7  8.7   8.7  68.5 11.5  11.5  58.9 58.9  58.9  58.2 58.2  60.8
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  57.7  8.7   8.7  68.5 11.5  11.5  58.9 58.9  58.9  58.2 58.2  60.8
LOS by Move:   E+    A     A     E   B+    B+    E+   E+    E+    E+   E+     E
HCM2kAvgQ:      1   10    10     3    9     9     3    3     3     2    2     5
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #7: ECR & Cambridge Ave



```
Street Name:                 ECR                            Cambridge Ave
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      17 1529    26    49 1224    42    33    9    14    28   16    94
Growth 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
Initial Bse:   17 1529    26    49 1224    42    33    9    14    28   16    94
Added Vol:      0    6     0     0    6     0     0    0     0     0    0     0
PasserByVol:    1   91     1     3   89     2     0    2     0     0    0     0
Initial Fut:   18 1626    27    52 1319    44    33   11    14    28   16    94
User 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
PHF 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
PHF Volume:    18 1626    27    52 1319    44    33   11    14    28   16    94
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   18 1626    27    52 1319    44    33   11    14    28   16    94
PCE 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
MLF 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
FinalVolume:   18 1626    27    52 1319    44    33   11    14    28   16    94
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.95  0.05  1.00 2.90  0.10  0.58 0.18  0.24  0.66 0.34  1.00
Final Sat.:  1750 5599    93  1750 5501   183  1011  337   429  1147  655  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.29  0.29  0.03 0.24  0.24  0.03 0.03  0.03  0.02 0.02  0.05
Crit Moves:       ****        ****                                           ****
Green Time:  19.3  107 107.2  11.0 98.9  98.9  19.8 19.8  19.8  19.8 19.8  19.8
Volume/Cap:  0.08 0.41  0.41  0.41 0.36  0.36  0.25 0.25  0.25  0.18 0.18  0.41
Uniform Del: 57.6  8.6   8.6  66.4 11.4  11.4  58.4 58.4  58.4  57.9 57.9  59.7
IncremntDel:  0.2  0.1   0.1   2.1  0.1   0.1   0.6  0.6   0.6   0.4  0.4   1.2
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   57.7  8.7   8.7  68.5 11.5  11.5  58.9 58.9  58.9  58.3 58.3  60.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  57.7  8.7   8.7  68.5 11.5  11.5  58.9 58.9  58.9  58.3 58.3  60.9
LOS by Move:   E+    A     A     E   B+    B+    E+   E+    E+    E+   E+     E
HCM2kAvgQ:      1   10    10     3    9     9     3    3     3     2    2     5
Note: Queue reported is the number of cars per lane.
```

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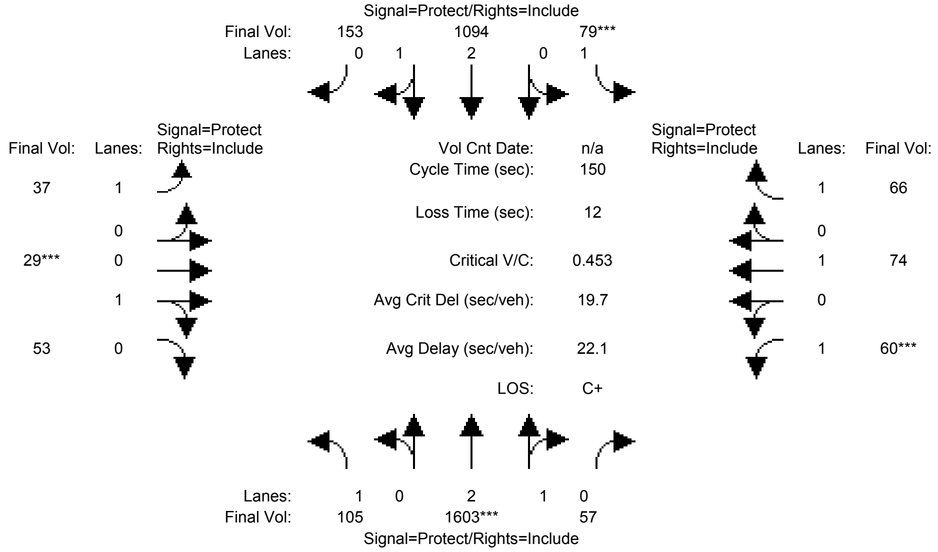
Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

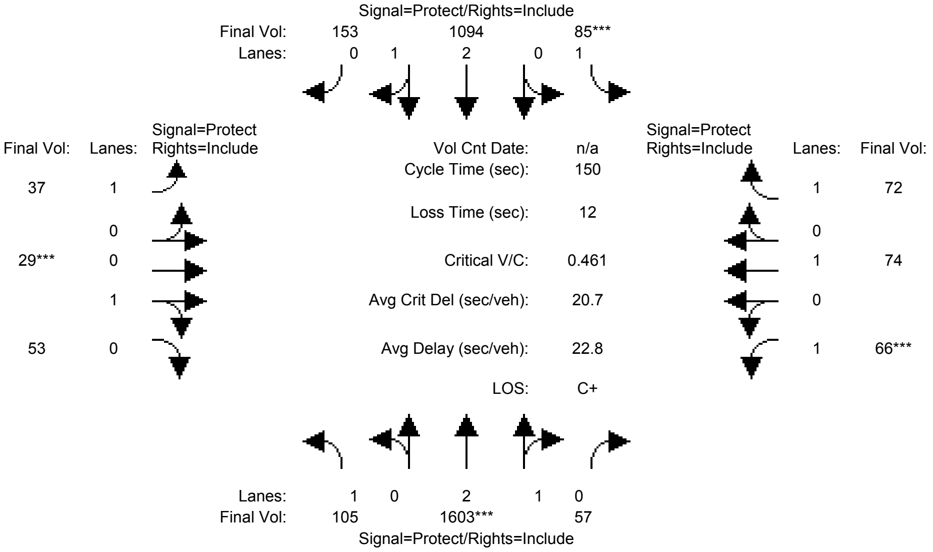
Intersection #8: ECR & California Ave



```
Street Name:                 ECR                          California Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     100 1513    54    60 1023   144    33   27    53    60   74    65
Growth 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
Initial Bse:  100 1513    54    60 1023   144    33   27    53    60   74    65
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    5   90     3    19   71     9     4    2     0     0    0     1
Initial Fut:  105 1603    57    79 1094   153    37   29    53    60   74    66
User 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
PHF 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
PHF Volume:   105 1603    57    79 1094   153    37   29    53    60   74    66
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  105 1603    57    79 1094   153    37   29    53    60   74    66
PCE 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
MLF 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
FinalVolume:  105 1603    57    79 1094   153    37   29    53    60   74    66
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.89  0.11  1.00 2.60  0.40  1.00 0.34  0.66  1.00 1.00  1.00
Final Sat.:  1750 5488   195  1750 4949   692  1750  637  1164  1750 1900  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.29  0.29  0.05 0.22  0.22  0.02 0.05  0.05  0.03 0.04  0.04
Crit Moves:       ****        ****                   ****        ****
Green Time:  23.8 96.6  96.6  14.9 87.8  87.8  10.9 15.1  15.1  11.3 15.5  15.5
Volume/Cap:  0.38 0.45  0.45  0.45 0.38  0.38  0.29 0.45  0.45  0.45 0.38  0.36
Uniform Del: 56.5 13.4  13.4  63.7 16.6  16.6  65.9 63.6  63.6  66.4 62.7  62.6
IncremntDel:  0.9  0.1   0.1   1.9  0.1   0.1   1.3  1.8   1.8   2.5  1.2   1.2
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   57.3 13.5  13.5  65.6 16.6  16.6  67.2 65.4  65.4  68.8 63.9  63.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  57.3 13.5  13.5  65.6 16.6  16.6  67.2 65.4  65.4  68.8 63.9  63.9
LOS by Move:   E+    B     B     E    B     B     E    E     E     E    E     E
HCM2kAvgQ:      5   12    12     4   10    10     2    4     4     3    3     3
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #8: ECR & California Ave

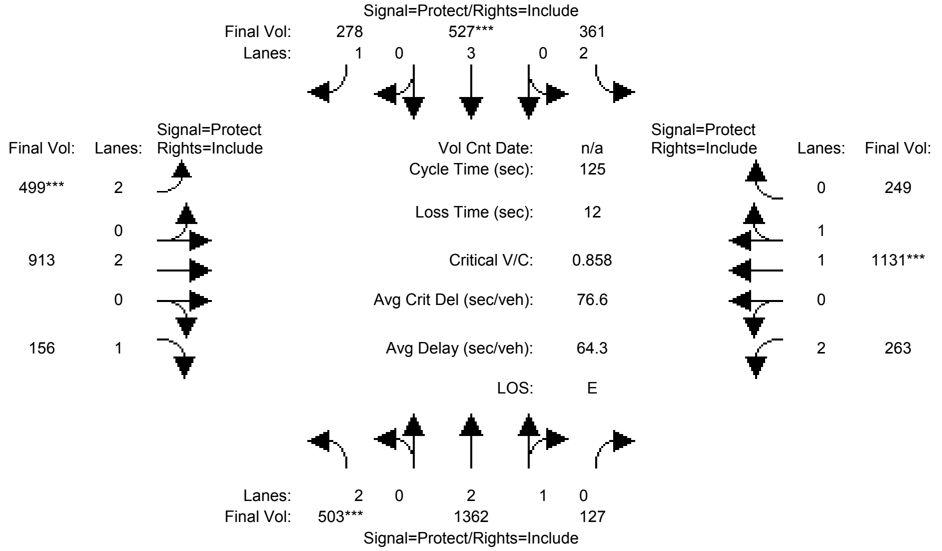


```
                     Signal=Protect/Rights=Include
             Final Vol:   153          1094         85***
                 Lanes:      0    1       2      0    1

             Signal=Protect                                       Signal=Protect
Final Vol:  Lanes:  Rights=Include     Vol Cnt Date:      n/a     Rights=Include     Lanes:  Final Vol:
                                       Cycle Time (sec):  150
    37        1                                                                        1       72
                                       Loss Time (sec):   12
              0                                                                        0
  29***       0                        Critical V/C:      0.461                        1       74
              1                        Avg Crit Del (sec/veh):  20.7                   0
    53        0                        Avg Delay (sec/veh):     22.8                   1       66***
                                       LOS:               C+

                 Lanes:      1    0       2      1    0
             Final Vol:   105          1603***        57
                     Signal=Protect/Rights=Include
```

```
Street Name:                    ECR                               California Ave
Approach:      North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     100 1513    54    60 1023   144    33   27    53    60   74    65
Growth 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
Initial Bse:  100 1513    54    60 1023   144    33   27    53    60   74    65
Added Vol:      0    0     0     6    0     0     0    0     0     6    0     6
PasserByVol:    5   90     3    19   71     9     4    2     0     0    0     1
Initial Fut:  105 1603    57    85 1094   153    37   29    53    66   74    72
User 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
PHF 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
PHF Volume:   105 1603    57    85 1094   153    37   29    53    66   74    72
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  105 1603    57    85 1094   153    37   29    53    66   74    72
PCE 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
MLF 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
FinalVolume:  105 1603    57    85 1094   153    37   29    53    66   74    72
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.89  0.11  1.00 2.60  0.40  1.00 0.34  0.66  1.00 1.00  1.00
Final Sat.:  1750 5488   195  1750 4949   692  1750  637  1164  1750 1900  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.29  0.29  0.05 0.22  0.22  0.02 0.05  0.05  0.04 0.04  0.04
Crit Moves:       ****        ****                  ****        ****
Green Time:  23.7 95.1  95.1  15.8 87.2  87.2  11.2 14.8  14.8  12.3 15.9  15.9
Volume/Cap:  0.38 0.46  0.46  0.46 0.38  0.38  0.28 0.46  0.46  0.46 0.37  0.39
Uniform Del: 56.6 14.2  14.2  63.1 16.9  16.9  65.6 63.8  63.8  65.7 62.3  62.5
IncremntDel:  0.9  0.1   0.1   1.8  0.1   0.1   1.2  1.9   1.9   2.3  1.1   1.3
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   57.5 14.3  14.3  64.9 16.9  16.9  66.8 65.7  65.7  68.0 63.5  63.8
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  57.5 14.3  14.3  64.9 16.9  16.9  66.8 65.7  65.7  68.0 63.5  63.8
LOS by Move:   E+    B     B     E    B     B     E    E     E     E    E     E
HCM2kAvgQ:      5   13    13     4   10    10     2    4     4     4    3     4
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #9: El Camino Real & Page Mill Rd

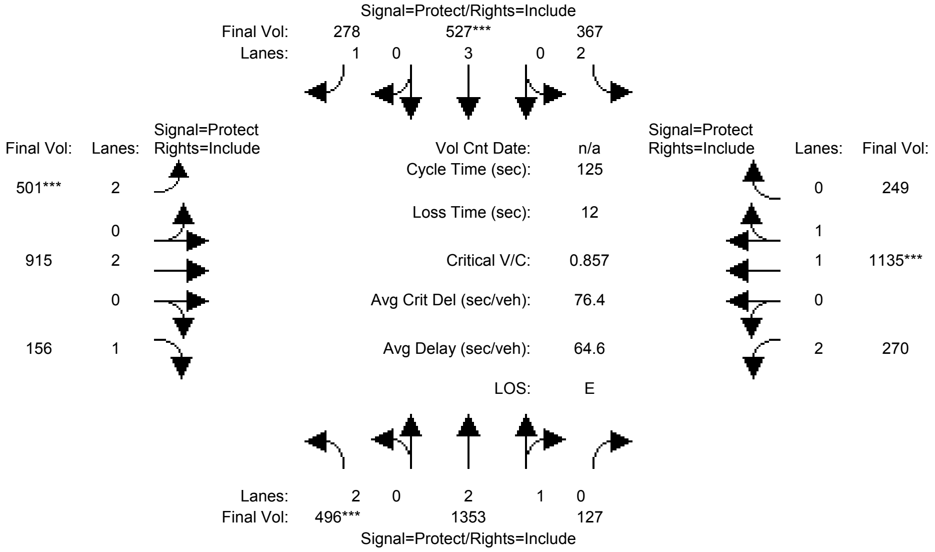


```
                          Signal=Protect/Rights=Include
              Final Vol:    278        527***        361
                 Lanes:       1    0     3      0    2

                   Signal=Protect                                  Signal=Protect
Final Vol:  Lanes: Rights=Include      Vol Cnt Date:      n/a      Rights=Include  Lanes:  Final Vol:
                                    Cycle Time (sec):     125
  499***      2                                                                      0        249
                                     Loss Time (sec):      12
              0                                                                      1
  913         2                         Critical V/C:     0.858                      1        1131***
              0                   Avg Crit Del (sec/veh):  76.6                      0
  156         1                      Avg Delay (sec/veh):  64.3                      2        263
                                                    LOS:     E

                 Lanes:       2    0     2      1    0
              Final Vol:   503***      1362          127
                          Signal=Protect/Rights=Include
```

```
Street Name:            El Camino Real                      Page Mill Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   30     0     7   30     0     7   28    28     7   30     0
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     474 1275   116   333  494   262   484  884   147   259 1113   247
Growth 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
Initial Bse:  474 1275   116   333  494   262   484  884   147   259 1113   247
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:   29   87    11    28   33    16    15   29     9     4   18     2
Initial Fut:  503 1362   127   361  527   278   499  913   156   263 1131   249
User 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
PHF 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
PHF Volume:   503 1362   127   361  527   278   499  913   156   263 1131   249
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  503 1362   127   361  527   278   499  913   156   263 1131   249
PCE 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
MLF 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
FinalVolume:  503 1362   127   361  527   278   499  913   156   263 1131   249
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.83 1.00  0.97  0.83 1.00  0.97  0.83 1.00  0.92  0.69 1.00  0.97
Lanes:       2.00 2.74  0.26  2.00 3.00  1.00  2.00 2.00  1.00  2.00 1.63  0.37
Final Sat.:  3150 5201   485  3150 5700  1847  3150 3800  1750  2625 3098   682
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.16 0.26  0.26  0.11 0.09  0.15  0.16 0.24  0.09  0.10 0.37  0.37
Crit Moves:  ****                  ****        ****                   ****
Green Time:  19.4 34.4  34.4  15.0 30.0  30.0  19.2 44.9  44.9  18.7 44.4  44.4
Volume/Cap:  1.03 0.95  0.95  0.95 0.39  0.63  1.03 0.67  0.25  0.67 1.03  1.03
Uniform Del: 52.8 44.5  44.5  54.6 39.8  42.5  52.9 33.8  28.2  50.2 40.3  40.3
IncremntDel: 48.3 14.0  14.0  35.7  0.8   6.6  48.4  2.6   0.9   8.7 32.2  32.2
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:  101.1 58.5  58.5  90.3 40.6  49.1 101.3 36.4  29.1  59.0 72.6  72.6
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh: 101.1 58.5  58.5  90.3 40.6  49.1 101.3 36.4  29.1  59.0 72.6  72.6
LOS by Move:    F   E+    E+     F    D     D     F   D+     C    E+    E     E
HCM2kAvgQ:     17   23    25    12    6    11    17   15     4     7   35    36
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

Intersection #9: El Camino Real & Page Mill Rd



Signal=Protect/Rights=Include
Final Vol: 278 527*** 367
Lanes: 1 0 3 0 2

Final Vol: | Lanes: | Signal=Protect Rights=Include

501*** 2
0
915 2
0
156 1

Vol Cnt Date: n/a
Cycle Time (sec): 125
Loss Time (sec): 12
Critical V/C: 0.857
Avg Crit Del (sec/veh): 76.4
Avg Delay (sec/veh): 64.6
LOS: E

Signal=Protect Rights=Include | Lanes: | Final Vol:

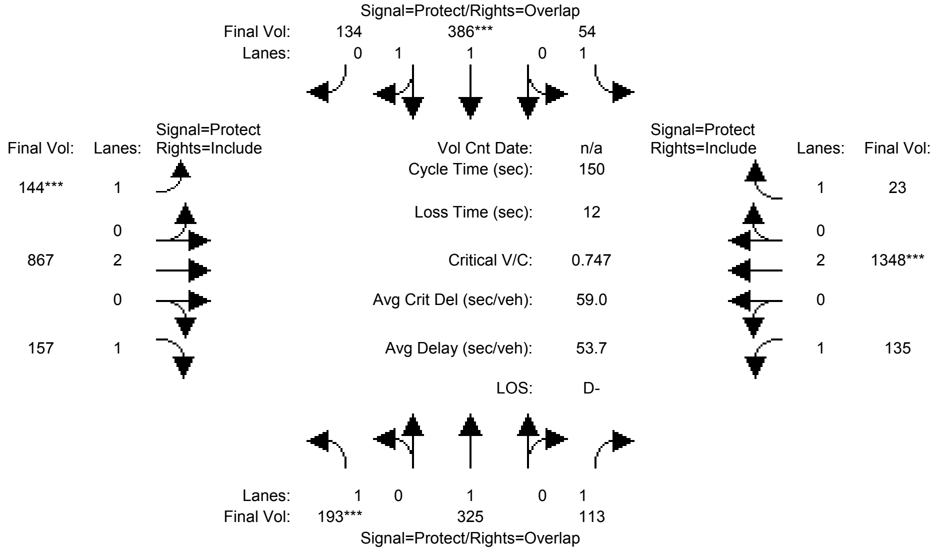
0 249
1
1 1135***
0
2 270

Lanes: 2 0 2 1 0
Final Vol: 496*** 1353 127
Signal=Protect/Rights=Include

```
Street Name:          El Camino Real                      Page Mill Rd
Approach:       North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:      7   30     0     7   30     0     7   28    28     7   30     0
Y+R:           4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      474 1275   116   333  494   262   484  884   147   259 1113   247
Growth 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
Initial Bse:   474 1275   116   333  494   262   484  884   147   259 1113   247
Added Vol:       0    7     0     6    0     0     2    2     0     7    4     0
PasserByVol:    22   71    11    28   33    16    15   29     9     4   18     2
Initial Fut:   496 1353   127   367  527   278   501  915   156   270 1135   249
User 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
PHF 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
PHF Volume:    496 1353   127   367  527   278   501  915   156   270 1135   249
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   496 1353   127   367  527   278   501  915   156   270 1135   249
PCE 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
MLF 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
FinalVolume:   496 1353   127   367  527   278   501  915   156   270 1135   249
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:   0.83 1.00  0.97  0.83 1.00  0.97  0.83 1.00  0.92  0.69 1.00  0.97
Lanes:        2.00 2.74  0.26  2.00 3.00  1.00  2.00 2.00  1.00  2.00 1.63  0.37
Final Sat.:   3150 5198   488  3150 5700  1847  3150 3800  1750  2625 3100   680
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.16 0.26  0.26  0.12 0.09  0.15  0.16 0.24  0.09  0.10 0.37  0.37
Crit Moves:   ****                   ****       ****                   ****
Green Time:   19.1 33.9  33.9  15.2 30.0  30.0  19.3 44.7  44.7  19.1 44.5  44.5
Volume/Cap:   1.03 0.96  0.96  0.96 0.39  0.63  1.03 0.67  0.25  0.67 1.03  1.03
Uniform Del:  52.9 44.8  44.8  54.6 39.8  42.5  52.8 33.9  28.3  50.0 40.2  40.2
IncremntDel:  48.3 14.9  14.9  36.6  0.8   6.6  48.1  2.7   1.0   8.7 32.0  32.0
InitQueuDel:   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   101.2 59.8  59.8  91.2 40.6  49.1 100.9 36.6  29.2  58.7 72.2  72.2
User DelAdj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  101.2 59.8  59.8  91.2 40.6  49.1 100.9 36.6  29.2  58.7 72.2  72.2
LOS by Move:     F   E+    E+     F    D     D     F   D+     C    E+    E     E
HCM2kAvgQ:      17   24    25    12    6    11    17   15     4     7   35    36
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background AM

Intersection #10: PAGEMILL-OREGON EXPWY/MIDDLEFIELD RD

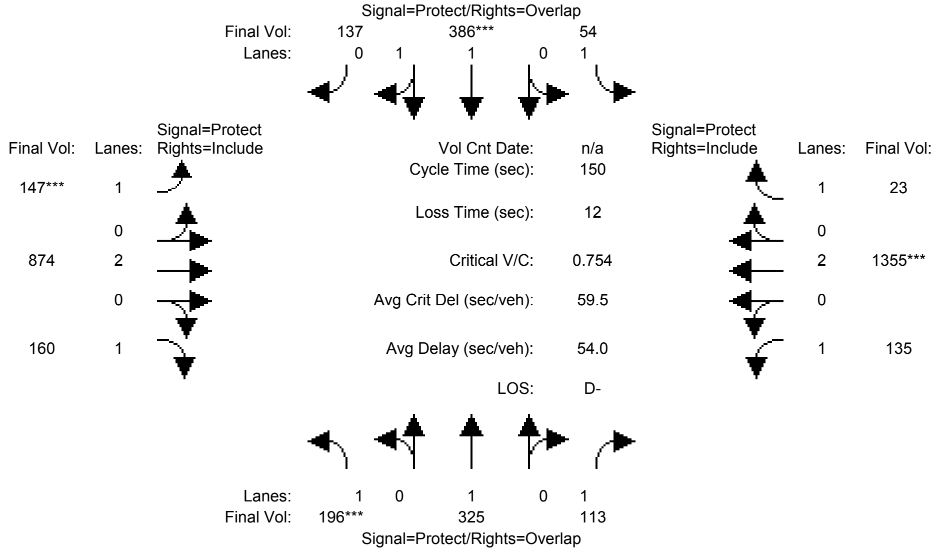


Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 0.747
Avg Crit Del (sec/veh): 59.0
Avg Delay (sec/veh): 53.7
LOS: D-

```
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     192  324   113    51  366   127   144  863   157   135 1308    23
Growth 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
Initial Bse:  192  324   113    51  366   127   144  863   157   135 1308    23
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    1    1     0     3   20     7     0    4     0     0   40     0
Initial Fut:  193  325   113    54  386   134   144  867   157   135 1348    23
User 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
PHF 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
PHF Volume:   193  325   113    54  386   134   144  867   157   135 1348    23
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  193  325   113    54  386   134   144  867   157   135 1348    23
PCE 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
MLF 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
FinalVolume:  193  325   113    54  386   134   144  867   157   135 1348    23
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 1.00  1.00  1.00 1.45  0.55  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.:  1750 1900  1750  1750 2760   958  1750 3800  1750  1750 3800  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.11 0.17  0.06  0.03 0.14  0.14  0.08 0.23  0.09  0.08 0.35  0.01
Crit Moves:  ****                  ****        ****                    ****
Green Time:  22.1 39.5  61.6  10.8 28.1  44.6  16.5 65.6  65.6  22.2 71.2  71.2
Volume/Cap:  0.75 0.65  0.16  0.43 0.75  0.47  0.75 0.52  0.21  0.52 0.75  0.03
Uniform Del: 61.2 49.1  27.8  66.7 57.6  43.0  64.7 30.8  26.1  59.0 32.0  21.0
IncremntDel: 11.3  3.0   0.1   2.4  4.4   0.3  14.8  0.3   0.1   1.9  1.8   0.0
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.08 1.52  1.52  1.12 1.60  1.60
Delay/Veh:   72.6 52.1  27.9  69.0 62.0  43.4  84.8 47.0  39.7  67.8 53.1  33.6
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  72.6 52.1  27.9  69.0 62.0  43.4  84.8 47.0  39.7  67.8 53.1  33.6
LOS by Move:    E   D-     C     E    E     D     F    D     D     E   D-    C-
HCM2kAvgQ:     11   14     3     3   13    10     9   18     7     7   30     1
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project AM

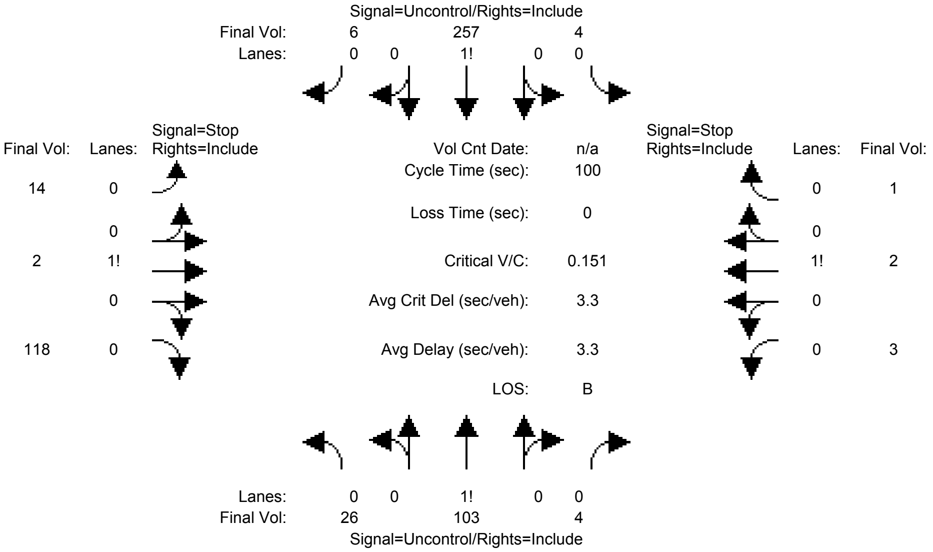
Intersection #10: PAGEMILL-OREGON EXPWY/MIDDLEFIELD RD



```
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:    7   10    10     7   10    10     7   10    10     7   10    10
Y+R:         4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:    192  324   113    51  366   127   144  863   157   135 1308    23
Growth 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
Initial Bse: 192  324   113    51  366   127   144  863   157   135 1308    23
Added Vol:     3    0     0     0    0     3     3    7     3     0    7     0
PasserByVol:   1    1     0     3   20     7     0    4     0     0   40     0
Initial Fut: 196  325   113    54  386   137   147  874   160   135 1355    23
User 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
PHF 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
PHF Volume:  196  325   113    54  386   137   147  874   160   135 1355    23
Reduct Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol: 196  325   113    54  386   137   147  874   160   135 1355    23
PCE 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
MLF 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
FinalVolume: 196  325   113    54  386   137   147  874   160   135 1355    23
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment: 0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:      1.00 1.00  1.00  1.00 1.44  0.56  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.: 1750 1900  1750  1750 2743   974  1750 3800  1750  1750 3800  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.11 0.17  0.06  0.03 0.14  0.14  0.08 0.23  0.09  0.08 0.36  0.01
Crit Moves: ****                  ****        ****                   ****
Green Time: 22.3 39.5  61.5  10.8 28.0  44.7  16.7 65.7  65.7  22.0 71.0  71.0
Volume/Cap: 0.75 0.65  0.16  0.43 0.75  0.47  0.75 0.53  0.21  0.53 0.75  0.03
Uniform Del: 61.2 49.1  27.9  66.7 57.7  43.0  64.6 30.8  26.1  59.2 32.4  21.1
IncremntDel: 11.8  3.0   0.1   2.3  4.7   0.3  15.3  0.3   0.1   2.0  1.9   0.0
InitQueuDel: 0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.08 1.52  1.52  1.11 1.60  1.60
Delay/Veh:  73.0 52.1  28.0  69.0 62.4  43.3  85.3 47.1  39.8  67.9 53.6  33.7
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh: 73.0 52.1  28.0  69.0 62.4  43.3  85.3 47.1  39.8  67.9 53.6  33.7
LOS by Move:   E   D-     C     E    E     D     F    D     D     E   D-    C-
HCM2kAvgQ:    11   14     3     3   13    10     9   18     7     7   30     1
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background PM

Intersection #1: Park Blvd & Sherman Ave

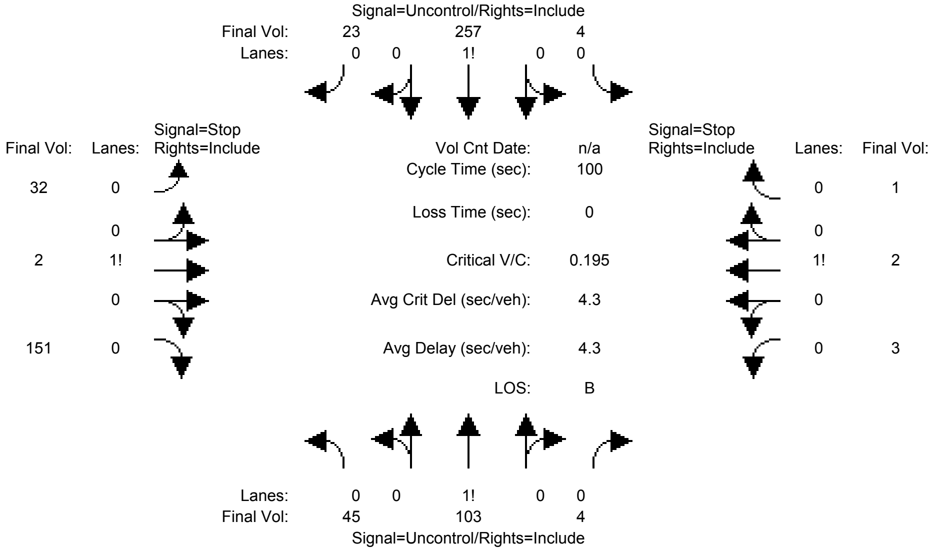


```
Street Name:            Park Blvd                       Sherman Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      26  103     4     4  256     6    14     2    99     3     2     1
Growth 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
Initial Bse:   26  103     4     4  256     6    14     2    99     3     2     1
Added Vol:      0    0     0     0    0     0     0     0     0     0     0     0
PasserByVol:    0    0     0     0    1     0     0     0    19     0     0     0
Initial Fut:   26  103     4     4  257     6    14     2   118     3     2     1
User 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
PHF 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
PHF Volume:    26  103     4     4  257     6    14     2   118     3     2     1
Reduct Vol:     0    0     0     0    0     0     0     0     0     0     0     0
FinalVolume:   26  103     4     4  257     6    14     2   118     3     2     1
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  263 xxxx xxxxx   107 xxxx xxxxx   427  427   260   485  428   105
Potent Cap.: 1313 xxxx xxxxx  1497 xxxx xxxxx   542  523   784   496  522   955
Move Cap.:   1313 xxxx xxxxx  1497 xxxx xxxxx   530  511   784   412  510   955
Volume/Cap:  0.02 xxxx  xxxx  0.00 xxxx  xxxx  0.03 0.00  0.15  0.01 0.00  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.8 xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *     *     *     *     *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  741 xxxxx  xxxx  490 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.7 xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.9 xxxxx xxxxx 12.4 xxxxx
Shared LOS:     *    *     *     *    *     *     *    B     *     *    B     *
ApproachDel:    xxxxxx           xxxxxx                10.9              12.4
ApproachLOS:         *                *                 B                 B
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   26  103     4     4  257     6    14    2   118     3    2     1
ApproachDel:    xxxxxx           xxxxxx              10.9              12.4
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.4]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=134]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=540]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=6]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=540]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   26  103     4     4  257     6    14    2   118     3    2     1
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             400
Minor Approach Volume:           134
Minor Approach Volume Threshold: 464
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project PM

Intersection #1: Park Blvd & Sherman Ave



Signal=Uncontrol/Rights=Include
Final Vol: 23 257 4
Lanes: 0 0 1! 0 0

Signal=Stop
Rights=Include
Final Vol: Lanes:
32 0
0
2 1!
0
151 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.195
Avg Crit Del (sec/veh): 4.3
Avg Delay (sec/veh): 4.3
LOS: B

Signal=Stop
Rights=Include
Lanes: Final Vol:
0 1
0
1! 2
0
0 3

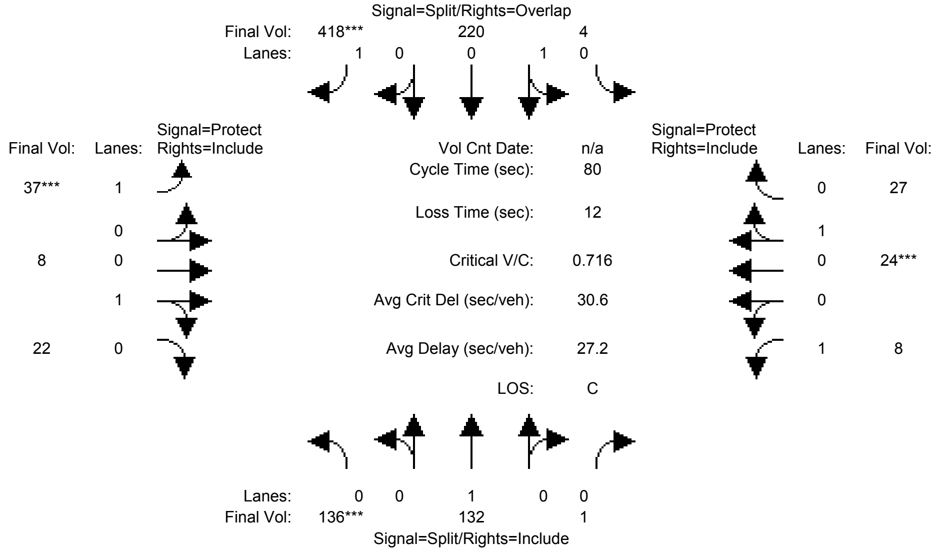
Lanes: 0 0 1! 0 0
Final Vol: 45 103 4
Signal=Uncontrol/Rights=Include

```
Street Name:                Park Blvd                          Sherman Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      26  103     4     4  256     6    14    2    99     3    2     1
Growth 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
Initial Bse:   26  103     4     4  256     6    14    2    99     3    2     1
Added Vol:     19    0     0     0    0    17    18    0    33     0    0     0
PasserByVol:    0    0     0     0    1     0     0    0    19     0    0     0
Initial Fut:   45  103     4     4  257    23    32    2   151     3    2     1
User 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
PHF 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
PHF Volume:    45  103     4     4  257    23    32    2   151     3    2     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   45  103     4     4  257    23    32    2   151     3    2     1
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  280 xxxx xxxxx   107 xxxx xxxxx   473  474   269   548  483   105
Potent Cap.: 1294 xxxx xxxxx  1497 xxxx xxxxx   505  492   775   450  486   955
Move Cap.:   1294 xxxx xxxxx  1497 xxxx xxxxx   488  473   775   351  468   955
Volume/Cap:  0.03 xxxx  xxxx  0.00 xxxx  xxxx  0.07 0.00  0.19  0.01 0.00  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.9 xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  699 xxxxx  xxxx  432 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  1.1 xxxxx xxxxx  0.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 12.0 xxxxx xxxxx 13.4 xxxxx
Shared LOS:     *    *     *     *    *     *     *    B     *     *    B     *
ApproachDel:     xxxxxx           xxxxxx             12.0             13.4
ApproachLOS:          *                *                B                B
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   45  103     4     4  257    23    32    2   151     3    2     1
ApproachDel:    xxxxxx           xxxxxx             12.0             13.4
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.6]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=185]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=627]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=6]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=627]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   45  103     4     4  257    23    32    2   151     3    2     1
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             436
Minor Approach Volume:           185
Minor Approach Volume Threshold: 441
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #2: Park Blvd & Page Mill Rd

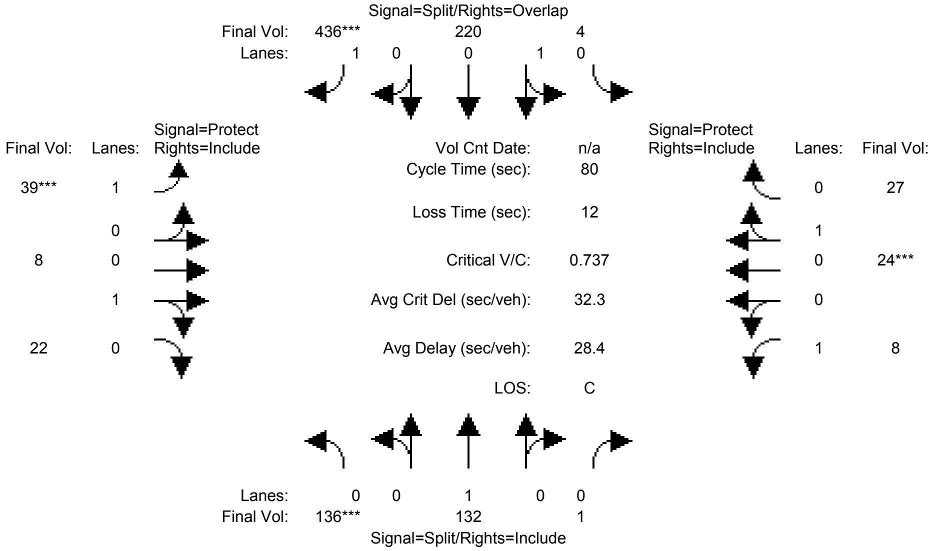


Vol Cnt Date: n/a
Cycle Time (sec): 80
Loss Time (sec): 12
Critical V/C: 0.716
Avg Crit Del (sec/veh): 30.6
Avg Delay (sec/veh): 27.2
LOS: C

```
Street Name:              Park Blvd                         Page Mill Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     104  120     0     0  214   372    32    3    21     5    4     5
Growth 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
Initial Bse:  104  120     0     0  214   372    32    3    21     5    4     5
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:   32   12     1     4    6    46     5    5     1     3   20    22
Initial Fut:  136  132     1     4  220   418    37    8    22     8   24    27
User 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
PHF 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
PHF Volume:   136  132     1     4  220   418    37    8    22     8   24    27
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  136  132     1     4  220   418    37    8    22     8   24    27
PCE 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
MLF 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
FinalVolume:  136  132     1     4  220   418    37    8    22     8   24    27
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.90 0.97  0.90  0.92 1.00  0.52  0.88 0.89  0.76  0.88 0.92  0.64
Lanes:       0.52 0.47  0.01  0.02 0.98  1.00  1.00 0.24  0.76  1.00 0.38  0.62
Final Sat.:   897  870     7    34 1861   993  1663  401  1102  1663  668   752
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.15 0.15  0.15  0.12 0.12  0.42  0.02 0.02  0.02  0.00 0.04  0.04
Crit Moves:  ****                        ****  ****                  ****
Green Time:  15.9 15.9  15.9  35.1 35.1  42.1   7.0 10.0  10.0   7.0 10.0  10.0
Volume/Cap:  0.76 0.76  0.76  0.27 0.27  0.80  0.25 0.16  0.16  0.05 0.29  0.29
Uniform Del: 30.2 30.2  30.2  14.3 14.3  15.5  34.1 31.2  31.2  33.5 31.8  31.8
IncremntDel:  9.3  9.3   9.3   0.2  0.2   8.6   0.9  0.4   0.4   0.2  0.9   0.9
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   39.6 39.6  39.6  14.5 14.5  24.2  35.0 31.6  31.6  33.6 32.7  32.7
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  39.6 39.6  39.6  14.5 14.5  24.2  35.0 31.6  31.6  33.6 32.7  32.7
LOS by Move:    D    D     D     B    B     C    C-    C     C    C-   C-    C-
HCM2kAvgQ:      8    8     8     4    4    12     1    1     1     0    2     1
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #2: Park Blvd & Page Mill Rd



Vol Cnt Date: n/a
Cycle Time (sec): 80
Loss Time (sec): 12
Critical V/C: 0.737
Avg Crit Del (sec/veh): 32.3
Avg Delay (sec/veh): 28.4
LOS: C

```
Street Name:                Park Blvd                           Page Mill Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     104  120     0     0  214   372    32    3    21     5    4     5
Growth 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
Initial Bse:  104  120     0     0  214   372    32    3    21     5    4     5
Added Vol:      0    0     0     0    0    18     2    0     0     0    0     0
PasserByVol:   32   12     1     4    6    46     5    5     1     3   20    22
Initial Fut:  136  132     1     4  220   436    39    8    22     8   24    27
User 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
PHF 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
PHF Volume:   136  132     1     4  220   436    39    8    22     8   24    27
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  136  132     1     4  220   436    39    8    22     8   24    27
PCE 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
MLF 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
FinalVolume:  136  132     1     4  220   436    39    8    22     8   24    27
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.90 0.97  0.90  0.92 1.00  0.52  0.88 0.89  0.76  0.88 0.92  0.64
Lanes:       0.52 0.47  0.01  0.02 0.98  1.00  1.00 0.24  0.76  1.00 0.38  0.62
Final Sat.:   897  870     7    34 1861   993  1663  401  1102  1663  668   752
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.15 0.15  0.15  0.12 0.12  0.44  0.02 0.02  0.02  0.00 0.04  0.04
Crit Moves:  ****                        ****  ****                    ****
Green Time:  15.4 15.4  15.4  35.6 35.6  42.6   7.0 10.0  10.0   7.0 10.0  10.0
Volume/Cap:  0.79 0.79  0.79  0.27 0.27  0.82  0.27 0.16  0.16  0.05 0.29  0.29
Uniform Del: 30.8 30.8  30.8  14.0 14.0  15.6  34.1 31.2  31.2  33.5 31.8  31.8
IncremntDel: 11.7 11.7  11.7   0.2  0.2  10.2   1.0  0.4   0.4   0.2  0.9   0.9
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   42.5 42.5  42.5  14.1 14.1  25.7  35.1 31.6  31.6  33.6 32.7  32.7
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  42.5 42.5  42.5  14.1 14.1  25.7  35.1 31.6  31.6  33.6 32.7  32.7
LOS by Move:    D    D     D     B    B     C    D+    C     C    C-   C-    C-
HCM2kAvgQ:      9    9     9     3    3    12     1    1     1     0    2     1
Note: Queue reported is the number of cars per lane.
```

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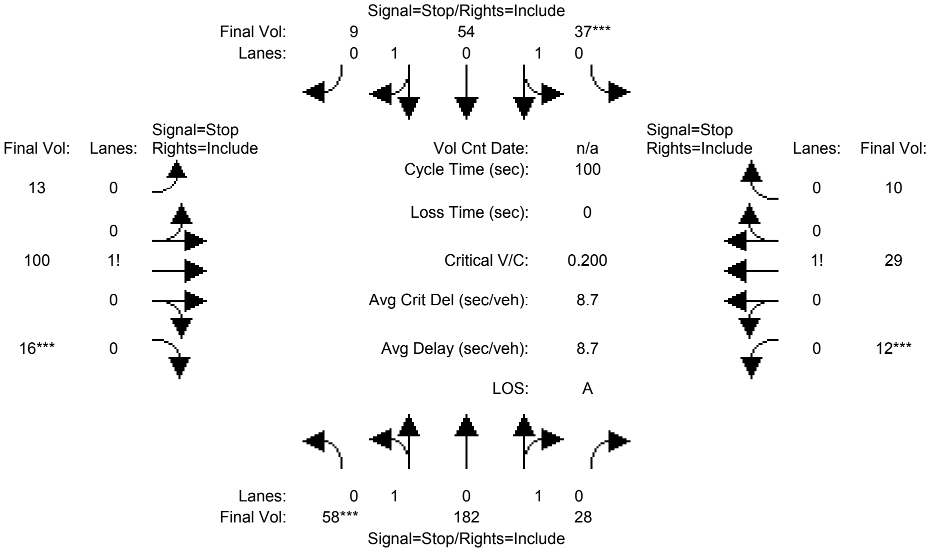
Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background PM

Intersection #3: Birch St & Sherman Ave



Signal=Stop/Rights=Include
Final Vol: 9 54 37***
Lanes: 0 1 0 1 0

Signal=Stop
Rights=Include
Final Vol: Lanes:
13 0
0
100 1!
0
16*** 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.200
Avg Crit Del (sec/veh): 8.7
Avg Delay (sec/veh): 8.7
LOS: A

Signal=Stop
Rights=Include
Lanes: Final Vol:
0 10
0
1! 29
0
0 12***

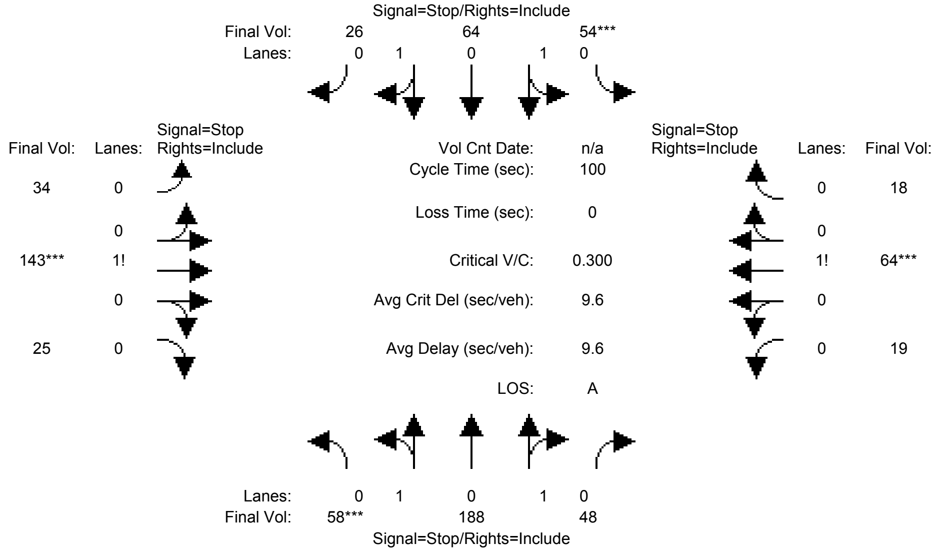
Lanes: 0 1 0 1 0
Final Vol: 58*** 182 28
Signal=Stop/Rights=Include

```
Street Name:             Birch St                        Sherman Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      53  182    28    37   54     9    13   81    16    12   29    10
Growth 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
Initial Bse:   53  182    28    37   54     9    13   81    16    12   29    10
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    5    0     0     0    0     0     0   19     0     0    0     0
Initial Fut:   58  182    28    37   54     9    13  100    16    12   29    10
User 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
PHF 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
PHF Volume:    58  182    28    37   54     9    13  100    16    12   29    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   58  182    28    37   54     9    13  100    16    12   29    10
PCE 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
MLF 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
FinalVolume:   58  182    28    37   54     9    13  100    16    12   29    10
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.43 1.36  0.21  0.74 1.08  0.18  0.10 0.78  0.12  0.23 0.57  0.20
Final Sat.:   290  948   150   464  725   123    72  556    89   164  396   136
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.20 0.19  0.19  0.08 0.07  0.07  0.18 0.18  0.18  0.07 0.07  0.07
Crit Moves:  ****             ****                        ****  ****
Delay/Veh:    9.2  8.9   8.7   8.7  8.3   8.1   8.8  8.8   8.8   8.2  8.2   8.2
Delay 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
AdjDel/Veh:   9.2  8.9   8.7   8.7  8.3   8.1   8.8  8.8   8.8   8.2  8.2   8.2
LOS by Move:    A    A     A     A    A     A     A    A     A     A    A     A
ApproachDel:       8.9              8.4              8.8              8.2
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:        8.9              8.4              8.8              8.2
LOS by Appr:         A                A                A                A
AllWayAvgQ:   0.2  0.2   0.2   0.1  0.1   0.1   0.2  0.2   0.2   0.1  0.1   0.1
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #3 Birch St & Sherman Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   58  182    28    37   54     9    13  100    16    12   29    10
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             368
Minor Approach Volume:           129
Minor Approach Volume Threshold: 629
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background+Project PM

Intersection #3: Birch St & Sherman Ave



Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.300
Avg Crit Del (sec/veh): 9.6
Avg Delay (sec/veh): 9.6
LOS: A

```
Street Name:                Birch St                            Sherman Ave
Approach:      North Bound      South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      53  182    28    37   54     9    13   81    16    12   29    10
Growth 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
Initial Bse:   53  182    28    37   54     9    13   81    16    12   29    10
Added Vol:      0    6    20    17   10    17    21   43     9     7   35     8
PasserByVol:    5    0     0     0    0     0     0   19     0     0    0     0
Initial Fut:   58  188    48    54   64    26    34  143    25    19   64    18
User 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
PHF 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
PHF Volume:    58  188    48    54   64    26    34  143    25    19   64    18
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   58  188    48    54   64    26    34  143    25    19   64    18
PCE 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
MLF 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
FinalVolume:   58  188    48    54   64    26    34  143    25    19   64    18
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.39 1.28  0.33  0.75 0.89  0.36  0.17 0.71  0.12  0.19 0.63  0.18
Final Sat.:   243  820   217   430  551   230   113  477    83   122  410   115
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.24 0.23  0.22  0.13 0.12  0.11  0.30 0.30  0.30  0.16 0.16  0.16
Crit Moves:  ****              ****                  ****              ****
Delay/Veh:   10.0  9.6   9.3   9.5  8.9   8.7  10.1 10.1  10.1   9.1  9.1   9.1
Delay 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
AdjDel/Veh:  10.0  9.6   9.3   9.5  8.9   8.7  10.1 10.1  10.1   9.1  9.1   9.1
LOS by Move:    B    A     A     A    A     A     B    B     B     A    A     A
ApproachDel:        9.7               9.1              10.1               9.1
Delay Adj:         1.00              1.00              1.00              1.00
ApprAdjDel:         9.7               9.1              10.1               9.1
LOS by Appr:          A                 A                 B                 A
AllWayAvgQ:    0.3  0.3   0.3   0.1  0.1   0.1   0.4  0.4   0.4   0.2  0.2   0.2
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #3 Birch St & Sherman Ave
********************************************************************************
```

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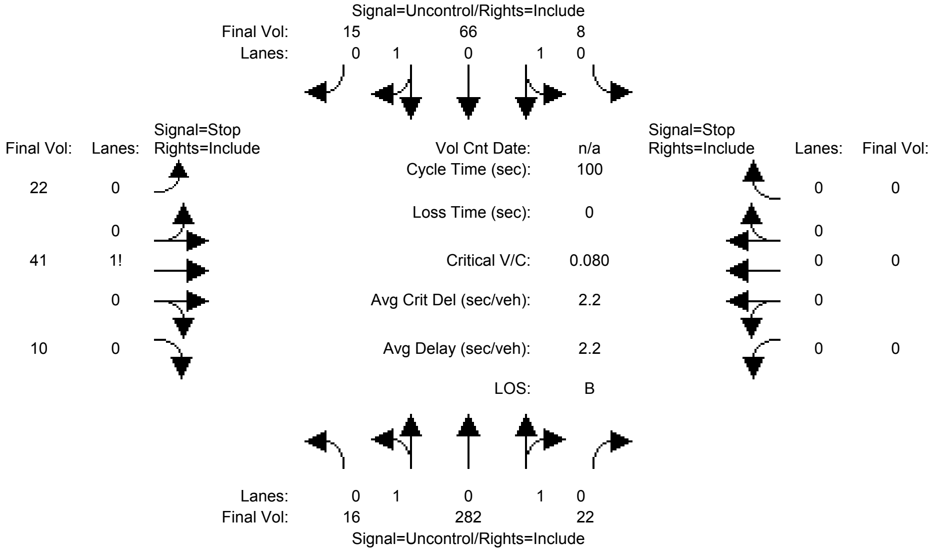
```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   58  188    48    54   64    26    34  143    25    19   64    18
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             438
Minor Approach Volume:           202
Minor Approach Volume Threshold: 569
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background PM

Intersection #4: Birch St & Grant Ave



```
Street Name:                Birch St                          Grant Ave
Approach:      North Bound      South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      13  277    21     8   66    15    22   33    10     0    0     0
Growth 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
Initial Bse:   13  277    21     8   66    15    22   33    10     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    3    5     1     0    0     0     0    8     0     0    0     0
Initial Fut:   16  282    22     8   66    15    22   41    10     0    0     0
User 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
PHF 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
PHF Volume:    16  282    22     8   66    15    22   41    10     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   16  282    22     8   66    15    22   41    10     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   81 xxxx xxxxx   304 xxxx xxxxx   263  426    41  xxxx xxxx xxxxx
Potent Cap.: 1529 xxxx xxxxx  1268 xxxx xxxxx   710  524  1028  xxxx xxxx xxxxx
Move Cap.:   1529 xxxx xxxxx  1268 xxxx xxxxx   701  515  1028  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  0.01 xxxx  xxxx  0.03 0.08  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx   7.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  605 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.4 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx   7.9 xxxx xxxxx xxxxx 11.8 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     A    *     *     *    B     *     *    *     *
ApproachDel:    xxxxxx            xxxxxx             11.8            xxxxxx
ApproachLOS:         *                 *                B                 *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

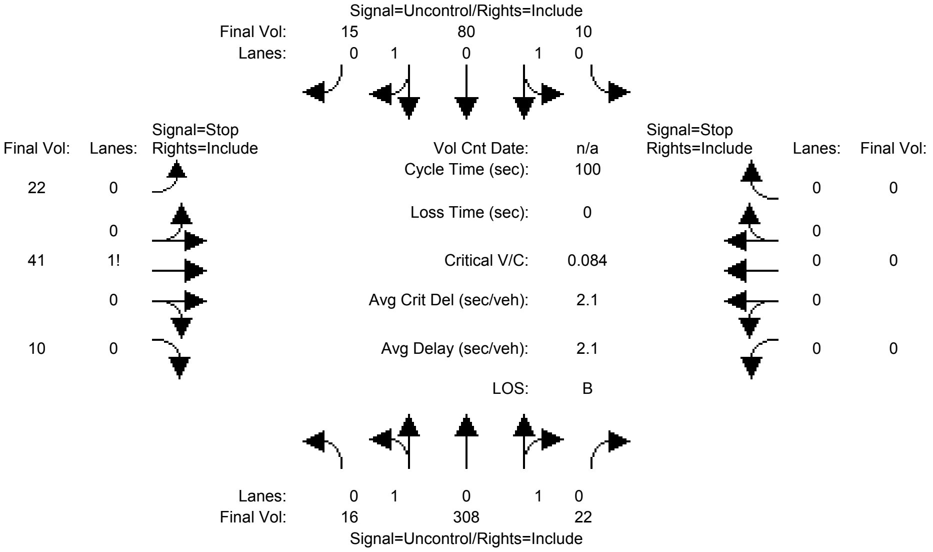
```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   16  282    22     8   66    15    22   41    10     0    0     0
ApproachDel:    xxxxxx           xxxxxx             11.8           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=73]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=482]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   16  282    22     8   66    15    22   41    10     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             409
Minor Approach Volume:           73
Minor Approach Volume Threshold: 593
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project PM

Intersection #4: Birch St & Grant Ave



```
                         Signal=Uncontrol/Rights=Include
              Final Vol:     15          80          10
                 Lanes:       0     1     0     1     0

             Signal=Stop                                           Signal=Stop
Final Vol:  Lanes:  Rights=Include     Vol Cnt Date:      n/a      Rights=Include   Lanes:  Final Vol:
                                      Cycle Time (sec):   100
   22        0                                                                        0        0
                                       Loss Time (sec):    0
             0                                                                        0
   41        1!                          Critical V/C:   0.084                        0        0
             0                       Avg Crit Del (sec/veh):  2.1                     0
   10        0                          Avg Delay (sec/veh):  2.1                     0        0
                                                  LOS:     B

                 Lanes:       0     1     0     1     0
              Final Vol:     16          308         22
                         Signal=Uncontrol/Rights=Include
```

```
Street Name:                Birch St                          Grant Ave
Approach:      North Bound      South Bound        East Bound        West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      13  277    21      8   66    15     22   33    10      0    0     0
Growth 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
Initial Bse:   13  277    21      8   66    15     22   33    10      0    0     0
Added Vol:      0   26     0      2   14     0      0    0     0      0    0     0
PasserByVol:    3    5     1      0    0     0      0    8     0      0    0     0
Initial Fut:   16  308    22     10   80    15     22   41    10      0    0     0
User 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
PHF 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
PHF Volume:    16  308    22     10   80    15     22   41    10      0    0     0
Reduct Vol:     0    0     0      0    0     0      0    0     0      0    0     0
FinalVolume:   16  308    22     10   80    15     22   41    10      0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   95 xxxx xxxxx   330 xxxx xxxxx   294  470    48  xxxx xxxx xxxxx
Potent Cap.: 1512 xxxx xxxxx  1241 xxxx xxxxx   679  495  1018  xxxx xxxx xxxxx
Move Cap.:   1512 xxxx xxxxx  1241 xxxx xxxxx   669  485  1018  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  0.01 xxxx  xxxx  0.03 0.08  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx   7.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  574 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.4 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx   7.9 xxxx xxxxx xxxxx 12.2 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     A    *     *     *    B     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx            12.2            xxxxxx
ApproachLOS:         *                *               B                 *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

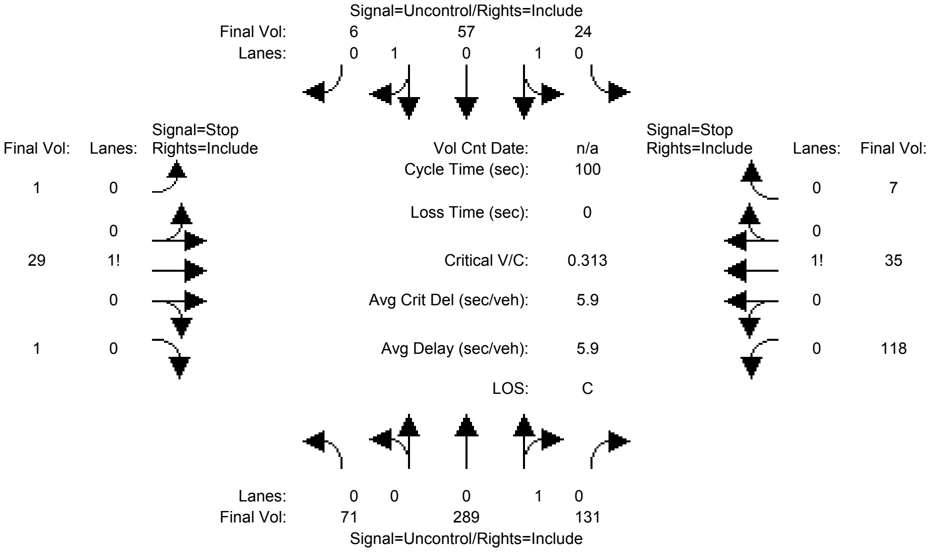
```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   16  308    22    10   80    15    22   41    10     0    0     0
ApproachDel:    xxxxxx           xxxxxx             12.2           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=73]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=524]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   16  308    22    10   80    15    22   41    10     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             451
Minor Approach Volume:           73
Minor Approach Volume Threshold: 559
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background PM

Intersection #5: Birch St & Sheridan Ave



Signal=Uncontrol/Rights=Include
Final Vol: 6 57 24
Lanes: 0 1 0 1 0

Signal=Stop
Rights=Include
Final Vol: 1, 29, 1
Lanes: 0, 0, 1!, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.313
Avg Crit Del (sec/veh): 5.9
Avg Delay (sec/veh): 5.9
LOS: C

Signal=Stop
Rights=Include
Lanes: 0, 0, 1!, 0, 0
Final Vol: 7, 35, 118

Lanes: 0 0 0 1 0
Final Vol: 71 289 131
Signal=Uncontrol/Rights=Include

```
Street Name:                 Birch St                           Sheridan Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      71  280   119    24   57     6     1   29     1    67   24     7
Growth 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
Initial Bse:   71  280   119    24   57     6     1   29     1    67   24     7
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    9    12     0    0     0     0    0     0    51   11     0
Initial Fut:   71  289   131    24   57     6     1   29     1   118   35     7
User 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
PHF 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
PHF Volume:    71  289   131    24   57     6     1   29     1   118   35     7
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   71  289   131    24   57     6     1   29     1   118   35     7
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   63 xxxx xxxxx   420 xxxx xxxxx   626  670    32   588  608   355
Potent Cap.: 1553 xxxx xxxxx  1150 xxxx xxxxx   400  381  1048   424  413   694
Move Cap.:   1553 xxxx xxxxx  1150 xxxx xxxxx   349  355  1048   377  385   694
Volume/Cap:  0.05 xxxx  xxxx  0.02 xxxx  xxxx  0.00 0.08  0.00  0.31 0.09  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx   8.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  362 xxxxx  xxxx  386 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx  0.3 xxxxx xxxxx  2.0 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   8.2 xxxx xxxxx xxxxx 15.9 xxxxx xxxxx 20.8 xxxxx
Shared LOS:     *    *     *     A    *     *     *    C     *     *    C     *
ApproachDel:     xxxxxx           xxxxxx             15.9             20.8
ApproachLOS:        *                *                 C                C
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

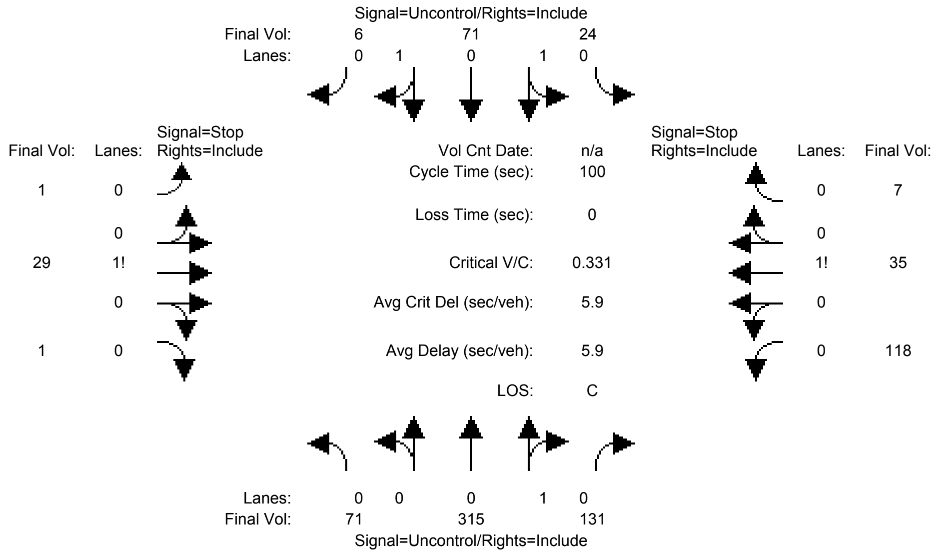
```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   71  289   131    24   57     6     1   29     1   118   35     7
ApproachDel:    xxxxxx           xxxxxx             15.9             20.8
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=31]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=769]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.9]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=160]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=769]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   71  289   131    24   57     6     1   29     1   118   35     7
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             578
Minor Approach Volume:           160
Minor Approach Volume Threshold: 474
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Background+Project PM

Intersection #5: Birch St & Sheridan Ave



Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.331
Avg Crit Del (sec/veh): 5.9
Avg Delay (sec/veh): 5.9
LOS: C

```
Street Name:                Birch St                            Sheridan Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       71  280   119    24   57     6     1   29     1    67   24     7
Growth 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
Initial Bse:    71  280   119    24   57     6     1   29     1    67   24     7
Added Vol:       0   26     0     0   14     0     0    0     0     0    0     0
PasserByVol:     0    9    12     0    0     0     0    0     0    51   11     0
Initial Fut:    71  315   131    24   71     6     1   29     1   118   35     7
User 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
PHF 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
PHF Volume:     71  315   131    24   71     6     1   29     1   118   35     7
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    71  315   131    24   71     6     1   29     1   118   35     7
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:   2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:    77 xxxx xxxxx   446 xxxx xxxxx   666  710    39   621  648   381
Potent Cap.:  1535 xxxx xxxxx  1125 xxxx xxxxx   376  361  1039   403  392   671
Move Cap.:    1535 xxxx xxxxx  1125 xxxx xxxxx   327  336  1039   356  365   671
Volume/Cap:   0.05 xxxx  xxxx  0.02 xxxx  xxxx  0.00 0.09  0.00  0.33 0.10  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.1 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:   7.5 xxxx xxxxx   8.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  343 xxxxx  xxxx  366 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx  0.3 xxxxx xxxxx  2.2 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   8.3 xxxx xxxxx xxxxx 16.5 xxxxx xxxxx 22.3 xxxxx
Shared LOS:      *    *     *     A    *     *     *    C     *     *    C     *
ApproachDel:     xxxxxx           xxxxxx             16.5              22.3
ApproachLOS:          *                *                C                 C
Note: Queue reported is the number of cars per lane.
                    Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   71  315   131    24   71     6     1   29     1   118   35     7
ApproachDel:    xxxxxx           xxxxxx             16.5             22.3
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=31]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=809]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=1.0]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=160]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=809]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
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"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   71  315   131    24   71     6     1   29     1   118   35     7
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             618
Minor Approach Volume:           160
Minor Approach Volume Threshold: 451
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```
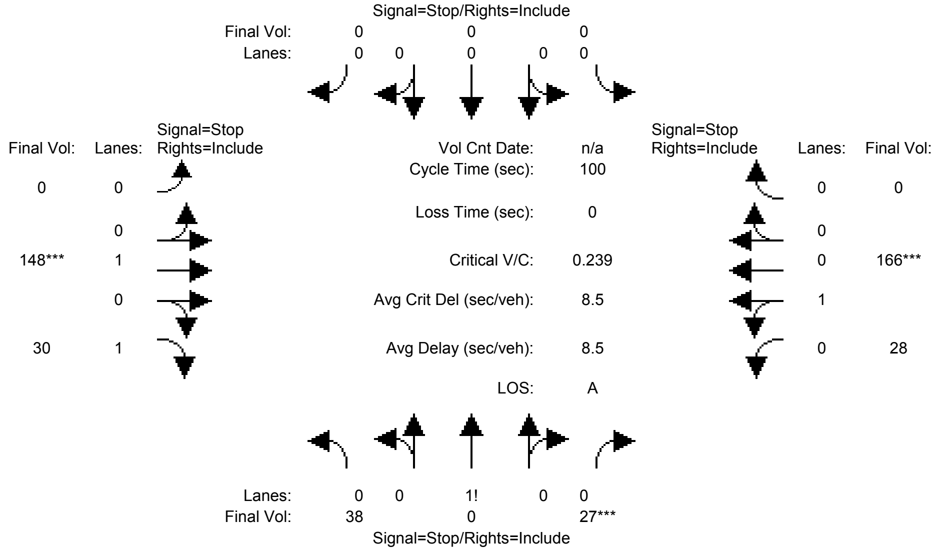

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background PM

Intersection #6: Ash St & California Ave



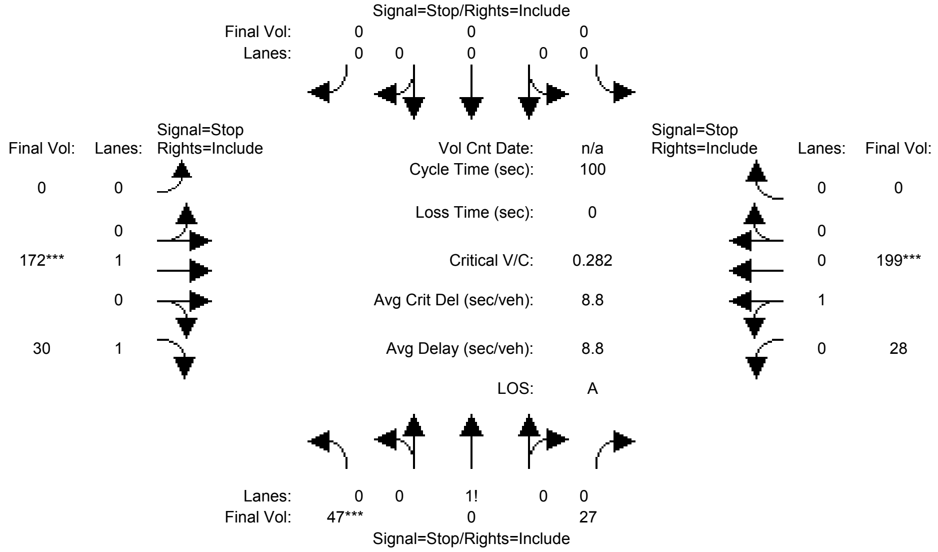
```
                          Signal=Stop/Rights=Include
                 Final Vol:    0          0          0
                     Lanes:    0    0     0     0    0

             Signal=Stop                                              Signal=Stop
Final Vol: Lanes: Rights=Include      Vol Cnt Date:        n/a        Rights=Include   Lanes:  Final Vol:
                                      Cycle Time (sec):    100
   0        0                                                                           0        0
                                      Loss Time (sec):      0
            0                                                                           0
 148***     1                         Critical V/C:       0.239                         0      166***
            0                         Avg Crit Del (sec/veh): 8.5                       1
  30        1                         Avg Delay (sec/veh):    8.5                       0        28
                                      LOS:                  A

                     Lanes:    0    0     1!    0    0
                 Final Vol:   38          0          27***
                          Signal=Stop/Rights=Include
```

```
Street Name:                 Ash St                         California Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      38    0    27     0    0     0     0  147    30    28  166     0
Growth 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
Initial Bse:   38    0    27     0    0     0     0  147    30    28  166     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    1     0     0    0     0
Initial Fut:   38    0    27     0    0     0     0  148    30    28  166     0
User 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
PHF 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
PHF Volume:    38    0    27     0    0     0     0  148    30    28  166     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   38    0    27     0    0     0     0  148    30    28  166     0
PCE 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
MLF 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
FinalVolume:   38    0    27     0    0     0     0  148    30    28  166     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.58 0.00  0.42  0.00 0.00  0.00  0.00 1.00  1.00  0.14 0.86  0.00
Final Sat.:   433    0   308     0    0     0     0  743   867   117  695     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.09 xxxx  0.09  xxxx xxxx  xxxx  xxxx 0.20  0.03  0.24 0.24  xxxx
Crit Moves:             ****                        ****              ****
Delay/Veh:    8.0  0.0   8.0   0.0  0.0   0.0   0.0  8.6   6.9   8.7  8.7   0.0
Delay 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
AdjDel/Veh:   8.0  0.0   8.0   0.0  0.0   0.0   0.0  8.6   6.9   8.7  8.7   0.0
LOS by Move:    A    *     A     *    *     *     *    A     A     A    A     *
ApproachDel:       8.0            xxxxxx             8.4               8.7
Delay Adj:        1.00             xxxxx            1.00              1.00
ApprAdjDel:        8.0            xxxxxx             8.4               8.7
LOS by Appr:         A                 *               A                 A
AllWayAvgQ:   0.1  0.1   0.1   0.0  0.0   0.0   0.0  0.2   0.0   0.3  0.3   0.3
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #6 Ash St & California Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
Initial Vol:   38    0    27     0    0     0     0  148    30    28  166     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             372
Minor Approach Volume:           65
Minor Approach Volume Threshold: 626
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Background+Project PM

Intersection #6: Ash St & California Ave



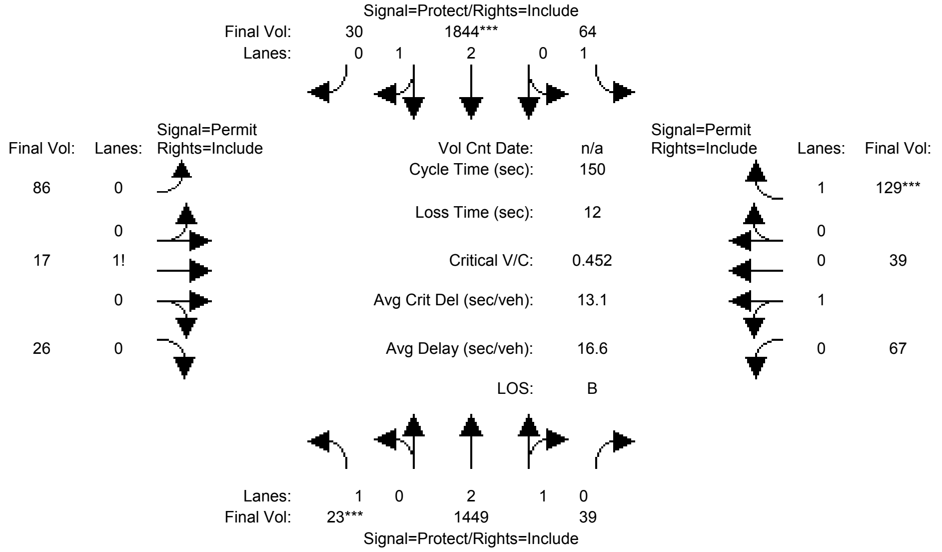
Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.282
Avg Crit Del (sec/veh): 8.8
Avg Delay (sec/veh): 8.8
LOS: A

```
Street Name:                 Ash St                        California Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      38    0    27     0    0     0     0  147    30    28  166     0
Growth 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
Initial Bse:   38    0    27     0    0     0     0  147    30    28  166     0
Added Vol:      9    0     0     0    0     0     0   24     0     0   33     0
PasserByVol:    0    0     0     0    0     0     0    1     0     0    0     0
Initial Fut:   47    0    27     0    0     0     0  172    30    28  199     0
User 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
PHF 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
PHF Volume:    47    0    27     0    0     0     0  172    30    28  199     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   47    0    27     0    0     0     0  172    30    28  199     0
PCE 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
MLF 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
FinalVolume:   47    0    27     0    0     0     0  172    30    28  199     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.64 0.00  0.36  0.00 0.00  0.00  0.00 1.00  1.00  0.12 0.88  0.00
Final Sat.:   452    0   260     0    0     0     0  734   856    99  705     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.10 xxxx  0.10  xxxx xxxx  xxxx  xxxx 0.23  0.04  0.28 0.28  xxxx
Crit Moves:  ****                                   ****              ****
Delay/Veh:    8.2  0.0   8.2   0.0  0.0   0.0   0.0  9.0   7.0   9.1  9.1   0.0
Delay 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
AdjDel/Veh:   8.2  0.0   8.2   0.0  0.0   0.0   0.0  9.0   7.0   9.1  9.1   0.0
LOS by Move:    A    *     A     *    *     *     *    A     A     A    A     *
ApproachDel:       8.2           xxxxxx              8.7               9.1
Delay Adj:        1.00            xxxxx             1.00              1.00
ApprAdjDel:        8.2           xxxxxx              8.7               9.1
LOS by Appr:         A                *                A                 A
AllWayAvgQ:   0.1  0.1   0.1   0.0  0.0   0.0   0.0  0.3   0.0   0.4  0.4   0.4
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #6 Ash St & California Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
Initial Vol:   47    0    27     0    0     0     0  172    30    28  199     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            429
Minor Approach Volume:          74
Minor Approach Volume Threshold: 576
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #7: ECR & Cambridge Ave

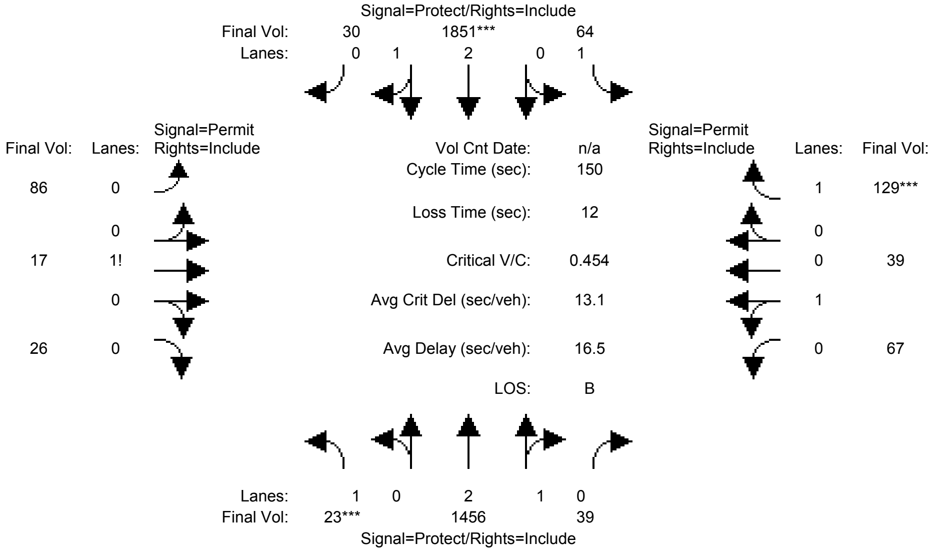


Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 0.452
Avg Crit Del (sec/veh): 13.1
Avg Delay (sec/veh): 16.6
LOS: B

```
Street Name:                   ECR                          Cambridge Ave
Approach:      North Bound      South Bound      East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      22 1347    37    61 1730    28    86   17    26    67   37   129
Growth 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
Initial Bse:   22 1347    37    61 1730    28    86   17    26    67   37   129
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    1  102     2     3  114     2     0    0     0     0    2     0
Initial Fut:   23 1449    39    64 1844    30    86   17    26    67   39   129
User 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
PHF 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
PHF Volume:    23 1449    39    64 1844    30    86   17    26    67   39   129
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   23 1449    39    64 1844    30    86   17    26    67   39   129
PCE 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
MLF 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
FinalVolume:   23 1449    39    64 1844    30    86   17    26    67   39   129
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.91  0.09  1.00 2.95  0.05  0.68 0.12  0.20  0.65 0.35  1.00
Final Sat.:  1750 5538   149  1750 5601    91  1179  233   356  1139  663  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.26  0.26  0.04 0.33  0.33  0.07 0.07  0.07  0.06 0.06  0.07
Crit Moves:  ****                  ****                                    ****
Green Time:   7.0 96.8  96.8  17.3  107 107.0  24.0 24.0  24.0  24.0 24.0  24.0
Volume/Cap:  0.28 0.41  0.41  0.32 0.46  0.46  0.46 0.46  0.46  0.37 0.37  0.46
Uniform Del: 69.1 12.8  12.8  61.0  9.2   9.2  57.1 57.1  57.1  56.3 56.3  57.2
IncremntDel:  1.9  0.1   0.1   0.9  0.1   0.1   1.2  1.2   1.2   0.8  0.8   1.2
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   71.0 12.9  12.9  61.9  9.3   9.3  58.3 58.3  58.3  57.1 57.1  58.4
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  71.0 12.9  12.9  61.9  9.3   9.3  58.3 58.3  58.3  57.1 57.1  58.4
LOS by Move:    E    B     B     E    A     A    E+   E+    E+    E+   E+    E+
HCM2kAvgQ:      1   11    11     3   12    12     6    6     6     5    5     6
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #7: ECR & Cambridge Ave

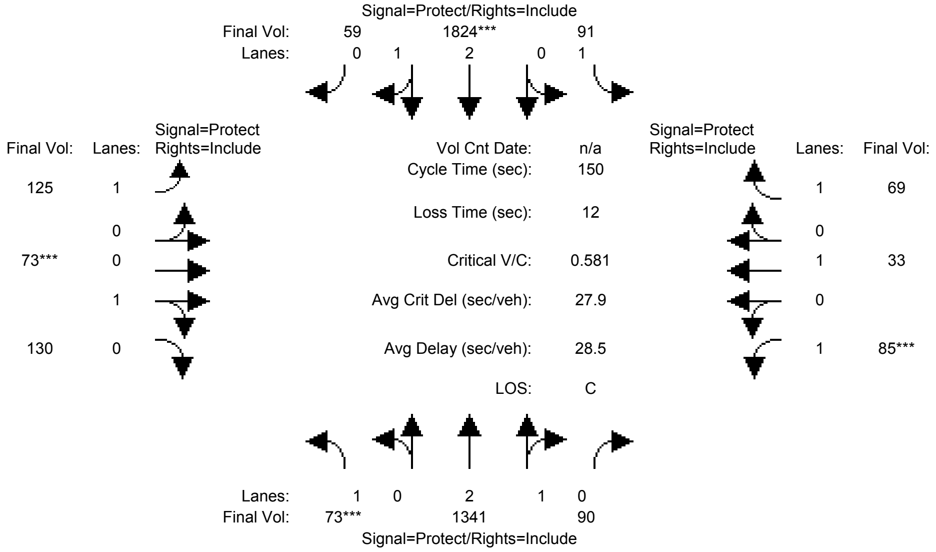


```
                              Signal=Protect/Rights=Include
                   Final Vol:    30         1851***        64
                       Lanes:     0    1       2       0    1

                 Signal=Permit                                    Signal=Permit
Final Vol: Lanes: Rights=Include          Vol Cnt Date:   n/a     Rights=Include   Lanes:  Final Vol:
                                      Cycle Time (sec):   150
    86       0                                                                       1       129***
                                       Loss Time (sec):    12
             0                                                                       0
    17       1!                          Critical V/C:  0.454                        0        39
             0                     Avg Crit Del (sec/veh):  13.1                     1
    26       0                        Avg Delay (sec/veh):  16.5                     0        67
                                                      LOS:    B

                       Lanes:     1    0       2       1    0
                   Final Vol:   23***        1456          39
                              Signal=Protect/Rights=Include
```

```
Street Name:                    ECR                           Cambridge Ave
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10     10     7   10     10     7   10     10     7   10     10
Y+R:          4.0  4.0    4.0   4.0  4.0    4.0   4.0  4.0    4.0   4.0  4.0    4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      22 1347     37    61 1730     28    86   17     26    67   37    129
Growth 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
Initial Bse:   22 1347     37    61 1730     28    86   17     26    67   37    129
Added Vol:      0    7      0     0    7      0     0    0      0     0    0      0
PasserByVol:    1  102      2     3  114      2     0    0      0     0    2      0
Initial Fut:   23 1456     39    64 1851     30    86   17     26    67   39    129
User 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
PHF 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
PHF Volume:    23 1456     39    64 1851     30    86   17     26    67   39    129
Reduct Vol:     0    0      0     0    0      0     0    0      0     0    0      0
Reduced Vol:   23 1456     39    64 1851     30    86   17     26    67   39    129
PCE 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
MLF 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
FinalVolume:   23 1456     39    64 1851     30    86   17     26    67   39    129
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900   1900  1900 1900   1900  1900 1900   1900  1900 1900   1900
Adjustment:  0.92 1.00   0.92  0.92 1.00   0.92  0.92 1.00   0.92  0.92 1.00   0.92
Lanes:       1.00 2.92   0.08  1.00 2.95   0.05  0.68 0.12   0.20  0.65 0.35   1.00
Final Sat.:  1750 5539    148  1750 5601     91  1179  233    356  1139  663   1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.26   0.26  0.04 0.33   0.33  0.07 0.07   0.07  0.06 0.06   0.07
Crit Moves:  ****                   ****                                       ****
Green Time:   7.0 96.9   96.9  17.2  107  107.1  23.9 23.9   23.9  23.9 23.9   23.9
Volume/Cap:  0.28 0.41   0.41  0.32 0.46   0.46  0.46 0.46   0.46  0.37 0.37   0.46
Uniform Del: 69.1 12.7   12.7  61.0  9.2    9.2  57.2 57.2   57.2  56.3 56.3   57.2
IncremntDel:  1.9  0.1    0.1   0.9  0.1    0.1   1.2  1.2    1.2   0.8  0.8    1.2
InitQueuDel:  0.0  0.0    0.0   0.0  0.0    0.0   0.0  0.0    0.0   0.0  0.0    0.0
Delay 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
Delay/Veh:   71.0 12.8   12.8  61.9  9.2    9.2  58.4 58.4   58.4  57.1 57.1   58.4
User DelAdj: 1.00 1.00   1.00  1.00 1.00   1.00  1.00 1.00   1.00  1.00 1.00   1.00
AdjDel/Veh:  71.0 12.8   12.8  61.9  9.2    9.2  58.4 58.4   58.4  57.1 57.1   58.4
LOS by Move:    E    B      B     E    A      A    E+   E+     E+    E+   E+     E+
HCM2kAvgQ:      1   11     11     3   12     12     6    6      6     5    5      6
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

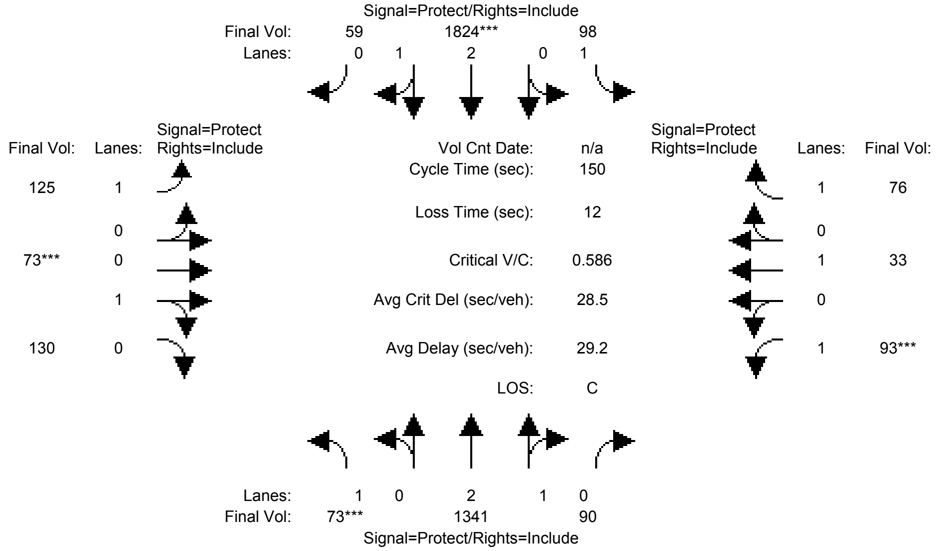
Intersection #8: ECR & California Ave



```
Street Name:               ECR                          California Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      69 1241    85    74 1712    51   122   73   130    85   31    67
Growth 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
Initial Bse:   69 1241    85    74 1712    51   122   73   130    85   31    67
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    4  100     5    17  112     8     3    0     0     0    2     2
Initial Fut:   73 1341    90    91 1824    59   125   73   130    85   33    69
User 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
PHF 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
PHF Volume:    73 1341    90    91 1824    59   125   73   130    85   33    69
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   73 1341    90    91 1824    59   125   73   130    85   33    69
PCE 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
MLF 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
FinalVolume:   73 1341    90    91 1824    59   125   73   130    85   33    69
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.80  0.20  1.00 2.90  0.10  1.00 0.34  0.66  1.00 1.00  1.00
Final Sat.:  1750 5313   357  1750 5507   178  1750  648  1153  1750 1900  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.04 0.25  0.25  0.05 0.33  0.33  0.07 0.11  0.11  0.05 0.02  0.04
Crit Moves:  ****                  ****             ****        ****
Green Time:  10.8 79.9  79.9  16.5 85.6  85.6  21.5 29.1  29.1  12.5 20.1  20.1
Volume/Cap:  0.58 0.47  0.47  0.47 0.58  0.58  0.50 0.58  0.58  0.58 0.13  0.29
Uniform Del: 67.4 21.9  21.9  62.7 20.7  20.7  59.2 54.9  54.9  66.2 57.2  58.5
IncremntDel:  6.7  0.1   0.1   1.8  0.3   0.3   1.5  2.5   2.5   5.8  0.2   0.7
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   74.1 22.0  22.0  64.6 21.0  21.0  60.8 57.4  57.4  72.0 57.5  59.2
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  74.1 22.0  22.0  64.6 21.0  21.0  60.8 57.4  57.4  72.0 57.5  59.2
LOS by Move:    E   C+    C+     E   C+    C+     E   E+    E+     E   E+    E+
HCM2kAvgQ:      4   13    13     4   18    18     6    9     9     5    1     3
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

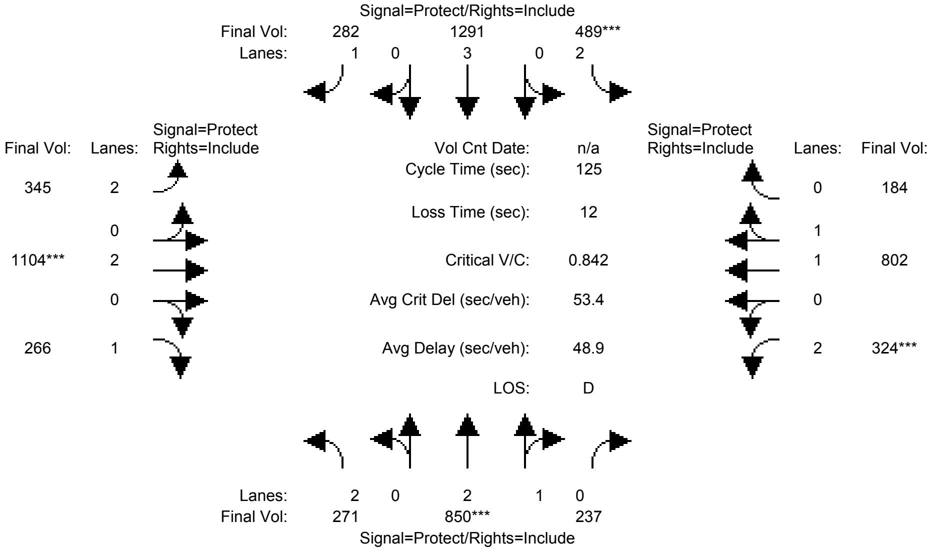
Intersection #8: ECR & California Ave



```
Street Name:               ECR                          California Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      69 1241    85    74 1712    51   122   73   130    85   31    67
Growth 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
Initial Bse:   69 1241    85    74 1712    51   122   73   130    85   31    67
Added Vol:      0    0     0     7    0     0     0    0     0     8    0     7
PasserByVol:    4  100     5    17  112     8     3    0     0     0    2     2
Initial Fut:   73 1341    90    98 1824    59   125   73   130    93   33    76
User 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
PHF 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
PHF Volume:    73 1341    90    98 1824    59   125   73   130    93   33    76
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   73 1341    90    98 1824    59   125   73   130    93   33    76
PCE 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
MLF 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
FinalVolume:   73 1341    90    98 1824    59   125   73   130    93   33    76
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.80  0.20  1.00 2.90  0.10  1.00 0.34  0.66  1.00 1.00  1.00
Final Sat.:  1750 5313   357  1750 5507   178  1750  648  1153  1750 1900  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.04 0.25  0.25  0.06 0.33  0.33  0.07 0.11  0.11  0.05 0.02  0.04
Crit Moves:  ****                  ****             ****        ****
Green Time:  10.7 78.2  78.2  17.3 84.8  84.8  22.0 28.9  28.9  13.6 20.5  20.5
Volume/Cap:  0.59 0.48  0.48  0.48 0.59  0.59  0.49 0.59  0.59  0.59 0.13  0.32
Uniform Del: 67.5 23.0  23.0  62.1 21.2  21.2  58.8 55.1  55.1  65.5 56.9  58.4
IncremntDel:  7.0  0.1   0.1   1.8  0.3   0.3   1.5  2.6   2.6   5.6  0.2   0.8
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   74.5 23.1  23.1  64.0 21.4  21.4  60.3 57.7  57.7  71.0 57.1  59.2
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  74.5 23.1  23.1  64.0 21.4  21.4  60.3 57.7  57.7  71.0 57.1  59.2
LOS by Move:    E    C     C     E   C+    C+     E   E+    E+     E   E+    E+
HCM2kAvgQ:      4   14    14     4   18    18     6    9     9     5    1     4
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

Intersection #9: El Camino Real & Page Mill Rd

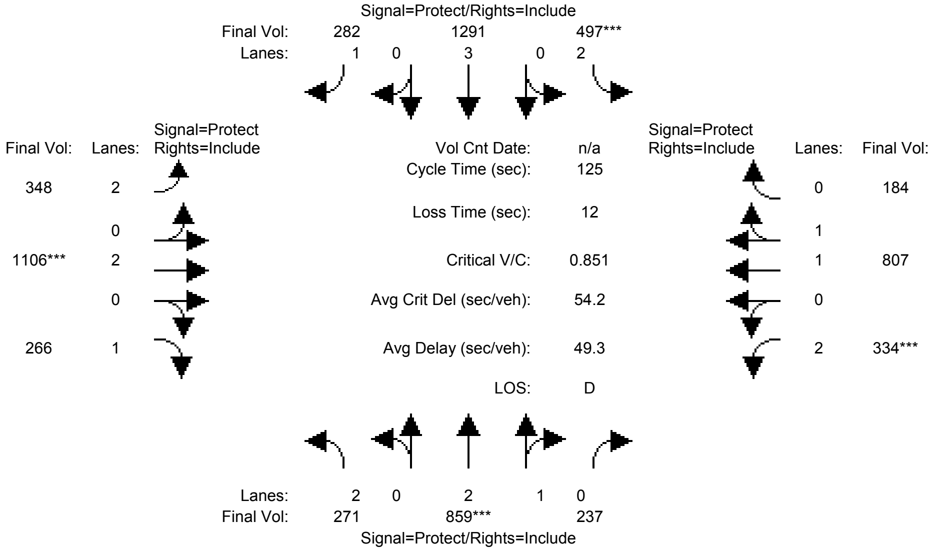


```
                          Signal=Protect/Rights=Include
               Final Vol:   282        1291        489***
                   Lanes:     1    0      3      0    2

                 Signal=Protect                                      Signal=Protect
Final Vol:  Lanes: Rights=Include          Vol Cnt Date:     n/a     Rights=Include   Lanes:  Final Vol:
                                      Cycle Time (sec):      125
   345         2                                                                          0       184
                                        Loss Time (sec):      12
               0                                                                          1
 1104***       2                            Critical V/C:   0.842                         1       802
               0                     Avg Crit Del (sec/veh):  53.4                        0
   266         1                        Avg Delay (sec/veh):  48.9                        2       324***
                                                     LOS:       D

                   Lanes:     2    0      2      1    0
               Final Vol:   271        850***       237
                          Signal=Protect/Rights=Include
```

```
Street Name:          El Camino Real                     Page Mill Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   30     0     7   30     0     7   28    28     7   30     0
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     247  788   224   462 1212   260   334 1097   265   303  748   174
Growth 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
Initial Bse:  247  788   224   462 1212   260   334 1097   265   303  748   174
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:   24   62    13    27   79    22    11    7     1    21   54    10
Initial Fut:  271  850   237   489 1291   282   345 1104   266   324  802   184
User 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
PHF 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
PHF Volume:   271  850   237   489 1291   282   345 1104   266   324  802   184
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  271  850   237   489 1291   282   345 1104   266   324  802   184
PCE 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
MLF 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
FinalVolume:  271  850   237   489 1291   282   345 1104   266   324  802   184
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.83 1.00  0.97  0.83 1.00  0.97  0.83 1.00  0.92  0.69 1.00  0.97
Lanes:       2.00 2.33  0.67  2.00 3.00  1.00  2.00 2.00  1.00  2.00 1.62  0.38
Final Sat.:  3150 4430  1235  3150 5700  1847  3150 3800  1750  2625 3074   705
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.09 0.19  0.19  0.16 0.23  0.15  0.11 0.29  0.15  0.12 0.26  0.26
Crit Moves:       ****        ****                  ****        ****
Green Time:  13.9 30.0  30.0  22.6 38.7  38.7  17.8 42.4  42.4  18.0 42.5  42.5
Volume/Cap:  0.77 0.80  0.80  0.86 0.73  0.49  0.77 0.86  0.45  0.86 0.77  0.77
Uniform Del: 54.0 44.7  44.7  49.6 38.5  35.1  51.6 38.5  32.2  52.2 36.8  36.8
IncremntDel: 15.3  5.0   5.0  15.3  2.7   3.0  11.8  7.5   2.4  21.4  4.4   4.4
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   69.4 49.7  49.7  64.9 41.2  38.1  63.4 46.0  34.7  73.7 41.2  41.2
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  69.4 49.7  49.7  64.9 41.2  38.1  63.4 46.0  34.7  73.7 41.2  41.2
LOS by Move:    E    D     D     E    D    D+     E    D    C-     E    D     D
HCM2kAvgQ:      8   15    16    14   16    10     9   22     9    10   18    19
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #9: El Camino Real & Page Mill Rd

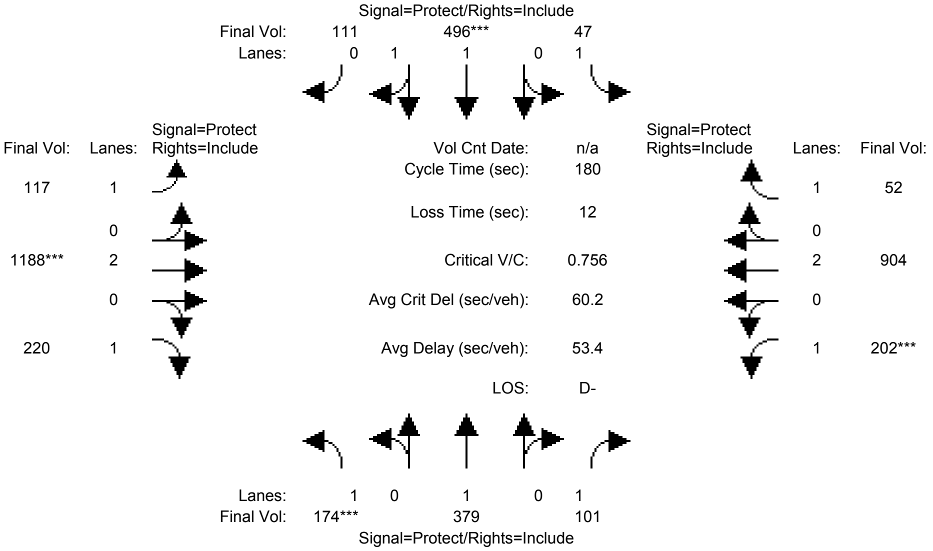


Vol Cnt Date: n/a
Cycle Time (sec): 125
Loss Time (sec): 12
Critical V/C: 0.851
Avg Crit Del (sec/veh): 54.2
Avg Delay (sec/veh): 49.3
LOS: D

```
Street Name:           El Camino Real                     Page Mill Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   30     0     7   30     0     7   28    28     7   30     0
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     247  788   224   462 1212   260   334 1097   265   303  748   174
Growth 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
Initial Bse:  247  788   224   462 1212   260   334 1097   265   303  748   174
Added Vol:      0    9     0     8    0     0     3    2     0    10    5     0
PasserByVol:   24   62    13    27   79    22    11    7     1    21   54    10
Initial Fut:  271  859   237   497 1291   282   348 1106   266   334  807   184
User 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
PHF 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
PHF Volume:   271  859   237   497 1291   282   348 1106   266   334  807   184
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  271  859   237   497 1291   282   348 1106   266   334  807   184
PCE 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
MLF 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
FinalVolume:  271  859   237   497 1291   282   348 1106   266   334  807   184
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.83 1.00  0.97  0.83 1.00  0.97  0.83 1.00  0.92  0.69 1.00  0.97
Lanes:       2.00 2.34  0.66  2.00 3.00  1.00  2.00 2.00  1.00  2.00 1.62  0.38
Final Sat.:  3150 4440  1225  3150 5700  1847  3150 3800  1750  2625 3078   702
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.09 0.19  0.19  0.16 0.23  0.15  0.11 0.29  0.15  0.13 0.26  0.26
Crit Moves:       ****        ****                   ****       ****
Green Time:  13.9 30.0  30.0  22.7 38.8  38.8  17.9 41.9  41.9  18.3 42.4  42.4
Volume/Cap:  0.77 0.81  0.81  0.87 0.73  0.49  0.77 0.87  0.45  0.87 0.77  0.77
Uniform Del: 54.0 44.8  44.8  49.7 38.4  35.1  51.6 38.9  32.5  52.1 37.0  37.0
IncremntDel: 15.2  5.2   5.2  16.2  2.7   3.0  12.2  8.1   2.5  22.3  4.6   4.6
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   69.2 50.0  50.0  65.9 41.1  38.1  63.8 47.1  35.1  74.4 41.6  41.6
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  69.2 50.0  50.0  65.9 41.1  38.1  63.8 47.1  35.1  74.4 41.6  41.6
LOS by Move:    E    D     D     E    D    D+     E    D    D+     E    D     D
HCM2kAvgQ:      8   15    16    14   16    10    10   23     9    10   18    19
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background PM

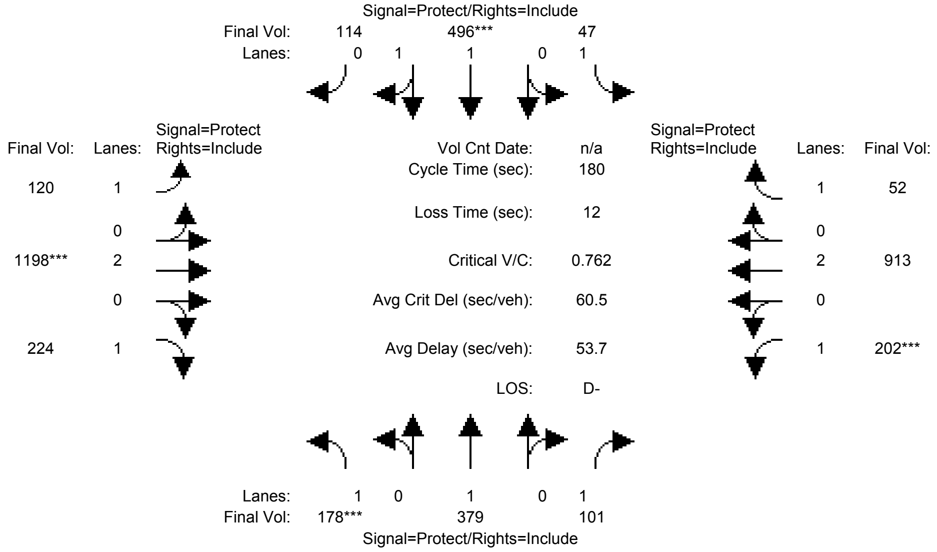
Intersection #10: PAGEMILL-OREGON EXPWY/MIDDLEFIELD RD



```
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     168  366    98    45  472   106   117 1136   220   202  895    52
Growth 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
Initial Bse:  168  366    98    45  472   106   117 1136   220   202  895    52
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    6   13     3     2   24     5     0   52     0     0    9     0
Initial Fut:  174  379   101    47  496   111   117 1188   220   202  904    52
User 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
PHF 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
PHF Volume:   174  379   101    47  496   111   117 1188   220   202  904    52
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  174  379   101    47  496   111   117 1188   220   202  904    52
PCE 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
MLF 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
FinalVolume:  174  379   101    47  496   111   117 1188   220   202  904    52
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.88 1.00  0.78  0.88 0.97  0.90  0.88 1.00  0.78  0.88 1.00  0.78
Lanes:       1.00 1.00  1.00  1.00 1.61  0.39  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.:  1663 1900  1488  1663 2975   666  1663 3800  1488  1663 3800  1488
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.10 0.20  0.07  0.03 0.17  0.17  0.07 0.31  0.15  0.12 0.24  0.03
Crit Moves:  ****                  ****              ****        ****
Green Time:  24.9 54.1  54.1  10.5 39.7  39.7  23.6 74.4  74.4  28.9 79.8  79.8
Volume/Cap:  0.76 0.66  0.23  0.48 0.76  0.76  0.54 0.76  0.36  0.76 0.54  0.08
Uniform Del: 74.6 55.0  47.3  82.1 65.6  65.6  73.1 45.0  36.3  72.2 36.6  28.9
IncremntDel: 13.4  2.9   0.3   3.7  4.1   4.1   2.6  2.2   0.4  11.7  0.3   0.1
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   88.0 58.0  47.5  85.8 69.8  69.8  75.7 47.2  36.7  83.8 37.0  29.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  88.0 58.0  47.5  85.8 69.8  69.8  75.7 47.2  36.7  83.8 37.0  29.0
LOS by Move:    F   E+     D     F    E     E    E-    D    D+     F   D+     C
HCM2kAvgQ:     11   18     4     3   17    17     7   28     9    13   18     2
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Background+Project PM

Intersection #10: PAGEMILL-OREGON EXPWY/MIDDLEFIELD RD

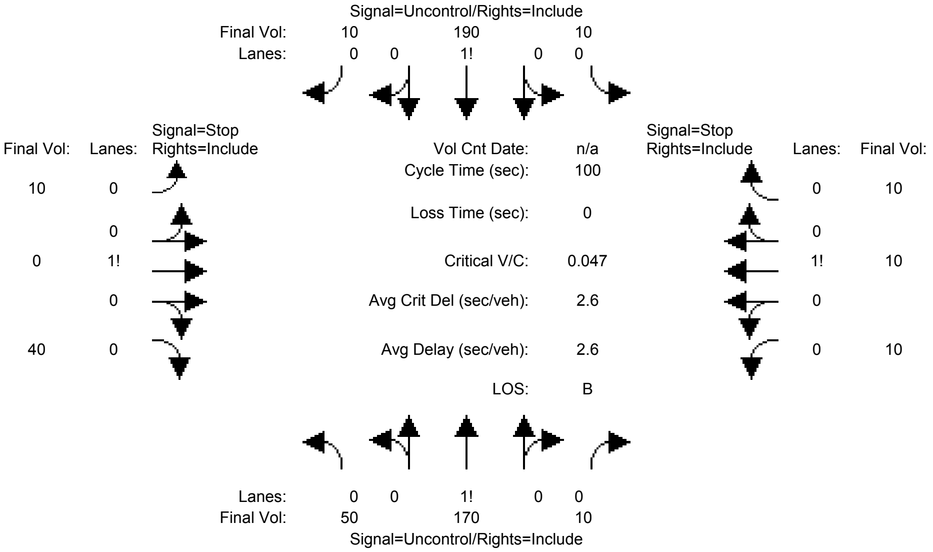


```
                          Signal=Protect/Rights=Include
               Final Vol:     114          496***        47
                   Lanes:        0    1       1       0    1

               Signal=Protect                                          Signal=Protect
 Final Vol:  Lanes:  Rights=Include        Vol Cnt Date:      n/a      Rights=Include    Lanes:  Final Vol:
                                       Cycle Time (sec):      180
    120         1                                                                          1        52

                0                       Loss Time (sec):       12                          0

   1198***      2                          Critical V/C:     0.762                         2       913

                0                  Avg Crit Del (sec/veh):     60.5                         0

    224         1                     Avg Delay (sec/veh):     53.7                         1       202***

                                                   LOS:        D-

                   Lanes:        1    0       1       0    1
               Final Vol:   178***          379            101
                          Signal=Protect/Rights=Include
```

```
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     168  366    98    45  472   106   117 1136   220   202  895    52
Growth 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
Initial Bse:  168  366    98    45  472   106   117 1136   220   202  895    52
Added Vol:      4    0     0     0    0     3     3   10     4     0    9     0
PasserByVol:    6   13     3     2   24     5     0   52     0     0    9     0
Initial Fut:  178  379   101    47  496   114   120 1198   224   202  913    52
User 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
PHF 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
PHF Volume:   178  379   101    47  496   114   120 1198   224   202  913    52
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  178  379   101    47  496   114   120 1198   224   202  913    52
PCE 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
MLF 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
FinalVolume:  178  379   101    47  496   114   120 1198   224   202  913    52
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.88 1.00  0.78  0.88 0.97  0.90  0.88 1.00  0.78  0.88 1.00  0.78
Lanes:       1.00 1.00  1.00  1.00 1.60  0.40  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.:  1663 1900  1488  1663 2956   679  1663 3800  1488  1663 3800  1488
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.11 0.20  0.07  0.03 0.17  0.17  0.07 0.32  0.15  0.12 0.24  0.03
Crit Moves:  ****                  ****              ****        ****
Green Time:  25.3 54.3  54.3  10.6 39.6  39.6  23.8 74.4  74.4  28.7 79.3  79.3
Volume/Cap:  0.76 0.66  0.23  0.48 0.76  0.76  0.55 0.76  0.36  0.76 0.55  0.08
Uniform Del: 74.5 54.8  47.1  82.0 65.8  65.8  73.0 45.2  36.4  72.4 37.1  29.2
IncremntDel: 13.8  2.9   0.3   3.7  4.4   4.4   2.8  2.3   0.4  12.3  0.4   0.1
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   88.2 57.7  47.3  85.7 70.1  70.1  75.9 47.5  36.8  84.7 37.5  29.2
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  88.2 57.7  47.3  85.7 70.1  70.1  75.9 47.5  36.8  84.7 37.5  29.2
LOS by Move:    F   E+     D     F    E     E    E-    D    D+     F   D+     C
HCM2kAvgQ:     12   18     4     3   17    17     7   29     9    13   18     2
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cummulative AM

Intersection #1: Park Blvd & Sherman Ave



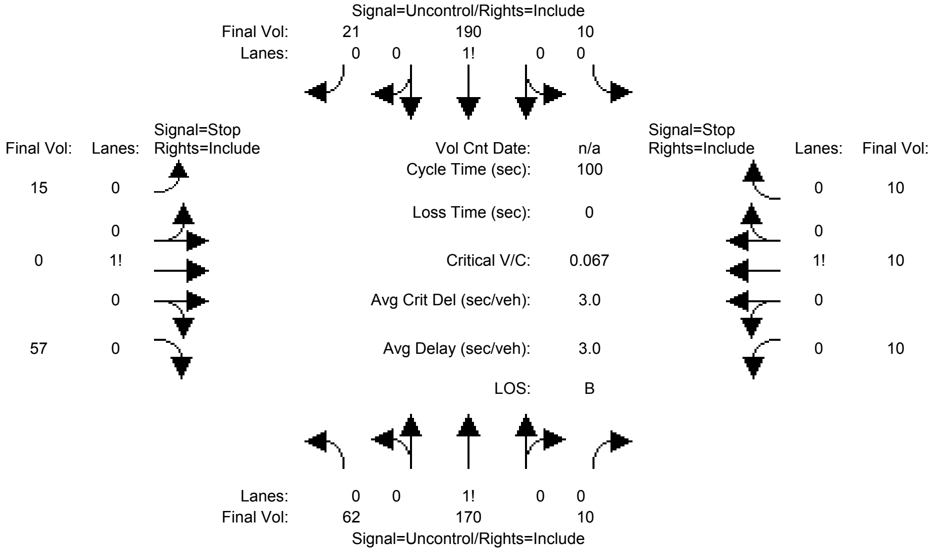
```
                        Signal=Uncontrol/Rights=Include
           Final Vol:      10          190          10
              Lanes:        0     0      1!     0     0

              Signal=Stop                                  Signal=Stop
Final Vol:  Lanes:  Rights=Include   Vol Cnt Date:    n/a  Rights=Include  Lanes:  Final Vol:
                                   Cycle Time (sec):  100
   10         0                                                              0        10
                                   Loss Time (sec):     0
              0                                                              0
    0         1!                      Critical V/C:  0.047                   1!       10
              0                 Avg Crit Del (sec/veh):  2.6                  0
   40         0                    Avg Delay (sec/veh):  2.6                  0        10
                                               LOS:    B

              Lanes:        0     0      1!     0     0
           Final Vol:      50          170          10
                        Signal=Uncontrol/Rights=Include
```

```
Street Name:             Park Blvd                        Sherman Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      50  170    10    10  190    10    10    0    40    10   10    10
Growth 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
Initial Bse:   50  170    10    10  190    10    10    0    40    10   10    10
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   50  170    10    10  190    10    10    0    40    10   10    10
User 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
PHF 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
PHF Volume:    50  170    10    10  190    10    10    0    40    10   10    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   50  170    10    10  190    10    10    0    40    10   10    10
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  200 xxxx xxxxx   180 xxxx xxxxx   500  495   195   510  495   175
Potent Cap.: 1384 xxxx xxxxx  1408 xxxx xxxxx   484  479   851   477  479   874
Move Cap.:   1384 xxxx xxxxx  1408 xxxx xxxxx   455  458   851   439  458   874
Volume/Cap:  0.04 xxxx  xxxx  0.01 xxxx  xxxx  0.02 0.00  0.05  0.02 0.02  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.7 xxxx xxxxx   7.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  725 xxxxx  xxxx  535 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.2 xxxxx xxxxx  0.2 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.3 xxxxx xxxxx 12.1 xxxxx
Shared LOS:     *    *     *     *    *     *     *    B     *     *    B     *
ApproachDel:    xxxxxx           xxxxxx             10.3             12.1
ApproachLOS:         *                *                B                B
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   50  170    10    10  190    10    10    0    40    10   10    10
ApproachDel:    xxxxxx           xxxxxx             10.3             12.1
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=50]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=520]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=30]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=520]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   50  170    10    10  190    10    10    0    40    10   10    10
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             440
Minor Approach Volume:           50
Minor Approach Volume Threshold: 438
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cummulative+Project AM

Intersection #1: Park Blvd & Sherman Ave



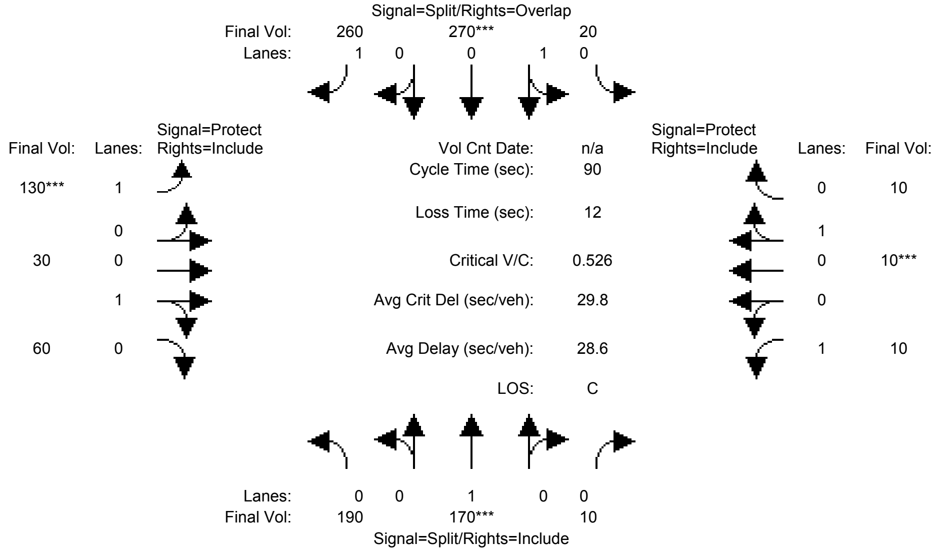
Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.067
Avg Crit Del (sec/veh): 3.0
Avg Delay (sec/veh): 3.0
LOS: B

```
Street Name:            Park Blvd                          Sherman Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      50  170    10    10  190    10    10    0    40    10   10    10
Growth 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
Initial Bse:   50  170    10    10  190    10    10    0    40    10   10    10
Added Vol:     12    0     0     0    0    11     5    0    17     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   62  170    10    10  190    21    15    0    57    10   10    10
User 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
PHF 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
PHF Volume:    62  170    10    10  190    21    15    0    57    10   10    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   62  170    10    10  190    21    15    0    57    10   10    10
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  211 xxxx xxxxx   180 xxxx xxxxx   530  525   201   548  530   175
Potent Cap.: 1372 xxxx xxxxx  1408 xxxx xxxxx   463  461   846   450  457   874
Move Cap.:   1372 xxxx xxxxx  1408 xxxx xxxxx   431  436   846   403  433   874
Volume/Cap:  0.05 xxxx  xxxx  0.01 xxxx  xxxx  0.03 0.00  0.07  0.02 0.02  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.7 xxxx xxxxx   7.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  705 xxxxx  xxxx  505 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.3 xxxxx xxxxx  0.2 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.7 xxxxx xxxxx 12.6 xxxxx
Shared LOS:     *    *     *     *    *     *     *    B     *     *    B     *
ApproachDel:     xxxxxx           xxxxxx             10.7             12.6
ApproachLOS:        *                *                 B                B
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   62  170    10    10  190    21    15    0    57    10   10    10
ApproachDel:    xxxxxx           xxxxxx             10.7             12.6
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.2]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=72]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=565]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=30]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=565]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   62  170    10    10  190    21    15    0    57    10   10    10
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             463
Minor Approach Volume:           72
Minor Approach Volume Threshold: 425
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative AM

Intersection #2: Park Blvd & Page Mill Rd

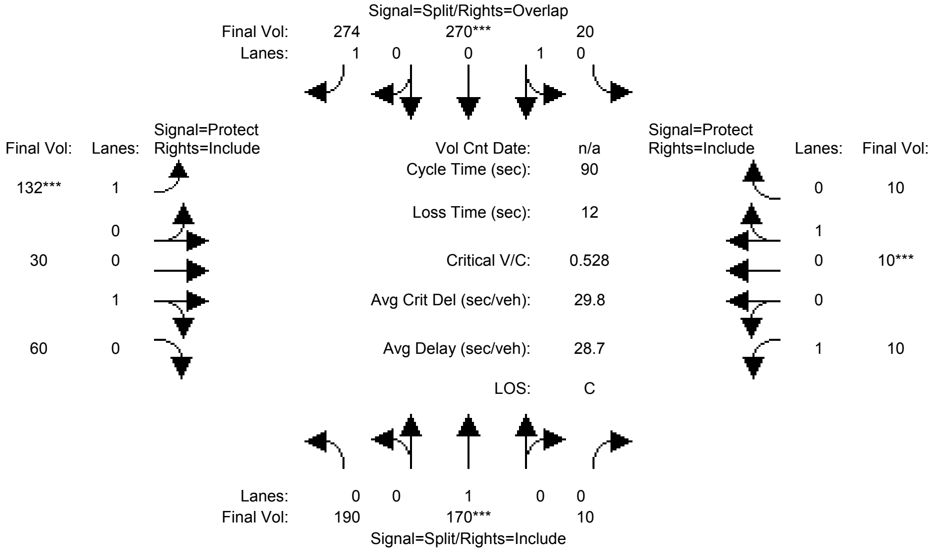


```
                          Signal=Split/Rights=Overlap
            Final Vol:   260        270***          20
                Lanes:     1    0      0       1    0

                     Signal=Protect                                    Signal=Protect
Final Vol:  Lanes:   Rights=Include       Vol Cnt Date:     n/a        Rights=Include   Lanes:  Final Vol:
                                        Cycle Time (sec):    90
  130***      1                                                                           0        10
                                         Loss Time (sec):    12
              0                                                                           1
    30        0                            Critical V/C:    0.526                         0        10***
              1                     Avg Crit Del (sec/veh):  29.8                         0
    60        0                         Avg Delay (sec/veh):  28.6                        1        10
                                                     LOS:    C

                Lanes:     0    0      1       0    0
            Final Vol:   190        170***          10
                          Signal=Split/Rights=Include
```

```
Street Name:               Park Blvd                        Page Mill Rd
Approach:       North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R     L  -  T  -  R     L  -  T  -  R     L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     190  170    10    20  270   260   130   30    60    10   10    10
Growth 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
Initial Bse:  190  170    10    20  270   260   130   30    60    10   10    10
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  190  170    10    20  270   260   130   30    60    10   10    10
User 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
PHF 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
PHF Volume:   190  170    10    20  270   260   130   30    60    10   10    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  190  170    10    20  270   260   130   30    60    10   10    10
PCE 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
MLF 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
FinalVolume:  190  170    10    20  270   260   130   30    60    10   10    10
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.89 0.97  0.88  0.92 1.00  0.63  0.88 0.90  0.80  0.88 0.93  0.64
Lanes:       0.53 0.44  0.03  0.07 0.93  1.00  1.00 0.31  0.69  1.00 0.41  0.59
Final Sat.:   905  810    48   130 1753  1205  1663  525  1049  1663  719   719
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.21 0.21  0.21  0.15 0.15  0.22  0.08 0.06  0.06  0.01 0.01  0.01
Crit Moves:       ****             ****        ****                    ****
Green Time:  32.3 32.3  32.3  23.7 23.7  35.7  12.0 13.0  13.0   9.1 10.0  10.0
Volume/Cap:  0.59 0.59  0.59  0.59 0.59  0.54  0.59 0.40  0.40  0.06 0.13  0.13
Uniform Del: 23.4 23.4  23.4  28.9 28.9  20.9  36.6 35.0  35.0  36.6 36.1  36.1
IncremntDel:  1.4  1.4   1.4   1.8  1.8   1.3   4.0  1.1   1.1   0.1  0.4   0.4
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   24.8 24.8  24.8  30.7 30.7  22.2  40.6 36.1  36.1  36.8 36.4  36.4
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  24.8 24.8  24.8  30.7 30.7  22.2  40.6 36.1  36.1  36.8 36.4  36.4
LOS by Move:    C    C     C     C    C    C+     D   D+    D+    D+   D+    D+
HCM2kAvgQ:      9    9     9     8    8     7     5    3     3     0    1     1
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative+Project AM

Intersection #2: Park Blvd & Page Mill Rd

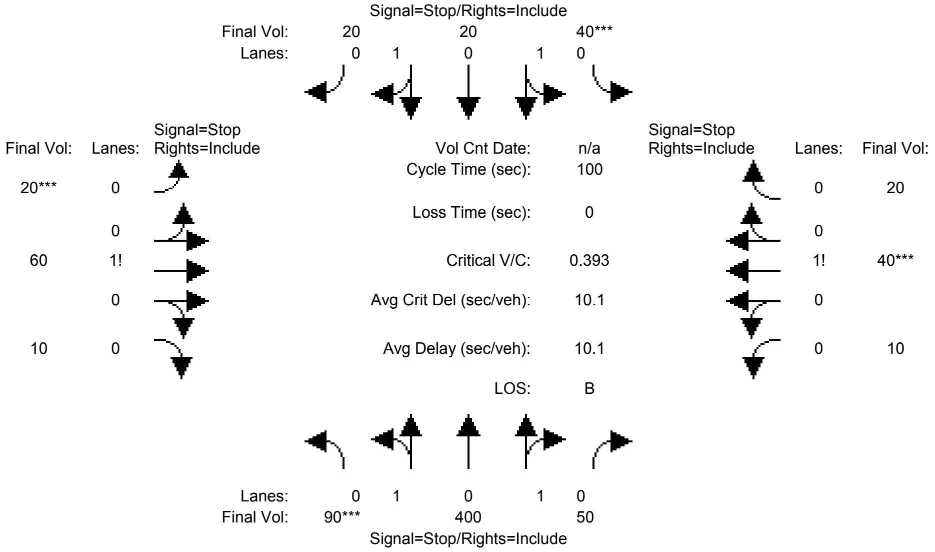


Vol Cnt Date: n/a
Cycle Time (sec): 90
Loss Time (sec): 12
Critical V/C: 0.528
Avg Crit Del (sec/veh): 29.8
Avg Delay (sec/veh): 28.7
LOS: C

```
Street Name:            Park Blvd                        Page Mill Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     190  170    10    20  270   260   130   30    60    10   10    10
Growth 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
Initial Bse:  190  170    10    20  270   260   130   30    60    10   10    10
Added Vol:      0    0     0     0    0    14     2    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  190  170    10    20  270   274   132   30    60    10   10    10
User 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
PHF 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
PHF Volume:   190  170    10    20  270   274   132   30    60    10   10    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  190  170    10    20  270   274   132   30    60    10   10    10
PCE 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
MLF 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
FinalVolume:  190  170    10    20  270   274   132   30    60    10   10    10
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.89 0.97  0.88  0.92 1.00  0.63  0.88 0.90  0.80  0.88 0.93  0.64
Lanes:       0.53 0.44  0.03  0.07 0.93  1.00  1.00 0.31  0.69  1.00 0.41  0.59
Final Sat.:   905  810    48   130 1753  1205  1663  525  1049  1663  719   719
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.21 0.21  0.21  0.15 0.15  0.23  0.08 0.06  0.06  0.01 0.01  0.01
Crit Moves:       ****             ****        ****                  ****
Green Time:  32.2 32.2  32.2  23.6 23.6  35.8  12.2 13.0  13.0   9.1 10.0  10.0
Volume/Cap:  0.59 0.59  0.59  0.59 0.59  0.57  0.59 0.39  0.39  0.06 0.13  0.13
Uniform Del: 23.5 23.5  23.5  28.9 28.9  21.1  36.5 34.9  34.9  36.6 36.1  36.1
IncremntDel:  1.4  1.4   1.4   1.8  1.8   1.7   4.0  1.1   1.1   0.1  0.4   0.4
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   24.9 24.9  24.9  30.8 30.8  22.8  40.5 36.0  36.0  36.7 36.4  36.4
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  24.9 24.9  24.9  30.8 30.8  22.8  40.5 36.0  36.0  36.7 36.4  36.4
LOS by Move:    C    C     C     C    C    C+     D   D+    D+    D+   D+    D+
HCM2kAvgQ:      9    9     9     8    8     7     5    3     3     0    1     1
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cummulative AM

Intersection #3: Birch St & Sherman Ave

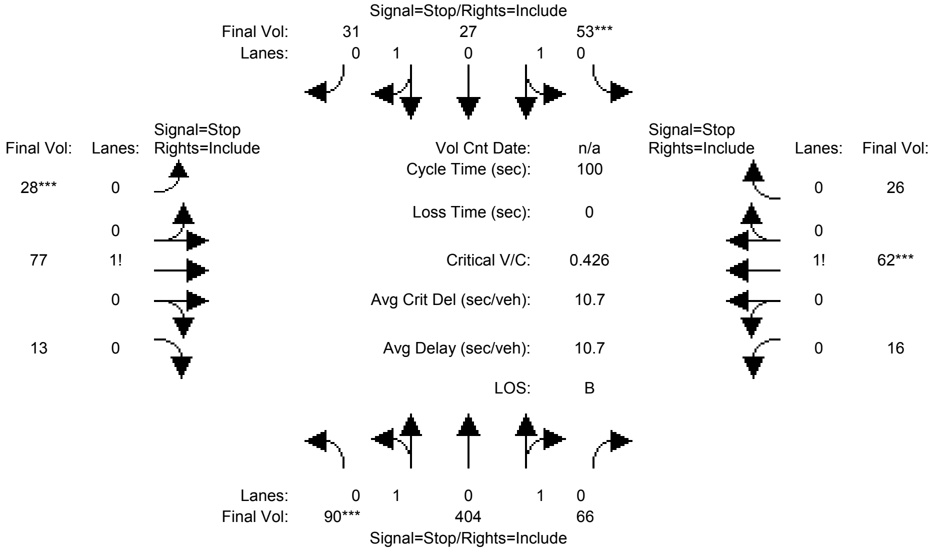


```
Street Name:                 Birch St                          Sherman Ave
Approach:      North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        90  400    50    40   20    20    20   60    10    10   40    20
Growth 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
Initial Bse:    90  400    50    40   20    20    20   60    10    10   40    20
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    90  400    50    40   20    20    20   60    10    10   40    20
User 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
PHF 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
PHF Volume:     90  400    50    40   20    20    20   60    10    10   40    20
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    90  400    50    40   20    20    20   60    10    10   40    20
PCE 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
MLF 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
FinalVolume:    90  400    50    40   20    20    20   60    10    10   40    20
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.33 1.48  0.19  1.00 0.50  0.50  0.22 0.67  0.11  0.14 0.57  0.29
Final Sat.:    229 1052   135   584  339   339   142  427    71    93  370   185
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.39 0.38  0.37  0.07 0.06  0.06  0.14 0.14  0.14  0.11 0.11  0.11
Crit Moves:  ****             ****             ****                  ****
Delay/Veh:   11.1 10.7  10.3   9.1  8.1   8.1   9.1  9.1   9.1   8.8  8.8   8.8
Delay 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
AdjDel/Veh:  11.1 10.7  10.3   9.1  8.1   8.1   9.1  9.1   9.1   8.8  8.8   8.8
LOS by Move:    B    B     B     A    A     A     A    A     A     A    A     A
ApproachDel:      10.7              8.6              9.1              8.8
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:       10.7              8.6              9.1              8.8
LOS by Appr:         B                A                A                A
AllWayAvgQ:   0.6  0.6   0.6   0.1  0.1   0.1   0.1  0.1   0.1   0.1  0.1   0.1
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #3 Birch St & Sherman Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign         Stop Sign         Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   90  400    50    40   20    20    20   60    10    10   40    20
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            620
Minor Approach Volume:          90
Minor Approach Volume Threshold: 450
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cummulative+Project AM

Intersection #3: Birch St & Sherman Ave

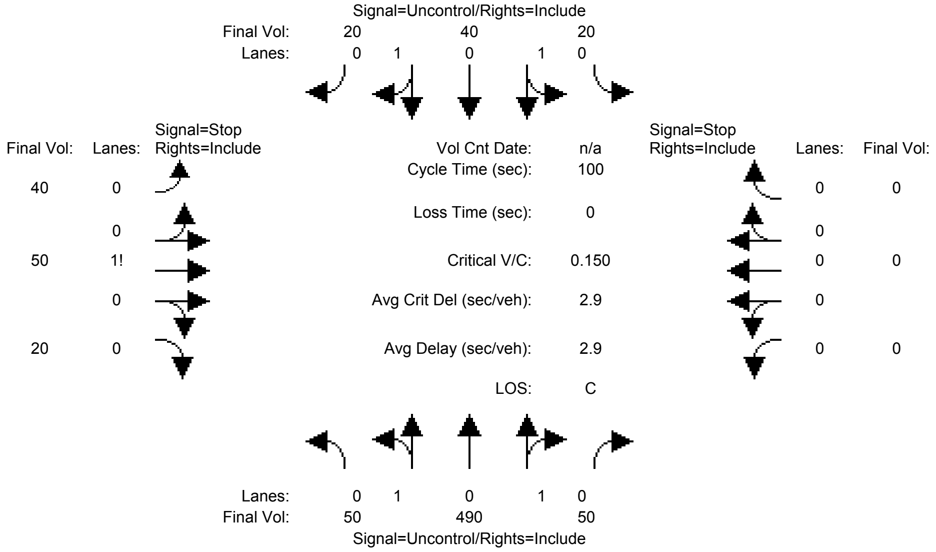


```
Street Name:                 Birch St                        Sherman Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      90  400    50    40   20    20    20   60    10    10   40    20
Growth 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
Initial Bse:   90  400    50    40   20    20    20   60    10    10   40    20
Added Vol:      0    4    16    13    7    11     8   17     3     6   22     6
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   90  404    66    53   27    31    28   77    13    16   62    26
User 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
PHF 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
PHF Volume:    90  404    66    53   27    31    28   77    13    16   62    26
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   90  404    66    53   27    31    28   77    13    16   62    26
PCE 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
MLF 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
FinalVolume:   90  404    66    53   27    31    28   77    13    16   62    26
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.32 1.44  0.24  0.95 0.49  0.56  0.24 0.65  0.11  0.15 0.60  0.25
Final Sat.:   211  981   165   533  309   360   146  401    68    96  370   155
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.43 0.41  0.40  0.10 0.09  0.09  0.19 0.19  0.19  0.17 0.17  0.17
Crit Moves:  ****              ****              ****                   ****
Delay/Veh:   11.9 11.4  11.0   9.5  8.6   8.5   9.7  9.7   9.7   9.4  9.4   9.4
Delay 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
AdjDel/Veh:  11.9 11.4  11.0   9.5  8.6   8.5   9.7  9.7   9.7   9.4  9.4   9.4
LOS by Move:    B    B     B     A    A     A     A    A     A     A    A     A
ApproachDel:      11.5              9.0               9.7               9.4
Delay Adj:        1.00             1.00              1.00              1.00
ApprAdjDel:       11.5              9.0               9.7               9.4
LOS by Appr:         B                A                 A                 A
AllWayAvgQ:   0.7  0.6   0.6   0.1  0.1   0.1   0.2  0.2   0.2   0.2  0.2   0.2
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #3 Birch St & Sherman Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   90  404    66    53   27    31    28   77    13    16   62    26
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             671
Minor Approach Volume:           118
Minor Approach Volume Threshold: 422
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cummulative AM

Intersection #4: Birch St & Grant Ave



```
Street Name:                 Birch St                          Grant Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      50  490    50    20   40    20    40   50    20     0    0     0
Growth 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
Initial Bse:   50  490    50    20   40    20    40   50    20     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   50  490    50    20   40    20    40   50    20     0    0     0
User 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
PHF 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
PHF Volume:    50  490    50    20   40    20    40   50    20     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   50  490    50    20   40    20    40   50    20     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   60 xxxx xxxxx   540 xxxx xxxxx   435  730    30  xxxx xxxx xxxxx
Potent Cap.: 1556 xxxx xxxxx  1039 xxxx xxxxx   555  352  1044  xxxx xxxx xxxxx
Move Cap.:   1556 xxxx xxxxx  1039 xxxx xxxxx   532  333  1044  xxxx xxxx xxxxx
Volume/Cap:  0.03 xxxx  xxxx  0.02 xxxx  xxxx  0.08 0.15  0.02  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx   8.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  450 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx   0.1 xxxx xxxxx xxxxx  0.9 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx   8.5 xxxx xxxxx xxxxx 15.6 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     A    *     *     *    C     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx             15.6            xxxxxx
ApproachLOS:         *                *                C                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

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```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   50  490    50    20   40    20    40   50    20     0    0     0
ApproachDel:    xxxxxx           xxxxxx             15.6           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.5]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=110]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=780]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
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"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   50  490    50    20   40    20    40   50    20     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            670
Minor Approach Volume:          110
Minor Approach Volume Threshold: 423
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```
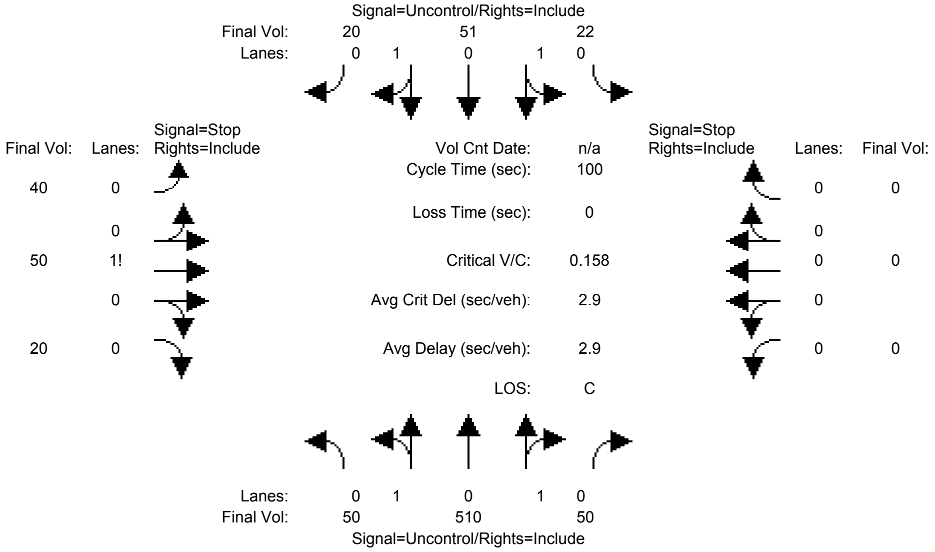

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cummulative+Project AM

Intersection #4: Birch St & Grant Ave

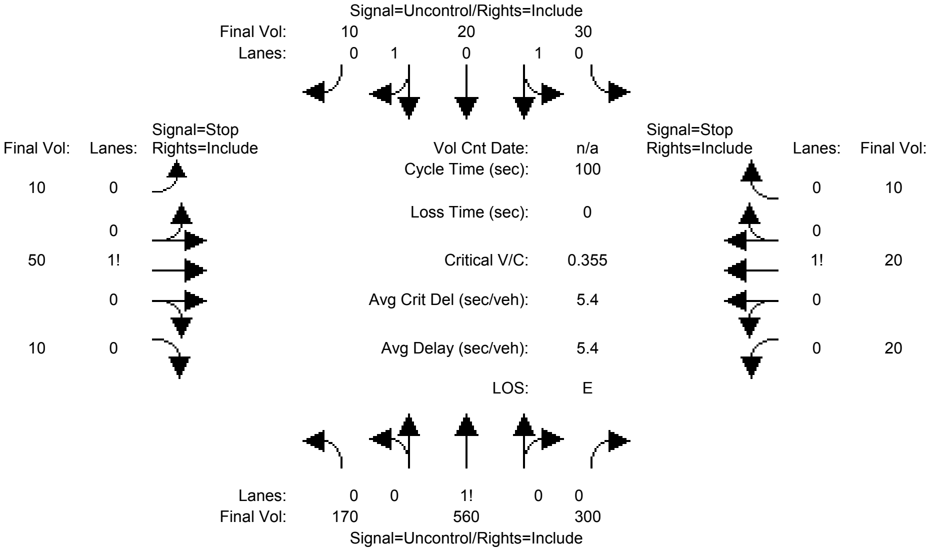


```
Street Name:             Birch St                         Grant Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      50  490    50    20   40    20    40   50    20     0    0     0
Growth 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
Initial Bse:   50  490    50    20   40    20    40   50    20     0    0     0
Added Vol:      0   20     0     2   11     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   50  510    50    22   51    20    40   50    20     0    0     0
User 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
PHF 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
PHF Volume:    50  510    50    22   51    20    40   50    20     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   50  510    50    22   51    20    40   50    20     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   71 xxxx xxxxx   560 xxxx xxxxx   460  765    36  xxxx xxxx xxxxx
Potent Cap.: 1542 xxxx xxxxx  1021 xxxx xxxxx   535  336  1036  xxxx xxxx xxxxx
Move Cap.:   1542 xxxx xxxxx  1021 xxxx xxxxx   512  317  1036  xxxx xxxx xxxxx
Volume/Cap:  0.03 xxxx  xxxx  0.02 xxxx  xxxx  0.08 0.16  0.02  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx   8.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  431 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx   0.1 xxxx xxxxx xxxxx  1.0 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx   8.6 xxxx xxxxx xxxxx 16.2 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     A    *     *     *    C     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx             16.2           xxxxxx
ApproachLOS:         *                *                C                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   50  510    50    22   51    20    40   50    20     0    0     0
ApproachDel:    xxxxxx           xxxxxx             16.2           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.5]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=110]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=813]
   SUCCEED - Total volume greater than or equal to 650 for intersection
             with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   50  510    50    22   51    20    40   50    20     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            703
Minor Approach Volume:          110
Minor Approach Volume Threshold: 406
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cummulative AM

Intersection #5: Birch St & Sheridan Ave



Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.355
Avg Crit Del (sec/veh): 5.4
Avg Delay (sec/veh): 5.4
LOS: E

```
Street Name:             Birch St                        Sheridan Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     170  560   300    30   20    10    10   50    10    20   20    10
Growth 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
Initial Bse:  170  560   300    30   20    10    10   50    10    20   20    10
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  170  560   300    30   20    10    10   50    10    20   20    10
User 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
PHF 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
PHF Volume:   170  560   300    30   20    10    10   50    10    20   20    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  170  560   300    30   20    10    10   50    10    20   20    10
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   30 xxxx xxxxx   860 xxxx xxxxx  1150 1285    15  1145 1140   710
Potent Cap.: 1596 xxxx xxxxx   790 xxxx xxxxx   177  166  1070   178  203   437
Move Cap.:   1596 xxxx xxxxx   790 xxxx xxxxx   139  141  1070   114  172   437
Volume/Cap:  0.11 xxxx  xxxx  0.04 xxxx  xxxx  0.07 0.35  0.01  0.18 0.12  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.4 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.5 xxxx xxxxx   9.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  161 xxxxx  xxxx  159 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx  2.0 xxxxx xxxxx  1.3 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   9.7 xxxx xxxxx xxxxx 43.7 xxxxx xxxxx 37.8 xxxxx
Shared LOS:     *    *     *     A    *     *     *    E     *     *    E     *
ApproachDel:    xxxxxx           xxxxxx             43.7             37.8
ApproachLOS:         *                *                E                E
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  170  560   300    30   20    10    10   50    10    20   20    10
ApproachDel:    xxxxxx           xxxxxx             43.7             37.8
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.8]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=70]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1210]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.5]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=50]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1210]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
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"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  170  560   300    30   20    10    10   50    10    20   20    10
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1090
Minor Approach Volume:           70
Minor Approach Volume Threshold: 255
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```
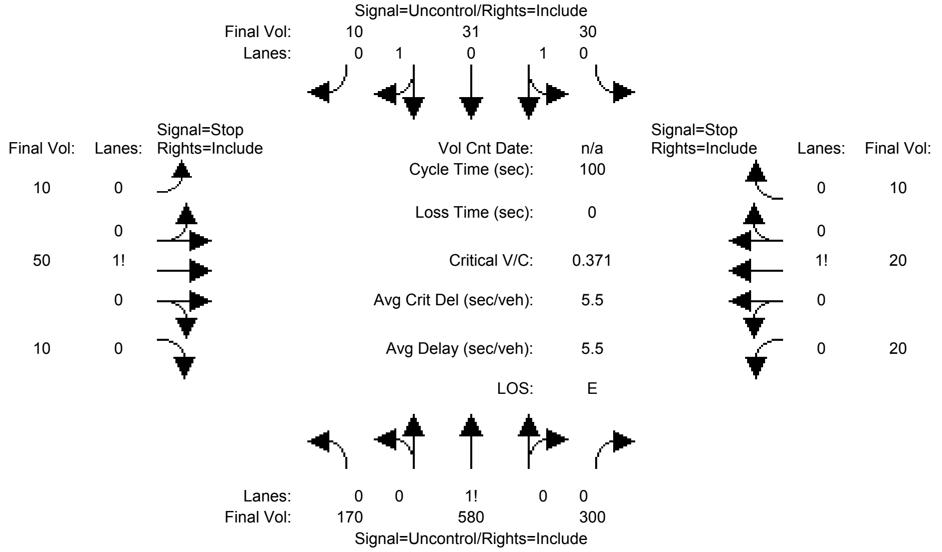

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cummulative+Project AM

Intersection #5: Birch St & Sheridan Ave



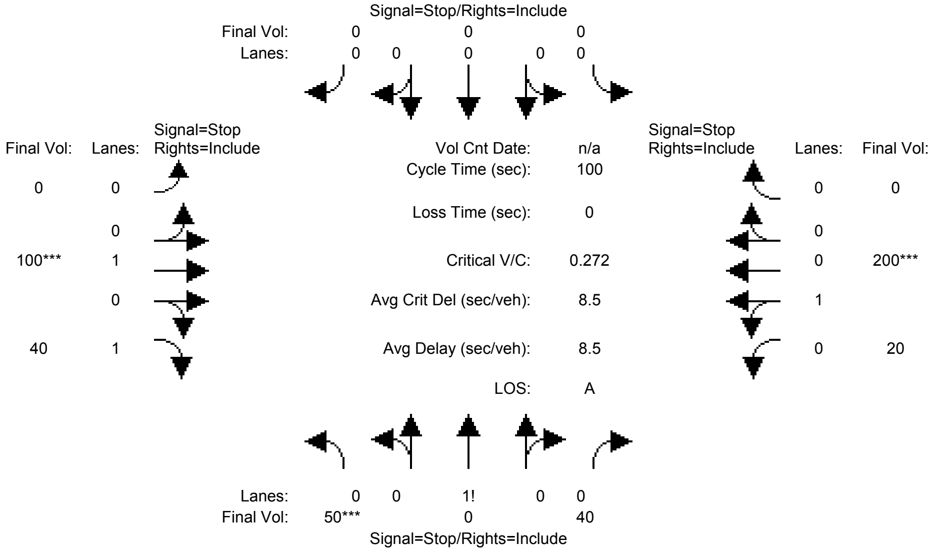
```
                              Signal=Uncontrol/Rights=Include
                   Final Vol:    10          31          30
                       Lanes:     0    1      0      1    0

            Signal=Stop                                               Signal=Stop
Final Vol: Lanes: Rights=Include          Vol Cnt Date:      n/a     Rights=Include    Lanes:  Final Vol:
                                      Cycle Time (sec):      100
   10        0                                                                           0       10

                                       Loss Time (sec):       0
             0                                                                           0

   50        1!                           Critical V/C:     0.371                        1!      20

             0                      Avg Crit Del (sec/veh):   5.5                        0

   10        0                        Avg Delay (sec/veh):    5.5                        0       20

                                                   LOS:        E

                       Lanes:     0    0      1!     0    0
                   Final Vol:   170          580         300
                              Signal=Uncontrol/Rights=Include
```

```
Street Name:               Birch St                          Sheridan Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      170  560   300    30   20    10    10   50    10    20   20    10
Growth 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
Initial Bse:   170  560   300    30   20    10    10   50    10    20   20    10
Added Vol:       0   20     0     0   11     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   170  580   300    30   31    10    10   50    10    20   20    10
User 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
PHF 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
PHF Volume:    170  580   300    30   31    10    10   50    10    20   20    10
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   170  580   300    30   31    10    10   50    10    20   20    10
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:   2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:    41 xxxx xxxxx   880 xxxx xxxxx  1181 1316    21  1171 1171   730
Potent Cap.:  1581 xxxx xxxxx   777 xxxx xxxxx   168  159  1063   171  194   426
Move Cap.:    1581 xxxx xxxxx   777 xxxx xxxxx   132  135  1063   107  164   426
Volume/Cap:   0.11 xxxx  xxxx  0.04 xxxx  xxxx  0.08 0.37  0.01  0.19 0.12  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.4 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:   7.6 xxxx xxxxx   9.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  153 xxxxx  xxxx  151 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx  2.1 xxxxx xxxxx  1.3 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   9.8 xxxx xxxxx xxxxx 46.8 xxxxx xxxxx 40.3 xxxxx
Shared LOS:      *    *     *     A    *     *     *    E     *     *    E     *
ApproachDel:      xxxxxx           xxxxxx              46.8              40.3
ApproachLOS:         *                *                  E                 E
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  170  580   300    30   31    10    10   50    10    20   20    10
ApproachDel:    xxxxxx           xxxxxx             46.8             40.3
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.9]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=70]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1241]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.6]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=50]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=1241]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:  170  580   300    30   31    10    10   50    10    20   20    10
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             1121
Minor Approach Volume:           70
Minor Approach Volume Threshold: 245
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cummulative AM

Intersection #6: Ash St & California Ave

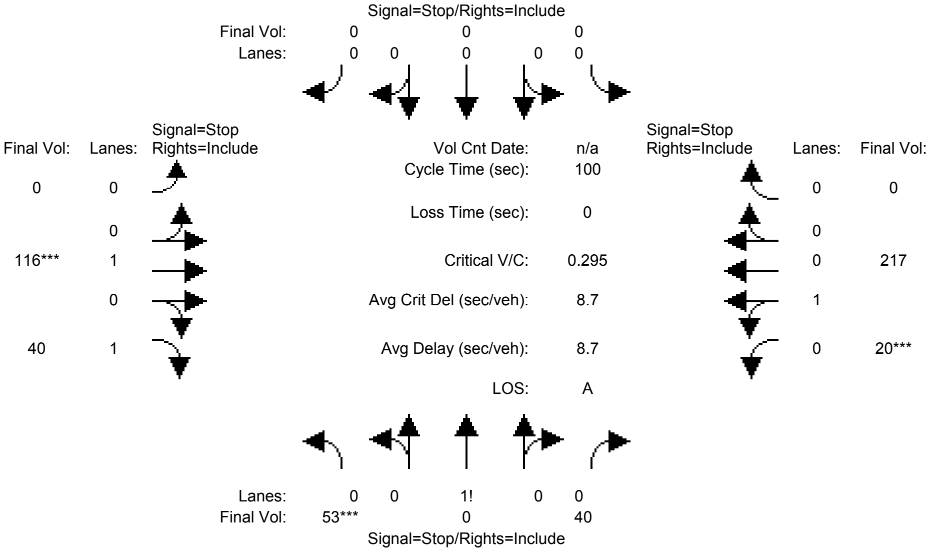


```
Street Name:                 Ash St                        California Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      50    0    40     0    0     0     0  100    40    20  200     0
Growth 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
Initial Bse:   50    0    40     0    0     0     0  100    40    20  200     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   50    0    40     0    0     0     0  100    40    20  200     0
User 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
PHF 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
PHF Volume:    50    0    40     0    0     0     0  100    40    20  200     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   50    0    40     0    0     0     0  100    40    20  200     0
PCE 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
MLF 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
FinalVolume:   50    0    40     0    0     0     0  100    40    20  200     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.56 0.00  0.44  0.00 0.00  0.00  0.00 1.00  1.00  0.09 0.91  0.00
Final Sat.:   418    0   334     0    0     0     0  726   846    74  736     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.12 xxxx  0.12  xxxx xxxx  xxxx  xxxx 0.14  0.05  0.27 0.27  xxxx
Crit Moves:  ****                                   ****              ****
Delay/Veh:    8.1  0.0   8.1   0.0  0.0   0.0   0.0  8.3   7.1   9.0  9.0   0.0
Delay 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
AdjDel/Veh:   8.1  0.0   8.1   0.0  0.0   0.0   0.0  8.3   7.1   9.0  9.0   0.0
LOS by Move:    A    *     A     *    *     *     *    A     A     A    A     *
ApproachDel:       8.1           xxxxxx              8.0              9.0
Delay Adj:        1.00            xxxxx             1.00             1.00
ApprAdjDel:        8.1           xxxxxx              8.0              9.0
LOS by Appr:         A                *                A                A
AllWayAvgQ:   0.1  0.1   0.1   0.0  0.0   0.0   0.0  0.2   0.0   0.4  0.4   0.4
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #6 Ash St & California Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
Initial Vol:   50    0    40     0    0     0     0  100    40    20  200     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             360
Minor Approach Volume:           90
Minor Approach Volume Threshold: 637
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cummulative+Project AM

Intersection #6: Ash St & California Ave



```
Street Name:                Ash St                        California Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      50    0    40     0    0     0     0  100    40    20  200     0
Growth 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
Initial Bse:   50    0    40     0    0     0     0  100    40    20  200     0
Added Vol:      3    0     0     0    0     0     0   16     0     0   17     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   53    0    40     0    0     0     0  116    40    20  217     0
User 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
PHF 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
PHF Volume:    53    0    40     0    0     0     0  116    40    20  217     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   53    0    40     0    0     0     0  116    40    20  217     0
PCE 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
MLF 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
FinalVolume:   53    0    40     0    0     0     0  116    40    20  217     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.57 0.00  0.43  0.00 0.00  0.00  0.00 1.00  1.00  0.08 0.92  0.00
Final Sat.:   419    0   316     0    0     0     0  723   841    68  737     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.13 xxxx  0.13  xxxx xxxx  xxxx  xxxx 0.16  0.05  0.29 0.29  xxxx
Crit Moves:  ****                                   ****        ****
Delay/Veh:    8.2  0.0   8.2   0.0  0.0   0.0   0.0  8.5   7.1   9.2  9.2   0.0
Delay 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
AdjDel/Veh:   8.2  0.0   8.2   0.0  0.0   0.0   0.0  8.5   7.1   9.2  9.2   0.0
LOS by Move:    A    *     A     *    *     *     *    A     A     A    A     *
ApproachDel:       8.2           xxxxxx              8.1              9.2
Delay Adj:        1.00            xxxxx             1.00             1.00
ApprAdjDel:        8.2           xxxxxx              8.1              9.2
LOS by Appr:         A                *                A                A
AllWayAvgQ:   0.1  0.1   0.1   0.0  0.0   0.0   0.0  0.2   0.0   0.4  0.4   0.4
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #6 Ash St & California Ave
********************************************************************************
```

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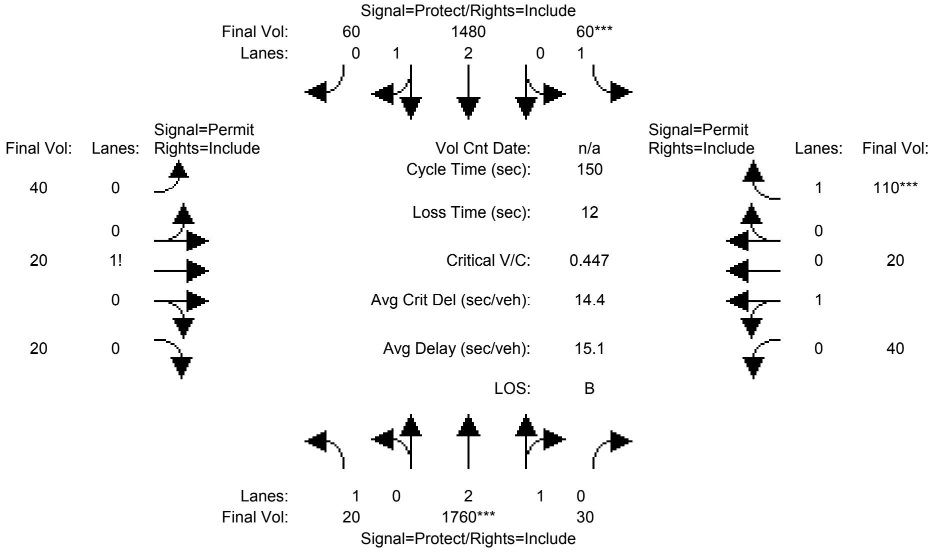
```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
Initial Vol:   53    0    40     0    0     0     0  116    40    20  217     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            393
Minor Approach Volume:          93
Minor Approach Volume Threshold: 607
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative AM

Intersection #7: ECR & Cambridge Ave



```
Street Name:                  ECR                              Cambridge Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      20 1760    30    60 1480    60    40   20    20    40   20   110
Growth 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
Initial Bse:   20 1760    30    60 1480    60    40   20    20    40   20   110
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   20 1760    30    60 1480    60    40   20    20    40   20   110
User 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
PHF 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
PHF Volume:    20 1760    30    60 1480    60    40   20    20    40   20   110
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   20 1760    30    60 1480    60    40   20    20    40   20   110
PCE 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
MLF 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
FinalVolume:   20 1760    30    60 1480    60    40   20    20    40   20   110
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.95  0.05  1.00 2.87  0.13  0.51 0.23  0.26  0.68 0.32  1.00
Final Sat.:  1750 5596    95  1750 5460   221   893  446   446  1198  599  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.31  0.31  0.03 0.27  0.27  0.04 0.04  0.04  0.03 0.03  0.06
Crit Moves:       ****        ****                                           ****
Green Time:  17.2  105 105.4  11.5 99.8  99.8  21.1 21.1  21.1  21.1 21.1  21.1
Volume/Cap:  0.10 0.45  0.45  0.45 0.41  0.41  0.32 0.32  0.32  0.24 0.24  0.45
Uniform Del: 59.5  9.7   9.7  66.2 11.5  11.5  58.0 58.0  58.0  57.3 57.3  59.1
IncremntDel:  0.2  0.1   0.1   2.4  0.1   0.1   0.7  0.7   0.7   0.5  0.5   1.3
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   59.7  9.7   9.7  68.6 11.6  11.6  58.7 58.7  58.7  57.8 57.8  60.4
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  59.7  9.7   9.7  68.6 11.6  11.6  58.7 58.7  58.7  57.8 57.8  60.4
LOS by Move:   E+    A     A     E   B+    B+    E+   E+    E+    E+   E+     E
HCM2kAvgQ:      1   12    12     3   11    11     4    4     4     3    3     5
Note: Queue reported is the number of cars per lane.
```

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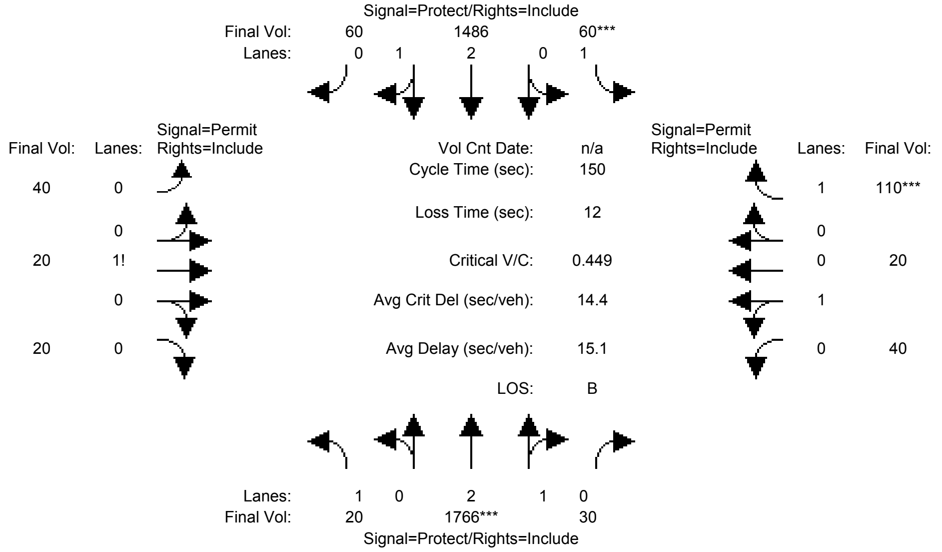
Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative+Project AM

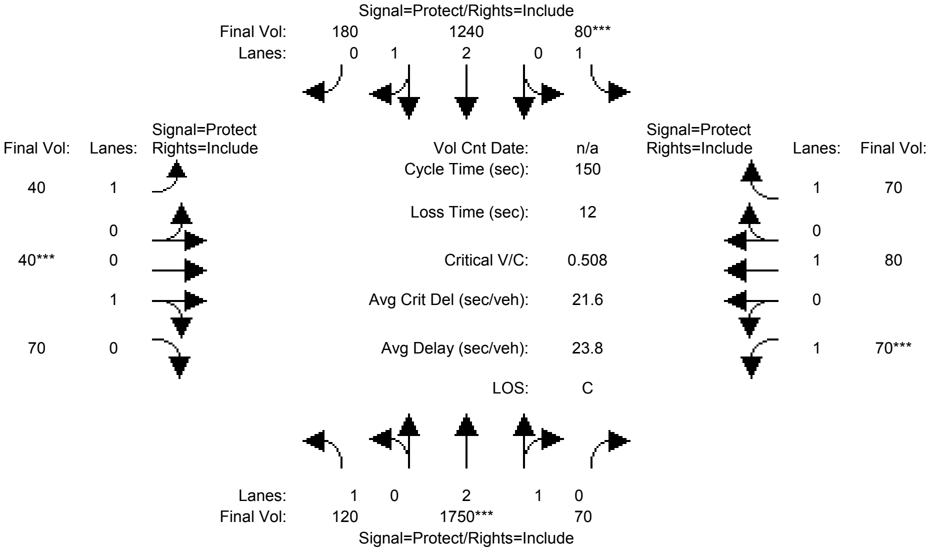
Intersection #7: ECR & Cambridge Ave



```
Street Name:                  ECR                         Cambridge Ave
Approach:      North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      20 1760    30    60 1480    60    40   20    20    40   20   110
Growth 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
Initial Bse:   20 1760    30    60 1480    60    40   20    20    40   20   110
Added Vol:      0    6     0     0    6     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   20 1766    30    60 1486    60    40   20    20    40   20   110
User 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
PHF 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
PHF Volume:    20 1766    30    60 1486    60    40   20    20    40   20   110
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   20 1766    30    60 1486    60    40   20    20    40   20   110
PCE 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
MLF 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
FinalVolume:   20 1766    30    60 1486    60    40   20    20    40   20   110
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.95  0.05  1.00 2.87  0.13  0.51 0.23  0.26  0.68 0.32  1.00
Final Sat.:  1750 5597    95  1750 5461   220   893  446   446  1198  599  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.32  0.32  0.03 0.27  0.27  0.04 0.04  0.04  0.03 0.03  0.06
Crit Moves:       ****        ****                                            ****
Green Time:  17.1  106 105.5  11.5 99.9  99.9  21.0 21.0  21.0  21.0 21.0  21.0
Volume/Cap:  0.10 0.45  0.45  0.45 0.41  0.41  0.32 0.32  0.32  0.24 0.24  0.45
Uniform Del: 59.5  9.6   9.6  66.2 11.5  11.5  58.1 58.1  58.1  57.4 57.4  59.2
IncremntDel:  0.2  0.1   0.1   2.4  0.1   0.1   0.7  0.7   0.7   0.5  0.5   1.3
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   59.8  9.7   9.7  68.6 11.6  11.6  58.8 58.8  58.8  57.9 57.9  60.5
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  59.8  9.7   9.7  68.6 11.6  11.6  58.8 58.8  58.8  57.9 57.9  60.5
LOS by Move:   E+    A     A     E   B+    B+    E+   E+    E+    E+   E+     E
HCM2kAvgQ:      1   12    12     3   11    11     4    4     4     3    3     5
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative AM

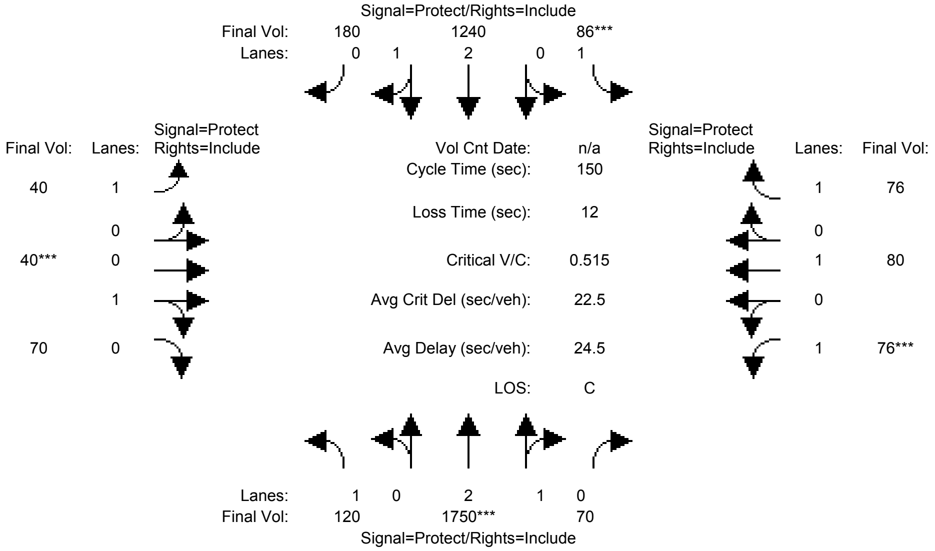
Intersection #8: ECR & California Ave



```
Street Name:                 ECR                             California Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     120 1750    70    80 1240   180    40   40    70    70   80    70
Growth 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
Initial Bse:  120 1750    70    80 1240   180    40   40    70    70   80    70
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  120 1750    70    80 1240   180    40   40    70    70   80    70
User 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
PHF 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
PHF Volume:   120 1750    70    80 1240   180    40   40    70    70   80    70
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  120 1750    70    80 1240   180    40   40    70    70   80    70
PCE 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
MLF 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
FinalVolume:  120 1750    70    80 1240   180    40   40    70    70   80    70
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.88  0.12  1.00 2.59  0.41  1.00 0.34  0.66  1.00 1.00  1.00
Final Sat.:  1750 5463   219  1750 4924   715  1750  655  1147  1750 1900  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.07 0.32  0.32  0.05 0.25  0.25  0.02 0.06  0.06  0.04 0.04  0.04
Crit Moves:       ****        ****                   ****        ****
Green Time:  23.1 94.6  94.6  13.5 85.0  85.0  12.3 18.0  18.0  11.8 17.6  17.6
Volume/Cap:  0.44 0.51  0.51  0.51 0.44  0.44  0.28 0.51  0.51  0.51 0.36  0.34
Uniform Del: 57.6 15.0  15.0  65.1 18.8  18.8  64.7 61.8  61.8  66.3 61.0  60.9
IncremntDel:  1.2  0.1   0.1   2.7  0.1   0.1   1.1  2.0   2.0   3.1  1.0   1.0
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   58.8 15.2  15.2  67.8 18.9  18.9  65.8 63.8  63.8  69.4 62.0  61.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  58.8 15.2  15.2  67.8 18.9  18.9  65.8 63.8  63.8  69.4 62.0  61.9
LOS by Move:   E+    B     B     E   B-    B-     E    E     E     E    E     E
HCM2kAvgQ:      6   15    15     4   12    12     2    5     5     4    4     3
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative+Project AM

Intersection #8: ECR & California Ave



Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 0.515
Avg Crit Del (sec/veh): 22.5
Avg Delay (sec/veh): 24.5
LOS: C

```
Street Name:                  ECR                             California Ave
Approach:       North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     120 1750    70    80 1240   180    40   40    70    70   80    70
Growth 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
Initial Bse:  120 1750    70    80 1240   180    40   40    70    70   80    70
Added Vol:      0    0     0     6    0     0     0    0     0     6    0     6
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  120 1750    70    86 1240   180    40   40    70    76   80    76
User 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
PHF 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
PHF Volume:   120 1750    70    86 1240   180    40   40    70    76   80    76
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  120 1750    70    86 1240   180    40   40    70    76   80    76
PCE 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
MLF 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
FinalVolume:  120 1750    70    86 1240   180    40   40    70    76   80    76
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.88  0.12  1.00 2.59  0.41  1.00 0.34  0.66  1.00 1.00  1.00
Final Sat.:  1750 5463   219  1750 4924   715  1750  655  1147  1750 1900  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.07 0.32  0.32  0.05 0.25  0.25  0.02 0.06  0.06  0.04 0.04  0.04
Crit Moves:       ****        ****                   ****        ****
Green Time:  23.0 93.3  93.3  14.3 84.6  84.6  12.5 17.8  17.8  12.6 17.9  17.9
Volume/Cap:  0.45 0.52  0.52  0.52 0.45  0.45  0.27 0.52  0.52  0.52 0.35  0.36
Uniform Del: 57.7 15.8  15.8  64.5 19.1  19.1  64.5 62.1  62.1  65.7 60.7  60.8
IncremntDel:  1.2  0.1   0.1   2.8  0.1   0.1   1.0  2.2   2.2   3.1  0.9   1.1
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   58.9 15.9  15.9  67.3 19.2  19.2  65.5 64.2  64.2  68.9 61.7  61.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  58.9 15.9  15.9  67.3 19.2  19.2  65.5 64.2  64.2  68.9 61.7  61.9
LOS by Move:   E+    B     B     E   B-    B-     E    E     E     E    E     E
HCM2kAvgQ:      6   15    15     4   12    12     2    6     6     4    4     4
Note: Queue reported is the number of cars per lane.
```

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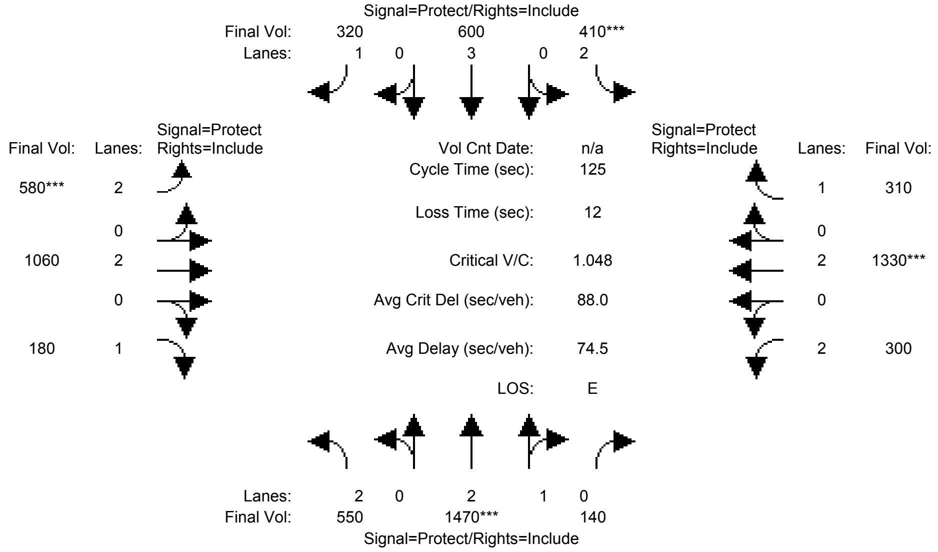
Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative AM

Intersection #9: El Camino Real & Page Mill Rd

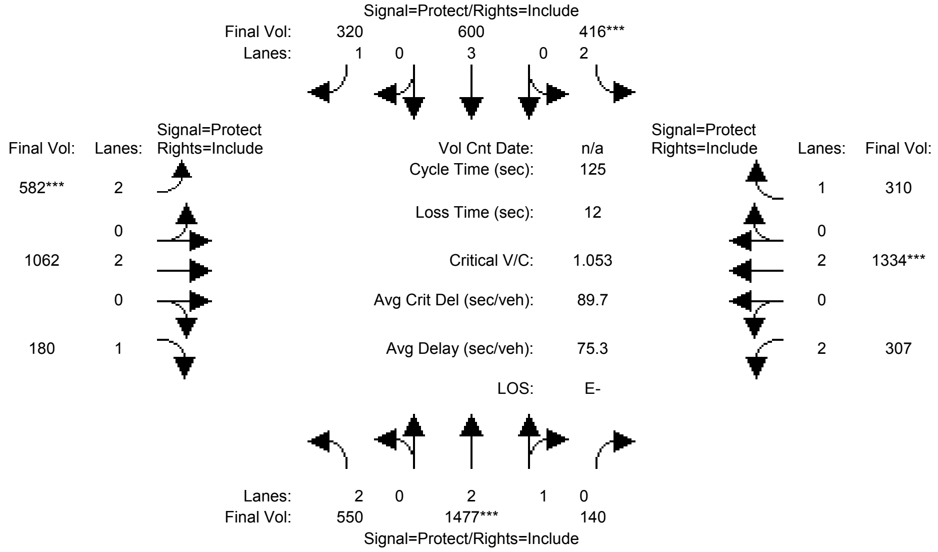


Vol Cnt Date: n/a
Cycle Time (sec): 125
Loss Time (sec): 12
Critical V/C: 1.048
Avg Crit Del (sec/veh): 88.0
Avg Delay (sec/veh): 74.5
LOS: E

```
Street Name:          El Camino Real                    Page Mill Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   30     0     7   30     0     7   28    28     7   30     0
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     550 1470   140   410  600   320   580 1060   180   300 1330   310
Growth 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
Initial Bse:  550 1470   140   410  600   320   580 1060   180   300 1330   310
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  550 1470   140   410  600   320   580 1060   180   300 1330   310
User 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
PHF 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
PHF Volume:   550 1470   140   410  600   320   580 1060   180   300 1330   310
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  550 1470   140   410  600   320   580 1060   180   300 1330   310
PCE 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
MLF 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
FinalVolume:  550 1470   140   410  600   320   580 1060   180   300 1330   310
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.83 1.00  0.97  0.83 1.00  0.97  0.83 1.00  0.92  0.69 1.00  0.97
Lanes:       2.00 2.73  0.27  2.00 3.00  1.00  2.00 2.00  1.00  2.00 2.00  1.00
Final Sat.:  3150 5191   494  3150 5700  1847  3150 3800  1750  2625 3800  1847
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.17 0.28  0.28  0.13 0.11  0.17  0.18 0.28  0.10  0.11 0.35  0.17
Crit Moves:       ****        ****             ****                  ****
Green Time:  19.3 33.8  33.8  15.5 30.0  30.0  22.0 45.2  45.2  18.5 41.7  41.7
Volume/Cap:  1.13 1.05  1.05  1.05 0.44  0.72  1.05 0.77  0.28  0.77 1.05  0.50
Uniform Del: 52.9 45.6  45.6  54.7 40.3  43.7  51.5 35.3  28.4  51.2 41.6  33.3
IncremntDel: 82.0 36.7  36.7  58.6  1.0   9.8  51.4  4.3   1.1  13.8 38.8   2.9
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:  134.8 82.3  82.3 113.4 41.4  53.4 103.0 39.6  29.5  65.0 80.5  36.2
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh: 134.8 82.3  82.3 113.4 41.4  53.4 103.0 39.6  29.5  65.0 80.5  36.2
LOS by Move:    F    F     F     F    D    D-     F    D     C     E    F    D+
HCM2kAvgQ:     21   29    30    15    7    13    20   19     5     9   34    10
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative+Project AM

Intersection #9: El Camino Real & Page Mill Rd

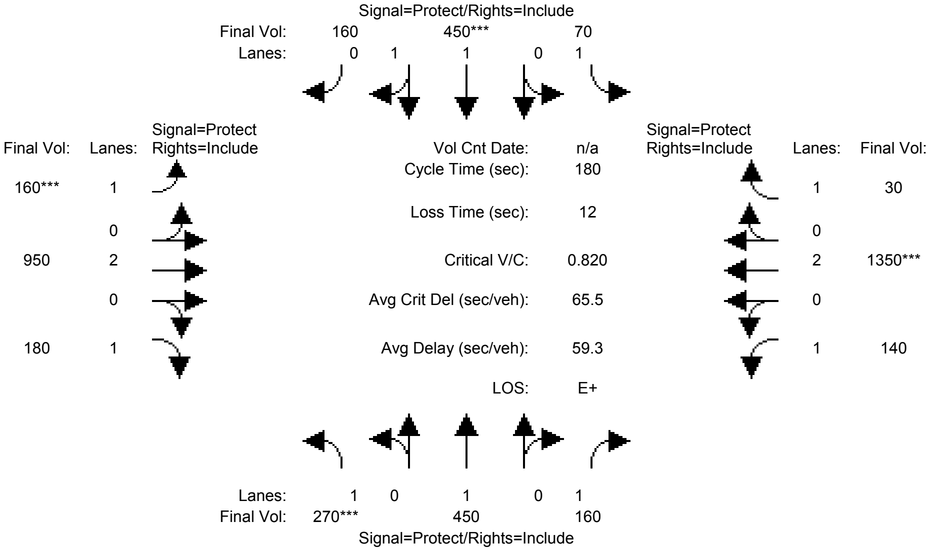


```
                           Signal=Protect/Rights=Include
                Final Vol:    320          600          416***
                    Lanes:      1    0      3      0    2

            Signal=Protect                                    Signal=Protect
Final Vol: Lanes: Rights=Include      Vol Cnt Date:      n/a  Rights=Include   Lanes:  Final Vol:
                                  Cycle Time (sec):      125
 582***      2                                                                   1       310
                                   Loss Time (sec):       12
             0                                                                   0
 1062        2                        Critical V/C:    1.053                     2       1334***
             0               Avg Crit Del (sec/veh):    89.7                     0
 180         1                  Avg Delay (sec/veh):    75.3                     2       307
                                                LOS:      E-

                    Lanes:      2    0      2      1    0
                Final Vol:    550        1477***       140
                           Signal=Protect/Rights=Include
```

```
Street Name:          El Camino Real                    Page Mill Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   30     0     7   30     0     7   28    28     7   30     0
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     550 1470   140   410  600   320   580 1060   180   300 1330   310
Growth 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
Initial Bse:  550 1470   140   410  600   320   580 1060   180   300 1330   310
Added Vol:      0    7     0     6    0     0     2    2     0     7    4     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  550 1477   140   416  600   320   582 1062   180   307 1334   310
User 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
PHF 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
PHF Volume:   550 1477   140   416  600   320   582 1062   180   307 1334   310
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  550 1477   140   416  600   320   582 1062   180   307 1334   310
PCE 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
MLF 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
FinalVolume:  550 1477   140   416  600   320   582 1062   180   307 1334   310
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.83 1.00  0.97  0.83 1.00  0.97  0.83 1.00  0.92  0.69 1.00  0.97
Lanes:       2.00 2.73  0.27  2.00 3.00  1.00  2.00 2.00  1.00  2.00 2.00  1.00
Final Sat.:  3150 5194   492  3150 5700  1847  3150 3800  1750  2625 3800  1847
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.17 0.28  0.28  0.13 0.11  0.17  0.18 0.28  0.10  0.12 0.35  0.17
Crit Moves:       ****        ****             ****                  ****
Green Time:  19.4 33.7  33.7  15.7 30.0  30.0  21.9 44.8  44.8  18.8 41.7  41.7
Volume/Cap:  1.12 1.05  1.05  1.05 0.44  0.72  1.05 0.78  0.29  0.78 1.05  0.50
Uniform Del: 52.8 45.6  45.6  54.7 40.3  43.7  51.5 35.7  28.7  51.1 41.7  33.4
IncremntDel: 79.3 38.5  38.5  60.0  1.0   9.8  53.1  4.5   1.1  14.1 40.6   2.9
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:  132.1 84.1  84.1 114.7 41.4  53.4 104.6 40.2  29.8  65.3 82.3  36.3
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh: 132.1 84.1  84.1 114.7 41.4  53.4 104.6 40.2  29.8  65.3 82.3  36.3
LOS by Move:    F    F     F     F    D    D-     F    D     C     E    F    D+
HCM2kAvgQ:     21   29    30    15    7    13    20   19     5     9   35    10
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative AM

Intersection #10: PAGEMILL-OREGON EXPWY/MIDDLEFIELD RD

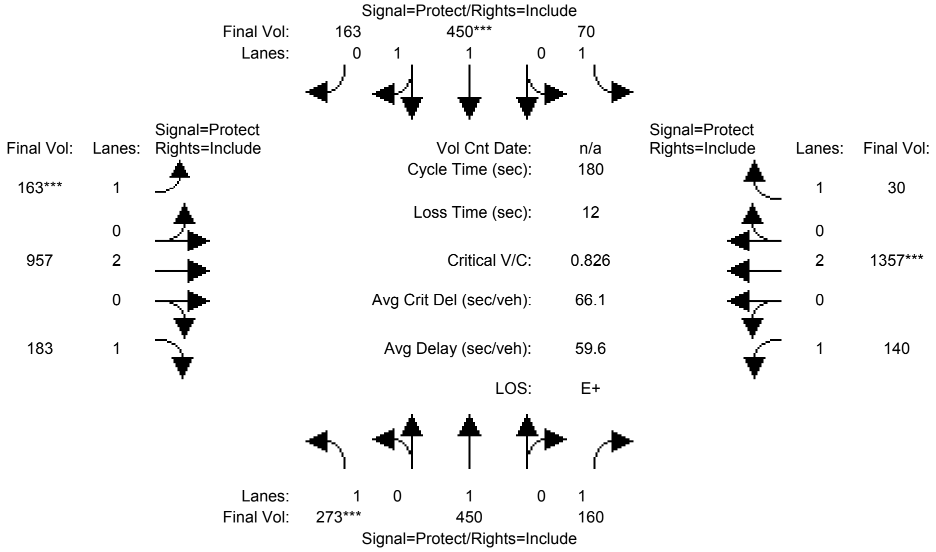


```
                    Signal=Protect/Rights=Include
         Final Vol:   160        450***        70
             Lanes:      0    1     1      0    1

                   Signal=Protect                                     Signal=Protect
Final Vol:  Lanes: Rights=Include     Vol Cnt Date:     n/a        Rights=Include      Lanes:  Final Vol:
                                     Cycle Time (sec):  180
  160***      1                                                                           1        30
                                      Loss Time (sec):   12
              0                                                                           0
   950        2                           Critical V/C:  0.820                            2      1350***
              0                  Avg Crit Del (sec/veh):  65.5                            0
   180        1                     Avg Delay (sec/veh):  59.3                            1       140
                                                   LOS:  E+

             Lanes:      1    0     1      0    1
         Final Vol:   270***     450           160
                    Signal=Protect/Rights=Include
```

```
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:      7   10    10     7   10    10     7   10    10     7   10    10
Y+R:           4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      270  450   160    70  450   160   160  950   180   140 1350    30
Growth 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
Initial Bse:   270  450   160    70  450   160   160  950   180   140 1350    30
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   270  450   160    70  450   160   160  950   180   140 1350    30
User 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
PHF 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
PHF Volume:    270  450   160    70  450   160   160  950   180   140 1350    30
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   270  450   160    70  450   160   160  950   180   140 1350    30
PCE 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
MLF 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
FinalVolume:   270  450   160    70  450   160   160  950   180   140 1350    30
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:   0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:        1.00 1.00  1.00  1.00 1.44  0.56  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.:   1750 1900  1750  1750 2742   975  1750 3800  1750  1750 3800  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.15 0.24  0.09  0.04 0.16  0.16  0.09 0.25  0.10  0.08 0.36  0.02
Crit Moves:   ****                   ****       ****                   ****
Green Time:   33.9 59.8  59.8  10.1 36.0  36.0  20.1 74.3  74.3  23.8 78.0  78.0
Volume/Cap:   0.82 0.71  0.28  0.71 0.82  0.82  0.82 0.61  0.25  0.61 0.82  0.04
Uniform Del:  70.1 52.6  44.2  83.5 68.9  68.9  78.2 41.4  34.6  73.7 44.8  29.4
IncremntDel:  19.9  6.7   1.2  35.6  9.8   9.8  30.5  1.7   0.8  11.2  4.7   0.1
InitQueuDel:   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:    90.1 59.3  45.3 119.2 78.7  78.7 108.7 43.1  35.4  84.9 49.5  29.5
User DelAdj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   90.1 59.3  45.3 119.2 78.7  78.7 108.7 43.1  35.4  84.9 49.5  29.5
LOS by Move:     F   E+     D     F   E-    E-     F    D    D+     F    D     C
HCM2kAvgQ:      17   22     7     5   18    18    11   20     7     9   33     1
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative+Project AM

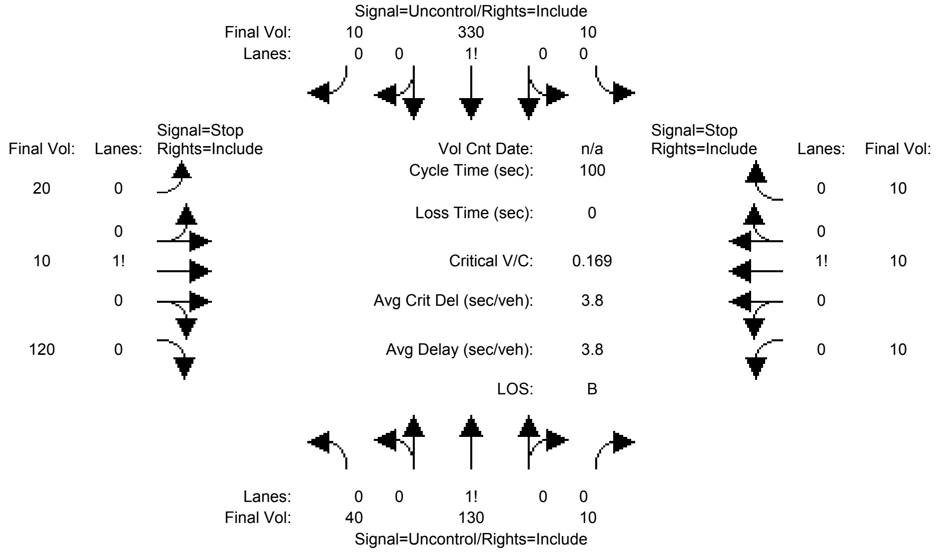
Intersection #10: PAGEMILL-OREGON EXPWY/MIDDLEFIELD RD



```
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:    7   10    10     7   10    10     7   10    10     7   10    10
Y+R:         4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     270  450   160    70  450   160   160  950   180   140 1350    30
Growth 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
Initial Bse:  270  450   160    70  450   160   160  950   180   140 1350    30
Added Vol:      3    0     0     0    0     3     3    7     3     0    7     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  273  450   160    70  450   163   163  957   183   140 1357    30
User 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
PHF 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
PHF Volume:   273  450   160    70  450   163   163  957   183   140 1357    30
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  273  450   160    70  450   163   163  957   183   140 1357    30
PCE 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
MLF 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
FinalVolume:  273  450   160    70  450   163   163  957   183   140 1357    30
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 1.00  1.00  1.00 1.44  0.56  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.:  1750 1900  1750  1750 2727   988  1750 3800  1750  1750 3800  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.16 0.24  0.09  0.04 0.16  0.16  0.09 0.25  0.10  0.08 0.36  0.02
Crit Moves:  ****                  ****        ****                  ****
Green Time:  34.0 59.8  59.8  10.1 35.9  35.9  20.3 74.4  74.4  23.6 77.8  77.8
Volume/Cap:  0.83 0.71  0.28  0.71 0.83  0.83  0.83 0.61  0.25  0.61 0.83  0.04
Uniform Del: 70.2 52.6  44.2  83.5 69.0  69.0  78.1 41.4  34.6  73.8 45.1  29.5
IncremntDel: 20.5  6.7   1.2  35.6 10.2  10.2  31.1  1.8   0.8  11.5  4.9   0.1
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   90.7 59.3  45.3 119.2 79.2  79.2 109.2 43.1  35.4  85.3 50.0  29.6
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  90.7 59.3  45.3 119.2 79.2  79.2 109.2 43.1  35.4  85.3 50.0  29.6
LOS by Move:    F   E+     D     F   E-    E-     F    D    D+     F    D     C
HCM2kAvgQ:     18   22     7     5   18    18    12   20     7     9   34     1
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cummulative PM

Intersection #1: Park Blvd & Sherman Ave



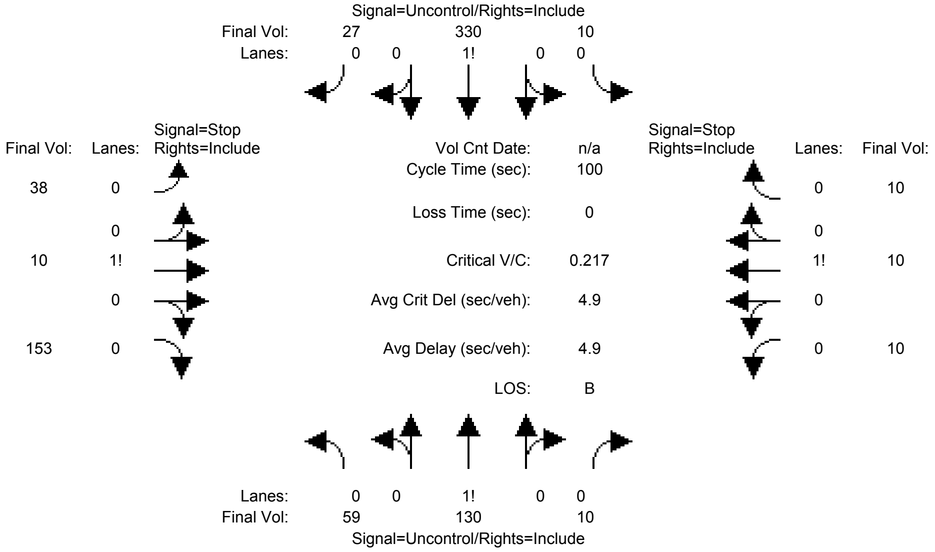
Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.169
Avg Crit Del (sec/veh): 3.8
Avg Delay (sec/veh): 3.8
LOS: B

```
Street Name:              Park Blvd                        Sherman Ave
Approach:      North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      40  130    10    10  330    10    20   10   120    10   10    10
Growth 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
Initial Bse:   40  130    10    10  330    10    20   10   120    10   10    10
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   40  130    10    10  330    10    20   10   120    10   10    10
User 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
PHF 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
PHF Volume:    40  130    10    10  330    10    20   10   120    10   10    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   40  130    10    10  330    10    20   10   120    10   10    10
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  340 xxxx xxxxx   140 xxxx xxxxx   580  575   335   635  575   135
Potent Cap.: 1230 xxxx xxxxx  1456 xxxx xxxxx   429  431   712   394  431   919
Move Cap.:   1230 xxxx xxxxx  1456 xxxx xxxxx   404  414   712   312  414   919
Volume/Cap:  0.03 xxxx  xxxx  0.01 xxxx  xxxx  0.05 0.02  0.17  0.03 0.02  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.0 xxxx xxxxx   7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  619 xxxxx  xxxx  447 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.9 xxxxx xxxxx  0.2 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 12.7 xxxxx xxxxx 13.6 xxxxx
Shared LOS:     *    *     *     *    *     *     *    B     *     *    B     *
ApproachDel:     xxxxxx           xxxxxx             12.7              13.6
ApproachLOS:          *                *                B                 B
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   40  130    10    10  330    10    20   10   120    10   10    10
ApproachDel:    xxxxxx           xxxxxx              12.7             13.6
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.5]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=150]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=710]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=30]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=710]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   40  130    10    10  330    10    20   10   120    10   10    10
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             530
Minor Approach Volume:           150
Minor Approach Volume Threshold: 389
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cummulative+Project PM

Intersection #1: Park Blvd & Sherman Ave



Signal=Uncontrol/Rights=Include
Final Vol: 27 330 10
Lanes: 0 0 1! 0 0

Signal=Stop
Rights=Include
Final Vol: 38, 10, 153
Lanes: 0, 0, 1!, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.217
Avg Crit Del (sec/veh): 4.9
Avg Delay (sec/veh): 4.9
LOS: B

Signal=Stop
Rights=Include
Lanes: 0, 0, 1!, 0, 0
Final Vol: 10, 10, 10

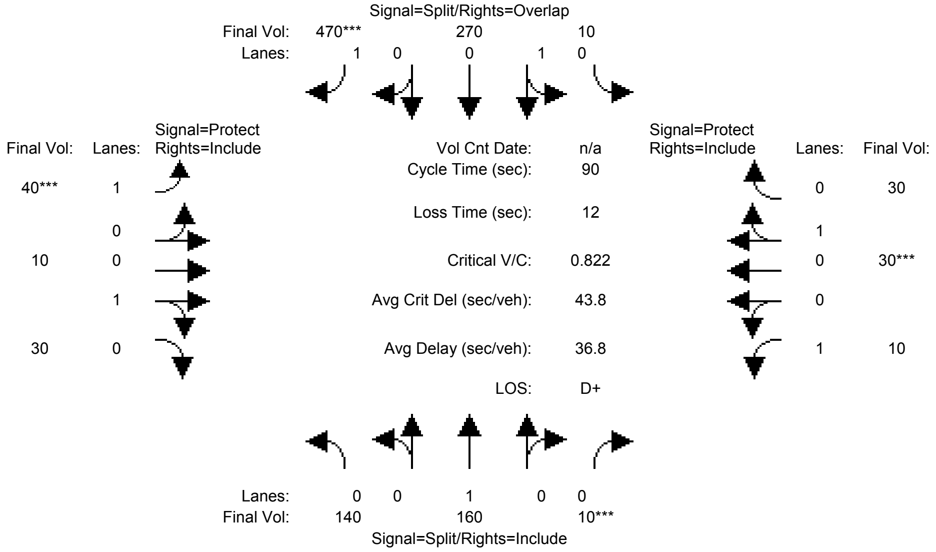
Lanes: 0 0 1! 0 0
Final Vol: 59 130 10
Signal=Uncontrol/Rights=Include

```
Street Name:              Park Blvd                        Sherman Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       40  130    10     10  330    10     20   10   120     10   10    10
Growth 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
Initial Bse:    40  130    10     10  330    10     20   10   120     10   10    10
Added Vol:      19    0     0      0    0    17     18    0    33      0    0     0
PasserByVol:     0    0     0      0    0     0      0    0     0      0    0     0
Initial Fut:    59  130    10     10  330    27     38   10   153     10   10    10
User 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
PHF 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
PHF Volume:     59  130    10     10  330    27     38   10   153     10   10    10
Reduct Vol:      0    0     0      0    0     0      0    0     0      0    0     0
FinalVolume:    59  130    10     10  330    27     38   10   153     10   10    10
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   4.1 xxxx xxxxx    4.1 xxxx xxxxx    7.1  6.5   6.2    7.1  6.5   6.2
FollowUpTim:   2.2 xxxx xxxxx    2.2 xxxx xxxxx    3.5  4.0   3.3    3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   357 xxxx xxxxx    140 xxxx xxxxx    627  622   344    698  630   135
Potent Cap.:  1213 xxxx xxxxx   1456 xxxx xxxxx    399  406   704    358  401   919
Move Cap.:    1213 xxxx xxxxx   1456 xxxx xxxxx    370  383   704    262  378   919
Volume/Cap:   0.05 xxxx  xxxx   0.01 xxxx  xxxx   0.10 0.03  0.22   0.04 0.03  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.2 xxxx xxxxx    0.0 xxxx xxxxx   xxxx xxxx xxxxx   xxxx xxxx xxxxx
Control Del:   8.1 xxxx xxxxx    7.5 xxxx xxxxx  xxxxx xxxx xxxxx  xxxxx xxxx xxxxx
LOS by Move:     A    *     *      A    *     *      *    *     *      *    *     *
Movement:      LT - LTR - RT     LT - LTR - RT     LT - LTR - RT     LT - LTR - RT
Shared Cap.:  xxxx xxxx xxxxx   xxxx xxxx xxxxx   xxxx  581 xxxxx   xxxx  398 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  1.5 xxxxx xxxxx  0.2 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 14.4 xxxxx xxxxx 14.8 xxxxx
Shared LOS:      *    *     *      *    *     *      *    B     *      *    B     *
ApproachDel:      xxxxxx            xxxxxx               14.4              14.8
ApproachLOS:           *                 *                  B                 B
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   59  130    10    10  330    27    38   10   153    10   10    10
ApproachDel:    xxxxxx           xxxxxx             14.4             14.8
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.8]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=201]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=797]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.1]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=30]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=797]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #1 Park Blvd & Sherman Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   59  130    10    10  330    27    38   10   153    10   10    10
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             566
Minor Approach Volume:           201
Minor Approach Volume Threshold: 371
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative PM

Intersection #2: Park Blvd & Page Mill Rd

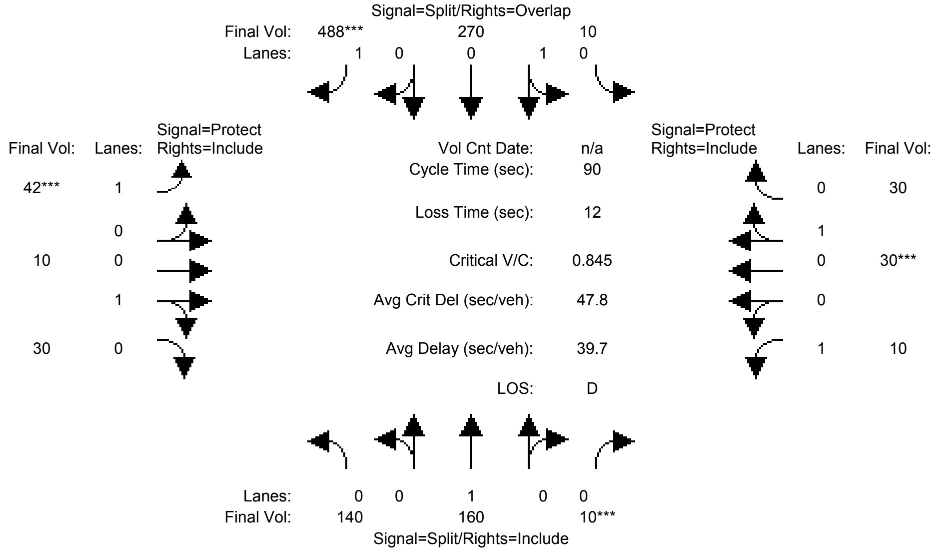


Vol Cnt Date: n/a
Cycle Time (sec): 90
Loss Time (sec): 12
Critical V/C: 0.822
Avg Crit Del (sec/veh): 43.8
Avg Delay (sec/veh): 36.8
LOS: D+

```
Street Name:                Park Blvd                        Page Mill Rd
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     140  160    10    10  270   470    40   10    30    10   30    30
Growth 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
Initial Bse:  140  160    10    10  270   470    40   10    30    10   30    30
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  140  160    10    10  270   470    40   10    30    10   30    30
User 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
PHF 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
PHF Volume:   140  160    10    10  270   470    40   10    30    10   30    30
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  140  160    10    10  270   470    40   10    30    10   30    30
PCE 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
MLF 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
FinalVolume:  140  160    10    10  270   470    40   10    30    10   30    30
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.90 0.97  0.88  0.92 1.00  0.49  0.88 0.89  0.75  0.88 0.93  0.81
Lanes:       0.47 0.50  0.03  0.04 0.96  1.00  1.00 0.22  0.78  1.00 0.47  0.53
Final Sat.:   802  917    57    68 1823   937  1663  371  1114  1663  819   819
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.17 0.17  0.17  0.15 0.15  0.50  0.02 0.03  0.03  0.01 0.04  0.04
Crit Moves:             ****             ****  ****                  ****
Green Time:  17.8 17.8  17.8  43.2 43.2  50.2   7.0 10.0  10.0   7.0 10.0  10.0
Volume/Cap:  0.88 0.88  0.88  0.31 0.31  0.90  0.31 0.24  0.24  0.08 0.33  0.33
Uniform Del: 35.1 35.1  35.1  14.3 14.3  17.7  39.2 36.5  36.5  38.5 36.9  36.9
IncremntDel: 22.1 22.1  22.1   0.2  0.2  18.3   1.4  0.8   0.8   0.3  1.1   1.1
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   57.2 57.2  57.2  14.5 14.5  36.0  40.6 37.3  37.3  38.8 38.0  38.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  57.2 57.2  57.2  14.5 14.5  36.0  40.6 37.3  37.3  38.8 38.0  38.0
LOS by Move:   E+   E+    E+     B    B    D+     D   D+    D+    D+   D+    D+
HCM2kAvgQ:     12   12    12     5    5    16     1    1     1     0    2     2
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative+Project PM

Intersection #2: Park Blvd & Page Mill Rd



Vol Cnt Date: n/a
Cycle Time (sec): 90
Loss Time (sec): 12
Critical V/C: 0.845
Avg Crit Del (sec/veh): 47.8
Avg Delay (sec/veh): 39.7
LOS: D

```
Street Name:              Park Blvd                          Page Mill Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     140  160    10    10  270   470    40   10    30    10   30    30
Growth 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
Initial Bse:  140  160    10    10  270   470    40   10    30    10   30    30
Added Vol:      0    0     0     0    0    18     2    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  140  160    10    10  270   488    42   10    30    10   30    30
User 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
PHF 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
PHF Volume:   140  160    10    10  270   488    42   10    30    10   30    30
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  140  160    10    10  270   488    42   10    30    10   30    30
PCE 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
MLF 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
FinalVolume:  140  160    10    10  270   488    42   10    30    10   30    30
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.90 0.97  0.88  0.92 1.00  0.49  0.88 0.89  0.75  0.88 0.93  0.81
Lanes:       0.47 0.50  0.03  0.04 0.96  1.00  1.00 0.22  0.78  1.00 0.47  0.53
Final Sat.:   802  917    57    68 1823   937  1663  371  1114  1663  819   819
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.17 0.17  0.17  0.15 0.15  0.52  0.03 0.03  0.03  0.01 0.04  0.04
Crit Moves:             ****              ****  ****                   ****
Green Time:  17.2 17.2  17.2  43.8 43.8  50.8   7.0 10.0  10.0   7.0 10.0  10.0
Volume/Cap:  0.91 0.91  0.91  0.30 0.30  0.92  0.32 0.24  0.24  0.08 0.33  0.33
Uniform Del: 35.6 35.6  35.6  13.9 13.9  17.9  39.3 36.5  36.5  38.5 36.9  36.9
IncremntDel: 27.6 27.6  27.6   0.2  0.2  22.0   1.5  0.8   0.8   0.3  1.1   1.1
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   63.2 63.2  63.2  14.1 14.1  39.8  40.7 37.3  37.3  38.8 38.0  38.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  63.2 63.2  63.2  14.1 14.1  39.8  40.7 37.3  37.3  38.8 38.0  38.0
LOS by Move:    E    E     E     B    B     D     D   D+    D+    D+   D+    D+
HCM2kAvgQ:     13   13    12     5    5    18     2    1     1     0    2     2
Note: Queue reported is the number of cars per lane.
```

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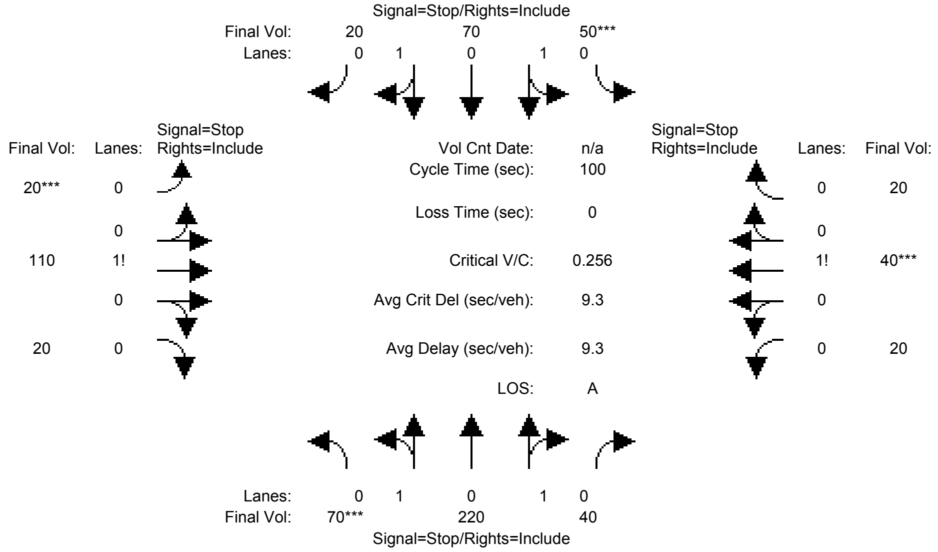
Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cummulative PM

Intersection #3: Birch St & Sherman Ave

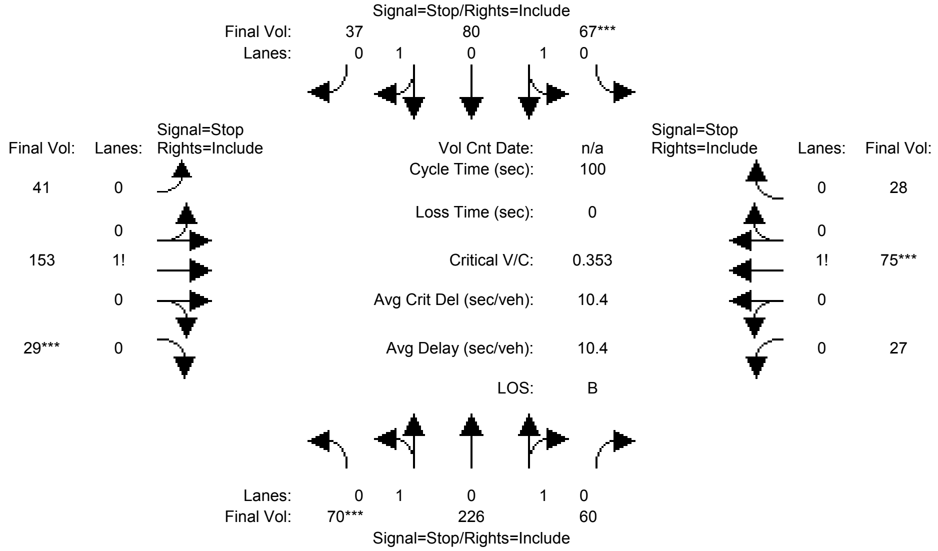


```
Street Name:             Birch St                        Sherman Ave
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      70  220    40    50   70    20    20  110    20    20   40    20
Growth 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
Initial Bse:   70  220    40    50   70    20    20  110    20    20   40    20
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   70  220    40    50   70    20    20  110    20    20   40    20
User 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
PHF 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
PHF Volume:    70  220    40    50   70    20    20  110    20    20   40    20
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   70  220    40    50   70    20    20  110    20    20   40    20
PCE 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
MLF 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
FinalVolume:   70  220    40    50   70    20    20  110    20    20   40    20
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.42 1.34  0.24  0.71 1.00  0.29  0.13 0.74  0.13  0.25 0.50  0.25
Final Sat.:   273  894   167   427  641   188    89  492    89   164  327   164
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.26 0.25  0.24  0.12 0.11  0.11  0.22 0.22  0.22  0.12 0.12  0.12
Crit Moves:  ****             ****             ****                  ****
Delay/Veh:    9.9  9.6   9.3   9.2  8.7   8.5   9.4  9.4   9.4   8.8  8.8   8.8
Delay 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
AdjDel/Veh:   9.9  9.6   9.3   9.2  8.7   8.5   9.4  9.4   9.4   8.8  8.8   8.8
LOS by Move:    A    A     A     A    A     A     A    A     A     A    A     A
ApproachDel:       9.6              8.9              9.4              8.8
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:        9.6              8.9              9.4              8.8
LOS by Appr:         A                A                A                A
AllWayAvgQ:   0.3  0.3   0.3   0.1  0.1   0.1   0.3  0.3   0.3   0.1  0.1   0.1
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #3 Birch St & Sherman Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   70  220    40    50   70    20    20  110    20    20   40    20
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            470
Minor Approach Volume:          150
Minor Approach Volume Threshold: 545
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cummulative+Project PM

Intersection #3: Birch St & Sherman Ave

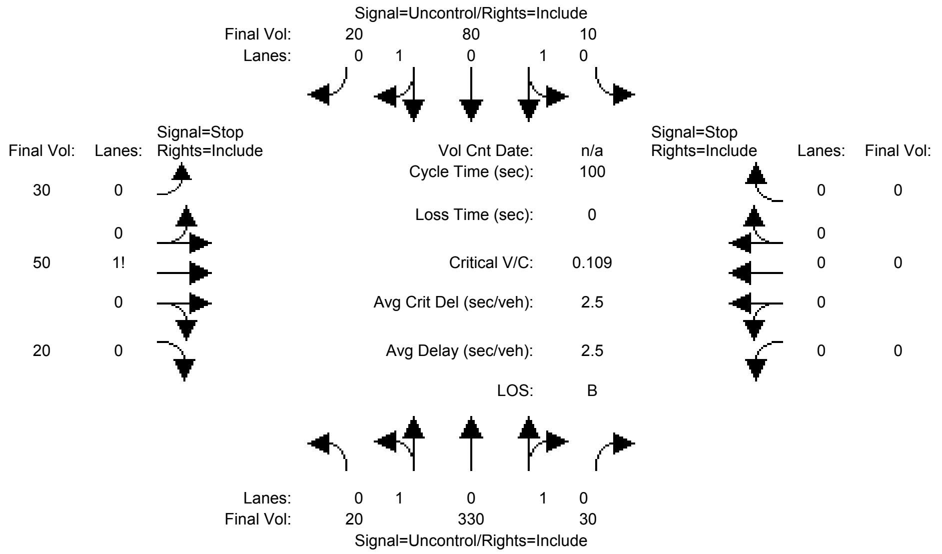


```
Street Name:             Birch St                        Sherman Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      70  220    40    50   70    20    20  110    20    20   40    20
Growth 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
Initial Bse:   70  220    40    50   70    20    20  110    20    20   40    20
Added Vol:      0    6    20    17   10    17    21   43     9     7   35     8
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   70  226    60    67   80    37    41  153    29    27   75    28
User 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
PHF 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
PHF Volume:    70  226    60    67   80    37    41  153    29    27   75    28
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   70  226    60    67   80    37    41  153    29    27   75    28
PCE 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
MLF 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
FinalVolume:   70  226    60    67   80    37    41  153    29    27   75    28
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.39 1.27  0.34  0.73 0.87  0.40  0.18 0.69  0.13  0.21 0.58  0.21
Final Sat.:   232  780   214   397  510   244   116  433    82   126  350   131
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.30 0.29  0.28  0.17 0.16  0.15  0.35 0.35  0.35  0.21 0.21  0.21
Crit Moves:  ****             ****                        ****        ****
Delay/Veh:   11.0 10.5  10.1  10.1  9.5   9.2  11.1 11.1  11.1   9.9  9.9   9.9
Delay 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
AdjDel/Veh:  11.0 10.5  10.1  10.1  9.5   9.2  11.1 11.1  11.1   9.9  9.9   9.9
LOS by Move:    B    B     B     B    A     A     B    B     B     A    A     A
ApproachDel:      10.6              9.7              11.1              9.9
Delay Adj:        1.00             1.00              1.00             1.00
ApprAdjDel:       10.6              9.7              11.1              9.9
LOS by Appr:         B                A                 B                A
AllWayAvgQ:   0.4  0.4   0.4   0.2  0.2   0.2   0.5  0.5   0.5   0.2  0.2   0.2
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #3 Birch St & Sherman Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   70  226    60    67   80    37    41  153    29    27   75    28
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             540
Minor Approach Volume:           223
Minor Approach Volume Threshold: 497
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cummulative PM

Intersection #4: Birch St & Grant Ave



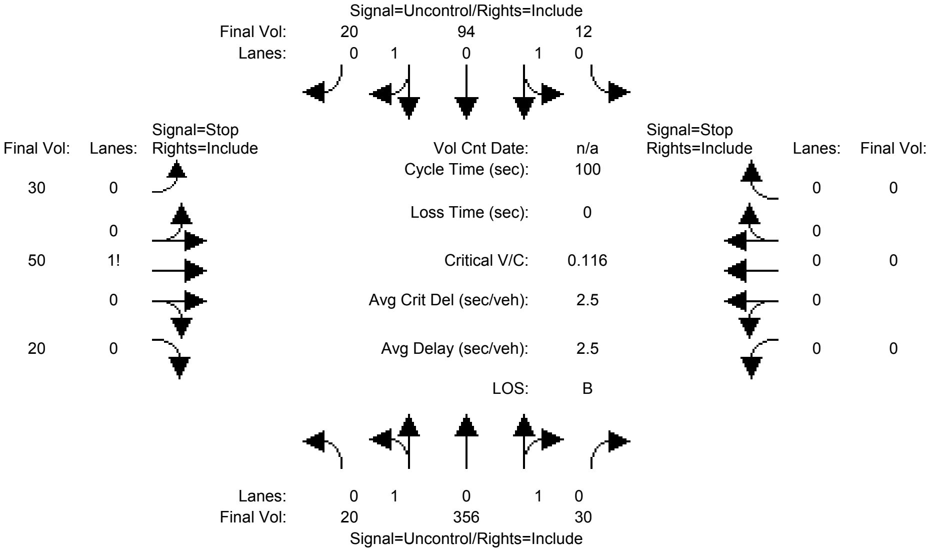
```
                              Signal=Uncontrol/Rights=Include
                  Final Vol:    20          80          10
                     Lanes:       0    1      0     1    0

                Signal=Stop                                        Signal=Stop
 Final Vol:  Lanes:  Rights=Include      Vol Cnt Date:      n/a    Rights=Include    Lanes:   Final Vol:
                                         Cycle Time (sec):  100
    30        0                                                                      0          0
                                         Loss Time (sec):    0
              0                                                                      0
    50        1!                         Critical V/C:     0.109                     0          0
              0                          Avg Crit Del (sec/veh): 2.5                 0
    20        0                          Avg Delay (sec/veh):    2.5                 0          0
                                         LOS:               B

                     Lanes:       0    1      0     1    0
                  Final Vol:    20          330         30
                              Signal=Uncontrol/Rights=Include
```

```
Street Name:                 Birch St                          Grant Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      20  330    30    10   80    20    30   50    20     0    0     0
Growth 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
Initial Bse:   20  330    30    10   80    20    30   50    20     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   20  330    30    10   80    20    30   50    20     0    0     0
User 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
PHF 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
PHF Volume:    20  330    30    10   80    20    30   50    20     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   20  330    30    10   80    20    30   50    20     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  100 xxxx xxxxx   360 xxxx xxxxx   315  510    50  xxxx xxxx xxxxx
Potent Cap.: 1505 xxxx xxxxx  1210 xxxx xxxxx   659  469  1014  xxxx xxxx xxxxx
Move Cap.:   1505 xxxx xxxxx  1210 xxxx xxxxx   648  459  1014  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  0.01 xxxx  xxxx  0.05 0.11  0.02  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx   8.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  572 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.6 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx   8.0 xxxx xxxxx xxxxx 12.6 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     A    *     *     *    B     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx             12.6             xxxxxx
ApproachLOS:         *                *                B                  *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   20  330    30    10   80    20    30   50    20     0    0     0
ApproachDel:    xxxxxx           xxxxxx             12.6           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.4]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=100]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=590]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   20  330    30    10   80    20    30   50    20     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             490
Minor Approach Volume:           100
Minor Approach Volume Threshold: 531
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cummulative+Project PM

Intersection #4: Birch St & Grant Ave



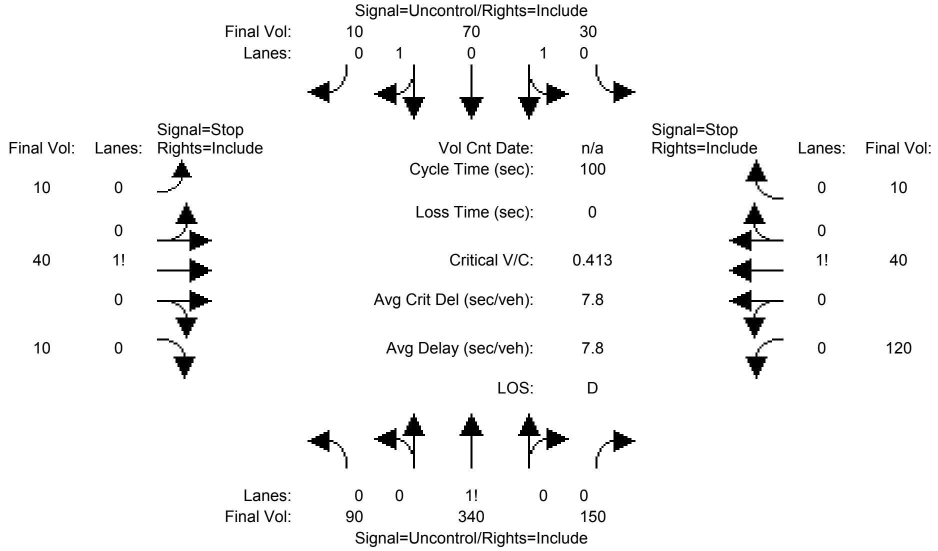
Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.116
Avg Crit Del (sec/veh): 2.5
Avg Delay (sec/veh): 2.5
LOS: B

```
Street Name:            Birch St                          Grant Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       20  330    30    10   80    20    30   50    20     0    0     0
Growth 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
Initial Bse:    20  330    30    10   80    20    30   50    20     0    0     0
Added Vol:       0   26     0     2   14     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    20  356    30    12   94    20    30   50    20     0    0     0
User 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
PHF 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
PHF Volume:     20  356    30    12   94    20    30   50    20     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    20  356    30    12   94    20    30   50    20     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   4.1 xxxx xxxxx   4.1 xxxx xxxxx   6.8  6.5   6.9 xxxxx xxxx xxxxx
FollowUpTim:   2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   114 xxxx xxxxx   386 xxxx xxxxx   346  554    57  xxxx xxxx xxxxx
Potent Cap.:  1488 xxxx xxxxx  1184 xxxx xxxxx   630  443  1004  xxxx xxxx xxxxx
Move Cap.:    1488 xxxx xxxxx  1184 xxxx xxxxx   619  433  1004  xxxx xxxx xxxxx
Volume/Cap:   0.01 xxxx  xxxx  0.01 xxxx  xxxx  0.05 0.12  0.02  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.0 xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:   7.5 xxxx xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     A    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  543 xxxxx  xxxx xxxx xxxxx
SharedQueue:   0.0 xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.7 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:   7.5 xxxx xxxxx   8.1 xxxx xxxxx xxxxx 13.1 xxxxx xxxxx xxxx xxxxx
Shared LOS:      A    *     *     A    *     *     *    B     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx             13.1            xxxxxx
ApproachLOS:         *                *                 B                *
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   20  356    30    12   94    20    30   50    20     0    0     0
ApproachDel:    xxxxxx           xxxxxx             13.1           xxxxxx
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.4]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=100]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=3][total volume=632]
   FAIL - Total volume less than 650 for intersection
          with less than four approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #4 Birch St & Grant Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  1  0  1  0    0  1  0  1  0    0  0  1! 0  0    0  0  0  0  0
Initial Vol:   20  356    30    12   94    20    30   50    20     0    0     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             532
Minor Approach Volume:           100
Minor Approach Volume Threshold: 502
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cummulative PM

Intersection #5: Birch St & Sheridan Ave



```
Street Name:                 Birch St                             Sheridan Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       90  340   150    30   70    10    10   40    10   120   40    10
Growth 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
Initial Bse:    90  340   150    30   70    10    10   40    10   120   40    10
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    90  340   150    30   70    10    10   40    10   120   40    10
User 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
PHF 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
PHF Volume:     90  340   150    30   70    10    10   40    10   120   40    10
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    90  340   150    30   70    10    10   40    10   120   40    10
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:   2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:    80 xxxx xxxxx   490 xxxx xxxxx   755  805    40   710  735   415
Potent Cap.: 1531 xxxx xxxxx  1084 xxxx xxxxx   328  318  1037   351  349   642
Move Cap.:    1531 xxxx xxxxx  1084 xxxx xxxxx   272  290  1037   290  318   642
Volume/Cap:   0.06 xxxx  xxxx  0.03 xxxx  xxxx  0.04 0.14  0.01  0.41 0.13  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.2 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:   7.5 xxxx xxxxx   8.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     A    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  326 xxxxx  xxxx  307 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx  0.7 xxxxx xxxxx  3.2 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   8.4 xxxx xxxxx xxxxx 18.5 xxxxx xxxxx 30.4 xxxxx
Shared LOS:      *    *     *     A    *     *     *    C     *     *    D     *
ApproachDel:      xxxxxx           xxxxxx             18.5             30.4
ApproachLOS:          *                *                C                D
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   90  340   150    30   70    10    10   40    10   120   40    10
ApproachDel:    xxxxxx           xxxxxx             18.5             30.4
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.3]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=60]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=920]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=1.4]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=170]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=920]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
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"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   90  340   150    30   70    10    10   40    10   120   40    10
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             690
Minor Approach Volume:           170
Minor Approach Volume Threshold: 413
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```
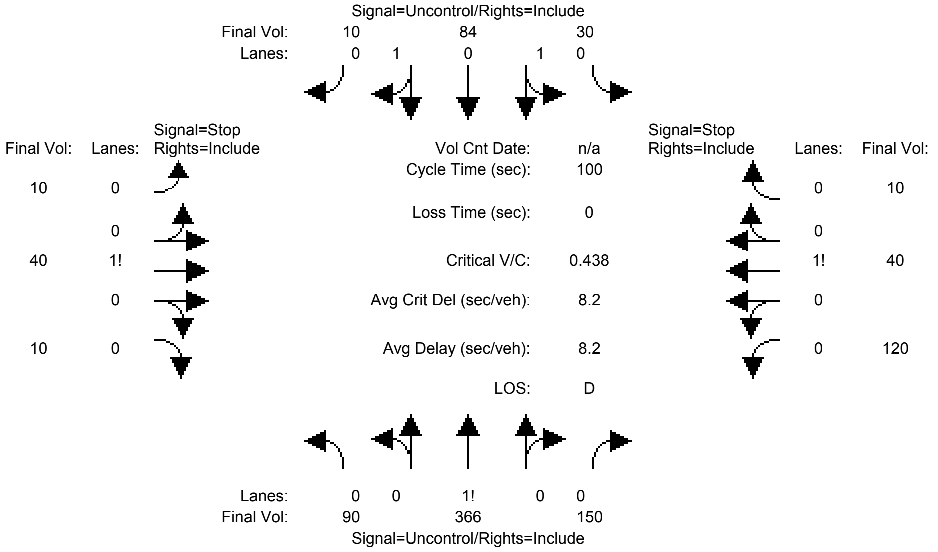

Level Of Service Computation Report
2000 HCM Unsignalized (Future Volume Alternative)
Cummulative+Project PM

Intersection #5: Birch St & Sheridan Ave

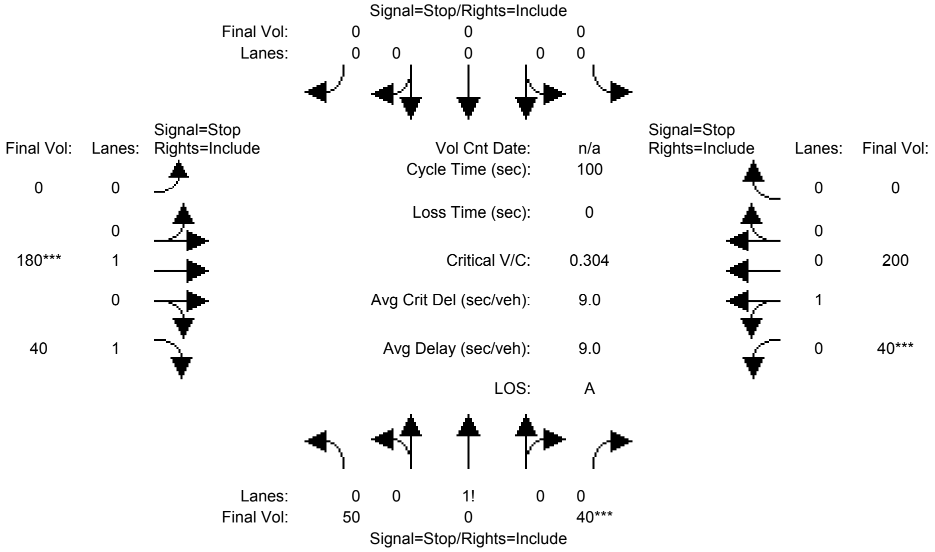


```
Street Name:                 Birch St                         Sheridan Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       90  340   150    30   70    10    10   40    10   120   40    10
Growth 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
Initial Bse:    90  340   150    30   70    10    10   40    10   120   40    10
Added Vol:       0   26     0     0   14     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    90  366   150    30   84    10    10   40    10   120   40    10
User 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
PHF 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
PHF Volume:     90  366   150    30   84    10    10   40    10   120   40    10
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    90  366   150    30   84    10    10   40    10   120   40    10
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:    94 xxxx xxxxx   516 xxxx xxxxx   795  845    47   743  775   441
Potent Cap.:  1513 xxxx xxxxx  1060 xxxx xxxxx   308  302  1028   334  331   621
Move Cap.:    1513 xxxx xxxxx  1060 xxxx xxxxx   254  275  1028   274  302   621
Volume/Cap:   0.06 xxxx  xxxx  0.03 xxxx  xxxx  0.04 0.15  0.01  0.44 0.13  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.2 xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:   7.5 xxxx xxxxx   8.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  308 xxxxx  xxxx  290 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx  0.7 xxxxx xxxxx  3.5 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   8.5 xxxx xxxxx xxxxx 19.5 xxxxx xxxxx 33.7 xxxxx
Shared LOS:      *    *     *     A    *     *     *    C     *     *    D     *
ApproachDel:     xxxxxx           xxxxxx             19.5             33.7
ApproachLOS:        *                *                 C                D
Note: Queue reported is the number of cars per lane.
                     Peak Hour Delay Signal Warrant Report
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
```

```
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   90  366   150    30   84    10    10   40    10   120   40    10
ApproachDel:    xxxxxx           xxxxxx             19.5             33.7
------------|---------------||---------------||---------------||---------------|
Approach[eastbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=0.3]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=60]
   FAIL - Approach volume less than 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=960]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
Approach[westbound][lanes=1][control=Stop Sign]
Signal Warrant Rule #1: [vehicle-hours=1.6]
   FAIL - Vehicle-hours less than 4 for one lane approach.
Signal Warrant Rule #2: [approach volume=170]
   SUCCEED - Approach volume greater than or equal to 100 for one lane approach.
Signal Warrant Rule #3: [approach count=4][total volume=960]
   SUCCEED - Total volume greater than or equal to 800 for intersection
             with four or more approaches.
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************
Intersection #5 Birch St & Sheridan Ave
********************************************************************************
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  1  0  1  0    0  0  1! 0  0    0  0  1! 0  0
Initial Vol:   90  366   150    30   84    10    10   40    10   120   40    10
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             730
Minor Approach Volume:           170
Minor Approach Volume Threshold: 393
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cummulative PM

Intersection #6: Ash St & California Ave



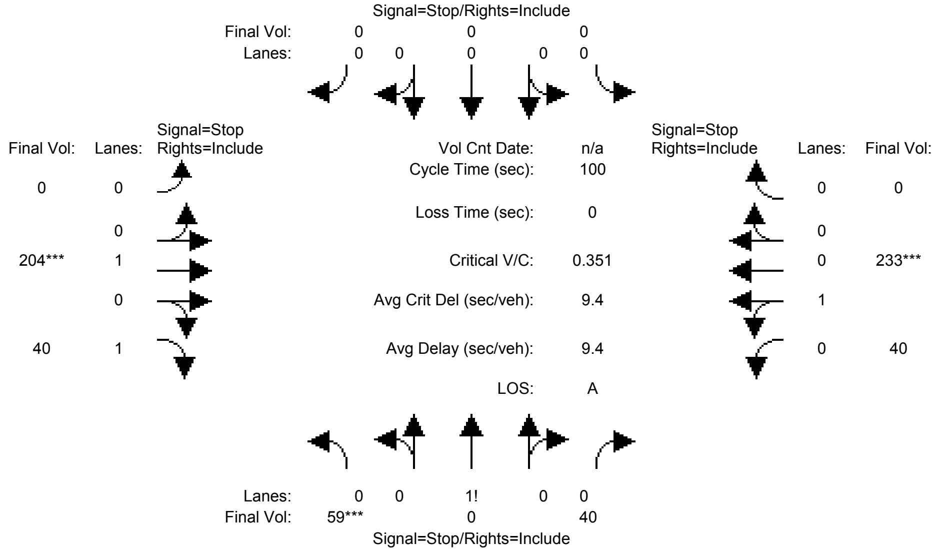
Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 0
Critical V/C: 0.304
Avg Crit Del (sec/veh): 9.0
Avg Delay (sec/veh): 9.0
LOS: A

```
Street Name:                Ash St                         California Ave
Approach:      North Bound       South Bound        East Bound        West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      50    0    40     0    0     0     0  180    40    40  200     0
Growth 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
Initial Bse:   50    0    40     0    0     0     0  180    40    40  200     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   50    0    40     0    0     0     0  180    40    40  200     0
User 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
PHF 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
PHF Volume:    50    0    40     0    0     0     0  180    40    40  200     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   50    0    40     0    0     0     0  180    40    40  200     0
PCE 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
MLF 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
FinalVolume:   50    0    40     0    0     0     0  180    40    40  200     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.56 0.00  0.44  0.00 0.00  0.00  0.00 1.00  1.00  0.17 0.83  0.00
Final Sat.:   394    0   315     0    0     0     0  724   842   132  658     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.13 xxxx  0.13  xxxx xxxx  xxxx  xxxx 0.25  0.05  0.30 0.30  xxxx
Crit Moves:             ****                        ****        ****
Delay/Veh:    8.4  0.0   8.4   0.0  0.0   0.0   0.0  9.2   7.1   9.4  9.4   0.0
Delay 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
AdjDel/Veh:   8.4  0.0   8.4   0.0  0.0   0.0   0.0  9.2   7.1   9.4  9.4   0.0
LOS by Move:    A    *     A     *    *     *     *    A     A     A    A     *
ApproachDel:       8.4           xxxxxx              8.8              9.4
Delay Adj:        1.00            xxxxx             1.00             1.00
ApprAdjDel:        8.4           xxxxxx              8.8              9.4
LOS by Appr:         A                *                A                A
AllWayAvgQ:   0.1  0.1   0.1   0.0  0.0   0.0   0.0  0.3   0.0   0.4  0.4   0.4
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #6 Ash St & California Ave
********************************************************************************
```

```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
Initial Vol:   50    0    40     0    0     0     0  180    40    40  200     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:             460
Minor Approach Volume:           90
Minor Approach Volume Threshold: 552
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM 4-Way Stop (Future Volume Alternative)
Cummulative+Project PM

Intersection #6: Ash St & California Ave



```
Street Name:                Ash St                        California Ave
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      50    0    40     0    0     0     0  180    40    40  200     0
Growth 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
Initial Bse:   50    0    40     0    0     0     0  180    40    40  200     0
Added Vol:      9    0     0     0    0     0     0   24     0     0   33     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   59    0    40     0    0     0     0  204    40    40  233     0
User 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
PHF 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
PHF Volume:    59    0    40     0    0     0     0  204    40    40  233     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   59    0    40     0    0     0     0  204    40    40  233     0
PCE 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
MLF 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
FinalVolume:   59    0    40     0    0     0     0  204    40    40  233     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.60 0.00  0.40  0.00 0.00  0.00  0.00 1.00  1.00  0.15 0.85  0.00
Final Sat.:   407    0   276     0    0     0     0  715   831   114  665     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.14 xxxx  0.14  xxxx xxxx  xxxx  xxxx 0.29  0.05  0.35 0.35  xxxx
Crit Moves:  ****                                   ****              ****
Delay/Veh:    8.6  0.0   8.6   0.0  0.0   0.0   0.0  9.6   7.2   9.9  9.9   0.0
Delay 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
AdjDel/Veh:   8.6  0.0   8.6   0.0  0.0   0.0   0.0  9.6   7.2   9.9  9.9   0.0
LOS by Move:    A    *     A     *    *     *     *    A     A     A    A     *
ApproachDel:       8.6           xxxxxx              9.2               9.9
Delay Adj:        1.00            xxxxx             1.00              1.00
ApprAdjDel:        8.6           xxxxxx              9.2               9.9
LOS by Appr:         A                *                A                 A
AllWayAvgQ:   0.1  0.1   0.1   0.0  0.0   0.0   0.0  0.4   0.0   0.5  0.5   0.5
Note: Queue reported is the number of cars per lane.
                Peak Hour Volume Signal Warrant Report [Urban]
********************************************************************************

Intersection #6 Ash St & California Ave
********************************************************************************
```

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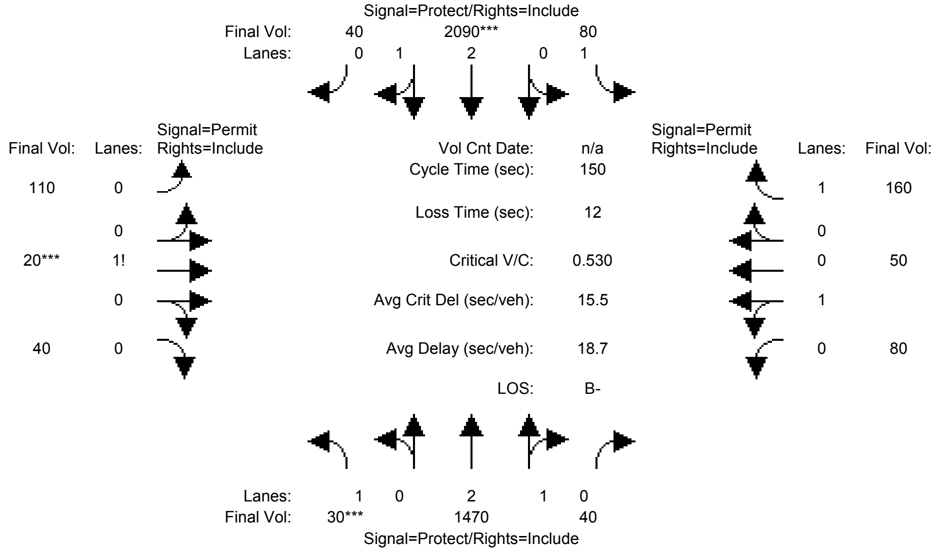
```
Future Volume Alternative: Peak Hour Warrant NOT Met
------------|---------------||---------------||---------------||---------------|
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
Initial Vol:   59    0    40     0    0     0     0  204    40    40  233     0
------------|---------------||---------------||---------------||---------------|
Major Street Volume:            517
Minor Approach Volume:          99
Minor Approach Volume Threshold: 512
--------------------------------------------------------------------------------
SIGNAL WARRANT DISCLAIMER
This peak hour signal warrant analysis should be considered solely as an
"indicator" of the likelihood of an unsignalized intersection warranting
a traffic signal in the future.  Intersections that exceed this warrant
are probably more likely to meet one or more of the other volume based
signal warrant (such as the 4-hour or 8-hour warrants).

The peak hour warrant analysis in this report is not intended to replace
a rigorous and complete traffic signal warrant analysis by the responsible
jurisdiction.  Consideration of the other signal warrants, which is beyond
the scope of this software, may yield different results.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative PM

Intersection #7: ECR & Cambridge Ave

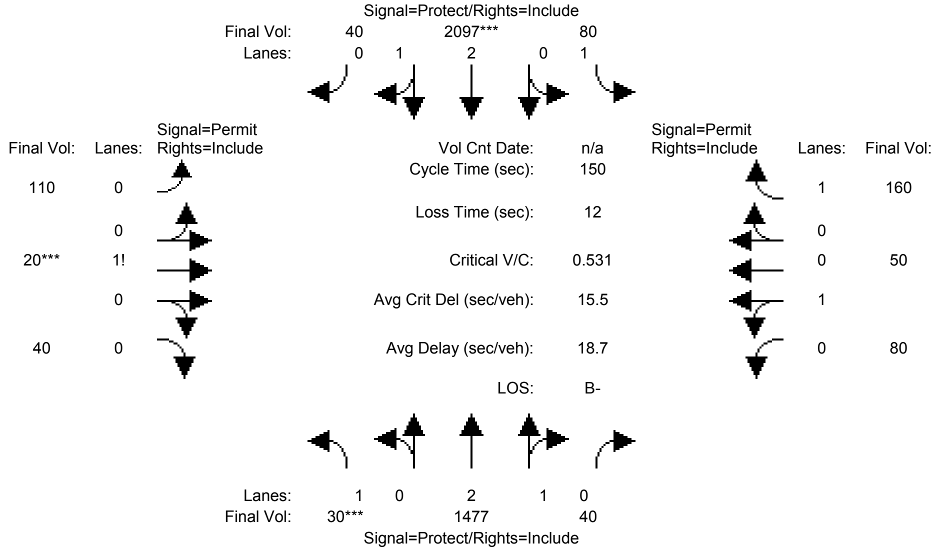


```
                         Signal=Protect/Rights=Include
           Final Vol:    40        2090***        80
               Lanes:     0    1     2      0     1

Signal=Permit                                            Signal=Permit
Final Vol: Lanes: Rights=Include   Vol Cnt Date:     n/a   Rights=Include   Lanes:  Final Vol:
                                 Cycle Time (sec):   150
 110        0                                                                1        160
                                  Loss Time (sec):    12
            0                                                                0
 20***      1!                      Critical V/C:  0.530                     0         50

            0                 Avg Crit Del (sec/veh):  15.5                  1

 40         0                    Avg Delay (sec/veh):  18.7                  0         80

                                                LOS:    B-

               Lanes:     1    0     2      1     0
           Final Vol:   30***       1470          40
                         Signal=Protect/Rights=Include
```

```
Street Name:                  ECR                           Cambridge Ave
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      30 1470    40    80 2090    40   110   20    40    80   50   160
Growth 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
Initial Bse:   30 1470    40    80 2090    40   110   20    40    80   50   160
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   30 1470    40    80 2090    40   110   20    40    80   50   160
User 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
PHF 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
PHF Volume:    30 1470    40    80 2090    40   110   20    40    80   50   160
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   30 1470    40    80 2090    40   110   20    40    80   50   160
PCE 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
MLF 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
FinalVolume:   30 1470    40    80 2090    40   110   20    40    80   50   160
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.91  0.09  1.00 2.94  0.06  0.65 0.11  0.24  0.63 0.37  1.00
Final Sat.:  1750 5536   151  1750 5584   107  1143  208   416  1111  694  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.02 0.27  0.27  0.05 0.37  0.37  0.10 0.10  0.10  0.07 0.07  0.09
Crit Moves:  ****                  ****              ****
Green Time:   7.0 94.6  94.6  16.6  104 104.2  26.8 26.8  26.8  26.8 26.8  26.8
Volume/Cap:  0.37 0.42  0.42  0.41 0.54  0.54  0.54 0.54  0.54  0.40 0.40  0.51
Uniform Del: 69.4 13.9  13.9  62.1 11.2  11.2  56.0 56.0  56.0  54.5 54.5  55.7
IncremntDel:  2.8  0.1   0.1   1.4  0.1   0.1   1.9  1.9   1.9   0.8  0.8   1.4
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   72.1 14.0  14.0  63.6 11.3  11.3  57.8 57.8  57.8  55.4 55.4  57.1
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  72.1 14.0  14.0  63.6 11.3  11.3  57.8 57.8  57.8  55.4 55.4  57.1
LOS by Move:    E    B     B     E   B+    B+    E+   E+    E+    E+   E+    E+
HCM2kAvgQ:      1   11    11     4   16    16     8    8     8     6    6     8
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative+Project PM

Intersection #7: ECR & Cambridge Ave

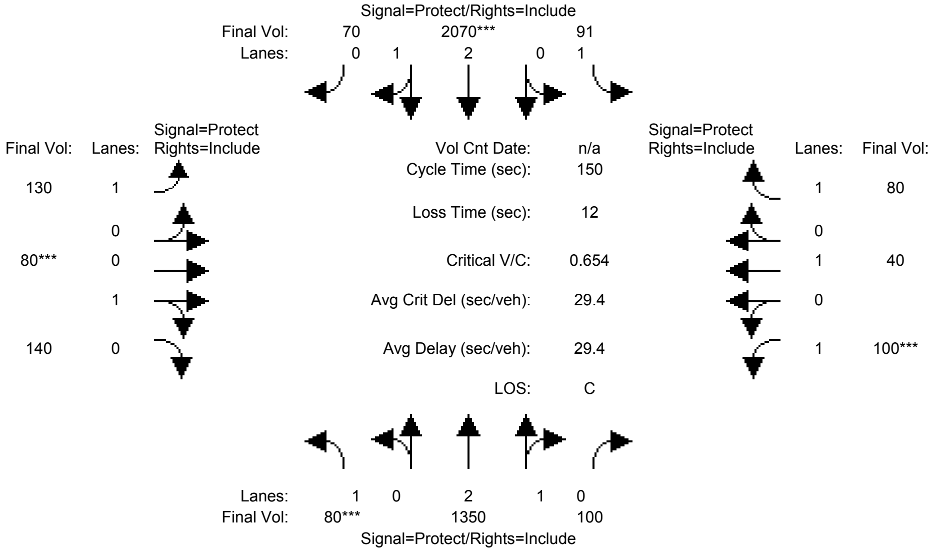


```
                          Signal=Protect/Rights=Include
           Final Vol:    40          2097***          80
              Lanes:      0     1       2        0     1

                  Signal=Permit                                      Signal=Permit
Final Vol:  Lanes: Rights=Include        Vol Cnt Date:    n/a        Rights=Include    Lanes:  Final Vol:
                                       Cycle Time (sec):  150
   110        0                                                                          1       160
                                        Loss Time (sec):   12
              0                                                                          0
  20***       1!                          Critical V/C:  0.531                           0        50
              0                     Avg Crit Del (sec/veh): 15.5                         1
    40        0                          Avg Delay (sec/veh): 18.7                       0        80
                                                     LOS:  B-

              Lanes:      1     0       2        1     0
           Final Vol:   30***         1477            40
                          Signal=Protect/Rights=Include
```

```
Street Name:                  ECR                         Cambridge Ave
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      30 1470    40    80 2090    40   110   20    40    80   50   160
Growth 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
Initial Bse:   30 1470    40    80 2090    40   110   20    40    80   50   160
Added Vol:      0    7     0     0    7     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   30 1477    40    80 2097    40   110   20    40    80   50   160
User 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
PHF 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
PHF Volume:    30 1477    40    80 2097    40   110   20    40    80   50   160
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   30 1477    40    80 2097    40   110   20    40    80   50   160
PCE 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
MLF 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
FinalVolume:   30 1477    40    80 2097    40   110   20    40    80   50   160
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.91  0.09  1.00 2.94  0.06  0.65 0.11  0.24  0.63 0.37  1.00
Final Sat.:  1750 5537   150  1750 5584   107  1143  208   416  1111  694  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.02 0.27  0.27  0.05 0.38  0.38  0.10 0.10  0.10  0.07 0.07  0.09
Crit Moves:  ****                    ****             ****
Green Time:   7.0 94.7  94.7  16.6  104 104.3  26.7 26.7  26.7  26.7 26.7  26.7
Volume/Cap:  0.37 0.42  0.42  0.41 0.54  0.54  0.54 0.54  0.54  0.40 0.40  0.51
Uniform Del: 69.4 13.9  13.9  62.2 11.2  11.2  56.1 56.1  56.1  54.6 54.6  55.8
IncremntDel:  2.8  0.1   0.1   1.4  0.2   0.2   1.9  1.9   1.9   0.8  0.8   1.5
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   72.1 14.0  14.0  63.6 11.3  11.3  57.9 57.9  57.9  55.4 55.4  57.2
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  72.1 14.0  14.0  63.6 11.3  11.3  57.9 57.9  57.9  55.4 55.4  57.2
LOS by Move:    E    B     B     E   B+    B+    E+   E+    E+    E+   E+    E+
HCM2kAvgQ:      1   11    11     4   16    16     8    8     8     6    6     8
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative PM

Intersection #8: ECR & California Ave



Signal=Protect/Rights=Include
Final Vol: 70 2070*** 91
Lanes: 0 1 2 0 1

Final Vol: Lanes: Signal=Protect Rights=Include
130 1
0
80*** 0
1
140 0

Vol Cnt Date: n/a
Cycle Time (sec): 150
Loss Time (sec): 12
Critical V/C: 0.654
Avg Crit Del (sec/veh): 29.4
Avg Delay (sec/veh): 29.4
LOS: C

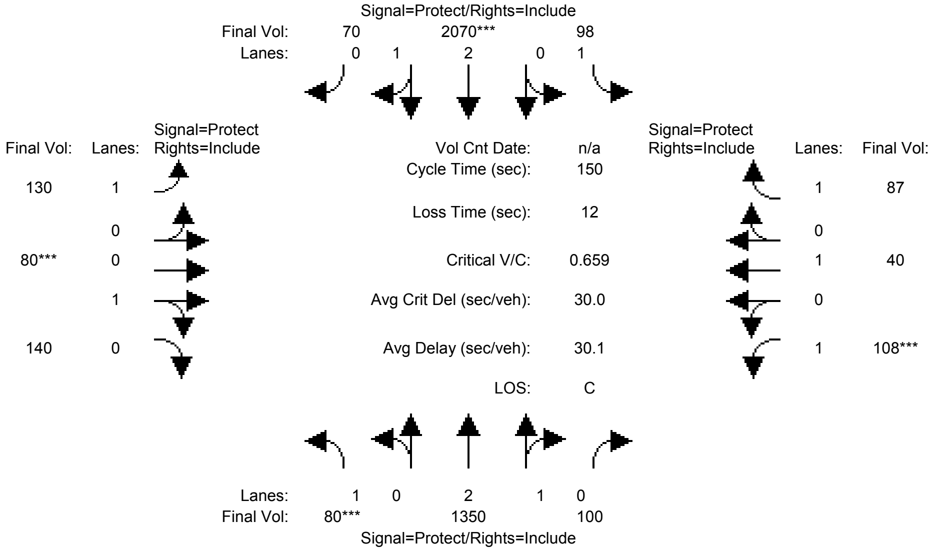
Signal=Protect Rights=Include Lanes: Final Vol:
1 80
0
1 40
0
1 100***

Lanes: 1 0 2 1 0
Final Vol: 80*** 1350 100
Signal=Protect/Rights=Include

```
Street Name:                  ECR                          California Ave
Approach:      North Bound       South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      80 1350   100    91 2070    70   130   80   140   100   40    80
Growth 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
Initial Bse:   80 1350   100    91 2070    70   130   80   140   100   40    80
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   80 1350   100    91 2070    70   130   80   140   100   40    80
User 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
PHF 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
PHF Volume:    80 1350   100    91 2070    70   130   80   140   100   40    80
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   80 1350   100    91 2070    70   130   80   140   100   40    80
PCE 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
MLF 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
FinalVolume:   80 1350   100    91 2070    70   130   80   140   100   40    80
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 2.78  0.22  1.00 2.89  0.11  1.00 0.34  0.66  1.00 1.00  1.00
Final Sat.:  1750 5276   391  1750 5498   186  1750  655  1147  1750 1900  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.05 0.26  0.26  0.05 0.38  0.38  0.07 0.12  0.12  0.06 0.02  0.05
Crit Moves:  ****                  ****              ****        ****
Green Time:  10.5 80.5  80.5  16.4 86.4  86.4  21.7 28.0  28.0  13.1 19.5  19.5
Volume/Cap:  0.65 0.48  0.48  0.48 0.65  0.65  0.51 0.65  0.65  0.65 0.16  0.35
Uniform Del: 68.0 21.6  21.6  62.8 21.6  21.6  59.3 56.5  56.5  66.2 58.0  59.5
IncremntDel: 12.0  0.1   0.1   1.9  0.5   0.5   1.8  4.6   4.6   9.7  0.3   0.9
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   80.0 21.7  21.7  64.7 22.1  22.1  61.1 61.1  61.1  76.0 58.3  60.5
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  80.0 21.7  21.7  64.7 22.1  22.1  61.1 61.1  61.1  76.0 58.3  60.5
LOS by Move:    F   C+    C+     E   C+    C+     E    E     E    E-   E+     E
HCM2kAvgQ:      5   14    14     4   22    22     6   11    11     6    2     4
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative+Project PM

Intersection #8: ECR & California Ave

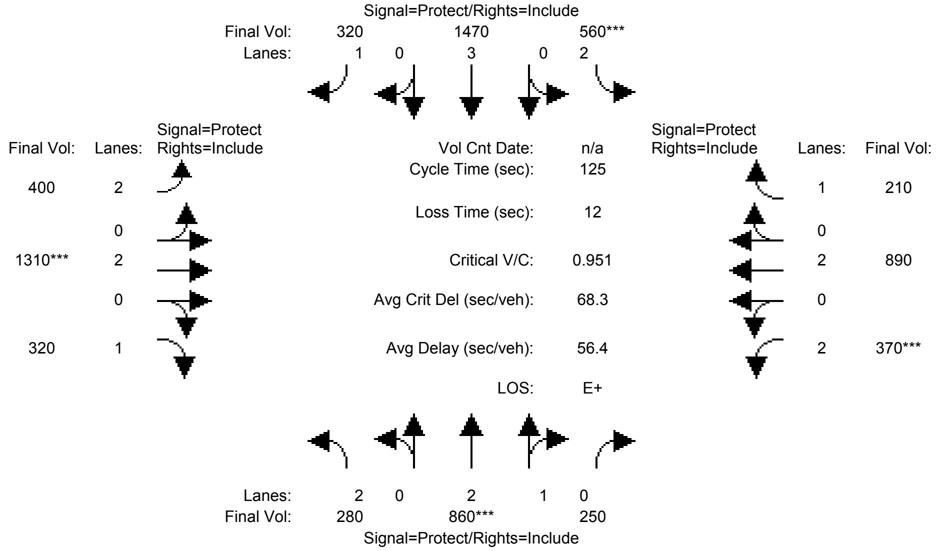


```
                           Signal=Protect/Rights=Include
              Final Vol:    70         2070***          98
                  Lanes:     0    1       2       0     1

                  Signal=Protect                                        Signal=Protect
 Final Vol:  Lanes:  Rights=Include         Vol Cnt Date:      n/a      Rights=Include    Lanes:   Final Vol:
                                         Cycle Time (sec):     150
   130         1                                                                            1         87
                                          Loss Time (sec):      12
               0                                                                            0
   80***       0                             Critical V/C:    0.659                         1         40
               1                      Avg Crit Del (sec/veh):  30.0                         0
   140         0                           Avg Delay (sec/veh): 30.1                        1        108***
                                                     LOS:        C

                  Lanes:     1    0       2       1     0
              Final Vol:    80***       1350           100
                           Signal=Protect/Rights=Include
```

```
Street Name:                 ECR                          California Ave
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10     10     7   10     10     7   10     10     7   10     10
Y+R:          4.0  4.0    4.0   4.0  4.0    4.0   4.0  4.0    4.0   4.0  4.0    4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      80 1350    100    91 2070     70   130   80    140   100   40     80
Growth 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
Initial Bse:   80 1350    100    91 2070     70   130   80    140   100   40     80
Added Vol:      0    0      0     7    0      0     0    0      0     8    0      7
PasserByVol:    0    0      0     0    0      0     0    0      0     0    0      0
Initial Fut:   80 1350    100    98 2070     70   130   80    140   108   40     87
User 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
PHF 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
PHF Volume:    80 1350    100    98 2070     70   130   80    140   108   40     87
Reduct Vol:     0    0      0     0    0      0     0    0      0     0    0      0
Reduced Vol:   80 1350    100    98 2070     70   130   80    140   108   40     87
PCE 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
MLF 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
FinalVolume:   80 1350    100    98 2070     70   130   80    140   108   40     87
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900   1900  1900 1900   1900  1900 1900   1900  1900 1900   1900
Adjustment:  0.92 1.00   0.92  0.92 1.00   0.92  0.92 1.00   0.92  0.92 1.00   0.92
Lanes:       1.00 2.78   0.22  1.00 2.89   0.11  1.00 0.34   0.66  1.00 1.00   1.00
Final Sat.:  1750 5276    391  1750 5498    186  1750  655   1147  1750 1900   1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.05 0.26   0.26  0.06 0.38   0.38  0.07 0.12   0.12  0.06 0.02   0.05
Crit Moves:  ****                   ****                  ****        ****
Green Time:  10.4 78.9   78.9  17.3 85.7   85.7  22.1 27.8   27.8  14.1 19.8   19.8
Volume/Cap:  0.66 0.49   0.49  0.49 0.66   0.66  0.51 0.66   0.66  0.66 0.16   0.38
Uniform Del: 68.1 22.7   22.7  62.2 22.1   22.1  58.9 56.7   56.7  65.7 57.7   59.5
IncremntDel: 12.5  0.1    0.1   1.8  0.5    0.5   1.6  4.8    4.8   9.5  0.3    1.0
InitQueuDel:  0.0  0.0    0.0   0.0  0.0    0.0   0.0  0.0    0.0   0.0  0.0    0.0
Delay 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
Delay/Veh:   80.6 22.8   22.8  64.1 22.6   22.6  60.6 61.5   61.5  75.1 58.0   60.5
User DelAdj: 1.00 1.00   1.00  1.00 1.00   1.00  1.00 1.00   1.00  1.00 1.00   1.00
AdjDel/Veh:  80.6 22.8   22.8  64.1 22.6   22.6  60.6 61.5   61.5  75.1 58.0   60.5
LOS by Move:    F   C+     C+     E   C+     C+     E    E      E    E-   E+      E
HCM2kAvgQ:      5   14     14     4   22     22     6   11     11     6    2      4
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative PM

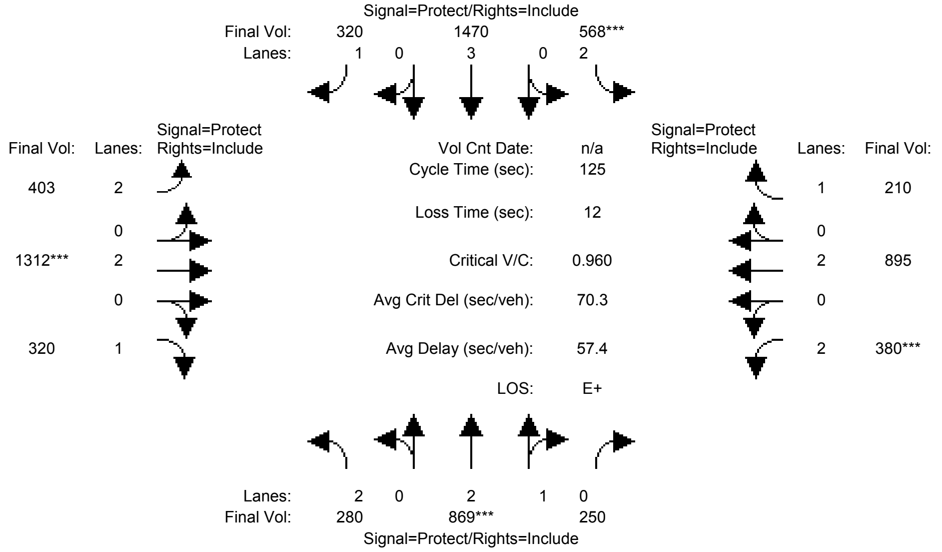
Intersection #9: El Camino Real & Page Mill Rd



```
Street Name:          El Camino Real                 Page Mill Rd
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   30     0     7   30     0     7   28    28     7   30     0
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     280  860   250   560 1470   320   400 1310   320   370  890   210
Growth 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
Initial Bse:  280  860   250   560 1470   320   400 1310   320   370  890   210
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  280  860   250   560 1470   320   400 1310   320   370  890   210
User 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
PHF 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
PHF Volume:   280  860   250   560 1470   320   400 1310   320   370  890   210
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  280  860   250   560 1470   320   400 1310   320   370  890   210
PCE 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
MLF 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
FinalVolume:  280  860   250   560 1470   320   400 1310   320   370  890   210
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.83 1.00  0.97  0.83 1.00  0.97  0.83 1.00  0.92  0.69 1.00  0.97
Lanes:       2.00 2.31  0.69  2.00 3.00  1.00  2.00 2.00  1.00  2.00 2.00  1.00
Final Sat.:  3150 4388  1276  3150 5700  1847  3150 3800  1750  2625 3800  1847
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.09 0.20  0.20  0.18 0.26  0.17  0.13 0.34  0.18  0.14 0.23  0.11
Crit Moves:       ****        ****                   ****        ****
Green Time:  13.4 30.0  30.0  22.2 38.8  38.8  21.0 43.1  43.1  17.6 39.7  39.7
Volume/Cap:  0.83 0.82  0.82  1.00 0.83  0.56  0.75 1.00  0.53  1.00 0.74  0.36
Uniform Del: 54.7 44.9  44.9  51.4 40.0  35.9  49.5 40.9  32.8  53.7 38.0  32.8
IncremntDel: 20.5  5.5   5.5  37.8  4.7   3.9   9.6 24.7   3.3  46.6  4.0   1.7
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   75.2 50.4  50.4  89.2 44.7  39.8  59.2 65.6  36.1 100.2 42.0  34.5
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  75.2 50.4  50.4  89.2 44.7  39.8  59.2 65.6  36.1 100.2 42.0  34.5
LOS by Move:   E-    D     D     F    D     D    E+    E    D+     F    D    C-
HCM2kAvgQ:      9   16    16    18   20    11    10   32    11    13   16     7
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative+Project PM

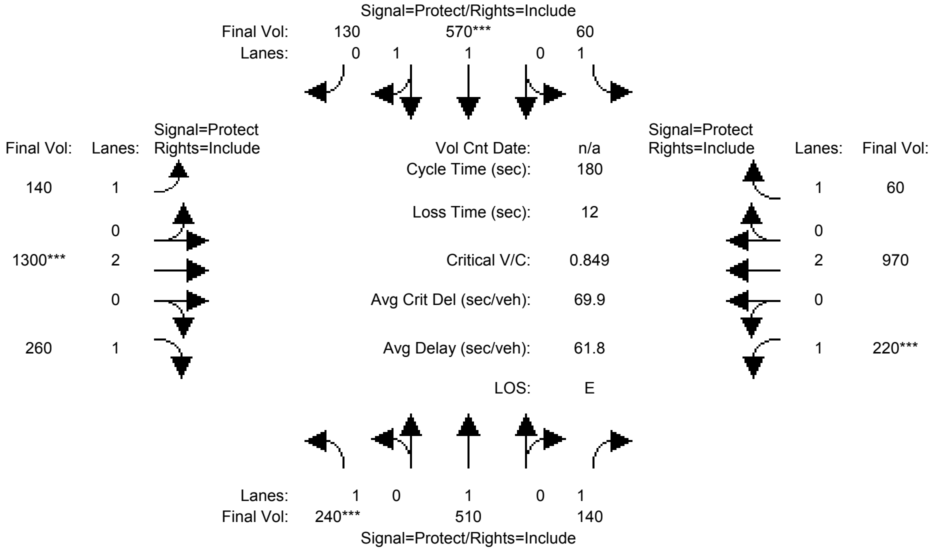
Intersection #9: El Camino Real & Page Mill Rd



```
Street Name:          El Camino Real                   Page Mill Rd
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   30     0     7   30     0     7   28    28     7   30     0
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     280  860   250   560 1470   320   400 1310   320   370  890   210
Growth 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
Initial Bse:  280  860   250   560 1470   320   400 1310   320   370  890   210
Added Vol:      0    9     0     8    0     0     3    2     0    10    5     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  280  869   250   568 1470   320   403 1312   320   380  895   210
User 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
PHF 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
PHF Volume:   280  869   250   568 1470   320   403 1312   320   380  895   210
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  280  869   250   568 1470   320   403 1312   320   380  895   210
PCE 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
MLF 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
FinalVolume:  280  869   250   568 1470   320   403 1312   320   380  895   210
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.83 1.00  0.97  0.83 1.00  0.97  0.83 1.00  0.92  0.69 1.00  0.97
Lanes:       2.00 2.31  0.69  2.00 3.00  1.00  2.00 2.00  1.00  2.00 2.00  1.00
Final Sat.:  3150 4398  1265  3150 5700  1847  3150 3800  1750  2625 3800  1847
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.09 0.20  0.20  0.18 0.26  0.17  0.13 0.35  0.18  0.14 0.24  0.11
Crit Moves:       ****        ****                   ****        ****
Green Time:  13.4 30.0  30.0  22.3 38.9  38.9  21.1 42.7  42.7  17.9 39.6  39.6
Volume/Cap:  0.83 0.82  0.82  1.01 0.83  0.56  0.76 1.01  0.53  1.01 0.74  0.36
Uniform Del: 54.7 45.0  45.0  51.3 39.9  35.9  49.5 41.1  33.1  53.5 38.2  32.9
IncremntDel: 20.3  5.8   5.8  40.3  4.6   3.9   9.7 27.3   3.4  48.8  4.2   1.7
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   75.0 50.7  50.7  91.7 44.6  39.7  59.3 68.5  36.5 102.3 42.4  34.6
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  75.0 50.7  50.7  91.7 44.6  39.7  59.3 68.5  36.5 102.3 42.4  34.6
LOS by Move:   E-    D     D     F    D     D    E+    E    D+     F    D    C-
HCM2kAvgQ:      9   16    17    19   20    11    11   32    11    13   16     7
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative PM

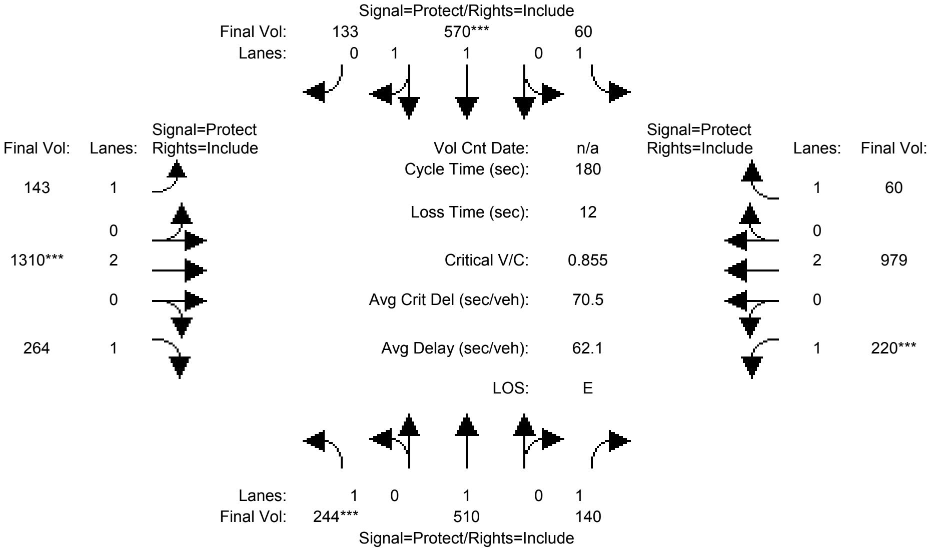
Intersection #10: PAGEMILL-OREGON EXPWY/MIDDLEFIELD RD



```
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     240  510   140    60  570   130   140 1300   260   220  970    60
Growth 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
Initial Bse:  240  510   140    60  570   130   140 1300   260   220  970    60
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  240  510   140    60  570   130   140 1300   260   220  970    60
User 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
PHF 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
PHF Volume:   240  510   140    60  570   130   140 1300   260   220  970    60
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  240  510   140    60  570   130   140 1300   260   220  970    60
PCE 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
MLF 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
FinalVolume:  240  510   140    60  570   130   140 1300   260   220  970    60
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 1.00  1.00  1.00 1.60  0.40  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.:  1750 1900  1750  1750 3046   695  1750 3800  1750  1750 3800  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.14 0.27  0.08  0.03 0.19  0.19  0.08 0.34  0.15  0.13 0.26  0.03
Crit Moves:  ****                  ****             ****        ****
Green Time:  29.1 60.1  60.1   8.7 39.7  39.7  23.7 72.6  72.6  26.7 75.5  75.5
Volume/Cap:  0.85 0.80  0.24  0.71 0.85  0.85  0.61 0.85  0.37  0.85 0.61  0.08
Uniform Del: 73.3 54.6  43.4  84.4 67.3  67.3  73.8 48.7  37.7  74.7 40.7  31.4
IncremntDel: 25.9 10.4   1.0  39.8 10.6  10.6  11.4  6.1   1.5  27.7  1.7   0.2
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   99.2 65.0  44.4 124.2 77.9  77.9  85.2 54.8  39.1 102.4 42.4  31.6
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  99.2 65.0  44.4 124.2 77.9  77.9  85.2 54.8  39.1 102.4 42.4  31.6
LOS by Move:    F    E     D     F   E-    E-     F   D-     D     F    D     C
HCM2kAvgQ:     16   27     6     5   21    21     9   34    10    15   20     2
Note: Queue reported is the number of cars per lane.
```

Level Of Service Computation Report
2000 HCM Operations (Future Volume Alternative)
Cummulative+Project PM

Intersection #10: PAGEMILL-OREGON EXPWY/MIDDLEFIELD RD



```
                         Signal=Protect/Rights=Include
             Final Vol:    133         570***        60
                 Lanes:      0    1       1      0    1

                 Signal=Protect                                 Signal=Protect
Final Vol:   Lanes:  Rights=Include        Vol Cnt Date:    n/a    Rights=Include     Lanes:   Final Vol:
                                        Cycle Time (sec):   180
   143         1                                                                        1         60
                                          Loss Time (sec):   12
               0                                                                        0
 1310***       2                              Critical V/C:  0.855                      2        979
               0                      Avg Crit Del (sec/veh): 70.5                      0
   264         1                         Avg Delay (sec/veh): 62.1                      1        220***
                                                        LOS:  E

                 Lanes:      1    0       1      0    1
             Final Vol:  244***          510         140
                         Signal=Protect/Rights=Include
```

```
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Min. Green:     7   10    10     7   10    10     7   10    10     7   10    10
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     240  510   140    60  570   130   140 1300   260   220  970    60
Growth 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
Initial Bse:  240  510   140    60  570   130   140 1300   260   220  970    60
Added Vol:      4    0     0     0    0     3     3   10     4     0    9     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  244  510   140    60  570   133   143 1310   264   220  979    60
User 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
PHF 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
PHF Volume:   244  510   140    60  570   133   143 1310   264   220  979    60
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  244  510   140    60  570   133   143 1310   264   220  979    60
PCE 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
MLF 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
FinalVolume:  244  510   140    60  570   133   143 1310   264   220  979    60
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92  0.92 1.00  0.92
Lanes:       1.00 1.00  1.00  1.00 1.60  0.40  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.:  1750 1900  1750  1750 3032   707  1750 3800  1750  1750 3800  1750
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.14 0.27  0.08  0.03 0.19  0.19  0.08 0.34  0.15  0.13 0.26  0.03
Crit Moves:  ****                  ****             ****        ****
Green Time:  29.4 60.2  60.2   8.7 39.6  39.6  23.9 72.6  72.6  26.5 75.2  75.2
Volume/Cap:  0.85 0.80  0.24  0.71 0.85  0.85  0.62 0.85  0.37  0.85 0.62  0.08
Uniform Del: 73.2 54.5  43.3  84.4 67.4  67.4  73.8 48.9  37.7  74.9 41.1  31.6
IncremntDel: 26.4 10.3   1.0  39.5 11.0  11.0  11.7  6.3   1.5  28.6  1.8   0.2
InitQueuDel:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
Delay 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
Delay/Veh:   99.7 64.8  44.3 123.8 78.5  78.5  85.4 55.2  39.3 103.5 42.9  31.8
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  99.7 64.8  44.3 123.8 78.5  78.5  85.4 55.2  39.3 103.5 42.9  31.8
LOS by Move:    F    E     D     F   E-    E-     F   E+     D     F    D     C
HCM2kAvgQ:     16   27     6     5   21    21     9   34    11    15   21     2
Note: Queue reported is the number of cars per lane.
```

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APPENDIX 21.5 EIR CONSULTANT TEAM

MIG, Inc.

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Steve Ridone, Senior Project Associate
Becca Dannels, Environmental Analyst/GIS Analyst
Chris Dugan, Senior Project Manager
Phil Gleason, Environmental Analyst
Ivy Poisson, Environmental Planner
Christopher Purtell, Senior Archaeologist