Attachment No. 5

Class 32 Report

Costco Fuel Facility
Re-Location

PREPARED BY

Barghausen Consulting Engineers, Inc.
Ambruster Goldsmith & Delvac, LLP

PREPARED FOR	CLIENT ADDRESS
Costco Wholesale	730 Lake Drive, Issaquah, WA 98027

SITE ADDRESS	JURISDICTION	DATE	PROJECT NO.
13463 Washington Blvd., Culver City, CA 90292	City of Culver City	06/28/2024	10857.13

SUPPORTING ANALYSIS FOR A CLASS 32 EXEMPTION

I. Description of the Proposed Project

A. Project Site and Surrounding Uses

The Proposed Project will relocate the existing Costco fuel facility located at 13463 Washington Boulevard (Project Site) to the two developed parcels currently occupied by commercial buildings in the southwest corner of the existing shopping center. The Project Site comprises approximately 136,343 square feet (3.11 acres).

B. Existing Zoning and Land Use Designation

The Costco Wholesale (Costco) property is zoned Commercial Regional Retail (CRR), which permits the fuel facility. The existing fuel facility was previously approved as an ancillary use to the main Costco Warehouse under Tentative Parcel Map No. 52382, TPM No. 97-01 and Conditional Use Permit No. 97-01.

C. Proposed Project

The existing Culver City Costco is located at 13463 Washington Blvd in the City of Culver City California (City) and includes a Costco Warehouse and a Costco Gasoline fuel station with 16 vehicle fueling positions located in the south-east corner. In addition, there are several pad developments on the overall shopping center property, including fast food and small retail. The Proposed Project will relocate the gas station to the area with two currently unoccupied that housed a Verizon mobile phone store, Subway, a GNC shop, and a Starbucks Coffee. This will provide more space between the gas station queues and the main entrance at the Washington Blvd. & Glencoe Ave. traffic signal. The existing buildings will be demolished and, therefore, eliminate on-site trips associated with those land uses[1]. The existing gas station will also be demolished and developed with Costco warehouse member parking. (See Figure 1.)

The Proposed Project comprises a new 13,000-square-foot fuel canopy, the installation of 15 new multi-product dispensers (MPDs), three 40,000-gallon underground gasoline storage tanks (USTs), one (1) 1,500-gallon fuel additive UST, a new controller enclosure, a vapor processing unit, and associated site improvements, such as parking and landscaping. The relocated gasoline station will increase the number of dispensers from 8 dispensers (16 fueling positions) to 15 dispensers (30 fueling positions). However, there will be no increase in throughput (i.e., the total amount of gasoline to be dispensed yearly). The existing fuel facility will be demolished and removed from the site, and the existing commercial buildings will be demolished. The existing underground storage tanks and piping will be decommissioned and removed by State-certified contractors. Following demolition, the existing fuel facility site will be improved with additional parking for the Costco Warehouse. The intent of the relocation is to install a new state-of-the-art facility to provide a more efficient fuel purchasing experience for Costco members.

[1] The buildings were historically occupied and could be reoccupied again without any discretionary City approvals. Under applicable case law (North County Advocates v. City of Carlsbad (2015) 241 Cal. App. 4th 94), these uses are considered to be part of the CEQA baseline even though the buildings are currently unoccupied. Therefore, the technical analyses include a trip credit for the removal of these uses from the project site. Moreover, as the buildings were occupied when the historic traffic counts at area roadways were taken, not taking such a credit would overstate project impacts.

1. Business Hours of Operation

The relocated fuel facility would operate from 5:30 a.m. to 9:30 p.m. Monday through Friday, 6:00 a.m. to 8:00 p.m. Saturday, and 6:00 a.m. to 7:30 p.m. Sunday, which are the same hours the existing facility is open. The station will be available for Costco Warehouse members only and will require a Costco membership to access the fuel pumps. The relocated station would be manned by one Costco employee, who will oversee day-to-day operations and cleanliness at the site. An additional one to two employees will be brought on site as needed to help implement the queue management plan and for overall vehicle circulation. No other automotive or retail sales will be available at the station. The facility is anticipated to receive up to eight nighttime fuel deliveries spread out evenly between 10:00 p.m. and 6:00 a.m. (i.e., one fuel delivery per hour).

The proposed business hours of the gasoline station are compatible with the existing surrounding businesses in that the station provides a consumer service during typical gas station hours, same as the existing facility.

2. Parking & Circulation/Queue Management

The Proposed Project will remove 56 parking stalls for a total of 907 stalls for the overall shopping center. City parking standards do not require a minimum amount of parking stalls for the overall development. The overall development will continue to meet City parking requirements after the gasoline station is relocated.

The new fuel facility will continue to provide single-direction circulation with a full-length bypass lane between each dispenser island. The relocated facility will be equipped with a red-light/green-light system to indicate which pump is open and available to the next person in line along with CostcoPay (a key-fob pay system), which improves efficiency and helps shorten lines for waiting members.

3. Design

The canopy design includes a gray, metal canopy fascia with concrete masonry unit-wrapped canopy columns. The new controller enclosure is designed to match the fuel canopy and includes a gray, metal wrapped building. This design is consistent with the main Costco warehouse design.

4. Lighting and Signage

The under-canopy lighting will be flat lens LED light fixtures for the relocated canopy. Signage and any new parking lot lighting will also be LED. The new canopy signs will include 20-square-foot "Costco Wholesale" signs located and centered on each façade of the canopy. The new signs are also designed consistent with the main Costco warehouse signage for a unified design.

5. Entitlement Requests

The applicant is requesting the following discretionary approval from the City to permit construction of the Proposed Project:

- Conditional Use Permit Modification

In addition, the applicant will seek ministerial grading and building permits and other ministerial approvals to permit construction of the Proposed Project, UST Installation Permit and UST Removal Permit from the Certified Unified Program Agency, and permits from the South Coast Air Quality Management District (SCAQMD) to construct and operate the new fuel facility.

II. Evaluation of Class 32 Criteria

Generally, a discretionary action by the City requires environmental review pursuant to California Environmental Quality Act ("CEQA"). However, the CEQA Guidelines (Sections 15300 to 15332) include a list of classes of projects that have been determined to not have a significant effect on the environment, also known as Categorical Exemptions. If a project falls within one of these classes, it is exempt from the provisions of CEQA, and no further environmental review is required. The Class 32 "Infill" Categorical Exemption (CEQA Guideline Section 15332) (the Class 32 Exemption), exempts infill development within urbanized areas if it meets certain criteria. The class consists of environmentally benign infill projects that are consistent with the local General Plan and zoning requirements. The Proposed Project meets this exemption by adding a General Plan and zoning-compliant, relocated fuel facility use to a portion of an existing shopping center in a developed, urbanized area. Relocating the fuel facility on the Project Site will improve site circulation, as well as eliminate any potential off-site queuing.

This class of exemption is not intended for projects that would result in any significant traffic, noise, air quality, or water quality impacts. It may apply to residential, commercial, industrial, and/or mixed-use projects. A Class 32 Exemption applies to a project characterized as in-fill development by meeting the criteria described below:

(a) The project is consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations.

(b) The proposed development occurs within city limits on a project site of no more than five acres substantially surrounded by urban uses.

(c) The project site has no value as habitat for endangered, rare or threatened species.

(d) Approval of the project would not result in any significant effects relating to traffic, noise, air quality, or water quality.

(e) The site can be adequately served by all required utilities and public services.

The following is an analysis of each of the above criteria.

A. The Proposed Project is consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations.

The Project Site is subject to the Culver City General Plan.

1. Culver City General Plan

The General Plan serves as a blueprint for future growth and development in the City, and contains policies and programs designed to provide decision-makers with a basis for all land use related decisions. The General Plan addresses, among other subjects, land use, circulation, public safety, noise, and growth management.

The Land Use Element is a guide to the allocation of land uses in the City and provides a framework or context for the issues and subject areas examined in the other Elements of the General Plan.

The Project Site is designated as Regional Center ("RC") under the Land Use Element. RC allows a fuel facility as an ancillary use to the main Costco warehouse designation.

The relocation of the fuel facility will execute the following goals of the General Plan:

- LU Policy 7.B: Allow existing regional and community centers to upgrade and expand in response to changing market demands, to maintain their economic viability, with adequate mitigation of impacts to nearby residential neighborhoods.

  The Proposed Project will upgrade and expand the existing fuel facility and will reduce onsite vehicular congestion by providing more space between the gas station queues and the main entrance at the Washington Blvd. & Glencoe Ave. traffic signal. The new state-of-the-art facility will provide a more efficient fuel purchasing experience for Costco members.

- LU Policy 8.A: Support desirable retail establishments in proximity to residential neighborhoods that provide needed goods and services.

  The relocation and expansion of the members only fuel station will support the adjacent Costco warehouse.

- LU Policy 8.B: Ensure that development impact fees mitigate all resultant costs burdened on City infrastructure and services.

  The Proposed Project would pay all required impact fees.

- LU Policy 16.C: Encourage compatible commercial uses, through conditional expansion of commercial users, to adjacent residential lots in designated areas of Washington Boulevard.

  The Proposed Project is the relocation and expansion of the existing fuel facility and will be conditioned to ensure compatibility with adjacent residential lots through the conditional use permit modification.

2. Culver City Municipal Code

The Proposed Project is subject to Title 17 – Zoning Code of the Culver City Municipal Code ("CCMC"). As set forth in the table below, the Proposed Project would comply with the applicable provisions of the CCMC.

Development Standard	**Requirement**	**Response**
Maximum Building Height	56 feet	The maximum height of the canopy is approximately 17 feet from finished grade with a 14-foot 6-inch clearance.
Minimum Front Building Setback	15 feet	The Proposed Project will maintain the required setback.
Minimum Side Building Setback	None	Not applicable.
Minimum Side Street Building Setback	15 feet	The Proposed Project will maintain the required setback.
Minimum Rear Building Setback	None	Not applicable.

Off-Street Parking	None	The Proposed Project will remove 56 stalls for a total of 907 stalls for the overall development.
Landscaping	Minimum 5-foot landscape strip along street frontages.	The Proposed Project will provide a minimum 12-foot landscape strip along Washington Boulevard and Walnut Avenue in the vicinity of the fueling facility and a minimum 9-foot landscape strip along Washington Boulevard in the vicinity of the new parking
Signs	Maximum sign area of 1.5 square feet/1 linear foot of elevation (not to exceed 40% of wall area). (North/South Facades: 141.5 linear feet of canopy elevation = 212.25 sq. ft. sign area) ((141.5 linear feet x 3 feet) x 40% = 169.8 sq. ft. maximum sign area) (East/West Facades: 92 linear feet of canopy elevation = 138 sq. ft. sign area) ((92 linear feet x 3 feet) x 40% = 110.4 sq. ft.	The project will include one 20-square-foot "Costco Wholesale" sign on each façade of the canopy.

Development Standard	Requirement	Response
Exterior Lighting	All exterior light sources, including canopy, flood, and perimeter, shall be energy efficient, stationary, and shielded or recessed within the roof canopy to ensure that all light, including glare or reflections is directed away from adjoining properties and public rights-of-way.	Under-canopy lighting and parking lot lighting will be installed with flat lens LED lighting fixtures and lighting will be directed downward to prevent offsite glare.
Design Criteria	Architectural designs shall be consistent in quality and appearance with the overall development.	The canopy design is consistent with the design of the main Costco Warehouse and will include a metal-wrapped canopy fascia with concrete masonry unit wrapped canopy columns.

3. Conclusion

As discussed above, the Proposed Project is consistent with the applicable General Plan designation and all applicable General Plan policies, as well as with the applicable zoning designation and regulations. Therefore, the Proposed Project satisfies the first criterion for a Class 32 Exemption.

B. The proposed development occurs within city limits on a project site of no more than five acres substantially surrounded by urban uses.

As shown in Figure 1, the Project Site Map, the Project Site is located within a portion of an existing shopping center in Culver City and is entirely surrounded by urban uses. The Project Site (consisting of the area where the fueling station and landscape screening will be relocated to and the area of the existing gas station to be demolished and replaced with parking) has a total area of approximately 3.11 acres. The Project Site includes all areas that will be physically changed.[2] No new development or construction activity related to the Proposed Project will occur in the other portions of the shopping center, including the existing Costco Warehouse and other pad parcels, nor will the existing operations at these uses change as a result of the Proposed Project. These uses and areas are part of the existing physical environment prior to

[2] CEQA Guidelines Section 15378(a) provides: "'Project' means 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***…" (Emphasis added.) See *Protect Tustin Ranch v. City of Tustin*, 70 Cal.App.5th 951 (2021) (Upholding use of Class 32 CEQA exemption for 2.38 acre project site included within 12-acre existing shopping center as project site was below 5-acre maximum).

the Project that will not change as result of the Project. Therefore, they comprise the environmental baseline and are not part of the Proposed Project.[3]

Therefore, the Proposed Project satisfies the second criterion for a Class 32 Exemption.

C. The Project Site has no value as habitat for endangered, rare or threatened species.

The Project Site is located in a highly urbanized area within the City. The current location of the fuel facility is fully developed as is the relocation site. The surrounding area is fully developed with urban infrastructure and does not contain any significant areas of natural open space or areas of significant biological resource or habitat value. The Project Site is developed with the existing fuel facility, two retail buildings, and asphalt-paved parking areas. There are ornamental trees and other vegetation located on-site as landscaping within the surface parking areas. According to the U.S. Fish and Wildlife Service (USFWS) Threatened & Endangered Species Active Critical Habitat Report, no candidate, sensitive, or special status species identified in local plans, policies, or regulations, or by the California Department of Fish and Wildlife (CDFW) or the USFWS have been recorded or exist on the Project Site. Furthermore, no critical habitat was identified in the U.S. Environmental Protection Agency's NEPAssist mapping tool.

The Proposed Project would relocate seven and remove 33 non-protected trees and zero protected trees on the Project Site. While the removal of non-protected trees would not be considered a significant impact under CEQA, the removal of these trees has the potential to impact nesting bird species if they are present at the time of tree removal. Nesting birds are protected under the Federal Migratory Bird Treaty Act (MBTA) (Title 16, United States Code, Section 703 et seq., see also Title 50, Code of Federal Regulation, Part 20) and Section 3503 of the California Fish and Game Code. In accordance with the MBTA, tree removal activities would take place outside of the nesting season (February 15–September 15), if and to the extent feasible. To the extent that vegetation removal activities must occur during the nesting season, a biological monitor would be present during the removal activities to ensure that no active nests would be impacted. If active nests are found, a 300-foot buffer (500 feet for raptors) would be established until the fledglings have left the nest. Accordingly, with adherence to the Federal Migratory Bird Treaty Act and the State Fish and Game Code. Therefore, the Proposed Project would have a less than significant impact on endangered, rare, or threatened species or their habitat.

Therefore, the Proposed Project satisfies the third criterion for a Class 32 Exemption.

D. Approval of the Proposed Project would not result in any significant effects relating to traffic, noise, air quality, or water quality.

1. Traffic

The following traffic impact analysis summarizes and incorporates the information set forth in the Culver City Costco Fuel Station On-Site Relocation Transportation Study prepared by Kittelson & Associates (KA) dated May 29, 2024 (Traffic Analysis). The Traffic Analysis is included as Attachment 1 to this document.

[3] CEQA Guidelines Section 15125(a) provides: "An EIR must include a description of the physical environmental conditions in the vicinity of the project … at the time environmental analysis is commenced, from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant."

a) Programs, Plans, Ordinances, And Policies

As set forth in detail in the Traffic Analysis, the Proposed Project would not conflict with or preclude the ability of the City to implement its programs, plans, ordinances, and policies related to the transportation system.

b) VMT Analysis

On July 13, 2020, the City updated the Transportation Study Criteria and Guidelines, which include methodologies and criteria to evaluate land use and transportation projects from a VMT standpoint. Regional serving retail projects should be evaluated to determine their effect on vehicle trip length and VMT.

As set forth in detail in the Traffic Analysis, a VMT estimate was developed for the Proposed Project that takes into account the fact that the fuel station exists on the Project Site today, and the Project is an on-site relocation to this existing use, not the addition of a new use. The membership of a Costco warehouse is not related to or affected by the size of its fuel facility, and the existing demand for gas by members of the Culver City Costco warehouse would remain after the expansion. The proposed Project relocates the existing fuel station on site and removes four existing retail/commercial uses on the site (Verizon store, Subway, GNC, and Starbucks), resulting in fewer vehicle trips to the site overall. Specifically, the Proposed Project would result in a net decrease of 331 daily trips. Regarding trip lengths, the Project would be replacing trips from retail uses with trips to a gas station. Retail stores and restaurants in urban areas normally attract trips from a larger area compared to gas stations, as gasoline is a commodity that can be found in multiple locations in the West Los Angeles and Culver City area, and most consumers normally do not divert from their routes to buy gasoline. Additionally, a Costco membership is needed to use the gas station, and trips associated with the gas station are typically associated with trips to the warehouse. Conversely, retail uses have a larger number of employees that typically drive longer distances, and consumers normally drive longer distances to purchase goods and services. In summary, as the Project would generate fewer daily trips and the trip lengths associated with the Project would be shorter, the Project would result in a net decrease in VMT and, therefore, would not result in a significant impact.

c) Geometric Design Standards

As set forth in detail in the Traffic Analysis, the Project will not cause a substantial increase in on-street hazards due to geometric design or incompatible uses and, therefore, not result in a significant impact related to CEQA. The intersection queuing analysis concluded that the Project may result in increased queuing but would not result in new locations where the available storage would be exceeded at study intersections on public street approaches. Therefore, the Proposed Project would not result in a significant impact.

d) Emergency Access

The Proposed Project will retain the existing emergency access driveway on Walnut Avenue. The Proposed Project will maintain this emergency access during construction. As the Proposed Project will result in a net reduction in vehicle trips, it will not impede emergency access on area roadways. Therefore, the Proposed Project would not result in a significant impact.

2. Noise

The following noise impact analysis summarizes and incorporates the information set forth in the Costco Fuel Station Relocation Project prepared by Acoustical Engineering Services, Inc (AES) dated May 2024 (Noise Report). The Noise Report is included as Attachment 2 to this document.

a) Construction Noise Impacts

The following Project Design Features would be implemented as part of the Project to reduce the construction-related noise impacts:

PDF-1: Temporary noise barriers would be provided at the following locations to block the line-of-sight between the construction equipment and the adjacent noise sensitive uses.

- Along the project's western property line. The noise barrier shall provide minimum 20 dBA noise reduction (minimum 16 feet high, relative to local grade elevation) at the residences across the Project Site to the west (receptor location R1).
- Along the project's northern property line. The noise barrier shall provide minimum 5 dBA noise reduction (minimum 6 feet high, relative to local grade elevation) at the residences to the northwest (receptor location R5).
- Along the existing fuel station eastern property line. The noise barrier shall provide minimum 12 dBA noise reduction (minimum 12 feet high, relative to local grade elevation) to the residences across the Project Site to the east (receptor location R3).

PDF-2: The Project contractor will use power construction equipment with properly operating and maintained noise shielding and muffling devices, consistent with manufacturers' standards.

PDF-3: The Project construction activities will avoid concurrent construction with the Washington Boulevard Stormwater and Urban Runoff Project (City's Sewer Project) as follows:

- Avoid concurrent construction within 500 feet of the City's Stormwater Project and receptor location R1
- Avoid concurrent construction within 400 feet of the City's Stormwater Project and receptor location R3
- Avoid concurrent construction within 100 feet of the City's Stormwater Project and receptor location R4

The estimated noise levels from on-site temporary construction activities would temporarily increase ambient noise levels in the immediate vicinity of the Project Site. However, the construction noise level would be below the significance threshold with implementation of the specified Project Design Features. As such, Project-specific construction noise impacts would be less than significant.

b) Construction Vibration Impacts

The estimated vibration levels from Project on-site temporary construction activities would be below the significance threshold for building damage at the nearest off-site buildings to the north, south, east and west. Therefore, temporary vibration impacts associated with Project on-site construction activities would be less than significant.

The estimated vibration levels from the Project's on-site temporary construction activities would be below the 80 VdB significance threshold pursuant to human annoyance at all off-site vibration sensitive receptors. Therefore, Project-level vibration impacts from on-site construction activities with respect to human annoyance would be less than significant.

c) Operational Noise Impacts

Noise levels associated with the fuel station typical operation would include running product dispensers, vehicle circulation, and arrival, unloading and departure of a delivery truck. The estimated overall noise levels from the product dispensers and vehicles range from 13.5 dBA (L_{eq}) at receptor R2 to 43.6 dBA (L_{eq}) at receptor location R1, which would be below the existing ambient noise levels. As such, the estimated noise levels at all off-site receptor locations would be below the significance threshold of 5 dBA (L_{eq}) above ambient noise levels.

The estimated noise levels from the product delivery truck operation range from 30.3 dBA (L_{eq}) at receptor R2 to 52.5 dBA (L_{eq}) at receptor location R4, which would be consistent with the existing ambient noise levels. As such, the estimated noise levels increase at all off-site receptor locations would be below the significance threshold of 5 dBA (L_{eq}) increase over the ambient noise levels.

In addition, a noise analysis was conducted to evaluate the potential sleep disturbance associated with the product delivery trucks. The potential sleep disturbance was analyzed using the Sound Exposure Level (SEL) and based on the recommended SEL noise limit from the LAX South Airfield Improvement Project EIR. The estimated SEL noise level at all off-site receptors ranged from 65.9 dBA SEL at the exterior of receptor R2 to 88.1 dBA SEL at the exterior of receptor R4, which would be below the maximum exterior noise limit of 94 dBA SEL (assuming windows open). In addition, the estimated SEL at the interior of the residence, with the window opens (worst-case noise scenario) would be approximately 52.9 to 75.1 dBA SEL, which would be below the 81 dBA SEL interior noise limits.

A temporary 80 KVA generator would be used for the new fuel facility operation. The temporary generator for the new fuel facility operation would be used 24 hours per day, on a temporary basis. The estimated generator noise levels would be below the Project significance threshold at all off-site noise receptors.

A composite operational noise analysis was performed to evaluate the noise impacts (concurrent operation) from all Project-related noise sources, including product dispensers, vehicle queueing, and product delivery truck operations. The Project would result in a maximum increase of 0.1 dBA CNEL at receptor R2 to 2.4 dBA CNEL at receptor R1. The increases in noise levels due to Project operations (all noise sources) at off-site receptors R1, R2, R3, and R5 would be below the 5 dBA CNEL significance threshold, as the estimated noise levels would be below 65 dBA CNEL. The estimated noise level increase at off-site receptor R4 would be below the 3 dBA CNEL significance threshold for noise level greater than 65 dBA CNEL. Therefore, the composite operational noise level impacts due to Project operation would be less than significant.

3. Air Quality

The following air quality impact analysis summarizes and incorporates the information set forth in the Costco Culver City Project Air Quality/Health Risk Technical Report prepared by Ramboll Americas Engineering Solutions, Inc. (Ramboll), dated May 2024 (AQ Analysis). The AQ Analysis is included as Attachment 3 to this document.

a) Air Quality Analysis

(1) Introduction

The AQ Analysis provides an air quality assessment of the Proposed Project in compliance with the requirements of CEQA. Specifically, emissions of criteria air pollutants (CAP) associated with construction and operation of the Proposed Project were estimated in order to evaluate if the Proposed Project would cause significant air quality impacts. The AQ Analysis concludes that the Proposed Project would not cause significant air quality impacts. A brief description of the methodology and results of the analyses are provided in the following sub-sections.

(2) Methodology

Ramboll developed a criteria area pollutant (CAP) emission inventory for the construction and operation of the Proposed Project. Sources of construction emissions related to the Proposed Project include off-road equipment, fugitive dust, off-gassing from paving, architectural coatings, and on-road mobile sources. The Proposed Project would also generate emissions during operation from area sources (architectural coatings, consumer products, and landscaping), energy sources (natural gas and electricity), and mobile sources (passenger cars and fuel delivery trucks).

Ramboll utilized the California Emission Estimator Model version 2020.4.0 (CalEEMod®)[4] to quantify the CAP emissions associated with construction and operation of the Proposed Project. CalEEMod® is a state-wide program designed to calculate both criteria pollutant emissions from development projects in California developed under the auspices of the South Coast Air Quality Management District (SCAQMD), with input from other California air districts, and is currently supported by numerous lead agencies for use in quantifying the emissions associated with development projects undergoing environmental review. CalEEMod® utilizes widely accepted models for emission estimates combined with appropriate default data that can be used if site-specific information is not available. These models and default estimates use sources, such as the USEPA AP-42 emission factors[5], CARB's on-road and off-road equipment emission models, such as the EMission FACtor model (EMFAC) and the Emissions Inventory Program model (OFFROAD), and studies commissioned by California agencies, such as the California Energy Commission (CEC) and CalRecycle.

In addition, CalEEMod® contains default values and existing regulation methodologies to use in each specific local air district region. Appropriate statewide default values can be utilized if regional default values are not defined. Ramboll used default factors for the Los Angeles County area (within the SCAQMD's jurisdiction) for the emissions inventory, unless otherwise noted in the methodology descriptions below.

[4] SCAQMD. 2020. California Emissions Estimator Model®. Available at: http://www.CalEEMod.com/.

[5] The USEPA maintains a compilation of Air Pollutant Emission Factors and process information for several air pollution source categories. The data is based on source test data, material balance studies, and engineering estimates. Available at: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors.

(3) Results

(a) Criteria Air Pollutant Emissions

(i) Mass Daily Emissions

Table 4-6 to the AQ Analysis presents the maximum daily CAP emission estimates from construction of the Proposed Project. As shown in this table, the construction emissions for the Proposed Project are less than the SCAQMD mass daily significance thresholds for all pollutants. Therefore, impacts would be less than significant.

Table 4-9 to the AQ Analysis presents the maximum daily CAP emission estimates from Proposed Project operations. As shown in the table, the operational emissions for the Proposed Project are less than the SCAQMD mass daily significance thresholds for all pollutants. Therefore, impacts would be less than significant.

(ii) Localized Ambient Air Quality

Ramboll evaluated the localized ambient air quality impacts from on-site construction and operational activities for carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter less than 10 microns (PM_{10}), and particulate matter less than 2.5 microns ($PM_{2.5}$) using SCAQMD's localized significance thresholds (LSTs) methodology[6]. As shown in Table 7-1 to the AQ Analysis, the Proposed Project's localized construction and operation emissions would not result in an exceedance of SCAQMD's LSTs. Hence, the proposed construction and operational activities do not result in a significant localized impact for air quality.

(b) Health Risk Assessment

Table 5-4 to the AQ Analysis presents the health risk assessment for toxic air contaminants (TACs) for each receptor type during construction. Table 5-3 to the AQ Analysis presents the health risk assessment for TACs for each receptor type during operation. As shown in the tables, the Proposed Project TAC emissions are below the SCAQMD thresholds for cancer risk, chronic hazard index and acute hazard index. Hence, the Proposed Project would not cause a significant health risk impact during construction or operation.

(4) Conclusion

As described in the results section, the AQ Analysis concludes that the Proposed Project would not cause a significant air quality impact.

b) Regulatory Compliance Measures

As conditioned, the applicant must obtain approval from SCAQMD prior to the issuance of the building or grading permit and must comply with all SCAQMD regulations and obtain a Permit to Construct and Permit to Operate with respect to the Proposed Project.

[6] SCAQMD. Final Localized Significance Threshold Methodology. June 2003, Revised July 2008. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2.

In addition to the analysis set forth in the AQ Analysis, compliance with these regulatory compliance measures will ensure that construction and operation of the Proposed Project would not cause any significant impacts to air quality.

4. Water Quality

Fuscoe Engineering, Inc. (Fuscoe) prepared the Preliminary Final Hydrology/MS4 Study Costco Culver City Gas Station Relocation for the Proposed Project, dated September 29, 2022, Revised May 31, 2024 (Hydrology Report), which is included as Attachment 4. Based on the proposed site development layout and grading, following development of the Proposed Project the site will follow similar drainage patterns as in the existing conditions, with flow being routed to on-site catch basins before ultimately being discharged to the existing infrastructure in Washington Boulevard. All on-site drainage will be collected in a proposed private storm drain system and treated before discharging to the public street. Water quality treatment will be provided via a detention system and a modular wetland on the Project Site. Fuscoe determined that the Proposed Project's hydrology and MS4 (Municipal Separate Storm Sewer Plan) site program meets the design requirements as specified by the Culver City Hydrology and Low Impact Development (LID) Manuals. In addition, the Proposed Project will include water quality best management practices (BMPs), LID BMPs, and source controls to reduce pollutants in storm water discharges.

The following addresses CEQA Appendix G threshold questions related to hydrology and water quality.

Would the project:

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

During construction, the Proposed Project would implement an Erosion Control Plan that specifies BMPs and erosion control measures to be used during construction to manage runoff flows. These BMPs would be designed to reduce runoff and pollutant levels in runoff during construction. Therefore, impacts to water surface water quality during construction would be less than significant.

During on-site grading and building construction, hazardous materials, such as fuels, paints, solvents, and concrete additives, could be used and would therefore require proper management and, in some cases, disposal. The management of any resultant hazardous wastes could increase the opportunity for hazardous materials releasing into groundwater. However, compliance with all applicable federal, state, and local requirements concerning the handling, storage, and disposal of hazardous waste, would reduce the potential for the construction of the Proposed Project to release contaminants into groundwater. Therefore, the Proposed Project would not result in any substantial increase in groundwater contamination through hazardous materials releases, and impacts on groundwater quality during construction would be less than significant.

Under the existing conditions, there are no water quality BMPs implemented within the project area. Under the proposed conditions, biofiltration BMPs will be implemented as part of the site design. Based on the implementation of water quality BMPs consistent with the MS4 Stormwater Permit, no violations of any water quality standards or waste discharge requirements are anticipated during operation and are considered less than significant. Infiltration has not been proposed as a storm water quality solution; therefore, groundwater quality would not be affected.

Operational activities which could affect groundwater quality include spills of hazardous materials and leaking underground storage tanks (USTs). The four USTs that will be installed as part of the Proposed Project will undergo preinstallation testing to verify structural integrity and employ safety features such as

primary and secondary containment systems, spill containment and overfill prevention systems, and leak detection systems. Therefore, with compliance with applicable regulations, impacts to groundwater from the USTs would be less than significant.

The development of the expanded fuel facility would incrementally increase the use of on-site hazardous materials during operations. However, compliance with all applicable regulations regarding the handling and potentially required cleanup of hazardous materials would prevent the Proposed Project from affecting or expanding any potential areas of contamination, increasing the level of contamination, or causing regulatory water quality standards at an existing production well to be violated. Furthermore, operation of the Proposed Project would not require extraction from the groundwater supply. The Proposed Project is not anticipated to result in releases or spills of contaminants that could reach a groundwater recharge area or spreading ground or otherwise reach groundwater through percolation. Therefore, impacts to groundwater quality would be less than significant.

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

The existing site condition is 95% impervious, and infiltration and associated groundwater recharge is highly limited due to very little pervious area. Under the proposed condition, site perviousness will remain nearly the same and thus will allow the same or more incidental groundwater recharge through proposed landscaping areas. Neither the existing condition nor the Proposed Project include any groundwater pumping onsite. Therefore, impacts related to decreasing groundwater supplies is less than significant.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i) result in a substantial erosion or siltation on- or off-site;

During construction, the Proposed Project would be required to comply with all applicable City grading permit regulations that require necessary measures, plans, and inspections to reduce sedimentation and erosion. Through compliance with all NPDES General Construction Permit requirements, implementation of BMPs, and compliance with applicable City grading regulations, Proposed Project construction would not result in substantial erosion or siltation on- or off-site.

Under the existing condition, an existing storm drain system collects flows from the project areas and conveys the flows to improved storm drain facilities on Washington Boulevard before being ultimately discharged into Marina Del Rey. The site is currently 95% impervious. and the on-site and off-site storm drain systems are fully hardened and improved and are not susceptible to erosion on-site or off-site.

Under the proposed condition, the site will remain 95% impervious, and the proposed on-site storm drain will not be susceptible to erosion. The existing off-site storm drain systems will continue to be utilized. Thus, the project will not result in any increase in erosion on or off-site, and impacts are considered less than significant.

ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

Construction activities are temporary, and flow directions and runoff volumes during construction will be controlled. Through compliance with all NPDES General Construction Permit requirements, implementation of BMPs, and compliance with applicable City grading regulations, the Project would not

substantially alter the project site drainage patterns during construction in a manner that would result flooding on- or off-site.

During operation, the proposed project will not significantly alter the rate or amount of surface runoff that could impact flooding on-site or off-site. Under the proposed conditions, peak flow runoff will slightly decrease due to improved site design and a proposed storm drain system will collect runoff to minimize on-site flooding. Due to the slight decrease in proposed runoff conditions, impacts related to off- site flooding are considered less than significant.

iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

As discussed above, the project would implement an Erosion Control Plan that specifies BMPs and erosion control measures to be used during construction to manage runoff flows and prevent pollution. These BMPs would be designed to contain stormwater or construction watering on the Project Site such that runoff will not impact off-site drainage facilities or receiving water. Therefore, impacts during construction would be less than significant.

Implementation of the project will result in a decrease in proposed runoff, and the existing and proposed storm drain systems are adequately sized to accommodate flood flows. Increases in runoff water will not exceed the capacity of existing or planned stormwater drainage systems. Therefore, impacts during operation would be less than significant.

iv) impede or redirect flood flows?

The site is located in FEMA flood zone X, and therefore is located within an area of minimum flood hazard. In addition, the existing and proposed storm drain systems are adequately sized to accommodate flood flows. Further, implementation of the project will result in a small decrease in proposed runoff. As such, the project would not alter the existing drainage pattern of the Project Site in a manner that would impede or redirect flood flows, and impacts would be less than significant.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

The project is not located in an area subject to flood hazard, tsunami or seiche. The project is not located adjacent to a major body of water and is over 1.5 miles from the Pacific Ocean. The project site is not in a hillside area and is not at risk of mudflow. Therefore, impacts related to release of pollutants due to project inundation are considered less than significant.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

As discussed above in the responses to (a) and (b) above, the project would implement BMPs to filter, treat, and reduce stormwater pollutants prior to discharge from the project site in accordance with applicable regulations. Non-stormwater runoff associated with typical operations of the Project Site would also be filtered by the BMPs provided on-site prior to discharging from the Project Site. Therefore, the Project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan, and impacts would be less than significant.

5. Conclusion

Based on the foregoing, the Proposed Project satisfies the fourth criterion for a Class 32 Exemption.

E. The Project Site can be adequately served by all required utilities and public services.

The Project Site is located in an urbanized area within an existing shopping center. The Proposed Project relocates the existing gas station. The infrastructure for the utilities required to serve the Proposed Project is already in place and serve the existing gas station. The nominal increase in demand for utilities would be offset by the decrease from demolition of the existing fueling facility and commercial buildings.

The Proposed Project has no residential uses and, like the existing fuel facility, will only employ one regular employee. Therefore, the Proposed Project can be adequately served by existing police and fire services, schools, parks, and libraries.

Therefore, the Proposed Project can be adequately served by all required utilities and public services and satisfies the fifth criterion for a Class 32 Exemption.

III. Exceptions to Categorical Exemptions

Section 15300.2 of the State CEQA Guidelines provides exceptions to the exemptions depending on the nature or location of a project, including the following:

1. The project and successive projects of the same type in the same place will result in cumulative impacts;

2. There are unusual circumstances creating the reasonable possibility of significant effects;

3. The project may result in damage to scenic resources, including, but not limited to, trees, historic buildings, rock outcroppings, or similar resources, within an officially designated scenic highway;

4. The project is located on a site on any list compiled pursuant to Government code section 65962.5, as being affected by hazardous wastes or clean-up problems; or

5. The project may cause a substantial adverse change in the significance of an historical resource.

A. Cumulative Impacts

The Proposed Project and successive projects of the same type in the same place would not result in cumulative impacts.

1. Traffic

As noted above, development of the Proposed Project would not result in any significant traffic impacts. Moreover, the City would review any related project for consistency with transportation plans and VMT impacts. Each related project would be required to comply with applicable City design standards and therefore would not substantially increase hazards. Further, as the Proposed Project will maintain emergency access during construction and will result in a net reduction in vehicle trips, it would not result in a significant cumulative impact to emergency access.

2. Noise

Noise attenuates rapidly with distance and due to intervening barriers, such as buildings or landscaping. The City's Washington Boulevard Stormwater and Urban Runoff Project is the only related project in close enough proximity to the Project Site that, when combined with the Proposed Project, could potentially result in cumulative construction noise impacts. However, implementation of the Project Design Feature identified in the Noise Report will ensure that such cumulative impacts would be less than significant.

Vibration also attenuates rapidly with distance. The City's Washington Boulevard Stormwater and Urban Runoff Project is the only related project in close enough proximity to the Project Site that, when combined with the Proposed Project, could potentially result in cumulative construction vibration impacts. However, implementation of the Project Design Feature that avoids concurrent construction in proximity to sensitive receptors will ensure that such cumulative impacts would be less than significant.

Regarding mobile noise sources during operations, it generally requires a doubling of traffic volumes to result in a perceptible increase in traffic noise. As shown in the Traffic Analysis, the Proposed Project would result in a net reduction in trips and would therefore not result in a doubling of traffic volumes on any roadways. Accordingly, cumulative noise impacts from operational traffic would be less than significant.

3. Air Quality

Cumulative air quality impacts from construction and operation of the Proposed Project, based on SCAQMD guidelines, are analyzed in a manner similar to project-specific air quality impacts. The SCAQMD recommends that a project's potential contribution to cumulative impacts should be assessed utilizing the same significance criteria as those for project specific impacts. Therefore, according to the SCAQMD, individual development projects that generate construction or operational emissions that exceed the SCAQMD recommended daily thresholds for project-specific impacts would also cause a cumulatively considerable increase in emissions.

Thus, as discussed above, because the construction-related and operational daily emissions associated with Proposed Project would not exceed the SCAQMD's recommended thresholds, these emissions associated with the Proposed Project would not be cumulatively considerable. Therefore, cumulative air quality impacts would be less than significant.

4. Water Quality

The Proposed Project would not result in any significant water quality impacts. Like the Proposed Project, any other projects in the vicinity would be required to implement stormwater BMPs pursuant to Water Quality Management Plans. Mandatory structural BMPs in accordance with the NPDES water quality program and LID requirements would result in a cumulative reduction of surface water runoff, as the development in the vicinity of the Project Site is limited to infill development and redevelopment of existing urbanized areas. Therefore, by means of regulatory compliance by the Proposed Project and other projects, cumulative water quality impacts would be less than significant.

5. Utilities and Public Services

As noted above, the Proposed Project is consistent with the General Plan, the Project Site is served by existing utilities infrastructure, and the Proposed Project is not expected to result in significant new demand for utilities or public services. Adequate capacity exists to serve the Proposed Project, and it would not result in any significant cumulative impacts associated with utilities or public services.

B. Unusual Circumstances

As noted in the analyses presented herein, there are no unusual circumstances that exist in connection with the Proposed Project or surrounding environmental conditions that have the potential to result in significant environmental impacts. The Project Site is located in an urbanized area of the City and is consistent with the existing physical arrangement of the properties within the vicinity of the Project Site. The zoning designation for the Project Site is Commercial Regional Retail, the General Plan land use designation for the Project Site is Regional Commercial. The Proposed Project is permitted under the zoning and General Plan.

The Proposed Project constitutes infill development within a portion of an existing commercial shopping center along a major commercial thoroughfare and in close proximity to significant transportation facilities. There are no features of the Proposed Project, such as its size or location, that distinguish it from others in the exempt class. The relocated fuel facility is generally consistent with other gas stations in the City and other Costco fuel facilities in the area, including the existing fuel facility on the Project Site.

Therefore, no unique or unusual circumstances exist with respect to the Proposed Project that would give rise to a reasonable possibility of a significant effect upon the environment.

C. Scenic Highways

The Project Site is located in an urbanized area and does not contain any scenic resources. The Project Site is not bordered by or within the viewshed of any designated scenic highway.[7] Further, there are no protected trees or unique geologic features on-site. The Proposed Project would not damage any scenic resources within an officially designated scenic highway.

D. Historical Resources

The existing fuel facility was constructed in 2002. Based upon information set forth in the Limited Phase II Environmental Site Assessment 13431 and 13455 Washington Boulevard Culver City Gasoline Station Relocation prepared by Kleinfelder, dated December 1, 2021 (Phase II ESA), included as Attachment 5, the two commercial buildings to be removed were also constructed in approximately 2002. These buildings are utilitarian in design. Accordingly, there are no historical resources on the Project Site.

The immediate vicinity of the Project Site is developed with a shopping center and other commercial uses. There are no historical resources located in the vicinity of the Project Site.

Therefore, the Proposed Project would not cause a substantial adverse change in the significance of an historical resource.

E. Hazardous Materials

Pursuant to Government Code Section 65962.5(a), the Department of Toxic Substances Control (DTSC) shall compile and update as appropriate, at least annually, a list of all hazardous waste facilities subject to corrective action (pursuant to Section 25187.5 of the Health and Safety Code), all land designated as hazardous waste property or border zone property (pursuant to Section 25220 of the Health and Safety Code), all information received by the DTSC on hazardous waste disposals on public land (pursuant to

[7] https://dot.ca.gov/-/media/dot-media/programs/design/documents/od-county-scenic-hwys-2015-a11y.pdf; https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways

Section 25242 of the Health and Safety Code), and all sites listed pursuant to Section 25356 of the Health and Safety Code.

Pursuant to Government Code Section 65962.5(b), the Department of Health Services (DHS) shall compile and update, at least annually, a list of all public drinking water wells that contain detectable levels of organic contaminants and that are subject to water analysis pursuant to Section 116395 of the Health and Safety Code.

Pursuant to Government Code Section 65962.5(c), the State Water Resources Control Board shall compile and update, at least annually, a list of all underground storage tanks for which an unauthorized release report is filed pursuant to Section 25295 of the Health and Safety Code, a list of all solid waste disposal facilities from which there is a migration of hazardous waste and for which a California regional water quality control board has notified the DTSC pursuant to subdivision (e) of Section 13273 of the Water Code, and a list of all cease and desist orders issued after January 1, 1986, pursuant to Section 13301 of the Water Code, and all cleanup or abatement orders issued after January 1, 1986, pursuant to Section 13304 of the Water Code, that concern the discharge of wastes that are hazardous materials.

Pursuant to Government Code Section 65962.5(d), the local enforcement agency shall compile, at least annually, a list of all solid waste disposal facilities from which there is a known migration of hazardous waste. The California Integrated Waste Management Board shall compile the local lists into a statewide list, which shall be submitted to the Secretary for Environmental Protection and shall be available to any person who requests the information.

The Project Site and adjoining properties are not listed in the EnviroStor database, as confirmed in the Phase II ESA. In addition, the Project Site is not listed for cleanup, permitting, or investigation of any hazardous waste contamination on any of the lists published pursuant to Government Code Section 65962.5. Therefore, the Project Site is not located on a site that the DTSC and the Secretary for Environmental Protection have identified as being affected by hazardous wastes or clean-up problems.

Figures:

1 Project Site Map

Attachments:

1 Culver City Costco Fuel Station On-Site Relocation Transportation Study prepared by Kittelson & Associates, dated May 29, 2024.

2 Costco Fuel Station Relocation Project prepared by Acoustical Engineering Services, Inc., Inc., dated May 2024.

3 Costco Culver City Project Air Quality/Health Risk Technical Report prepared by Ramboll Americas Engineering Solutions, Inc., dated May 2024.

4 Preliminary Final Hydrology/MS4 Study Costco Culver City Gas Station Relocation for the Proposed Project, prepared by Fuscoe Engineering, Inc., dated September 29, 2022, revised May 31, 2024.

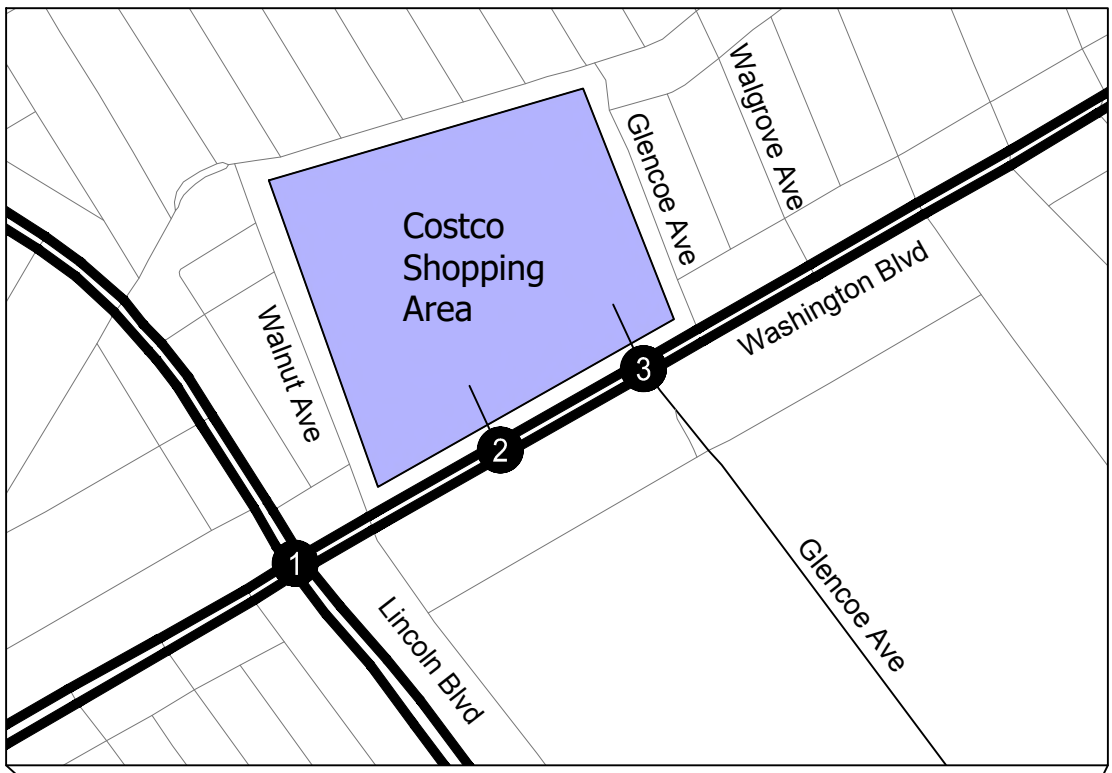
5 Limited Phase II Environmental Site Assessment 13431 and 13455 Washington Boulevard Culver City Gasoline Station Relocation prepared by Kleinfelder, dated December 1, 2021.

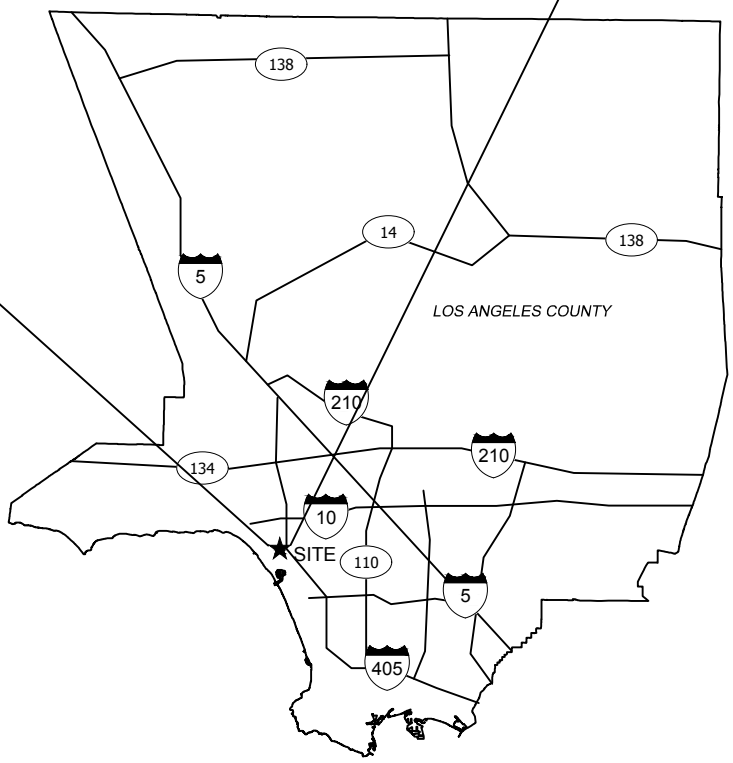
6 Protect Tustin Ranch v. City of Tustin, 70 Cal.App.5th 951 (2021)

Figure 1

Project Site Map

(Attached)





Project Location
Culver City, California

Figure
1

(##) - Study Intersections

Attachment 1

Culver City Costco Fuel Station On-Site Relocation Transportation Study
prepared by Kittelson & Associates, dated May 29, 2024.

(Attached)

KITTELSON & ASSOCIATES

CULVER CITY COSTCO FUEL STATION ON-SITE RELOCATION TRANSPORTATION STUDY

13431-13463 WASHINGTON BOULEVARD, CULVER CITY

May 29, 2024

Inside front cover

Page Intentionally blank

Costco Culver City Fuel Station On-Site Relocation Project Transportation Study

13431-13463 Washington Boulevard, City of Culver City

Prepared for:
Costco Wholesale
999 Lake Drive
Issaquah, WA 98027

Prepared by:
Kittelson & Associates, Inc.
750 The City Drive, Suite 410
Orange, CA 92868
714.468.1997

Project Manager:
Fernando Sotelo, TE
Principal Engineer

Project Principal:
Sonia Hennum Daleiden, PTOE
Senior Principal Engineer

Project Analyst:
Michael Ruiz-Leon
Karen Phan, AICP
Transportation Analysts

Project Number 24944

May 29, 2024

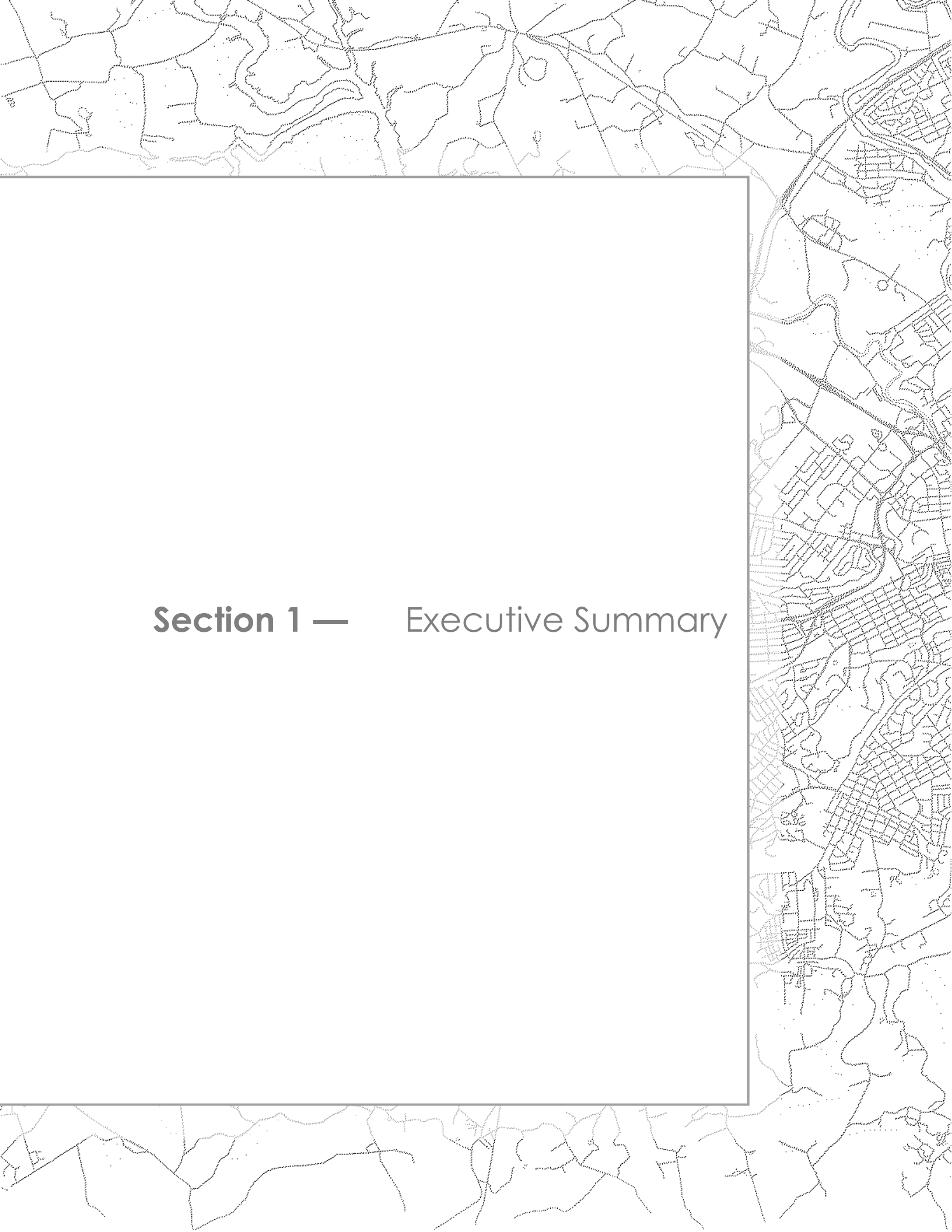
Page Intentionally blank

CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES



Section 1 — Executive Summary

EXECUTIVE SUMMARY

PROJECT DESCRIPTION

The Project proposes the relocation of an existing Costco Gasoline fuel station located within the Culver City Costco Warehouse shopping area, located at 13463 Washington Boulevard in Culver City, California. The property is currently developed with a Costco warehouse and a sixteen (16) vehicle fueling position Costco Gasoline fuel station located on the southeast corner of the property. In addition, there are several pad developments on the property including a fast-food restaurant and other retail uses. The project includes a new, approximately 13,000-square-foot fuel canopy, the installation of 15 new multi-product dispensers (MPDs), three (3) 40,000-gallon underground gasoline storage tanks (USTs), one (1) 1,500-gallon fuel additive UST, a new controller enclosure, a vapor processing unit, and associated site improvements, such as parking and landscaping. In addition, temporary noise barriers will be provided along the project's western property line, northern property line, and the existing fueling facility's eastern property line; the power construction equipment will contain noise shielding and muffling devices, consistent with manufacturers' standards; and a portion of the project construction activities will not occur concurrently with the City's Washington Boulevard Stormwater and Urban Runoff Project, as further described in the Noise Study, prepared by Acoustical Engineering Services, Inc., dated February 2023.

The existing fueling facility will be razed and removed from the site and the existing currently unoccupied commercial buildings will be demolished. The existing underground storage tanks and piping will be decommissioned and removed by state certified contractors. Following demolition, the existing fueling facility site will be improved with additional parking for the Costco Warehouse. The intent of the relocation is to install a new state of the art facility to provide a more efficient fuel purchasing experience for Costco members.

As discussed above, the on-site relocation will move the gas station to the southwest corner of the site to provide better on-site circulation and fuel station queue management. The relocation will also expand the fuel station to thirty (30) vehicle fueling positions to better serve peak period demand and reduce peak period queuing, wait times, and idling. The new location is currently occupied by retail buildings and a coffee shop with a total area of 6,890 square feet, and a Starbucks Coffee with an area of 1,590 square feet. These buildings will be demolished and therefore existing permitted trips associated with those land uses will be eliminated. [1] The on-site relocation and expansion will improve site circulation and service provided to Costco members.

The project is anticipated to be constructed during the first half of 2023 and last for 6 months. The proposed fuel station will retain the same operating hours as the existing station, operating approximately from 5:30 AM to 9:30 PM Monday through Friday, from 6:00 AM. to 8:00 PM on Saturdays, and from 6:00 AM to 7:30 PM on Sundays.

The expansion and relocation of the Culver City Costco Gasoline fuel station (along with the removal of existing retail uses) will result in a reduction in net new trips to the site. The Project is estimated to approximately reduce 13 weekday PM peak hour net new trips (6 inbound, 7 outbound) and 14 Saturday midday peak hour net new trips (8 inbound/6 outbound). On a daily basis, the Project would result in 331 fewer trips during the weekdays. While Saturday daily estimates are not available, a comparison between the peak hour trips on weekdays and Saturdays suggest that the net daily trip reduction would also occur on Saturdays.

[1] Under applicable case law (*North County Advocates v. City of Carlsbad* (2015) 241 Cal. App. 4th 94), these uses are considered to be part of the CEQA baseline even though the buildings are currently unoccupied. Therefore, this analysis includes a trip credit for the removal of these uses from the Project site. Moreover, as the buildings were occupied when the historic traffic counts at area roadways were taken, not taking such a credit would overstate post-Project traffic conditions.

SCOPE OF THE ANALYSIS

Kittelson & Associates, Inc. (Kittelson) has prepared a transportation study for the Costco fuel station on-site relocation project ("Project") at the existing Costco development on Washington Boulevard in Culver City, California. This study was prepared in consultation with City of Culver City (City) staff and consistent with the Culver City *Transportation Study Criteria and Guidelines (*"Guidelines"*) (*dated June 8, 2020) as well as a Memorandum of Understanding (MOU).

The study evaluated potential project impacts in terms of vehicle miles traveled (VMT), provided an evaluation of potential operation impacts for auto, bicycle, and pedestrian modes, and provided an evaluation of potential impacts during project construction, as summarized below.

A post-occupancy traffic count analysis of the development will be provided by the applicant if required by the City of Culver City. The analysis would be used to confirm the findings in this transportation study and would verify that the project would not result in any additional traffic impacts that would require additional mitigation measures and/or conditions of approval on the project.

SUMMARY OF CEQA ANALYSIS

CONSISTENCY WITH PROGRAMS, PLANS, ORDINANCES, & POLICIES

This transportation analysis evaluated potential for the project to preclude the ability of Culver City to implement its goals and policies. A review of key policies was conducted including the City's General Plan Circulation Element, the City's Neighborhood Traffic Management Program, Short Range Transit Plan and the Bicycle and Pedestrian Action Plan, among others. It was concluded that the proposed Project would not conflict with or preclude the ability of Culver City to implement its programs, plans, ordinances, and policies related to the transportation system.

VMT IMPACT ANALYSIS

On June 8, 2020, the City of Culver City updated the Transportation Study Criteria and Guidelines, which includes methodologies and criteria to evaluate land use and transportation projects from a VMT standpoint. Regional serving retail projects should be evaluated to determine their effect on vehicle trip length and VMT.

The Project would result in a net decrease of 331 daily trips. The Project would be replacing trips from retail uses with trips to a gas station, which on average consist of shorter trip lengths compared to those of retail trips. In summary, as the Project would generate fewer daily trips and the trip lengths associated with the Project would be less, the Project would result in a net decrease in VMT and therefore not result in a significant impact.

POLICIES & GEOMETRIC DESIGN STANDARDS

The Project will not cause a substantial increase in on-street hazards due to geometric design or incompatible uses and therefore not result in a significant impact related to CEQA. The intersection queuing analysis concluded that the Project may result in increased queuing but would not result in new locations where the available storage would be exceeded at study intersections on public street approaches.

SUMMARY OF NON-CEQA OPERATIONAL AND CONSTRUCTION ANALYSES

INTERSECTION LOS AND DELAY

Table 1 summarizes the LOS and delay at the three study intersections during the weekday PM peak hours. With Project traffic under existing and background (project opening) year conditions, there is no degradation in LOS or major changes in delay at the study intersections. Therefore, the Project would not degrade intersection operations in terms of LOS or delay during the weekday PM peak hour.

Table 1 – Intersection LOS Summary Table, Weekday PM Conditions

ID	Intersection	Existing		Existing Plus Project		Background		Background Plus Project	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Lincoln Boulevard & Washington Boulevard	62.7	**E**	62.7	**E**	67.5	**E**	67.7	**E**
2	West Access & Washington Boulevard	7.1	A	9.3	A	6.8	A	8.9	A
3	Glencoe Avenue & Washington Boulevard	41.8	D	41.9	D	48.6	D	50.8	D

Source: Kittelson & Associates, Inc. 2021
Notes: **bold** correspond to LOS E and F operations.

Table 2 summarizes the LOS and delay at the three study intersections during the Saturday peak hours. With Project traffic under existing and background year conditions, the intersection of West Access & Washington Boulevard would change from LOS A to LOS B, which is considered acceptable in terms of operations. There is no degradation in LOS or minor changes in delay at the intersections of Lincoln Boulevard & Washington Boulevard, and Glencoe Avenue & Washington Boulevard. Therefore, the Project would not degrade intersection operations in terms of LOS and delay on Saturdays.

Table 2 – Intersection LOS Summary Table, Saturday Peak Hour Conditions

ID	Intersection	Existing		Existing Plus Project		Background		Background Plus Project	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Lincoln Boulevard & Washington Boulevard	48.1	D	48.1	D	51.5	D	51.4	D
2	West Access & Washington Boulevard	9.3	A	11.3	B	8.9	A	11.0	B
3	Glencoe Avenue & Washington Boulevard	49.7	D	53.2	D	68.6	**E**	75.8	**E**

Source: Kittelson & Associates, Inc. 2021
Notes: **bold** correspond to LOS E and F operations.

INTERSECTION QUEUES

The Project would increase the queue length and exceed the turn lane storage at the following locations on public streets:

- West Access at Washington Boulevard:
  - Eastbound left-turn lane; Saturday – the 95th percentile queue at this intersection is currently exceeding the available storage at this location, in a condition where the queue extends to the adjacent eastbound through lane on Washington Boulevard. A review of aerial photography indicates that the left turn pocket cannot be extended. The Project would increase the 95th percentile queue. Modifications to the signal timing would alleviate this queue but would result in an increase in the queue compared to no project conditions.

- Glencoe Avenue at Washington Boulevard:
  - Westbound left-turn lane; weekday PM and Saturday - the 95th percentile queue at this intersection is currently exceeding the available storage at this location, in a condition where the queue extends to the adjacent westbound through lane on Washington Boulevard. A review of aerial photography indicates that the left turn pocket cannot be extended. The Project would nominally increase the 95th percentile queue by less than one vehicle. Modifications to the signal timing would offset the queue increase.
  - Northbound left-turn lane; weekday PM and Saturday- the 95th percentile queue at this intersection is currently exceeding the available storage at this location. The Project would nominally modify the queue length by less than one vehicle at this location. The queue would be contained within the northbound approach of Glencoe Avenue and would not extend to the next driveway at Beach Avenue. This would not substantially affect circulation in the area, and no modifications are recommended to address this condition.

Project-related traffic would result in an increase in the queues at the eastbound left turn lane West access at Washington Boulevard, at a location where the queue already extends past the available storage. The project will be conditioned to either the installation of a battery backup and a Video Detection camera for the existing traffic signal, or payment of a $30,000 in-lieu fee.

NEIGHBORHOOD CUT-THROUGH TRAFFIC

The Project would not add new access driveways to the circulation network. All vehicular ingress and egress would continue to occur via Washington Boulevard. No access driveway will be constructed on Walnut Avenue. Walnut Avenue and Zanja Street already have traffic calming measures that restrict cut-thought traffic on those streets. Because the Project would result in a net decrease in traffic, and because site access would continue to occur primarily via the existing access driveways at Washington Boulevard, the Project would not add cut-through traffic to the nearby residential neighborhoods.

In addition, the Project would not add vehicle trips to the study area and therefore not exacerbate cut-through traffic through the neighborhood by causing additional congestion to the study area.

POTENTIAL IMPACTS TO NON-AUTO MODES

Pedestrian and Bicycle Circulation

The existing Costco site provides decorative paving at all on-site pedestrian walkways and courtyards. The gasoline station would not generate a substantial number of pedestrian traffic to/from the warehouse and other parts of the shopping area. The new parking lot area at the location where the existing gas station is located will continue to be connected with decorative paving at all on-site pedestrian walkways and courtyards.

The Project does not include any off-site work that would adversely impact off-site bicycle and sidewalks. In addition, the proposed gasoline station would not create a substantial increase in pedestrian and bicycle activity. As such, the Project would not impact off-site pedestrian and bicycle facilities and should not be required to provide any off-site bicycle and pedestrian improvements.

Bicycle Parking

Short-term bicycle parking is provided at the main Costco warehouse. The fuel facility is not required to provide parking stalls as it is an ancillary use to the main Costco warehouse, and no goods, other than fuel, are sold at the facility. In addition, the Project will remove approximately 29 parking stalls, and the California Green Building Code only requires new bicycle parking for any new parking provided. Based on the above information, the provision of additional short-term bicycle stalls should not be required for the fuel facility.

Transit

The Project does not include any off-site work and does not impact the existing bus stops along Washington Boulevard. In addition, the Project is not anticipated to generate a significant number of additional trips to the site. As such, improvement measures are not warranted.

CONSTRUCTION

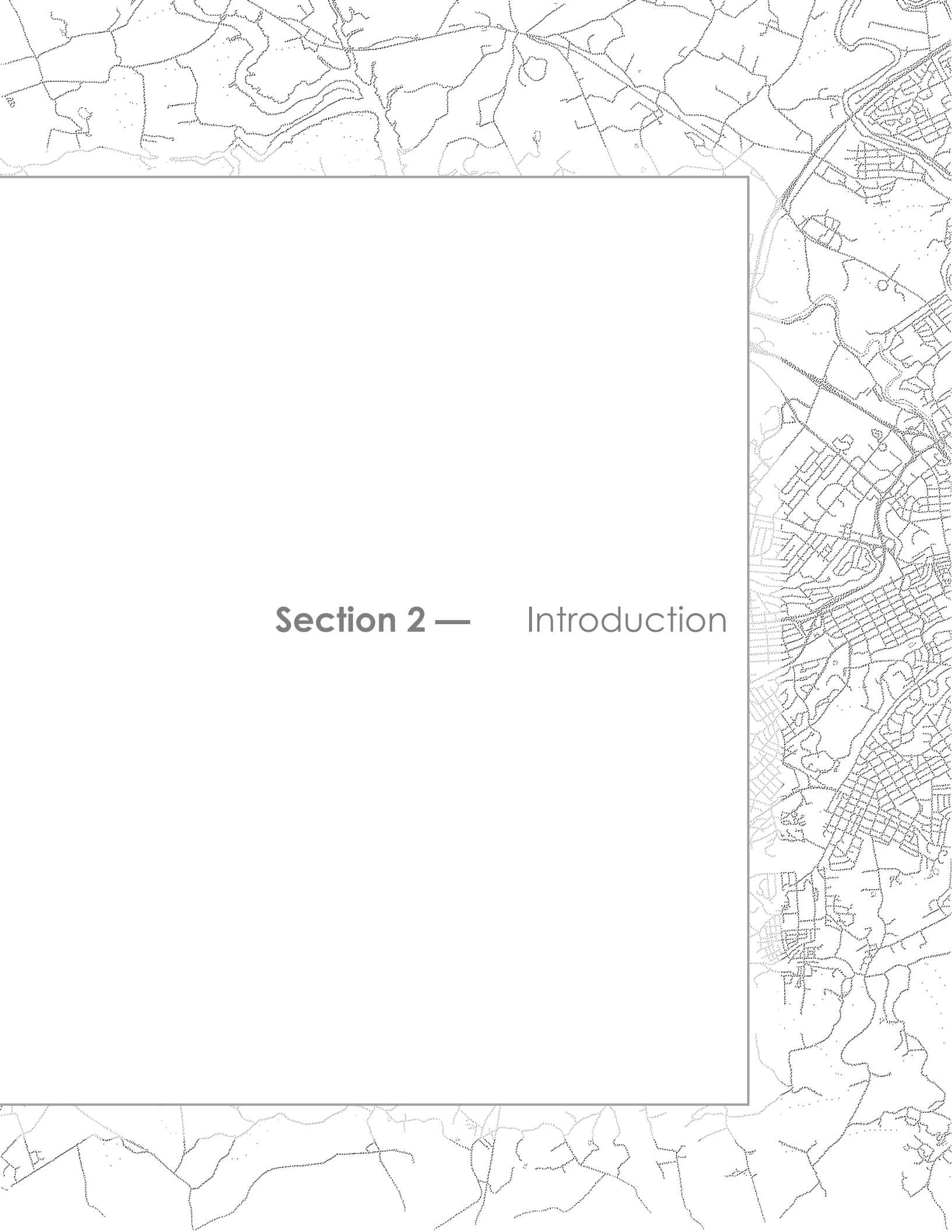
Construction of the Stormwater Project was scheduled to start in January 2022 and be completed in November 2022. However, the start of the project has been delayed. It is possible that the construction activities for both projects may overlap. As a project design feature of the Project, there would be no overlapping construction with the Washington Boulevard Stormwater close to certain nearby receptors, as described in Section 6.

During the Stormwater Project construction, the work zone traffic control plan outlines the closure of one lane of through eastbound traffic and the center median lane, as well as temporary removal of on-street parking along Washington Boulevard between the western Costco Wholesale driveway and Redwood Avenue. Furthermore, several pedestrian crosswalks will be closed during the project construction, but only across Washington Boulevard. Sidewalks along Washington Boulevard are to remain open and untouched by the project construction.

During the Stormwater Project construction, traffic in the vicinity of the Costco warehouse area could be affected by temporary lane closures, turn restrictions, potential alterations to bus stops, restrictions to local access driveways, and temporary loss of curbside parking. Traffic mitigation identified in the Washington Boulevard Diversion Traffic Management Plan, prepared by Albert Grover and Associates in December 2018, would include:

- Work zone traffic control and changeable message signs
- Facilitate flow on Washington Boulevard and alternative routes
- Intelligent project staging and work activities

To minimize congestion related to construction traffic, Costco will prepare a construction management plan in consultation with the City of Culver City, which will establish truck haul routes, access driveways, staging, parking and loading areas and traffic controls such as signage, pavement markings, cones, barricades, flaggers and other elements. The construction management plan will be submitted to the City and be approved prior to obtaining construction permits.



Section 2 — Introduction

INTRODUCTION

PURPOSE OF TRANSPORTATION STUDY & STUDY OBJECTIVES

Kittelson & Associates, Inc. (Kittelson) has prepared a transportation study for the Costco fuel station on-site relocation project ("Project") at the existing Costco development on Washington Boulevard in Culver City, California. This study was prepared in consultation with City of Culver City (City) staff and consistent with the Culver City *Transportation Study Criteria and Guidelines (*"Guidelines"*)* (dated July 13, 2020) as well as a Memorandum of Understanding (MOU) (dated February 5, 2021) agreed to by both the City and Los Angeles Department of Transportation (LADOT). The scope for this transportation analysis was developed in consultation with City of Culver City and City of Los Angeles staff. A copy of the Memorandum of Understanding is included in Appendix A.

This study evaluates the impacts to the transportation system associated with the Project and involves:

- Assessment of the project site access, internal circulation, off-site traffic operations, parking, potential conflicts with pedestrian and bicyclists, and impacts to transit facilities;
- Review of potential inconsistencies with existing City programs, plans, ordinances, and policies;
- Assessment of the Project's Vehicle Miles Traveled (VMT) impact compared to the City's adopted thresholds;
- Assessment of impacts and mitigations related to geometric design and emergency access; and
- Potential transportation impacts during construction.

PROJECT DESCRIPTION

The Project proposes the relocation of an existing fuel station located within the Culver City Costco Warehouse shopping area, located at 13463 Washington Boulevard in Culver City, California. The property is currently developed with a Costco warehouse and a sixteen (16) vehicle fueling position Costco Gasoline fuel station located on the southeast corner of the property. In addition, there are several pad developments on the property including a fast-food restaurant and other retail uses.

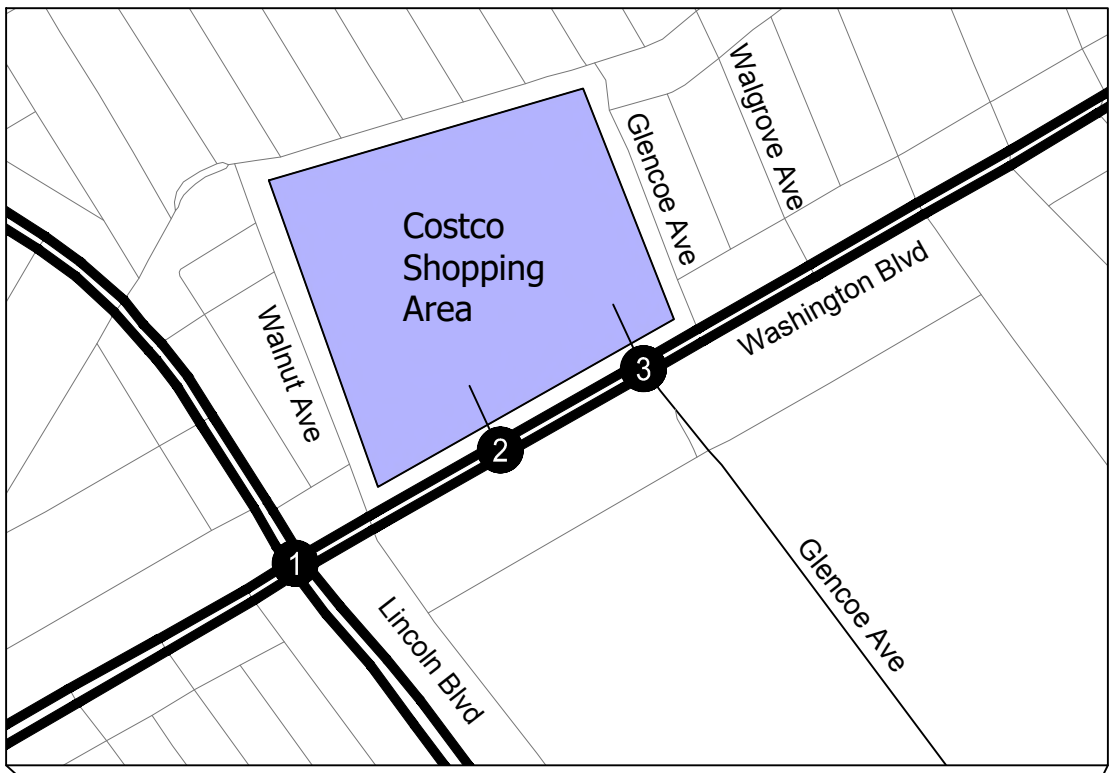
The project includes a new, approximately 13,000-square-foot fuel canopy, the installation of 15 new multi-product dispensers (MPDs), three (3) 40,000-gallon underground gasoline storage tanks (USTs), one (1) 1,500-gallon fuel additive UST, a new controller enclosure, a vapor processing unit, and associated site improvements, such as parking and landscaping. In addition, temporary noise barriers will be provided along the project's western property line, northern property line, and the existing fueling facility's eastern property line; the power construction equipment will contain noise shielding and muffling devices, consistent with manufacturers' standards; and a portion of the project construction activities will not occur concurrently with the City's Washington Boulevard Stormwater and Urban Runoff Project, as further described in the Noise Study, prepared by Acoustical Engineering Services, Inc., dated February 2023.

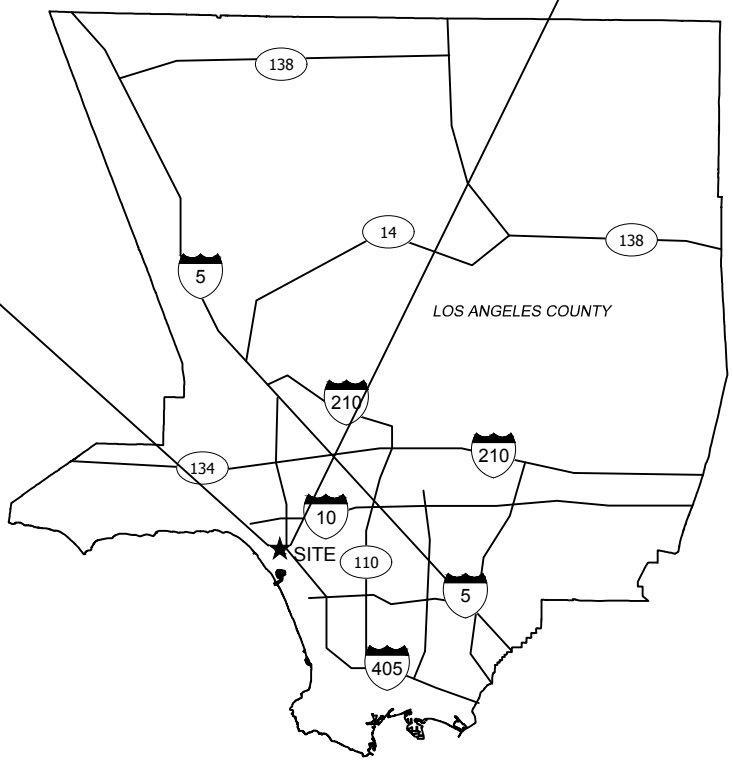
The existing fueling facility will be razed and removed from the site and the existing commercial buildings will be demolished. The existing underground storage tanks and piping will be decommissioned and removed by state certified contractors. Following demolition, the existing fueling facility site will be improved with additional parking for the Costco Warehouse. The intent of the relocation is to install a new state of the art facility to provide a more efficient fuel purchasing experience for Costco members.

The on-site relocation will move the gas station to the southwest corner of the site to provide better on-site circulation and fuel station queue management. The relocation will also expand the fuel station to thirty (30) vehicle fueling positions to better serve peak period demand and reduce peak period queuing, wait

times, and idling. The new location is currently occupied by commercial buildings with a combined total gross floor area of 8,480 square feet. The buildings previously housed a Verizon mobile phone store, a Subway sandwich shop, and a GNC shop with a total gross floor area of 6,890 square feet, and a Starbucks Coffee with a gross floor area of 1,590 square feet. These buildings will be demolished and therefore eliminate existing permitted trips associated with those land uses. The existing fuel station will also be demolished and converted into additional parking for the site. The on-site relocation and expansion will improve site circulation and service provided to Costco members. The project is anticipated to be constructed during the first half of 2023 and last for 6 months. The proposed fuel station will retain the same operating hours as the existing station, operating approximately from 5:30 AM to 9:30 PM Monday through Friday, from 6:00 AM. to 8:00 PM on Saturdays, and from 6:00 AM to 7:30 PM on Sundays.

Figure 1 shows the Costco shopping area location, and Figure 2 depicts the Costco shopping area and project site plan.

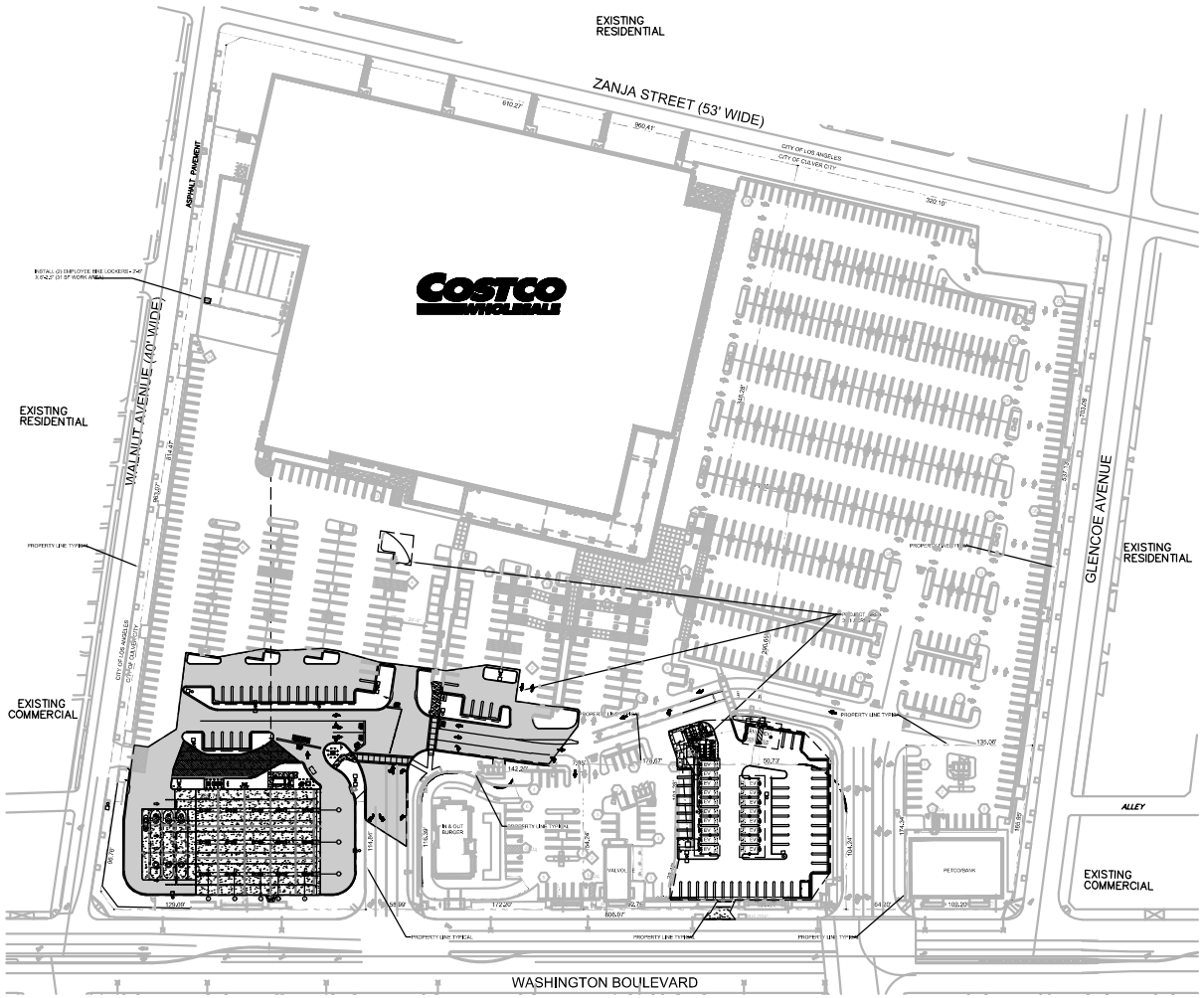




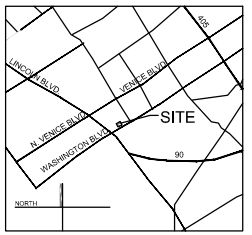
Project Location
Culver City, California

Figure
1

(##) - Study Intersections



VICINITY MAP



0 25' 50' 100'
1" = 50'-0"

COSTCO WHOLESALE
CULVER CITY, CA
#479

13463 WASHINGTON BLVD.
CULVER CITY, CA 90292

94-0630-37
FEBRUARY 7, 2024

CONCEPT
SITE PLAN
OVERLAY

DD10-19

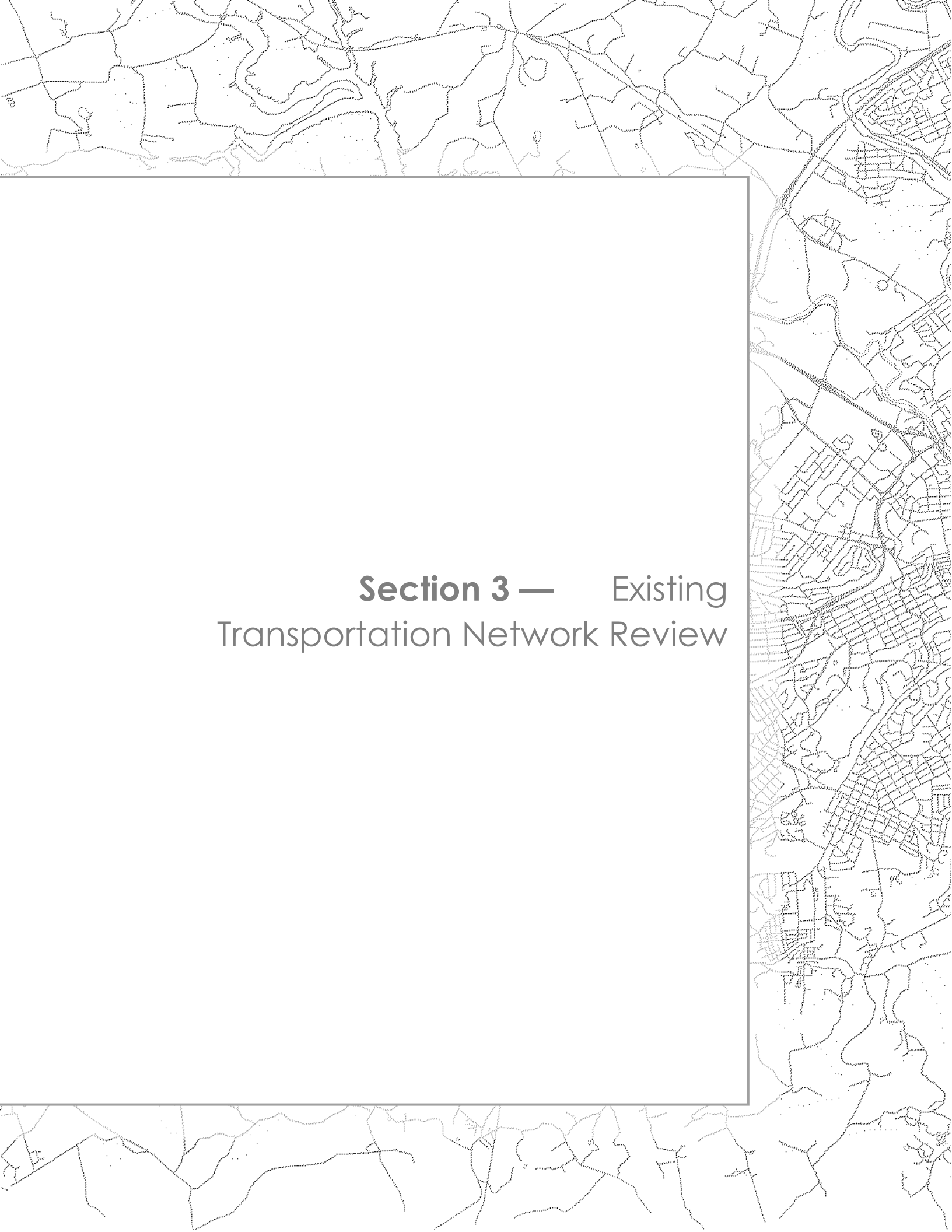
COSTCO WHOLESALE CONCEPT SITE PLAN OVERLAY

CULVER CITY, CALIFORNIA FEBRUARY 7, 2024

Proposed Site Plan
Culver City, California

Figure
2

KITTELSON & ASSOCIATES



Section 3 — Existing Transportation Network Review

EXISTING TRANSPORTATION NETWORK REVIEW

ROADWAY NETWORK

ARTERIALS

Washington Boulevard is a major east-west arterial that runs from Venice Beach, through Downtown Los Angeles, east to Santa Fe Springs Road in Whittier where it merges with Whittier Boulevard. Within the vicinity of the Project, Washington Boulevard has a speed limit of 35 miles per hour and has two travel lanes in each direction plus turn lanes at certain intersections. Metered on-street parking is generally provided on both sides of the street, which mainly abuts commercial land uses. Shared lane markings are present near the Project site, and bicycle lanes are present west of Lincoln Boulevard and east of Redwood Avenue. The main access points for the Project site are from Washington Boulevard.

Lincoln Boulevard is a major north-south arterial that runs from Sepulveda Boulevard near Los Angeles International Airport to San Vicente Boulevard in Santa Monica. Lincoln Boulevard runs just west of the Project site. Within the vicinity of the Project, Lincoln Boulevard has a speed limit of 40 miles per hour and has two to three travel lanes in each direction (two lanes north of Washington Boulevard and three lanes south of Washington Boulevard). Bicycle facilities are not present. Free on-street parking is available on both sides of the street:

- South of Washington Boulevard: two-hour parking (7 AM to 6 PM on east side; 9 AM to 4 PM on west side)
- North of Washington Boulevard: one-hour parking (varies between 9 AM to 4 PM and 8 AM to 6 PM)

Venice Boulevard is a major east-west arterial that runs from Venice Beach to Main Street in Downtown Los Angeles, where it becomes 16th Street. Within the vicinity of the Project, Venice Boulevard has a speed limit of 35 miles per hour and three travel lanes in each direction, with a raised center median. Bicycle lanes are present on both sides of the street.

COLLECTORS

Zanja Street is an east-west collector roadway that runs just north of the Project site. The roadway serves mostly residential land uses and allows free on-street parking (with some restrictions). Through movements are restricted for eastbound vehicles at Walnut Avenue – vehicles must turn right at the all-way stop-controlled intersection.

Glencoe Avenue is a north-south collector roadway that runs just east of the Project site. The roadway serves mostly residential land uses and allows free on-street parking (with some restrictions).

LOCAL ROADS

Walnut Avenue is a local north-south roadway that runs just west of the Project site. Apart from truck access to the Project site, the roadway primarily serves residential land uses. Through movements are restricted for northbound vehicles at Elm Street (vehicles must turn left) and for southbound vehicles at Zanja Street (vehicles must turn right; northbound vehicles are restricted from turning right).

Walgrove Avenue is a local north-south roadway that runs east of the Project site. Two-hour on-street parking is available on both sides of the street.

EXISTING TRANSIT SERVICE

Transit service is provided by LA Metro, Culver CityBus, and Santa Monica Big Blue Bus near the Project site, mainly along Venice Boulevard, Washington Boulevard, and Lincoln Boulevard. Table 3 presents the transit routes that serve the Project area.

Table 3 – Existing Transit Service

Agency	Transit Line	Description
LA Metro	Rapid Line 733	Rapid line offering service between Santa Monica and Downtown Los Angeles, primarily along Venice Boulevard
	Local Line 33	Local line offering service between Santa Monica and Downtown Los Angeles, primarily along Venice Boulevard
Culver CityBus	Line 1	East-west line on Washington Boulevard/Fairfax Avenue from Venice Beach to the West Los Angeles Transit Center. Key route connecting Downtown Culver City and Venice Beach to the Metro E Line Light Rail Station
	Line 2	Weekday community circulator that connects Washington Boulevard and Lincoln Boulevard with the Westfield Culver City Mall and Corporate Pointe, providing access to LA Metro lines and Santa Monica's Big Blue Bus lines
Santa Monica Big Blue Bus	Route 3	Runs mainly on Lincoln Boulevard, from LAX to Downtown Santa Monica

Source: Kittelson & Associates, Inc. 2021
Note: Table reflects transit service as of February 1, 2021

Several bus stops are located near the Project site, including one serving Culver Citybus Lines 1 and 2 along the Project frontage on Washington Boulevard. The following bus stops are located within the vicinity of the Project site.

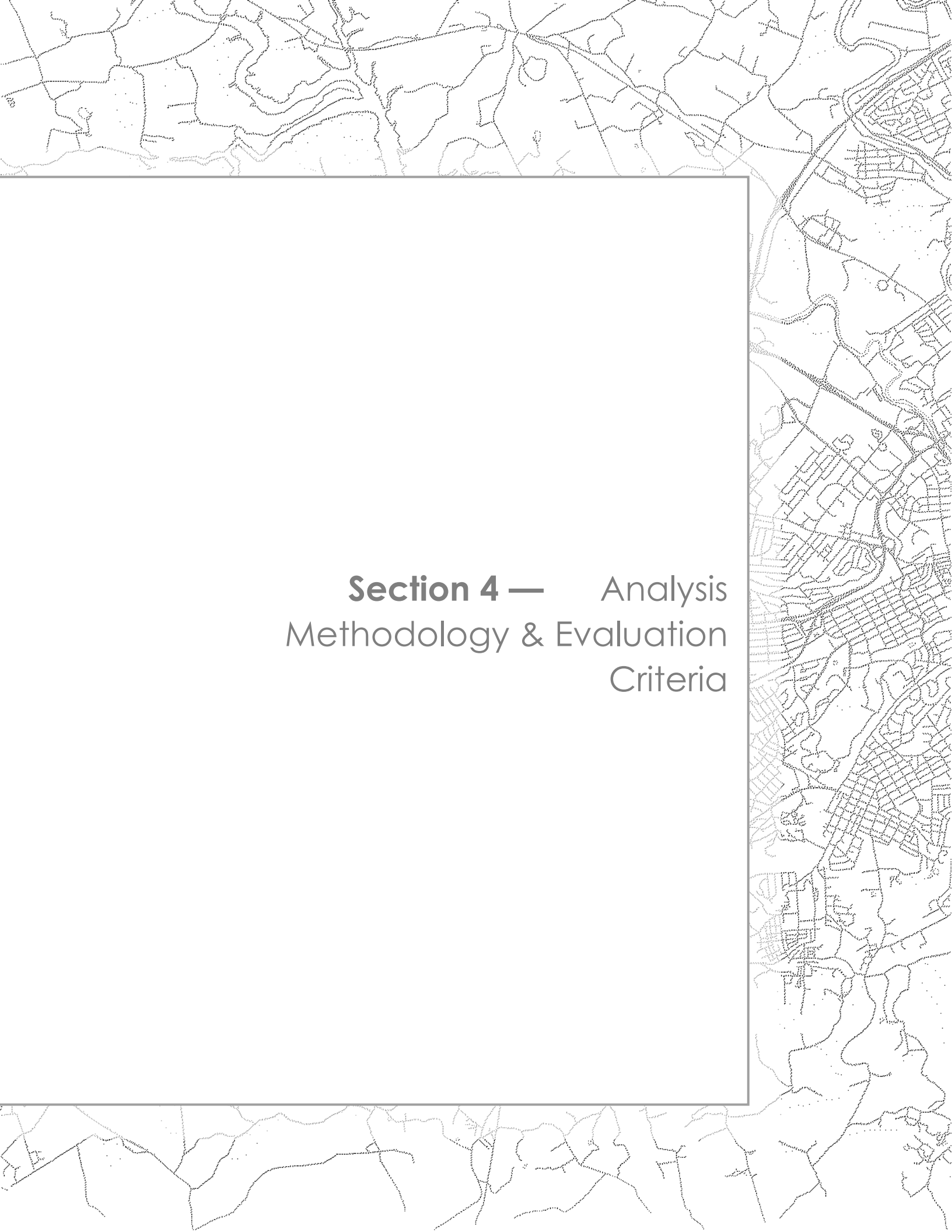
- LA Metro
  - Venice Boulevard/Lincoln Boulevard – Eastbound and Westbound (733 and 33)
  - Venice Boulevard/Walgrove Boulevard – Eastbound and Westbound (733 and 33)
  - Venice Boulevard/Glyndon Avenue – Eastbound and Westbound (33 only)
- Culver CityBus Line 1
  - Washington Boulevard/Lincoln Boulevard – Eastbound and Westbound
  - Washington Boulevard/Glencoe Avenue (near Vitamin Shoppe) – Eastbound and Westbound
  - Washington Boulevard/Redwood Avenue – Eastbound and Westbound
- Culver CityBus Line 2
  - Washington Boulevard/Redwood Avenue (near Taco Bell) – Westbound
  - Washington Boulevard/Glencoe Avenue – Westbound
  - Washington Boulevard/Lincoln Boulevard – Westbound
  - Lincoln Boulevard/Zanja Street – Westbound
  - Lincoln Boulevard/Venice Boulevard – Westbound
- Santa Monica Big Blue Bus
  - Lincoln Boulevard/Venice Boulevard – Northbound and Southbound

PEDESTRIAN & BICYCLE FACILITIES

The following bicycle facilities are present near the Project site:

- Bicycle Lanes – Class II
    - Washington Boulevard, west of Lincoln Boulevard
    - Washington Boulevard, east of Redwood Avenue
    - Venice Boulevard, entire length near Project
- Bicycle Shared Lanes (Route) – Class III
    - Washington Boulevard, between Lincoln Boulevard and Redwood Avenue

The abutting streets to the site including Walnut Avenue, Glencoe Avenue and Walgrove Avenue, contain sidewalks on both sides. There are no bikeways on connecting streets to the site. In the vicinity of the Project site, both sides of Washington Boulevard include sidewalks. The intersection of Glencoe Avenue at Washington Boulevard has crosswalks and pedestrian signal heads on the northern, southern, and eastern legs. The intersection at the west driveway and Washington Boulevard has crosswalks and pedestrian signal heads at the northern and eastern legs.



Section 4 — Analysis Methodology & Evaluation Criteria

ANALYSIS METHODOLOGY & EVALUATION CRITERIA

This section describes the methodology and significance criteria used for the California Environmental Quality Act (CEQA) transportation analysis, and the methodology used to evaluate the existing and future non-CEQA traffic operating conditions of the Project study area.

CEQA TRANSPORTATION ANALYSIS

METHODOLOGY/CEQA CHECKLIST & SIGNIFICANCE CRITERIA

According to the City of Culver City's Traffic Impact Study (TIS) Guidelines, CEQA-related potential impacts would occur if a land development project would:

- *Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?*

The proposed Project will be qualitatively evaluated to determine if it is expected to conflict with a relevant programs, plans, ordinances, and policies related to the circulation system. For the purpose of this analysis, the Project could result in a significant impact if it results in a conflict with any of the programs, plans, ordinances, and policies listed in Section 5 under the CEQA Transportation Analysis discussion. A conflict could occur if the proposed Project would preclude the ability of Culver City to implement its goals or policies.

- *Conflict or be inconsistent with CEQA Guidelines Section 15064.3(b)(1)?*

Regional serving retail projects should be evaluated to determine their effect on vehicle trip length and VMT. It is accepted that regional serving retail may be responsible for substituting longer trips for short ones. The applicable metric is the total VMT generated by a retail project. The threshold of significance for retail projects, as discussed below, if any net positive change in citywide VMT.

A project has a significant impact related to VMT if it results in VMT greater than the following thresholds:

  - Residential Use – Daily home-based daily VMT/capita – 15 percent below existing levels
  - Work Use – Daily home-based-work VMT/employee – 15 percent below existing levels
  - Regional Retail – Total VMT – Any net positive change in citywide VMT

For the purpose of this analysis, the Project would result in a potentially significant impact if it would result in a net positive change in citywide VMT.

- *Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*

Any project that causes a substantial increase in on-street hazards due to geometric design will potentially result in a significant impact. The method for determining geometric design impact involves examining the existing interactions on roadways around the project site between vehicles to vehicles, vehicles to bikes, and vehicles to pedestrians, and determining how those interactions may change with the proposed project.

NON-CEQA TRAFFIC OPERATIONS ANALYSIS

STUDY INTERSECTIONS

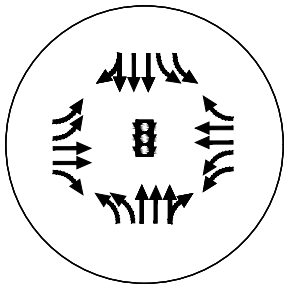
Traffic operations and queue lengths for the following signalized intersections were analyzed using methodologies from the *Highway Capacity Manual* (HCM), 6th Edition (Transportation Research Board, Washington, D.C., 2016). The study intersections were selected based on estimated trip distribution patterns and in consultation with the City. The following delay scenarios were analyzed:

- Existing
- Existing Plus Project
- Background Base
- Background Plus Project
- Background Plus Project with Improvements

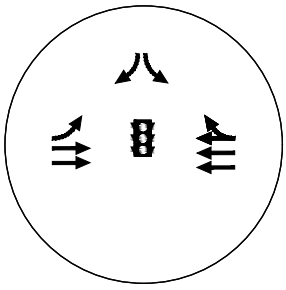
Background base corresponds to the project opening year condition in 2023 without project. Figure 3 shows the location of these intersections and the existing lane configurations and traffic control devices. All study intersections are signalized. The following are the study intersections and their jurisdictions:

- Washington Boulevard & Lincoln Boulevard (Los Angeles)
- Washington Boulevard & Project Driveway – West Access (Culver City)
- Washington Boulevard & Glencoe Avenue – East Access (Culver City)

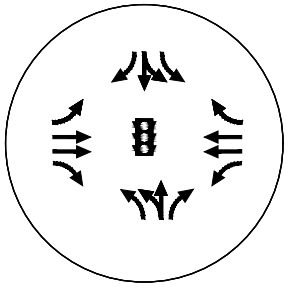
1 Washington Boulevard & Lincoln Boulevard



2 Washington Boulevard & Project Driveway



3 Washington Boulevard & Glencoe Avenue



- EXISTING TRAFFIC SIGNAL

Study Intersections
Existing Lane Configurations & Traffic Control Devices
Culver City, California

Figure
3

METHODOLOGY

Intersection Level of Service Analysis

"Level of service" describes the operating conditions experienced by users of a facility. Level of service (LOS) is a qualitative measure of the effect of several factors, including speed, travel time, traffic interruptions, freedom to maneuver, driving comfort, and convenience. Levels of service are designated "A" through "F," from best to worst, which cover the entire range of traffic operations that might occur. LOS A through E generally represent traffic volumes at less than roadway capacity while LOS F represents over capacity or forced flow conditions. In general, LOS D or better is considered acceptable while LOS E and LOS F are not. These conditions are generally described in Table 4.

All intersection level-of-service evaluations used the peak 15-minute flow rate during the weekday PM and Saturday peak hours. The peak hours were identified as the worse four consecutive 15-minute periods between 4 and 6 PM on weekdays, and between 11 AM and 1 PM on Saturdays. These represent the critical time periods for evaluation based on peak demand on the surrounding transportation system and the peak demand at the Costco fuel station. Using the peak 15-minute flow rate ensures that this analysis is based on a reasonable worst-case scenario. For this reason, the analysis reflects conditions that are only likely to occur for 15 minutes out of each average peak hour. During all other periods, the transportation system likely will operate under conditions better than the conditions described in this report.

Table 4 – General Level of Service Definitions

LOS	Description
A	**Free Flow or Insignificant Delays**: Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal.
B	**Stable Operation or Minimal Delays**: The ability to maneuver within the traffic stream is only slightly restricted, and control delay at signalized intersections are not significant.
C	**Stable Operation or Acceptable Delays**: The ability to maneuver and change lanes is somewhat restricted, and average travel speeds may be about 5 percent of the free flow speed.
D	**Approaching Unstable or Tolerable Delays**: Small increases in flow may cause substantial increases in delay and decreases in travel speed.
E	**Unstable Operation or Significant Delays:** Significant delays may occur, and average travel speeds may be 33 percent or less of the free flow speed.
F	**Forced Flow or Excessive Delays**: Congestion, high delays, and extensive queuing occur at critical signalized intersections with urban street flow at extremely low speeds.

Source: *Highway Capacity Manual*, Transportation Research Board, Washington D.C., 2016

Intersection analysis was conducted using the operational methodology outlined in the HCM at all intersections, as operationalized by the Synchro version 10 software tool. The HCM procedure calculates a weighted average stop delay in seconds per vehicle at an intersection and assigns a level of service designation based on the delay. Table 5 presents the relationship of average delay to level of service.

Table 5 – Signalized Intersection Level of Service Definitions

Average Delay Per Vehicle (Seconds)	LOS	Description of Traffic Conditions
≤10.0	A	LOS A represents free-flow travel with excellent levels of comfort and convenience and the freedom to maneuver.
>10.0 and ≤20.0	B	LOS B has stable operating conditions, but the presence of other road users causes a noticeable, though slight, reduction in comfort, convenience, and maneuvering freedom.
>20.0 and ≤35.0	C	LOS C has stable operating conditions, but the operation of individual users is substantially affected by the interaction with others in the traffic stream.
>35.0 and ≤55.0	D	LOS D represents high-density, but stable flow. Users experience severe restriction in speed and freedom to maneuver, with poor levels of comfort and convenience.
>55.0 and ≤80.0	E	LOS E represents operating conditions at or near capacity. Speeds are reduced to a low but relatively uniform value. Freedom to maneuver is difficult with users experiencing frustration and poor comfort and convenience. Unstable operation is frequent, and minor disturbances in traffic flow can cause breakdown conditions.
>80.0	F	LOS F is used to define forced or breakdown conditions. This condition exists wherever the volume of traffic exceeds the capacity of the roadway. Long queues can form behind these bottleneck points with queued traffic traveling in a stop-and-go fashion.

Source: Transportation Research Board, *Highway Capacity Manual*, Washington, D.C., 2016

Intersection Queuing Analysis

Intersection queuing analysis was conducted for the study intersections. Expected intersection queues and how they compare to intersection geometry and available queue storage influence traffic operations. The average and 95th percentile queues, as reported by Synchro 10 HCM methodology, were used to assess queuing at all study intersections. The queue storage was estimated based on the striped queue storage shown in Google Earth and field verification.

INTERSECTION ANALYSES EVALUATION CRITERIA

Intersection performance measures reported in this study include LOS and queuing. Transportation system operations were compared to applicable evaluation criteria for the City of Culver City and the City of Los Angeles. The sections below summarize each of the respective agency standards and evaluation criteria.

Culver City Intersection Delay and Queuing Evaluation Criteria

The study area includes study two intersections (#2 and #3) in Culver City, where the following criteria applies. Queuing conditions would be considered substantial if trips generated by the Project cause the queue lengths at nearby intersections to exceed the available capacity. This would apply for the Culver City study intersections.

The driveway LOS and queuing analysis should address the following questions:

- Would the project's driveways on arterial highways be limited to improve the pedestrian and bicycle environment?
- Would the location of project driveways relative to side streets or other driveways adversely affect left-turn queuing?
- Would the location of project driveways or sidewalls of structures affect motorists' visibility of vehicles, pedestrians, or bicyclists?

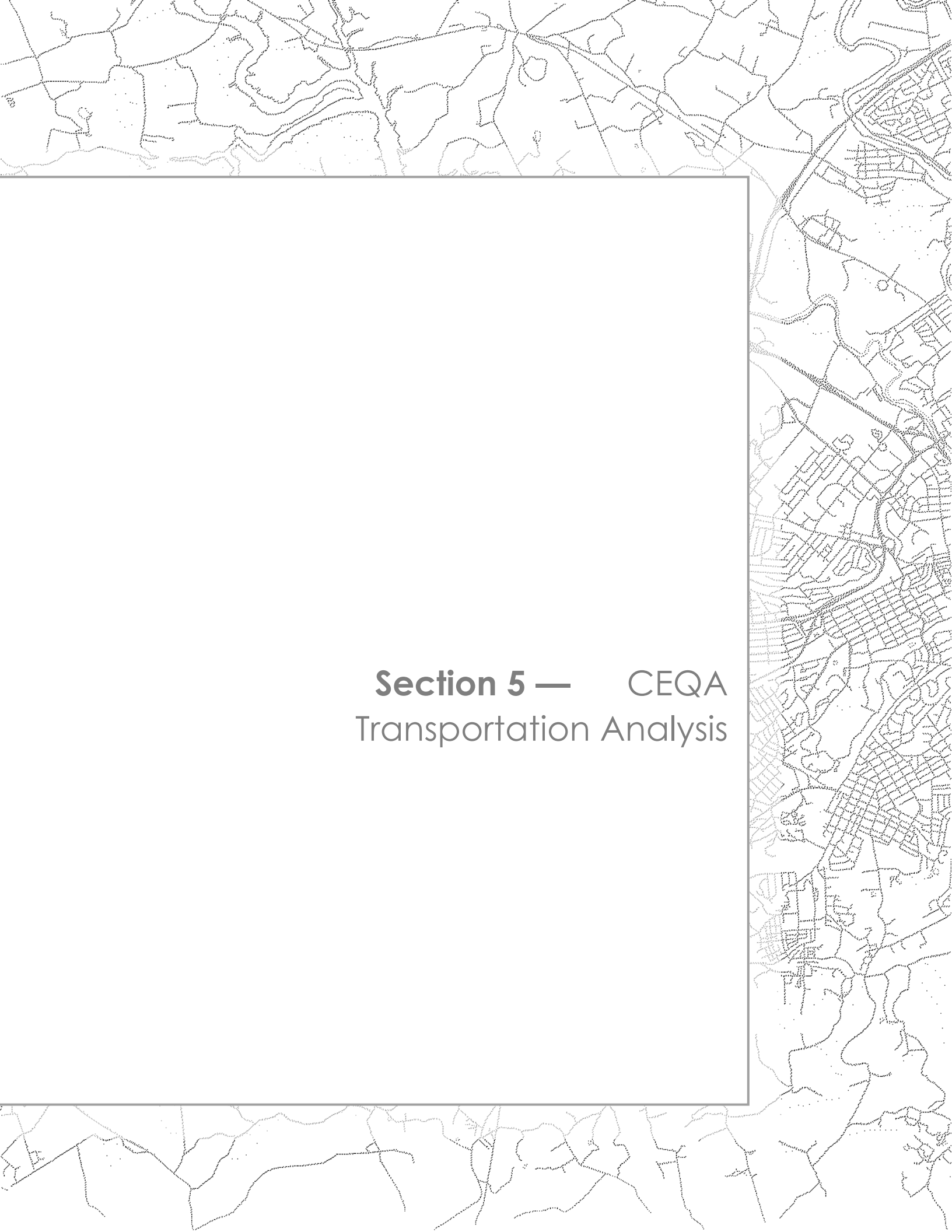
Los Angeles Intersection Delay and Queuing Evaluation Criteria

The study area includes intersections (#1) in Los Angeles, where the following criteria applies. For land use and transportation projects, the City of Los Angeles Transportation Assessment Guidelines calls for a quantitative evaluation of the project's expected access and circulation operations. According to the guidelines, project access is considered constrained if the project's traffic would contribute to unacceptable queuing on an Avenue or Boulevard (as designated in the City of Los Angeles Mobility Plan 2035) at project driveway(s) or would cause or substantially extend queuing at nearby signalized intersections. Unacceptable or extended queuing may be defined as follows:

- Spill over from turn pockets into through lane
- Block cross streets or alleys
- Contribute to "gridlock" congestion. For the purposes of this section, "gridlock" is defined as the condition in which traffic queues between closely spaced intersections impedes the flow of traffic through upstream intersections.

POST-OCCUPANCY TRAFFIC ANALYSIS

A post-occupancy traffic count analysis of the development will be provided by the applicant if required by the City of Culver City. The analysis would be used to confirm the findings in this transportation study and would verify that the project would not result in any additional traffic impacts that would require additional mitigation measures and/or conditions of approval on the project. The study will be prepared approximately six months to a year after project construction or at a time where traffic patterns are no longer impacted by COVID-19 conditions.



Section 5 — CEQA Transportation Analysis

CEQA TRANSPORTATION ANALYSIS

The following provides an evaluation of the Project's (1) potential conflicts with City's programs, plans, ordinances, and policies, (2) impacts in terms of VMT, and (3) potential geometric design hazards.

PROGRAMS, PLANS, ORDINANCES, AND POLICIES

The City has many programs, plans, ordinances, and policies related to the transportation system in Culver City. The following discusses the primary programs, plans, ordinances, and policies related to the Project and the study area:

TRAFFIC CODE, CHAPTER 7.05: MOTOR VEHICLE AIR QUALITY MANAGEMENT

Chapter 7.05 of the Culver City Municipal Code outlines the requirements for new developments regarding transportation demand and trip reduction measures, maintenance, and violations and resulting penalties. Per Section 7.05.15, the requirements in this chapter are applicable to projects that result in a net increase of twenty-five thousand (25,000) or more gross square feet of floor area. The proposed Project does not meet this threshold and therefore is not required to meet the development standards and trip reduction measures provided in the code.

CITY OF CULVER CITY GENERAL PLAN CIRCULATION ELEMENT

The currently adopted Circulating Element (1994) includes several goals and policies related to the Project area, such as improving traffic flow, expanding public transit service and ridership, providing convenient and pleasant pedestrian access, and minimizing traffic hazards and accidents. As demonstrated in this study, the Project would generate a net reduction in trips and would not degrade intersection operations in terms of LOS and delay on Saturdays. Also, the Project would not add new access driveways to the circulation network; all vehicular ingress and egress would continue to occur via Washington Boulevard. No substantial hazards related to design have been identified. Finally, the Project would not include any off-site work and would not impact off-site bicycle and sidewalks; therefore, the Project would not result in significant impacts to off-site pedestrian and bicycle facilities. In summary, the Project would not conflict with the goals and policies in the General Plan Circulation Element.

CITY OF CULVER CITY GENERAL PLAN LAND USE ELEMENT

The currently adopted Land Use Element (1996) is intended to guide land use and development with Culver City by designating the general distribution, intensity, and development policies regarding various land uses. The land use map designates the Project location as a "Regional Center", which allows large-scale commercial uses that serve regional residential and business communities. Policy 24.C specifically calls for development of this Project site as a regional serving commercial center. The Project does not conflict with policies or goals stated in the Land Use Element or propose a change in land use or function.

NEIGHBORHOOD TRAFFIC MANAGEMENT PROGRAM

This analysis evaluates the potential for Project traffic that can adversely affect the character and function of local streets in the vicinity of the Project site cut-through trips. Cut-through trips are defined as those which feature travel along local streets (e.g., Walnut Avenue, Glyndon Avenue, Louella Avenue, Glencoe Avenue, and Zanja Street) with residential land-use frontage, as an alternative to traveling through major streets (e.g., Washington Boulevard and Lincoln Boulevard) to access a destination that is not within the neighborhood within which the local street is located. Effects on residential streets near the Project site are determined[1] based on the following analysis:

- Assess the potential for cut-through traffic generation and preventive measures such as traffic calming subject to community input
- Assess the potential for neighborhood parking intrusion and preventive measures

The City of Culver City Transportation Impact Guidelines sets criteria to determine if a project creates significant conditions on a local residential street. The thresholds are shown in Table 6 below.

Table 6 – Culver City Related Projects

Projected ADT With Project	Significant Project-Related Increase in ADT Volume
999 or Less	120 or more
1,000 to 1,999	12 percent or more of final ADT
2,000 to 2,999	10 percent or more of final ADT
3,000 or More	8 percent or more of final ADT

Source: City of Culver City Transportation Impact Guidelines

The Project would not add new access driveways to the circulation network. All vehicular ingress and egress would continue to occur via Washington Boulevard. The project will retain the existing emergency access driveway on Walnut Avenue. This driveway is gated and not available for customer and employee use. No new access driveways would be accessible to customers and employees through nearby local streets. Walnut Avenue and Zanja Street already have traffic calming measures that restrict cut-through traffic on those streets. Because the Project would result in a net decrease in traffic, and because site access would continue to occur primarily via the existing access driveways at Washington Boulevard, the Project would not add cut-through traffic to the nearby residential neighborhoods.

Sometimes cut-through traffic can be exacerbated by development projects that add vehicle trips to congested arterial street segments. However, the Project would not add vehicle trips to the study area or cause any intersection levels of service to degrade to unacceptable levels and therefore would not exacerbate cut-through traffic by causing additional congestion to the study area.

GATEWAY NEIGHBORHOOD DESIGN GUIDELINES

The Project does not fall within the Gateway Neighborhood area and the Gateway Neighborhood Design Guidelines are therefore not applicable.

GATEWAY ADJACENT NEIGHBORHOOD DESIGN GUIDELINES

The Project does not fall within the Gateway Adjacent Neighborhood area and the Gateway Adjacent Neighborhood Design Guidelines are therefore not applicable.

[1] Per City's Transportation Impact Guidelines.

RESIDENTIAL PARKWAY GUIDELINES

The Project is not located along a Residential Parkway and the Residential Parkway Guidelines are therefore not applicable.

UPPER CULVER CREST HILLSIDE DESIGN STANDARDS

The Project does not fall within the Upper Culver Crest area and the Upper Culver Crest Hillside Design Standards are therefore not applicable.

SHORT RANGE TRANSIT PLAN

The Project does not include any off-site work and does not impact the existing bus stops along Washington Boulevard. In addition, the Project is not anticipated to generate additional transit trips to the site, as it would consist of a fuel station.

Because the Project would not generate new transit trips and would not affect transit service, placement of bus stops or bus lanes, the Project would not conflict or impact transit service or conflict with Culver City's transit planning efforts.

BICYCLE AND PEDESTRIAN ACTION PLAN

The new parking lot area where the existing gas station is located will continue to be connected with decorative paving at all on-site pedestrian walkways and courtyards.

Culver City's Bicycle and Pedestrian Action Plan supersedes the 2010 *Bicycle and Pedestrian Master Plan* and sets an overall vision and actions to establish walking and cycling as viable modes of travel for all trip types. The plan recommends the following active transportation improvements near the Project site.

- Class II bicycle lanes on Washington Boulevard, between Lincoln Boulevard to Zanja Street
- Improved pedestrian crossings
    - Washington Boulevard/Glencoe Avenue – Restripe existing crosswalks as continental (across Glencoe and driveway)
    - Washington Boulevard/Beethoven Street – Restripe existing crosswalks

The following provides a review of the internal pedestrian circulation and the site's connectivity with Washington Boulevard, including sidewalks and transit service/bus stops.

Pedestrian and Bicycle Circulation

The existing Costco site provides decorative paving at all on-site pedestrian walkways and courtyards. Two (2) 4-foot-wide pedestrian accesses will continue to be provided from the warehouse to Washington Boulevard. Pedestrian walkways throughout the parking area provide a pedestrian-friendly environment that will not be impacted by the Project.

The proposed gasoline station would not generate a substantial amount of pedestrian traffic to/from the warehouse and other parts of the shopping area. Internal pedestrian paths and crosswalks would connect the sidewalk on Washington Boulevard via the west/left side of the western access driveway to a pedestrian path oriented in the north-south direction towards the warehouse. These paths would be linked with new crosswalks as follows: (1) a continental crosswalk on the south leg of the intersection and (2) a continental crosswalk on the east leg of the intersection.

The crosswalks at the Project driveway/Washington Boulevard and Glencoe Avenue/Washington Boulevard intersections and the *Keep Clear* marking on Washington Boulevard will be re-striped as a result of the City's stormwater control project; therefore, a refresh is not required for the Costco Fuel Facility project.

The project includes the repairment of three (3) sidewalk panels along Washington Boulevard fronting the project site. The project will also close the existing gas station exit driveway, so there will be minor off-site work associated with that closure. As the egress driveway from the gas station is eliminated, vehicles would no longer cross the pedestrian path, improving pedestrian experience.

The proposed gasoline station would not create a substantial increase in pedestrian and bicycle activity and will provide improvements to sidewalks and crosswalks noted above. As such, the Project would not impact off-site pedestrian and bicycle facilities and would not conflict with the Bicycle and Pedestrian Action Plan.

Bicycle Parking

Short-term bicycle parking is provided at the main Costco warehouse. The City requirement to provide bicycle parking correlates to minimum parking requirements for new buildings (e.g., 5 percent of required parking spaces). Based on previous discussions with City staff, the fuel facility is not required to provide parking stalls as it is an ancillary use to the main Costco warehouse and no goods, other than fuel, are sold at the facility. In addition, the Project will remove approximately 29 parking stalls, and the California Green Building Code only requires new bicycle parking for any new parking provided. Based on the above information, the provision of additional short-term bicycle stalls is not needed for the fuel facility.

As demonstrated, the Project would not impact off-site pedestrian and bicycle facilities and would not conflict or impact bicycle and pedestrian travel and inhibit implementation of potential pedestrian and bicycle improvement projects or conflict with Culver City's bicycle and pedestrian planning efforts.

LOCAL ROAD SAFETY PLAN

Culver City is currently developing a comprehensive Local Road Safety Plan (LRSP) to identify traffic safety improvements to reduce fatal and severe injuries. The plan has not yet been published, it is antecipated to be considered by City Council in the fall of 2021.

SUMMARY OF PROGRAMS, PLANS, ORDINANCES, AND POLICIES

In summary, the proposed Project would not conflict with or preclude the ability of Culver City to implement its programs, plans, ordinances, and policies related to the transportation system.

VEHICLE-MILES TRAVELED ANALYSIS

Senate Bill 743 (SB 743) was signed into law in September 2013. Senate Bill 743 (Steinberg, 2013) requires changes to the CEQA Guidelines regarding the analysis of transportation impacts. Historically, CEQA transportation analyses of individual projects determined impacts in the circulation system in terms of roadway delay and/or capacity at specific locations. SB 743 changes include the elimination of auto delay, level of service (LOS), and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts and identified vehicle miles traveled (VMT) as the most appropriate metric to evaluate a project's transportation impacts. Since the bill has gone into effect, automobile delay, as measured by "level of service" and other similar metrics, no longer constitutes a significant environmental effect under CEQA. Auto-mobility (often expressed as "level of service") may continue to be a measure for the local agency planning purposes. In December 2018, the California Governor's Office of Planning and Research (OPR) and the State Natural Resources Agency submitted updated CEQA Guidelines to the Office of Administrative Law for final approval to implement SB 743. The Office of Administrative Law approved the updated CEQA Guidelines, thus implementing SB 743 and making VMT the primary metric used to analyze transportation impacts. The final text, final statement of reasons, and related materials are posted at http://resources.ca.gov/ceqa. The changes have been approved by the Office of the Administrative Law and are now in effect. For land use and transportation projects, SB 743-compliant CEQA analysis became mandatory on July 1, 2020.

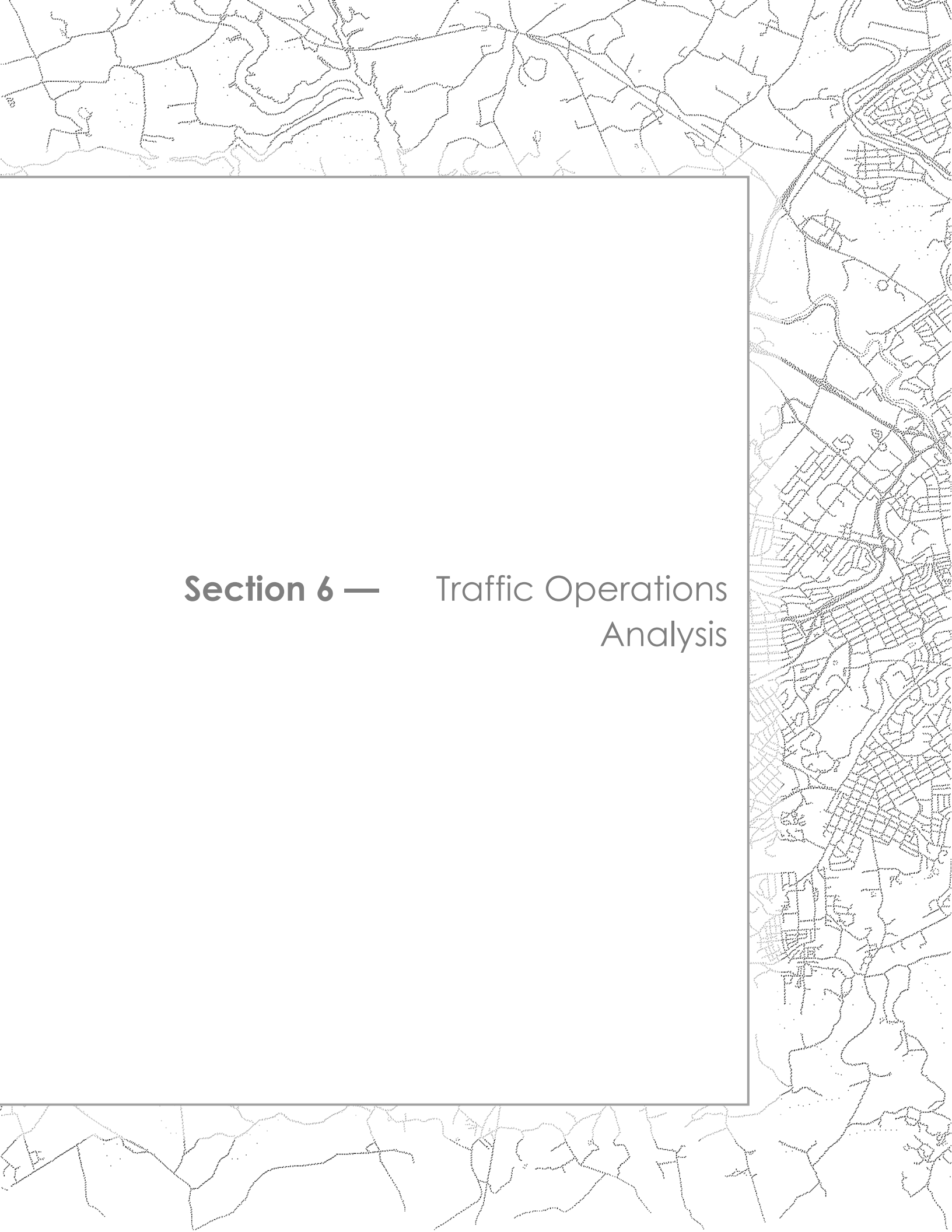
On July 13, 2020, the City of Culver City updated the Transportation Study Criteria and Guidelines, which includes methodologies and criteria to evaluate land use and transportation projects from a VMT standpoint. Regional serving retail projects should be evaluated to determine their effect on vehicle trip length and VMT. VMT provides an indication of the amount of travel in the roadway system by multiplying the number of trips by the distance traveled. For example, 10 vehicles taking 10-mile trips each would result in a total of 100 VMT. In developing a VMT estimate for the fuel station expansion, it is important to recognize that the fuel station exists on site today, and the Project is an expansion an on-site relocation to this existing use, not the addition of a new use. The membership of a Costco warehouse is not related to or affected by the size of its fuel facility, and the existing demand for gas by members of the Culver City Costco warehouse would remain after the expansion. The proposed Project relocates the existing fuel station on site and removes four existing retail/commercial uses on the site (Verizon store, Subway, GNC, and Starbucks), resulting in fewer vehicle trips to the site overall. Specifically, using Costco trip rates, the project would result in a net decrease of 331 daily trips. Regarding trip lengths, the Project would be replacing trips from retail uses with trips to a gas station. Retail stores and restaurants in urban areas normally attract trips from a larger area compared to gas stations, as gasoline is a commodity that can be found in several locations in the west Los Angeles and Culver City area, and most consumers normally do not divert from their routes to buy gasoline. Additionally, a Costco membership is needed to use the gas station, and trips associated with the gas station are typically associated with trips to the warehouse. Conversely, retail uses have a larger number of employees that typically drive longer distances, and consumers normally drive longer distances to purchase goods and services.

In summary, as the Project would generate fewer daily trips and the trip lengths associated with the Project would be less, the Project would result in a net decrease in VMT and therefore not result in a significant VMT impact.

GEOMETRIC DESIGN HAZARDS

As previously discussed, the method for determining geometric design impact involves examining the existing interactions on roadways around the project site between vehicles to vehicles, vehicles to bikes, and vehicles to pedestrians, and determining how those interactions may change with the proposed project. The project would not generate additional vehicular and pedestrian and bicycle traffic. The project site would not alter site access driveways or introduce new off-site crosswalks or modify the location of sidewalks, crosswalks, bike lanes and transit stops. Therefore, this analysis focuses on the potential for project traffic to result in greater queues at intersections.

To determine potential design hazards, intersection queuing analysis were conducted for the study intersections to identify locations where the queue length would exceed the available turn pockets (see Section 6). The intersection queuing analysis concluded that the Project would not result in new locations where the available storage would be exceeded at study intersections on public street approaches.



Section 6 — Traffic Operations Analysis

TRAFFIC OPERATIONS ANALYSIS

EXISTING CONDITIONS

EXISTING TRAFFIC VOLUMES

Due to atypical traffic conditions associated with the COVID-19 pandemic, turning movement counts were not collected at study intersections, as they would not represent typical traffic conditions in the area. Instead, existing (2020) volumes were developed using historic counts (included in Appendix B) and applying adjustments, as described below:

- Costco Accesses on Washington Boulevard: Weekday PM peak hour and Saturday midday turning movement counts were collected in 2018 for both the Glencoe Avenue/East Costco Access & Washington Boulevard and the West Costco Access & Washington Boulevard study intersections for the Washington Boulevard Diversion Project. According to the LA County 2010 Congestion Management Program, growth in the area near the 2020 is estimated to be 0.5 percent per year. To be conservative and consistent with other traffic impact studies prepared for projects in Culver City, an annual growth rate of 1 percent per year was utilized. Therefore, for the intersections of Glencoe Avenue/East Costco Access & Washington Boulevard and the West Costco Access & Washington Boulevard, a growth rate of 1 percent per year growth rate was applied to the 2018 weekday PM peak hour and Saturday midday peak hour turning movement counts to estimate typical 2020 volumes.
- Washington Boulevard & Lincoln Boulevard: Historical weekday PM peak hour counts were obtained from the City of Los Angeles traffic count database. Traffic counts for this intersection were retrieved for the years 2009, 2011, and 2019. The average growth rate is negative between the previous years and 2019. The most recent 2019 traffic counts were used and adjusted by applying a growth rate of 1 percent per year that was estimated in the LA County 2010 Congestion Management Program to estimate typical 2020 weekday PM peak hour counts.

  Because no Saturday midday turning movement counts are available, an adjustment of 4.2 percent was applied to the 2020 weekday PM peak hour counts to obtain 2020 Saturday midday peak hour counts. This rate was determined by comparing the westbound and eastbound through movements at the intersections along Washington Boulevard during the weekday PM peak hour and Saturday midday peak hour. The average difference between the weekday PM and Saturday midday is 4.2 percent (1.7% WB/6.7% EB).

The latest signal timings for signalized intersections were obtained from Culver City and the City of Los Angeles Department of Transportation. Figure 4 shows the existing 2020 traffic volumes for the three study intersections for the weekday PM and Saturday midday peak periods. As previously discussed, a post-occupancy traffic count analysis of the development will be provided by the applicant if required by the City of Culver City. The analysis would be used to confirm the findings in this transportation study to confirm the traffic generated and intersection operations after the Costco fuel station and Washington Boulevard stormwater and urban runoff projects are completed.

EXISTING CONDITIONS INTERSECTION ANALYSIS

As previously discussed, the operational intersection analysis was conducted using the HCM methodology and reflecting the weekday evening commute and Saturday peak hour conditions. Table 7 summarizes existing traffic operations. As shown in Table 7, the existing signalized intersections operate at Level of Service ranging from "A" to "E" or better during the weekday PM peak hour and Saturday midday peak hours. Appendix C contains the year 2020 existing conditions Synchro worksheets.

Table 7 – Existing Conditions Intersection Operations

ID	Intersection	Weekday PM		Saturday Peak	
		Delay	LOS	Delay	LOS
1	Lincoln Boulevard & Washington Boulevard	62.7	**E**	48.1	D
2	West Access & Washington Boulevard	7.1	A	9.3	A
3	Glencoe Avenue & Washington Boulevard	41.8	D	49.7	D

Source: Kittelson & Associates, Inc. 2021
Notes: **bold** correspond to LOS E and F operations.

Existing Signalized Queuing Analysis

Signalized queues at the intersection of Lincoln Boulevard and Washington Boulevard and at the two access intersections are summarized in Table 8.

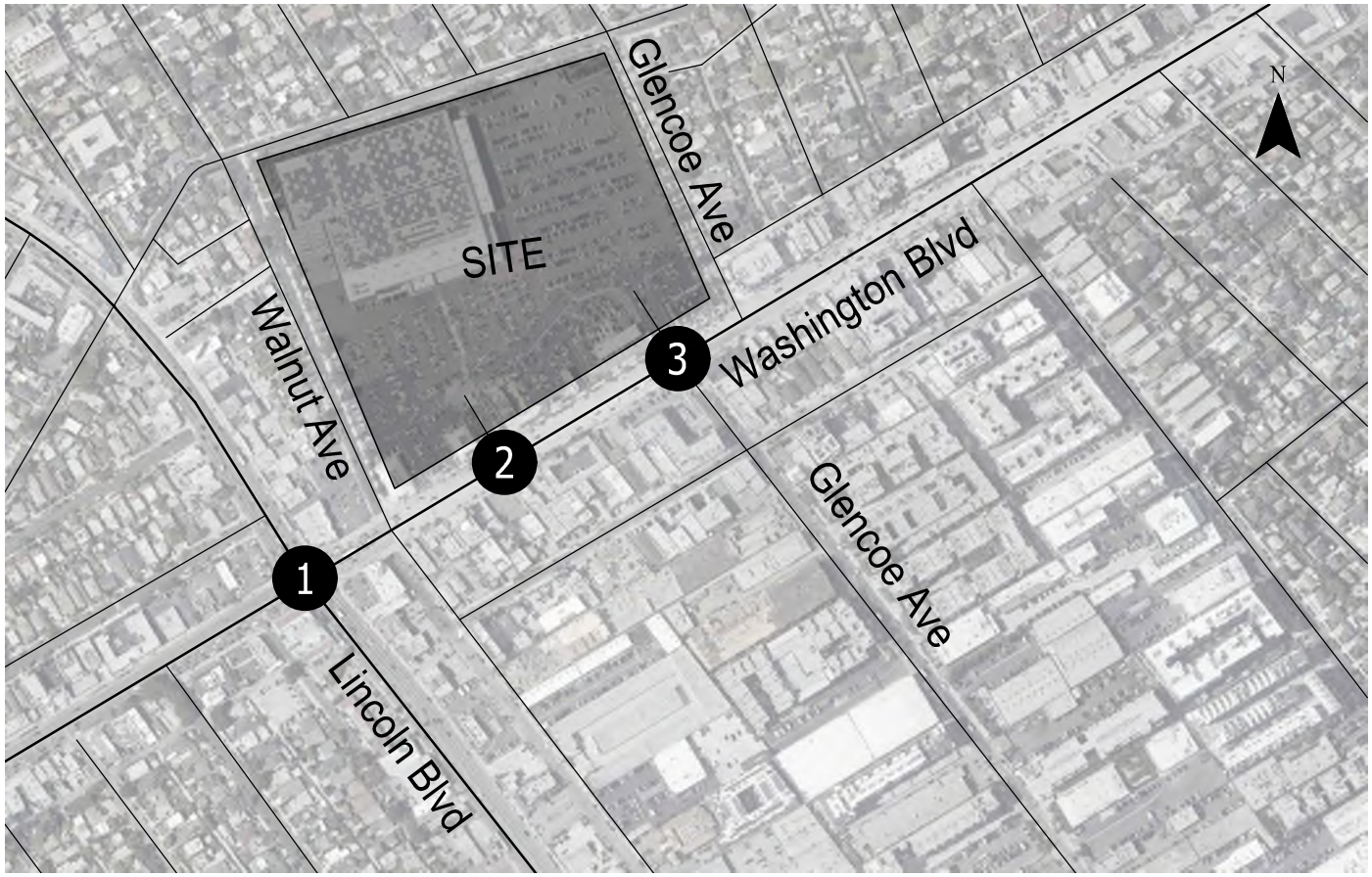
Table 8 – Existing Queuing at Intersections

ID	Intersection	Movement	Available Storage (ft)	Average | 95th Percentile Queue	
				Weekday PM	Saturday Midday
1	Lincoln Boulevard & Washington Boulevard	EBL	250	28 | 53	18 | 33
		EBR	350	209 | 322	227 | 349
		WBL	350	167 | 262	91 | 122
		WBR	470	46 | 86	48 | 92
		NBL	400	206 | 370	160 | 290
		SBL	200	62 | 98	47 | 74
2	West Access & Washington Boulevard	EBL	170	30 | 63	79 | **181**
		SBL	175	91 | 146	136 | **213**
		SBR	175	105 | 161	113 | 173
3	Glencoe Avenue & Washington Boulevard	EBL	375	14 | 37	17 | 36
		EBR	435	14 | 80	30 | 108
		WBL	300	219 | **523**	226 | **407**
		WBR	150	80 | **207**	118 | **257**
		NBL	145	136 | **203**	107 | **174**
		NBR	400	0 | 90	54 | 91
		SBL	165	**187** | **270**	**173** | **270**
		SBR	165	0 | 30	0 | 33

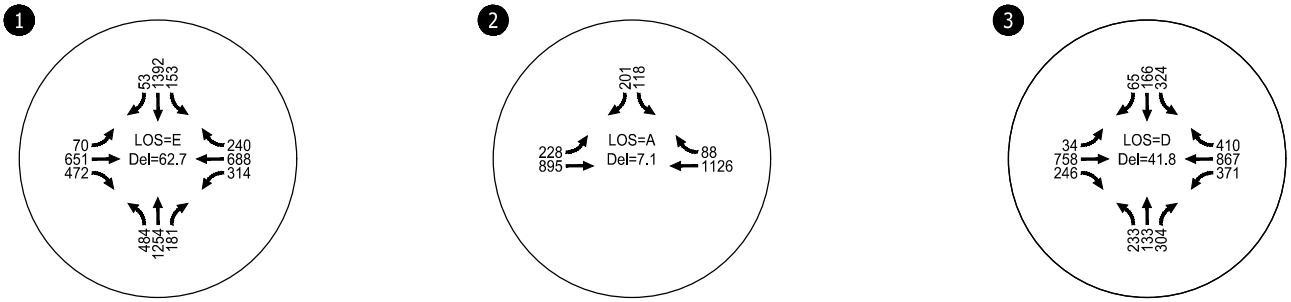
Source: Kittelson & Associates, Inc. 2021

Table 8 shows that the existing 95th percentile queues exceed available storage at the following locations:

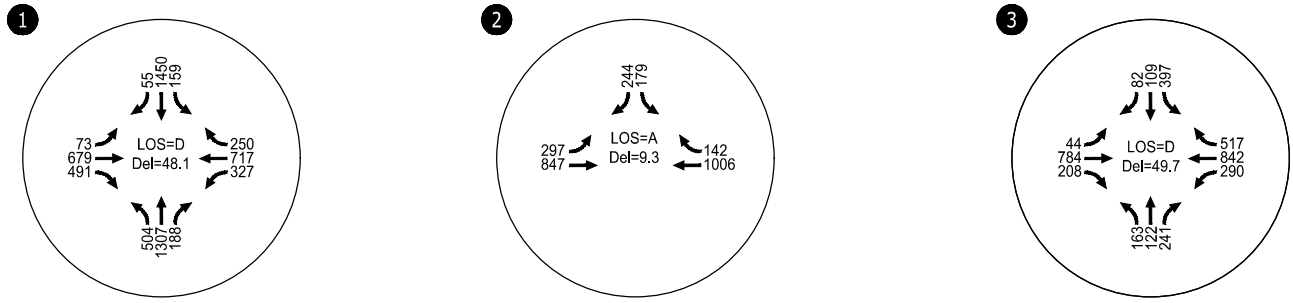
- West Access at Washington Boulevard:
  - Eastbound left-turn lane; Saturday
  - Southbound left-turn lane (internal driveway); Saturday
- Glencoe Avenue at Washington Boulevard:
  - Westbound left-turn lane; weekday PM and Saturday
  - Westbound right-turn lane; weekday PM and Saturday
  - Northbound left-turn lane; weekday PM and Saturday
  - Southbound left-turn lane (internal driveway); Saturday



Weekday PM Peak Hour



Saturday Midday Peak Hour



Existing Traffic Volumes & Operations
Weekday PM Peak Hour & Saturday Midday Peak Hour
Culver City, California

Figure 4

EXISTING PLUS PROJECT CONDITIONS

PROJECT TRIP GENERATION & DISTRIBUTION

Costco Trip Generation Database

For the past 17 years, Kittelson has maintained a database of traffic data and travel characteristics for Costco Wholesale, including data about their fuel stations. The database contains transportation information such as trip rates, trip type percentages (total, pass-by, internal), and parking demand for Costco locations in the United States, as well as for locations in Canada and Mexico. The database is updated and refined whenever new Costco traffic counts or information become available to Kittelson.

The Costco transportation database contains a large quantity of data related to Costco fuel stations. Trip generation rates and trip type information for over 50 Costco Gasoline facilities located throughout the U.S. are included. Costco has invested significant time and effort into developing this use-specific trip generation database for its warehouses and fuel stations. Because of membership requirements and the nature of Costco sales, Costco members have unique travel characteristics and patterns which are different from those of customers of other supermarkets. These unique characteristics and patterns exist in the trip generation for Costco warehouses, Costco Gasoline facilities, and the interaction of trips between the two.

The Costco-specific trip generation data presented herein follows nationally accepted practices for trip generation data collection as recommended by the Institute of Transportation Engineers (ITE) and presents a robust dataset upon which to confidently and accurately predict the trip generation of the expansion of the Culver City Costco Gasoline fuel station.

Before & After Fuel Expansion Data Summary

In developing a trip generation estimate for the Project, it is important to recognize that the fuel station exists on site today and that the Project is an on-site relocation and expansion of that station. The membership of Costco does not change with the expansion or on-site relocation of a fuel facility, and the general demand for fuel at the Culver City Costco will not change. Therefore, it is unlikely that the trip generation of the fuel station will increase directly in proportion to the increased number of fueling positions. Instead, the additional fueling positions will serve to more efficiently and effectively process the current peak demand at the fuel station, thus reducing wait times, vehicles queuing, and vehicle idling. This has been confirmed through before and after data collection at other Costco Gasoline expansion locations.

Kittelson has reviewed before and after data from other comparable Costco Gasoline facility expansion sites to determine a representative relationship between new trip generation and the addition of fueling positions to an existing fuel station.

Kittelson used trip generation counts at six Costco Gasoline facility locations that have expanded in size to study the relationship between trip generation and the fuel station expansion. These locations include sites where fuel stations have expanded from 16 fueling positions to 22 or 24 fueling positions. Currently, we do not have a sufficient database with 30 fueling positions; therefore, the trip rates are based on the sample for 24 fueling positions. The comparable expansion sites identified are:

- Rancho Del Rey, California
- NE San Jose, California
- Concord, California
- Rohnert Park, California
- Cypress, California
- Portland, Oregon

To work with a representative sample size, Costco provided fuel transactions collected on an hourly basis for a period before and after the expansion at each of these locations. Only data collected during the same months of the year before and after the expansion were included in this summary; for example, fuel transactions for the months of March and April before the expansion were compared to fuel transactions for the months of March and April after the expansion. The total number of weekday PM peak hour and Saturday midday peak hour trip ends counted for the seven listed sites are provided in Table 9 and Table 10, respectively. Note: the total number of trip ends does not reflect any reductions due to internal capture, pass-by, or diverted trips.

As shown in Table 9 and Table 10, each of the sites recorded some increase in the number of peak hour fuel transactions. However, the increase found in most situations is significantly less than what would be calculated from a direct linear relationship to the number of additional fueling positions. Using a linear relationship, expanding the gas bar from 16 to 22 fueling positions would equate to an increase in activity or trip generation of 38 percent, and expanding from 16 to 24 positions would equate to an increase of 50 percent. However, the before and after data show an average increase of 26.5 percent and 33.5 percent in fuel transactions during the weekday PM peak hour and Saturday midday peak hour, respectively.

These data demonstrate that increasing the number of fueling positions at the Culver City fuel station will not result in a direct linear increase in trip generation. The before and after data capture the change in demand that results from reducing peak hour queues and wait times at the fuel stations due to latent demand and more efficient peak operations. In all cases, peak queues and wait times are significantly reduced. Those members who previously chose not to purchase fuel because of the wait times will likely do so after the expansion when operations are improved.

Table 9 – Weekday PM Peak Hour Growth

Location	Average Weekday PM Peak Hour Trips Generated				
	Fueling Positions	**Before Expansion**	**Fueling Positions**	**After Expansion**	**Percent Difference**
Rancho Del Rey, CA	16	414	24	676	63.3%
NE San Jose, CA	16	474	24	458	-3.4%
Concord, CA	16	470	24	550	17.0%
Rohnert Park, CA	16	426	24	498	16.9%
Cypress, CA	16	472	24	654	38.6%
Portland, OR	16	N/A	24	404	N/A
Average					**26.5%**

Source: Kittelson & Associates, Inc. 2021

Table 10 – Saturday Midday Peak Hour Trip Growth

Location	Average Weekday PM Peak Hour Trips Generated				
	Fueling Positions	**Before Expansion**	**Fueling Positions**	**After Expansion**	**Percent Difference**
Rancho Del Rey, CA	16	N/A	24	678	N/A
NE San Jose, CA	16	494	24	686	38.9%
Concord, CA	16	520	24	700	34.6%
Rohnert Park, CA	16	518	24	606	17.0%
Cypress, CA	16	514	24	740	44.0%
Portland, OR	16	462	24	616	33.0%
Average					**33.5%**

Source: Kittelson & Associates, Inc. 2021

Weekday daily trip rates for the existing site were calculated based on trip generation counts for fueling facilities with 16 positions. For the proposed Project, the daily trip rates are based on trip generation counts for sites ranging from 22 to 24 fueling positions. The trip rates were then multiplied by the number of fueling positions to calculate the number of daily trips with the existing and proposed gas station.

Trip Credits

The data collected at existing Costco Gasoline fuel stations indicate the trip generation characteristics described below for internal trip capture between the fuel station and the warehouse, as well as pass-by trips and diverted trips capture from the surrounding street system. The unique nature of Costco operations and its membership requirements result in different trip characteristics than those observed at typical fuel stations summarized in the standard reference *Trip Generation Manual*, published by the Institute of Transportation Engineers (ITE). The percentages of pass-by or diverted trips at Costco fuel stations is considerably lower than those quoted in the ITE *Trip Generation Manual* for typical fuel stations. Correspondingly, membership requirements also have a significant effect on trip internalization (or sharing of trips) between the warehouse and the fuel station. Fewer people exclusively visit a Costco fuel station (in comparison to a typical standalone fuel station) because they have another primary purpose (i.e., a trip to the warehouse) for visiting the site,

Internal Trips

A key finding from the studies conducted at Costco warehouses with fuel stations is that approximately 34 percent of the PM peak hour trips to and from Costco fuel stations and 35 percent of the Saturday midday trips are internal capture trips. Internal capture trips account for those members who patronize both the warehouse and the fuel station during a single visit to the Costco site. As such, although they account for a trip to both the warehouse and the fuel station, they only account for one overall vehicle trip to the site and on the surrounding transportation system. Based on studies, including surveys at Costco fuel stations and membership card transaction data, on average 34 percent and 35 percent of the members buying gas during the weekday PM and Saturday midday peak hours, respectively, are members whose main purpose to the site is to visit the Costco warehouse. At some sites, this number ranges as high as 75 percent.

Internal capture data was analyzed from daily transactions at the Costco warehouse and at Costco Gasoline at the Culver City site for the entire year of 2019. The data was filtered to the same member transactions during times when the warehouse and the gas station were open. A review of the 2019 data at the Culver City location (see sample in Attachment A) indicates that the average weekday internal capture rate is 35.8 percent, 36.4 percent for Saturdays, and 38.4 percent for Sundays. In other words, in an average weekday, 35.8 percent of transactions at the warehouse also resulted in gasoline transactions. However, to remain conservative, the average rates of 34 and 35 percent for all warehouses described above applied to this analysis.

Pass-By & Diverted Trips

Another key trip characteristic that must be considered is that of pass-by trip capture. Pass-by trips represent members (and trips) that are currently traveling on the surrounding street network for some other primary purpose (e.g., a trip from work to home) and stop into the site in-route during their normal travel. As such, pass-by trips do not result in a net increase in traffic on the surrounding transportation system and their only effect occurs at the immediate intersections and site access driveways where they become turning movements. Based on studies of customer surveys at Costco Gasoline fuel stations, an average of 37 percent and 33 percent of the members buying gas during the weekday PM and Saturday midday peak hours, respectively, can be classified as pass-by trip capture from the surrounding street system. This is lower than the average pass-by rate (45 percent) quoted in the ITE *Trip Generation Manual* for typical service stations and is attributable to the unique travel characteristics that result from Costco's membership requirements.

Diverted trips are similar to pass-by trips in that they represent members (and trips) that are currently traveling on the surrounding street network for some other primary purpose and stop into the site in-route during their travel. However, as the name indicates, diverted trips divert from the normal roadways on which they would be traveling to go to the Costco site. Based on studies of customer surveys at Costco Gasoline fuel stations (see sample survey in Attachment A), an average of 37 percent and 36 percent of the members buying gas during the weekday PM and Saturday midday peak hours, respectively, can be classified as diverted trip capture from the surrounding street system.

Diverted and pass-by trips are accounted for in the evaluation of the internal circulation and project driveways and intersections, as these trips ingress and egress the site.

Trip Generation

In order to best evaluate the on-site trip impact of expanding and relocating the Culver City Costco Gasoline fuel station, the existing land uses were calculated to understand the trips brought to the site currently. Due to the stay-at-home order related to COVID-19, realistic counts at the driveways and fuel station could not be obtained. Therefore, Kittelson's Costco trip counts database was used to calculate the average weekday PM peak hour and Saturday midday peak hour for a sixteen (16) vehicle fueling station. Internal, pass-by, and diverted trip percentages were also obtained from the Kittelson Costco database. The *ITE Trip Generation Manual, 10th Edition* (Reference 2) was used to estimate existing land uses trips. Existing pass-by trips were estimated using the *ITE Trip Generation Handbook, 3rd Edition* (Reference 3).

The Project will include expanding the existing sixteen (16) vehicle fueling station to thirty (30) vehicle fueling stations. The before and after data average percentages were used to grow the existing trips. The weekday PM peak hour increased by 26.5 percent, while the Saturday midday peak hour increased by 33.5 percent. Internal, pass-by, and diverted trip percentages remained the same.

The trip generation rates for the existing land uses to be removed are shown in Table 11. As shown in Table 12, the existing land use net new trips were subtracted from the resulting Project land use net new trips to calculate a net new trip difference for the site.

Table 11 – ITE Trip Generation Rates

Land Use	ITE Code	Unit[1]	Trip Generation Rates[2]					
			PM Peak Hour			Saturday Peak Hour		
			Total	In	Out	Total	In	Out
Retail	820	TSF	10.89	5.23	5.66	10.86	5.64	5.21
Coffee Shop	937	TSF	37.43	19.09	18.34	87.70	43.85	43.85

Source: Kittelson & Associates, Inc. 2021

[1] TSF = thousand square feet (of building floor area)

[2] Trip generation rates for peak hour of adjacent street per ITE *Trip Generation Manual, 10th Edition*

Table 12 – Comparative Trip Generation Summary

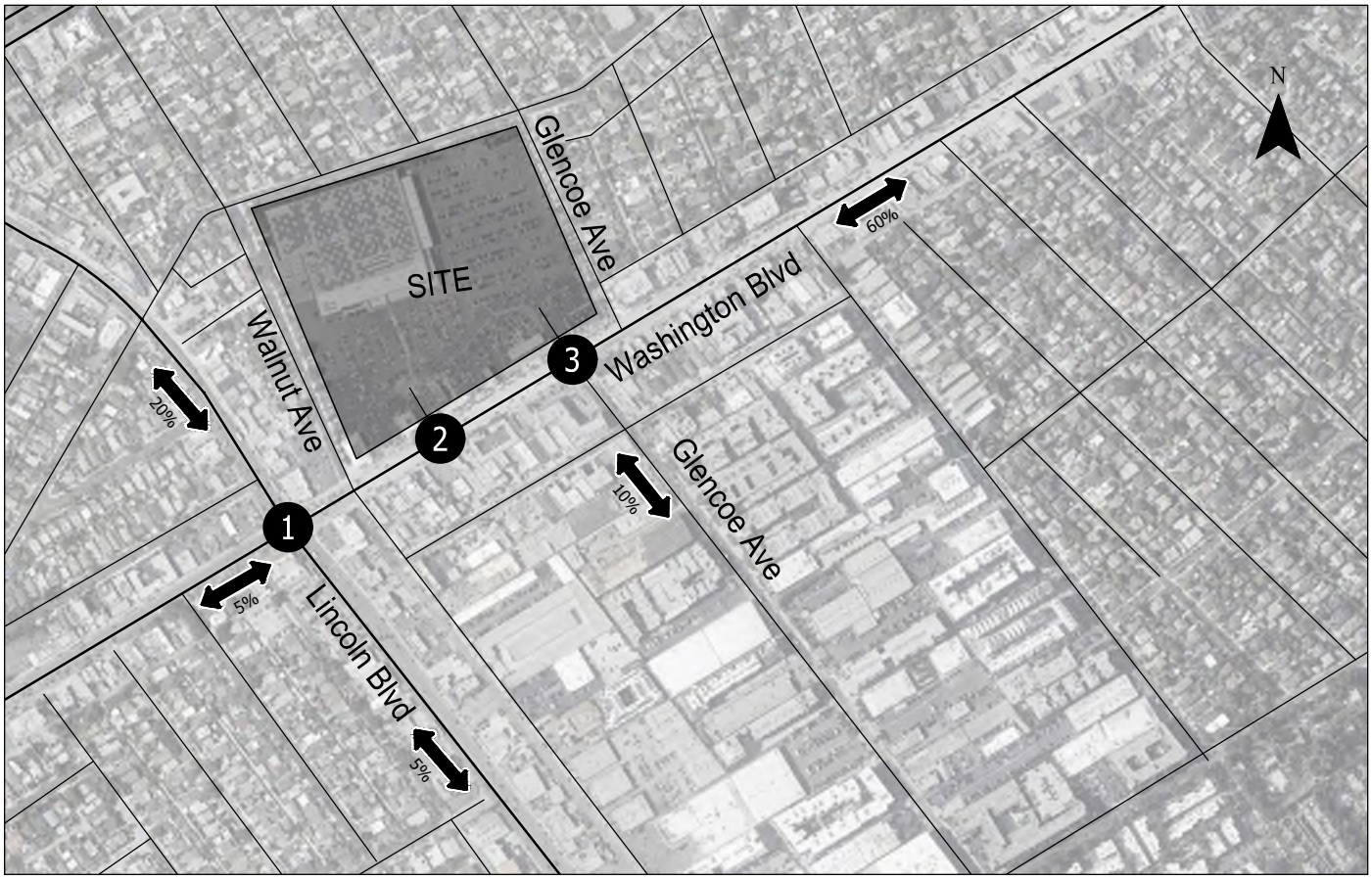
Land Use	Size	Weekday PM Peak Hour			Saturday PM Peak Hour			Weekday Daily Trips
		Total	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Existing Uses								
Costco Fueling Station	16 Fueling Positions	452	226	226	473	237	236	5605
Internal Trips (34% PM; 35% Saturday)		*(154)*	*(77)*	*(77)*	*(166)*	*(83)*	*(83)*	(1,906)
External Trips		**298**	**149**	**149**	**307**	**154**	**153**	**3,699**
Pass-By Trips (36% PM; 33% Saturday)		*(110)*	*(55)*	*(55)*	*(101)*	*(51)*	*(51)*	(1,369)
Diverted Trips (37% PM; 36% Saturday)		*(110)*	*(55)*	*(55)*	*(111)*	*(56)*	*(55)*	(1,369)
Net New Trips		**78**	**39**	**39**	**94**	**47**	**47**	**961**
Retail (820)	6,890 SF	75	36	39	75	39	36	975
Pass-By Trips (34% PM; 26% Saturday)		*(26)*	*(13)*	*(13)*	*(20)*	*(10)*	*(10)*	(332)
Net New Trips		**49**	**23**	**26**	**55**	**29**	**26**	**643**
Coffee Shop (937)	1,590 SF	69	34	35	139	69	70	1,304
Pass-By Trips (89% PM, Saturday)		*(61)*	*(30)*	*(31)*	*(124)*	*(62)*	*(62)*	(1,161)
Net New Trips		**8**	**4**	**4**	**15**	**7**	**8**	**143**
Total Existing Net New Trips		**135**	**66**	**69**	**164**	**83**	**81**	**1,747**
Proposed Uses								
Costco Fueling Station	30 Fueling Positions	709	355	354	750	375	375	8,257
Internal Trips (34% PM; 35% Saturday)		*(241)*	*(121)*	*(120)*	*(263)*	*(131)*	*(132)*	(2,807)
External Trips		**468**	**234**	**234**	**487**	**244**	**243**	**5,450**
Pass-By Trips (36% PM; 33% Saturday)		*(173)*	*(87)*	*(86)*	*(162)*	*(81)*	*(81)*	(2,017)
Diverted Trips (36% PM; 36% Saturday)		*(173)*	*(87)*	*(86)*	*(175)*	*(88)*	*(87)*	(2,017)
Total Proposed Net New Trips		**122**	**60**	**62**	**150**	**75**	**75**	**1,416**
Trip Difference (Proposed Uses – Existing Uses)								
Net New Trip Difference		***(13)***	***(6)***	***(7)***	***(14)***	***(8)***	***(6)***	***(331)***

Source: Kittelson & Associates, Inc. 2021

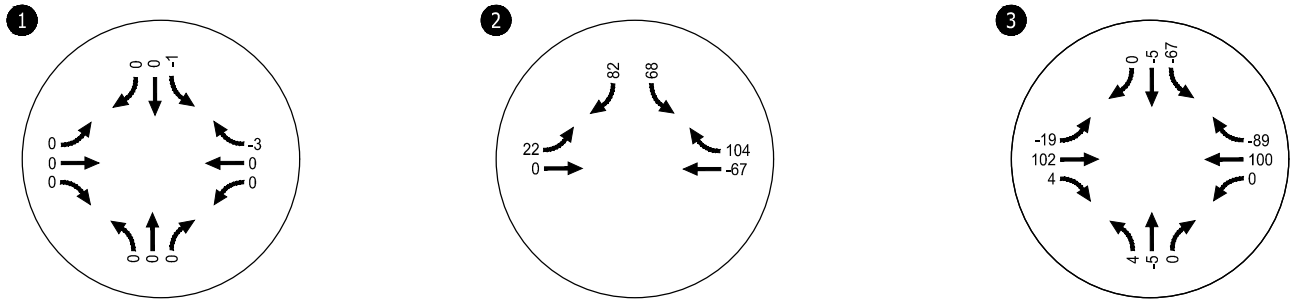
As shown in Table 12, the expansion and relocation of the Culver City Costco Gasoline fuel station (along with the removal of existing retail uses) will result in a reduction in net new trips to the site. The Project is estimated to approximately reduce 13 weekday PM peak hour net new trips (6 inbound, 7 outbound) and 14 Saturday midday peak hour net new trips (8 inbound/6 outbound). On a daily basis, the Project would result in 331 fewer trips during the weekdays. While Saturday daily estimates are not available, a comparison between the peak hour trips on weekdays and Saturdays suggest that the net daily trip reduction would also occur on Saturdays.

Trip Distribution/Assignment

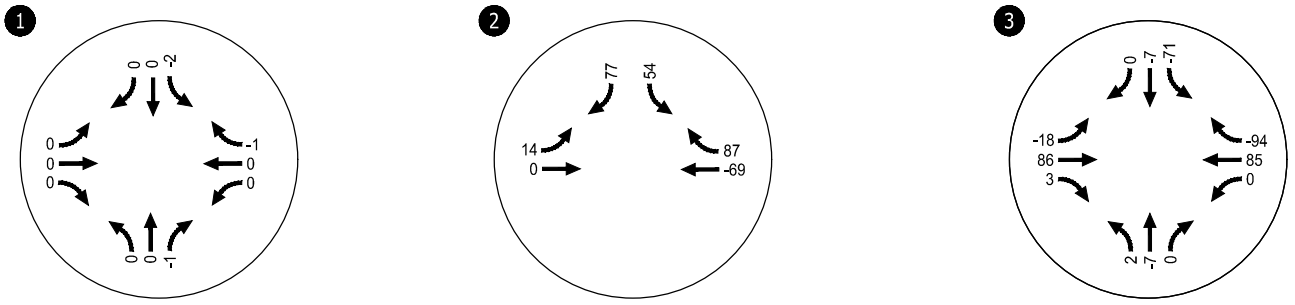
Pass-by and diverted trips to the site would be from Washington Boulevard. While these trips are not deducted to assess traffic entering and egressing the site (for evaluating site accesses), pass-by and diverted trips do not result in system capacity and environmental impacts to off-site intersections as compared to new trips because these trips are already present on the adjacent arterial street. Figure 5 shows the trip distribution and Project only volumes for the study intersections. The volumes for intersections 2 and 3 include pass-by and diverted trips, and the volumes at intersection 1 represent net trips only.



Weekday PM Peak Hour



Saturday Midday Peak Hour



Trip Distribution & Project Only Volumes
Weekday PM Peak Hour & Saturday Midday Peak Hour
Culver City, California

Figure 5

EXISTING PLUS PROJECT INTERSECTION ANALYSIS

Table 13 summarizes existing plus Project scenario intersection operations results. As shown in Table 13 and Figure 6, the existing signalized intersections operate at Level of Service ranging from "A" to "E" or better during the weekday PM peak hour and Saturday midday peak hours. There is no degradation in LOS at the study intersections. The average delay per vehicle at the intersection of West Access & Washington Boulevard increases slightly (from 7.1 to 9.4 on weekdays PM and from 9.2 to 11.9 seconds/vehicle in the Saturday peak) in the existing plus Project scenario, but remains at LOS A. There is no change in operations at the Lincoln Boulevard & Washington Boulevard intersection and only a minor change in delay at the Glencoe Avenue & Washington Boulevard intersection. Appendix D contains the year 2020 existing plus Project conditions Synchro worksheets.

Existing Plus Project Signalized Queuing Analysis

Signalized queues at the intersection of Lincoln Boulevard & Washington Boulevard and at the two access intersections under the existing plus Project scenario are summarized in Table 14. The analysis shows signalized 95th percentile queues exceed available storage at the following locations:

- West Access at Washington Boulevard:
  - Eastbound left-turn lane; Saturday
  - **Southbound left-turn lane (internal driveway); weekday PM**[2] and Saturday
  - **Southbound right-turn lane (internal driveway); Saturday**[1]
- Glencoe Avenue at Washington Boulevard:
  - Westbound left-turn lane; weekday PM and Saturday
  - Northbound left-turn lane; weekday PM and Saturday

Compared to existing conditions, the Project results in one new turn lane exceeding available storage (identified in **bold** above) at the southbound west access driveway right-turn lane. The southbound west access driveway left-turn lane is also forecast to exceed available storage in the weekday PM period in addition to the Saturday period identified in existing conditions. The additional queues would be contained within the internal Project driveways, not on public streets. Therefore, this would not be considered a substantially adverse condition that affects traffic on public streets. In addition, the existing plus Project scenario found that two of the queuing impacts identified at the Glencoe Avenue & Washington Boulevard intersection (the westbound right-turn lane and the southbound left-turn lane) would be eliminated in the existing plus Project scenario.

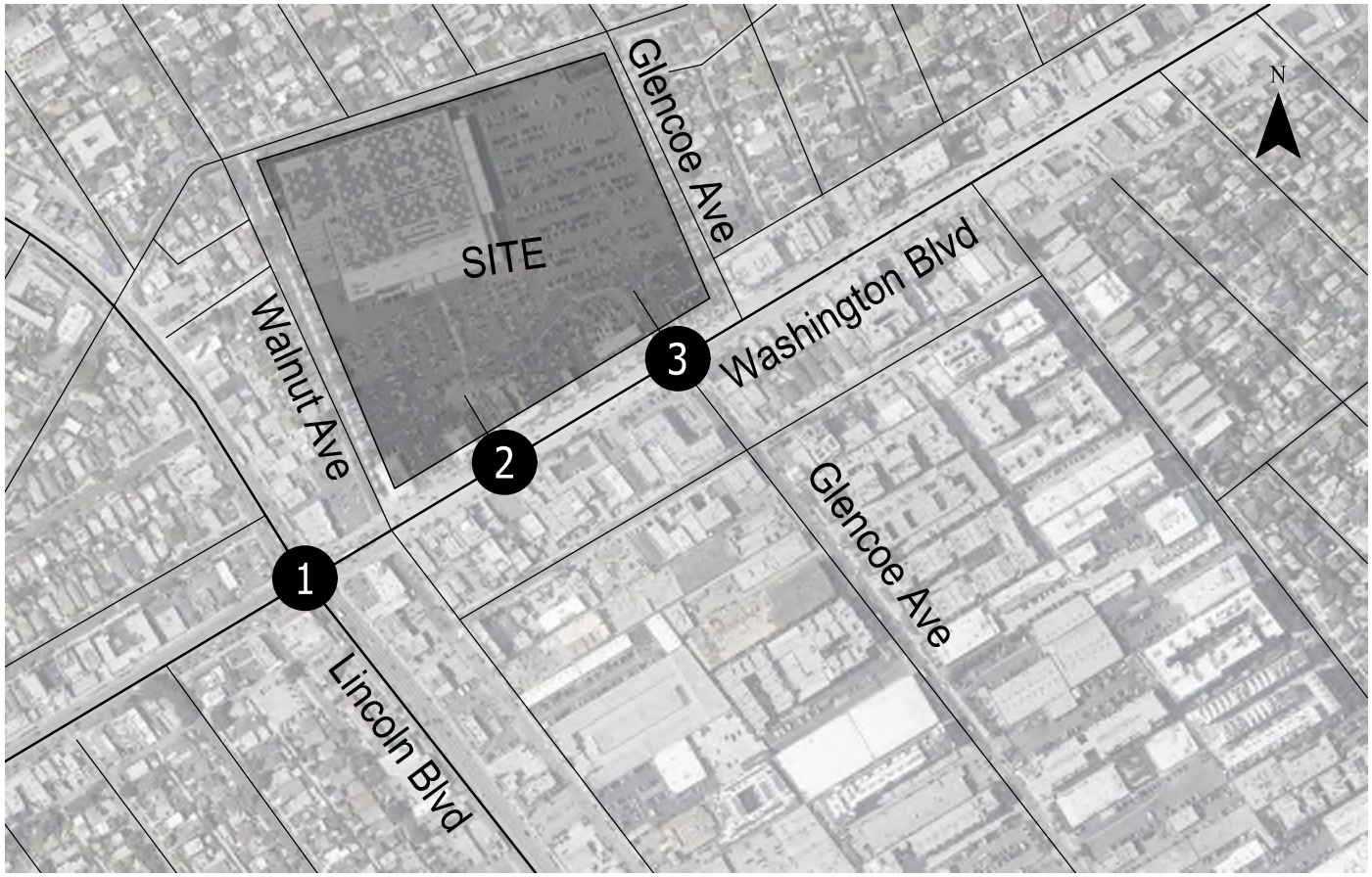
The Project would increase the queue length and exceed the turn lane storage at the following locations on public streets:

- West Access at Washington Boulevard:
  - Eastbound left-turn lane; Saturday – the available storage is 170 feet, and the Project would increase the 95th percentile queue from 181 to 255 feet. This exceeds the available storage by approximately four vehicle lengths, which will typically pull into the taper to get out of the way as much as possible of eastbound through vehicles on Washington Boulevard. A review of aerial photography indicates that the left turn pocket cannot be extended. Modifications to the signal timing by allocating more time to the eastbound left-turn split would reduce this queue to 209 feet. The eastbound left-turn lane is already exceeding storage in the existing conditions for the 95th percentile queue, with signal timing improvements the project will add less than two vehicles in length. During the Saturday midday peak hour, the available storage is adequate for the average peak hour demand.

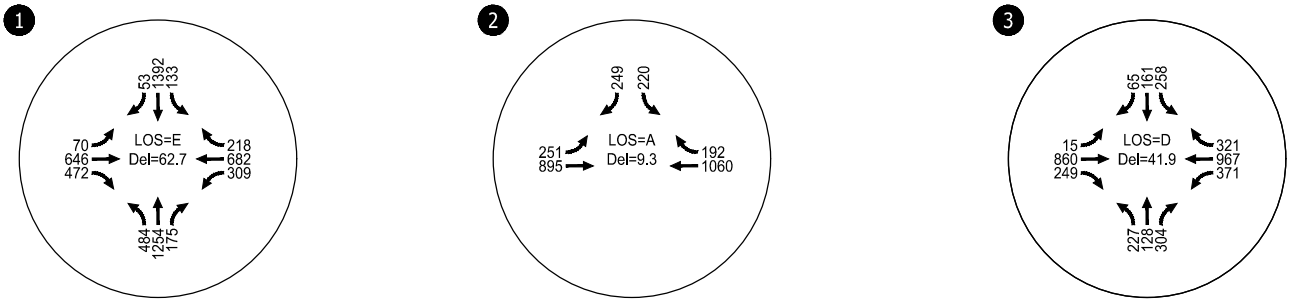
[2] Average queues also exceed available storage.

- Glencoe Avenue at Washington Boulevard:
  - Westbound left-turn lane; weekday PM and Saturday - the available storage is 300 feet, and the Project would increase the 95th percentile queue from 523 to 527 feet on weekdays and from 407 to 418 on Saturdays. The Project would nominally increase the queue length by less than one vehicle at this location (less than 11 feet in both periods), which will typically pull into the taper to get out of the way of westbound through vehicles on Washington Boulevard. A review of aerial photography indicates that the left turn pocket cannot be extended. Modifications to the signal timing would offset the queue increase.

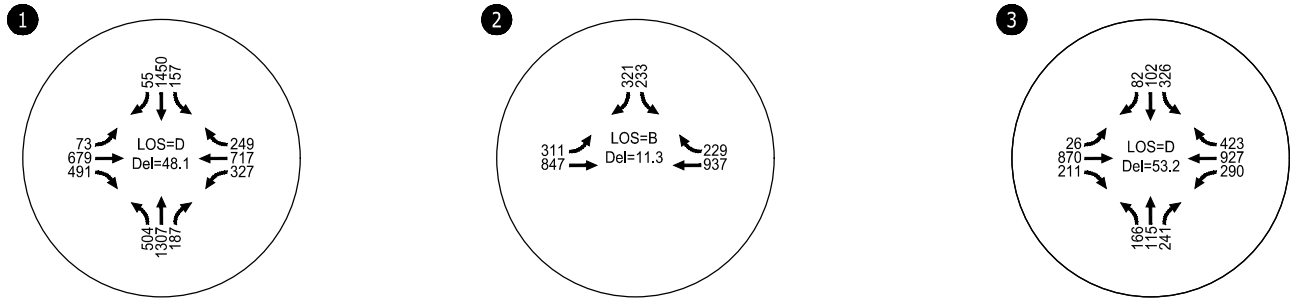
  - Northbound left-turn lane; weekday PM and Saturday- the available storage is 145 feet, and the Project would increase the 95th percentile queue from 203 to 205 feet on weekdays and decrease from 174 to 171 on Saturdays. The Project would nominally modify the queue length by less than one vehicle at this location, and only 2 feet which can be considered negligible, which will typically back into the northbound lane of Glencoe Avenue. The queue would be contained within the northbound approach of Glencoe Avenue and would not extend to the next driveway at Beach Avenue. This would not substantially affect circulation in the area, and no modifications are recommended to address this condition.



Weekday PM Peak Hour



Saturday Midday Peak Hour



Existing Plus Project Traffic Volumes & Operations
Weekday PM Peak Hour & Saturday Midday Peak Hour
Culver City, California

Figure
6

Table 13 – Existing Plus Project Intersection Operations

ID	Intersection	Weekday PM		Saturday Peak	
		Delay	LOS	Delay	LOS
1	Lincoln Boulevard & Washington Boulevard	62.7	**E**	48.1	D
2	West Access & Washington Boulevard	9.3	A	11.3	B
3	Glencoe Avenue & Washington Boulevard	41.9	D	53.2	D

Source: Kittelson & Associates, Inc. 2021
Notes: **bold** correspond to LOS E and F operations.

Table 14 – Existing Plus Project Queuing (Weekday PM & Saturday Midday)

ID	Intersection	Movement	Available Storage (ft)	Average | 95th Percentile Queue		Substantial Project Increase	
				Weekday PM	Saturday Midday	Weekday PM	Saturday Midday
1	Lincoln Boulevard & Washington Boulevard	EBL	250	28 | 53	18 | 33	-	-
		EBR	350	209 | 322	227 | 349	-	-
		WBL	350	162 | 262	91 | 122	-	-
		WBR	470	45 | 85	47 | 92	-	-
		NBL	400	206 | 370	160 | 290	-	-
		SBL	200	62 | 98	46 | 73	-	-
2	West Access & Washington Boulevard	EBL	170	43 | 119	99 | **255**	-	Yes
		SBL	175	143 | **206**	**185** | **261**	Yes	Yes
		SBR	175	158 | **202**	**162** | **236**	Yes	Yes
3	Glencoe Avenue & Washington Boulevard	EBL	375	5 | 13	11 | 23	-	-
		EBR	435	21 | 83	46 | 78	-	-
		WBL	300	213 | **527**	237 | **418**	Yes	Yes
		WBR	150	68 | **176**	110 | **225**	-	-
		NBL	145	137 | **205**	105 | **171**	Yes	-
		NBR	400	0 | 90	54 | 91	-	-
		SBL	165	162 | **232**	143 | **227**	-	-
		SBR	165	0 | 30	0 | 33	-	-

Source: Kittelson & Associates, Inc. 2021

BACKGROUND CONDITIONS

PROJECTED TRAFFIC VOLUMES

Ambient Growth

To obtain background traffic volumes, a growth rate of 1 percent per year over the existing conditions was included per traffic growth projections in the LA County 2010 Congestion Management Program. In addition, traffic volumes from related projects were also included. Background conditions correspond to 2 years of traffic growth over existing conditions. At the time of the initiation of this study and consultation with public agencies, existing conditions corresponded to 2020, and the project opening year was anticipated to occur in 2022. While existing conditions are 2021 and the project is now anticipated to be operational in 2023, background traffic still correspond to 2 years of background traffic growth. Given the annual traffic growth of 1 percent per year, this discrepancy does not affect the findings and conclusions of this study.

Related Projects

The Cities of Culver City and Los Angeles identified related projects that could be operational in background conditions. Table 15 and Table 16 list projects in which project trips were added individually to the study area due to their size and proximity. Figure 7 shows their location, and Figure 8 shows their projected volumes. Other projects are included in the traffic forecast as part of the ambient growth traffic. Table 17 shows the applicable trip generation rates for the related projects, and Table 18 summarizes the trip generation calculations for related projects. Appendix E contains a list of Culver City and Los Angeles projects.

Table 15 – Culver City Related Projects

Related Project #	Project Name	Location	Description
1	Baldwin Site	12803 Washington Blvd	Mixed-Use Project 37 Multi-Family dwelling units 7,206 square foot Shopping Center
2	99 Cents Site	12727 Washington Blvd	Mixed-Use Project 117 Multi-Family dwelling units 17,880 square feet Shopping Center Replacing Existing 13,00 square foot Commercial Building
3	Motel Mixed-Use	12654 Washington Blvd	Mixed-use Project 6,836 square foot Ground Floor Commercial One 5,863 square foot Residential Dwelling
4	Essence Cannabis Retail	12450 Washington Blvd	4,950 square foot Cannabis Retail
5	Market Hall	12403 (12237-12423) Washington Blvd	21,605 square foot Market Hall and Food Building 5,230 square foot Shopping Center
6	Grandview Apartments	4025 Grand View Blvd	36 Multi-Family dwelling units Replacing 20 mobile home units

Source: City of Culver City

Table 16 – City of Los Angeles Related Projects

Related Project #	Project Name	Location	Description
7	High Turnover Restaurant	2508 Naples Ave, Venice, CA	3,895 square foot High Turnover (sit-down) Restaurant
8	Mixed-Use, Hotel, Retail & Restaurant	1027 Abbot Kinney Blvd, Venice, CA	92-Guest Room Hotel 3,000 square foot Shopping Center 2,072 square foot Restaurant
9	Mixed-Use Project	1414 Main St, Venice, CA	Mixed-Use building: 26 Condo Units 1,184 square foot Shopping Center 4,567 square foot Restaurant
10	Condos and Commercial Building	4091 Redwood Ave, Los Angeles, CA	67 Multi-Family dwelling units 7,525 square foot Commercial Office
11	Mixed-Use Apartment and Mini-Warehouse	4040 Del Rey Ave, Marina Del Rey, CA	168 Multi-Family dwelling units 33,000 square foot General Office
12	New 3-Story Manufacturing and Retail	595 Venice Blvd, Venice, CA	25,150 square foot Manufacturing 5,028 square foot Shopping Center
13	Inclave	4065 Glencoe Ave, Marina Del Rey, CA	35,206 square foot Creative Office 1,500 square foot Shopping Center 49 Multi-Family dwelling units
14	Mixed-Use: Residential & Commercial	2454 Lincoln Blvd, Venice, CA	77 Multi-Family dwelling units 4,040 square foot Restaurant 1,905 square foot Shopping Center
15	Apartments	1015 Venice Blvd, Venice, CA	56 Multi-Family dwelling units
16	Thatcher Yard Residential	3311 Thatcher Ave, Marina Del Rey, CA	50 affordable dwelling units (senior) 23 Multi-Family dwelling units 25 permanent supportive housing dwelling units
17	Office and Retail	4212 Glencoe Ave, Marina Del Rey, CA	121,822 square foot Commercial Office 1,500 square foot Shopping Center
18	New 4-Story 77 Apartments	1600 Venice Blvd, Venice, CA	Demolish 7 Apartments and 1 Duplex 77 Apartments with Underground Parking
19	Apartments and Restaurant	1808 Lincoln Blvd, Venice, CA	50 Multi-Family dwelling units 4,458 square foot Restaurant

Source: City of Los Angeles

Table 17 – Trip Generation Rates for Related Projects

Land Use	ITE Code	Unit[1]	Trip Generation[2]					
			PM Peak Hour			Saturday Peak Hour		
			Total	In	Out	Total	In	Out
Manufacturing	140	TSF	0.79	0.34	0.45	0.94	0.47	0.47
Multifamily Housing (Mid-Rise)	221	DU	0.41	0.25	0.16	0.44	0.22	0.22
Mid-Rise Residential with 1st-Floor Commercial	231	DU	0.44	0.30	0.14	0.86	0.43	0.43
Mobile Home Park	240	DU	0.49	0.29	0.20	0.40	0.20	0.20
Hotel	310	Rooms	0.61	0.35	0.26	0.72	0.40	0.32
General Office Building	710	TSF	1.42	0.26	1.16	0.53	0.29	0.24
Shopping Center	820	TSF	4.21	2.11	2.10	4.50	2.34	2.16
Marijuana Dispensary	882	TSF	29.93	14.97	14.96	36.43	18.22	18.21
High-Turnover (Sit-Down) Restaurant	932	TSF	17.41	9.05	8.36	11.19	5.71	5.48

Source: Kittelson & Associates, Inc. 2021

[1] TSF = thousand square feet, DU = dwelling units

[2] Trip generation rates for peak hour of adjacent street, per the ITE Trip Generation Manual 10th Edition

Table 18 – Trip Generation for Related Projects

ID	Project Name	Weekday PM Peak Hour[1]			Saturday Midday Peak Hour[2]		
		Total	In	Out	Total	In	Out
1	Baldwin Site	101	53	48	111	62	49
2	99 Cents Site	157	88	69	188	117	71
3	Motel Mixed-Use	82	41	41	74	38	36
4	Essence Cannabis Retail	148	74	74	180	90	90
5	Market Hall[1]	137	83	54	174	96	78
6	Grandview Apartments	9	5	4	14	7	7
7	High Turnover Restaurant	33	20	13	44	22	22
8	Mixed-Use, Hotel, Retail & Restaurant	42	25	17	103	56	47
9	Mixed-Use Project	40	29	11	78	39	39
10	Condos and Commercial Building	51	29	22	39	19	20
11	Mixed-Use Apartment and Mini-Warehouse	121	149	-28	288	139	149
12	New 3-Story Manufacturing and Retail	85	15	70	47	24	23
13	Inclave	53	1	52	68	35	33
14	Mixed-Use: Residential & Commercial	54	40	14	88	44	44
15	Apartments	37	24	13	25	12	13
16	Thatcher Yard Residential	19	10	9	23	13	10
17	Office and Retail	124	63	61	38	14	24
18	New 4-Story 77 Apartments	155	24	131	72	39	33
19	Apartments and Restaurant	27	16	11	34	18	16
	Total	**634**	**344**	**290**	**742**	**410**	**332**

Source: Kittelson & Associates, Inc. 2021

[1] Weekday PM peak hour trips for ID 1-6 were taken from the Market Hall traffic study and for ID 7-19 were received from the City of Los Angeles and include net trips.

[2] Weekday PM peak hour and Saturday midday peak hour trips were generated using rates for peak hour of generator, per the ITE Trip Generation Manual 10th Edition.

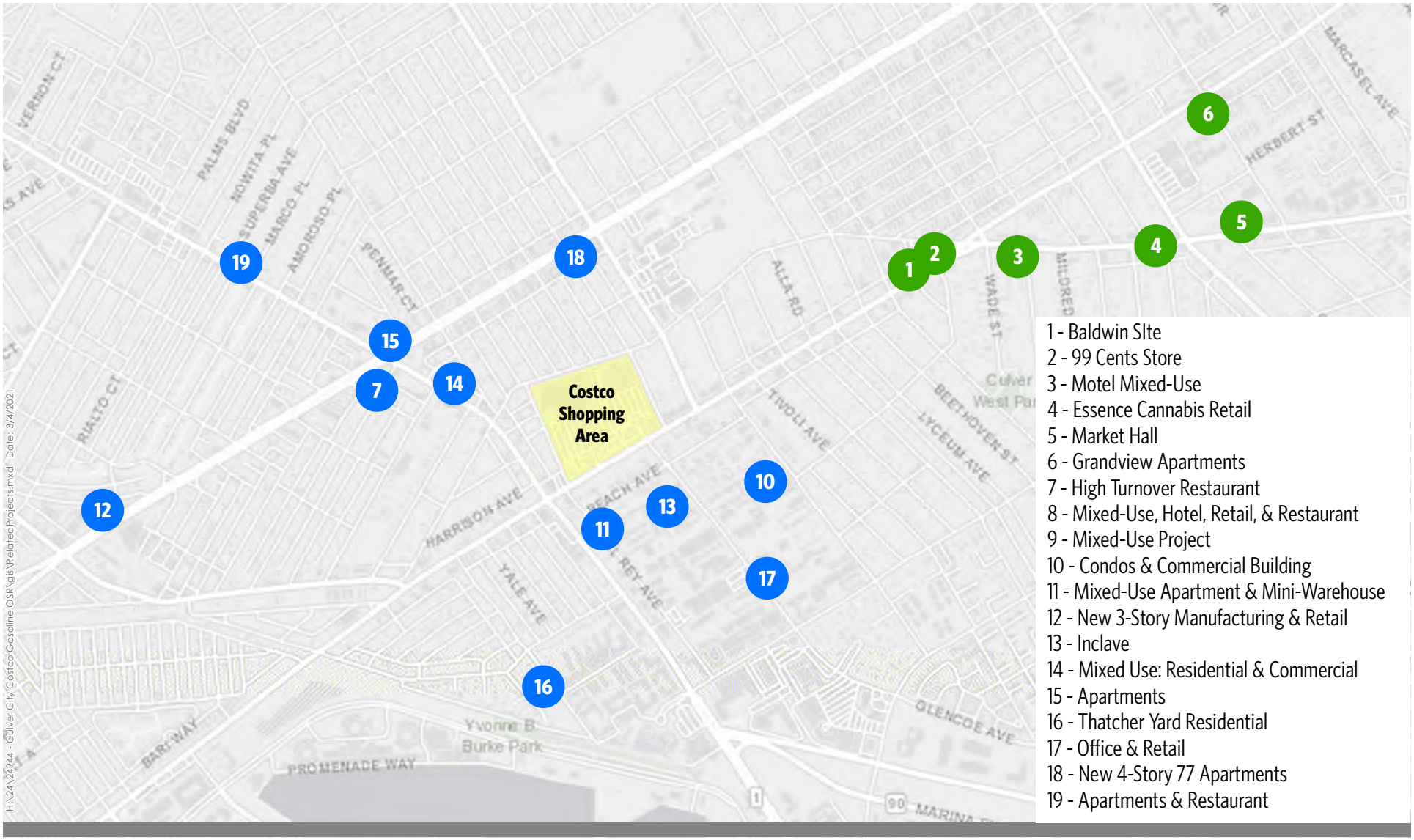
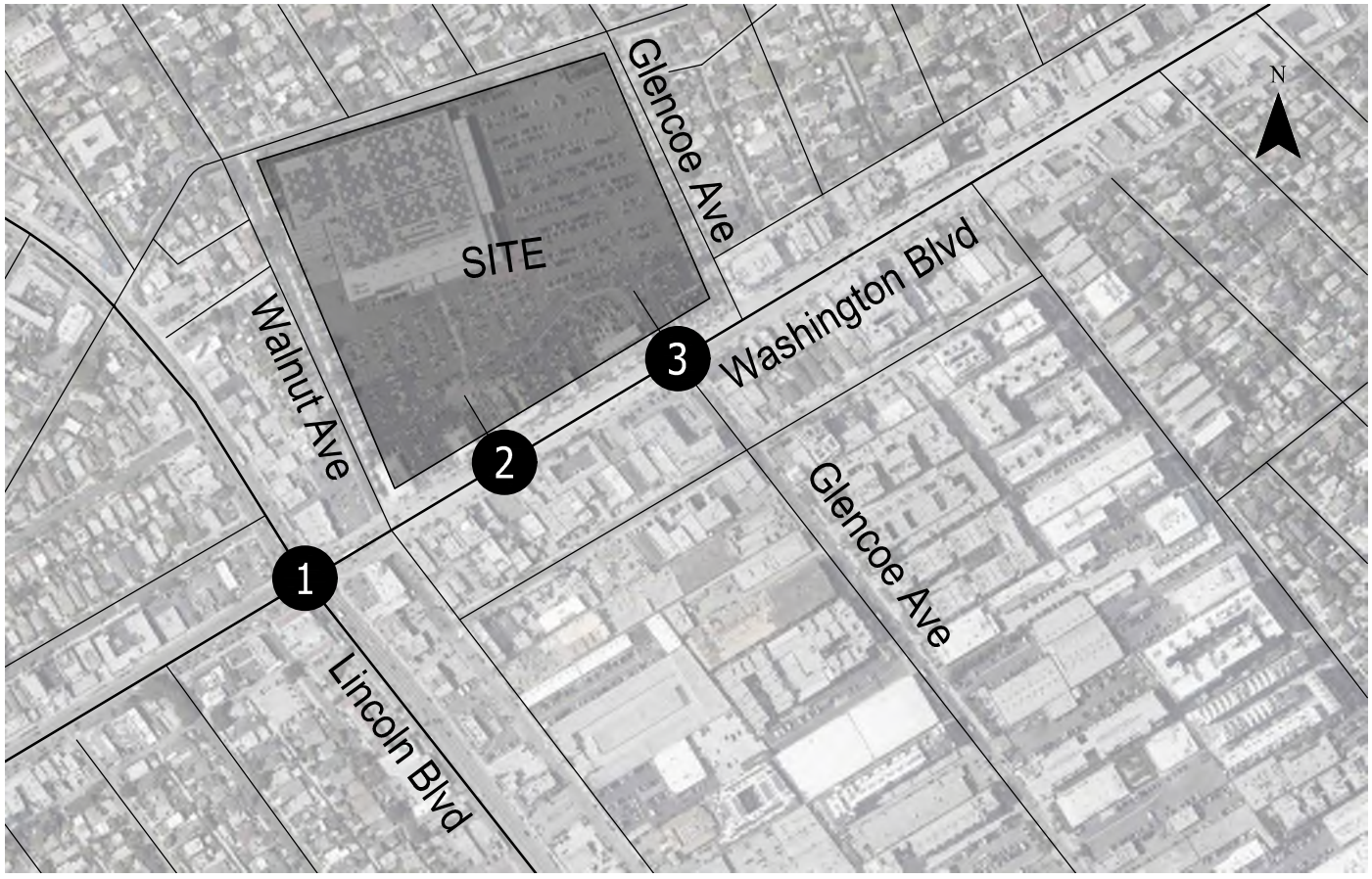


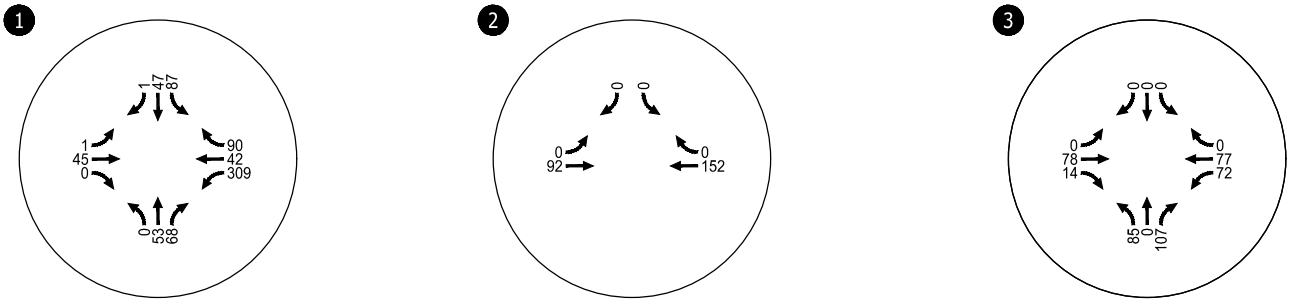
Figure 7

Related Project Locations
Culver City, CA

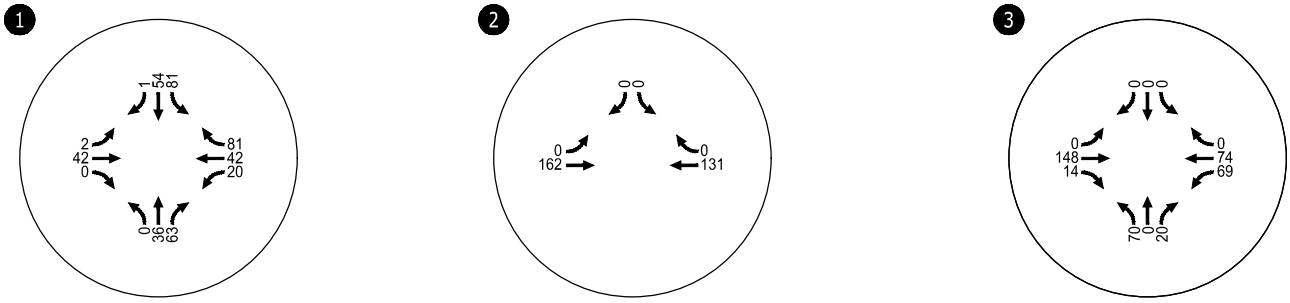
KITTELSON & ASSOCIATES



Weekday PM Peak Hour



Saturday Midday Peak Hour



Related Projects Traffic Volumes
Weekday PM Peak Hour & Saturday Midday Peak Hour
Culver City, California

Figure 8

BACKGROUND CONDITIONS INTERSECTION ANALYSIS

Intersection operations and queuing were analyzed for each study intersection for the Project opening year, including ambient growth and related projects but *without* the Project. As previously discussed, the operational intersection analysis was conducted using the HCM methodology and reflecting the weekday evening commute and Saturday peak hour conditions. Table 19 summarizes background traffic operations. As shown in Table 19 and Figure 9, the signalized intersections operate at Level of Service ranging from "A" to "E" or better during the weekday PM peak hour and Saturday midday peak hours. Appendix F contains the background conditions Synchro worksheets.

Background Conditions Signalized Queuing Analysis

Signalized queues at the intersection of Lincoln Boulevard & Washington Boulevard and at the two access intersections are summarized in Table 20. The analysis shows signalized 95th percentile queues exceed available storage at the following locations:

- Lincoln Boulevard at Washington Boulevard:
  - Eastbound right-turn lane; Saturday
- West Access at Washington Boulevard:
  - Eastbound left-turn lane; Saturday
  - Southbound left-turn lane (internal driveway); Saturday
  - Southbound right-turn lane (internal driveway); Saturday
- Glencoe Avenue at Washington Boulevard:
  - Westbound left-turn lane; weekday PM[3] and Saturday[2]
  - Westbound right-turn lane; weekday PM and Saturday
  - Northbound left-turn lane; weekday PM[2] and Saturday
  - Southbound left-turn lane (internal driveway); weekday PM[2] and Saturday[2]

Table 19 – Background Intersection Operations

ID	Intersection	Weekday PM		Saturday Peak	
		Delay	LOS	Delay	LOS
1	Lincoln Boulevard & Washington Boulevard	67.5	**E**	51.5	D
2	West Access & Washington Boulevard	6.8	A	8.9	A
3	Glencoe Avenue & Washington Boulevard	48.6	D	68.6	E

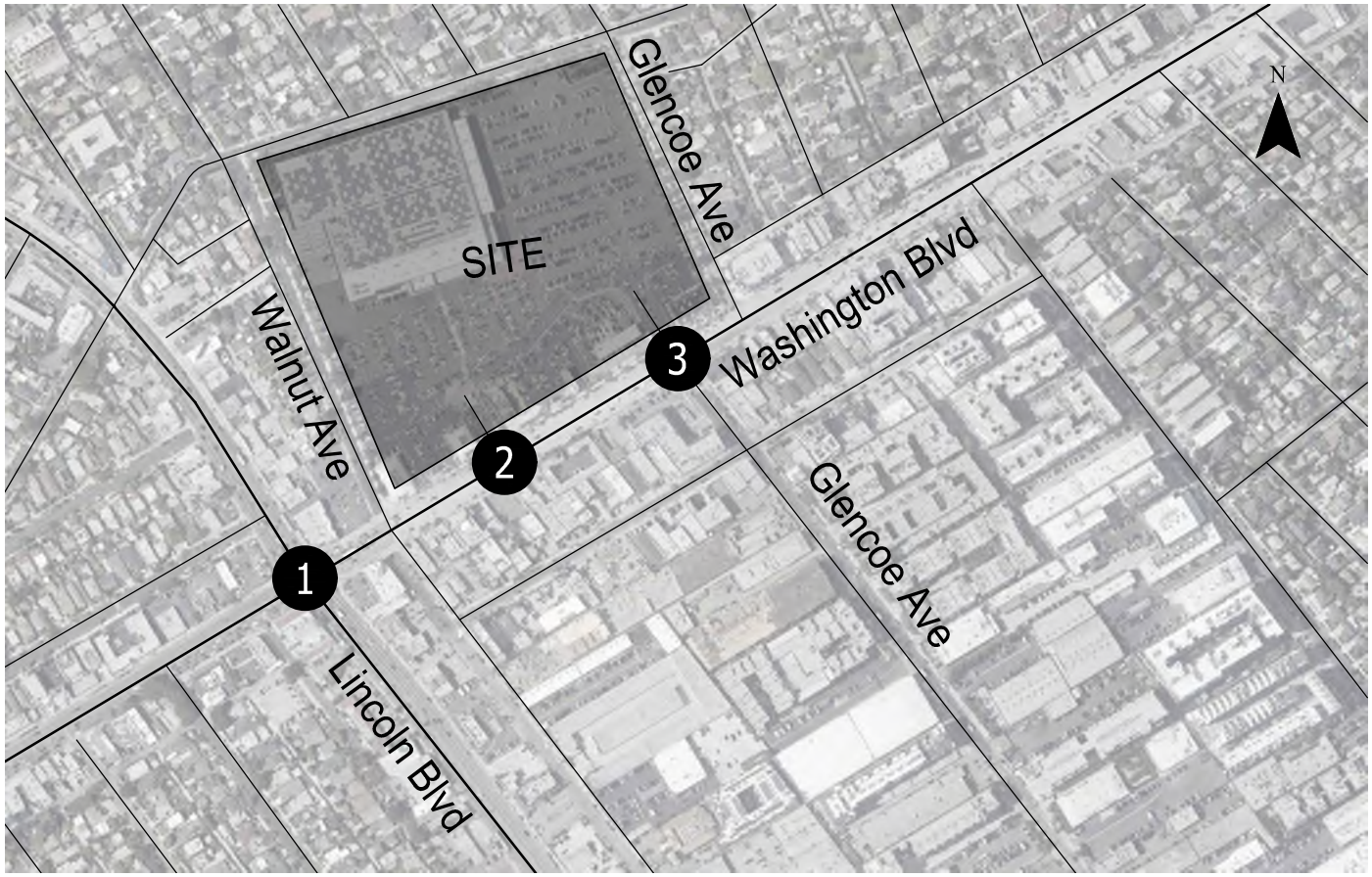
Source: Kittelson & Associates, Inc. 2021
Notes: **bold** correspond to LOS E and F operations.

[3] Average queues also exceed available storage.

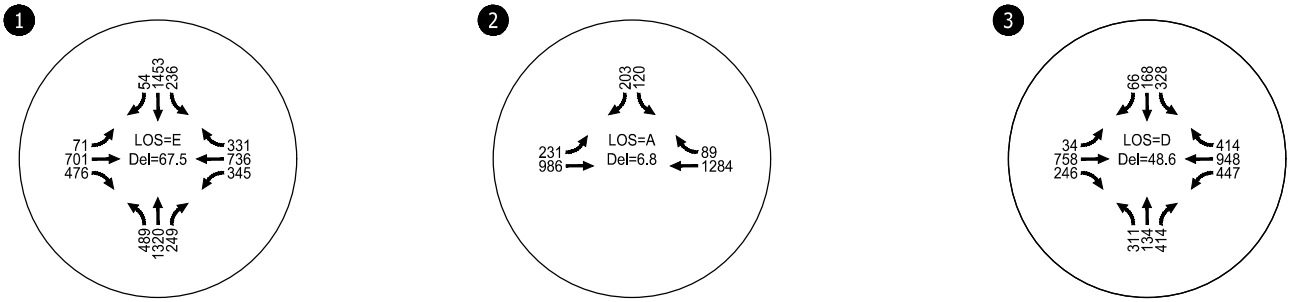
Table 20 – Background Queuing (Weekday PM & Saturday Midday)

ID	Intersection	Movement	Available Storage (ft)	Average | 95th Percentile Queue	
				Weekday PM	Saturday Midday
1	Lincoln Boulevard & Washington Boulevard	EBL	250	29 | 54	19 | 34
		EBR	350	212 | 327	231 | **355**
		WBL	350	194 | 293	96 | 148
		WBR	470	86 | 143	86 | 147
		NBL	400	237 | 375	165 | 294
		SBL	200	98 | 146	74 | 107
2	West Access & Washington Boulevard	EBL	170	32 | 107	119 | **224**
		SBL	175	91 | 147	138 | **214**
		SBR	175	119 | 165	124 | **188**
3	Glencoe Avenue & Washington Boulevard	EBL	375	15 | 26	17 | 35
		EBR	435	20 | 79	42 | 120
		WBL	300	**354** | **664**	**357** | **552**
		WBR	150	102 | **228**	147 | **290**
		NBL	145	**169** | **248**	137 | **206**
		NBR	400	7 | 123	62 | 102
		SBL	165	**189** | **280**	**176** | **288**
		SBR	165	0 | 32	0 | 35

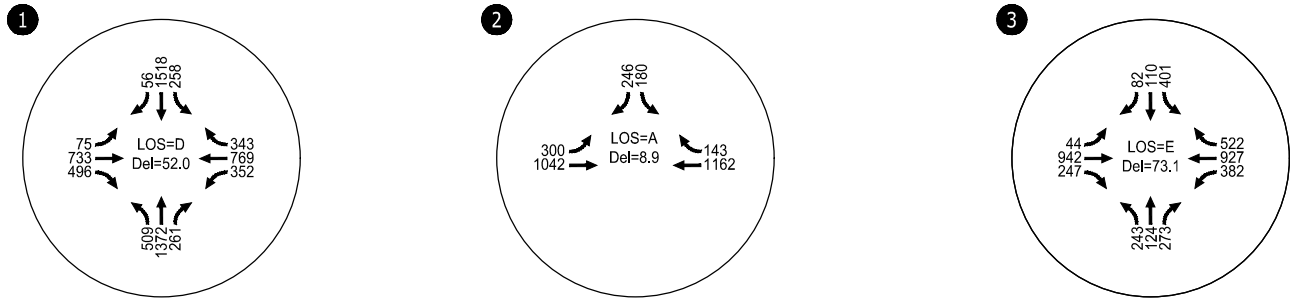
Source: Kittelson & Associates, Inc. 2021
Notes: **bold** correspond to queues exceeding available storage.



Weekday PM Peak Hour



Saturday Midday Peak Hour



Background Traffic Volumes & Operations
Weekday PM Peak Hour & Saturday Midday Peak Hour
Culver City, California

Figure
9

BACKGROUND PLUS PROJECT CONDITIONS

BACKGROUND PLUS PROJECT INTERSECTION ANALYSIS

The background plus Project scenario evaluates future year operations including ambient growth, relevant projects, and the Project in place. Table 21 summarizes background plus traffic operations. As shown in Table 21 and Figure 10, the background year plus Project signalized intersections operate at Level of Service ranging from "A" to "E" or better during the weekday PM peak hour and Saturday midday peak hours. There would be no change in LOS grades at each peak hour analysis period at the study intersections compared to those in the no Project condition. The average delay per vehicle at the intersection of West Access & Washington Boulevard would increase slightly (from 6.8 to 8.9 on weekdays PM and from 8.9 to 11.0 seconds/vehicle in the Saturday peak), but would remain at LOS A. The average delay per vehicle at the intersection of Glencoe Avenue & Washington Boulevard would increase (from 48.6 to 50.8 on weekdays PM and from 68.6 to 75.8 seconds/vehicle in the Saturday peak), but would remain at LOS D/E (weekday PM peak/Saturday midday peak). Appendix F contains the background plus Project conditions Synchro worksheets.

Background Plus Project Signalized Queuing Analysis

Signalized queues at the intersection of Lincoln Boulevard & Washington Boulevard and at the two access intersections are summarized in Table 22. The analysis shows signalized 95th percentile queues exceed available storage at the following locations:

- Lincoln Boulevard & Washington Boulevard:
  - Eastbound right-turn lane
- West Access at Washington Boulevard:
  - Eastbound left-turn lane; Saturday
  - Southbound left-turn lane (internal driveway); weekday PM[4] and Saturday
  - Southbound right-turn lane (internal driveway); weekday PM and Saturday[1]
- Glencoe Avenue at Washington Boulevard:
  - Westbound left-turn lane; weekday PM and Saturday
  - Westbound right-turn lane; weekday PM and Saturday
  - Northbound left-turn lane; weekday PM and Saturday
  - Southbound left-turn lane; weekday PM and Saturday

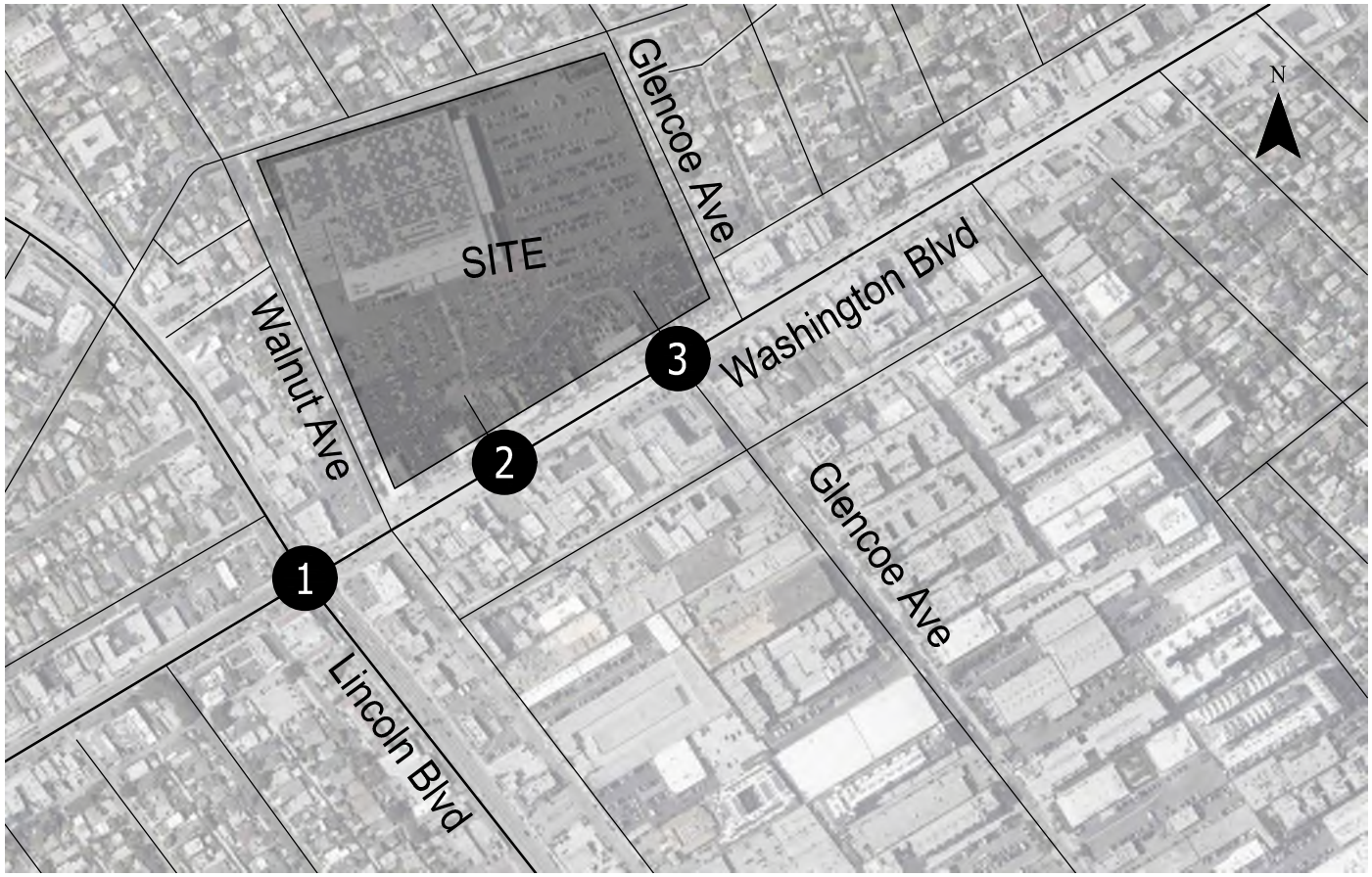
Compared to existing conditions, the Project would not result in additional turn lanes exceeding the available storage when compared to the background no Project conditions.

Table 21 – Background Plus Project Intersection Operations

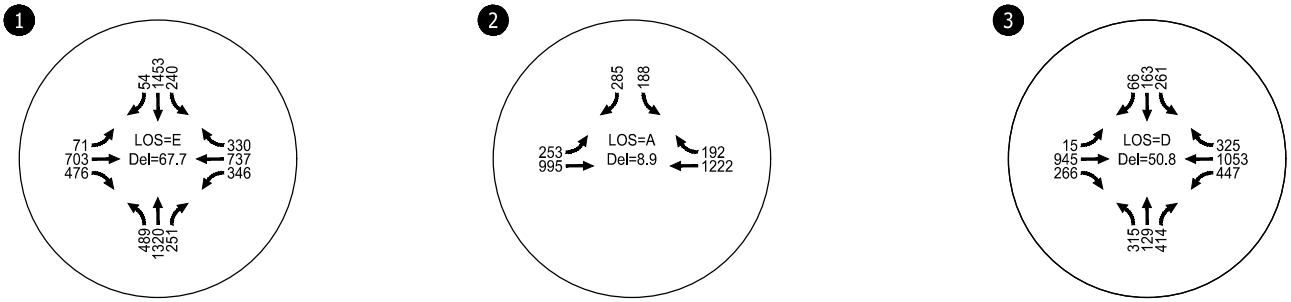
ID	Intersection	Weekday PM		Saturday Peak	
		Delay	LOS	Delay	LOS
1	Lincoln Boulevard & Washington Boulevard	67.7	**E**	51.4	D
2	West Access & Washington Boulevard	8.9	A	11.0	B
3	Glencoe Avenue & Washington Boulevard	50.8	D	75.8	**E**

Source: Kittelson & Associates, Inc. 2021
Notes: **bold** correspond to LOS E and F operations.

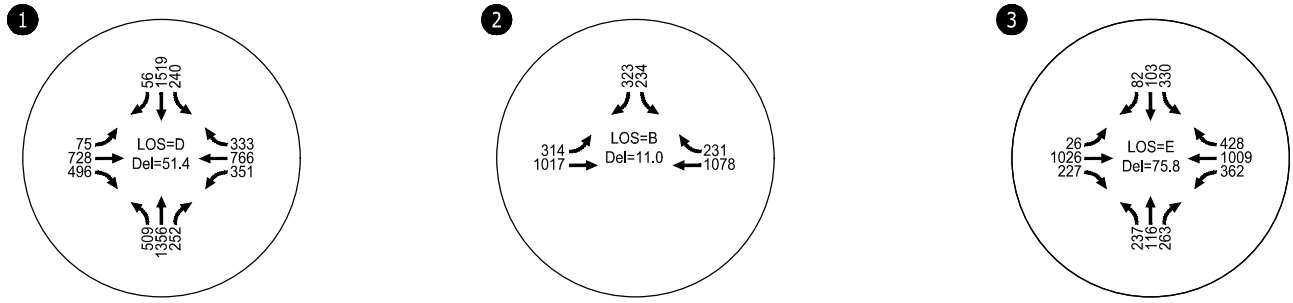
[4] Average queues also exceed available storage.



Weekday PM Peak Hour



Saturday Midday Peak Hour



Background Plus Project Traffic Volumes & Operations
Weekday PM Peak Hour & Saturday Midday Peak Hour
Culver City, California

Figure 10

Table 22 – Background Plus Project Queuing (Weekday PM & Saturday Midday)

ID	Intersection	Movement	Available Storage (ft)	Average | 95th Percentile Queue		Substantial Project Increase	
				Weekday PM	Saturday Midday	Weekday PM	Saturday Midday
1	Lincoln Boulevard & Washington Boulevard	EBL	250	29 | 54	19 | 34	-	-
		EBR	350	212 | 327	231 | **355**	-	-
		WBL	350	195 | 294	96| 148	-	-
		WBR	470	86 | 143	85 | 146	-	-
		NBL	400	237 | 375	165 | 294	-	-
		SBL	200	101 | 153	73 | 107	-	-
2	West Access & Washington Boulevard	EBL	170	59 | 160	137| **345**	-	Yes
		SBL	175	142 | **207**	**185** | **257**	Yes	Yes
		SBR	175	167 | **206**	170 | **255**	Yes	Yes
3	Glencoe Avenue & Washington Boulevard	EBL	375	4 | 14	10 | 21	-	-
		EBR	435	32| 67	58 | 75	-	-
		WBL	300	328 | **668**	**357** | **552**	Yes	-
		WBR	150	83 |**191**	128 |**247**	-	-
		NBL	145	**169** | **246**	135 | **204**	-	-
		NBR	400	0 | 107	62 | 102	-	-
		SBL	165	164 | **242**	145 |**243**	-	-
		SBR	165	0 | 32	0 | 35	-	-

Source: Kittelson & Associates, Inc. 2021

Notes: **bold** correspond to queues exceeding available storage.

Signalized queues at the intersection of Lincoln Boulevard & Washington Boulevard and at the two access intersections under the background plus Project scenario are summarized in Table 22. The analysis shows signalized 95th percentile queues exceed available storage at the following locations:

- West Access at Washington Boulevard:
  - Eastbound left-turn lane; Saturday
  - **Southbound left-turn lane (internal driveway); weekday PM**[5] and Saturday
  - **Southbound right-turn lane (internal driveway); Saturday**[1]
- Glencoe Avenue at Washington Boulevard:
  - **Westbound left-turn lane; weekday PM** and Saturday
  - **Northbound left-turn lane; weekday PM** and Saturday

Compared to background without Project conditions, the project results in an increase in queue at four turn lanes exceeding available storage (identified in **bold** above).

[5] Average queues also exceed available storage.

The Project would increase the queue length and exceed the turn lane storage at the following locations on public streets:

- West Access at Washington Boulevard:
  - Eastbound left-turn lane; Saturday – the available storage is 170 feet, and the Project would increase the 95th percentile queue from 224 to 345 feet. This exceeds the available storage by approximately seven vehicle lengths, which will typically pull into the taper to get out of the way of eastbound through vehicles on Washington Boulevard. A review of aerial photography indicates that the left turn pocket cannot be extended. Modifications to the signal timing by allocating more time to the eastbound left-turn split would reduce this queue to 253 feet. The eastbound left-turn lane is already exceeding storage in the background conditions for the 95th percentile queue, with signal timing improvements the project will add less than two vehicles in length. During the Saturday midday peak hour, the available storage is adequate for the average peak hour demand.

- Glencoe Avenue at Washington Boulevard:
  - Westbound left-turn lane; weekday PM and Saturday - the available storage is 300 feet, and the Project would increase the 95th percentile queue from 664 to 668 feet on weekdays and remain at 552 feet on Saturdays. The Project would nominally increase the queue length by less than one vehicle at this location (less than 11 feet in both periods), which will typically pull into the taper to get out of the way of westbound through vehicles on Washington Boulevard. A review of aerial photography indicates that the left turn pocket cannot be extended. Modifications to the signal timing would offset the queue increase.

The background plus Project scenario found that two of the queuing impacts identified at the Glencoe Avenue & Washington Boulevard intersection (the westbound right-turn lane and the southbound left-turn lane) would be eliminated. The additional segments would be contained within the internal Project driveways, not on public streets. Therefore, the increase in the queues at southbound approach at West Access & Washington Boulevard would not be considered a substantially adverse condition that affects traffic on public streets.

TEMPORARY CONSTRUCTION TRAFFIC

The Washington Boulevard Stormwater and Urban Runoff Project ("Stormwater Project") will be implemented by the City of Culver City to capture stormwater and urban runoff before it enters the storm drain system. The redesign proposes five landscaped medians to be constructed within the existing painted medians on Washington Boulevard and will not remove any lanes once complete. The only raised median proposed on Washington Boulevard adjacent to the Costco site would be constructed between the eastern access driveway and Glencoe Avenue. Other medians would be constructed east of Walgrove Avenue.

Construction of the Stormwater Project was scheduled to start in January 2022 and be completed in November 2022. However, the start of the project has been delayed. It is possible that the construction activities for both projects may overlap. The following provides a detailed description of the anticipated construction activities, timing, location and construction-related traffic.

Costco Fuel Station Construction

The existing Costco Gasoline fuel station will be re-located to the two (2) developed parcels in the southwest corner of the shopping center currently occupied by commercial buildings. The existing fuel station will be razed and removed from the site and the existing commercial buildings will be demolished. The existing underground storage tanks and piping will be decommissioned and removed by state certified contractors. Following demolition, the existing fuel facility site will be improved with additional parking for the Costco Warehouse. Construction of the proposed new fuel station and demolition of the existing fuel station is estimated to take approximately 6 months. Construction of the fuel station project would consist of 5 phases. Figure 11 depicts the anticipated start, end days and duration for each phase. Figure 11 shows the duration of each construction phase ranging from 29 to 88 days. The following provides a summary of each phase, duration in days, and total number of truckloads (truck hauling round trips) during the duration each phase:

- Phase 1, Demolition of commercial buildings – 29 days, 179 truckloads
- Phase 2, Relocation of major utilities, rough grade and parking lot modification – 42 days, 179 truckloads
- Phase 3 A and B, New Fuel Facility Construction and Parking Lot Modifications – 88 days, 302 truckloads
- Phase 4, Decommission and demolition of the existing fuel facility – 61 days, 174 truckloads
- Phase 5, Installation of new parking lot at existing gas station – 61 days, 40 truckloads

As a project design feature, there would be no overlapping construction with the Washington Boulevard Stormwater, as follows[6]:

- Avoid concurrent construction within 500 feet of the City's Stormwater Project and receptor location R1
- Avoid concurrent construction within 400 feet of the City's Stormwater Project and receptor location R3
- Avoid concurrent construction within 100 feet of the City's Stormwater Project and receptor location R4

Washington Boulevard Stormwater and Urban Runoff Project Construction

Work to be done along Washington Boulevard is anticipated to occur for a duration of 8 months. Figure 12 depicts the phases and timing for the Stormwater Project construction. Appendix J presents a description and schedule for each phase. The work area associated to the sewer connection will be plated during the

[6] Receptors R1, R3, R4 are residential properties located on Walnut Avenue, Zanja Street, and Glencoe Avenue. These are described in detail in the Costco Fuel Station Relocation Project Environmental Noise Impact Study, prepared by AES in October 2022.

day for vehicular traffic. The work zone on Washington Boulevard would comprise of a 38-foot-wide area. Traffic on Washington Boulevard would have limited travel and turning lanes at intersections.

A traffic control plan for the Stormwater Project was prepared and would include the closure of one lane of through eastbound traffic and the center median lane. The plan would also temporarily remove on-street parking along Washington Boulevard between the western Costco Wholesale driveway and Redwood Avenue. Furthermore, several pedestrian crosswalks will be closed during Stormwater Project construction, but only across Washington Boulevard. Sidewalks along Washington Boulevard are to remain open and untouched by the project construction.

Figure 11- Costco Fuel Station Construction Phases

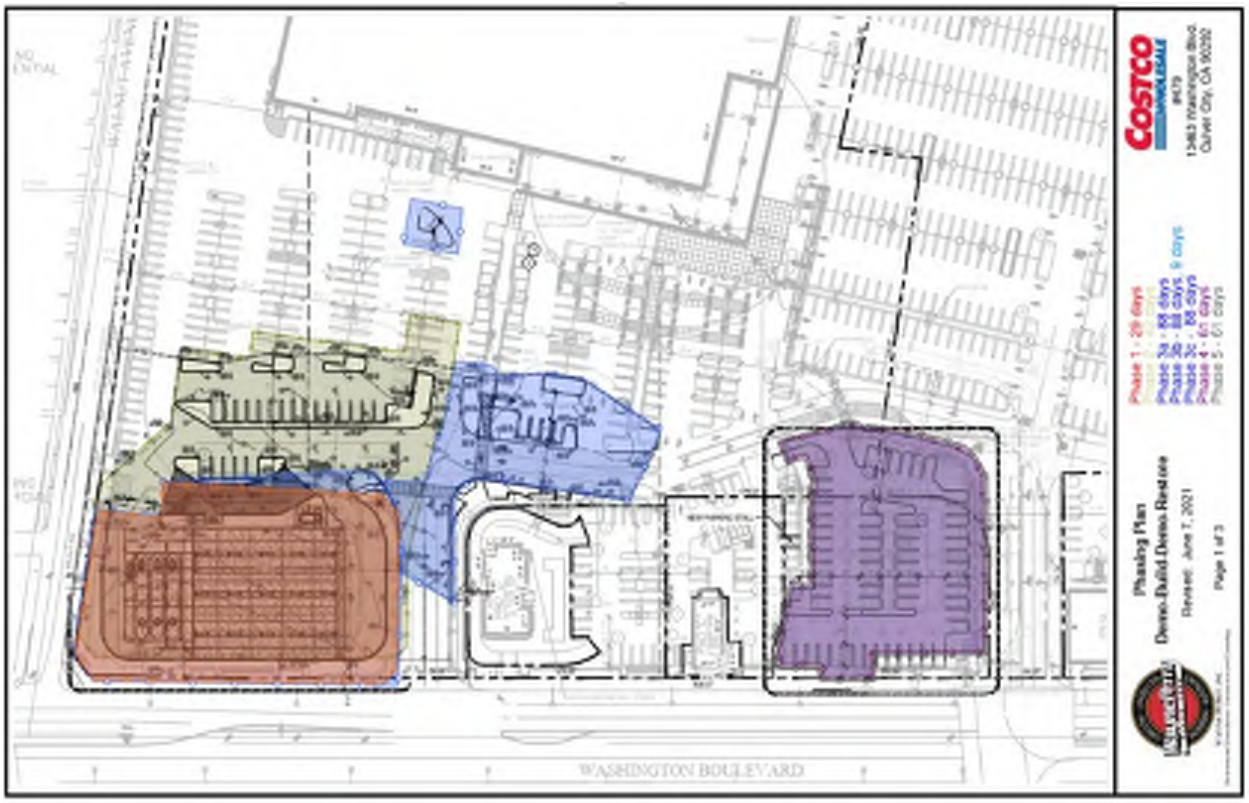


Figure 12 - Washington Boulevard Construction Phases

During construction of the Stormwater Project, traffic in the vicinity of the Costco warehouse area could be affected by temporary lane closures, turn restrictions, potential alterations to bus stops, restrictions to local access driveways, and temporary loss of curbside parking. Traffic mitigation identified in the Washington Boulevard Diversion Traffic Management Plan, prepared by Albert Grover and Associates in December 2018, would include:

- Work zone traffic control and changeable message signs
- Facilitate flow on Washington Boulevard and alternative routes
- Intelligent project staging and work activities
- Updating signal timing to facilitate traffic flow through construction zones
- Restricting deliveries and demolition hauling outside of the peak hours

Anticipated delays and congestion due to construction activities and lane reductions are likely to influence motorists to choose alternate routes that provide a time advantage over waiting in congestion along Washington Boulevard. It is anticipated that some motorists will divert to Venice Boulevard and Maxella Avenue depending on their ultimate destination.

To minimize congestion related to construction traffic, Costco will prepare a construction management plan in consultation with the City of Culver City, which will establish truck haul routes, access driveways, time restrictions, maximum number of trucks per hour or per day, staging, parking and loading areas and

traffic controls such as signage, pavement markings, cones, barricades, flaggers and other elements for implementation of the proposed fuel facility. The construction management plan will be submitted to the City and be approved prior to obtaining construction permits.

Section 7— Findings & Recommendations

FINDINGS & RECOMMENDATIONS

The expansion and relocation of the Culver City Costco Gasoline fuel station (along with the removal of existing retail uses) will result in a reduction in net new trips to the site. The Project is estimated to approximately reduce 13 weekday PM peak hour net new trips (6 inbound, 7 outbound) and 14 Saturday midday peak hour net new trips (8 inbound/6 outbound). On a daily basis, the Project would result in 331 fewer trips during the weekdays. While Saturday daily estimates are not available, a comparison between the peak hour trips on weekdays and Saturdays suggest that the net daily trip reduction would also occur on Saturdays.

CEQA-RELATED

POTENTIAL CONFLICTS WITH PROGRAMS, PLANS, ORDINANCES, AND POLICIES

Neighborhood Traffic Management Program

The Project would not add new access driveways to the circulation network. All vehicular ingress and egress would continue to occur via Washington Boulevard. No access driveway will be constructed on Walnut Avenue. Walnut Avenue and Zanja Street already have traffic calming measures that restrict cut-thought traffic on those streets. Because the Project would result in a net decrease in traffic, and because site access would continue to occur primarily via the existing access driveways at Washington Boulevard, the Project would not add cut-through traffic to the nearby residential neighborhoods.

In addition, the Project would not add vehicle trips to the study area and therefore not exacerbate cut-through traffic through the neighborhood by causing additional congestion to the study area.

Potential Impacts to Non-Auto Modes

Pedestrian and Bicycle Circulation

The existing Costco site provides decorative paving at all on-site pedestrian walkways and courtyards. The gasoline station would not generate a substantial number of pedestrian traffic to/from the warehouse and other parts of the shopping area. The new parking lot area at the location where the existing gas station is located will continue to be connected with decorative paving at all on-site pedestrian walkways and courtyards.

As previously described in Section 5, the Project would not modify existing bicycle and pedestrian facilities that would impact off-site bicycle and sidewalks. The project includes the repairment of three (3) sidewalk panels along Washington Boulevard fronting the project site. The project will also close the existing gas station exit driveway, so vehicles would no longer cross the pedestrian path, improving pedestrian experience. In addition, the proposed gasoline station would not create a substantial increase in pedestrian and bicycle activity. As such, the Project would not impact off-site pedestrian and bicycle facilities and should not be required to provide any off-site bicycle and pedestrian improvements.

Bicycle Parking

Short-term bicycle parking is provided at the main Costco warehouse. The fuel facility is not required to provide parking stalls as it is an ancillary use to the main Costco warehouse and no goods, other than fuel, are sold at the facility. In addition, the Project will remove approximately 29 parking stalls, and the California Green Building Code only requires new bicycle parking for any new parking provided. Based on the above information, the provision of additional short-term bicycle stalls is not needed for the fuel facility.

Transit

The Project would not impact the existing bus stops along Washington Boulevard. In addition, the Project is not anticipated to generate a significant number of additional trips to the site. As such, bus stop upgrades should not be required.

VEHICLE MILES TRAVELED (VMT) IMPACTS

On June 8, 2020, the City of Culver City updated the Transportation Study Criteria and Guidelines, which includes methodologies and criteria to evaluate land use and transportation projects from a VMT standpoint. Regional serving retail projects should be evaluated to determine their effect on vehicle trip length and VMT.

The Project would result in a net decrease of 331 daily trips. The Project would be replacing trips from retail uses with trips to a gas station, which on average consist of shorter trip lengths compared to those of retail trips. In summary, as the Project would generate fewer daily trips and the trip lengths associated with the Project would be less, the Project would result in a net decrease in VMT and therefore not result in a significant VMT impact.

GEOMETRIC DESIGN HAZARDS

Intersection Queues

The Project would increase the queue length and exceed the turn lane storage at the following locations on public streets. Table 23 and Table 24 summarize the 95th percentile queues at the critical movements, as described below.

- West Access at Washington Boulevard:
  - Eastbound left-turn lane; Saturday – The available storage is 170 feet. The 95th percentile queue at this intersection of 181 feet is currently exceeding the available storage at this location, in a condition where the queue extends to the adjacent eastbound through lane on Washington Boulevard. A review of aerial photography indicates that the left turn pocket cannot be extended. The Project would increase the 95th percentile queue under existing and background conditions. Signal timing adjustments would reduce queue increases with the project as shown on Table 23, but queues would remain greater compared to no project conditions.
- Glencoe Avenue at Washington Boulevard:
  - Westbound left-turn lane; weekday PM and Saturday - The available storage is 300 feet. The 95th percentile queue (523 feet weekday PM/407 feet Saturday) feet at this intersection is currently exceeding the available storage at this location. A review of aerial photography indicates that the left turn pocket cannot be extended. The Project would increase the 95th percentile queue under existing and background conditions. Modifications to the signal timing would offset the queue increase as shown on Table 24.
  - Northbound left-turn lane; weekday PM and Saturday- The available storage is 145 feet. The 95th percentile queue (203 feet weekday PM/174 feet Saturday) at this intersection is currently exceeding the available storage at this location. The Project would nominally modify the queue length by less than one vehicle at this location. The queue would be contained within the northbound approach of Glencoe Avenue and would not extend to the next driveway at Beach Avenue. This would not substantially affect circulation in the area, and no modifications are recommended to address this condition.

Table 23- West Access & Washington Blvd Critical Movements 95th Percentile Queues Summary

Turn Lane	Condition	Existing 95 Percentile Queues			Background 95 Percentile Queues		
		No Project	With Project	With Project and Signal Timing Updates	No Project	With Project	With Project and Signal Timing Updates
Eastbound Left	Weekday PM	63	119	119	107	160	160
	Saturday	**181**	**255**	**210**	**224**	**345**	**253**

Notes: **bold** correspond to queues exceeding available storage of 170 feet.

Table 24 - Glencoe Av & Washington Blvd Critical Movements 95th Percentile Queues Summary

Turn Lane	Condition	Existing 95 Percentile Queues			Background 95 Percentile Queues		
		No Project	With Project	With Project and Signal Timing Updates	No Project	With Project	With Project and Signal Timing Updates
Westbound Left	Weekday PM	**523**	**527**	**515**	**664**	**668**	**656**
	Saturday	**407**	**418**	**405**	**552**	**552**	**502**
Northbound Left	Weekday PM	**203**	**205**	**205**	**248**	**246**	**248**
	Saturday	**174**	**171**	**171**	**206**	**204**	**206**

Notes: **bold** correspond to queues exceeding available storage as follows:

- Westbound left available storage = 300 feet
- Northbound left available storage = 145 feet

Project-related traffic would result in an increase in the queues at the eastbound left turn lane of West access at Washington Boulevard, at a location where the queue already extends past the available storage. The project will be conditioned to either the installation of a battery backup and a Video Detection camera for the existing traffic signal, or payment of a $30,000 in-lieu fee.

The intersection queuing analysis concluded that the Project would not result in new locations where the available storage would be exceeded at study intersections on public street approaches. In addition, the Project will not cause a substantial increase in on-street hazards due to geometric design or incompatible uses and therefore not result in a significant impact related to CEQA.

NON-CEQA SUPPLEMENTAL TRANSPORTATION ANALYSIS

INTERSECTION LOS AND DELAY

Table 25 summarizes the LOS and delay at the three study intersections during the weekday PM peak hours. With Project traffic under existing and background conditions, there is no degradation in LOS or minor changes in delay at the study intersections. Therefore, the Project would not degrade intersection operations in terms of LOS or delay during the weekday PM peak hour.

Table 25 – Intersection LOS Summary Table, Weekday PM Conditions

ID	Intersection	Existing		Existing Plus Project		Background		Background Plus Project	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Lincoln Boulevard & Washington Boulevard	62.7	**E**	62.7	**E**	67.5	**E**	67.7	**E**
2	West Access & Washington Boulevard	7.1	A	9.3	A	6.8	A	8.9	A
3	Glencoe Avenue & Washington Boulevard	41.8	D	41.9	D	48.6	D	50.8	D

Source: Kittelson & Associates, Inc. 2021
Notes: **bold** correspond to LOS E and F operations.

Table 26 summarizes the LOS and delay at the three study intersections during the Saturday peak hours. With Project traffic under existing and background conditions, the intersection of West Access & Washington Boulevard would change from LOS A to LOS B, which is considered acceptable in terms of operations. There is no degradation in LOS or minor changes in delay at the intersections of Lincoln Boulevard & Washington Boulevard, and Glencoe Avenue & Washington Boulevard. Therefore, the Project would not degrade intersection operations in terms of LOS and delay on Saturdays.

Table 26 – Intersection LOS Summary Table, Saturday Peak Hour Conditions

ID	Intersection	Existing		Existing Plus Project		Background		Background Plus Project	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	Lincoln Boulevard & Washington Boulevard	48.1	D	48.1	D	51.5	D	51.4	D
2	West Access & Washington Boulevard	9.3	A	11.3	B	8.9	A	11.0	B
3	Glencoe Avenue & Washington Boulevard	49.7	D	53.2	D	68.6	**E**	75.8	**E**

Source: Kittelson & Associates, Inc. 2021
Notes: **bold** correspond to LOS E and F operations.

PROJECT CONSTRUCTION

The Stormwater Project will be implemented by the City of Culver City in the near future. Construction of the proposed Costco Gasoline fuel facility and demolition of the existing gasoline dispensing facility is expected to last for 6 months. It is possible that an overlap of the construction projects may occur. As a project design feature of the Project, there would be no overlapping construction with the Washington Boulevard Stormwater as previously described.

During the Stormwater Project construction, the work zone traffic control plan outlines the closure of one lane of through westbound traffic and most of the center median lane, as well as temporary removal of on-street parking along Washington Boulevard between the western Costco Wholesale driveway and Redwood Avenue. Furthermore, several pedestrian crosswalks will be closed during the project

construction, but only across Washington Boulevard. Sidewalks along Washington Boulevard are to remain open and untouched by the project construction.

During the Stormwater Project construction, traffic in the vicinity of the Costco warehouse area could be affected by temporary lane closures, turn restrictions, potential alterations to bus stops, restrictions to local access driveways, and temporary loss of curbside parking. Traffic mitigation identified in the Washington Boulevard Diversion Traffic Management Plan, prepared by Albert Grover and Associates in December 2018, would include:

- Work zone traffic control and changeable message signs
- Facilitate flow on Washington Boulevard and alternative routes
- Intelligent project staging and work activities

To minimize congestion related to construction traffic, Costco will prepare a construction management plan in consultation with the City of Culver City, which will establish truck haul routes, access driveways, staging, parking and loading areas and traffic controls such as signage, pavement markings, cones, barricades, flaggers and other elements. The construction management plan will be submitted to the City and be approved prior to obtaining construction permits.

Appendix A:
Memorandum of Understanding

Memorandum of Understanding for Transportation Study

This Memorandum of Understanding (MOU) acknowledges and agrees to all the City of Culver City requirements and fees for the review of a transportation study for the following project.

Date Submitted: 02/05/2021 **MOU Version #** 2021 v3

Project Name: Culver City Costco Fuel Station Relocation

Project Address: 13463 Washington Blvd in Marina Del Rey, California 90292

Project Description:

The site is currently developed with a Costco warehouse and a sixteen (16) vehicle fueling position Costco Gasoline fuel station. In addition, there are several retail buildings on the property including fast food and small retail. The project will move the gas station to the southwest corner of the site and expand to thirty (30) vehicle fueling positions to better serve peak period demand. The new location is currently occupied by two buildings that house a Verizon mobile phone store, Subway, a GNC shop and a Starbucks Coffee. These buildings will be demolished and therefore eliminate on-site trips associated with those land uses. The existing gas station will as be demolished and converted into Costco warehouse customer parking. The on-site relocation and expansion will improve site circulation and service provided to Costco members.

Land Use	Gross Floor Area (sq. ft.) *Defined per latest ITE publication*	Residential Units (#)
Costco Fueling Station	30 Fueling Positions	0

Project Horizon Year: 2022

Ambient Growth Rate (% per year): 1% (see Attachment for details)

Directional Distribution (%): N: 20% S: 15% E: 60% W: 5%

Trip Generation Rates: Show AM, PM and daily trip generation rates for each land use and attach total daily trips generation calculations. Indicate ITE Latest Edition/Other: Kittelson Costco Trip Counts Database

Land Use	ITE Code #	PM Trips		SAT Trips		Daily Totals	
		In	Out	In	Out	In	Out
Costco Fueling Station (30 Fueling Positions)	NA	355	354	375	375	4129	4128

See attachment for trip generation calculation details.

Study Intersections: Show all study intersections, intersections subject to capacity analysis credit for advanced traffic signal control synchronization, whether intersections are signalized or non-signalized, and use the same numbering system for all lists of intersections and figures in the study.

No.	Intersection	Signalized/Non-Signalized	Jurisdiction
1	Washington Blvd & Glencoe Ave/Costco East Access	Signalized	Culver City
2	Washington Blvd & Costco West Access	Signalized	Culver City
3	Washington Blvd & Lincoln Blvd	Signalized	City of Los Angeles

Trip Credits: Indicate trip credits to be requested (subject to City approval)

	Trip Credits (PM/SAT)	Yes/No
Existing Uses	596/687	Yes
Pass-By Trips	198/246	Yes
Internal Trip Capture	395/428	Yes
Diverted Trips	284/286	Yes
Transit-Oriented Development (TOD)		No
Transportation Demand Management (TDM)		No

See attachment for trip credit details.

Related Projects: Before the start of any proposed project analysis, consultants shall:

1. Obtain a list of related projects from the Culver City Current Planning Division and other affected jurisdictions.
2. Prepare a draft list of "related projects specific to the proposed project."
3. Obtain written approval from the City of the "related projects specific to the proposed project."

Maps: The following maps shall be attached to the MOU:

1. A map showing the study intersections and street segments to be analyzed, including City limit lines where applicable.
2. A map showing the project's trip distribution percentages for each land use (inbound and outbound) on the area's road network.
3. A map showing the project's trip assignments at the study intersections and project driveways, as well as road segments when applicable.
4. A site plan of the project showing property lines, alleys, project's driveways and nearby driveways and intersections on both sides of the street including dimensions.

Proposed Mitigation and Transportation Improvements: Any proposed transportation improvement(s) or mitigation measure(s) shall be listed and accompanied by plans of the existing and proposed improvements, including city limit lines and existing and proposed property lines. The City may initially accept conceptual plans to be included in the Transportation Study. Detailed design of such improvements will be part of the project's plans submittals.

Post-Occupancy Traffic Counts: By signing below, the Property Owner/ Developer/Applicant hereby agrees to pay for and submit to the City a post-occupancy traffic count analysis of the development to the satisfaction of the City. The analysis shall determine the amount of actual traffic (motor vehicle, bicycle, and pedestrian) generated by the development compared to the ITE trip generation rates. The analysis shall include a traffic count of all onsite driveways taken upon reaching eighty-five percent (85%) occupancy of the total building gross floor area or within one (1) year of the issuance of the first Temporary Certificate of Occupancy (TCO), as determined by the City. The data shall be used to confirm the findings in the approved study and ~~not~~ may result in ~~any~~ additional traffic mitigation measures ~~and/or conditions of approval~~ on the subject project.

and study intersections

The post-occupancy analysis will double check accuracy of the LOS findings and will not add any other study intersections.

Fees: Payment of a fee to the City's PWD for the City's processing of the MOU shall be required before the City approves the MOU. Payment for review of the Transportation Study shall be paid before the City's PWD completes its review of the Transportation Study. Said fees shall be per the most recent Fee Schedule as approved by the City Council.

Applicant Information:

	Property Owner/Applicant	Developer/Applicant	Traffic Consultant
Name	Ms. Kim Katz		Mr. Fernando Sotelo, TE, PTP
Title			Associate Engineer
Company	Costco Wholesale		Kittelson and Associates
Street Address	999 Lake Drive		750 The City Drive, Suite 410
City, State, Zip	Issaquah, WA, 98027		Orange, CA, 92868
Office			714-468-1997
Cell			
Fax			
Email	Kkatz@costco.com		fsotelo@kittelson.com

Public Agency Information: If any of the intersection(s) to be studied as part of this study are located within the City of Los Angeles, the unincorporated areas of Los Angeles County and/or impact any other public agency (i.e., Caltrans), then this MOU shall also be approved by the reviewing staff representative from each agency:

	City of Los Angeles	County of Los Angeles	Other Public Agency
Name	Robert Sanchez		
Title			
Company	LADOT, West LA / Coastal Development Review		
Street Address			
City, State, Zip			
Office			
Cell			
Fax			
Email	robert.sanchez-jr@lacity.org		

Signatures/Expiration: This MOU shall become valid as of the date of the City's signature and expire one year thereafter. If the administrative draft of the study has not been filed with the City by the expiration date, the MOU shall expire and a new MOU filing, fee, review, and approval process shall be required.

Approved By:

Date:

Property Owner/Applicant

Developer/Applicant

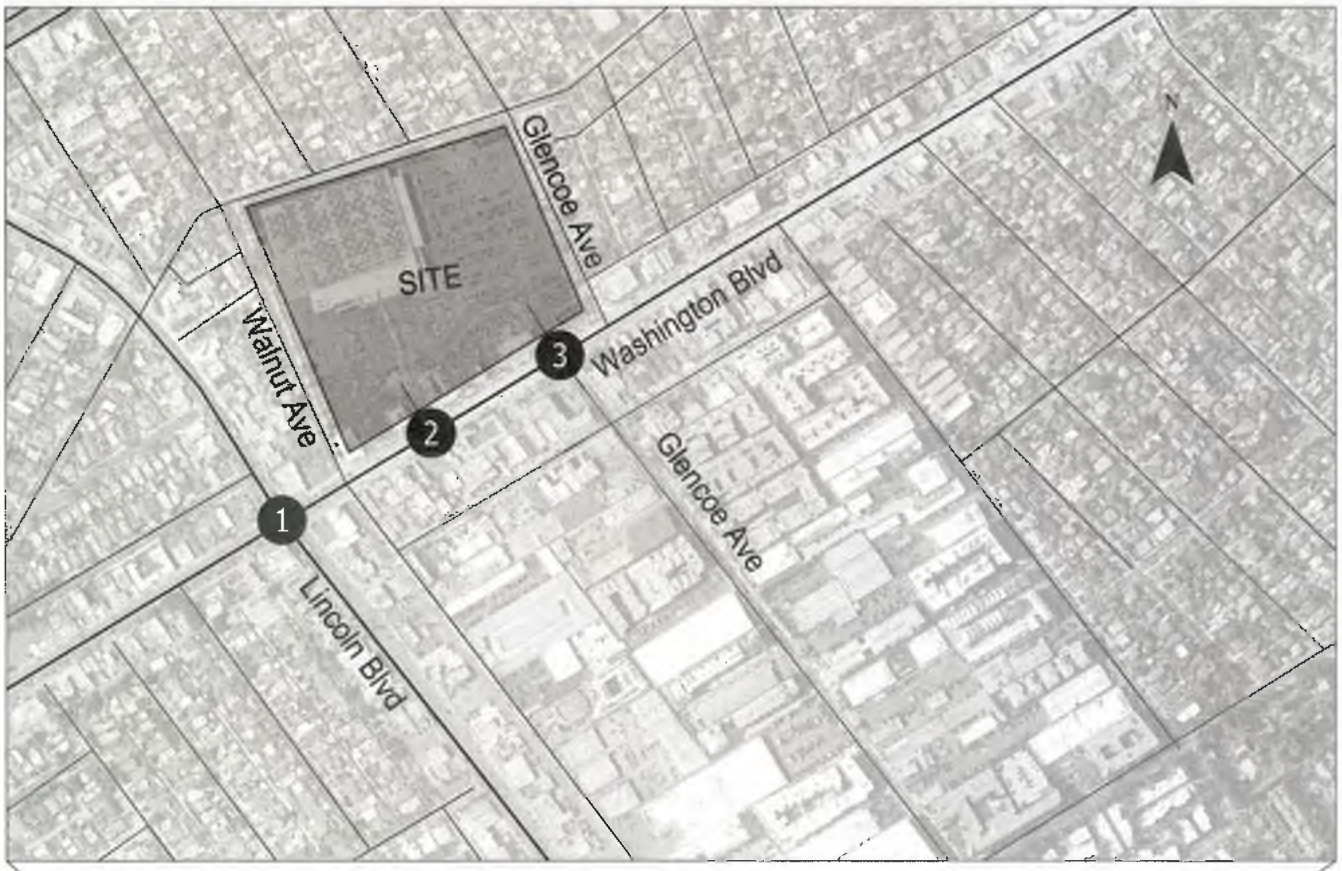
02/05/2021

Traffic Consultant

Heba El-Gendy

02/11/2021

City of Culver City

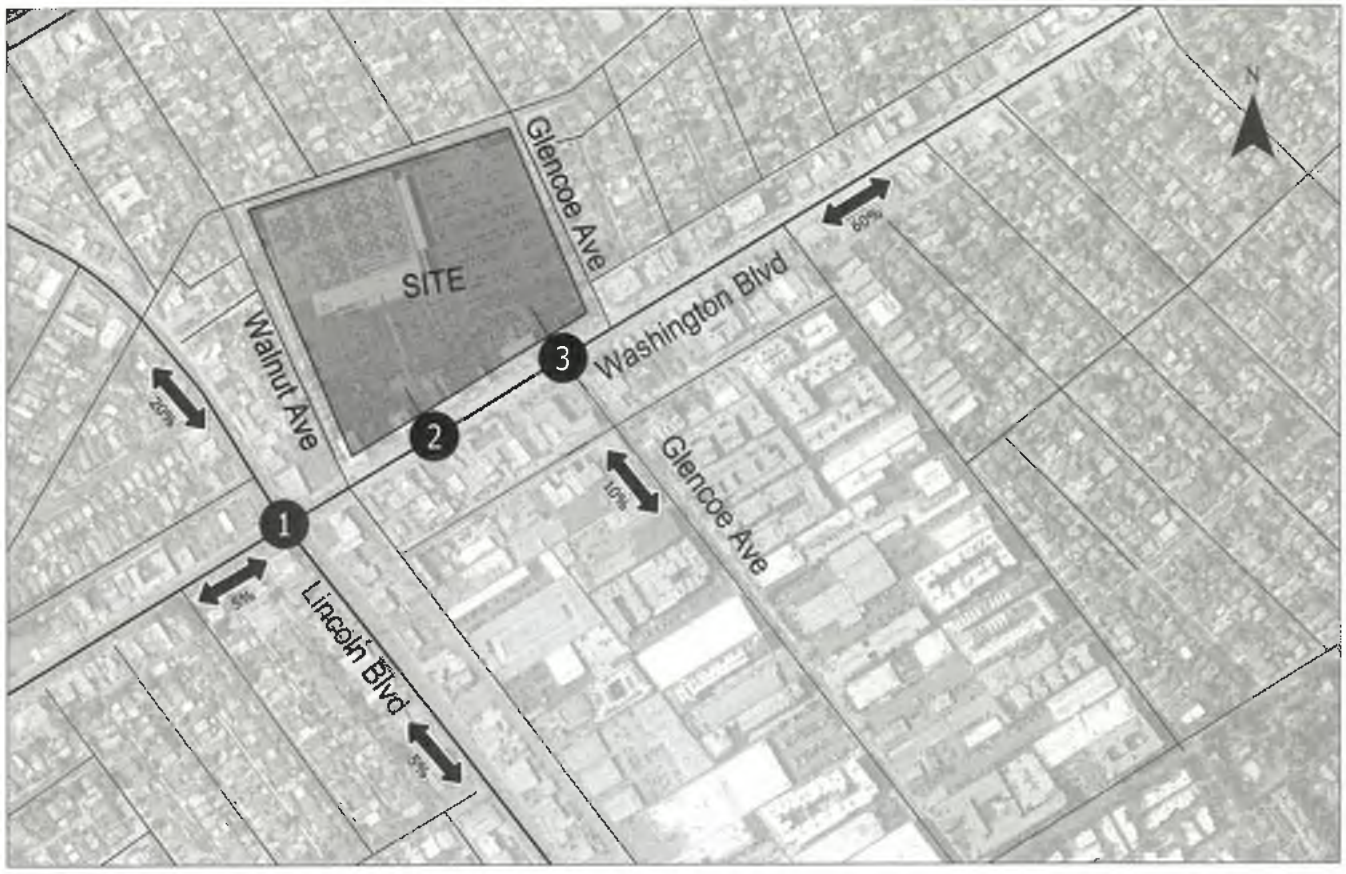


- Study Intersections

Site Vicinity Map
Culver City, Califronia

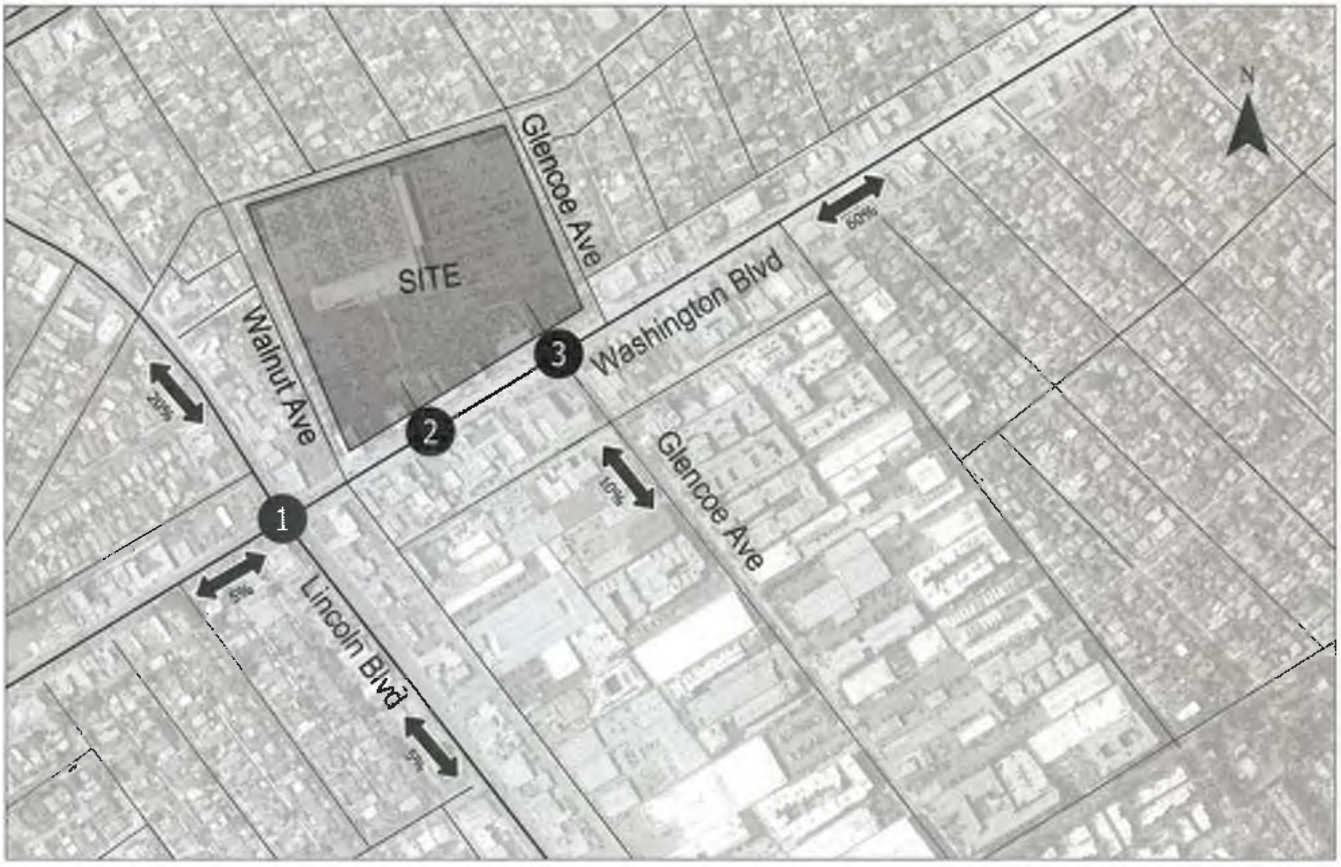
Figure
1

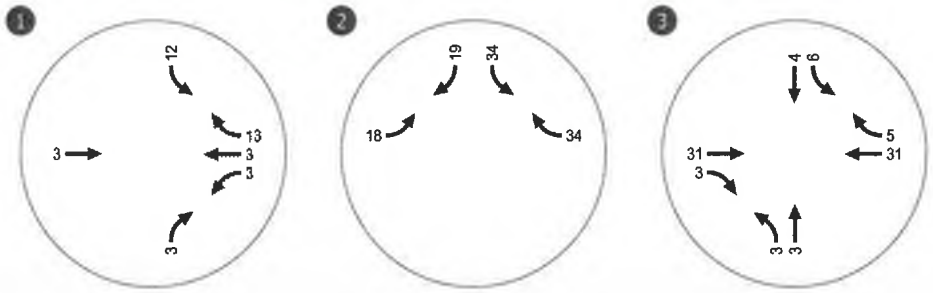
KITTELSON & ASSOCIATES



Trip Distribution Percentages
Weekday PM And Saturday Midday Peak Hours
Culver City, California

Figure
2



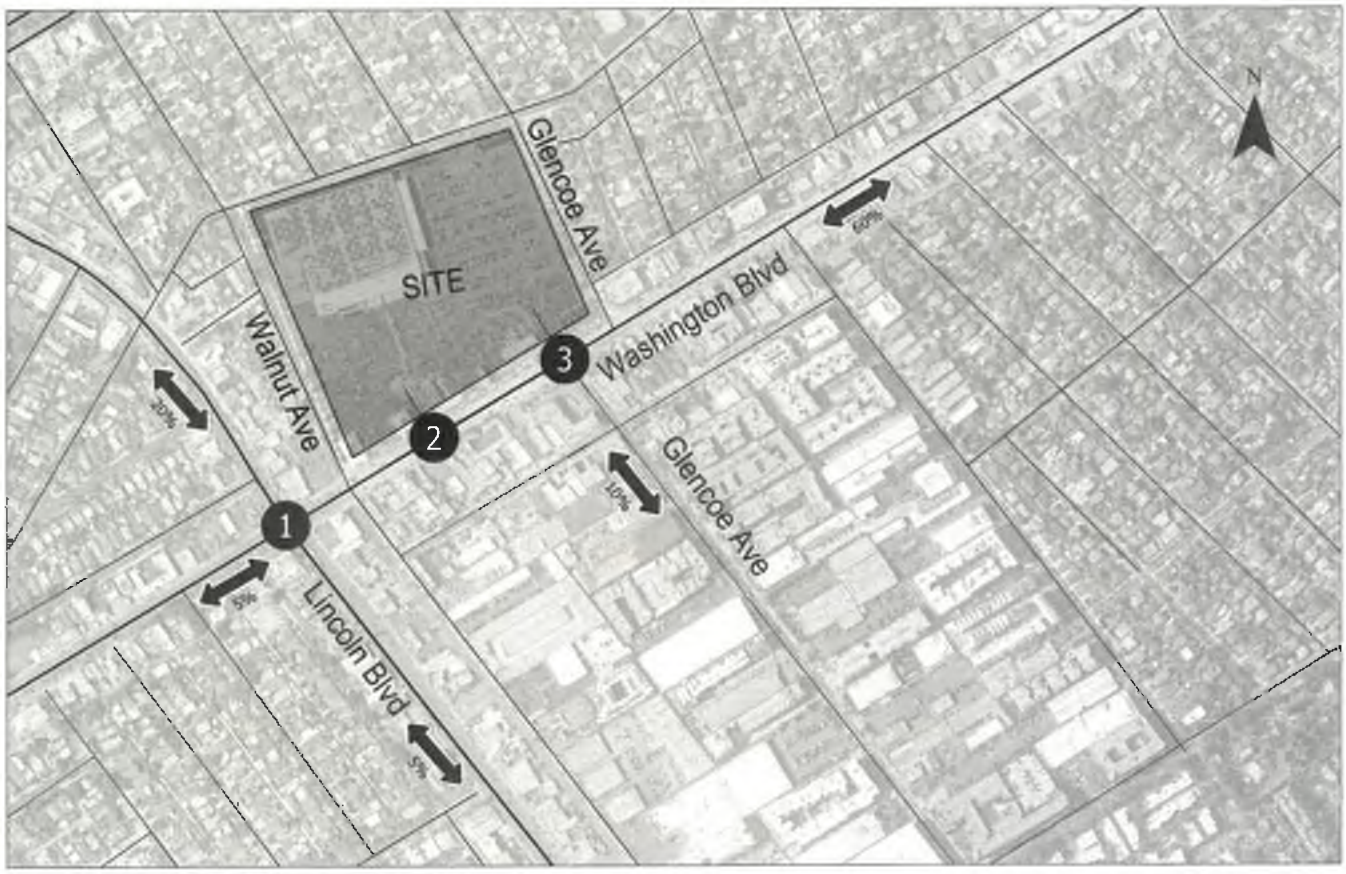


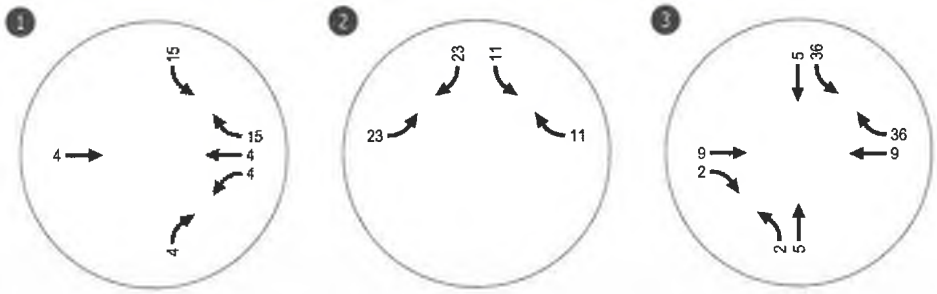
EXISTING USES TRIP CREDITS NOT INCLUDED

Proposed Project Trip Assignment
Weekday PM Peak Hour
Culver City, California

Figure
3

KITTELSON & ASSOCIATES

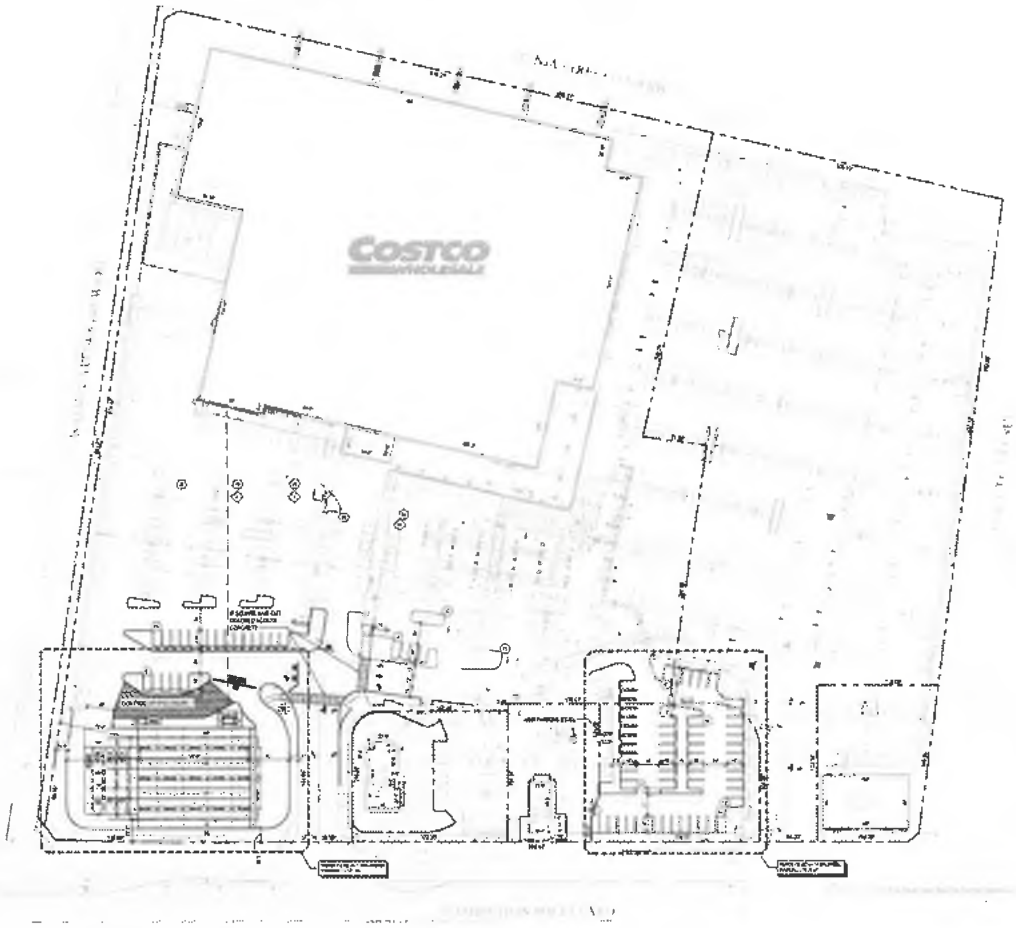




EXISTING USES TRIP CREDITS NOT INCLUDED

Proposed Project Trip Assignment
Saturday Midday Peak Hour
Culver City, California

Figure
4



PROJECT DATA

CLIENT:	COSTCO WHOLESALE 999 LAKE DRIVE ISSAQUAH, WA. 98027
PROJECT ADDRESS:	13483 WASHINGTON BLVD. CULVER CITY, CA 90292
APN:	4236-029-013, 4236-029-016, 4236-029-018

SITE DATA:

TOTAL SITE AREA:	18.41 ACRES (801,884 S.F.)
JURISDICTION:	CULVER CITY
ZONING:	COMMERCIAL REGIONAL RETAIL (CRR)
SETBACKS:	70 FT. FROM VANJA ST (NORTH) 70 FT. FROM WALNUT AVE (WEST)

BUILDING DATA:

EXISTING BUILDING AREA	165,934 S.F.
EXISTING FOOD SERVICE	1,879 S.F.
EXISTING TIRE CENTER	5,422 S.F.
TOTAL COSTCO	173,479 S.F.
EXISTING PAD B, C, D, E, F	19,721 S.F.
TOTAL EXISTING BUILDING AREA	193,888 S.F.
PROPOSED DEMO PAD B PAD C & PAD F	8,450 S.F.
PROPOSED BUILDING AREA	193,888 S.F.

PARKING DATA:

EXISTING PARKING:

10' X 19' STALLS	282 STALLS
9' X 19' STALLS	443 STALLS
8' X 16' OR 9' X 17' COMPACT STALLS	91 STALLS
ACCESSIBLE STALLS	10 STALLS
TOTAL PARKING FOR CENTER	826 STALLS
NO. OF STALLS PER 1000 S.F. OF NEW BUILDING AREA:	5.23 STALLS

PROPOSED PARKING:

10' X 19' STALLS	484 STALLS
9' X 19' STALLS	359 STALLS
8' X 16' OR 9' X 17' COMPACT STALLS	16 STALLS
ACCESSIBLE STALLS	27 STALLS
TOTAL PARKING FOR CENTER	854 STALLS
NO. OF STALLS PER 1000 S.F. OF NEW BUILDING AREA:	5.06 STALLS
JURISDICTIONAL REQUIRED PARKING: 5 STALLS/1,000 S.F.	823 STALLS
NET PARKING CHANGE	+29 STALLS
EXISTING BICYCLE PARKING - COSTCO	37 STALLS
EXISTING BICYCLE PARKING - PAD BLDGS	12 STALLS

NOTES:
EXISTING CONDITIONS TO BE FIELD VERIFIED.

VICINITY MAP

0 25 50 100
1" = 50'-0"

COSTCO WHOLESALE
CULVER CITY, CA
#478

13483 WASHINGTON BLVD.
CULVER CITY, CA 90292

MG2

94-0830-37
SEPTEMBER 24, 2020

CONCEPT
SITE PLAN

DD11-17

COSTCO WHOLESALE

CULVER CITY, CALIFORNIA

CONCEPT SITE PLAN

SEPTEMBER 24, 2020

Figure 5

Proposed Site Plan
Culver City, California

RECEIVED FROM MG2 : (10/5/2020)

KITTELSON & ASSOCIATES

KITTELSON & ASSOCIATES

750 THE CITY DRIVE, SUITE 410
ORANGE CA 92868
P 714.468.1997

MOU ATTACHMENTS

Date: February 1, 2020 Project #: 24944

To: Heba El-Guindy – Culver City

CC:

From: Fernando Sotelo, TE, PTP
Project: Culver City Costco Fuel Station Relocation
Subject: Supporting data for Costco Culver City MOU

Kittelson & Associates, Inc. (Kittelson) is preparing a transportation impact study (TIS) for the fuel station relocation project at the Costco Warehouse site at Washington Boulevard in Culver City. This attachment has been prepared to support the Memorandum of Understanding (MOU) for the Transportation Study of the proposed fuel station relocation project at the Costco Warehouse site at Washington Boulevard in Culver City. This attachment consists of the following elements:

A. Project Description
B. Supporting data and methodology to support the following rates specific to Costco sites:
    - Project trip generation
    - Internal capture rates
    - Pass-by trip rates
    - Diverted trip rates
C. Related (Cumulative) Projects
D. Baseline Traffic Conditions

A. Project Description

The existing Culver City Costco is located at 13463 Washington Blvd in Marina Del Rey, California. The site is currently developed with a Costco warehouse and a sixteen (16) vehicle fueling position Costco Gasoline fuel station located in the south-east corner. In addition, there are several pad developments on the property including fast food and small retail. The on-site relocation will move the gas station to the southwest corner of the site, providing space between the gas station queues and the main entrance at the Washington Blvd & Glencoe Ave traffic signal. The relocation will also allow the gas station to expand to thirty (30) vehicle fueling positions to provide more fueling positions to better serve peak period demand. The new location is currently occupied by two buildings that house a Verizon mobile phone store, Subway, a GNC shop and a Starbucks Coffee. These buildings will be demolished and therefore eliminate on-site trips associated with those land uses. The existing gas station will as be demolished and converted into Costco warehouse customer parking. The on-site relocation and expansion will improve site circulation and service provided to Costco members.

B. Supporting Data and Methodology

Costco Trip Generation Database

For the past 17 years, Kittelson has maintained a database of traffic data and travel characteristics for Costco Wholesale, including data about their fuel stations. The database contains transportation information such as trip rates, trip type percentages (total, pass-by, internal), and parking demand for Costco locations in the United States, as well as Canada and Mexico. The database is updated and refined each time new Costco traffic counts or information become available to Kittelson.

The Costco transportation database contains a large quantity of data related to Costco fuel stations. Trip generation rates and trip type information for over 50 Costco Gasoline facilities located throughout the U.S. are included. Costco has invested significant time and effort into developing this use-specific trip generation database for both its warehouses and its fuel stations. Because of membership requirements and the nature of Costco sales, Costco members have unique travel characteristics and patterns which are different from customers of other supermarkets. These unique characteristics and patterns exist in the trip generation for Costco warehouses, Costco Gasoline facilities, and the interaction of trips between the two.

The Costco-specific trip generation data presented herein follows nationally-accepted practices for trip generation data collection as recommended by the Institute of Transportation Engineers (ITE) and presents a robust dataset upon which to confidently and accurately predict the trip generation of the expansion of the Culver City Costco Gasoline fuel station.

Culver City Fuel Station Expansion Trip Generation Estimate

In developing a trip generation estimate for the project, it is important to recognize that the fuel station exists on site today and the project is an on-site relocation and expansion of that station. The membership of Costco does not change with the expansion or on-site relocation of a fuel facility, and the general demand for gas at the Culver City Costco will not change. Therefore, it is unlikely that the trip generation of the fuel station will increase directly in proportion to the increased number of fueling positions. Instead, the additional fueling positions will serve to more efficiently and effectively process the current peak demand at the fuel station, thus reducing wait times, vehicles queuing, and vehicle idling. This has been confirmed through before and after data collection at other Costco Gasoline expansion locations.

Kittelson has reviewed before and after data from other comparable Costco gasoline facility expansion sites to determine a representative relationship between new trip generation and the addition of fueling positions to an existing fuel station.

Before and After Fuel Expansion Data Summary

Kittelson used trip generation counts at six Costco Gasoline facility locations that have expanded in size to study the relationship between trip generation and the fuel station expansion. These locations include sites where fuel stations have expanded from 16 fueling positions to 22 or 24 fueling positions. Currently we do not have a sufficient database with 30 fueling positions, therefore the trip rates are based on the sample for 24 fueling positions. The comparable expansion sites identified were:

- Rancho Del Rey, California
- NE San Jose, California
- Concord, California
- Rohnert Park, California
- Cypress, California
- Portland, Oregon

To work with a representative sample size, Costco provided fuel transactions collected on an hourly basis for a period before and after the expansion at each of these locations. Only data collected during the same months of the year before and after the expansion were included in this summary (for example, fuel transactions for the months of March and April before the expansion were compared to fuel transactions for the months of March and April after the expansion). The total number of weekday PM peak hour and Saturday midday peak hour trip ends counted for the seven listed sites are provided in Table 1 and Table 2, respectively. Note the total number of trip ends does not reflect any reductions due to internal capture, pass-by, or diverted trips.

As shown in Table 1 and Table 2, each of the sites recorded some increase in the number of peak hour fuel transactions. However, the increase found in most situations is significantly less than what would be calculated from a direct linear relationship to the number of additional fueling positions. Using a linear relationship, expanding the gas bar from 16 to 22 fueling positions would equate to an increase in activity or trip generation of 38% and expanding from 16 to 24 positions would equate to an increase of 50%. However, the before and after data show an average increase of 26.5% and 33.5% in fuel transactions during the weekday PM peak hour and Saturday midday peak hour, respectively.

These data demonstrate that increasing the number of fueling positions at the Culver City fuel station will not result in a direct linear increase in trip generation. The before and after data capture the change in demand that results from reducing peak hour queues and wait times at the fuel stations due to latent demand and more efficient peak operations. In all cases, peak queues and wait times are significantly reduced. Those members who previously chose not to purchase fuel because of the wait times will likely do so after expansion when the operations are improved.

Table 1. Weekday PM Peak Hour Trip Growth

Location	Average Weekday PM Peak Hour Trips Generated		
	Before Expansion	After Expansion	% Difference
Rancho Del Rey, CA	414	676	63.3%
NE San Jose, CA	474	458	-3.4%
Concord, CA	470	550	17.0%
Rohnert Park, CA	426	498	16.9%
Cypress, CA	472	654	38.6%
Portland, OR	N/A	404	--
Average			**26.5%**

Source: Kittelson & Associates, Inc. 2020
[1] All locations expanded from 16 to 24 fueling positions

Table 2. Saturday Midday Peak Hour Trip Growth

Location	Saturday Midday Peak Hour Trips Generated		
	Before Expansion	After Expansion	% Difference
Rancho Del Rey, CA	N/A	678	--
NE San Jose, CA	494	686	38.9%
Concord, CA	520	700	34.6%
Rohnert Park, CA	518	606	17.0%
Cypress, CA	514	740	44.0%
Portland, OR	462	616	33.0%
Average			**33.5%**

Source: Kittelson & Associates, Inc. 2020
[1] All locations expanded from 16 to 24 fueling positions

Weekday daily trip rates for the existing site were calculated based on trip generation counts for fueling facilities with 16 positions. For the proposed project, the daily trip rates are based on trip generation counts for sites ranging from 22 to 24 fueling positions. The trip rates were then multiplied by the number of fueling positions to calculate the number of daily trips with the existing and proposed gas station.

Trip Type

The data collected at existing Costco Gasoline fuel stations indicate the trip generation characteristics described below for internal trip capture between the fuel station and the warehouse, as well as pass-by trips and diverted capture from the surrounding street system (included in Attachment A). The unique nature of Costco operations and its membership requirements result in different trip characteristics than those observed at typical fuel stations summarized in the standard reference *Trip Generation Manual*, published by the Institute of Transportation Engineers (ITE). The percentages of pass-by or diverted trips at Costco fuel stations is considerably lower than those quoted in the ITE *Trip Generation Manual* for typical fuel stations. Correspondingly, membership requirements also have a significant effect on trip internalization (or sharing of trips) between the warehouse and the fuel station. Fewer people exclusively visit a Costco fuel station (in comparison to a typical standalone fuel station) because they have another primary purpose for visiting the site (that being a trip to the warehouse).

Internal Trips

A key finding from the studies conducted at Costco warehouses with fuel stations is the fact that approximately 34 percent of the PM peak hour trips to and from Costco fuel stations and 35 percent of the Saturday midday trips are internal capture trips. Internal capture trips account for those members who patronize both the warehouse and the fuel station during a single visit to the Costco site. As such, although they account for a trip to both the warehouse and the fuel station, they only account for one overall vehicle trip to the site and on the surrounding transportation system. Based on studies including surveys at Costco fuel stations and membership card transaction data, on average 34 percent and 35 percent of the members buying gas during the weekday PM and Saturday midday peak hours, respectively, are members whose main purpose to the site is to visit the Costco warehouse. At some sites, this number ranges as high as 75 percent.

Internal capture data was analyzed from daily transactions at the Costco Warehouse and at the Gasoline at the Culver City site for the entire year of 2019. The data was filtered to same member transactions during times when the warehouse and the gas station were open. A review of the 2019 data at the Culver City location (see sample in Attachment A) indicates that the average weekday internal capture rate is 35.8 percent, for Saturdays 36.4 percent, and 38.4 percent for Sundays. In other words, in an average weekday 35.8 percent of transactions at the warehouse also resulted in gasoline transactions. However, to remain conservative, the average rates of 34 and 35 percent for all warehouses described above applied to this analysis.

Pass-by and Diverted Trips

Another key trip characteristic that must be considered is that of pass-by trip capture. Pass-by trips represent members (and trips) that are currently traveling on the surrounding street network for some other primary purpose (such as a trip from work to home) and stop into the site in-route during their normal travel. As such, pass-by trips do not result in a net increase in traffic on the surrounding transportation system and their only effect occurs at the immediate intersections and site access driveways where they become turning movements. Based on studies of customer surveys at Costco Gasoline fuel stations, on average 37 percent and 33 percent of the members buying gas during the weekday PM and Saturday midday peak hours, respectively can be classified as pass-by trip capture from the surrounding street system. This is lower than the average pass-by rate quoted in the ITE *Trip Generation Manual* for typical service stations (45 percent) and is attributable to the unique travel characteristics that result from Costco's membership requirements.

Diverted trips are similar to pass-by trips they represent members (and trips) that are currently traveling on the surrounding street network for some other primary purpose and stop into the site in-route during their travel. However, as the name indicates, diverted trips divert from the normal roadways they would be traveling on to go to the Costco site. Based on studies of customer surveys at Costco Gasoline fuel stations (see sample survey in Attachment A), on average 37 percent and 36 percent of the members buying gas during the weekday PM and Saturday midday peak hours, respectively, can be classified as diverted trip capture from the surrounding street system.

Diverted and pass-by trips are taken into account in the evaluation of the internal circulation and project driveways and intersections, as these trips ingress and egress the site.

Trip Generation Summary

In order to best evaluate the on-site trip impact of expanding and relocating the Culver City Costco, the existing land uses were calculated to understand the trips brought to the site currently. Due to the stay-at-home order related to COVID-19, realistic counts at the driveways and fuel station were unable to be obtained. Therefore, Kittelson's Costco trip counts database was used to calculate the average weekday p.m. peak hour and Saturday midday peak hour for a sixteen (16) vehicle fueling station. Internal, pass-by, and diverted trip percentages were also obtained from the Kittelson Costco database. The *ITE Trip Generation Manual, 10th Edition* (Reference 2) was used to estimate existing land uses trips. Existing pass-by trips were estimated using the *ITE Trip Generation Handbook, 3rd Edition* (Reference 3).

The project will include expanding the existing sixteen (16) vehicle fueling station to thirty (30) vehicle fueling stations. The before and after data average percentages were used to grow the existing trips. The weekday PM peak hour was grown by 26.5%, while the Saturday midday peak hour was grown by 33.5%. Internal, pass-by, and diverted trip percentages remained the same.

The trip generation rates for the existing land uses to be removed are shown in Table 3. The existing land use net new trips were subtracted from the resulting project land use net new trips to come up with a net new trip difference for the site as shown in Table 4.

Table 3. ITE Trip Generation Rates

Land Use	ITE Code	Unit[1]	Trip Generation[2]					
			PM Peak Hour			Saturday Peak Hour		
			Total	In	Out	Total	In	Out
Retail	820	TSF	10.89	5.23	5.66	10.86	5.64	5.21
Coffee Shop	937	TSF	37.43	19.09	18.34	87.70	43.85	43.85

[1]TSF = thousand square feet
[2]Trip generation rates for peak hour of adjacent street, per the ITE Trip Generation Manual 10th Edition

Table 4. Comparative Trip Generation Summary

Land Use	Size	Weekday PM Peak Hour			Saturday Peak Hour			Weekday Daily Trips
		Total	In	Out	Total	In	Out	Total
Existing Uses								
Costco Fueling Station	16 Fueling Positions	452	226	226	473	237	236	5605
Internal Trips (34% PM, 35% Saturday)		*(154)*	*(77)*	*(77)*	*(166)*	*(83)*	*(83)*	*(1,906)*
External Trips		**298**	**149**	**149**	**307**	**154**	**153**	**3,699**
Pass-by Trips (37% PM, 33% Saturday)		*(110)*	*(55)*	*(55)*	*(101)*	*(51)*	*(51)*	*(1,369)*
Diverted Trips (37% PM, 36% Saturday)		*(110)*	*(55)*	*(55)*	*(111)*	*(56)*	*(55)*	*(1,369)*
Net New Trips		**78**	**39**	**39**	**94**	**47**	**47**	**961**
Retail (820)	6,890 SF	75	36	39	75	39	36	975
Pass-by Trips (34% PM, 26% Saturday)		*(26)*	*(13)*	*(13)*	*(20)*	*(10)*	*(10)*	*(332)*
Net New Trips		**49**	**23**	**26**	**55**	**29**	**26**	**643**
Coffee Shop (937)	1,590 SF	69	34	35	139	69	70	1,304
Pass-by Trips (89% PM, Saturday)		*(61)*	*(30)*	*(31)*	*(124)*	*(62)*	*(62)*	*(1,161)*
Net New Trips		**8**	**4**	**4**	**15**	**7**	**8**	**143**
Total Existing Net New Trips		***135***	***66***	***69***	***164***	***83***	***81***	***1,747***
Proposed Uses								
Costco Fueling Station (26.5% PM, 33.5% Saturday)	30 Fueling Positions	709	355	354	750	375	375	8,257
Internal Trips (34% PM, 35% Saturday)		*(241)*	*(121)*	*(120)*	*(263)*	*(132)*	*(131)*	*(2,807)*
External Trips		**468**	**234**	**234**	**487**	**243**	**244**	**5,450**
Pass-by Trips (37% PM, 33% Saturday)		*(173)*	*(87)*	*(86)*	*(162)*	*(81)*	*(81)*	*(2,017)*
Diverted Trips (37% PM, 36% Saturday)		*(173)*	*(87)*	*(86)*	*(175)*	*(87)*	*(88)*	*(2,017)*
Net New Trips		**122**	**60**	**62**	**150**	**75**	**75**	**1,416**
Trip Difference (Proposed Uses - Existing Uses)								
Net New Trip Difference		***(13)***	***(6)***	***(7)***	***(14)***	***(8)***	***(6)***	***(331)***

As shown in Table 4, the expansion and relocation of the Culver City Costco Gasoline fuel station (along with the removal of existing retail uses) is expected to reduce the net new trips to the site due to the removal of existing buildings. The project is estimated to approximately reduce 13 weekday p.m. peak hour net new trips (6 inbound, 7 outbound) and 14 Saturday midday peak hour net new trips (8 inbound/6 outbound). On a daily basis, the project would result in 331 less trips during the weekdays. While Saturday daily estimates are not available, a comparison between the peak hour trips on weekdays and Saturdays suggest that the net daily trip reduction would also occur on Saturdays.

C. RELATED PROJECTS

C1 – Culver City Public Market Hall

The Culver City Public Market Hall is a 1.6-acre project located at Washington Boulevard at Centinela Avenue is currently on hold but is slated to begin construction again in Spring 2021. The public market hall is located approximately 1.2 miles east of the Costco fuel station.

C2 - West Washington Area Improvement Program (AIP)

The West Washington AIP is a project that consists of installing street scape medians along West Washington Boulevard between Beethoven Street and Glencoe Avenue. The AIP is currently on hold but is slated to begin construction again in Spring 2021. The study intersections for the project are all located between the West Washington AIP project boundaries.

C3 - Washington Boulevard Stormwater and Urban Runoff Project

The study will also review the potential for cumulative impacts during project construction and operations for the Washington Boulevard Stormwater and Urban Runoff Project. This project is anticipated to be constructed between September 2021 and October 2022. The study will evaluate potential impacts of construction of the Washington Boulevard Stormwater and Urban Runoff Project regarding site access and internal circulation to the Costco site, as well as the potential for construction activities to overlap. The construction analysis will address two major topics: potential impacts due to project construction to the circulation system, and potential cumulative impacts due to construction activities for implementation of the Washington Boulevard Stormwater and Urban Runoff Project. The study will describe the staging area, identify any potential driveway closures and rerouting during project construction, and identify the amount of haul truck traffic and truck haul routes during temporary project construction. The study will evaluate if project construction would cause potential impacts to traffic on public streets. Potential interference with pedestrian and bicycle facilities during project construction will also be identified. The study will determine is impacts may occur and if the preparation of a traffic management and control plan may be warranted.

The study will include a list of cumulative land use projects received from the City of Culver City and the City of Los Angeles, included in Attachment B.

D. BASELINE TRAFFIC CONDITIONS

Data Collection

Due to the stay-at-home order and atypical traffic conditions associated with the COVID 19 pandemic, turning movement counts are not able to be collected at study intersections at this time or in the near future. We were unable to locate any 2020 turning movement counts prior to the COVID 19 pandemic. Therefore, we will use historic counts (included in Attachment C) combined with adjustments to develop 2020 existing volumes, as follows:

- Costco Accesses on Washington Blvd: Weekday p.m. peak hour and Saturday midday turning movement counts were collected in 2018 for both the Glencoe Ave/East Costco Access &

Washington Blvd and the West Costco Access & Washington Blvd study intersections for the Washington Boulevard Diversion Project. According to the LA County 2010 Congestion Management Program, growth in the area near the 2020 is estimated to be 0.5% per year. To be conservative and consistent with other traffic impact studies prepared for projects in Culver City, an annual growth rate of 1% per year will be utilized. Therefore, for the intersections of Glencoe Ave/East Costco Access & Washington Blvd and the West Costco Access & Washington Blvd we will use a growth rate of 1% per year on the 2018 weekday p.m. peak hour and Saturday midday peak hour turning movement counts to obtain 2020 volumes.

- Washington Blvd & Lincoln Blvd: Historical weekday p.m. peak hour counts were obtained from the City of Los Angeles traffic count database. Traffic counts for this intersection were retrieved for the years 2009, 2011, and 2019. The average growth rate is negative between the previous years and 2019. We will use the most recent 2019 traffic counts and apply a growth rate of 1% per year that was estimated in the LA County 2010 Congestion Management Program to obtain 2020 weekday p.m. peak hour counts.

  Because no Saturday midday turning movement are available, we will use a growth rate of 4.2% on the 2020 weekday p.m. peak hour counts to obtain 2020 Saturday midday peak hour counts. This rate was determined by comparing the westbound and eastbound through movements at the intersections along Washington Blvd during the weekday p.m. peak hour and Saturday midday peak hour. The average difference between the weekday p.m. and Saturday midday is 4.2% (1.7% WB/6.7% EB).

The latest signal timings for signalized intersections were obtained from Culver City and the City of Los Angeles Department of Transportation.

E. POST-OCCUPANCY STUDY

A separate study will be conducted to confirm the traffic generated and intersection operations after the Costco fuel station and Washington Boulevard stormwater and urban runoff projects are completed. Both projects are expected to be completed in the fall of 2022.

The post-occupancy study will include traffic counts and intersection LOS in the weekday PM and Saturday midday peak hours at the Washington Boulevard/Lincoln Boulevard, Washington Boulevard/West Costco Access, and Glencoe Avenue/East Costco Access intersections, The post-occupancy study will also collect traffic counts during the weekday PM and Saturday midday peak hours at the fuel station ingress. The study will also include a survey of Costco fuel station patrons to confirm internal capture, diverted, and pass-by trip rates during the weekday PM and Saturday midday peak hours. Kittelson will reach out to the Costco site operators to confirm that the surveys can be taken with patrons fueling their cars. If not possible, alternative methods will be utilized such as a review of transaction records to confirm the trip generation associated with the proposed 30-fueling positions gasoline station.

Finally the trip generation from the post-occupancy study will confirm the VMT estimates in the traffic study. The results of the post-occupancy study will be summarized in a technical memorandum with all traffic counts and survey data (or other methods) included as attachments.

REFERENCES

1. Culver City. *Transportation Study Criteria and Guidelines.* June 2020.
2. Institute of Transportation Engineers. *Trip Generation Manual, 10th Edition.* 2017.
3. Institute of Transportation Engineers. *Trip Generation Handbook, 3rd Edition.* 2017.
4. Transportation Research Board. *Highway Capacity Manual 6th Edition.* 2016.

ATTACHMENTS

Attachment A Trip Generation Characteristics

COSTCO GASOLINE TRIP TYPE INFORMATION

Internalization, Pass-by and Diverted Data

LOCATION	Internalization Data					Passby Data				Diverted Data			
	AM Peak Hour	Midday Peak Hour	PM Peak Hour	Weekday Overall	Saturday Peak	AM Peak Hour	Midday Peak Hour	PM Peak Hour	Saturday Peak	AM Peak Hour	Midday Peak Hour	PM Peak Hour	Saturday Peak
Redwood City			22.0%		47.0%			22.0%	29.0%			59.0%	52.0%
Waterbury, CT			46.0%		29.0%			76.0%	70.0%				
Missoula, MT			29.4%		25.7%								
Milford, CT			13.0%		44.0%			59.0%	54.0%				
Helena, MT			21.3%										
Oxnard, CA			27.7%					28.8%				47.3%	
Fountain Valley, CA			32.2%		29.4%			61.5%	26.1%			23.5%	33.9%
Corona, CA			27.1%		34.8%			34.1%	33.3%			34.5%	33.3%
City of Industry, CA			28.9%		24.0%			53.1%	10.2%			13.5%	34.7%
Chino Hills, CA			25.4%		25.2%			36.1%	11.2%			42.9%	36.0%
SE San Diego, CA			42.3%					30.8%				26.9%	
Rancho Del Ray, CA			41.3%					32.3%				26.4%	
Morena, CA			42.3%					15.4%				42.3%	
Carlsbad, CA			30.8%					32.7%				36.6%	
Laguna Niguel, CA (Marketplace)			41.0%		47.4%	33.6%		27.2%	35.7%	39.3%		30.1%	27.9%
Scottsdale, AZ			66.0%			34.0%		34.0%		43.0%		46.0%	
Tucson, AZ			39.0%		47.0%	30.0%		18.0%	25.0%	48.0%		50.0%	36.0%
Average (all data)			33.9%		35.4%	32.5%		37.4%	32.7%	43.4%		36.8%	36.3%

2019 Average=	36.2%
Weekday Average=	35.8%
Saturday Average=	36.4%
Sunday Average=	38.4%

REGION	WAREHOUSE	DATE	Day of Week	Gas Trans During WH Hours	Gas & WH Same day members	Internal Capture
LA	Culver City	1/4/2019	Friday	2,300	891	38.7%
LA	Culver City	1/11/2019	Friday	2,304	906	39.3%
LA	Culver City	1/18/2019	Friday	2,353	926	39.4%
LA	Culver City	1/25/2019	Friday	2,257	774	34.3%
LA	Culver City	2/1/2019	Friday	2,402	851	35.4%
LA	Culver City	2/8/2019	Friday	2,347	909	38.7%
LA	Culver City	2/15/2019	Friday	2,317	870	37.5%
LA	Culver City	2/22/2019	Friday	2,404	874	36.4%
LA	Culver City	3/1/2019	Friday	2,364	927	39.2%
LA	Culver City	3/8/2019	Friday	2,397	863	36.0%
LA	Culver City	3/15/2019	Friday	2,400	911	38.0%
LA	Culver City	3/22/2019	Friday	2,382	848	35.6%
LA	Culver City	3/29/2019	Friday	2,416	793	32.8%
LA	Culver City	4/5/2019	Friday	2,432	876	36.0%
LA	Culver City	4/12/2019	Friday	2,349	749	31.9%
LA	Culver City	4/19/2019	Friday	2,428	875	36.0%
LA	Culver City	4/26/2019	Friday	2,411	838	34.8%
LA	Culver City	5/3/2019	Friday	2,378	793	33.3%
LA	Culver City	5/10/2019	Friday	2,402	883	36.8%
LA	Culver City	5/17/2019	Friday	2,504	884	35.3%
LA	Culver City	5/24/2019	Friday	2,446	847	34.6%
LA	Culver City	5/31/2019	Friday	2,367	787	33.2%
LA	Culver City	6/7/2019	Friday	2,444	880	36.0%
LA	Culver City	6/14/2019	Friday	2,488	922	37.1%
LA	Culver City	6/21/2019	Friday	2,432	839	34.5%
LA	Culver City	6/28/2019	Friday	2,487	934	37.6%
LA	Culver City	7/5/2019	Friday	2,404	871	36.2%
LA	Culver City	7/12/2019	Friday	2,328	824	35.4%

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Location: Bellingham, Washington
Date: 11/28/2018
7:00AM-9:00AM

Time	Participated in Survey	Trip Origination Q1	Immediate Return Q2	Trip Destination Q3	Normal Route Q4	Neighboring Intersection Q5
7:00	Yes	Home	Yes	-		
7:00	No					
7:00	No		-			
7:00	Yes	Home	No	Work	No	F
7:00	Yes	Home	No	Work	No	A
7:00	Yes	Home	No	Work	No	A
7:00	Yes	Home	No	Work	No	C
7:00	Yes	Home	Yes	-		
7:00	No			-		
7:00	Yes	Home	No	Work	Yes	
7:00	Yes	Home	No	Work	Yes	
7:00	No			-		
7:00	Yes	Home	No	Work	No	Slater Rd
7:00	Yes	Home	No	Work	Yes	-
7:00	Yes	Home	No	Sunrise	No	Sunset
7:00	Yes	Home	Yes			
7:00	Yes	Home	No	Work	Yes	-
7:00	No			-		
7:00	Yes	Home	No	Work	Yes	
7:00	Yes	Other	No	Work	Yes	-
7:00	Yes	Home	No	Work	No	A
7:00	Yes	Home	No	Work	No	A
7:00	No		-	-		
7:00	No		-	-		
7:00	Yes	Home	No	Work	No	F
7:00	Yes	Home	No	Work	No	F
7:00	Yes	Home	No	Work	No	Other
7:00	Yes	Home	No	Work	No	F
7:00	Yes	Home	No	Work	No	A
7:00	No		-	-		
7:00	Yes	Home	Yes	-		-
7:00	Yes	Work	Yes			
7:00	Yes	Home	No	Airport	Yes	-
7:30	Yes	Home	No	Errands	No	Other
7:30	Yes	Church	No	Home	Yes	
7:30	Yes	Home	No	Work	No	Other
7:30	Yes	Home	No	Work	No	Other
7:30	Yes	Meeting	No	Home	Yes	
7:30	Yes	Other	No	Vancouver	No	A
7:30	Yes	Home	No	Errands	No	F
7:30	No					
7:30	Yes	Home	No	Vegas	Yes	
7:30	No		-	-		
7:30	Yes	Home	No	Work	Yes	
7:30	Yes	Home	Yes	-	-	
7:30	No	-		-		
7:30	Yes	Home	No	Work	No	Baker Hwy
7:30	Yes	Home	No	Work	No	A
7:30	Yes	Home	No	Work	Yes	-
7:30	Yes	Home	No	Work	No	A
7:30	Yes	Home	No	Work	Yes	

Poll Data Set

Total Number of Vehicles	172	
Participating Groups	133	77%
Non-participating Groups	39	23%

Trip Origination Q1		
Home	108	81%
Costco Warehouse	0	0%
Work	14	11%
Other	11	8%

Immediate Return Q2		
Yes	31	23%
No	102	77%

Trip Destination Q3		
Home	8	8%
Costco Warehouse	0	0%
Work	60	59%
Other	34	33%

Normal Route Q4		
Yes	38	37%
No	64	63%

Neighboring Intersection Q5		
A. I-5	31	48%
B. Northwest Dr	7	11%
C. Bakerview Rd	2	3%
D. Maplewood Ave	0	0%
E. Airport Dr	0	0%
F. Hwy 539-Meridian St	11	17%
Other	13	20%

Q1 Where did your trip begin immediately prior to stopping at this gas station?
A. Home
B. Work (other than Costco)
C. Costco Warehouse
D. Other (Please Note)

Q2 From here, will you go directly back to where you began your trip?
A. Yes (skip remaining questions)
B. No (go to Q3)

Q3 Where will your next stop be?
A. Home
B. Work (other than Costco)
C. Costco Warehouse
D. Other (Please Note)

Q4 On your trip, would you have driven by this site on Bakerview Rd even if you had not stopped here now?
A. Yes (skip remaining questions)
B. No (go to Q5)

Q5 If this gas station was not here, what is the closest intersection you would have traveled through?
A. I-5
B. Northwest Dr
C. Bakerview Rd
D. Maplewood Ave
E. Airport Dr
F. Hwy 539-Meridian St

Attachment B Cumulative Projects

Culver City Cumulative Projects									
No.	Project Name	Address	Description	City	Est. Date C	Completed D	Project Phase	Date of	Planner
1	3-unit Washington Place Condos	12464 Washington Place	Three (3) new condominium dwelling units and demolition of single family dwelling, resulting in two (2) net new dwellings	CC	2019	3/26/2019	Completed - Occupied	4/26/2017	Gabriela Silva (310) 253-5736
4	Grandview Apartments	4025 Grand View Blvd	New 3-story, for lease housing development, consisting of 36 units, with subterranean parking. Previous/Existing use includes 20 mobile home units.	CC	2019	8/5/2019	Completed - Occupied	01/27/2016 (PC) 03/28/2016 (CC)	Jose Mendivil (310) 253-5757
13	Baldwin Site	12803 Washington Blvd	New 4 story mixed use project, cosisting of 37 dwelling units and 7,206 sq. ft. of ground floor retail, on currently vacant site	CC	2020	9/2/2020	Completed	07/27/2016 (PC) 09/12/2016 (CC)	Jose Mendivil (310) 253-5757
17	4-unit Townhome Development	4118 Wade Street	Sudivision of one parcel into four (4) townhome-style dwelling units, resulting in a net increase of one (1) new unit	CC	2020	TBD	Construction	06/12/2017 (PC) 09/11/2017 (CC)	Jose Mendivil (310) 253-5757
24	Motel Mixed-Use	12654 Washington Blvd	New mixed-use building, including 6,836 sq. ft. ground floor commercial and one (1) 5,863 sq. ft. residential dwelling on top	CC	2021	TBD	Construction	5/29/2020	Jose Mendivil (310) 253-5757
35	Market Hall - Washington Centinela	12403 (12237-12423) Washington Boulevard	New multi-story 21,605 sq. ft. market hall and food retail building with attached parking structure (184 spaces) and a new single story 5,230 sq. ft. retail building with surface parking (20 spaces), on two currently vacant sites	CC	2021	TBD	Construction	10/25/2017 (PC) 01/22/2018 (CC) 02/12/2018 (CC)	Gabriela Silva (310) 253-5736
42	Outdoor dining and tandem parking for VFF Coffee	12680 Washington Blvd	New coffee shop and expansion of existing preschool use on a site currently developed with church. Project results in net increase of 952 sq. ft. (485 sq. ft. coffee shop outdoor dining, 315 sq. ft. coffee shop indoor use, 152 sq. ft. increase in preschool uses).	CC	2021	TBD	Pre-Building Permit	10/16/2020	Deborah Hong (310) 253-5714
46	Essence (Cannabis Retail)	12450 Washington Blvd	Conversion of existing 4,950 sq. ft. retail space to storefront cannabis retail space	CC	2021	TBD	Pre-Application	TBD	Jose Mendivil (310) 253-5757
77	99¢ site	12727 Washington Blvd	New 6-story mixed-use development on a split- jurisdiction site, including 117 units (CC: 82 units; LA: 35 units), 17,880 sq. ft. of ground floor retail (CC), 258 parking spaces (CC: 72 retail stalls and 130 residential stalls; LA: 46 residential stalls) at grade and in a 2-level subterranean garage. Demolition of existing 13,000 sq. ft. commercial building.	CC/ LA	2023	TBD	Pre-Application	TBD	Michael Allen (310) 253-5710
80	ECF Site	8700, 8710, 8740, and 8750 Washington Boulevard	Preliminary Concept - Mixed Use TOD with approximately 199 residential units and 40,00 sq. ft. of commercial space (17,250 sq. ft. of live/work space, 5,000 sq. ft. of restaurant, and 17,750 sq. ft. of retail), on a 3.06 to possibly 3.53 acre site, currently developed with multiple uses	CC	2022	TBD	Pre-Application	TBD	Susan Herbertson (310) 253-5755
81	Federal Express Site	3710 and 3750 S. Robertson Boulevard	Preliminary Concept - Mixed Use TOD with approximately 141 residential units and 60,200 sq. ft. of creative office and 30,042 sq. ft. commercial (retail/restaurant/live-work space), on a 2.2 acre site.	CC	2023	TBD	Pre-PPR	TBD	Susan Herbertson (310) 253-5755

CLATS
Case Logging and Tracking System

Welcome **pedro!** | Log Out | Profile | Admin

RELATED PROJECTS

Centroid Info: PROJ ID: 50962
Address: 13463 WASHINGTON BLVD
CULVER CITY, CA 90292
Lat/Long: 33.9926, -118.447

Buffer Radius: 1.50 mile

Search

Include NULL "Trip info": ☐
Include NULL "FirstStudySubmittalDate" (latest) ☐
Include "Inactive" projects: ☐
Include "Do not show in Related Project": ☐

Net_AM_Trips - Select -
Net_PM_Trips - Select -
Net_Daily_Trips - Select -

Column

Record Count: 26 | Record Per Page: All Records

Results generated since: (1/31/2021 4:09:23 AM)

Proj ID	Office	Area	CD	Year	Project Title	Project Desc	Address	First Study Submittal Date	Inactive	Do not show in Related Project	Distance (mile)	Trip Info

12530 | Westchester | CTC | 11 | 2005 | Restaurant, High Turnover | Proposed House Pies Sit-Down Restaurant land use (3,895 sq. ft.) | 1020 E VENICE BLVD | 04/10/2013 | ☐ | ☐ | 0.3

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Other	S.F. Gross Area	3895	33	33	396	18	15	20	13
			33	**33**	**396**		**18**	**15**	**20**

13667 | Westchester | CTC | 11 | 2011 | New 77 Unit Apartment Project | New 77-Unit Apartment Project | 4100 S DEL REY AV | 05/06/2011 | ☐ | ☐ | 0.3

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartment	Total Units	77	39	54	512	8	31	35	19
			39	**54**	**512**		**8**	**31**	**35**

13738 | Westchester | CTC | 11 | 2011 | MDR-LCP Amendment | MDR-LCP Amendment | 1 MARINA EXPRESSWAY | 02/16/2011 | ☐ | ☐ | 0.9

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Other	Total Units	2044		66					
Other	Total Units	129		22					
Other	Other	505		178					
Retail	S.F. Gross Area	273741		1215					
Other	Seats	1323		331					
Office	S.F. Gross Area	26000		57					
Other	S.F. Gross Area	3000		14					
Other	Other	375		18					
Other	Other		1707	0		622	1085	1378	1125
			1707	**2503**	**0**		**622**	**1085**	**1378**

40436 | Westchester | CTC | 11 | 2012 | New Apt & Office Bldg VTT-72107 | New 4-Story,67-Unit Apt & 3,211 SF Office Bldg over 2-level pkg garage | 4140 S GLENCOE AV | 08/01/2012 | ☐ | ☐ | 0.4

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartment	Total Units	67	34	47	446	7	27	31	16
Office	S.F. Gross Area	3211	5	9	35	4	1	2	7
			39	**56**	**481**		**11**	**28**	**33**

40714 | Westchester | CTC | 11 | 2012 | Mixed-Use, Hotel, Retail & Restaurant Uses | New 92-Guest Room Hotel, 3,000 SF Retail & 2,072 SF Restaurant Use. | 1027 S ABBOT KINNEY BLVD | 12/17/2012 | ☐ | ☐ | 1.4

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Rooms	85	25	42	654	16	9	25	17
			25	**42**	**654**		**16**	**9**	**25**

41239 | Westchester | CTC | 11 | 2013 | Mixed-Use: Residential & Office | Proposed Mixed-Use:136 Condominium Units & 20,000 SF Commercial Office | 4210 S DEL REY AV | 11/05/2014 | ☐ | ☐ | 0.4

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Total Units	136	71	85	627	24	47	48	37
			71	**85**	**627**		**24**	**47**	**48**

41687 | Westchester | CTC | 11 | 2013 | Mixed-Use Project | Mixed-Use Bldg: 26 Condo Units, 1,184 SF Retail & 4,567 SF Restaurant | 1414 S MAIN ST | 12/13/2013 | ☐ | ☐ | 1.5

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Total Units	26	9	40	421	3	6	29	11
			9	**40**	**421**		**3**	**6**	**29**

42024 | Westchester | CTC | 11 | 2014 | Condominium & Commercial Office Building | 67-DU Condo & 7,525 SF Commercial Office Bldg providing 141 pkg spaces | 4091 S REDWOOD AV | 04/25/2014 | ☐ | ☐ | 0.3

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Condominium	Total Units	67	25	51	351	4	21	29	22
Apartments		77			39				

	Total Units									
			25	51	430		4	21	29	

42586	Westchester	CTC	11	2014	Mixed-Use	168-Unit Apt. & 100KSF Mini-Warehouse (Opt 1) or 33KSF Office (Opt 2)	4040 S DEL REY AV	07/20/2015	☐ ☐	0.2
42637	Westchester	CTC	11	2014	Market Deli with Take-Out and Sit-Down Restaurant	Adding Sit-Down Restaurant to existing Market Deli with Take-Out	600 E MILDRED AV	06/25/2019	☐ ☐	1.1
43597	Westchester	CTC	11	2015	Teledyne Office Project	159,000 sf creative office	12964 W Panama Street	02/02/2016	☐ ☐	1.3
43730	Westchester	CTC	11	2015	New 3-Story Manufacturing & Retail	Construct new 3-story 25,150SF Manufacturing & 5,028SF Retail	595 E VENICE BLVD	02/08/2016	☐ ☐	0.8
44394	Westchester	CTC	11	2016	Mixed-Use Project (Inclave)	New 35206 SF Creative Office; 1500 SF Retail Space; & 49 Res Apt Unit	4065 S GLENCOE AVE	08/16/2016	☐ ☐	0.2
44456	Westchester	CTC	11	2016	COU Warehouse to Office	COU Warehouse (24,051 SF) to Office, with 7,926 SF Office Addition	4721 S ALLA RD	08/18/2016	☐ ☐	1.1
44625	Westchester	CTC	11	2016	Apartment Building, 65 Units	new 6-Story, 65-Unit Residential Apartment Building (Stella, Phase 2)	13488 W MAXELLA AV	10/13/2016	☐ ☐	0.6
44829	Westchester	CTC	11	2016	Mixed-Use, Residential, Restaurant & Commercial	new Mixed-Use: 658-Unit Apt, 13.65 ksf Restaurant &13.65 ksf Commercia	13400 W Maxella Ave	04/28/2017	☐ ☐	0.5
44850	Westchester	CTC	11	2016	Charter School	Relocation of the Ocean Charter School w/ 532-student enrollment (K-8)	12870 W PANAMA ST	11/30/2016	☐ ☐	1.3
46481	Westchester	WLA	11	2017	Mixed Use - Apts + Retail	New mixed use - 32 Apts + 3KSF Retail replaces 7.6KSF Furniture Store	12331 W PALMS BLVD	01/29/2018	☐ ☐	1.3
46715	Westchester	CTC	11	2018	Mixed-Use: Residential & Commercial	Mixed-Use Bldg.: 77-DU Apt., 4,040 ksf Restaurant & 1,905 ksf Retail	2454 S LINCOLN BLVD	05/04/2018	☐ ☐	0.2
46938	Westchester	CTC	11	2018	Apartments	new 5-story, 56-Unit Apartment Bldg. over 2-Level basement pkg garage	1015 E VENICE BLVD	05/02/2018	☐ ☐	0.3

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Total Units	195	41	59	08	-24	65	72	-13
Mixed Use	Total Units	235	47	62	31	-26	74	77	-15
			88	121	1839		-50	139	149

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	S.F. Gross Area	1134	5	1	26	3	2	2	1
			5	3	26		3	2	2

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Office	S.F. Gross Area	159000	81	91	777	72	9	20	71
			81	91	777		72	9	20

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Office	S.F. Gross Area	25150	63	80	460	55	8	14	66
Retail	S.F. Gross Area	5028	6	25	201	4	2	11	14
Other	S.F. Gross Area	5930	-13	-20	-105	-9	-4	-10	-10
			56	85	556		50	6	15

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Office	S.F. Gross Area	35206	55	99	388	48	7	17	82
Retail	S.F. Gross Area	1500	2	8	66	1	1	4	4
Apartments	Total Units	49	25	34	326	5	20	22	12
Other	Svc Bays/Lanes	14	-21	-84	-840	-14	-7	-42	-42
Industrial	S.F. Gross Area	5050	-5	-4	-35	-4	-1	0	-4
Mixed Use	Other		49	48	-96	31	18	1	47
			105	101	-191		67	38	2

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Office	S.F. Gross Area	118352	43	57	257	38	5	9	48
			43	57	267		38	5	9

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartments	Total Units	65	29	40	362	6	23	26	14
			29	40	362		6	23	26

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Total Units	658	296	83	2079	60	236	115	-32
			296	83	2079		60	236	115

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
School	Enrollment	532	479	168	1320	263	216	79	89
			479	168	1320		263	216	79

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Other		18	28	303	4	14	16	12
			18	28	303		4	14	16

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Total Units	77	42	54	527	15	27	40	14
			42	54	527		15	27	40

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartments	Total Units	56	27	37	343	6	21	24	13
			27	37	343		6	21	24

46994	Westchester	CTC	11	2018	Thatcher Yard Residential	98-DU: Affordable Senior(50), Family(23) & Perm Supportive(25) Housing	3233 S THATCHER AV	05/23/2018	☐	☐	0.5
47496	Westchester	CTC	11	2018	Mixed-Use: Affordable Housing & Commercial	140-DU Affordable Apts, 1 ksf Cafe, 4065 sf Retail & 3155 sf Art space	204 E North Venice Blvd	11/13/2019	☐	☐	1.4
48252	Westchester	CTC	11	2019	Change of Use: Office to Medical Office	COU: 40ksf Office to Med Office w-in 130,312 sf Office/Med Office bldg	13160 W MINDANAO WY	08/15/2019	☐	☐	0.8
48488	Westchester	CTC	11	2019	Office & Retail	new 121,822 sf Commercial Office & 1,500 sf Retail Complex(4 bldgs.)	4204 S GLENCOE AV	10/23/2019	☐	☐	0.4
48532	Westchester	CTC	11	2019	New 4-Story 77 Apts	Demolish 7 Apts & 1 Duplex, Construct 77 Apts with underground parking	1600 E Venice Bl	09/16/2019	☐	☐	0.3
49101	Westchester	CTC	11	2019	Apartments & Restaurant	new MU: 6-Story, 50-Unit Residential Apt. & 4,458 sf Restaurant bldg.	1808 S LINCOLN BLVD	12/05/2019	☐	☐	0.6

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartment	Total Units	98	21	19	212	8	13	10	9
			21	19	212		8	13	10

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartment	Total Units	140	88	124	911	39	49	63	61
			88	124	911		39	49	63

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Office	S.F. Gross Area	13031	64	44	1003	46	18	26	18
			64	44	1003		46	18	26

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Office	S.F. Gross Area	12182	79	155	816	65	14	24	131
			79	155	816		65	14	24

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartment	Total Units	77	25	27	341	7	18	16	11
			25	27	341		7	18	16

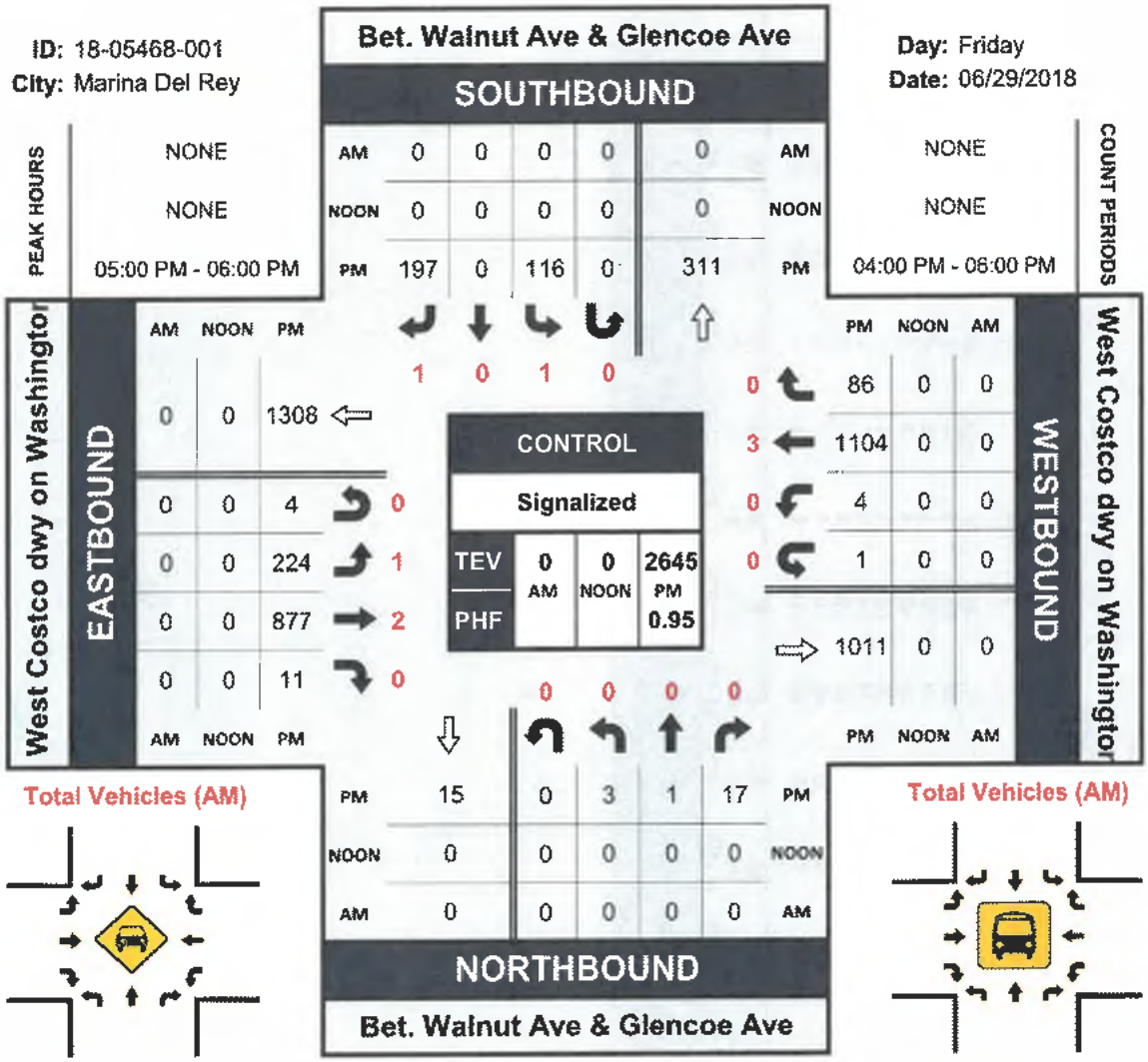
Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartment	Total Units	50	45	44	557	20	25	28	16
			45	44	557		20	25	28

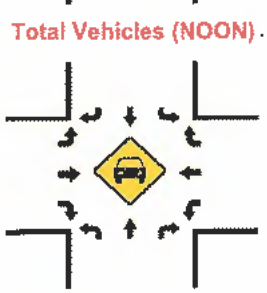
Attachment C Historical Traffic Counts

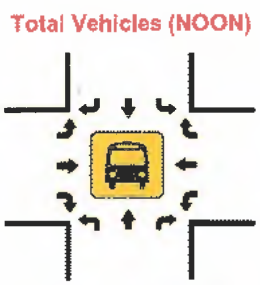
Prepared by National Data & Surveying Services

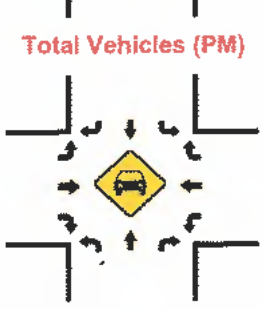
Bet. Walnut Ave & Glencoe Ave & West Costco dwy on Washington Blvd

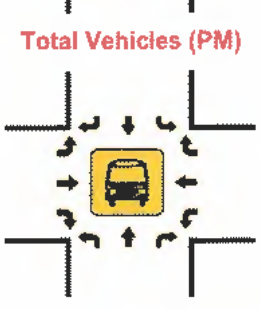
Peak Hour Turning Movement Count

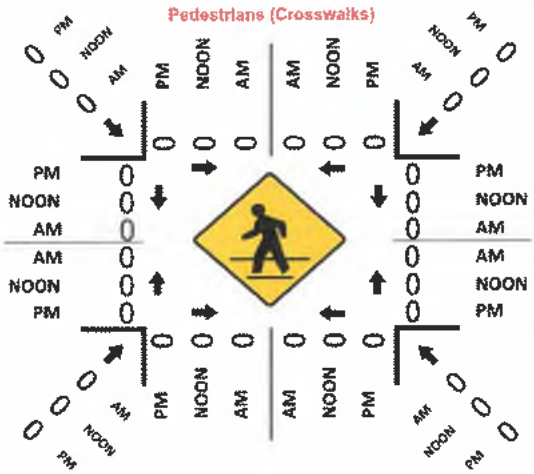












National Data & Surveying Services

Intersection Turning Movement Count

Location: Bet. Walnut Ave & Glencoe Ave [illegible] Costco dwy on Washington Blvd
City: Marina Del Rey
Control: Signalized

Project ID: 18-05468-001
Date: 2018-06-29

Total

NS/EW Streets:	Bet. Walnut Ave & Glencoe Ave				Bet. Walnut Ave & Glencoe Ave				West Costco dwy on Washington Blvd				West Costco dwy on Washington Blvd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0 NL	0 NT	0 NR	0 NU	1 SL	0 ST	1 SR	0 SU	1 EL	2 ET	0 ER	0 EU	0 WL	3 WT	0 WR	0 WU	TOTAL
4:00 PM	0	0	3	0	36	2	79	0	50	213	0	0	2	259	24	0	668
4:15 PM	1	1	3	0	40	0	53	0	49	209	1	0	0	256	20	0	633
4:30 PM	0	0	3	0	27	0	42	0	56	206	4	2	0	269	20	0	629
4:45 PM	0	0	2	0	30	0	43	0	43	221	1	1	1	271	26	0	639
5:00 PM	1	0	10	0	28	0	54	0	48	215	5	0	0	271	23	0	655
5:15 PM	1	1	6	0	27	0	53	0	68	235	5	2	2	270	23	0	693
5:30 PM	0	0	1	0	24	0	43	0	43	213	1	1	0	281	20	1	628
5:45 PM	1	0	0	0	37	0	47	0	65	214	0	1	2	282	20	0	669
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	4	2	28	0	249	2	414	0	422	1726	17	7	7	2159	176	1	5214
APPROACH %'s :	11.76%	5.88%	82.35%	0.00%	37.44%	0.30%	62.26%	0.00%	19.43%	79.47%	0.78%	0.32%	0.30%	92.15%	7.51%	0.04%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	3	1	17	0	116	0	197	0	224	877	11	4	4	1104	86	1	2645
PEAK HR FACTOR :	0.750	0.250	0.425	0.000	0.784	0.000	0.912	0.000	0.824	0.933	0.550	0.500	0.500	0.979	0.935	0.250	0.954
	0.477				0.932				0.900				0.983				

Prepared by National Data & Surveying Services

Bet. Walnut Ave & Glencoe Ave & East Costco dwy on Washington Blvd

Peak Hour Turning Movement Count

ID: 18-05468-002
City: Marina Del Rey

Day: Friday
Date: 06/29/2018

Bet. Walnut Ave & Glencoe Ave

SOUTHBOUND

PEAK HOURS	COUNT PERIODS
NONE	NONE
NONE	NONE
04:45 PM - 05:45 PM	04:00 PM - 06:00 PM

AM	0	0	0	0	0	AM
NOON	0	0	0	0	0	NOON
PM	64	163	318	0	565	PM
	1	0.5	1.5	0		

EASTBOUND — East Costco dwy on Washington

AM	NOON	PM	
0	0	1133	⇦
0	0	0	0 ↶
0	0	33	1 ↱
0	0	743	2 →
0	0	241	1 ↳
AM	NOON	PM	

CONTROL
Signalized

TEV	0 AM	0 NOON	3825 PM
PHF			0.97

WESTBOUND — East Costco dwy on Washington

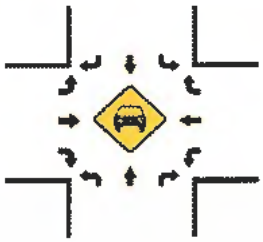
PM	NOON	AM	
1 ↰	402	0	0
2 ←	850	0	0
1 ↰	364	0	0
0 ↶	0	0	0
⇨	1359	0	0
PM	NOON	AM	

		0	1.5	0.5	1	
PM	768	0	219	130	298	PM
NOON	0	0	0	0	0	NOON
AM	0	0	0	0	0	AM

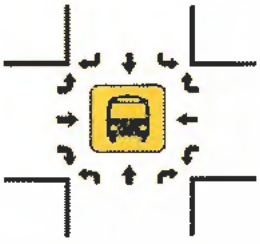
NORTHBOUND

Bet. Walnut Ave & Glencoe Ave

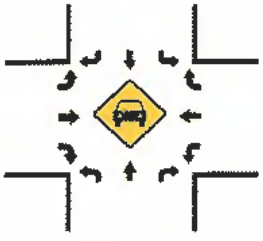
Total Vehicles (AM)



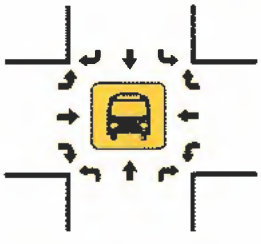
Total Vehicles (AM)



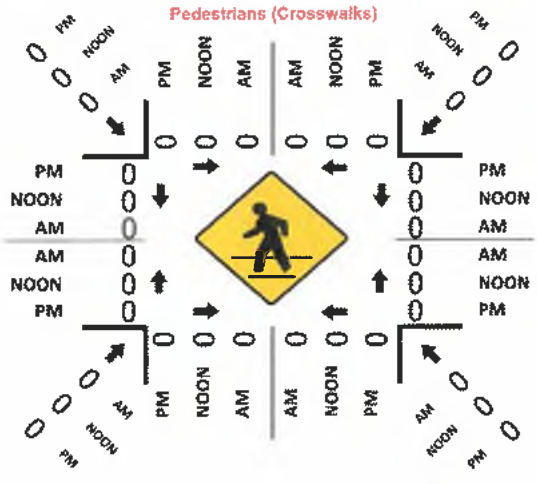
Total Vehicles (NOON)



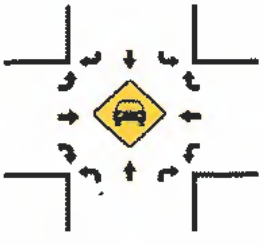
Total Vehicles (NOON)



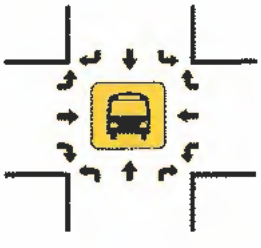
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Bet. Walnut Ave & Glencoe Ave & East Costco dwy on Washington Blvd
City: Marina Del Rey
Control: Signalized

Project ID: 18-05468-002
Date: 2018-06-29

Total

NS/EW Streets:	Bet. Walnut Ave & Glencoe Ave				Bet. Walnut Ave & Glencoe Ave				East Costco dwy on Washington Blvd				East Costco dwy on Washington Blvd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.5	0.5	1	0	1.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	64	35	76	0	90	36	23	0	8	172	64	0	86	171	117	0	942
4:15 PM	50	33	88	0	87	41	14	0	6	196	59	0	87	189	90	0	940
4:30 PM	53	25	77	0	75	37	14	0	6	177	56	0	87	187	107	0	901
4:45 PM	58	33	71	0	80	41	20	0	10	186	57	0	93	224	111	0	984
5:00 PM	56	40	91	0	97	39	14	0	7	189	45	0	83	192	99	0	952
5:15 PM	49	27	71	0	67	47	14	0	7	189	78	0	95	234	99	0	977
5:30 PM	56	30	65	0	74	36	16	0	9	179	61	0	93	200	93	0	912
5:45 PM	50	28	58	0	79	38	16	0	14	188	52	0	90	245	92	0	950
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	436	251	597	0	649	315	131	0	67	1476	472	0	714	1642	808	0	7558
APPROACH %'s :	33.96%	19.55%	46.50%	0.00%	59.27%	28.77%	11.96%	0.00%	3.33%	73.25%	23.42%	0.00%	22.57%	51.90%	25.54%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	219	130	298	0	318	163	64	0	33	743	241	0	364	850	402	0	3825
PEAK HR FACTOR :	0.944	0.813	0.819	0.000	0.820	0.867	0.800	0.000	0.825	0.983	0.772	0.000	0.958	0.908	0.905	0.000	0.972
	0.865				0.908				0.928				0.944				

Prepared by National Data & Surveying Services

Bet. Walnut Ave & Glencoe Ave & West Costco dwy on Washington Blvd

Peak Hour Turning Movement Count

ID: 18-05468-001
City: Marina Del Rey

Day: Saturday
Date: 06/30/2018

PEAK HOURS

AM: NONE
NOON: NONE
PM: 02:30 PM - 03:30 PM

COUNT PERIODS

AM: NONE
NOON: NONE
PM: 02:00 PM - 04:00 PM

Bet. Walnut Ave & Glencoe Ave — SOUTHBOUND

AM	0	0	0	0	0	AM
NOON	0	0	0	0	0	NOON
PM	239	2	175	0	428	PM

EASTBOUND — West Costco dwy on Washington

AM	NOON	PM	
0	0	1228	⇦
0	0	2	0
0	0	289	1
0	0	830	2
0	0	15	0
AM	NOON	PM	

WESTBOUND — West Costco dwy on Washington

PM	NOON	AM	
139	0	0	0
986	0	0	3
2	0	0	0
8	0	0	0
1029	0	0	⇨
PM	NOON	AM	

NORTHBOUND — Bet. Walnut Ave & Glencoe Ave

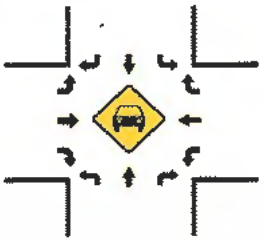
PM	20	1	1	0	16	PM
NOON	0	0	0	0	0	NOON
AM	0	0	0	0	0	AM

⇩	0	0	0	0	
	1	0	1	0	⇧

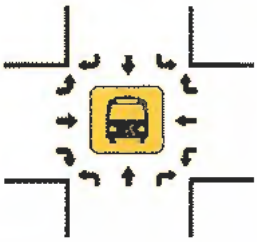
CONTROL: Signalized

	AM	NOON	PM
TEV	0	0	2705
PHF			0.93

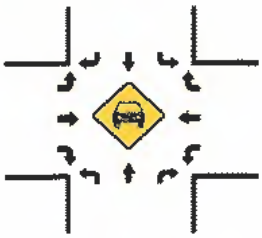
Total Vehicles (AM)



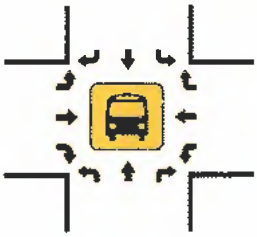
Total Vehicles (AM)



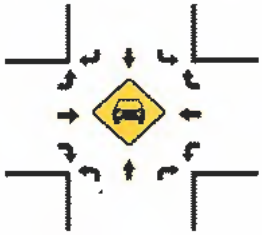
Total Vehicles (NOON)



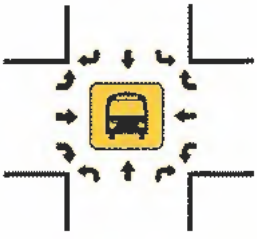
Total Vehicles (NOON)



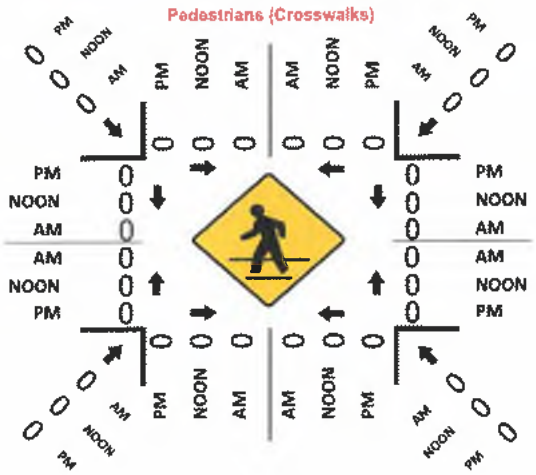
Total Vehicles (PM)



Total Vehicles (PM)



Pedestrians (Crosswalks)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Bet. Walnut Ave & Glencoe Ave [illegible] West Costco dwy on Washington Blvd
City: Marina Del Rey
Control: Signalized

Project ID: 18-05468-001
Date: 2018-06-30

Total

NS/EW Streets:	Bet. Walnut Ave & Glencoe Ave				Bet. Walnut Ave & Glencoe Ave				West Costco dwy on Washington Blvd				West Costco dwy on Washington Blvd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0 NL	0 NT	0 NR	0 NU	1 SL	0 ST	1 SR	0 SU	1 EL	2 ET	0 ER	0 EU	0 WL	3 WT	0 WR	0 WU	TOTAL
2:00 PM	1	0	5	1	36	0	66	0	65	190	5	0	0	248	35	4	656
2:15 PM	0	0	6	0	27	0	65	0	71	171	2	0	0	261	43	0	646
2:30 PM	0	0	4	0	38	0	54	0	73	199	1	0	0	254	38	1	662
2:45 PM	0	0	1	0	39	1	58	0	74	192	7	0	0	232	35	2	641
3:00 PM	0	0	7	1	56	1	56	0	68	226	4	2	0	271	33	3	728
3:15 PM	1	0	4	0	42	0	71	0	74	213	3	0	2	229	33	2	674
3:30 PM	0	0	1	0	36	0	43	0	66	196	3	0	0	259	24	1	629
3:45 PM	0	0	5	0	45	0	55	0	54	187	2	1	2	263	19	0	633
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	0	33	2	319	2	468	0	545	1574	27	3	4	2017	260	13	5269
APPROACH %'s :	5.41%	0.00%	89.19%	5.41%	40.43%	0.25%	59.32%	0.00%	25.36%	73.24%	1.26%	0.14%	0.17%	87.93%	11.33%	0.57%	
PEAK HR :	02:30 PM - 03:30 PM																TOTAL
PEAK HR VOL :	1	0	16	1	175	2	239	0	289	830	15	2	2	986	139	8	2705
PEAK HR FACTOR :	0.250	0.000	0.571	0.250	0.781	0.500	0.842	0.000	0.976	0.918	0.536	0.250	0.250	0.910	0.914	0.667	0.929
	0.563				0.920				0.947				0.924				

Prepared by National Data & Surveying Services

Bet. Walnut Ave & Glencoe Ave & East Costco dwy on Washington Blvd

Peak Hour Turning Movement Count

ID: 18-05468-002
City: Marina Del Rey

Day: Saturday
Date: 06/30/2018

Bet. Walnut Ave & Glencoe Ave

SOUTHBOUND

PEAK HOURS		COUNT PERIODS
NONE	AM	NONE
NONE	NOON	NONE
03:00 PM - 04:00 PM	PM	02:00 PM - 04:00 PM

AM	0	0	0	0	0	AM
NOON	0	0	0	0	0	NOON
PM	80	107	389	0	670	PM
	1	0.5	1.5	0		

East Costco dwy on Washington

EASTBOUND

AM	NOON	PM	
0	0	1065	⇦
0	0	0	0
0	0	43	1
0	0	769	2
0	0	204	1
AM	NOON	PM	

CONTROL

Signalized

	AM	NOON	PM
TEV	0	0	3724
PHF			0.98

WESTBOUND

	PM	NOON	AM
1	507	0	0
2	825	0	0
1	284	0	0
0	0	0	0
⇨	1394	0	0
	PM	NOON	AM

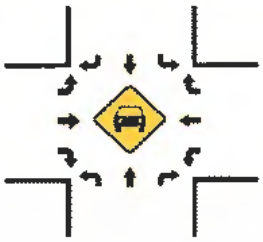
East Costco dwy on Washington

	0	1.5	0.5	1		
PM	595	0	160	120	236	PM
NOON	0	0	0	0	0	NOON
AM	0	0	0	0	0	AM

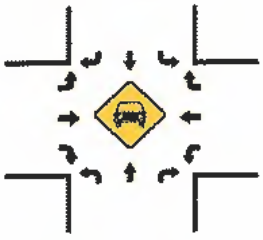
NORTHBOUND

Bet. Walnut Ave & Glencoe Ave

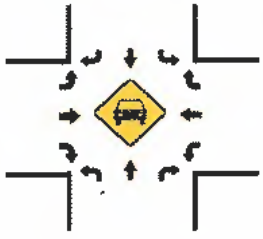
Total Vehicles (AM)



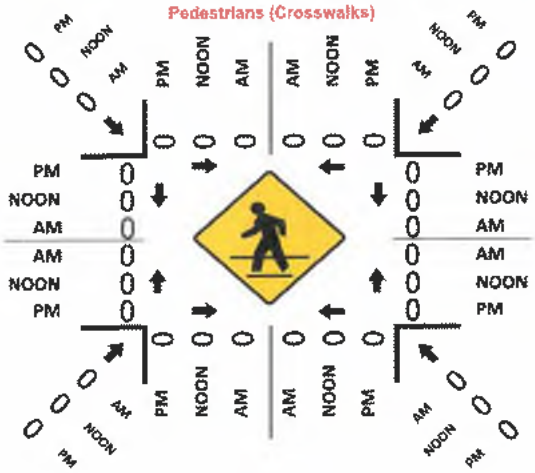
Total Vehicles (NOON)



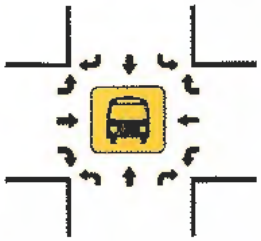
Total Vehicles (PM)



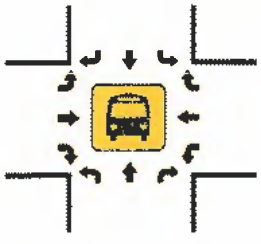
Pedestrians (Crosswalks)



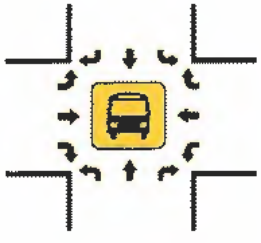
Total Vehicles (AM)



Total Vehicles (NOON)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Bet. Walnut Ave & Glencoe Ave & Bet. East Costco dwy on Washington Blvd
City: Marina Del Rey
Control: Signalized

Project ID: 18-05468-002
Date: 2018-06-30

Total

NS/EW Streets:	Bet. Walnut Ave & Glencoe Ave				Bet. Walnut Ave & Glencoe Ave				East Costco dwy on Washington Blvd				East Costco dwy on Washington Blvd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.5	0.5	1	0	1.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	50	44	56	0	102	39	20	0	11	172	48	0	67	191	119	0	919
2:15 PM	46	36	58	0	78	31	21	0	7	164	42	1	75	218	140	0	917
2:30 PM	55	28	63	0	95	28	27	0	11	194	46	0	70	180	110	0	907
2:45 PM	45	45	49	0	90	25	30	0	11	167	56	0	81	204	103	0	906
3:00 PM	35	30	61	0	87	27	25	0	9	198	54	0	68	205	142	0	941
3:15 PM	38	32	53	0	103	30	22	0	16	204	53	0	65	205	112	0	933
3:30 PM	47	33	59	0	102	21	14	0	12	192	37	0	71	194	118	0	900
3:45 PM	40	25	63	0	97	29	19	0	6	175	60	0	80	221	135	0	950
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	356	273	462	0	754	230	178	0	83	1466	396	1	577	1618	979	0	7373
APPROACH %'s :	32.63%	25.02%	42.35%	0.00%	64.89%	19.79%	15.32%	0.00%	4.27%	75.33%	20.35%	0.05%	18.18%	50.98%	30.84%	0.00%	
PEAK HR :	03:00 PM - 04:00 PM																TOTAL
PEAK HR VOL :	160	120	236	0	389	107	80	0	43	769	204	0	284	825	507	0	3724
PEAK HR FACTOR :	0.851	0.909	0.937	0.000	0.944	0.892	0.800	0.000	0.672	0.942	0.850	0.000	0.888	0.933	0.893	0.000	0.980
	0.928				0.929				0.930				0.927				

City Of Los Angeles
Department Of Transportation
MANUAL TRAFFIC COUNT SUMMARY

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

STREET:
North / Sounth: Lincoln

East/West: Washington

Day: Tuesday, May 7, 2019 Weather: Sunny

Hours:

School Day: Yes District I/S CODE

	N/B	S/B	E/B	W/B
DUAL+ WHEELED	515	365	305	255
BIKES	55	77	120	102
BUSES	57	56	44	35

	N/B	TIME	S/B	TIME	E/B	TIME	W/B	TIME
AM PK 15 MIN	601	7:00:00 AM	403	8:15:00 AM	390	8:15:00 AM	274	8:45:00 AM
PM PK 15 MIN	538	5:30:00 PM	441	4:30:00 PM	310	5:15:00 PM	316	5:45:00 PM
AM PK HOUR	2221	7:00:00 AM	1541	7:45:00 AM	1440	8:00:00 AM	998	8:00:00 AM
PM PK HOUR	1913	4:45:00 PM	1701	4:15:00 PM	1192	4:45:00 PM	1230	5:00:00 PM

NORTHBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	696	1437	88	2221
8-9	760	1222	124	2106
9-10	716	1229	184	2129
3-4	411	1032	206	1649
4-5	447	1070	188	1705
5-6	479	1242	179	1900
TOTAL	3509	7232	969	11710

SOUTHBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	176	921	75	1172
8-9	217	1203	67	1487
9-10	232	1102	98	1432
3-4	172	1329	59	1560
4-5	162	1451	56	1669
5-6	151	1378	52	1581
TOTAL	1110	7384	407	8901

TOTAL	XING S/L		XING N/L	
N-S	Ped	Sch	Ped	Sch
3393	26	7	22	4
3593	44	7	16	0
3561	43	11	45	7
3209	66	20	57	7
3374	66	20	43	7
3481	44	19	47	2
20611	289	84	230	27

EASTBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	56	701	415	1172
8-9	58	800	582	1440
9-10	88	653	513	1254
3-4	84	605	481	1170
4-5	70	565	455	1090
5-6	69	645	467	1181
TOTAL	425	3969	2913	7307

WESTBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	115	558	149	822
8-9	148	702	148	998
9-10	147	549	182	878
3-4	296	573	242	1111
4-5	301	604	244	1149
5-6	311	681	238	1230
TOTAL	1318	3667	1203	6188

TOTAL	XING W/L		XING E/L	
E-W	Ped	Sch	Ped	Sch
1994	23	4	37	5
2438	27	4	31	9
2132	40	8	54	7
2281	50	8	64	25
2239	45	8	77	6
2411	46	2	78	3
13495	231	34	341	55

LINCOLN & WASHINGTON

2009	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
445-545	121	1416	197	241	709	263	245	1529	564	580	814	129	6808

2011	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
500-600	118	1302	206	308	701	333	280	1684	485	554	802	122	6895

2014	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
500-600	62	1372	201	237	733	214	213	1145	464	464	686	72	5863

2019	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
500-600	52	1378	151	238	681	311	179	1242	479	467	645	69	5892

2014-2019 GROWTH	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
	-3.5%	0.1%	-5.6%	0.1%	-1.5%	7.8%	-3.4%	1.6%	0.6%	0.1%	-1.2%	-0.8%	0.1%

2011-2019 GROWTH	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
	-9.7%	0.7%	-3.8%	-3.2%	-0.4%	-0.9%	-5.4%	-3.7%	-0.2%	-2.1%	-2.7%	-6.9%	-1.9%

2009-2019 GROWTH	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
	-8.1%	-0.3%	-2.6%	-0.1%	-0.4%	1.7%	-3.1%	-2.1%	-1.6%	-2.1%	-2.3%	-6.1%	-1.4%

2020 LA County CMP Growth Rate 2.6%

GLENCOE & WASHINGTON PM

2014

	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
500-600	58	143	258	358	810	428	312	104	191	270	817	33	3782

2017

	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	73	134	312	405	843	394	281	107	199	270	797	30	3845

2014-2017 GROWTH

SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
8.0%	-2.1%	6.5%	4.2%	1.3%	-2.7%	-3.4%	1.0%	1.4%	0.0%	-0.8%	-3.1%	0.6%

GLENCOE & WASHINGTON SAT

2014

	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
445-545	*No 2014 data avaliable for Saturday												

2017

	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	86	99	330	453	858	331	284	149	187	240	854	44	3915

2014-2017 GROWTH

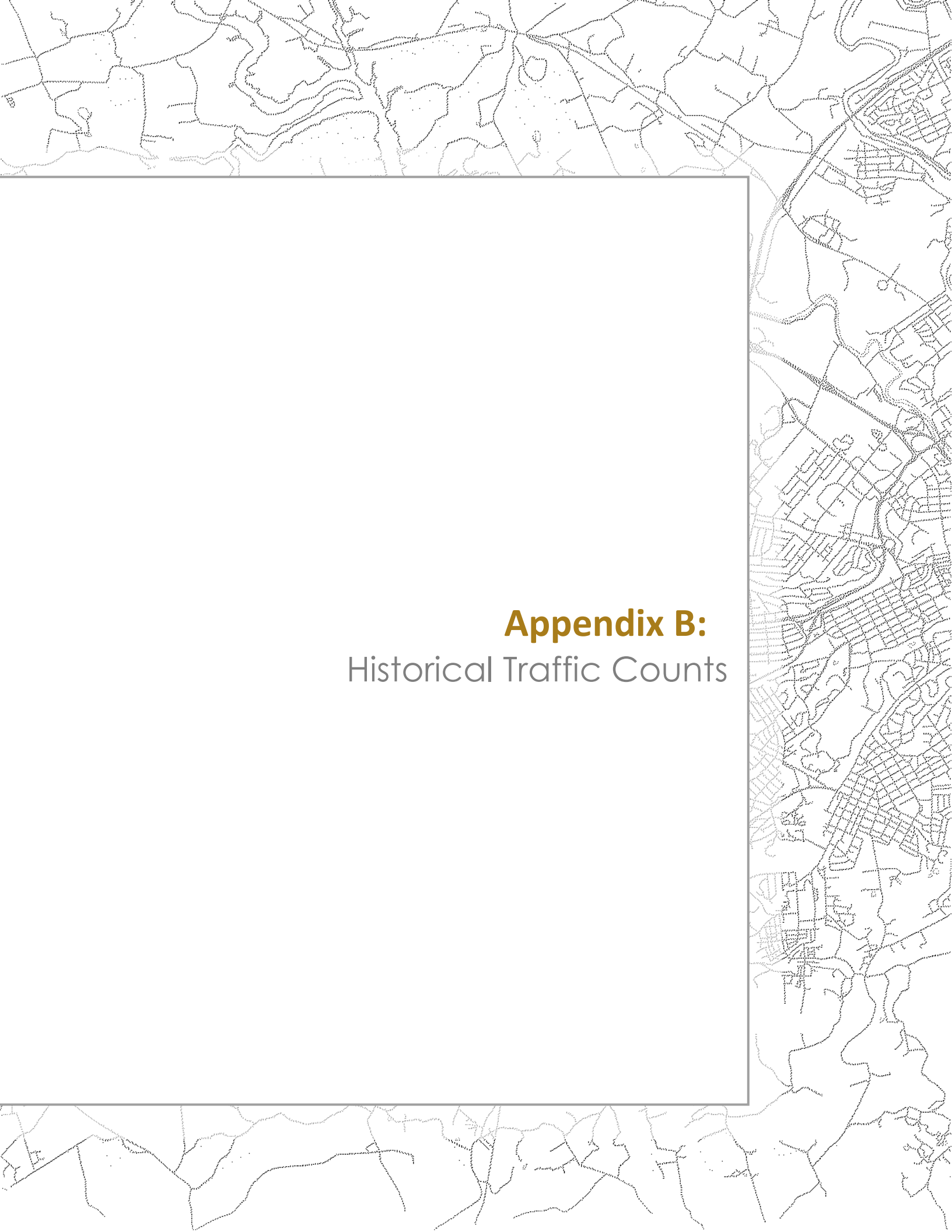
SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL

GLENCOE & WASHINGTON COMPARISON OF PM VS SAT

PM VS SAT COMPARISON

SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
15.1%	-35.4%	5.5%	10.6%	1.7%	-19.0%	1.1%	28.2%	-6.4%	-12.5%	6.7%	31.8%	1.8%

Comparison of through movements on Washington Blvd



Appendix B:
Historical Traffic Counts

Prepared by National Data & Surveying Services

Bet. Walnut Ave & Glencoe Ave & West Costco dwy on Washington Blvd

Peak Hour Turning Movement Count

ID: 18-05468-001
City: Marina Del Rey

Day: Friday
Date: 06/29/2018

Bet. Walnut Ave & Glencoe Ave

SOUTHBOUND

PEAK HOURS						COUNT PERIODS
	NONE				NONE	
	NONE				NONE	
	05:00 PM - 06:00 PM				04:00 PM - 06:00 PM	

AM	0	0	0	0	0
NOON	0	0	0	0	0
PM	197	0	116	0	311

	1	0	1	0

EASTBOUND

AM	NOON	PM	
0	0	1308	
0	0	4	0
0	0	224	1
0	0	877	2
0	0	11	0

WESTBOUND

PM	NOON	AM	
86	0	0	0
1104	0	0	3
4	0	0	0
1	0	0	0
1011	0	0	

CONTROL
Signalized

	AM	NOON	PM
TEV	0	0	2645
PHF			0.95

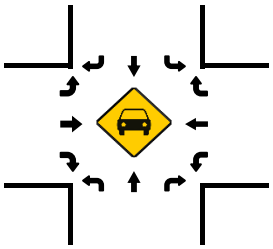
	0	0	0	0

PM	15	0	3	1	17
NOON	0	0	0	0	0
AM	0	0	0	0	0

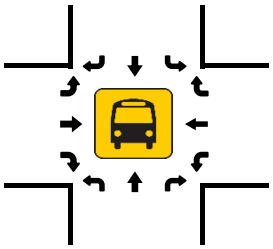
NORTHBOUND

Bet. Walnut Ave & Glencoe Ave

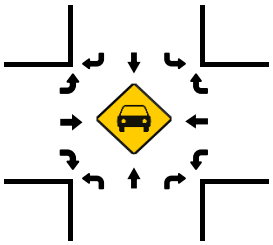
Total Vehicles (AM)



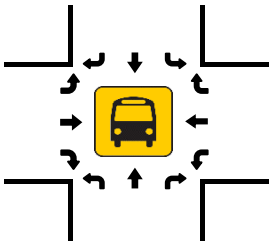
Total Vehicles (AM)



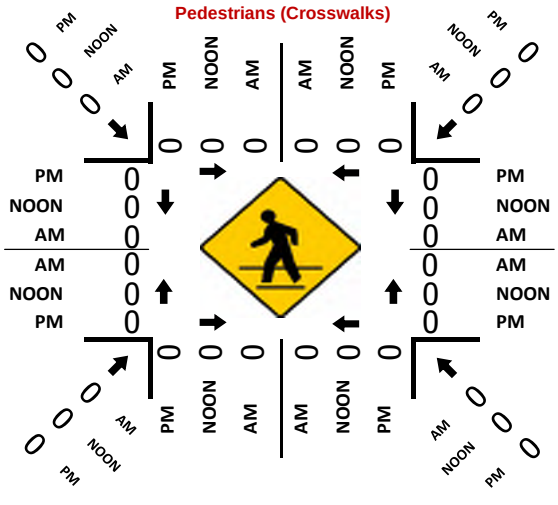
Total Vehicles (NOON)



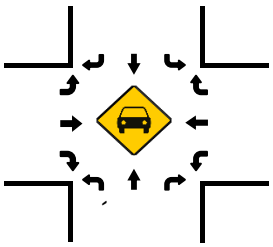
Total Vehicles (NOON)



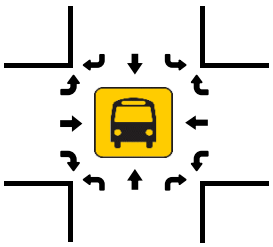
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Bet. Walnut Ave & Glencoe Ave & West Costco dwy on Washington Blvd
City: Marina Del Rey
Control: Signalized

Project ID: 18-05468-001
Date: 2018-06-29

Total

NS/EW Streets:	Bet. Walnut Ave & Glencoe Ave				Bet. Walnut Ave & Glencoe Ave				West Costco dwy on Washington Blvd				West Costco dwy on Washington Blvd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	2	0	0	0	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	3	0	36	2	79	0	50	213	0	0	2	259	24	0	668
4:15 PM	1	1	3	0	40	0	53	0	49	209	1	0	0	256	20	0	633
4:30 PM	0	0	3	0	27	0	42	0	56	206	4	2	0	269	20	0	629
4:45 PM	0	0	2	0	30	0	43	0	43	221	1	1	1	271	26	0	639
5:00 PM	1	0	10	0	28	0	54	0	48	215	5	0	0	271	23	0	655
5:15 PM	1	1	6	0	27	0	53	0	68	235	5	2	2	270	23	0	693
5:30 PM	0	0	1	0	24	0	43	0	43	213	1	1	0	281	20	1	628
5:45 PM	1	0	0	0	37	0	47	0	65	214	0	1	2	282	20	0	669
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	4	2	28	0	249	2	414	0	422	1726	17	7	7	2159	176	1	5214
APPROACH %'s :	11.76%	5.88%	82.35%	0.00%	37.44%	0.30%	62.26%	0.00%	19.43%	79.47%	0.78%	0.32%	0.30%	92.15%	7.51%	0.04%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	3	1	17	0	116	0	197	0	224	877	11	4	4	1104	86	1	2645
PEAK HR FACTOR :	0.750	0.250	0.425	0.000	0.784	0.000	0.912	0.000	0.824	0.933	0.550	0.500	0.500	0.979	0.935	0.250	0.954
	0.477				0.932				0.900				0.983				

Prepared by National Data & Surveying Services

Bet. Walnut Ave & Glencoe Ave & East Costco dwy on Washington Blvd

Peak Hour Turning Movement Count

ID: 18-05468-002
City: Marina Del Rey

Day: Friday
Date: 06/29/2018

PEAK HOURS	COUNT PERIODS
NONE	NONE
NONE	NONE
04:45 PM - 05:45 PM	04:00 PM - 06:00 PM

Bet. Walnut Ave & Glencoe Ave — SOUTHBOUND

AM	0	0	0	0	0	AM
NOON	0	0	0	0	0	NOON
PM	64	163	318	0	565	PM

EASTBOUND — East Costco dwy on Washington

AM	NOON	PM		
0	0	1133	⇦	
0	0	0	↶	0
0	0	33	↱	1
0	0	743	→	2
0	0	241	↴	1
AM	NOON	PM		

WESTBOUND — East Costco dwy on Washington

PM	NOON	AM		
				1
402	0	0	↰	2
850	0	0	←	1
364	0	0	↰	0
0	0	0	↶	
1359	0	0	⇨	
PM	NOON	AM		

	1	0.5	1.5	0
	0	1.5	0.5	1

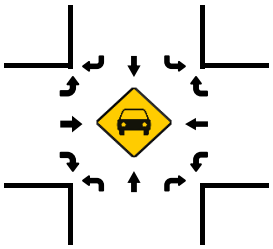
CONTROL: Signalized

TEV	0 AM	0 NOON	3825 PM
PHF			0.97

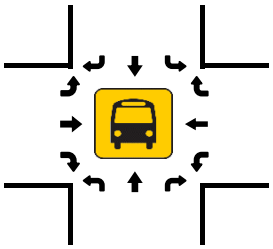
NORTHBOUND — Bet. Walnut Ave & Glencoe Ave

PM	768	0	219	130	298	PM
NOON	0	0	0	0	0	NOON
AM	0	0	0	0	0	AM

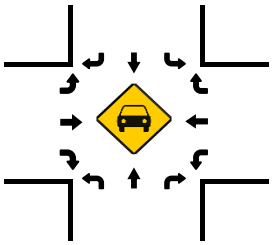
Total Vehicles (AM)



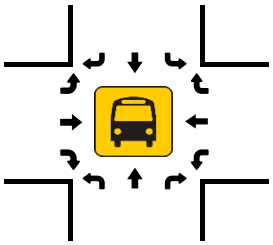
Total Vehicles (AM)



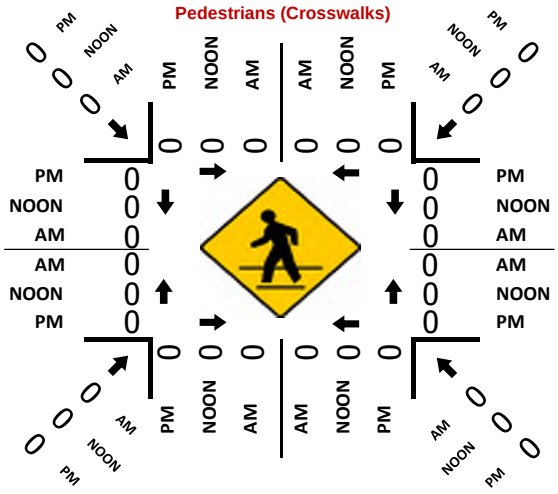
Total Vehicles (NOON)



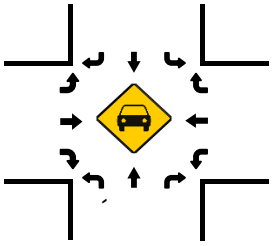
Total Vehicles (NOON)



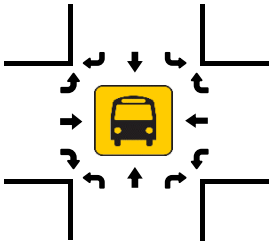
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Bet. Walnut Ave & Glencoe Ave & East Costco dwy on Washington Blvd
City: Marina Del Rey
Control: Signalized

Project ID: 18-05468-002
Date: 2018-06-29

Total

NS/EW Streets:	Bet. Walnut Ave & Glencoe Ave				Bet. Walnut Ave & Glencoe Ave				East Costco dwy on Washington Blvd				East Costco dwy on Washington Blvd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.5	0.5	1	0	1.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	64	35	76	0	90	36	23	0	8	172	64	0	86	171	117	0	942
4:15 PM	50	33	88	0	87	41	14	0	6	196	59	0	87	189	90	0	940
4:30 PM	53	25	77	0	75	37	14	0	6	177	56	0	87	187	107	0	901
4:45 PM	58	33	71	0	80	41	20	0	10	186	57	0	93	224	111	0	984
5:00 PM	56	40	91	0	97	39	14	0	7	189	45	0	83	192	99	0	952
5:15 PM	49	27	71	0	67	47	14	0	7	189	78	0	95	234	99	0	977
5:30 PM	56	30	65	0	74	36	16	0	9	179	61	0	93	200	93	0	912
5:45 PM	50	28	58	0	79	38	16	0	14	188	52	0	90	245	92	0	950
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	436	251	597	0	649	315	131	0	67	1476	472	0	714	1642	808	0	7558
APPROACH %'s :	33.96%	19.55%	46.50%	0.00%	59.27%	28.77%	11.96%	0.00%	3.33%	73.25%	23.42%	0.00%	22.57%	51.90%	25.54%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	219	130	298	0	318	163	64	0	33	743	241	0	364	850	402	0	3825
PEAK HR FACTOR :	0.944	0.813	0.819	0.000	0.820	0.867	0.800	0.000	0.825	0.983	0.772	0.000	0.958	0.908	0.905	0.000	0.972
	0.865				0.908				0.928				0.944				

Prepared by National Data & Surveying Services

Bet. Walnut Ave & Glencoe Ave & West Costco dwy on Washington Blvd

Peak Hour Turning Movement Count

ID: 18-05468-001
City: Marina Del Rey

Day: Saturday
Date: 06/30/2018

Bet. Walnut Ave & Glencoe Ave

SOUTHBOUND

PEAK HOURS		COUNT PERIODS
NONE	AM	NONE
NONE	NOON	NONE
02:30 PM - 03:30 PM	PM	02:00 PM - 04:00 PM

AM	0	0	0	0	0
NOON	0	0	0	0	0
PM	239	2	175	0	428

1 0 1 0

EASTBOUND

AM	NOON	PM	
0	0	1228	
0	0	2	0
0	0	289	1
0	0	830	2
0	0	15	0

WESTBOUND

PM	NOON	AM	
139	0	0	0
986	0	0	3
2	0	0	0
8	0	0	0
1029	0	0	

CONTROL

Signalized

	AM	NOON	PM
TEV	0	0	2705
PHF			0.93

0 0 0 0

PM	20	1	1	0	16
NOON	0	0	0	0	0
AM	0	0	0	0	0

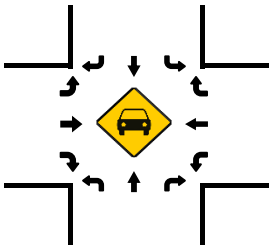
NORTHBOUND

Bet. Walnut Ave & Glencoe Ave

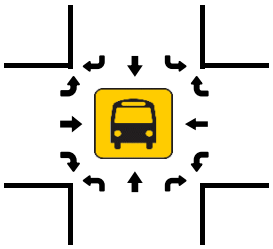
West Costco dwy on Washington

West Costco dwy on Washington

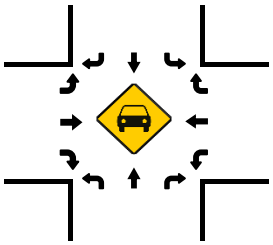
Total Vehicles (AM)



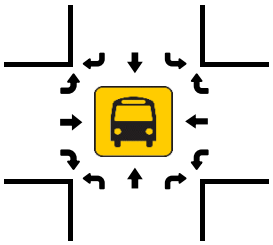
Total Vehicles (AM)



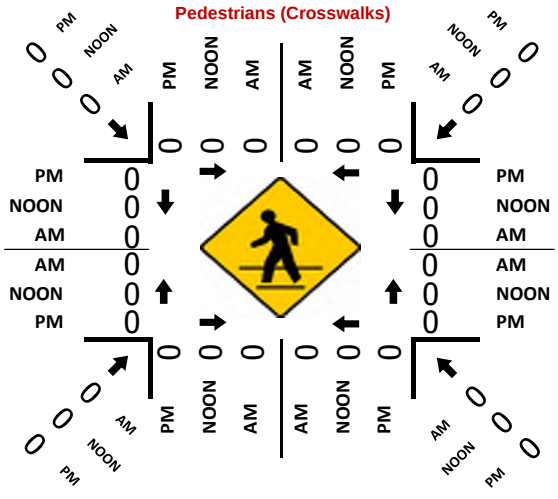
Total Vehicles (NOON)



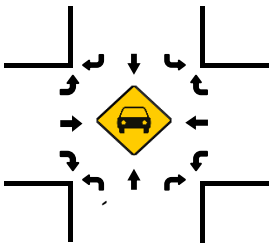
Total Vehicles (NOON)



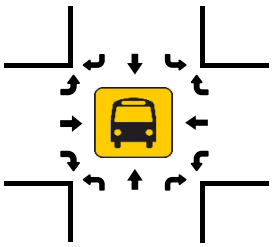
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Bet. Walnut Ave & Glencoe Ave & West Costco dwy on Washington Blvd
City: Marina Del Rey
Control: Signalized

Project ID: 18-05468-001
Date: 2018-06-30

Total

NS/EW Streets:	Bet. Walnut Ave & Glencoe Ave				Bet. Walnut Ave & Glencoe Ave				West Costco dwy on Washington Blvd				West Costco dwy on Washington Blvd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	2	0	0	0	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	1	0	5	1	36	0	66	0	65	190	5	0	0	248	35	4	656
2:15 PM	0	0	6	0	27	0	65	0	71	171	2	0	0	261	43	0	646
2:30 PM	0	0	4	0	38	0	54	0	73	199	1	0	0	254	38	1	662
2:45 PM	0	0	1	0	39	1	58	0	74	192	7	0	0	232	35	2	641
3:00 PM	0	0	7	1	56	1	56	0	68	226	4	2	0	271	33	3	728
3:15 PM	1	0	4	0	42	0	71	0	74	213	3	0	2	229	33	2	674
3:30 PM	0	0	1	0	36	0	43	0	66	196	3	0	0	259	24	1	629
3:45 PM	0	0	5	0	45	0	55	0	54	187	2	1	2	263	19	0	633
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	0	33	2	319	2	468	0	545	1574	27	3	4	2017	260	13	5269
APPROACH %'s :	5.41%	0.00%	89.19%	5.41%	40.43%	0.25%	59.32%	0.00%	25.36%	73.24%	1.26%	0.14%	0.17%	87.93%	11.33%	0.57%	
PEAK HR :	02:30 PM - 03:30 PM																TOTAL
PEAK HR VOL :	1	0	16	1	175	2	239	0	289	830	15	2	2	986	139	8	2705
PEAK HR FACTOR :	0.250	0.000	0.571	0.250	0.781	0.500	0.842	0.000	0.976	0.918	0.536	0.250	0.250	0.910	0.914	0.667	0.929
	0.563				0.920				0.947				0.924				

Prepared by National Data & Surveying Services

Bet. Walnut Ave & Glencoe Ave & East Costco dwy on Washington Blvd

Peak Hour Turning Movement Count

ID: 18-05468-002
City: Marina Del Rey

Day: Saturday
Date: 06/30/2018

Bet. Walnut Ave & Glencoe Ave

SOUTHBOUND

PEAK HOURS		COUNT PERIODS
NONE		NONE
NONE		NONE
03:00 PM - 04:00 PM		02:00 PM - 04:00 PM

AM	0	0	0	0	0	AM
NOON	0	0	0	0	0	NOON
PM	80	107	389	0	670	PM
	1	0.5	1.5	0		

EASTBOUND (East Costco dwy on Washington)

AM	NOON	PM	
0	0	1065	
0	0	0	0
0	0	43	1
0	0	769	2
0	0	204	1
AM	NOON	PM	

WESTBOUND (East Costco dwy on Washington)

PM	NOON	AM	
507	0	0	1
825	0	0	2
284	0	0	1
0	0	0	0
1394	0	0	
PM	NOON	AM	

CONTROL: Signalized

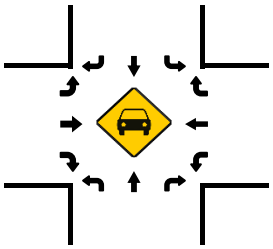
	AM	NOON	PM
TEV	0	0	3724
PHF			0.98

PM	595	0	160	120	236	PM
NOON	0	0	0	0	0	NOON
AM	0	0	0	0	0	AM
		0	1.5	0.5	1	

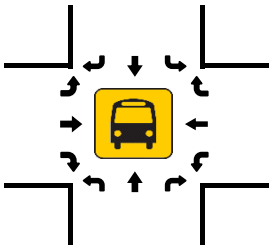
NORTHBOUND

Bet. Walnut Ave & Glencoe Ave

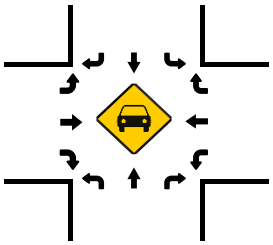
Total Vehicles (AM)



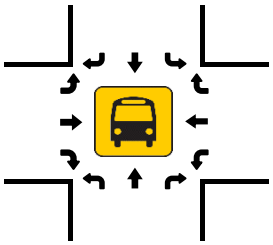
Total Vehicles (AM)



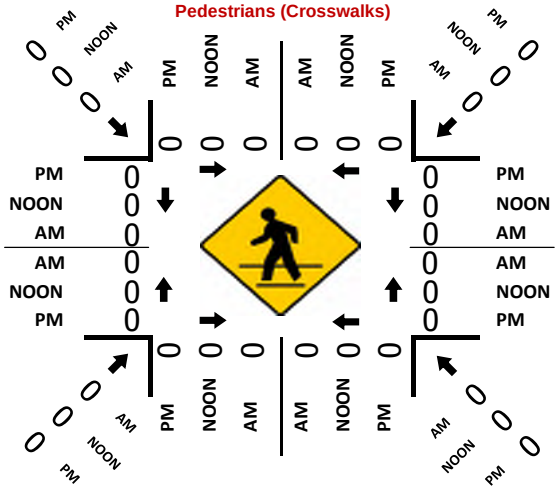
Total Vehicles (NOON)



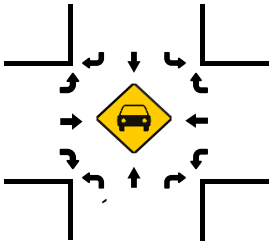
Total Vehicles (NOON)



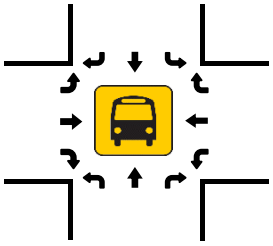
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Bet. Walnut Ave & Glencoe Ave & East Costco dwy on Washington Blvd
City: Marina Del Rey
Control: Signalized

Project ID: 18-05468-002
Date: 2018-06-30

Total

NS/EW Streets:	Bet. Walnut Ave & Glencoe Ave				Bet. Walnut Ave & Glencoe Ave				East Costco dwy on Washington Blvd				East Costco dwy on Washington Blvd				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.5	0.5	1	0	1.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	50	44	56	0	102	39	20	0	11	172	48	0	67	191	119	0	919
2:15 PM	46	36	58	0	78	31	21	0	7	164	42	1	75	218	140	0	917
2:30 PM	55	28	63	0	95	28	27	0	11	194	46	0	70	180	110	0	907
2:45 PM	45	45	49	0	90	25	30	0	11	167	56	0	81	204	103	0	906
3:00 PM	35	30	61	0	87	27	25	0	9	198	54	0	68	205	142	0	941
3:15 PM	38	32	53	0	103	30	22	0	16	204	53	0	65	205	112	0	933
3:30 PM	47	33	59	0	102	21	14	0	12	192	37	0	71	194	118	0	900
3:45 PM	40	25	63	0	97	29	19	0	6	175	60	0	80	221	135	0	950
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	356	273	462	0	754	230	178	0	83	1466	396	1	577	1618	979	0	7373
APPROACH %'s :	32.63%	25.02%	42.35%	0.00%	64.89%	19.79%	15.32%	0.00%	4.27%	75.33%	20.35%	0.05%	18.18%	50.98%	30.84%	0.00%	
PEAK HR :	03:00 PM - 04:00 PM																TOTAL
PEAK HR VOL :	160	120	236	0	389	107	80	0	43	769	204	0	284	825	507	0	3724
PEAK HR FACTOR :	0.851	0.909	0.937	0.000	0.944	0.892	0.800	0.000	0.672	0.942	0.850	0.000	0.888	0.933	0.893	0.000	0.980
	0.928				0.929				0.930				0.927				

City Of Los Angeles
Department Of Transportation
MANUAL TRAFFIC COUNT SUMMARY

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

STREET:
North / Sounth: Lincoln

East/West: Washington

Day: Tuesday, May 7, 2019 Weather: Sunny

Hours:

School Day: Yes District I/S CODE

	N/B	S/B	E/B	W/B
DUAL-WHEELED	515	365	305	255
BIKES	65	77	120	102
BUSES	57	56	44	35

	N/B	TIME	S/B	TIME	E/B	TIME	W/B	TIME
AM PK 15 MIN	601	7:00:00 AM	403	8:15:00 AM	390	8:15:00 AM	274	8:45:00 AM
PM PK 15 MIN	538	5:30:00 PM	441	4:30:00 PM	310	5:15:00 PM	316	5:45:00 PM
AM PK HOUR	2221	7:00:00 AM	1541	7:45:00 AM	1440	8:00:00 AM	998	8:00:00 AM
PM PK HOUR	1913	4:45:00 PM	1701	4:15:00 PM	1192	4:45:00 PM	1230	5:00:00 PM

NORTHBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	696	1437	88	2221
8-9	760	1222	124	2106
9-10	716	1229	184	2129
3-4	411	1032	206	1649
4-5	447	1070	188	1705
5-6	479	1242	179	1900
TOTAL	3509	7232	969	11710

SOUTHBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	176	921	75	1172
8-9	217	1203	67	1487
9-10	232	1102	98	1432
3-4	172	1329	59	1560
4-5	162	1451	56	1669
5-6	151	1378	52	1581
TOTAL	1110	7384	407	8901

TOTAL	XING S/L		XING N/L	
N-S	Ped	Sch	Ped	Sch
3393	26	7	22	4
3593	44	7	16	0
3561	43	11	45	7
3209	66	20	57	7
3374	66	20	43	7
3481	44	19	47	2
20611	289	84	230	27

EASTBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	56	701	415	1172
8-9	58	800	582	1440
9-10	88	653	513	1254
3-4	84	605	481	1170
4-5	70	565	455	1090
5-6	69	645	467	1181
TOTAL	425	3969	2913	7307

WESTBOUND Approach

Hours	Lt	Th	Rt	Total
7-8	115	558	149	822
8-9	148	702	148	998
9-10	147	549	182	878
3-4	296	573	242	1111
4-5	301	604	244	1149
5-6	311	681	238	1230
TOTAL	1318	3667	1203	6188

TOTAL	XING W/L		XING E/L	
E-W	Ped	Sch	Ped	Sch
1994	23	4	37	5
2438	27	4	31	9
2132	40	8	54	7
2281	50	8	64	25
2239	45	8	77	6
2411	46	2	78	3
13495	231	34	341	55

LINCOLN & WASHINGTON

2009													
	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
445-545	121	1416	197	241	709	263	245	1529	564	580	814	129	6808

2011													
	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
500-600	118	1302	206	308	701	333	280	1684	485	554	802	122	6895

2014													
	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
500-600	62	1372	201	237	733	214	213	1145	464	464	686	72	5863

2019													
	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
500-600	52	1378	151	238	681	311	179	1242	479	467	645	69	5892

2014-2019 GROWTH													
	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
	-3.5%	0.1%	-5.6%	0.1%	-1.5%	7.8%	-3.4%	1.6%	0.6%	0.1%	-1.2%	-0.8%	0.1%

2011-2019 GROWTH													
	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
	-9.7%	0.7%	-3.8%	-3.2%	-0.4%	-0.9%	-5.4%	-3.7%	-0.2%	-2.1%	-2.7%	-6.9%	-1.9%

2009-2019 GROWTH													
	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
	-8.1%	-0.3%	-2.6%	-0.1%	-0.4%	1.7%	-3.1%	-2.1%	-1.6%	-2.1%	-2.3%	-6.1%	-1.4%

2020 LA County CMP Growth Rate 2.6%

GLENCOE & WASHINGTON PM

2014

	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
500-600	58	143	258	358	810	428	312	104	191	270	817	33	3782

2017

	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	73	134	312	405	843	394	281	107	199	270	797	30	3845

2014-2017 GROWTH

SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
8.0%	-2.1%	6.5%	4.2%	1.3%	-2.7%	-3.4%	1.0%	1.4%	0.0%	-0.8%	-3.1%	0.6%

GLENCOE & WASHINGTON SAT

2014

	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
445-545	*No 2014 data avaliable for Saturday												

2017

	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	86	99	330	453	858	331	284	149	187	240	854	44	3915

2014-2017 GROWTH

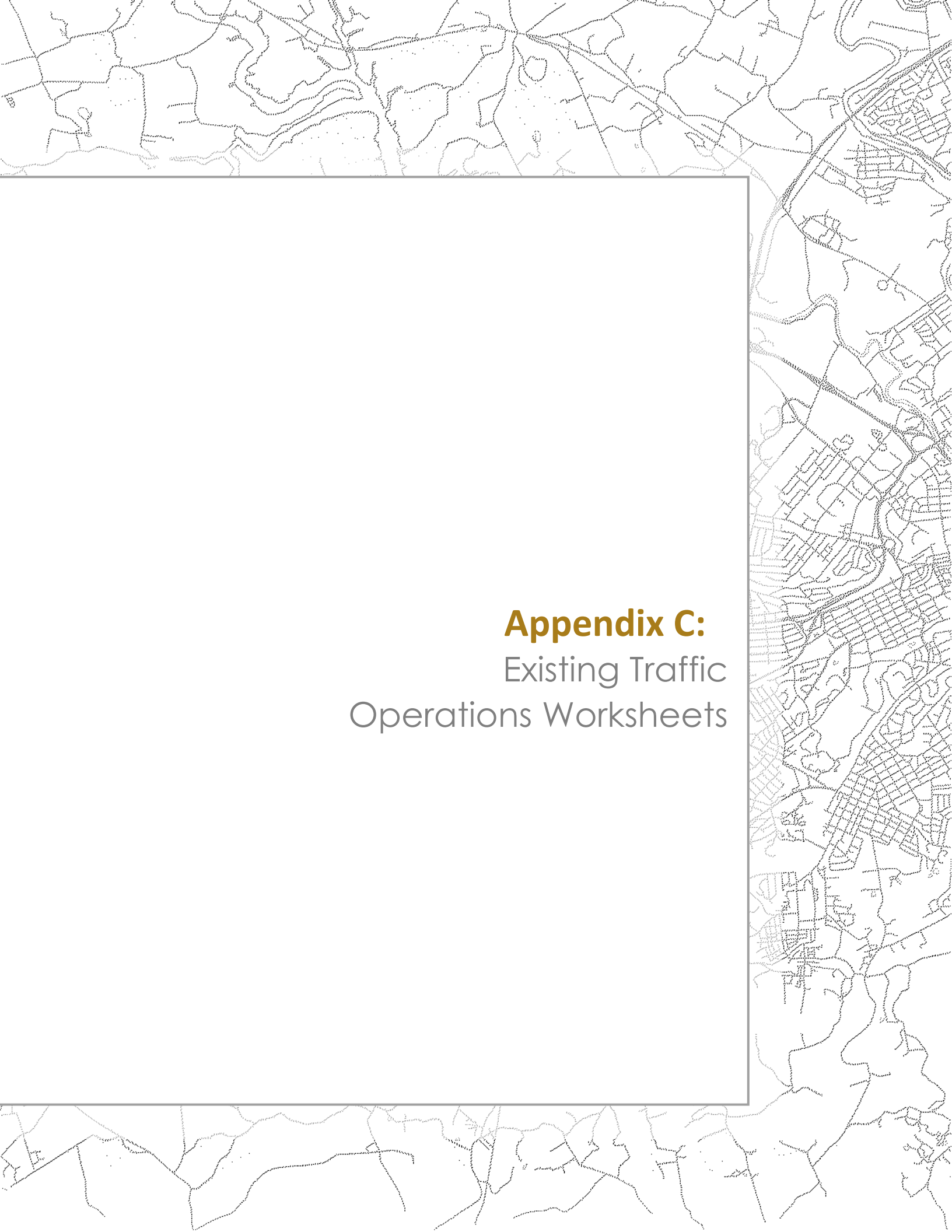
SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL

GLENCOE & WASHINGTON COMPARISON OF PM VS SAT

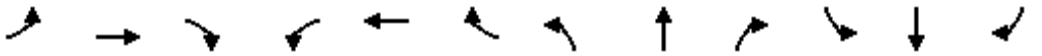
PM VS SAT COMPARISON

SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
15.1%	-35.4%	5.5%	10.6%	1.7%	-19.0%	1.1%	28.2%	-6.4%	-12.5%	6.7%	31.8%	1.8%

Comparison of through movements on Washington Blvd



Appendix C:
Existing Traffic Operations Worksheets



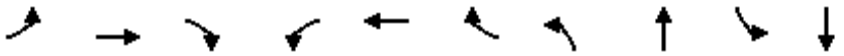
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	651	472	314	688	240	484	1254	181	153	1392	53
Future Volume (veh/h)	70	651	472	314	688	240	484	1254	181	153	1392	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	71	664	482	320	702	245	494	1280	185	156	1420	54
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	117	1035	639	256	1175	694	388	1582	229	369	1729	66
Arrive On Green	0.03	0.29	0.29	0.07	0.33	0.33	0.11	0.35	0.35	0.11	0.34	0.34
Sat Flow, veh/h	3510	3610	1610	3510	3610	1610	3510	4577	662	3510	5128	195
Grp Volume(v), veh/h	71	664	482	320	702	245	494	967	498	156	958	516
Grp Sat Flow(s),veh/h/ln	1755	1805	1610	1755	1805	1610	1755	1729	1781	1755	1729	1865
Q Serve(g_s), s	2.5	20.1	32.2	9.1	20.4	1.8	13.8	31.8	31.8	5.2	31.7	31.7
Cycle Q Clear(g_c), s	2.5	20.1	32.2	9.1	20.4	1.8	13.8	31.8	31.8	5.2	31.7	31.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.37	1.00		0.10
Lane Grp Cap(c), veh/h	117	1035	639	256	1175	694	388	1195	615	369	1166	629
V/C Ratio(X)	0.61	0.64	0.75	1.25	0.60	0.35	1.27	0.81	0.81	0.42	0.82	0.82
Avail Cap(c_a), veh/h	253	1069	654	256	1175	694	388	1195	615	369	1166	629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.93	0.93	0.93	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.6	39.0	32.4	58.0	35.3	11.8	55.6	37.2	37.2	52.4	38.0	38.0
Incr Delay (d2), s/veh	5.0	1.3	4.8	139.9	0.8	0.3	142.3	6.0	11.0	0.8	6.6	11.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	9.0	13.3	9.0	9.1	3.2	13.7	14.0	15.3	2.3	14.1	16.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.6	40.2	37.3	197.8	36.1	12.1	197.9	43.1	48.1	53.1	44.5	49.5
LnGrp LOS	E	D	D	F	D	B	F	D	D	D	D	D
Approach Vol, veh/h		1217			1267			1959			1630	
Approach Delay, s/veh		40.5			72.3			83.4			46.9	
Approach LOS		D			E			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.2	49.0	15.0	41.8	20.0	48.2	10.2	46.7
Change Period (Y+Rc), s	* 6	5.8	5.9	* 6	* 6.2	* 6	6.0	* 6
Max Green Setting (Gmax), s	* 12	43.2	9.1	* 37	* 14	* 41	9.0	* 37
Max Q Clear Time (g_c+I1), s	7.2	33.8	11.1	34.2	15.8	33.7	4.5	22.4
Green Ext Time (p_c), s	0.2	7.7	0.0	1.6	0.0	5.4	0.1	5.0

Intersection Summary	
HCM 6th Ctrl Delay	62.7
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

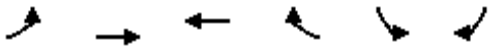


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	71	664	482	320	702	245	494	1465	156	1474
v/c Ratio	0.33	0.72	0.60	1.26	0.69	0.35	0.93	0.74	0.46	0.87
Control Delay	59.9	47.0	21.7	191.0	43.9	9.0	78.1	35.9	58.4	45.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	47.0	21.7	191.0	43.9	9.0	78.1	35.9	58.4	45.6
Queue Length 50th (ft)	28	258	209	~167	273	46	206	364	62	406
Queue Length 95th (ft)	53	308	322	#262	328	86	#370	452	98	471
Internal Link Dist (ft)		2378			480			1614		1054
Turn Bay Length (ft)	155			285			475		200	
Base Capacity (vph)	252	1068	803	254	1081	732	530	1982	336	1704
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.62	0.60	1.26	0.65	0.33	0.93	0.74	0.46	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

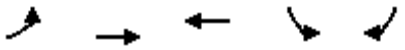
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	228	895	1126	88	118	201
Future Volume (veh/h)	228	895	1126	88	118	201
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1885	1870	1885	1885	1885	1885
Adj Flow Rate, veh/h	235	923	1161	91	122	207
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	2	1	1	1	1
Cap, veh/h	513	2767	3222	252	264	375
Arrive On Green	0.09	0.78	1.00	1.00	0.15	0.15
Sat Flow, veh/h	1795	3647	5036	381	1795	1598
Grp Volume(v), veh/h	235	923	818	434	122	207
Grp Sat Flow(s),veh/h/ln	1795	1777	1716	1817	1795	1598
Q Serve(g_s), s	4.1	9.3	0.0	0.0	7.5	13.7
Cycle Q Clear(g_c), s	4.1	9.3	0.0	0.0	7.5	13.7
Prop In Lane	1.00			0.21	1.00	1.00
Lane Grp Cap(c), veh/h	513	2767	2271	1203	264	375
V/C Ratio(X)	0.46	0.33	0.36	0.36	0.46	0.55
Avail Cap(c_a), veh/h	588	2767	2271	1203	477	564
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.68	0.68	0.81	0.81	1.00	1.00
Uniform Delay (d), s/veh	3.6	4.0	0.0	0.0	46.8	40.4
Incr Delay (d2), s/veh	0.2	0.2	0.4	0.7	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	2.8	0.1	0.2	3.4	12.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	3.8	4.2	0.4	0.7	47.3	40.9
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h		1158	1252		329	
Approach Delay, s/veh		4.1	0.5		43.2	
Approach LOS		A	A		D	

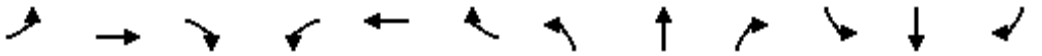
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		98.2		21.8	14.0	84.2
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3
Max Green Setting (Gmax), s		78.7		31.4	15.0	59.7
Max Q Clear Time (g_c+I1), s		12.3		16.7	7.1	3.0
Green Ext Time (p_c), s		17.4		0.5	0.2	24.4

Intersection Summary	
HCM 6th Ctrl Delay	7.1
HCM 6th LOS	A



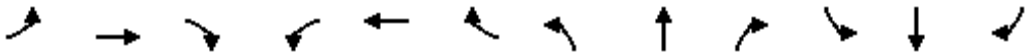
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	235	923	1252	122	207
v/c Ratio	0.57	0.32	0.36	0.56	0.48
Control Delay	8.4	3.7	7.0	58.9	32.0
Queue Delay	0.0	0.3	0.1	0.1	3.9
Total Delay	8.4	4.1	7.1	59.1	35.9
Queue Length 50th (ft)	30	79	97	91	105
Queue Length 95th (ft)	63	131	101	146	161
Internal Link Dist (ft)		480	440	166	
Turn Bay Length (ft)	135				
Base Capacity (vph)	464	2845	3456	475	494
Starvation Cap Reductn	0	1189	635	58	207
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.51	0.56	0.44	0.29	0.72

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	758	246	371	867	410	223	133	304	324	166	65
Future Volume (vph)	34	758	246	371	867	410	223	133	304	324	166	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1805	3574	1615	1770	3539	1615	1681	1709	1509	1715	1775	1615
Flt Permitted	0.32	1.00	1.00	0.11	1.00	1.00	0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (perm)	616	3574	1615	213	3539	1615	1681	1709	1509	1715	1775	1615
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	34	766	248	375	876	414	225	134	307	327	168	66
RTOR Reduction (vph)	0	0	185	0	0	145	0	0	235	0	0	47
Lane Group Flow (vph)	34	766	63	375	876	269	175	184	72	242	253	19
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%	2%	5%	7%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	Over	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	37.5	30.3	30.3	63.2	52.0	52.0	18.5	18.5	28.3	22.6	22.6	35.0
Effective Green, g (s)	37.5	30.3	30.3	63.2	52.0	52.0	18.5	18.5	28.3	22.6	22.6	35.0
Actuated g/C Ratio	0.31	0.25	0.25	0.53	0.43	0.43	0.15	0.15	0.24	0.19	0.19	0.29
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	263	902	407	479	1533	699	259	263	355	322	334	471
v/s Ratio Prot	0.01	c0.21		c0.18	0.25		0.10	c0.11	0.05	0.14	c0.14	0.01
v/s Ratio Perm	0.03		0.04	0.23		0.17						
v/c Ratio	0.13	0.85	0.15	0.78	0.57	0.38	0.68	0.70	0.20	0.75	0.76	0.04
Uniform Delay, d1	28.9	42.7	34.9	30.6	25.6	23.1	47.9	48.1	36.8	46.0	46.1	30.5
Progression Factor	0.93	1.02	1.58	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	9.5	0.8	8.2	1.6	1.6	6.8	7.9	0.3	9.5	9.4	0.0
Delay (s)	27.0	53.1	55.8	38.8	27.2	24.7	54.7	56.0	37.1	55.6	55.6	30.5
Level of Service	C	D	E	D	C	C	D	E	D	E	E	C
Approach Delay (s)		52.9			29.2			47.0			52.6	
Approach LOS		D			C			D			D	

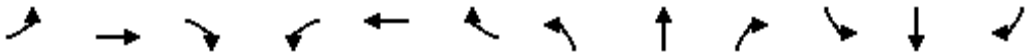
Intersection Summary			
HCM 2000 Control Delay	41.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	34	766	248	375	876	414	175	184	307	242	253	66
v/c Ratio	0.11	0.85	0.42	0.78	0.56	0.48	0.68	0.70	0.52	0.75	0.76	0.13
Control Delay	17.6	53.1	9.0	43.2	29.8	13.0	60.3	61.6	8.8	60.2	60.4	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	53.1	9.0	43.2	29.8	13.0	60.3	61.6	8.8	60.2	60.4	6.7
Queue Length 50th (ft)	14	299	14	219	272	80	136	144	0	187	195	0
Queue Length 95th (ft)	37	374	80	#523	404	207	203	212	90	270	280	30
Internal Link Dist (ft)		440			2455			2238			219	
Turn Bay Length (ft)	330			265		150	105					
Base Capacity (vph)	388	944	609	480	1557	854	389	396	590	378	391	597
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.81	0.41	0.78	0.56	0.48	0.45	0.46	0.52	0.64	0.65	0.11

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



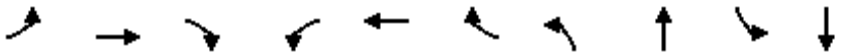
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	679	491	327	717	250	504	1307	188	159	1450	55
Future Volume (veh/h)	73	679	491	327	717	250	504	1307	188	159	1450	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	74	693	501	334	732	255	514	1334	192	162	1480	56
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	461	1046	642	479	1092	653	497	1526	220	507	1664	63
Arrive On Green	0.06	0.29	0.29	0.07	0.31	0.31	0.11	0.34	0.34	0.10	0.33	0.33
Sat Flow, veh/h	3456	3554	1585	3456	3554	1585	3456	4509	649	3456	5049	191
Grp Volume(v), veh/h	74	693	501	334	732	255	514	1007	519	162	998	538
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1777	1585	1728	1702	1754	1728	1702	1836
Q Serve(g_s), s	1.8	21.4	34.4	8.5	22.5	2.6	13.8	34.7	34.7	0.0	34.7	34.8
Cycle Q Clear(g_c), s	1.8	21.4	34.4	8.5	22.5	2.6	13.8	34.7	34.7	0.0	34.7	34.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.37	1.00		0.10
Lane Grp Cap(c), veh/h	461	1046	642	479	1092	653	497	1152	594	507	1122	605
V/C Ratio(X)	0.16	0.66	0.78	0.70	0.67	0.39	1.03	0.87	0.87	0.32	0.89	0.89
Avail Cap(c_a), veh/h	505	1052	644	479	1092	653	497	1176	606	507	1122	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	38.7	32.4	30.6	37.8	11.9	38.5	38.8	38.8	49.6	39.7	39.7
Incr Delay (d2), s/veh	0.2	1.6	6.1	4.0	1.4	0.3	49.7	9.3	16.3	1.7	10.6	17.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	9.4	14.1	3.8	10.0	3.2	9.4	15.5	17.2	2.4	15.7	18.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.7	40.2	38.5	34.6	39.2	12.2	88.2	48.1	55.2	51.3	50.3	57.4
LnGrp LOS	C	D	D	C	D	B	F	D	E	D	D	E
Approach Vol, veh/h		1268			1321			2040			1698	
Approach Delay, s/veh		38.9			32.8			60.0			52.7	
Approach LOS		D			C			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.1	48.1	15.0	42.8	20.0	47.2	13.4	44.4
Change Period (Y+Rc), s	* 6	5.8	5.9	* 6	* 6.2	* 6	6.0	* 6
Max Green Setting (Gmax), s	* 12	43.2	9.1	* 37	* 14	* 41	9.0	* 37
Max Q Clear Time (g_c+I1), s	2.0	36.7	10.5	36.4	15.8	36.8	3.8	24.5
Green Ext Time (p_c), s	0.3	5.6	0.0	0.4	0.0	3.5	0.1	4.8

Intersection Summary	
HCM 6th Ctrl Delay	48.1
HCM 6th LOS	D

Notes

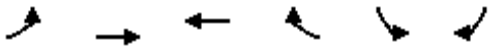
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	74	693	501	334	732	255	514	1526	162	1536
v/c Ratio	0.18	0.74	0.63	0.77	0.70	0.36	0.86	0.80	0.36	0.91
Control Delay	24.2	47.0	23.1	39.3	43.7	9.3	46.6	39.0	43.4	49.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	47.0	23.1	39.3	43.7	9.3	46.6	39.0	43.4	49.5
Queue Length 50th (ft)	18	265	227	91	280	48	160	405	47	435
Queue Length 95th (ft)	33	326	349	122	345	92	#290	483	74	#513
Internal Link Dist (ft)		2378			480			1614		1054
Turn Bay Length (ft)	155			285			475		200	
Base Capacity (vph)	443	1047	780	434	1079	727	600	1896	449	1680
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.66	0.64	0.77	0.68	0.35	0.86	0.80	0.36	0.91

Intersection Summary

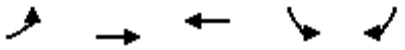
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	297	847	1006	142	179	244
Future Volume (veh/h)	297	847	1006	142	179	244
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1900	1870	1885	1885	1885	1900
Adj Flow Rate, veh/h	319	911	1082	153	192	262
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	1	1	1	0
Cap, veh/h	501	2664	2885	407	301	404
Arrive On Green	0.08	0.75	1.00	1.00	0.17	0.17
Sat Flow, veh/h	1810	3647	4726	644	1795	1610
Grp Volume(v), veh/h	319	911	814	421	192	262
Grp Sat Flow(s),veh/h/ln	1810	1777	1716	1769	1795	1610
Q Serve(g_s), s	6.9	10.4	0.0	0.0	12.0	17.5
Cycle Q Clear(g_c), s	6.9	10.4	0.0	0.0	12.0	17.5
Prop In Lane	1.00			0.36	1.00	1.00
Lane Grp Cap(c), veh/h	501	2664	2172	1120	301	404
V/C Ratio(X)	0.64	0.34	0.37	0.38	0.64	0.65
Avail Cap(c_a), veh/h	576	2664	2172	1120	470	556
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.69	0.69	0.66	0.66	1.00	1.00
Uniform Delay (d), s/veh	5.2	5.1	0.0	0.0	46.5	40.2
Incr Delay (d2), s/veh	0.8	0.2	0.3	0.6	0.8	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.3	0.1	0.2	5.5	15.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.0	5.3	0.3	0.6	47.4	40.8
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h		1230	1235		454	
Approach Delay, s/veh		5.5	0.4		43.6	
Approach LOS		A	A		D	

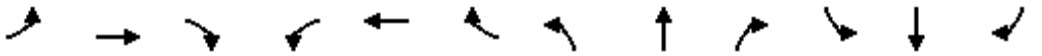
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		95.3		24.7	14.0	81.3
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3
Max Green Setting (Gmax), s		78.7		31.4	15.0	59.7
Max Q Clear Time (g_c+I1), s		12.4		19.5	8.9	2.0
Green Ext Time (p_c), s		17.1		0.7	0.3	24.2

Intersection Summary	
HCM 6th Ctrl Delay	9.3
HCM 6th LOS	A



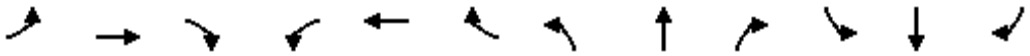
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	319	911	1235	192	262
v/c Ratio	0.69	0.36	0.46	0.56	0.40
Control Delay	19.8	6.6	3.0	50.8	22.2
Queue Delay	0.0	0.4	0.3	0.0	0.0
Total Delay	19.8	7.0	3.3	50.8	22.2
Queue Length 50th (ft)	79	121	24	136	113
Queue Length 95th (ft)	181	153	38	213	173
Internal Link Dist (ft)		480	440	186	
Turn Bay Length (ft)	135				
Base Capacity (vph)	459	2565	2705	467	656
Starvation Cap Reductn	0	1027	718	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.69	0.59	0.62	0.41	0.40

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	784	208	290	842	517	163	122	241	397	109	82
Future Volume (vph)	44	784	208	290	842	517	163	122	241	397	109	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	5.2	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1805	3574	1615	1787	3574	1615	1698	1773	1615	1715	1755	1615
Flt Permitted	0.14	1.00	1.00	0.12	1.00	1.00	0.95	0.99	1.00	0.95	0.97	1.00
Satd. Flow (perm)	261	3574	1615	227	3574	1615	1698	1773	1615	1715	1755	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	45	800	212	296	859	528	166	124	246	405	111	84
RTOR Reduction (vph)	0	0	106	0	0	245	0	0	50	0	0	50
Lane Group Flow (vph)	45	800	106	296	859	283	143	147	196	255	261	34
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%	1%	1%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	pt+ov	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	3 1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	42.7	33.7	33.7	48.1	36.7	36.7	20.4	20.4	31.8	34.2	34.2	48.4
Effective Green, g (s)	42.7	33.7	33.7	48.1	36.7	36.7	20.4	20.4	31.8	34.2	34.2	48.4
Actuated g/C Ratio	0.36	0.28	0.28	0.40	0.31	0.31	0.17	0.17	0.27	0.29	0.29	0.40
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2		5.2	5.2	
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	208	1003	453	239	1093	493	288	301	427	488	500	651
v/s Ratio Prot	0.02	0.22		c0.12	0.24		c0.08	0.08	0.12	0.15	c0.15	0.02
v/s Ratio Perm	0.06		0.07	c0.38		0.18						
v/c Ratio	0.22	0.80	0.23	1.24	0.79	0.57	0.50	0.49	0.46	0.52	0.52	0.05
Uniform Delay, d1	27.3	40.0	33.2	30.0	38.1	35.1	45.1	45.1	36.9	36.0	36.0	21.8
Progression Factor	0.88	0.89	0.66	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	6.3	1.2	137.8	5.7	4.8	0.5	0.5	0.3	4.0	3.9	0.0
Delay (s)	24.0	41.9	23.2	167.8	43.8	39.9	45.6	45.5	37.2	40.0	39.9	21.8
Level of Service	C	D	C	F	D	D	D	D	D	D	D	C
Approach Delay (s)		37.4			64.4			41.7			37.4	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	49.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

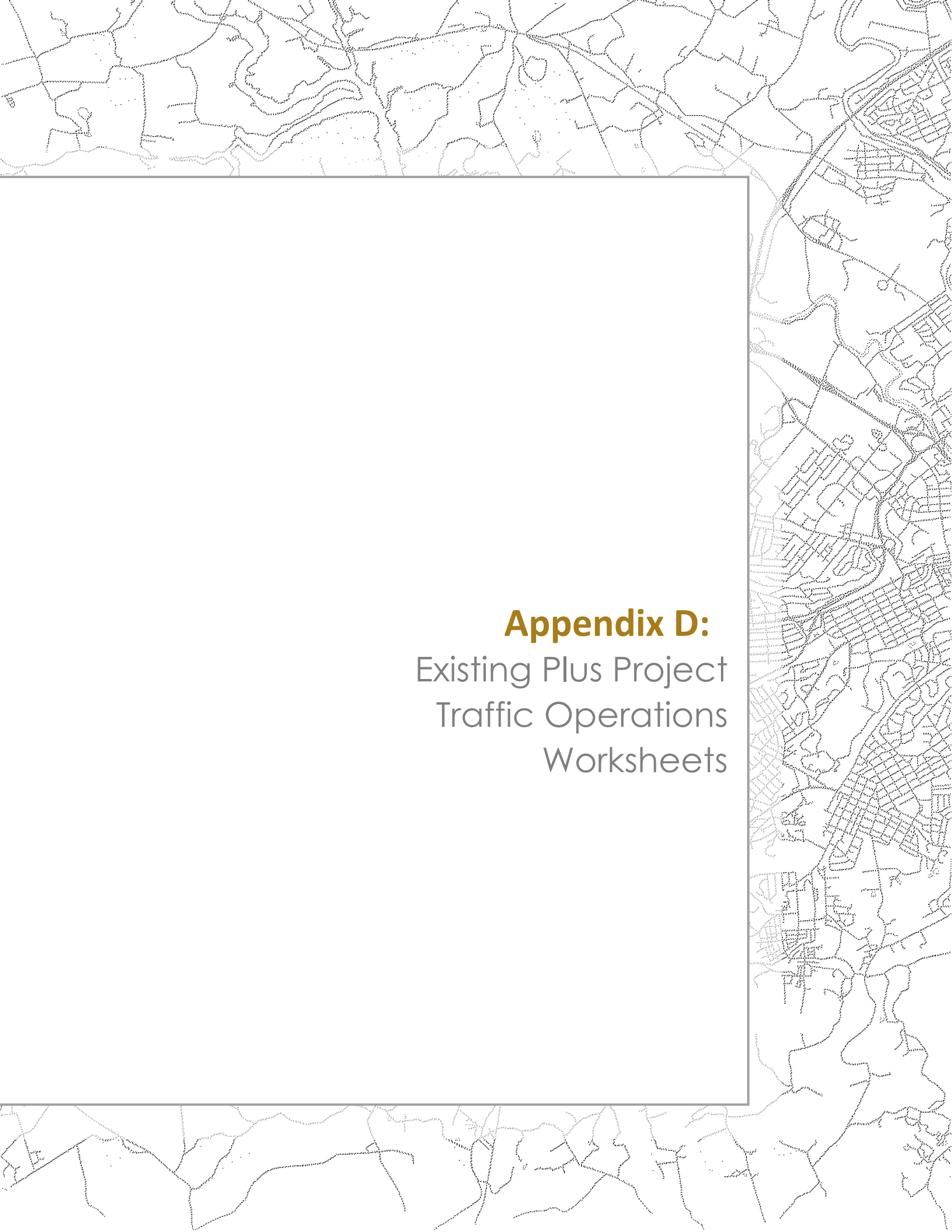


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	45	800	212	296	859	528	143	147	246	255	261	84
v/c Ratio	0.21	0.80	0.38	1.23	0.79	0.72	0.49	0.49	0.52	0.52	0.52	0.12
Control Delay	20.5	42.3	9.5	163.2	44.2	17.8	51.5	51.0	17.8	40.9	40.8	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	42.3	9.5	163.2	44.2	17.8	51.5	51.0	17.8	40.9	40.8	5.4
Queue Length 50th (ft)	17	313	30	~226	319	118	107	110	54	173	177	0
Queue Length 95th (ft)	36	388	108	#407	398	257	174	176	91	270	275	33
Internal Link Dist (ft)		440			2455			2238			214	
Turn Bay Length (ft)	330		150	265		150	105					
Base Capacity (vph)	211	1003	559	240	1093	738	464	484	630	488	499	685
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.80	0.38	1.23	0.79	0.72	0.31	0.30	0.39	0.52	0.52	0.12

Intersection Summary

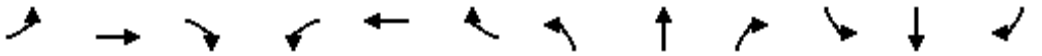
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Appendix D:

Existing Plus Project Traffic Operations Worksheets



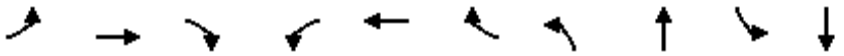
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	651	472	314	688	237	484	1254	181	152	1392	53
Future Volume (veh/h)	70	651	472	314	688	237	484	1254	181	152	1392	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	71	664	482	320	702	242	494	1280	185	155	1420	54
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	117	1035	639	256	1175	694	388	1582	229	369	1729	66
Arrive On Green	0.03	0.29	0.29	0.07	0.33	0.33	0.11	0.35	0.35	0.11	0.34	0.34
Sat Flow, veh/h	3510	3610	1610	3510	3610	1610	3510	4577	662	3510	5128	195
Grp Volume(v), veh/h	71	664	482	320	702	242	494	967	498	155	958	516
Grp Sat Flow(s),veh/h/ln	1755	1805	1610	1755	1805	1610	1755	1729	1781	1755	1729	1865
Q Serve(g_s), s	2.5	20.1	32.2	9.1	20.4	1.8	13.8	31.8	31.8	5.2	31.7	31.7
Cycle Q Clear(g_c), s	2.5	20.1	32.2	9.1	20.4	1.8	13.8	31.8	31.8	5.2	31.7	31.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.37	1.00		0.10
Lane Grp Cap(c), veh/h	117	1035	639	256	1175	694	388	1195	615	369	1166	629
V/C Ratio(X)	0.61	0.64	0.75	1.25	0.60	0.35	1.27	0.81	0.81	0.42	0.82	0.82
Avail Cap(c_a), veh/h	253	1069	654	256	1175	694	388	1195	615	369	1166	629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.6	39.0	32.4	58.0	35.3	11.8	55.6	37.2	37.2	52.3	38.0	38.0
Incr Delay (d2), s/veh	5.0	1.3	4.8	139.1	0.8	0.3	142.3	6.0	11.0	0.8	6.6	11.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	9.0	13.3	9.0	9.1	3.1	13.7	14.0	15.3	2.3	14.1	16.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.6	40.2	37.3	197.1	36.1	12.1	197.9	43.1	48.1	53.1	44.5	49.5
LnGrp LOS	E	D	D	F	D	B	F	D	D	D	D	D
Approach Vol, veh/h		1217			1264			1959			1629	
Approach Delay, s/veh		40.5			72.2			83.4			46.9	
Approach LOS		D			E			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.2	49.0	15.0	41.8	20.0	48.2	10.2	46.7
Change Period (Y+Rc), s	* 6	5.8	5.9	* 6	* 6.2	* 6	6.0	* 6
Max Green Setting (Gmax), s	* 12	43.2	9.1	* 37	* 14	* 41	9.0	* 37
Max Q Clear Time (g_c+I1), s	7.2	33.8	11.1	34.2	15.8	33.7	4.5	22.4
Green Ext Time (p_c), s	0.2	7.7	0.0	1.6	0.0	5.4	0.1	5.0

Intersection Summary	
HCM 6th Ctrl Delay	62.7
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

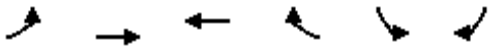


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	71	664	482	320	702	242	494	1465	155	1474
v/c Ratio	0.33	0.72	0.60	1.26	0.69	0.34	0.93	0.74	0.46	0.87
Control Delay	59.9	47.0	21.7	191.0	43.9	8.9	78.1	35.9	58.3	45.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	47.0	21.7	191.0	43.9	8.9	78.1	35.9	58.3	45.6
Queue Length 50th (ft)	28	258	209	~167	273	45	206	364	62	406
Queue Length 95th (ft)	53	308	322	#262	328	84	#370	452	98	471
Internal Link Dist (ft)		2378			480			1614		1054
Turn Bay Length (ft)	155			285			475		200	
Base Capacity (vph)	252	1068	803	254	1081	732	530	1982	336	1704
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.62	0.60	1.26	0.65	0.33	0.93	0.74	0.46	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

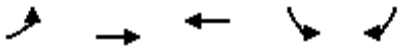
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	251	895	1059	192	186	283
Future Volume (veh/h)	251	895	1059	192	186	283
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1885	1870	1885	1885	1885	1885
Adj Flow Rate, veh/h	259	923	1092	198	192	292
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	2	1	1	1	1
Cap, veh/h	482	2597	2690	487	350	451
Arrive On Green	0.09	0.73	1.00	1.00	0.20	0.20
Sat Flow, veh/h	1795	3647	4550	794	1795	1598
Grp Volume(v), veh/h	259	923	855	435	192	292
Grp Sat Flow(s),veh/h/ln	1795	1777	1716	1742	1795	1598
Q Serve(g_s), s	5.5	11.3	0.0	0.0	11.6	19.3
Cycle Q Clear(g_c), s	5.5	11.3	0.0	0.0	11.6	19.3
Prop In Lane	1.00			0.46	1.00	1.00
Lane Grp Cap(c), veh/h	482	2597	2107	1070	350	451
V/C Ratio(X)	0.54	0.36	0.41	0.41	0.55	0.65
Avail Cap(c_a), veh/h	557	2597	2107	1070	477	564
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.69	0.69	0.78	0.78	1.00	1.00
Uniform Delay (d), s/veh	5.3	5.9	0.0	0.0	43.5	37.8
Incr Delay (d2), s/veh	0.2	0.3	0.5	0.9	0.5	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	3.8	0.1	0.3	5.2	16.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.6	6.1	0.5	0.9	44.0	38.6
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h		1182	1290		484	
Approach Delay, s/veh		6.0	0.6		40.8	
Approach LOS		A	A		D	

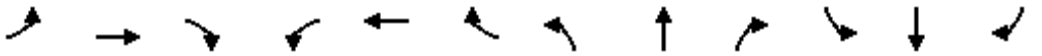
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		92.5		27.5	14.0	78.5
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3
Max Green Setting (Gmax), s		78.7		31.4	15.0	59.7
Max Q Clear Time (g_c+I1), s		14.3		22.3	8.5	3.0
Green Ext Time (p_c), s		17.3		0.7	0.2	25.7

Intersection Summary	
HCM 6th Ctrl Delay	9.3
HCM 6th LOS	A



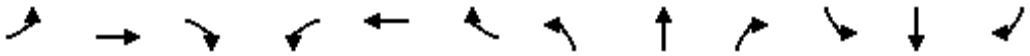
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	259	923	1290	192	292
v/c Ratio	0.65	0.34	0.40	0.68	0.57
Control Delay	14.0	5.2	7.3	59.6	31.7
Queue Delay	0.0	0.3	0.1	0.9	21.0
Total Delay	14.0	5.5	7.4	60.5	52.7
Queue Length 50th (ft)	43	98	78	143	158
Queue Length 95th (ft)	119	165	75	206	202
Internal Link Dist (ft)		480	440	166	
Turn Bay Length (ft)	135				
Base Capacity (vph)	442	2719	3192	475	557
Starvation Cap Reductn	0	1089	512	116	256
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.59	0.57	0.48	0.53	0.97

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	860	249	371	967	321	227	128	304	258	161	65
Future Volume (vph)	15	860	249	371	967	321	227	128	304	258	161	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1805	3574	1615	1770	3539	1615	1681	1709	1509	1715	1783	1615
Flt Permitted	0.29	1.00	1.00	0.11	1.00	1.00	0.95	0.99	1.00	0.95	0.99	1.00
Satd. Flow (perm)	557	3574	1615	205	3539	1615	1681	1709	1509	1715	1783	1615
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	15	869	252	375	977	324	229	129	307	261	163	66
RTOR Reduction (vph)	0	0	182	0	0	99	0	0	232	0	0	48
Lane Group Flow (vph)	15	869	70	375	977	225	176	182	75	209	215	18
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%	2%	5%	7%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	Over	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	38.9	31.7	31.7	65.5	54.3	54.3	18.2	18.2	29.2	20.6	20.6	33.0
Effective Green, g (s)	38.9	31.7	31.7	65.5	54.3	54.3	18.2	18.2	29.2	20.6	20.6	33.0
Actuated g/C Ratio	0.32	0.26	0.26	0.55	0.45	0.45	0.15	0.15	0.24	0.17	0.17	0.28
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	255	944	426	492	1601	730	254	259	367	294	306	444
v/s Ratio Prot	0.00	c0.24		c0.19	0.28		0.10	c0.11	0.05	c0.12	0.12	0.01
v/s Ratio Perm	0.02		0.04	0.23		0.14						
v/c Ratio	0.06	0.92	0.16	0.76	0.61	0.31	0.69	0.70	0.20	0.71	0.70	0.04
Uniform Delay, d1	27.6	42.9	34.0	30.4	24.8	20.9	48.3	48.3	36.1	46.9	46.8	31.9
Progression Factor	0.85	1.02	1.28	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	14.9	0.8	6.9	1.7	1.1	7.9	8.3	0.3	7.9	7.1	0.0
Delay (s)	23.5	58.9	44.4	37.3	26.6	22.0	56.2	56.7	36.4	54.8	53.9	31.9
Level of Service	C	E	D	D	C	C	E	E	D	D	D	C
Approach Delay (s)		55.2			28.1			47.2			51.3	
Approach LOS		E			C			D			D	

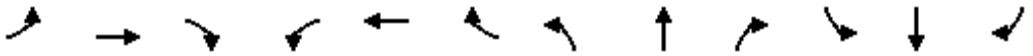
Intersection Summary			
HCM 2000 Control Delay	41.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	15	869	252	375	977	324	176	182	307	209	215	66
v/c Ratio	0.05	0.92	0.41	0.76	0.60	0.39	0.69	0.71	0.51	0.71	0.70	0.13
Control Delay	15.3	59.2	8.1	41.2	29.5	13.2	61.8	62.4	8.6	59.4	58.5	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	59.2	8.1	41.2	29.5	13.2	61.8	62.4	8.6	59.4	58.5	6.8
Queue Length 50th (ft)	5	353	21	213	303	68	137	143	0	162	166	0
Queue Length 95th (ft)	m13	#470	83	#527	#489	176	205	211	90	232	236	30
Internal Link Dist (ft)		440			2455			2238			219	
Turn Bay Length (ft)	330			265		150	105					
Base Capacity (vph)	378	944	608	493	1624	838	389	395	599	375	390	569
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.92	0.41	0.76	0.60	0.39	0.45	0.46	0.51	0.56	0.55	0.12

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



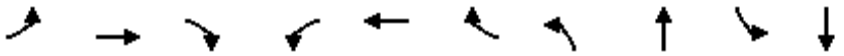
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	679	491	327	717	249	504	1307	187	157	1450	55
Future Volume (veh/h)	73	679	491	327	717	249	504	1307	187	157	1450	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	74	693	501	334	732	254	514	1334	191	160	1480	56
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	461	1046	642	479	1092	653	497	1527	219	507	1664	63
Arrive On Green	0.06	0.29	0.29	0.07	0.31	0.31	0.11	0.34	0.34	0.10	0.33	0.33
Sat Flow, veh/h	3456	3554	1585	3456	3554	1585	3456	4512	646	3456	5049	191
Grp Volume(v), veh/h	74	693	501	334	732	254	514	1006	519	160	998	538
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1777	1585	1728	1702	1754	1728	1702	1836
Q Serve(g_s), s	1.8	21.4	34.4	8.5	22.5	2.6	13.8	34.7	34.7	0.0	34.7	34.8
Cycle Q Clear(g_c), s	1.8	21.4	34.4	8.5	22.5	2.6	13.8	34.7	34.7	0.0	34.7	34.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.37	1.00		0.10
Lane Grp Cap(c), veh/h	461	1046	642	479	1092	653	497	1152	594	507	1122	605
V/C Ratio(X)	0.16	0.66	0.78	0.70	0.67	0.39	1.03	0.87	0.87	0.32	0.89	0.89
Avail Cap(c_a), veh/h	505	1052	644	479	1092	653	497	1176	606	507	1122	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.87	0.87	0.87	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	38.7	32.4	30.6	37.8	11.9	38.5	38.8	38.8	49.6	39.7	39.7
Incr Delay (d2), s/veh	0.2	1.6	6.1	3.8	1.4	0.3	49.7	9.3	16.3	1.6	10.6	17.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	9.4	14.1	3.8	10.0	3.2	9.4	15.5	17.1	2.3	15.7	18.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.7	40.2	38.5	34.4	39.2	12.2	88.2	48.1	55.1	51.2	50.3	57.4
LnGrp LOS	C	D	D	C	D	B	F	D	E	D	D	E
Approach Vol, veh/h		1268			1320			2039			1696	
Approach Delay, s/veh		38.9			32.8			60.0			52.7	
Approach LOS		D			C			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.1	48.1	15.0	42.8	20.0	47.2	13.4	44.4
Change Period (Y+Rc), s	* 6	5.8	5.9	* 6	* 6.2	* 6	6.0	* 6
Max Green Setting (Gmax), s	* 12	43.2	9.1	* 37	* 14	* 41	9.0	* 37
Max Q Clear Time (g_c+I1), s	2.0	36.7	10.5	36.4	15.8	36.8	3.8	24.5
Green Ext Time (p_c), s	0.3	5.6	0.0	0.4	0.0	3.5	0.1	4.8

Intersection Summary	
HCM 6th Ctrl Delay	48.1
HCM 6th LOS	D

Notes

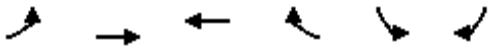
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	74	693	501	334	732	254	514	1525	160	1536
v/c Ratio	0.18	0.74	0.63	0.77	0.70	0.36	0.86	0.80	0.36	0.91
Control Delay	24.2	47.0	23.1	39.3	43.7	9.3	46.6	38.9	43.3	49.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	47.0	23.1	39.3	43.7	9.3	46.6	38.9	43.3	49.5
Queue Length 50th (ft)	18	265	227	91	280	47	160	404	46	435
Queue Length 95th (ft)	33	326	349	122	345	92	#290	482	73	#513
Internal Link Dist (ft)		2378			480			1614		1054
Turn Bay Length (ft)	155			285			475		200	
Base Capacity (vph)	443	1047	780	434	1079	727	600	1896	449	1680
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.66	0.64	0.77	0.68	0.35	0.86	0.80	0.36	0.91

Intersection Summary

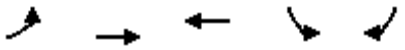
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	311	847	937	229	233	321
Future Volume (veh/h)	311	847	937	229	233	321
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1900	1870	1885	1885	1885	1900
Adj Flow Rate, veh/h	334	911	1008	246	251	345
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	1	1	1	0
Cap, veh/h	483	2504	2403	585	382	487
Arrive On Green	0.09	0.70	1.00	1.00	0.21	0.21
Sat Flow, veh/h	1810	3647	4299	1006	1795	1610
Grp Volume(v), veh/h	334	911	837	417	251	345
Grp Sat Flow(s),veh/h/ln	1810	1777	1716	1704	1795	1610
Q Serve(g_s), s	8.5	12.2	0.0	0.0	15.3	22.8
Cycle Q Clear(g_c), s	8.5	12.2	0.0	0.0	15.3	22.8
Prop In Lane	1.00			0.59	1.00	1.00
Lane Grp Cap(c), veh/h	483	2504	1997	992	382	487
V/C Ratio(X)	0.69	0.36	0.42	0.42	0.66	0.71
Avail Cap(c_a), veh/h	548	2504	1997	992	470	565
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.69	0.69	0.55	0.55	1.00	1.00
Uniform Delay (d), s/veh	7.2	7.0	0.0	0.0	43.2	37.2
Incr Delay (d2), s/veh	1.6	0.3	0.4	0.7	1.3	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	4.2	0.1	0.2	7.0	19.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.8	7.3	0.4	0.7	44.5	39.7
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h		1245	1254		596	
Approach Delay, s/veh		7.7	0.5		41.7	
Approach LOS		A	A		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		89.8		30.2	14.7	75.1
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3
Max Green Setting (Gmax), s		78.7		31.4	15.0	59.7
Max Q Clear Time (g_c+I1), s		14.2		24.8	10.5	2.0
Green Ext Time (p_c), s		17.0		0.7	0.2	24.9

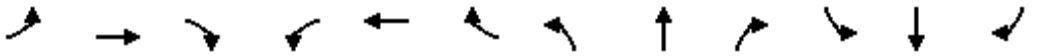
Intersection Summary	
HCM 6th Ctrl Delay	11.3
HCM 6th LOS	B



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	334	911	1254	251	345
v/c Ratio	0.75	0.36	0.47	0.69	0.51
Control Delay	25.7	7.3	1.7	54.7	24.2
Queue Delay	0.0	0.4	0.3	0.0	0.0
Total Delay	25.7	7.7	2.0	54.7	24.2
Queue Length 50th (ft)	99	121	9	185	162
Queue Length 95th (ft)	#255	183	21	261	236
Internal Link Dist (ft)		480	440	186	
Turn Bay Length (ft)	135				
Base Capacity (vph)	443	2525	2665	467	669
Starvation Cap Reductn	0	991	713	0	0
Spillback Cap Reductn	0	126	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.75	0.59	0.64	0.54	0.52

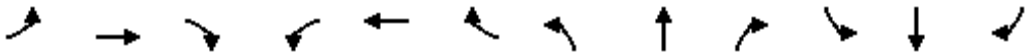
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	870	211	290	927	423	166	115	241	326	102	82
Future Volume (vph)	26	870	211	290	927	423	166	115	241	326	102	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	5.2	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1805	3574	1615	1787	3574	1615	1698	1770	1615	1715	1758	1615
Flt Permitted	0.12	1.00	1.00	0.11	1.00	1.00	0.95	0.99	1.00	0.95	0.97	1.00
Satd. Flow (perm)	226	3574	1615	205	3574	1615	1698	1770	1615	1715	1758	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	27	888	215	296	946	432	169	117	246	333	104	84
RTOR Reduction (vph)	0	0	96	0	0	182	0	0	50	0	0	50
Lane Group Flow (vph)	27	888	119	296	946	250	140	146	196	216	221	34
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%	1%	1%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	pt+ov	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	3 1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	42.7	33.7	33.7	48.1	36.7	36.7	20.4	20.4	31.8	34.2	34.2	48.4
Effective Green, g (s)	42.7	33.7	33.7	48.1	36.7	36.7	20.4	20.4	31.8	34.2	34.2	48.4
Actuated g/C Ratio	0.36	0.28	0.28	0.40	0.31	0.31	0.17	0.17	0.27	0.29	0.29	0.40
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2		5.2	5.2	
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	198	1003	453	232	1093	493	288	300	427	488	501	651
v/s Ratio Prot	0.01	0.25		c0.12	0.26		0.08	c0.08	0.12	c0.13	0.13	0.02
v/s Ratio Perm	0.04		0.07	c0.39		0.15						
v/c Ratio	0.14	0.89	0.26	1.28	0.87	0.51	0.49	0.49	0.46	0.44	0.44	0.05
Uniform Delay, d1	27.7	41.3	33.5	32.1	39.3	34.2	45.1	45.1	36.9	35.1	35.1	21.8
Progression Factor	0.83	0.88	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	10.7	1.3	153.2	9.2	3.7	0.5	0.5	0.3	2.9	2.8	0.0
Delay (s)	23.0	47.2	23.0	185.3	48.5	37.9	45.5	45.5	37.2	38.0	37.9	21.8
Level of Service	C	D	C	F	D	D	D	D	D	D	D	C
Approach Delay (s)		42.0			70.0			41.7			35.3	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	53.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



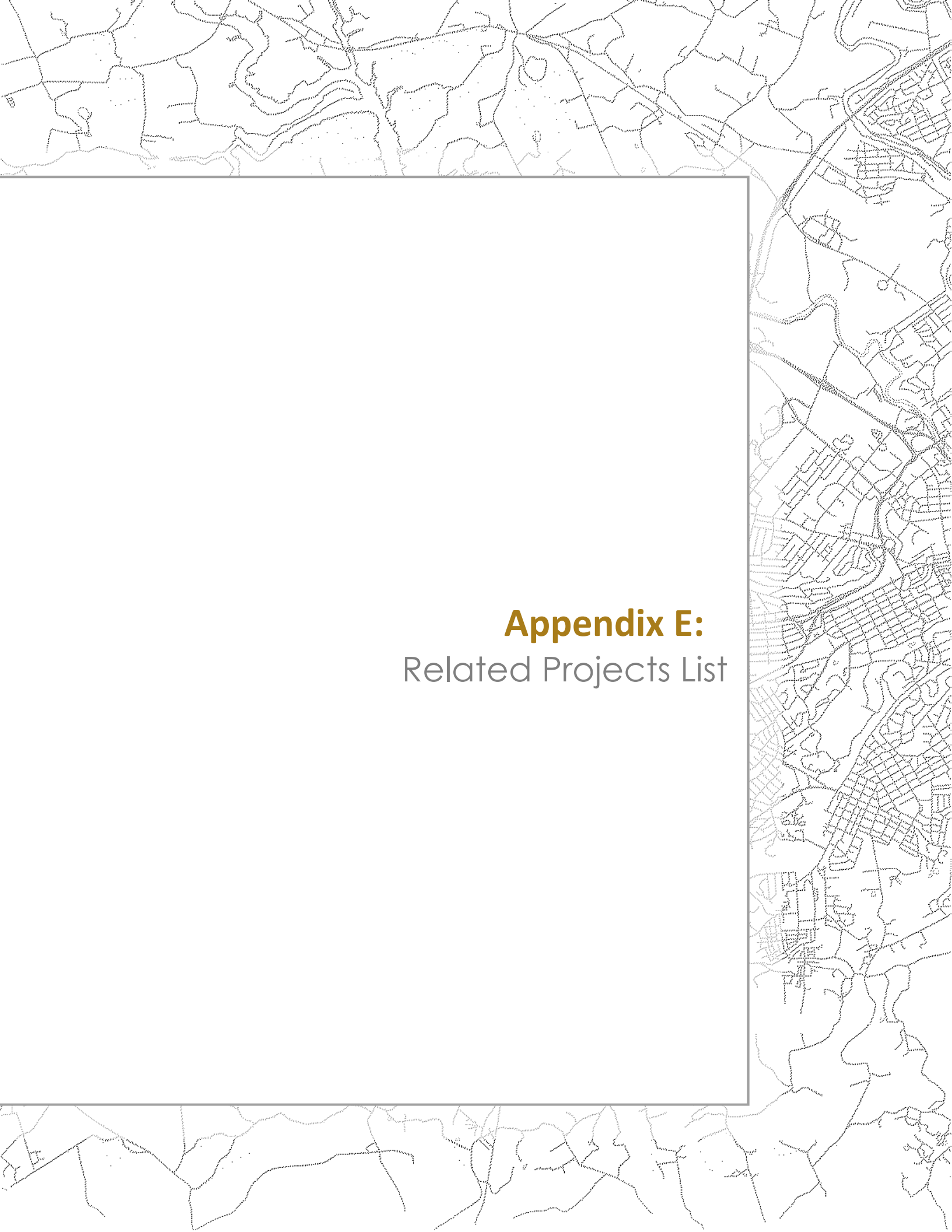
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	888	215	296	946	432	140	146	246	216	221	84
v/c Ratio	0.13	0.89	0.39	1.27	0.87	0.64	0.49	0.49	0.52	0.44	0.44	0.12
Control Delay	18.3	47.7	10.7	179.0	48.9	18.4	51.3	51.1	17.8	38.8	38.6	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	47.7	10.7	179.0	48.9	18.4	51.3	51.1	17.8	38.8	38.6	5.4
Queue Length 50th (ft)	11	358	46	~237	363	110	105	109	54	143	146	0
Queue Length 95th (ft)	m23	#461	78	#418	#454	225	171	177	91	227	232	33
Internal Link Dist (ft)		440			2455			2238			214	
Turn Bay Length (ft)	330		150	265		150	105					
Base Capacity (vph)	201	1003	549	233	1093	675	464	483	630	489	501	686
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.89	0.39	1.27	0.87	0.64	0.30	0.30	0.39	0.44	0.44	0.12

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



Appendix E:
Related Projects List

No.	Project Name	Address	Address_City	Description	City	Est. Date Completion	Completed Date	Project Phase	Date of Entitlement Approval	Planner
1	3-unit Washington Place Condos	12464 Washington Place	12464 Washington Place, Culver City	Three (3) new condominium dwelling units and demolition of single family dewlling, resulting in two (2) net new dwellings	CC	2019	3/26/2019	Completed - Occupied	4/26/2017	Gabriela Silva (310) 253-5736
2	Shell Carwash	11224 Venice Blvd	11224 Venice Blvd, Culver City	New 3,150 sq. ft. commercial building, which includes a 2,285 sq. ft. convenience store and 864 sq. ft. automated car wash facility, on a vacant site	CC	2019	6/5/2019	Completed - Occupied	12/9/2015	Gabriela Silva (310) 253-5736
3	One Culver 8-story Office Building Renovation	10000 Washington Blvd	10000 Washington Blvd, Culver City	Renovation of existing 8-story office building. Convert ground floor office space to retail and restaurant space. Total net increase of 10,614 sq. ft. of floor area, including a net reduction of 1,497 sq. ft. of office, increase of 8,424 sq. ft. of retail/ restaurant and 3,687 sq. ft. of fitness use	CC	2019	2019	Completed	6/22/2016	Planning Division (310) 253-5710
4	Grandview Apartments	4025 Grand View Blvd	4025 Grand View Blvd, Culver City	New 3-story, for lease housing development, consisting of 36 units, with subterranean parking. Previous/Existing use includes 20 mobile home units.	CC	2019	8/5/2019	Completed - Occupied	01/27/2016 (PC) 03/28/2016 (CC)	Jose Mendivil (310) 253-5757
5	Auto Repair Facility	2926 La Cienega Blvd	2926 La Cienega Blvd, Culver City	Four (4) bay auto repair use within existing car rental facility	CC	2019	8/17/2019	Completed - Occupied	8/8/2018	Jose Mendivil (310) 253-5757
6	Arora Condominiums	3837 Bentley Avenue	3837 Bentley Avenue, Culver City	Three (3) new condominium dwelling units, resulting in two (2) net new dwellings	CC	2019	10/3/2019	Completed - Occupied	4/8/2015	Gabriela Silva (310) 253-5736
7	New 4-unit Condo	4034 La Salle Avenue	4034 La Salle Avenue, Culver City	New four (4) unit residential condominium project, resulting in a net increase of three (3) dwelling units	CC	2019	11/19/2019	Completed	9/28/2016	William Kavadas (310) 253-5706
8	Office Use, Tandem Parking	5426 Sepulveda Blvd	5426 Sepulveda Blvd, Culver City	Change of use from auto repair to office use, with addition of tandem parking	CC	2019	12/10/2019	Completed	1/3/2019	William Kavadas (310) 253-5706
9	Retail Building	3030 La Cienega Blvd	3030 La Cienega Blvd, Culver City	Addition of 1,250 sq. ft. of retail floor area to an existing 8,338 sq. ft. retail building, and new tandem parking	CC	2020	1/3/2020	Completed	6/19/2017	Planning Division (310) 253-5710
10	Three unit condominium/ townhome Redevelopment	4241 Duquesne Avenue	4241 Duquesne Avenue, Culver City	New three (3) detached condominium/ townhomes, resulting in two (2) net new residential dwelling units	CC	2020	3/30/2020	Completed - Occupied	03/09/2016 (CC) 05/09/2016 (CC)	Jose Mendivil (310) 253-5757
11	2-unit Condominium	9615 Lucerne Ave	9615 Lucerne Ave, Culver City	Two (2) new residential condominium dwellings, resulting in one (1) net new dwelling unit	CC	2020	6/26/2020	Completed	9/27/2017	William Kavadas (310) 253-5706
12	Globe Affordable Housing Project	4044 - 4068 Globe Avenue	4044 - 4068 Globe Avenue, Culver City	Comprehensive Plan and Planned Development for a total of 10 new, for sale, residential dwelling units on currently vacant land; however, the site was previously developed with 7 single family homes.	CC	2020	7/16/2020	Completed - Occupied	03/23/2016 (PC) 05/05/2016 (CC)	Jose Mendivil (310) 253-5757

13	Baldwin Site	12803 Washington Blvd	12803 Washington Blvd, Culver City	New 4 story mixed use project, cosisting of 37 dwelling units and 7,206 sq. ft. of ground floor retail, on currently vacant site	CC	2020	9/2/2020	Completed	07/27/2016 (PC) 09/12/2016 (CC)	Jose Mendivil (310) 253-5757
14	Office Building	9919 Jefferson Blvd	9919 Jefferson Blvd, Culver City	New 3-story, 62,558 sq. ft., office and research and development (laboratory) building, as well as a five (5) level parking structure containing 398 parking spaces, and associated site improvements	CC	2020	TBD	Construction	10/26/2016	Gabriela Silva (310) 253-5736
15	Parcel B - Culver Steps	9300 Culver Blvd	9300 Culver Blvd, Culver City	118,000 G.S.F. of office, retail, and restaurant space.	CC	2020	TBD	Construction	7/7/2012	Susan Herbertson (310) 253-5755
16	New 3-unit Condo	4234 Sawtelle Blvd	4234 Sawtelle Blvd, Culver City	New three (3) unit residential condominium project, resulting in a net increase of two (2) dwelling units	CC	2020	TBD	Construction	3/8/2017	Planning Division (310) 253-5710
17	4-unit Townhome Development	4118 Wade Street	4118 Wade Street, Culver City	Sudivision of one parcel into four (4) townhome-style dwelling units, resulting in a net increase of one (1) new unit	CC	2020	TBD	Construction	06/12/2017 (PC) 09/11/2017 (CC)	Jose Mendivil (310) 253-5757
18	3906-3910 Sawtelle Blvd	3906-3910 Sawtelle Blvd	3906-3910 Sawtelle Blvd, Culver City	Addition of one (1) new dwelling unit to an existing triplex	CC	2020	TBD	Construction	6/19/2017	Gabriela Silva (310) 253-5736
19	3-unit Bentley Condos	3873 Bentley Avenue	3873 Bentley Avenue, Culver City	Three new residential condominium units, resulting in two (2) net new residential dwelling units	CC	2020	TBD	Construction	2/22/2017	William Kavadas 310-253-5706
20	6-unit Housing Complex	4227 Ince Boulevard	4227 Ince Boulevard, Culver City	Sudivision of one parcel into three (3) land lots with two (2) dwelling units each, for a total of six (6) new units, resulting in five (5) net new units	CC	2020	TBD	Construction	02/22/2017 (PC) 04/11/2017 (CC)	Jose Mendivil (310) 253-5757
21	5-unit Condominiums	3961 Tilden Avenue	3961 Tilden Avenue, Culver City	Construction of five (5) new residential condominium units, resulting in two (2) net new residential dwelling units	CC	2021	TBD	Construction	06/08/2016 (PC) 07/25/2016 (CC)	Gabriela Silva (310) 253-5736
22	Ivy Station Washington/ National TOD Comprehensive Plan	8824 National Blvd Corner of Washington Blvd/ National Blvd (8801, 8809 Washington Blvd)	8824 National Blvd Corner of Washington Blvd/ National Blvd (8801, 8809 Washington Blvd), Culver City	New TOD mixed use project consisting of a 148 room boutique hotel, approximately 57,742 gsf of retail and restaurant uses, 196,333 gsf of office use, and 200 residential units. Parking (1,531 spaces) provided on grade and in 3-level subterranean garage.	CC	2021	TBD	Construction	02/17/2016 (PC) 03/28/2016 (CC)	Susan Herbertson (310) 253-5755
23	Surfas Site	8777 Washington Blvd	8777 Washington Blvd, Culver City	New Office/Retail project, consisting of 128,000 sq. ft. of office, and 4,500 sq. ft. of retail/restaurant, with approximately 345 ground and subterranean (3 level) parking spaces	CC	2021	TBD	Construction	05/10/2017 (PC) 06/26/2017 (CC)	Susan Herbertson (310) 253-5755
24	Motel Mixed-Use	12654 Washington Blvd	12654 Washington Blvd, Culver City	New mixed-use building, including 6,836 sq. ft. ground floor commercial and one (1) 5,863 sq. ft. residential dwelling on top	CC	2021	TBD	Construction	5/29/2020	Jose Mendivil (310) 253-5757

25	New 4-unit Condo	4180 Duquesne Avenue	4180 Duquesne Avenue, Culver City	New four (4) unit residential condominium project, resulting in a net increase of three (3) dwelling units	CC	2021	TBD	Construction	9/28/2016	William Kavadas (310) 253-5706
26	4-unit Condos	3832 Bentley Avenue	3832 Bentley Avenue, Culver City	Four (4) new condominium dwelling units, resulting in three (3) net new dwellings	CC	2021	TBD	Construction	2/22/2017	Gabriela Silva (310) 253-5736
27	Synapse Office and Retail/Restaurant (ICC site)	8888 Washington Blvd	8888 Washington Blvd, Culver City	New 91,952 square foot, four (4) story, 56 ft. high, office and retail/restaurant building, including approximately 5,972 sq. ft. of ground floor space (for retail/restaurant uses) and 56,559 gsf of office space, and subterranean (24 ft. deep) automated parking accommodating up to 210 vertically stacked vehicles (3 stacked levels); the existing auto collision repair center will be demolished.	CC	2021	TBD	Construction	3/22/2017	Gabriela Silva (310) 253-5736
28	Lorcan O'Herlihy Architects	3434 Wesley Street	3434 Wesley Street, Culver City	New TOD Mixed Use project with 15 dwelling units, and 14,237sq. ft. of office/gallery on a vacant lot.	CC	2021	TBD	Construction	10/26/2016 (PC) 02/13/2017 (CC)	William Kavadas (310) 253-5706
29	West Los Angeles Community College Master Plan and EIR (2010)	LA County	LA County, Culver City	Approximately 92,000 sq. ft. of new building construction and renovation. Anticipate future student population of approx. 18,904 students.	LA County	2021	TBD	Construction	EIR Certified 2004	Susan Herbertson (310) 253-5755
30	Culver West Mixed Use Washington/Inglewood	11924 Washington Blvd	11924 Washington Blvd, Culver City	Mixed use project with 3,750 sq. ft. of restaurant, 11,250 sq. ft. of specialty retail, and 98 for lease residential apartment units. Previous use includes approximately 26,445 sq. ft. of commercial uses	CC/LA	2021	TBD	Construction	12/09/2015 (PC) 06/08/2016 (LA City)	Jose Mendivil (310) 253-5757
31	2-unit Condominium	4225 La Salle Ave	4225 La Salle Ave, Culver City	Sudivision of one (1) parcel into two (2) townhome-style dwelling units, resulting in one (1) net new dwelling unit	CC	2021	TBD	Construction	01/09/2019 (PC) 02/11/2019 (CC)	William Kavadas (310) 253-5706
32	Entrada Office Tower	6161 Centinela Blvd (6181 Centinela Blvd)	6161 Centinela Blvd (6181 Centinela Blvd), Culver City	New 281,194 sq. ft. creative office building	CC	2021	TBD	Construction	11/9/2016	Susan Herbertson (310) 253-5755
33	The Brick and the Machine	9735 Washington Boulevard	9735 Washington Boulevard, Culver City	New 3- to 4-story office and retail building consisting of 55,477 sq. ft. of office (upper floors), 12,249 sq. ft. of retail, 2,147 sq. ft. high turnover restaurant, and 2,000 sq. ft. of quality restaurant (on ground floor), and a 3-level, 228 space, subterranean parking garage. The existing vacant 16,200 sq. ft. bank and office building to be demolished.	CC	2021	TBD	Construction	06/27/2019 (PC) 11/12/2018 (CC)	Jose Mendivil (310) 253-5757
34	2-unit Condominium	4116 Higuera St	4116 Higuera St, Culver City	Sudivision of one (1) parcel into two (2) townhome-style dwelling units, resulting in one (1) net new dwelling unit	CC	2021	TBD	Construction	01/23/2019 (PC) 02/25/2019 (CC)	William Kavadas (310) 253-5706

35	Market Hall - Washington Centinela	12403 (12237-12423) Washington Boulevard	12403 (12237-12423) Washington Boulevard, Culver City	New multi-story 21,605 sq. ft. market hall and food retail building with attached parking structure (184 spaces) and a new single story 5,230 sq. ft. retail building with surface parking (20 spaces), on two currently vacant sites	CC	2021	TBD	Construction	10/25/2017 (PC) 01/22/2018 (CC) 02/12/2018 (CC)	Gabriela Silva (310) 253-5736
36	Culver Studios Innovation Plan Comprehensive Plan Amendment No.7	9336 Washington Blvd	9336 Washington Blvd, Culver City	New production office buildings to replace existing outmoded structures, to include 345,007 square feet of net new production space.	CC	2021	TBD	Construction	12/13/2017 (PC) 01/08/2018 (CC) 1/22/2018 (CC)	Susan Herbertson (310) 253-5755
37	Cosmetique	10744-10746 Washington Blvd	10744-10746 Washington Blvd, Culver City	New six (6) vehicle parking stacker for existing 4,700 sq. ft. medical office with additional 1,026 sq. ft.	CC	2021	TBD	Building Permit	12/11/2019	Jose Mendivil (310) 253-5757
38	Helms Homes	3336-3340 Helms Ave	3336-3340 Helms Ave, Culver City	Eight (8) new condominium dwelling units, resulting in six (6) net new dwelling uits	CC	2021	TBD	Building Permit	05/27/2020 (PC) 07/13/2020 (CC)	Gabriela Silva (310) 253-5736
39	6-unit Condominiums	3808 College Ave	3808 College Ave, Culver City	Six (6) new condominium dwelling units, resulting in three (3) net new dwelling units	CC	2021	TBD	Building Permit	07/22/2020 (PC) 09/14/2020 (CC)	Gabriela Silva (310) 253-5736
40	New Assisted Living Facility	11141 Washington Blvd	11141 Washington Blvd, Culver City	New 5-story, 157,500 sq. ft., 117 room assisted living facility, with subterranean parking. Exisitng 24,200 sq. ft. of commercial (retail, office, etc.) uses will be demolished.	CC	2021	TBD	Building Permit	3/11/2020	Gabriela Silva (310) 253-5736
41	Huntley Units	4338-4342 Huntley Ave	4338-4342 Huntley Ave, Culver City	Two (2) new residential dwellings on vacant lots, resulting in two (2) net new dwelling units	CC	2021	TBD	Building Permit	7/14/2020	William Kavadas (310) 253-5706
42	Outdoor dining and tandem parking for VFF Coffee	12680 Washington Blvd	12680 Washington Blvd, Culver City	New coffee shop and expansion of existing preschool use on a site currently developed with church. Project results in net increase of 952 sq. ft. (485 sq. ft. coffee shop outdoor dining, 315 sq. ft. coffee shop indoor use, 152 sq. ft. increase in preschool uses).	CC	2021	TBD	Pre-Building Permit	10/16/2020	Deborah Hong (310) 253-5714
43	Stacked Parking - NFL Building	10950 Washington Blvd	10950 Washington Blvd, Culver City	Addition of 164 parking spaces through installation of two- and three-level parking stackers and surface lot restriping for tandem parking to support exisitng media offices. No additional square feet.	CC	2021	TBD	Pre-Building Permit	4/10/2019 04/10/2020 (ET)	Gabriela Silva (310) 253-5736
44	Pure Carwash	11203 Washington Blvd	11203 Washington Blvd, Culver City	New waterless carwash, replacing auto repair use	CC	2021	TBD	Pre-Application	TBD	William Kavadas (310) 253-5706
45	Sweet Flower (Cannabis Retail)	10000 Culver Blvd	10000 Culver Blvd, Culver City	Conversion of existing 5,982 sq. ft. retail space to storefront cannabis retail store	CC	2021	TBD	Pre-Application	TBD	Jose Mendivil (310) 253-5757
46	Essence (Cannabis Retail)	12450 Washington Blvd	12450 Washington Blvd, Culver City	Conversion of existing 4,950 sq. ft. retail space to storefront cannabis retail space	CC	2021	TBD	Pre-Application	TBD	Jose Mendivil (310) 253-5757

47	Office Building	11259 Washington Blvd APN: 4233-033-021	11259 Washington Blvd APN: 4233-033-021, Culver City	New 3-story, 4,022 sq. ft. office building with at-grade parking, on a currently vacant site	CC	2022	TBD	Construction	12/31/2018 12/31/2019 (ET)	Jose Mendivil (310) 253-5757
48	Lenawee-Culver Place	3814 Lenawee Avenue	3814 Lenawee Avenue, Culver City	New 8 single family dwelling units and 95 unit, 110 bed, assisted living and memory care facility	CC	2022	TBD	Construction	06/08/2016 (PC) 08/08/2016 (CC)	Jose Mendivil (310) 253-5757
49	Willows School	8509 Higuera Street 8476 Warner Drive	8509 Higuera Street 8476 Warner Drive, Culver City	Modification to previously approved CUP to allow a playfield and increase student enrollment by 100, from 475 to 575, consistent with School Master Plan.	CC	2022	TBD	Construction	6/12/2019	Jose Mendivil (310) 253-5757
50	4-unit condominium	3846 Bentley Ave	3846 Bentley Ave, Culver City	Four (4) new condominium dwelling units, resulting in three (3) net new dwelling units	CC	2022	TBD	Building Permit	9/25/2019	William Kavadas (310) 253-5706
51	Warner Parking Structure	8511 Warner Drive	8511 Warner Drive, Culver City	51,520 G.S.F. Retail/Restaurant;784 parking spaces, five levels; site currently developed as a surface parking lot	CC	2022	TBD	Building Permit	08/03/2009 ET - 01/09/2019	Jose Mendivil (310) 253-5757
52	Park Century School	3939 Landmark Street	3939 Landmark Street, Culver City	New athletic field, 2,441 sq. ft. classroom building, and two-level subterranean parking, to allow an increase in student enrollment from 120 to 170 and increase of 20 staff people.	CC	2022	TBD	Building Permit	8/14/2019	Jose Mendivil (310) 253-5757
53	4-unit Sawtelle Condominiums	4041 Sawtelled Blvd	4041 Sawtelled Blvd, Culver City	Four (4) new condominium dwelling units, resulting in three (3) net new dwelling units	CC	2022	TBD	Building Permit	3/11/2020	Gabriela Silva (310) 253-5736
54	Schaefer II	3516 Schaefer St	3516 Schaefer St, Culver City	An approx. 9,338 sq. ft. addition to a creative office building, on a site spanning (3) three parcels currently developed with a 7,500 sf building, resulting in a three-story 16,839 sq. ft. building. On-site parking will include 12 surface stalls and 16 within parking stackers.	CC	2022	TBD	Building Permit	08/28/2019. ET. 08/28/2020	Planning Division (310) 253-5710
55	5-unit Condo	3906 Tilden Ave	3906 Tilden Ave, Culver City	Five (5) new condominium dwelling units, resulting in two (2) net new dwelling units	CC	2022	TBD	Pre-Building Permit	6/10/2020 (PC) 8/10/2020 (CC)	William Kavadas (310) 253-5706
56	Jackson Condos	4051 and 4055 Jackson Ave	4051 and 4055 Jackson Ave, Culver City	New nine (9) unit residential condominium project replacing six (6) existing units, for a net increase of three (3) dwelling units	CC	2022	TBD	Pre-Building Permit	04/10/2019 (PC) 04/10/2020 (ET) TBD (CC)	Jose Mendivil (310) 253-5757
57	5-unit Condominiums	4080 Lafayette Pl	4080 Lafayette Pl, Culver City	Five (5) new condominium dwelling units, resulting in two (2) net new dwelling units	CC	2022	TBD	Pre-Building Permit	08/26/2020 (PC) 10/12/2020 (CC)	Gabriela Silva (310) 253-5736

58	Robertson Mixed Use	3727 Robertson Blvd	3727 Robertson Blvd, Culver City	New 5-story mixed-use development, including approximately 6,800 sq. ft. of commercial (food retail and office) floor area and twelve (12) dwelling units. Demolition of approximately 2,850 sq. ft. 1-story commercial building and surface parking.	CC	2022	TBD	Entitlement	TBD	Gabriela Silva (310) 253-5736
59	Sawtelle 4-unit Condo	4095 Sawtelle Blvd	4095 Sawtelle Blvd, Culver City	Four (4) new residential condominiums, resulting in a net increase of three (3) dwelling units	CC	2022	TBD	Entitlement	TBD	William Kavadas (310) 253-5706
60	Boutique Hotel	11469 Jefferson Blvd	11469 Jefferson Blvd, Culver City	Demolition of 12,958 sq. ft. commercial shopping center. New 5-story hotel of 183 rooms with restaurant and outdoor dining.	CC	2022	TBD	Entitlement	TBD	Jose Mendivil (310) 253-5757
61	4-unit La Salle Condo's	4030 La Salle Ave	4030 La Salle Ave, Culver City	Four (4) new condominium dwelling units, resulting in three (3) net new dwelling units	CC	2022	TBD	Entitlement	TBD	William Kavadas (310) 253-5706
62	4-unit Madison Condo's	4044 Madison Ave	4044 Madison Ave, Culver City	Three (3) new townhome dwelling units, resulting in two (2) net new dwelling units	CC	2022	TBD	Entitlement	TBD	William Kavadas (310) 253-5706
63	Volvo Auto Repair	11039 Washington Blvd	11039 Washington Blvd, Culver City	Expansion of existing 2-bay auto repair facility, to add three (3) new auto bays	CC	2022	TBD	Pre-Application	TBD	Jose Mendivil (310) 253-5757
64	Automated Parking	5977 Washington Blvd	5977 Washington Blvd, Culver City	New 48 space stacked parking facility on a property with a vacant commercial building, to serve as off-site parking for commercial building at 5965 Washington Blvd.	CC	2022	TBD	Pre-Application	TBD	Jose Mendivil (310) 253-5757
68	4-unit Condo	3826 Girard Ave	3826 Girard Ave, Culver City	Four (4) new residential condominiums, resulting in a net increase of three (3) dwelling units	CC	2022	TBD	Pre-Application	TBD	William Kavadas (310) 253-5706
66	East Condos	4233 East Blvd	4233 East Blvd, Culver City	Four (4) new residential condominiums, resulting in a net increase of three (3) dwelling units	CC	2022	TBD	Pre-Application	TBD	William Kavadas (310) 253-5706
67	TGS CC Ventures (Cannabis Retail)	3800 Sepulveda Blvd	3800 Sepulveda Blvd, Culver City	New 5,280 sq. ft. storefront cannabis retail space on a vacant lot.	CC	2022	TBD	Pre-Application	TBD	Jose Mendivil (310) 253-5757
68	Vista Del Sol - Assisted Living Expansion	11620 Washington Blvd	11620 Washington Blvd, Culver City	New 5-story, 72 bed, 33,747 sq. ft. expansion to exisitng assisted living facility.	CC	2022	TBD	Pre-Application	TBD	Jose Mendivil (310) 253-5757
69	Costco Fueling Station	13463 Washington Blvd	13463 Washington Blvd, Culver City	Demolition of two (2) commercial buildings, totaling ±8,520 sq. ft., and 16 exisitng fueling pumps; and construction of 24 new fueling pumps	CC	2022	TBD	Pre-Application	TBD	Gabriela Silva (310) 253-5736
70	Hillside Memorial Cemetary	6001 Centinela	6001 Centinela, Culver City	Conversion of existing maintenance yard to additional burial plots	CC	2022	TBD	Pre-Application	TBD	William Kavadas (310)253-5706

71	Southern California Hospital ER Remodel	3828 Delmas Terrace	3828 Delmas Terrace, Culver City	Remodel of existing E.R. department resulting in 5,500 square foot demolition of exisitng square footage to accomdate new short term parking/drop off area	CC	2022	TBD	Pre-Application	TBD	William Kavadas (310)253-5706
72	New Hotel	3868 Sepulveda Blvd	3868 Sepulveda Blvd, Culver City	New 5-story, 94 room hotel with 1,375 sq. ft. retail space. Existing hotel totaling 38 rooms will be demolished.	CC	2022	TBD	Pre-Application	TBD	Jose Mendivil (310) 253-5757
73	New office and retail building with subterranean automated parking.	3951 Higuera St	3951 Higuera St, Culver City	Demolition of an existing 4,480 square foot co-working office facility and construction of new 36,614 sq.ft. office and retail building with subterranean automated parking.	CC	2023	TBD	Pre-Application	TBD	Jose Mendivil (310) 253-5757
74	New office building with surface and subterranean parking.	5863 Washington Blvd	5863 Washington Blvd, Culver City	New 17,500 sq. ft. creative office development	CC	2023	TBD	Pre-Application	TBD	Deborah Hong (310) 253-5714
75		3817 Watseka Ave	3817 Watseka Ave, Culver City	New 4-story 149,439 square foot office building replacing surface parking and 2 existing office buildings totaling 7,370 square feet	CC	2023	TBD	Pre-Application	TBD	William Kavadas (310) 253-5706
76	Triangle Site	11111 Jefferson Blvd	11111 Jefferson Blvd, Culver City	New 5-story mixed-use development, with 55,400 sq. ft. ground floor commercial, 51,300 sq. ft. office space, and 252 dwelling units	CC	2023	TBD	Pre-Application	TBD	Planning Division (310) 253-5710
77	99¢ site	12727 Washington Blvd	12727 Washington Blvd, Culver City	New 6-story mixed-use development on a split-jurisdiction site, including 117 units (CC: 82 units; LA: 35 units), 17,880 sq. ft. of ground floor retail (CC), 258 parking spaces (CC: 72 retail stalls and 130 residential stalls; LA: 46 residential stalls) at grade and in a 2-level subterranean garage. Demolition of existing 13,000 sq. ft. commercial building.	CC/ LA	2023	TBD	Pre-Application	TBD	Michael Allen (310) 253-5710
78	Jazz Bakery	9814 Washington Blvd	9814 Washington Blvd, Culver City	New 200 seat Performace Theatre with a museum and bakery/café, 2-stories & estimated 7,500 sqaure feet, on a property developed with a vacant residential structure	CC	2023	TBD	Pre-Application	TBD	Planning Division (310) 253-5710
79	Bristol Parkway Mixed Use	6221-6229 Bristol Parkway	6221-6229 Bristol Parkway, Culver City	A new mixed-use development on a 6.26 acre site in the Fox Hills area, consisting of 20,767 sq. ft. of commercial/retai uses, 712 residential dwelling units (including 50 live-work units), and approximately 850 subterranean parking spaces. Existing shopping center (approximately 60,000 sq. ft. of commercial floor area) to be demolished.	CC	2023	TBD	Pre-Application	TBD	Michael Allen (310) 253-5710

80	ECF Site	8700, 8710, 8740, and 8750 Washington Boulevard	8700, 8710, 8740, and 8750 Washington Boulevard, Culver City	Preliminary Concept - Mixed Use TOD with approximately 199 residential units and 40,00 sq. ft. of commercial space (17,250 sq. ft. of live/work space, 5,000 sq. ft. of restaurant, and 17,750 sq. ft. of retail), on a 3.06 to possibly 3.53 acre site, currently developed with multiple uses	CC	2022	TBD	Pre-Application	TBD	Susan Herbertson (310) 253-5755
81	Federal Express Site	3710 and 3750 S. Robertson Boulevard	3710 and 3750 S. Robertson Boulevard, Culver City	Preliminary Concept - Mixed Use TOD with approximately 141 residential units and 64,200 sq. ft. of creative office and 30,042 sq. ft. commercial (retail/restaurant/live-work space), on a 2.2 acre site.	CC	2023	TBD	Pre-PPR	TBD	Susan Herbertson (310) 253-5755

CLATS
Case Logging and Tracking System

RELATED PROJECTS

Centroid Info:
PROJ ID: 50962
Address: 13463 WASHINGTON BLVD
CULVER CITY, CA 90292
Lat/Long: 33.9926, -118.447

Buffer Radius: 1.50 mile
Search

Include NULL "Trip info":
Include NULL "FirstStudySubmittalDate" (latest)
Include "Inactive" projects:
Include "Do not show in Related Project":
Net_AM_Trips - Select -
Net_PM_Trips - Select -
Net_Daily_Trips - Select -

Column

Record Count: 26 | Record Per Page: All Records

Results generated since: (1/31/2021 4:09:23 AM)

Proj ID	Office	Area	CD	Year	Project Title	Project Desc	Address	First Study Submittal Date	Inactive	Do not show in Related Project	Distance (mile)	Trip Info

12530 | Westchester | CTC | 11 | 2005 | Restaurant, High Turnover | Proposed House Pies Sit-Down Restaurant land use (3,895 sq. ft.) | 1020 E VENICE BLVD | 04/10/2013 | ☐ | ☐ | 0.3

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Other	S.F. Gross Area	3895	33	33	396	18	15	20	13
			33	**33**	**396**		**18**	**15**	**20**

13667 | Westchester | CTC | 11 | 2011 | New 77 Unit Apartment Project | New 77-Unit Apartment Project | 4100 S DEL REY AV | 05/06/2011 | ☐ | ☐ | 0.3

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartments	Total Units	77	39	54	512	8	31	35	19
			39	**54**	**512**		**8**	**31**	**35**

13738 | Westchester | CTC | 11 | 2011 | MDR-LCP Amendment | MDR-LCP Amendment | 1 MARINA EXPRESSWAY | 02/16/2011 | ☐ | ☐ | 0.9

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Other	Total Units	2044		666					
Other	Total Units	129		22					
Other	Other	505		178					
Retail	S.F. Gross Area	273741		1215					
Other	Seats	1323		331					
Office	S.F. Gross Area	26000		57					
Other	S.F. Gross Area	3000		14					
Other	Other	375		18					
Other	Other		1707	2		622	1085	1378	1125
			1707	**2503**	**0**		**622**	**1085**	**1378**

40436 | Westchester | CTC | 11 | 2012 | New Apt & Office Bldg VTT-72107 | New 4-Story,67-Unit Apt & 3,211 SF Office Bldg over 2-level pkg garage | 4140 S GLENCOE AV | 08/01/2012 | ☐ | ☐ | 0.4

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartments	Total Units	67	34	47	446	7	27	31	16
Office	S.F. Gross Area	3211	5	9	35	4	1	2	7
			39	**56**	**481**		**11**	**28**	**33**

40714 | Westchester | CTC | 11 | 2012 | Mixed-Use, Hotel, Retail & Restaurant Uses | New 92-Guest Room Hotel, 3,000 SF Retail & 2,072 SF Restaurant Use. | 1027 S ABBOT KINNEY BLVD | 12/17/2012 | ☐ | ☐ | 1.4

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Rooms	85	25	42	654	16	9	25	17
			25	**42**	**654**		**16**	**9**	**25**

41239 | Westchester | CTC | 11 | 2013 | Mixed-Use: Residential & Office | Proposed Mixed-Use:136 Condominium Units & 20,000 SF Commercial Office | 4210 S DEL REY AV | 11/05/2014 | ☐ | ☐ | 0.4

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Total Units	136	71	85	627	24	47	48	37
			71	**85**	**627**		**24**	**47**	**48**

41687 | Westchester | CTC | 11 | 2013 | Mixed-Use Project | Mixed-Use Bldg: 26 Condo Units, 1,184 SF Retail & 4,567 SF Restaurant | 1414 S MAIN ST | 12/15/2013 | ☐ | ☐ | 1.5

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Total Units	26	9	40	421	3	6	29	11
			9	**40**	**421**		**3**	**6**	**29**

42024 | Westchester | CTC | 11 | 2014 | Condominium & Commercial Office Building | 67-DU Condo & 7,525 SF Commercial Office Bldg providing 141 pkg spaces | 4091 S REDWOOD AV | 04/25/2014 | ☐ | ☐ | 0.3

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Condominiums	Total Units	67	25	51	391	4	21	29	22
Apartments		77			39				

	Total Units								
			25	51	430		4	21	29

42588	Westchester	CTC	11	2014	Mixed-Use	168-Unit Apt. & 100KSF Mini-Warehouse (Opt 1) or 33KSF Office (Opt 2)	4040 S DEL REY AV	07/20/2015	☐	☐	0.2

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Total Units	195	41	59	908	-24	65	72	-13
Mixed Use	Total Units	235	47	62	931	-26	74	77	-15
			88	121	1839		-50	139	149

42637	Westchester	CTC	11	2014	Market Deli with Take-Out and Sit-Down Restaurant	Adding Sit-Down Restaurant to existing Market Deli with Take-Out	600 E MILDRED AV	06/25/2019	☐	☐	1.1

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	S.F. Gross Area	1134	5	3	26	3	2	2	1
			5	3	26		3	2	2

43597	Westchester	CTC	11	2015	Teledyne Office Project	159,000 sf creative office	12964 W Panama Street	02/02/2016	☐	☐	1.3

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Office	S.F. Gross Area	159000	81	91	777	72	9	20	71
			81	91	777		72	9	20

43730	Westchester	CTC	11	2015	New 3-Story Manufacturing & Retail	Construct new 3-story 25,150SF Manufacturing & 5,028SF Retail	595 E VENICE BLVD	02/08/2016	☐	☐	0.8

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Office	S.F. Gross Area	25150	63	80	460	55	8	14	66
Retail	S.F. Gross Area	5028	6	25	201	4	2	11	14
Other	S.F. Gross Area	5930	-13	-20	-105	-9	-4	-10	-10
			56	85	556		50	6	15

44394	Westchester	CTC	11	2016	Mixed-Use Project (Inclave)	New 35206 SF Creative Office; 1500 SF Retail Space; & 49 Res Apt Unit	4065 S GLENCOE AVE	08/16/2016	☐	☐	0.2

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Office	S.F. Gross Area	35206	55	99	388	48	7	17	82
Retail	S.F. Gross Area	1500	2	8	66	1	1	4	4
Apartments	Total Units	49	25	34	326	5	20	22	12
Other	Svc Bays/Lanes	14	-21	-84	-840	-14	-7	-42	-42
Industrial	S.F. Gross Area	5050	-5	-4	-35	-4	-1	0	-4
Mixed Use	Other		49	48	-96	31	18	1	47
			105	101	-191		67	38	2

44456	Westchester	CTC	11	2016	COU Warehouse to Office	COU Warehouse (24,051 SF) to Office, with 7,926 SF Office Addition	4721 S ALLA RD	08/18/2016	☐	☐	1.1

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Office	S.F. Gross Area	118352	43	57	267	38	5	9	48
			43	57	267		38	5	9

44625	Westchester	CTC	11	2016	Apartment Building, 65 Units	new 6-Story, 65-Unit Residential Apartment Building (Stella, Phase 2)	13488 W MAXELLA AV	10/13/2016	☐	☐	0.6

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartments	Total Units	65	29	40	362	6	23	26	14
			29	40	362		6	23	26

44829	Westchester	CTC	11	2016	Mixed-Use, Residential, Restaurant & Commercial	new Mixed-Use: 658-Unit Apt, 13.65 ksf Restaurant &13.65 ksf Commercia	13400 W Maxella Ave	04/28/2017	☐	☐	0.5

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Total Units	658	296	83	2079	60	236	115	-32
			296	83	2079		60	236	115

44850	Westchester	CTC	11	2016	Charter School	Relocation of the Ocean Charter School w/ 532-student enrollment (K-8)	12870 W PANAMA ST	11/30/2016	☐	☐	1.3

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
School	Enrollment	532	479	168	1320	263	216	79	89
			479	168	1320		263	216	79

46481	Westchester	WLA	11	2017	Mixed Use - Apts + Retail	New mixed use - 32 Apts + 3KSF Retail replaces 7.6KSF Furniture Store	12331 W PALMS BLVD	01/29/2018	☐	☐	1.3

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Other		18	28	303	4	14	16	12
			18	28	303		4	14	16

46715	Westchester	CTC	11	2018	Mixed-Use: Residential & Commercial	Mixed-Use Bldg.: 77-DU Apt., 4.040 ksf Restaurant & 1.905 ksf Retail	2454 S LINCOLN BLVD	05/04/2018	☐	☐	0.2

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Mixed Use	Total Units	77	42	54	527	15	27	40	14
			42	54	527		15	27	40

46938	Westchester	CTC	11	2018	Apartments	new 5-story, 56-Unit Apartment Bldg. over 2-Level basement pkg garage	1015 E VENICE BLVD	05/02/2018	☐	☐	0.3

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartments	Total Units	56	27	37	343	6	21	24	13
			27	37	343		6	21	24

46994	Westchester	CTC	11	2018	Thatcher Yard Residential	98-DU: Affordable Senior(50), Family(23) & Perm Supportive(25) Housing	3233 S THATCHER AV	05/23/2018	☐	☐

0.5

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartments	Total Units	98	21	19	212	8	13	10	9
			21	**19**	**212**		**8**	**13**	**10**

47496	Westchester	CTC	11	2018	Mixed-Use: Affordable Housing & Commercial	140-DU Affordable Apts, 1 ksf Cafe, 4065 sf Retail & 3155 sf Art space	204 E North Venice Blvd	11/13/2019	☐	☐

1.4

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartments	Total Units	140	88	124	911	39	49	63	61
			88	**124**	**911**		**39**	**49**	**63**

48252	Westchester	CTC	11	2019	Change of Use: Office to Medical Office	COU: 40ksf Office to Med Office w-in 130,312 sf Office/Med Office bldg	13160 W MINDANAO WY	08/15/2019	☐	☐

0.8

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Office	S.F. Gross Area	130312	64	44	1003	46	18	26	18
			64	**44**	**1003**		**46**	**18**	**26**

48488	Westchester	CTC	11	2019	Office & Retail	new 121,822 sf Commercial Office & 1,500 sf Retail Complex(4 bldgs.)	4204 S GLENCOE AV	10/23/2019	☐	☐

0.4

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Office	S.F. Gross Area	121822	79	155	816	65	14	24	131
			79	**155**	**816**		**65**	**14**	**24**

48532	Westchester	CTC	11	2019	New 4-Story 77 Apts	Demolish 7 Apts & 1 Duplex, Construct 77 Apts with underground parking	1600 E Venice Bl	09/16/2019	☐	☐

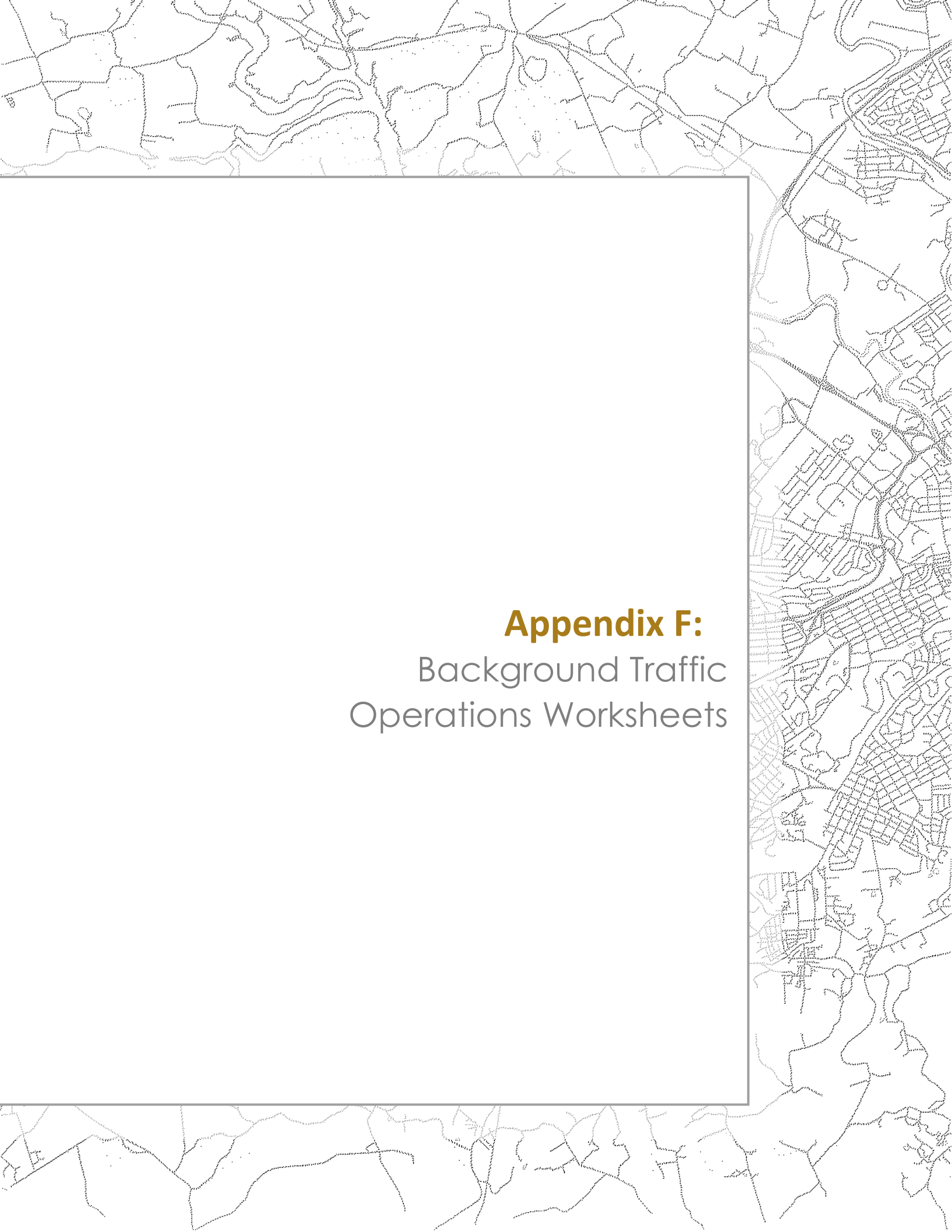
0.3

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartments	Total Units	77	25	27	341	7	18	16	11
			25	**27**	**341**		**7**	**18**	**16**

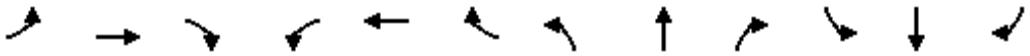
49101	Westchester	CTC	11	2019	Apartments & Restaurant	new MU: 6-Story, 50-Unit Residential Apt. & 4,458 sf Restaurant bldg.	1808 S LINCOLN BLVD	12/05/2019	☐	☐

0.6

Land_Use	Unit_ID	size	Net_AM_Trips	Net_PM_Trips	Net_Daily_Trips	NetAMIn	NetAMOut	NetPMIn	NetPMOut
Apartments	Total Units	50	45	44	557	20	25	28	16
			45	**44**	**557**		**20**	**25**	**28**



Appendix F:
Background Traffic Operations Worksheets



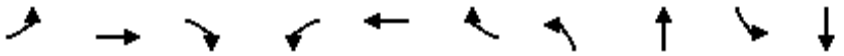
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	701	476	345	736	331	489	1320	249	236	1453	54
Future Volume (veh/h)	71	701	476	345	736	331	489	1320	249	236	1453	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	72	715	486	352	751	338	499	1347	254	241	1483	55
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	118	1041	642	256	1179	693	388	1515	285	364	1723	64
Arrive On Green	0.03	0.29	0.29	0.07	0.33	0.33	0.11	0.35	0.35	0.10	0.34	0.34
Sat Flow, veh/h	3510	3610	1610	3510	3610	1610	3510	4383	826	3510	5133	190
Grp Volume(v), veh/h	72	715	486	352	751	338	499	1062	539	241	999	539
Grp Sat Flow(s),veh/h/ln	1755	1805	1610	1755	1805	1610	1755	1729	1751	1755	1729	1866
Q Serve(g_s), s	2.5	22.0	32.5	9.1	22.1	2.8	13.8	36.3	36.3	8.3	33.7	33.7
Cycle Q Clear(g_c), s	2.5	22.0	32.5	9.1	22.1	2.8	13.8	36.3	36.3	8.3	33.7	33.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.47	1.00		0.10
Lane Grp Cap(c), veh/h	118	1041	642	256	1179	693	388	1195	605	364	1161	626
V/C Ratio(X)	0.61	0.69	0.76	1.38	0.64	0.49	1.29	0.89	0.89	0.66	0.86	0.86
Avail Cap(c_a), veh/h	253	1069	654	256	1179	693	388	1195	605	364	1161	626
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.6	39.5	32.4	58.0	35.8	12.7	55.6	38.6	38.6	53.9	38.8	38.8
Incr Delay (d2), s/veh	5.0	1.8	5.0	190.6	1.0	0.5	147.6	10.0	17.7	4.4	8.4	14.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	9.9	13.4	10.8	9.9	4.7	13.9	16.5	18.0	3.8	15.2	17.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.6	41.3	37.3	248.6	36.8	13.2	203.2	48.7	56.3	58.4	47.2	53.2
LnGrp LOS	E	D	D	F	D	B	F	D	E	E	D	D
Approach Vol, veh/h		1273			1441			2100			1779	
Approach Delay, s/veh		41.1			83.0			87.4			50.6	
Approach LOS		D			F			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	49.0	15.0	42.0	20.0	48.0	10.2	46.8
Change Period (Y+Rc), s	* 6	5.8	5.9	* 6	* 6.2	* 6	6.0	* 6
Max Green Setting (Gmax), s	* 12	43.2	9.1	* 37	* 14	* 41	9.0	* 37
Max Q Clear Time (g_c+I1), s	10.3	38.3	11.1	34.5	15.8	35.7	4.5	24.1
Green Ext Time (p_c), s	0.1	4.4	0.0	1.6	0.0	4.2	0.1	5.3

Intersection Summary	
HCM 6th Ctrl Delay	67.5
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

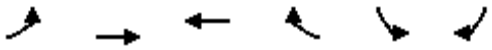


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	72	715	486	352	751	338	499	1601	241	1538
v/c Ratio	0.33	0.75	0.60	1.39	0.71	0.47	1.01	0.83	0.72	0.90
Control Delay	59.9	47.1	21.8	238.3	43.8	13.5	96.1	39.8	67.6	48.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	47.1	21.8	238.3	43.8	13.5	96.1	39.8	67.6	48.3
Queue Length 50th (ft)	29	274	212	~194	288	86	~237	427	98	432
Queue Length 95th (ft)	54	336	327	#293	356	143	#375	509	#146	498
Internal Link Dist (ft)		2378			480			1614		1054
Turn Bay Length (ft)	155			285			475		200	
Base Capacity (vph)	252	1068	797	254	1094	737	494	1927	336	1704
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.67	0.61	1.39	0.69	0.46	1.01	0.83	0.72	0.90

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

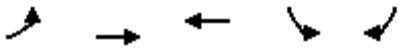
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	231	986	1284	89	120	203
Future Volume (veh/h)	231	986	1284	89	120	203
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1885	1870	1885	1885	1885	1885
Adj Flow Rate, veh/h	238	1016	1324	92	124	209
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	2	1	1	1	1
Cap, veh/h	470	2763	3247	226	266	377
Arrive On Green	0.09	0.78	1.00	1.00	0.15	0.15
Sat Flow, veh/h	1795	3647	5083	341	1795	1598
Grp Volume(v), veh/h	238	1016	925	491	124	209
Grp Sat Flow(s),veh/h/ln	1795	1777	1716	1824	1795	1598
Q Serve(g_s), s	4.2	10.7	0.0	0.0	7.6	13.8
Cycle Q Clear(g_c), s	4.2	10.7	0.0	0.0	7.6	13.8
Prop In Lane	1.00			0.19	1.00	1.00
Lane Grp Cap(c), veh/h	470	2763	2268	1205	266	377
V/C Ratio(X)	0.51	0.37	0.41	0.41	0.47	0.55
Avail Cap(c_a), veh/h	545	2763	2268	1205	477	564
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.59	0.59	0.73	0.73	1.00	1.00
Uniform Delay (d), s/veh	3.7	4.2	0.0	0.0	46.8	40.3
Incr Delay (d2), s/veh	0.2	0.2	0.4	0.7	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	3.1	0.1	0.3	3.5	12.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	3.8	4.4	0.4	0.7	47.2	40.8
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h		1254	1416		333	
Approach Delay, s/veh		4.3	0.5		43.2	
Approach LOS		A	A		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		98.1		21.9	14.0	84.1
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3
Max Green Setting (Gmax), s		78.7		31.4	15.0	59.7
Max Q Clear Time (g_c+I1), s		13.7		16.8	7.2	3.0
Green Ext Time (p_c), s		20.2		0.5	0.2	29.1

Intersection Summary	
HCM 6th Ctrl Delay	6.8
HCM 6th LOS	A

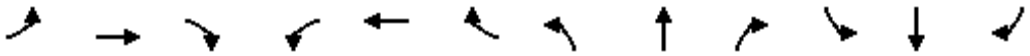


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	238	1016	1416	124	209
v/c Ratio	0.62	0.36	0.42	0.54	0.47
Control Delay	13.6	4.2	8.1	57.0	33.6
Queue Delay	0.0	0.4	0.1	0.2	5.9
Total Delay	13.6	4.5	8.2	57.2	39.5
Queue Length 50th (ft)	32	95	113	91	119
Queue Length 95th (ft)	107	154	97	147	165
Internal Link Dist (ft)		480	440	166	
Turn Bay Length (ft)	135				
Base Capacity (vph)	424	2823	3372	475	497
Starvation Cap Reductn	0	1126	612	70	229
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.56	0.60	0.51	0.31	0.78

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	758	246	447	948	414	311	134	414	328	168	66
Future Volume (vph)	34	758	246	447	948	414	311	134	414	328	168	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1805	3574	1615	1770	3539	1615	1681	1704	1509	1715	1775	1615
Flt Permitted	0.26	1.00	1.00	0.11	1.00	1.00	0.95	0.98	1.00	0.95	0.98	1.00
Satd. Flow (perm)	485	3574	1615	213	3539	1615	1681	1704	1509	1715	1775	1615
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	34	766	248	452	958	418	314	135	418	331	170	67
RTOR Reduction (vph)	0	0	182	0	0	140	0	0	325	0	0	48
Lane Group Flow (vph)	34	766	66	452	958	278	220	229	93	245	256	19
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%	2%	5%	7%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	Over	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	38.9	31.7	31.7	60.5	49.3	49.3	21.5	21.5	24.2	22.3	22.3	34.7
Effective Green, g (s)	38.9	31.7	31.7	60.5	49.3	49.3	21.5	21.5	24.2	22.3	22.3	34.7
Actuated g/C Ratio	0.32	0.26	0.26	0.50	0.41	0.41	0.18	0.18	0.20	0.19	0.19	0.29
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	236	944	426	421	1453	663	301	305	304	318	329	467
v/s Ratio Prot	0.01	0.21		c0.22	0.27		0.13	c0.13	0.06	0.14	c0.14	0.01
v/s Ratio Perm	0.04		0.04	c0.32		0.17						
v/c Ratio	0.14	0.81	0.15	1.07	0.66	0.42	0.73	0.75	0.31	0.77	0.78	0.04
Uniform Delay, d1	28.0	41.4	33.9	36.0	28.6	25.2	46.5	46.7	40.8	46.4	46.5	30.7
Progression Factor	0.87	1.00	1.40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	7.2	0.7	64.9	2.4	2.0	8.8	10.0	0.6	11.0	11.0	0.0
Delay (s)	24.7	48.4	48.0	101.0	30.9	27.1	55.3	56.7	41.3	57.4	57.5	30.7
Level of Service	C	D	D	F	C	C	E	E	D	E	E	C
Approach Delay (s)		47.5			47.4			48.9			54.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	48.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

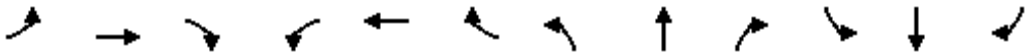


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	34	766	248	452	958	418	220	229	418	245	256	67
v/c Ratio	0.13	0.81	0.41	1.07	0.65	0.51	0.73	0.75	0.66	0.77	0.78	0.13
Control Delay	17.5	48.8	8.0	97.4	33.4	15.5	60.4	61.7	11.3	62.4	62.5	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.5	48.8	8.0	97.4	33.4	15.5	60.4	61.7	11.3	62.4	62.5	7.1
Queue Length 50th (ft)	15	299	20	~354	327	102	169	177	7	189	198	0
Queue Length 95th (ft)	26	374	79	#664	#453	228	248	256	#123	280	291	32
Internal Link Dist (ft)		440			2455			2238			219	
Turn Bay Length (ft)	330			265		150	105					
Base Capacity (vph)	358	944	609	423	1478	812	389	394	629	371	385	593
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.81	0.41	1.07	0.65	0.51	0.57	0.58	0.66	0.66	0.66	0.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



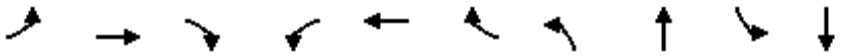
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	728	496	351	766	334	509	1356	253	242	1518	56
Future Volume (veh/h)	75	728	496	351	766	334	509	1356	253	242	1518	56
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	77	743	506	358	782	341	519	1384	258	247	1549	57
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	431	1050	643	461	1094	644	497	1487	277	465	1660	61
Arrive On Green	0.06	0.30	0.30	0.07	0.31	0.31	0.11	0.34	0.34	0.10	0.33	0.33
Sat Flow, veh/h	3456	3554	1585	3456	3554	1585	3456	4324	805	3456	5055	186
Grp Volume(v), veh/h	77	743	506	358	782	341	519	1089	553	247	1043	563
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1777	1585	1728	1702	1725	1728	1702	1837
Q Serve(g_s), s	1.8	23.3	34.8	9.1	24.4	4.8	13.8	38.6	38.7	3.8	37.1	37.1
Cycle Q Clear(g_c), s	1.8	23.3	34.8	9.1	24.4	4.8	13.8	38.6	38.7	3.8	37.1	37.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.47	1.00		0.10
Lane Grp Cap(c), veh/h	431	1050	643	461	1094	644	497	1171	594	465	1118	603
V/C Ratio(X)	0.18	0.71	0.79	0.78	0.71	0.53	1.04	0.93	0.93	0.53	0.93	0.93
Avail Cap(c_a), veh/h	474	1052	644	461	1094	644	497	1176	596	465	1122	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.86	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	39.2	32.4	31.5	38.4	13.6	38.0	39.6	39.6	51.5	40.6	40.6
Incr Delay (d2), s/veh	0.2	2.2	6.4	7.1	1.9	0.7	52.6	14.1	23.4	4.3	15.0	23.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	10.4	14.3	4.2	10.9	4.8	9.6	17.9	19.7	3.8	17.4	20.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	41.4	38.8	38.6	40.3	14.3	90.6	53.7	63.0	55.8	55.6	64.1
LnGrp LOS	C	D	D	D	D	B	F	D	E	E	E	E
Approach Vol, veh/h		1326			1481			2161			1853	
Approach Delay, s/veh		39.7			33.9			64.9			58.2	
Approach LOS		D			C			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.3	48.8	15.0	42.9	20.0	47.1	13.4	44.5
Change Period (Y+Rc), s	* 6	5.8	5.9	* 6	* 6.2	* 6	6.0	* 6
Max Green Setting (Gmax), s	* 12	43.2	9.1	* 37	* 14	* 41	9.0	* 37
Max Q Clear Time (g_c+I1), s	5.8	40.7	11.1	36.8	15.8	39.1	3.8	26.4
Green Ext Time (p_c), s	0.4	2.3	0.0	0.1	0.0	1.8	0.1	4.9

Intersection Summary	
HCM 6th Ctrl Delay	51.5
HCM 6th LOS	D

Notes

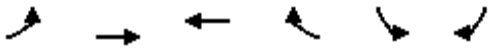
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	743	506	358	782	341	519	1642	247	1606
v/c Ratio	0.19	0.77	0.64	0.86	0.73	0.47	0.90	0.89	0.55	0.96
Control Delay	23.9	47.6	23.2	47.7	44.1	13.5	51.9	43.7	50.0	55.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.9	47.6	23.2	47.7	44.1	13.5	51.9	43.7	50.0	55.7
Queue Length 50th (ft)	19	285	231	96	300	86	165	457	74	464
Queue Length 95th (ft)	34	354	355	#148	373	147	#294	#567	107	#571
Internal Link Dist (ft)		2378			480			1614		1054
Turn Bay Length (ft)	155			285			475		200	
Base Capacity (vph)	425	1047	776	416	1087	730	578	1852	449	1671
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.71	0.65	0.86	0.72	0.47	0.90	0.89	0.55	0.96

Intersection Summary

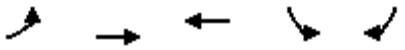
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	300	1017	1147	143	180	246
Future Volume (veh/h)	300	1017	1147	143	180	246
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1900	1870	1885	1885	1885	1900
Adj Flow Rate, veh/h	323	1094	1233	154	194	265
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	1	1	1	0
Cap, veh/h	461	2658	2926	365	304	407
Arrive On Green	0.08	0.75	1.00	1.00	0.17	0.17
Sat Flow, veh/h	1810	3647	4803	579	1795	1610
Grp Volume(v), veh/h	323	1094	913	474	194	265
Grp Sat Flow(s),veh/h/ln	1810	1777	1716	1781	1795	1610
Q Serve(g_s), s	7.0	13.4	0.0	0.0	12.1	17.7
Cycle Q Clear(g_c), s	7.0	13.4	0.0	0.0	12.1	17.7
Prop In Lane	1.00			0.32	1.00	1.00
Lane Grp Cap(c), veh/h	461	2658	2166	1125	304	407
V/C Ratio(X)	0.70	0.41	0.42	0.42	0.64	0.65
Avail Cap(c_a), veh/h	536	2658	2166	1125	470	556
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.63	0.63	0.55	0.55	1.00	1.00
Uniform Delay (d), s/veh	5.4	5.5	0.0	0.0	46.4	40.1
Incr Delay (d2), s/veh	1.5	0.3	0.3	0.6	0.8	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	4.3	0.1	0.2	5.5	15.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.9	5.8	0.3	0.6	47.2	40.8
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h		1417	1387		459	
Approach Delay, s/veh		6.0	0.4		43.5	
Approach LOS		A	A		D	

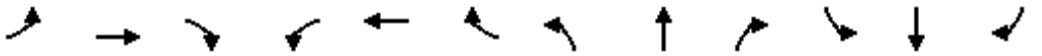
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		95.1		24.9	14.0	81.1
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3
Max Green Setting (Gmax), s		78.7		31.4	15.0	59.7
Max Q Clear Time (g_c+I1), s		15.4		19.7	9.0	2.0
Green Ext Time (p_c), s		22.5		0.7	0.3	28.7

Intersection Summary	
HCM 6th Ctrl Delay	8.9
HCM 6th LOS	A



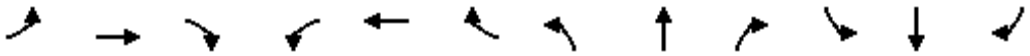
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	323	1094	1387	194	265
v/c Ratio	0.74	0.43	0.52	0.56	0.40
Control Delay	28.2	7.2	3.2	51.0	23.7
Queue Delay	0.0	0.5	0.4	0.0	0.0
Total Delay	28.2	7.8	3.6	51.0	23.7
Queue Length 50th (ft)	119	155	25	138	124
Queue Length 95th (ft)	224	196	43	214	188
Internal Link Dist (ft)		480	440	186	
Turn Bay Length (ft)	135				
Base Capacity (vph)	438	2563	2653	467	661
Starvation Cap Reductn	0	950	661	0	0
Spillback Cap Reductn	0	204	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.74	0.68	0.70	0.42	0.40

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	940	224	362	924	522	235	124	263	401	110	82
Future Volume (vph)	44	940	224	362	924	522	235	124	263	401	110	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	5.2	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1805	3574	1615	1787	3574	1615	1698	1759	1615	1715	1755	1615
Flt Permitted	0.12	1.00	1.00	0.11	1.00	1.00	0.95	0.98	1.00	0.95	0.97	1.00
Satd. Flow (perm)	226	3574	1615	205	3574	1615	1698	1759	1615	1715	1755	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	45	959	229	369	943	533	240	127	268	409	112	84
RTOR Reduction (vph)	0	0	95	0	0	226	0	0	49	0	0	51
Lane Group Flow (vph)	45	959	134	369	943	307	180	187	219	258	263	33
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%	1%	1%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	pt+ov	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	3 1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	42.7	33.7	33.7	48.1	36.7	36.7	21.6	21.6	33.0	33.0	33.0	47.2
Effective Green, g (s)	42.7	33.7	33.7	48.1	36.7	36.7	21.6	21.6	33.0	33.0	33.0	47.2
Actuated g/C Ratio	0.36	0.28	0.28	0.40	0.31	0.31	0.18	0.18	0.28	0.28	0.28	0.39
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2		5.2	5.2	
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	198	1003	453	232	1093	493	305	316	444	471	482	635
v/s Ratio Prot	0.02	0.27		c0.15	0.26		0.11	c0.11	0.14	c0.15	0.15	0.02
v/s Ratio Perm	0.06		0.08	c0.49		0.19						
v/c Ratio	0.23	0.96	0.30	1.59	0.86	0.62	0.59	0.59	0.49	0.55	0.55	0.05
Uniform Delay, d1	28.0	42.4	33.8	32.6	39.3	35.7	45.1	45.2	36.5	37.1	37.1	22.5
Progression Factor	0.89	0.88	0.68	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	18.6	1.5	285.2	9.0	5.8	2.0	2.0	0.3	4.5	4.4	0.0
Delay (s)	25.2	56.0	24.4	317.8	48.3	41.6	47.2	47.1	36.8	41.7	41.5	22.6
Level of Service	C	E	C	F	D	D	D	D	D	D	D	C
Approach Delay (s)		49.0			100.3			42.8			38.9	
Approach LOS		D			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	68.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

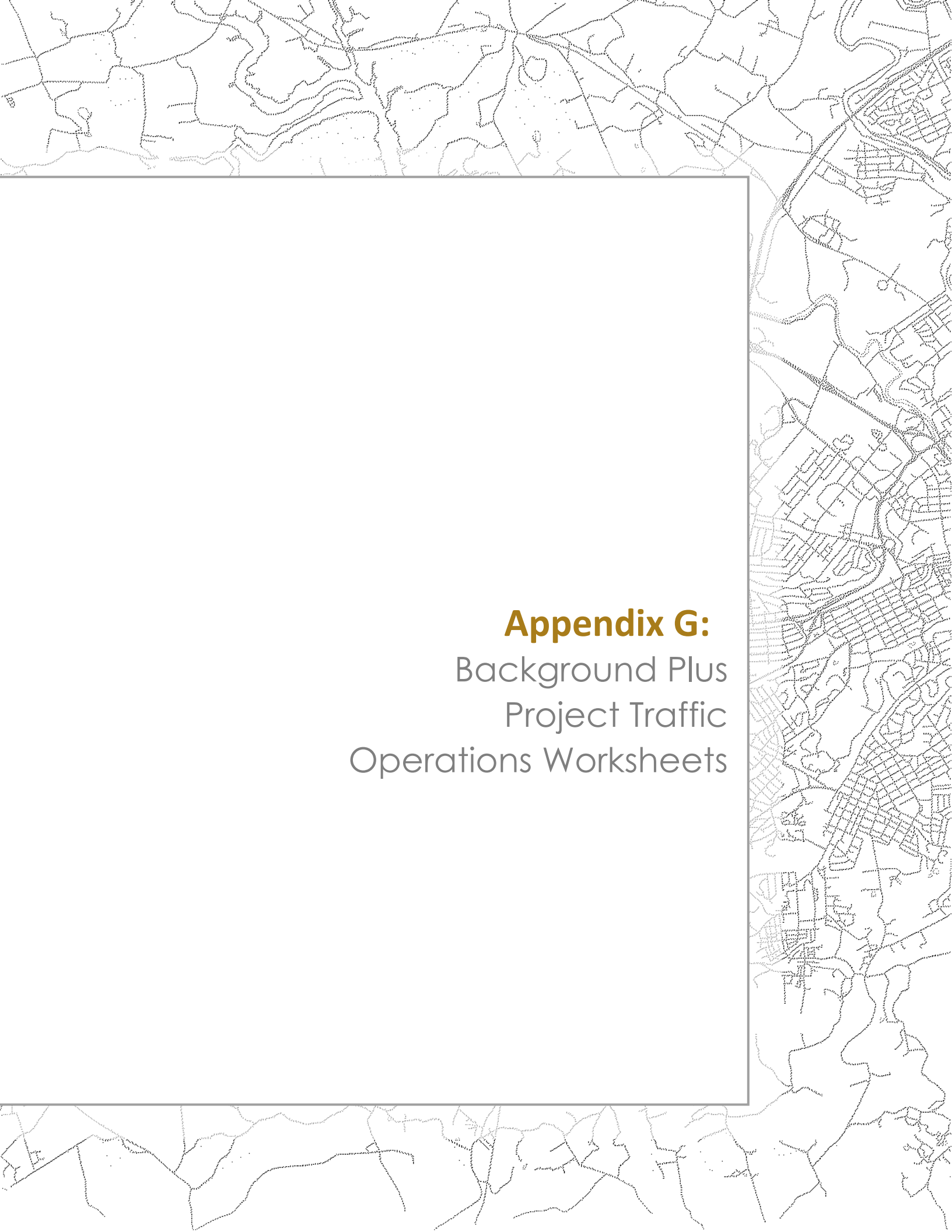


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	45	959	229	369	943	533	180	187	268	258	263	84
v/c Ratio	0.22	0.96	0.42	1.58	0.86	0.74	0.59	0.59	0.55	0.55	0.55	0.13
Control Delay	21.0	56.6	12.2	307.5	48.7	21.1	53.3	53.1	18.3	43.0	42.8	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	56.6	12.2	307.5	48.7	21.1	53.3	53.1	18.3	43.0	42.8	5.9
Queue Length 50th (ft)	17	392	42	~357	362	147	137	144	62	176	180	0
Queue Length 95th (ft)	35	#524	120	#552	#451	290	206	212	102	288	291	35
Internal Link Dist (ft)		440			2455			2238			214	
Turn Bay Length (ft)	330		150	265		150	105					
Base Capacity (vph)	201	1003	548	233	1093	719	464	480	630	471	482	671
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.96	0.42	1.58	0.86	0.74	0.39	0.39	0.43	0.55	0.55	0.13

Intersection Summary

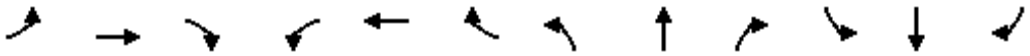
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Appendix G:

Background Plus Project Traffic Operations Worksheets



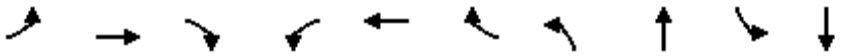
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	703	476	346	737	330	489	1320	251	240	1453	54
Future Volume (veh/h)	71	703	476	346	737	330	489	1320	251	240	1453	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	72	717	486	353	752	337	499	1347	256	245	1483	55
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	118	1041	642	256	1180	693	388	1513	287	364	1723	64
Arrive On Green	0.03	0.29	0.29	0.07	0.33	0.33	0.11	0.35	0.35	0.10	0.34	0.34
Sat Flow, veh/h	3510	3610	1610	3510	3610	1610	3510	4377	831	3510	5133	190
Grp Volume(v), veh/h	72	717	486	353	752	337	499	1064	539	245	999	539
Grp Sat Flow(s),veh/h/ln	1755	1805	1610	1755	1805	1610	1755	1729	1750	1755	1729	1866
Q Serve(g_s), s	2.5	22.0	32.5	9.1	22.1	2.7	13.8	36.4	36.4	8.4	33.7	33.7
Cycle Q Clear(g_c), s	2.5	22.0	32.5	9.1	22.1	2.7	13.8	36.4	36.4	8.4	33.7	33.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.47	1.00		0.10
Lane Grp Cap(c), veh/h	118	1041	642	256	1180	693	388	1195	605	364	1161	626
V/C Ratio(X)	0.61	0.69	0.76	1.38	0.64	0.49	1.29	0.89	0.89	0.67	0.86	0.86
Avail Cap(c_a), veh/h	253	1069	654	256	1180	693	388	1195	605	364	1161	626
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.87	0.87	0.87	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.6	39.5	32.4	58.0	35.8	12.7	55.6	38.7	38.7	54.0	38.8	38.8
Incr Delay (d2), s/veh	5.0	1.8	5.0	191.5	1.0	0.5	147.6	10.1	17.8	4.8	8.5	14.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	9.9	13.4	10.8	9.9	4.7	13.9	16.6	18.1	3.9	15.2	17.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.6	41.3	37.3	249.4	36.8	13.1	203.2	48.8	56.5	58.8	47.2	53.2
LnGrp LOS	E	D	D	F	D	B	F	D	E	E	D	D
Approach Vol, veh/h		1275			1442			2102			1783	
Approach Delay, s/veh		41.1			83.3			87.4			50.7	
Approach LOS		D			F			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	49.0	15.0	42.0	20.0	48.0	10.2	46.8
Change Period (Y+Rc), s	* 6	5.8	5.9	* 6	* 6.2	* 6	6.0	* 6
Max Green Setting (Gmax), s	* 12	43.2	9.1	* 37	* 14	* 41	9.0	* 37
Max Q Clear Time (g_c+I1), s	10.4	38.4	11.1	34.5	15.8	35.7	4.5	24.1
Green Ext Time (p_c), s	0.1	4.3	0.0	1.6	0.0	4.2	0.1	5.3

Intersection Summary	
HCM 6th Ctrl Delay	67.7
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

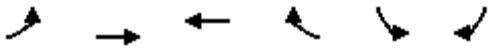


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	72	717	486	353	752	337	499	1603	245	1538
v/c Ratio	0.33	0.75	0.60	1.39	0.71	0.47	1.01	0.83	0.73	0.90
Control Delay	59.9	47.1	21.8	239.9	43.8	13.4	96.7	39.9	68.3	48.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	47.1	21.8	239.9	43.8	13.4	96.7	39.9	68.3	48.3
Queue Length 50th (ft)	29	275	212	~195	288	86	~237	428	101	432
Queue Length 95th (ft)	54	337	327	#294	356	143	#375	509	#153	498
Internal Link Dist (ft)		2378			480			1614		1054
Turn Bay Length (ft)	155			285			475		200	
Base Capacity (vph)	252	1068	797	254	1095	737	493	1925	336	1704
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.67	0.61	1.39	0.69	0.46	1.01	0.83	0.73	0.90

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

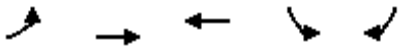
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	253	995	1222	192	188	285
Future Volume (veh/h)	253	995	1222	192	188	285
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1885	1870	1885	1885	1885	1885
Adj Flow Rate, veh/h	261	1026	1260	198	194	294
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	2	1	1	1	1
Cap, veh/h	442	2593	2749	432	352	453
Arrive On Green	0.09	0.73	1.00	1.00	0.20	0.20
Sat Flow, veh/h	1795	3647	4654	705	1795	1598
Grp Volume(v), veh/h	261	1026	964	494	194	294
Grp Sat Flow(s),veh/h/ln	1795	1777	1716	1758	1795	1598
Q Serve(g_s), s	5.6	13.2	0.0	0.0	11.7	19.4
Cycle Q Clear(g_c), s	5.6	13.2	0.0	0.0	11.7	19.4
Prop In Lane	1.00			0.40	1.00	1.00
Lane Grp Cap(c), veh/h	442	2593	2103	1078	352	453
V/C Ratio(X)	0.59	0.40	0.46	0.46	0.55	0.65
Avail Cap(c_a), veh/h	517	2593	2103	1078	477	564
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.59	0.59	0.69	0.69	1.00	1.00
Uniform Delay (d), s/veh	5.4	6.2	0.0	0.0	43.5	37.7
Incr Delay (d2), s/veh	0.3	0.3	0.5	1.0	0.5	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.4	0.1	0.3	5.3	16.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.7	6.4	0.5	1.0	44.0	38.6
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h		1287	1458		488	
Approach Delay, s/veh		6.3	0.7		40.7	
Approach LOS		A	A		D	

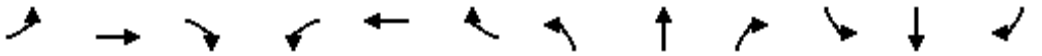
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		92.4		27.6	14.0	78.4
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3
Max Green Setting (Gmax), s		78.7		31.4	15.0	59.7
Max Q Clear Time (g_c+I1), s		16.2		22.4	8.6	3.0
Green Ext Time (p_c), s		20.3		0.7	0.2	30.6

Intersection Summary	
HCM 6th Ctrl Delay	8.9
HCM 6th LOS	A



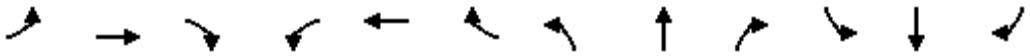
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	261	1026	1458	194	294
v/c Ratio	0.69	0.38	0.48	0.65	0.55
Control Delay	21.6	5.9	8.3	56.1	31.5
Queue Delay	0.0	0.4	0.1	1.2	54.7
Total Delay	21.6	6.3	8.5	57.3	86.2
Queue Length 50th (ft)	59	120	102	142	167
Queue Length 95th (ft)	160	194	52	207	206
Internal Link Dist (ft)		480	440	166	
Turn Bay Length (ft)	135				
Base Capacity (vph)	407	2682	3074	475	569
Starvation Cap Reductn	0	1021	590	131	298
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.64	0.62	0.59	0.56	1.08

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	945	266	447	1053	325	315	129	414	261	163	66
Future Volume (vph)	15	945	266	447	1053	325	315	129	414	261	163	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1805	3574	1615	1770	3539	1615	1681	1704	1509	1715	1783	1615
Flt Permitted	0.22	1.00	1.00	0.11	1.00	1.00	0.95	0.98	1.00	0.95	0.99	1.00
Satd. Flow (perm)	415	3574	1615	205	3539	1615	1681	1704	1509	1715	1783	1615
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	15	955	269	452	1064	328	318	130	418	264	165	67
RTOR Reduction (vph)	0	0	177	0	0	95	0	0	326	0	0	49
Lane Group Flow (vph)	15	955	92	452	1064	233	219	229	92	211	218	18
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%	2%	5%	7%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	Over	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	38.9	31.7	31.7	62.6	51.4	51.4	21.5	21.5	26.3	20.2	20.2	32.6
Effective Green, g (s)	38.9	31.7	31.7	62.6	51.4	51.4	21.5	21.5	26.3	20.2	20.2	32.6
Actuated g/C Ratio	0.32	0.26	0.26	0.52	0.43	0.43	0.18	0.18	0.22	0.17	0.17	0.27
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	217	944	426	449	1515	691	301	305	330	288	300	438
v/s Ratio Prot	0.00	0.27		c0.22	0.30		0.13	c0.13	0.06	c0.12	0.12	0.01
v/s Ratio Perm	0.02		0.06	c0.30		0.14						
v/c Ratio	0.07	1.01	0.22	1.01	0.70	0.34	0.73	0.75	0.28	0.73	0.73	0.04
Uniform Delay, d1	27.8	44.1	34.5	36.8	28.0	22.9	46.5	46.7	39.0	47.3	47.3	32.2
Progression Factor	0.86	0.98	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	31.3	1.1	44.1	2.7	1.3	8.5	10.0	0.5	9.3	8.5	0.0
Delay (s)	24.1	74.7	33.5	80.9	30.8	24.2	55.0	56.7	39.4	56.6	55.8	32.2
Level of Service	C	E	C	F	C	C	D	E	D	E	E	C
Approach Delay (s)		65.2			41.9			47.9			52.9	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	50.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



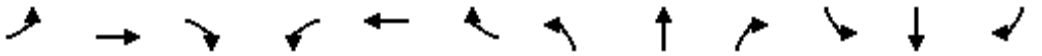
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	15	955	269	452	1064	328	219	229	418	211	218	67
v/c Ratio	0.06	1.01	0.45	1.00	0.69	0.41	0.73	0.75	0.64	0.73	0.72	0.14
Control Delay	16.4	74.7	8.4	79.1	33.5	15.4	60.1	61.7	9.6	61.6	60.7	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.4	74.7	8.4	79.1	33.5	15.4	60.1	61.7	9.6	61.6	60.7	7.3
Queue Length 50th (ft)	4	~405	32	~328	365	83	169	177	0	164	169	0
Queue Length 95th (ft)	m14	#546	67	#668	#565	191	246	256	107	242	247	32
Internal Link Dist (ft)		440			2455			2238			219	
Turn Bay Length (ft)	330			265		150	105					
Base Capacity (vph)	339	944	603	450	1538	796	389	394	656	368	383	563
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	1.01	0.45	1.00	0.69	0.41	0.56	0.58	0.64	0.57	0.57	0.12

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



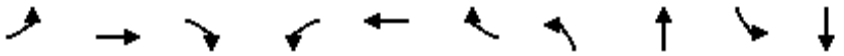
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	728	496	351	766	333	509	1356	252	240	1519	56
Future Volume (veh/h)	75	728	496	351	766	333	509	1356	252	240	1519	56
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	77	743	506	358	782	340	519	1384	257	245	1550	57
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	431	1050	643	461	1094	644	497	1488	276	465	1660	61
Arrive On Green	0.06	0.30	0.30	0.07	0.31	0.31	0.11	0.34	0.34	0.10	0.33	0.33
Sat Flow, veh/h	3456	3554	1585	3456	3554	1585	3456	4327	803	3456	5055	186
Grp Volume(v), veh/h	77	743	506	358	782	340	519	1088	553	245	1044	563
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1777	1585	1728	1702	1726	1728	1702	1837
Q Serve(g_s), s	1.8	23.3	34.8	9.1	24.4	4.7	13.8	38.5	38.6	3.7	37.1	37.1
Cycle Q Clear(g_c), s	1.8	23.3	34.8	9.1	24.4	4.7	13.8	38.5	38.6	3.7	37.1	37.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.47	1.00		0.10
Lane Grp Cap(c), veh/h	431	1050	643	461	1094	644	497	1171	594	465	1118	603
V/C Ratio(X)	0.18	0.71	0.79	0.78	0.71	0.53	1.04	0.93	0.93	0.53	0.93	0.93
Avail Cap(c_a), veh/h	474	1052	644	461	1094	644	497	1176	596	465	1122	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.83	0.83	0.83	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.8	39.2	32.4	31.5	38.4	13.6	38.0	39.5	39.6	51.5	40.7	40.7
Incr Delay (d2), s/veh	0.2	2.2	6.4	6.8	1.9	0.7	52.6	14.1	23.3	4.2	15.0	23.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	10.4	14.3	4.2	10.9	4.7	9.6	17.8	19.7	3.8	17.4	20.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	41.4	38.8	38.4	40.2	14.3	90.6	53.6	62.9	55.7	55.7	64.2
LnGrp LOS	C	D	D	D	D	B	F	D	E	E	E	E
Approach Vol, veh/h		1326			1480			2160			1852	
Approach Delay, s/veh		39.7			33.8			64.9			58.3	
Approach LOS		D			C			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.3	48.8	15.0	42.9	20.0	47.1	13.4	44.5
Change Period (Y+Rc), s	* 6	5.8	5.9	* 6	* 6.2	* 6	6.0	* 6
Max Green Setting (Gmax), s	* 12	43.2	9.1	* 37	* 14	* 41	9.0	* 37
Max Q Clear Time (g_c+I1), s	5.7	40.6	11.1	36.8	15.8	39.1	3.8	26.4
Green Ext Time (p_c), s	0.4	2.4	0.0	0.1	0.0	1.8	0.1	4.9

Intersection Summary	
HCM 6th Ctrl Delay	51.4
HCM 6th LOS	D

Notes

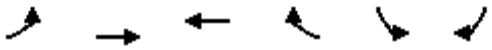
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	743	506	358	782	340	519	1641	245	1607
v/c Ratio	0.19	0.77	0.64	0.86	0.73	0.47	0.90	0.89	0.55	0.96
Control Delay	23.9	47.6	23.2	47.7	44.1	13.4	51.9	43.6	49.9	55.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.9	47.6	23.2	47.7	44.1	13.4	51.9	43.6	49.9	55.8
Queue Length 50th (ft)	19	285	231	96	300	85	165	457	73	464
Queue Length 95th (ft)	34	354	355	#148	373	146	#294	#566	107	#572
Internal Link Dist (ft)		2378			480			1614		1054
Turn Bay Length (ft)	155			285			475		200	
Base Capacity (vph)	425	1047	776	416	1087	730	578	1854	449	1671
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.71	0.65	0.86	0.72	0.47	0.90	0.89	0.55	0.96

Intersection Summary

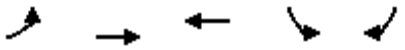
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	314	1017	1078	231	234	323
Future Volume (veh/h)	314	1017	1078	231	234	323
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1900	1870	1885	1885	1885	1900
Adj Flow Rate, veh/h	338	1094	1159	248	252	347
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	1	1	1	0
Cap, veh/h	449	2501	2461	527	384	490
Arrive On Green	0.09	0.70	1.00	1.00	0.21	0.21
Sat Flow, veh/h	1810	3647	4414	908	1795	1610
Grp Volume(v), veh/h	338	1094	937	470	252	347
Grp Sat Flow(s),veh/h/ln	1810	1777	1716	1722	1795	1610
Q Serve(g_s), s	8.6	15.8	0.0	0.0	15.4	22.9
Cycle Q Clear(g_c), s	8.6	15.8	0.0	0.0	15.4	22.9
Prop In Lane	1.00			0.53	1.00	1.00
Lane Grp Cap(c), veh/h	449	2501	1990	998	384	490
V/C Ratio(X)	0.75	0.44	0.47	0.47	0.66	0.71
Avail Cap(c_a), veh/h	512	2501	1990	998	470	567
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.63	0.63	0.43	0.43	1.00	1.00
Uniform Delay (d), s/veh	7.4	7.6	0.0	0.0	43.1	37.0
Incr Delay (d2), s/veh	2.8	0.4	0.3	0.7	1.3	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	5.5	0.1	0.2	7.0	19.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.2	8.0	0.3	0.7	44.5	39.5
LnGrp LOS	B	A	A	A	D	D
Approach Vol, veh/h		1432	1407		599	
Approach Delay, s/veh		8.5	0.5		41.6	
Approach LOS		A	A		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		89.7		30.3	14.9	74.9
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3
Max Green Setting (Gmax), s		78.7		31.4	15.0	59.7
Max Q Clear Time (g_c+I1), s		17.8		24.9	10.6	2.0
Green Ext Time (p_c), s		22.3		0.7	0.2	29.4

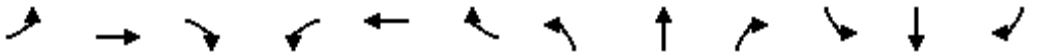
Intersection Summary	
HCM 6th Ctrl Delay	11.0
HCM 6th LOS	B



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	338	1094	1407	252	347
v/c Ratio	0.81	0.44	0.54	0.68	0.51
Control Delay	36.6	8.2	2.0	53.6	25.6
Queue Delay	0.0	0.6	0.5	0.0	0.0
Total Delay	36.6	8.8	2.4	53.6	25.6
Queue Length 50th (ft)	137	155	12	185	170
Queue Length 95th (ft)	#345	246	m25	257	255
Internal Link Dist (ft)		480	440	186	
Turn Bay Length (ft)	135				
Base Capacity (vph)	419	2512	2603	467	669
Starvation Cap Reductn	0	907	643	0	0
Spillback Cap Reductn	0	317	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.81	0.68	0.72	0.54	0.52

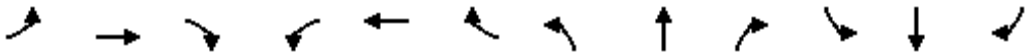
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1026	227	362	1009	428	237	116	263	330	103	82
Future Volume (vph)	26	1026	227	362	1009	428	237	116	263	330	103	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	5.2	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1805	3574	1615	1787	3574	1615	1698	1756	1615	1715	1758	1615
Flt Permitted	0.12	1.00	1.00	0.11	1.00	1.00	0.95	0.98	1.00	0.95	0.97	1.00
Satd. Flow (perm)	226	3574	1615	205	3574	1615	1698	1756	1615	1715	1758	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	27	1047	232	369	1030	437	242	118	268	337	105	84
RTOR Reduction (vph)	0	0	88	0	0	169	0	0	49	0	0	51
Lane Group Flow (vph)	27	1047	144	369	1030	268	177	183	219	219	223	33
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%	1%	1%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	pt+ov	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	3 1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	42.7	33.7	33.7	48.1	36.7	36.7	21.5	21.5	32.9	33.1	33.1	47.3
Effective Green, g (s)	42.7	33.7	33.7	48.1	36.7	36.7	21.5	21.5	32.9	33.1	33.1	47.3
Actuated g/C Ratio	0.36	0.28	0.28	0.40	0.31	0.31	0.18	0.18	0.27	0.28	0.28	0.39
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2		5.2	5.2	
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	198	1003	453	232	1093	493	304	314	442	473	484	636
v/s Ratio Prot	0.01	0.29		c0.15	0.29		c0.10	0.10	0.14	c0.13	0.13	0.02
v/s Ratio Perm	0.04		0.09	c0.49		0.17						
v/c Ratio	0.14	1.04	0.32	1.59	0.94	0.54	0.58	0.58	0.49	0.46	0.46	0.05
Uniform Delay, d1	28.5	43.1	34.1	32.8	40.6	34.7	45.1	45.1	36.6	36.1	36.0	22.5
Progression Factor	0.82	0.87	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	39.2	1.7	285.2	16.5	4.2	1.8	1.8	0.3	3.2	3.1	0.0
Delay (s)	23.4	76.7	23.8	318.0	57.1	38.9	47.0	46.9	36.9	39.3	39.2	22.5
Level of Service	C	E	C	F	E	D	D	D	D	D	D	C
Approach Delay (s)		66.2			105.2			42.7			36.6	
Approach LOS		E			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	75.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



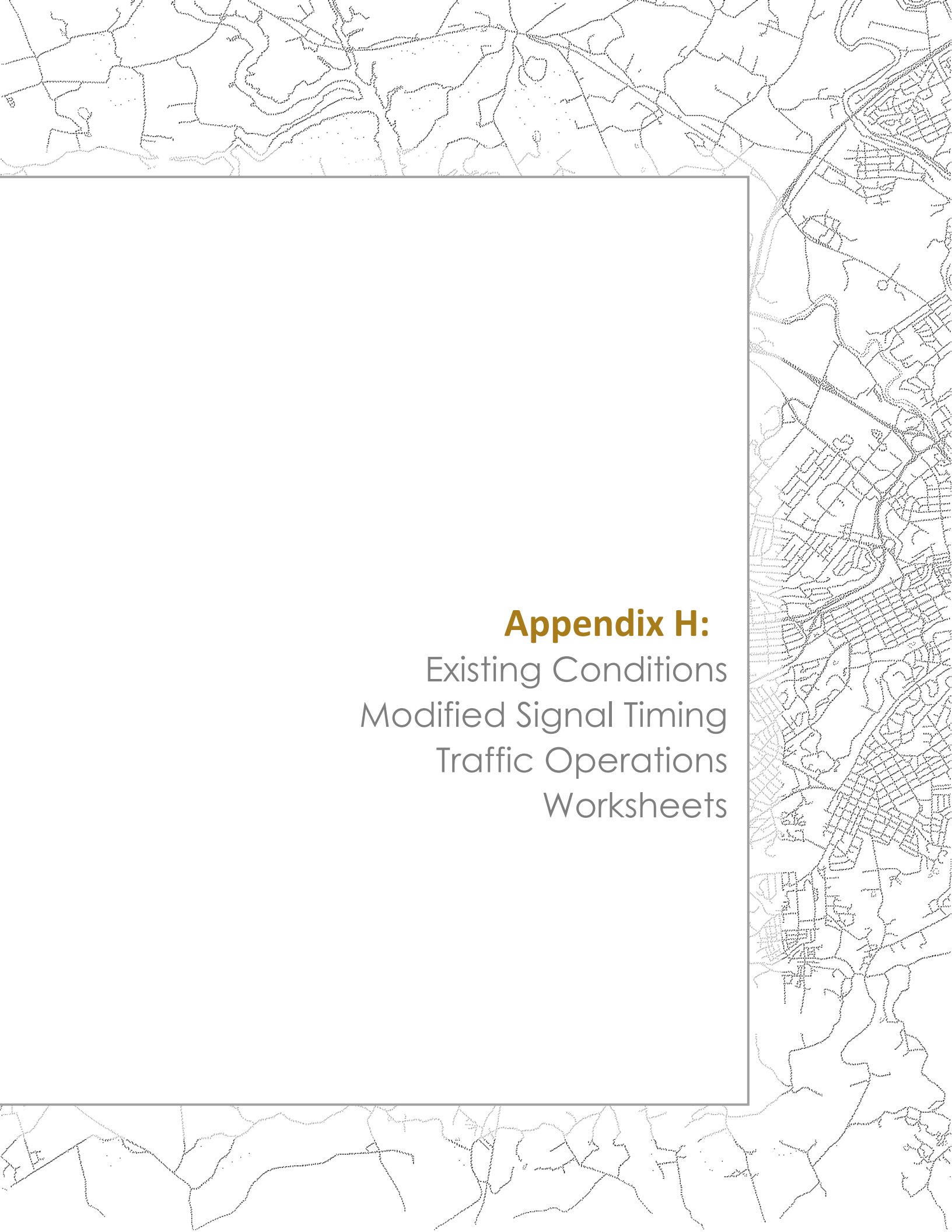
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	1047	232	369	1030	437	177	183	268	219	223	84
v/c Ratio	0.13	1.04	0.43	1.58	0.94	0.66	0.58	0.58	0.55	0.46	0.46	0.12
Control Delay	18.1	76.5	12.8	307.5	57.4	20.7	53.2	52.9	18.4	40.6	40.4	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.1	76.5	12.8	307.5	57.4	20.7	53.2	52.9	18.4	40.6	40.4	5.9
Queue Length 50th (ft)	10	~466	58	~357	408	128	135	140	62	145	148	0
Queue Length 95th (ft)	m21	#603	75	#552	#543	247	204	209	102	243	246	35
Internal Link Dist (ft)		440			2455			2238			214	
Turn Bay Length (ft)	330		150	265		150	105					
Base Capacity (vph)	201	1003	542	233	1093	663	464	480	630	473	485	672
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	1.04	0.43	1.58	0.94	0.66	0.38	0.38	0.43	0.46	0.46	0.13

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

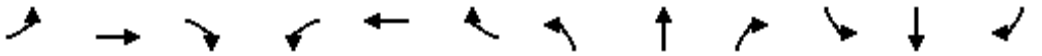
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



Appendix H:

Existing Conditions
Modified Signal Timing
Traffic Operations
Worksheets



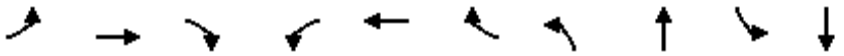
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	651	472	314	688	237	484	1254	181	152	1392	53
Future Volume (veh/h)	70	651	472	314	688	237	484	1254	181	152	1392	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	71	664	482	320	702	242	494	1280	185	155	1420	54
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	117	1035	639	256	1175	694	388	1582	229	369	1729	66
Arrive On Green	0.03	0.29	0.29	0.07	0.33	0.33	0.11	0.35	0.35	0.11	0.34	0.34
Sat Flow, veh/h	3510	3610	1610	3510	3610	1610	3510	4577	662	3510	5128	195
Grp Volume(v), veh/h	71	664	482	320	702	242	494	967	498	155	958	516
Grp Sat Flow(s),veh/h/ln	1755	1805	1610	1755	1805	1610	1755	1729	1781	1755	1729	1865
Q Serve(g_s), s	2.5	20.1	32.2	9.1	20.4	1.8	13.8	31.8	31.8	5.2	31.7	31.7
Cycle Q Clear(g_c), s	2.5	20.1	32.2	9.1	20.4	1.8	13.8	31.8	31.8	5.2	31.7	31.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.37	1.00		0.10
Lane Grp Cap(c), veh/h	117	1035	639	256	1175	694	388	1195	615	369	1166	629
V/C Ratio(X)	0.61	0.64	0.75	1.25	0.60	0.35	1.27	0.81	0.81	0.42	0.82	0.82
Avail Cap(c_a), veh/h	253	1069	654	256	1175	694	388	1195	615	369	1166	629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.6	39.0	32.4	58.0	35.3	11.8	55.6	37.2	37.2	52.3	38.0	38.0
Incr Delay (d2), s/veh	5.0	1.3	4.8	139.1	0.8	0.3	142.3	6.0	11.0	0.8	6.6	11.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	9.0	13.3	9.0	9.1	3.1	13.7	14.0	15.3	2.3	14.1	16.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.6	40.2	37.3	197.1	36.1	12.1	197.9	43.1	48.1	53.1	44.5	49.5
LnGrp LOS	E	D	D	F	D	B	F	D	D	D	D	D
Approach Vol, veh/h		1217			1264			1959			1629	
Approach Delay, s/veh		40.5			72.2			83.4			46.9	
Approach LOS		D			E			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.2	49.0	15.0	41.8	20.0	48.2	10.2	46.7
Change Period (Y+Rc), s	* 6	5.8	5.9	* 6	* 6.2	* 6	6.0	* 6
Max Green Setting (Gmax), s	* 12	43.2	9.1	* 37	* 14	* 41	9.0	* 37
Max Q Clear Time (g_c+I1), s	7.2	33.8	11.1	34.2	15.8	33.7	4.5	22.4
Green Ext Time (p_c), s	0.2	7.7	0.0	1.6	0.0	5.4	0.1	5.0

Intersection Summary	
HCM 6th Ctrl Delay	62.7
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

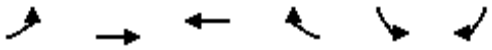


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	71	664	482	320	702	242	494	1465	155	1474
v/c Ratio	0.33	0.72	0.60	1.26	0.69	0.34	0.93	0.74	0.46	0.87
Control Delay	59.9	47.0	21.7	191.0	43.9	8.9	78.1	35.9	58.3	45.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.9	47.0	21.7	191.0	43.9	8.9	78.1	35.9	58.3	45.6
Queue Length 50th (ft)	28	258	209	~167	273	45	206	364	62	406
Queue Length 95th (ft)	53	308	322	#262	328	84	#370	452	98	471
Internal Link Dist (ft)		2378			480			1614		1054
Turn Bay Length (ft)	155			285			475		200	
Base Capacity (vph)	252	1068	803	254	1081	732	530	1982	336	1704
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.62	0.60	1.26	0.65	0.33	0.93	0.74	0.46	0.87

Intersection Summary

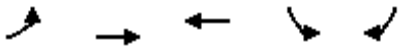
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



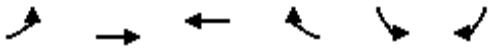
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	251	895	1059	192	186	283
Future Volume (vph)	251	895	1059	192	186	283
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.8	4.8		4.1	4.1
Lane Util. Factor	1.00	0.95	0.91		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1787	3539	5017		1787	1599
Flt Permitted	0.17	1.00	1.00		0.95	1.00
Satd. Flow (perm)	312	3539	5017		1787	1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	259	923	1092	198	192	292
RTOR Reduction (vph)	0	0	16	0	0	41
Lane Group Flow (vph)	259	923	1274	0	192	251
Heavy Vehicles (%)	1%	2%	1%	1%	1%	1%
Turn Type	pm+pt	NA	NA		Prot	pt+ov
Protected Phases	5	2	6		4	4 5
Permitted Phases	2					
Actuated Green, G (s)	91.7	91.7	75.4		18.4	35.3
Effective Green, g (s)	92.2	92.2	75.9		18.9	35.8
Actuated g/C Ratio	0.77	0.77	0.63		0.16	0.30
Clearance Time (s)	4.0	5.3	5.3		4.6	
Vehicle Extension (s)	2.0	5.0	5.0		2.0	
Lane Grp Cap (vph)	397	2719	3173		281	477
v/s Ratio Prot	c0.07	0.26	0.25		c0.11	0.16
v/s Ratio Perm	c0.43					
v/c Ratio	0.65	0.34	0.40		0.68	0.53
Uniform Delay, d1	6.5	4.4	10.9		47.7	35.0
Progression Factor	1.00	1.00	0.60		1.00	1.00
Incremental Delay, d2	2.9	0.3	0.3		5.4	0.5
Delay (s)	9.4	4.7	6.8		53.1	35.5
Level of Service	A	A	A		D	D
Approach Delay (s)		5.7	6.8		42.5	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	259	923	1290	192	292
v/c Ratio	0.65	0.34	0.40	0.68	0.57
Control Delay	14.0	5.2	7.2	59.6	31.7
Queue Delay	0.0	0.3	0.1	0.9	21.0
Total Delay	14.0	5.5	7.3	60.5	52.7
Queue Length 50th (ft)	43	98	76	143	158
Queue Length 95th (ft)	119	165	71	206	202
Internal Link Dist (ft)		480	440	166	
Turn Bay Length (ft)	135				
Base Capacity (vph)	442	2719	3192	475	557
Starvation Cap Reductn	0	1089	517	116	256
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.59	0.57	0.48	0.53	0.97

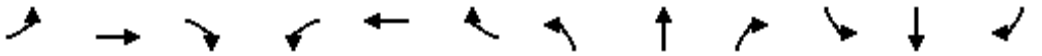
Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	251	895	1059	192	186	283
Future Volume (veh/h)	251	895	1059	192	186	283
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1885	1870	1885	1885	1885	1885
Adj Flow Rate, veh/h	259	923	1092	198	192	292
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	2	1	1	1	1
Cap, veh/h	482	2597	2690	487	350	451
Arrive On Green	0.09	0.73	1.00	1.00	0.20	0.20
Sat Flow, veh/h	1795	3647	4550	794	1795	1598
Grp Volume(v), veh/h	259	923	855	435	192	292
Grp Sat Flow(s),veh/h/ln	1795	1777	1716	1742	1795	1598
Q Serve(g_s), s	5.5	11.3	0.0	0.0	11.6	19.3
Cycle Q Clear(g_c), s	5.5	11.3	0.0	0.0	11.6	19.3
Prop In Lane	1.00			0.46	1.00	1.00
Lane Grp Cap(c), veh/h	482	2597	2107	1070	350	451
V/C Ratio(X)	0.54	0.36	0.41	0.41	0.55	0.65
Avail Cap(c_a), veh/h	557	2597	2107	1070	477	564
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.69	0.69	0.78	0.78	1.00	1.00
Uniform Delay (d), s/veh	5.3	5.9	0.0	0.0	43.5	37.8
Incr Delay (d2), s/veh	0.2	0.3	0.5	0.9	0.5	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	3.8	0.1	0.3	5.2	16.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.6	6.1	0.5	0.9	44.0	38.6
LnGrp LOS	A	A	A	A	D	D
Approach Vol, veh/h		1182	1290		484	
Approach Delay, s/veh		6.0	0.6		40.8	
Approach LOS		A	A		D	

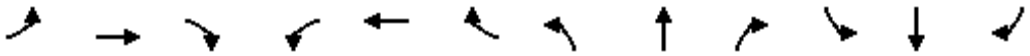
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		92.5		27.5	14.0	78.5
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3
Max Green Setting (Gmax), s		78.7		31.4	15.0	59.7
Max Q Clear Time (g_c+I1), s		14.3		22.3	8.5	3.0
Green Ext Time (p_c), s		17.3		0.7	0.2	25.7

Intersection Summary		
HCM 6th Ctrl Delay	9.3	
HCM 6th LOS	A	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	860	249	371	967	321	227	128	304	258	161	65
Future Volume (vph)	15	860	249	371	967	321	227	128	304	258	161	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1805	3574	1615	1770	3539	1615	1681	1709	1509	1715	1783	1615
Flt Permitted	0.29	1.00	1.00	0.11	1.00	1.00	0.95	0.99	1.00	0.95	0.99	1.00
Satd. Flow (perm)	557	3574	1615	211	3539	1615	1681	1709	1509	1715	1783	1615
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	15	869	252	375	977	324	229	129	307	261	163	66
RTOR Reduction (vph)	0	0	182	0	0	99	0	0	230	0	0	48
Lane Group Flow (vph)	15	869	70	375	977	225	176	182	77	209	215	18
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%	2%	5%	7%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	Over	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	37.9	30.7	30.7	65.5	54.3	54.3	18.2	18.2	30.2	20.6	20.6	33.0
Effective Green, g (s)	37.9	30.7	30.7	65.5	54.3	54.3	18.2	18.2	30.2	20.6	20.6	33.0
Actuated g/C Ratio	0.32	0.26	0.26	0.55	0.45	0.45	0.15	0.15	0.25	0.17	0.17	0.28
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	250	914	413	507	1601	730	254	259	379	294	306	444
v/s Ratio Prot	0.00	c0.24		c0.19	0.28		0.10	c0.11	0.05	c0.12	0.12	0.01
v/s Ratio Perm	0.02		0.04	0.22		0.14						
v/c Ratio	0.06	0.95	0.17	0.74	0.61	0.31	0.69	0.70	0.20	0.71	0.70	0.04
Uniform Delay, d1	28.3	43.9	34.7	29.6	24.8	20.9	48.3	48.3	35.4	46.9	46.8	31.9
Progression Factor	0.85	1.02	1.24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	19.4	0.8	5.6	1.7	1.1	7.9	8.3	0.3	7.9	7.1	0.0
Delay (s)	24.1	64.2	44.0	35.2	26.6	22.0	56.2	56.7	35.7	54.8	53.9	31.9
Level of Service	C	E	D	D	C	C	E	E	D	D	D	C
Approach Delay (s)		59.2			27.6			46.9			51.3	
Approach LOS		E			C			D			D	

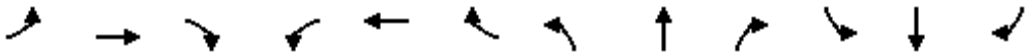
Intersection Summary			
HCM 2000 Control Delay	42.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	15	869	252	375	977	324	176	182	307	209	215	66
v/c Ratio	0.05	0.95	0.42	0.74	0.60	0.39	0.69	0.71	0.50	0.71	0.70	0.13
Control Delay	15.5	64.5	8.4	39.3	29.5	13.2	61.8	62.4	8.3	59.4	58.5	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.5	64.5	8.4	39.3	29.5	13.2	61.8	62.4	8.3	59.4	58.5	6.8
Queue Length 50th (ft)	4	356	21	210	303	68	137	143	0	162	166	0
Queue Length 95th (ft)	m14	#483	85	#515	#489	176	205	211	89	232	236	30
Internal Link Dist (ft)		440			2455			2238			219	
Turn Bay Length (ft)	330			265		150	105					
Base Capacity (vph)	374	914	595	508	1624	838	389	395	609	375	390	569
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.95	0.42	0.74	0.60	0.39	0.45	0.46	0.50	0.56	0.55	0.12

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



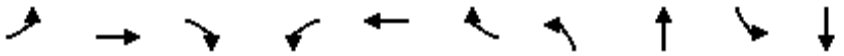
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	679	491	327	717	249	504	1307	187	157	1450	55
Future Volume (veh/h)	73	679	491	327	717	249	504	1307	187	157	1450	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	74	693	501	334	732	254	514	1334	191	160	1480	56
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	461	1046	642	479	1092	653	497	1527	219	507	1664	63
Arrive On Green	0.06	0.29	0.29	0.07	0.31	0.31	0.11	0.34	0.34	0.10	0.33	0.33
Sat Flow, veh/h	3456	3554	1585	3456	3554	1585	3456	4512	646	3456	5049	191
Grp Volume(v), veh/h	74	693	501	334	732	254	514	1006	519	160	998	538
Grp Sat Flow(s),veh/h/ln	1728	1777	1585	1728	1777	1585	1728	1702	1754	1728	1702	1836
Q Serve(g_s), s	1.8	21.4	34.4	8.5	22.5	2.6	13.8	34.7	34.7	0.0	34.7	34.8
Cycle Q Clear(g_c), s	1.8	21.4	34.4	8.5	22.5	2.6	13.8	34.7	34.7	0.0	34.7	34.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.37	1.00		0.10
Lane Grp Cap(c), veh/h	461	1046	642	479	1092	653	497	1152	594	507	1122	605
V/C Ratio(X)	0.16	0.66	0.78	0.70	0.67	0.39	1.03	0.87	0.87	0.32	0.89	0.89
Avail Cap(c_a), veh/h	505	1052	644	479	1092	653	497	1176	606	507	1122	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.87	0.87	0.87	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	38.7	32.4	30.6	37.8	11.9	38.5	38.8	38.8	49.6	39.7	39.7
Incr Delay (d2), s/veh	0.2	1.6	6.1	3.8	1.4	0.3	49.7	9.3	16.3	1.6	10.6	17.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	9.4	14.1	3.8	10.0	3.2	9.4	15.5	17.1	2.3	15.7	18.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.7	40.2	38.5	34.4	39.2	12.2	88.2	48.1	55.1	51.2	50.3	57.4
LnGrp LOS	C	D	D	C	D	B	F	D	E	D	D	E
Approach Vol, veh/h		1268			1320			2039			1696	
Approach Delay, s/veh		38.9			32.8			60.0			52.7	
Approach LOS		D			C			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.1	48.1	15.0	42.8	20.0	47.2	13.4	44.4
Change Period (Y+Rc), s	* 6	5.8	5.9	* 6	* 6.2	* 6	6.0	* 6
Max Green Setting (Gmax), s	* 12	43.2	9.1	* 37	* 14	* 41	9.0	* 37
Max Q Clear Time (g_c+I1), s	2.0	36.7	10.5	36.4	15.8	36.8	3.8	24.5
Green Ext Time (p_c), s	0.3	5.6	0.0	0.4	0.0	3.5	0.1	4.8

Intersection Summary	
HCM 6th Ctrl Delay	48.1
HCM 6th LOS	D

Notes

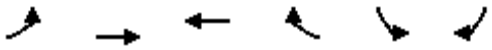
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	74	693	501	334	732	254	514	1525	160	1536
v/c Ratio	0.18	0.74	0.63	0.77	0.70	0.36	0.86	0.80	0.36	0.91
Control Delay	24.2	47.0	23.1	39.3	43.7	9.3	46.6	38.9	43.3	49.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	47.0	23.1	39.3	43.7	9.3	46.6	38.9	43.3	49.5
Queue Length 50th (ft)	18	265	227	91	280	47	160	404	46	435
Queue Length 95th (ft)	33	326	349	122	345	92	#290	482	73	#513
Internal Link Dist (ft)		2378			480			1614		1054
Turn Bay Length (ft)	155			285			475		200	
Base Capacity (vph)	443	1047	780	434	1079	727	600	1896	449	1680
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.66	0.64	0.77	0.68	0.35	0.86	0.80	0.36	0.91

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



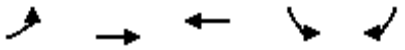
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	311	847	937	229	233	321
Future Volume (veh/h)	311	847	937	229	233	321
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1900	1870	1885	1885	1885	1900
Adj Flow Rate, veh/h	334	911	1008	246	251	345
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	1	1	1	0
Cap, veh/h	703	2689	1882	459	289	672
Arrive On Green	0.26	0.76	0.91	0.91	0.16	0.16
Sat Flow, veh/h	1810	3647	4299	1006	1795	1610
Grp Volume(v), veh/h	334	911	837	417	251	345
Grp Sat Flow(s),veh/h/ln	1810	1777	1716	1704	1795	1610
Q Serve(g_s), s	0.8	10.1	5.1	5.1	16.4	0.0
Cycle Q Clear(g_c), s	0.8	10.1	5.1	5.1	16.4	0.0
Prop In Lane	1.00			0.59	1.00	1.00
Lane Grp Cap(c), veh/h	703	2689	1564	777	289	672
V/C Ratio(X)	0.48	0.34	0.54	0.54	0.87	0.51
Avail Cap(c_a), veh/h	703	2689	1564	777	470	835
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.69	0.69	0.55	0.55	1.00	1.00
Uniform Delay (d), s/veh	20.4	4.8	3.1	3.1	49.1	25.9
Incr Delay (d2), s/veh	0.1	0.2	0.7	1.5	5.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	3.2	1.2	1.4	7.8	11.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.6	5.0	3.8	4.6	54.5	26.1
LnGrp LOS	C	A	A	A	D	C
Approach Vol, veh/h		1245	1254		596	
Approach Delay, s/veh		9.2	4.1		38.1	
Approach LOS		A	A		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		96.1		23.9	36.1	60.0
Change Period (Y+Rc), s		5.3		4.6	5.3	* 5.3
Max Green Setting (Gmax), s		78.7		31.4	20.0	* 55
Max Q Clear Time (g_c+I1), s		12.1		18.4	2.8	7.1
Green Ext Time (p_c), s		17.1		0.9	0.4	22.9

Intersection Summary	
HCM 6th Ctrl Delay	12.7
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

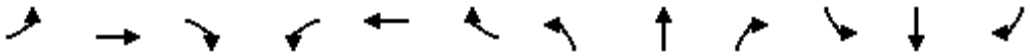


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	334	911	1254	251	345
v/c Ratio	0.70	0.36	0.48	0.69	0.50
Control Delay	34.8	7.3	2.1	54.9	24.8
Queue Delay	0.0	0.4	0.3	0.0	0.0
Total Delay	34.8	7.6	2.4	54.9	24.8
Queue Length 50th (ft)	86	121	12	185	168
Queue Length 95th (ft)	209	181	28	263	238
Internal Link Dist (ft)		480	440	186	
Turn Bay Length (ft)	135				
Base Capacity (vph)	475	2527	2600	467	775
Starvation Cap Reductn	0	994	632	0	0
Spillback Cap Reductn	0	57	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.59	0.64	0.54	0.45

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	870	211	290	927	423	166	115	241	326	102	82
Future Volume (vph)	26	870	211	290	927	423	166	115	241	326	102	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	5.2	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1805	3574	1615	1787	3574	1615	1698	1770	1615	1715	1758	1615
Flt Permitted	0.12	1.00	1.00	0.11	1.00	1.00	0.95	0.99	1.00	0.95	0.97	1.00
Satd. Flow (perm)	232	3574	1615	205	3574	1615	1698	1770	1615	1715	1758	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	27	888	215	296	946	432	169	117	246	333	104	84
RTOR Reduction (vph)	0	0	97	0	0	182	0	0	49	0	0	50
Lane Group Flow (vph)	27	888	118	296	946	250	140	146	197	216	221	34
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%	1%	1%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	pt+ov	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	3 1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	41.7	32.7	32.7	49.1	36.7	36.7	20.4	20.4	32.8	34.2	34.2	48.4
Effective Green, g (s)	41.7	32.7	32.7	49.1	36.7	36.7	20.4	20.4	32.8	34.2	34.2	48.4
Actuated g/C Ratio	0.35	0.27	0.27	0.41	0.31	0.31	0.17	0.17	0.27	0.29	0.29	0.40
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2		5.2	5.2	
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	198	973	440	247	1093	493	288	300	441	488	501	651
v/s Ratio Prot	0.01	0.25		c0.12	0.26		0.08	c0.08	0.12	c0.13	0.13	0.02
v/s Ratio Perm	0.04		0.07	c0.37		0.15						
v/c Ratio	0.14	0.91	0.27	1.20	0.87	0.51	0.49	0.49	0.45	0.44	0.44	0.05
Uniform Delay, d1	28.1	42.3	34.3	33.3	39.3	34.2	45.1	45.1	36.1	35.1	35.1	21.8
Progression Factor	0.79	0.79	0.53	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	13.5	1.4	121.6	9.2	3.7	0.5	0.5	0.3	2.9	2.8	0.0
Delay (s)	22.3	46.7	19.6	154.9	48.5	37.9	45.5	45.5	36.3	38.0	37.9	21.8
Level of Service	C	D	B	F	D	D	D	D	D	D	D	C
Approach Delay (s)		40.9			64.6			41.3			35.3	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	50.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



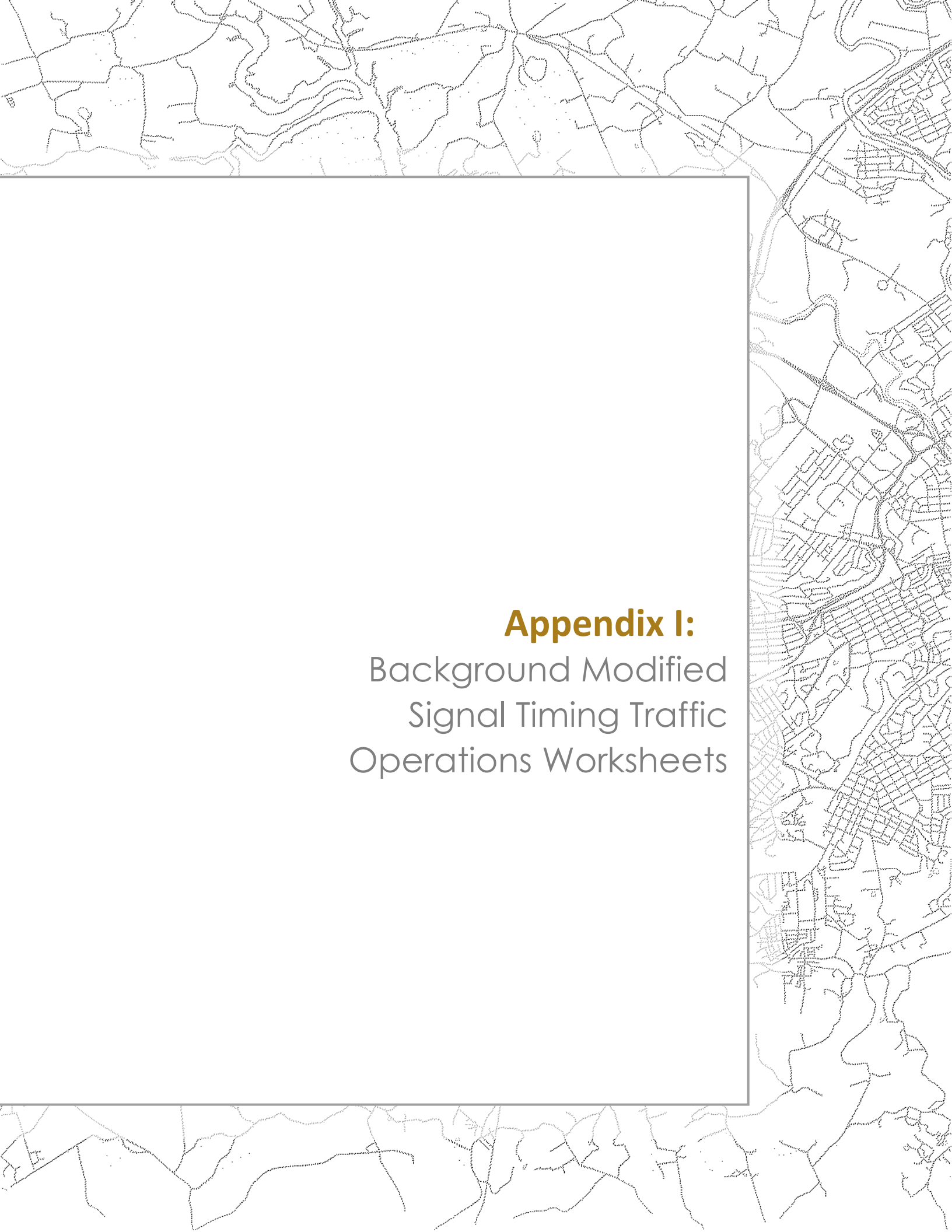
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	888	215	296	946	432	140	146	246	216	221	84
v/c Ratio	0.13	0.91	0.40	1.19	0.87	0.64	0.49	0.49	0.51	0.44	0.44	0.12
Control Delay	17.6	47.3	9.5	149.0	48.9	18.4	51.3	51.1	17.2	38.8	38.6	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	47.3	9.5	149.0	48.9	18.4	51.3	51.1	17.2	38.8	38.6	5.4
Queue Length 50th (ft)	9	362	25	~225	363	110	105	109	54	143	146	0
Queue Length 95th (ft)	m21	#452	72	#405	#454	225	171	177	89	227	232	33
Internal Link Dist (ft)		440			2455			2238			214	
Turn Bay Length (ft)	330		150	265		150	105					
Base Capacity (vph)	201	973	536	248	1093	675	464	483	642	489	501	686
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.91	0.40	1.19	0.87	0.64	0.30	0.30	0.38	0.44	0.44	0.12

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

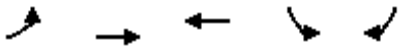
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



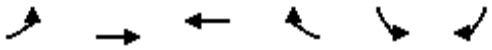
Appendix I:

Background Modified Signal Timing Traffic Operations Worksheets



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	261	1026	1460	229	259
v/c Ratio	0.60	0.38	0.51	0.76	0.44
Control Delay	29.2	6.0	9.2	63.1	27.5
Queue Delay	0.0	0.4	0.2	2.0	2.9
Total Delay	29.2	6.4	9.3	65.1	30.4
Queue Length 50th (ft)	59	122	104	171	135
Queue Length 95th (ft)	160	196	51	243	185
Internal Link Dist (ft)		480	440	166	
Turn Bay Length (ft)	135				
Base Capacity (vph)	483	2678	2869	475	735
Starvation Cap Reductn	0	1014	521	132	363
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.54	0.62	0.62	0.67	0.70

Intersection Summary



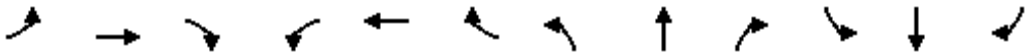
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	253	995	1224	192	222	251
Future Volume (veh/h)	253	995	1224	192	222	251
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1885	1870	1885	1885	1885	1885
Adj Flow Rate, veh/h	261	1026	1262	198	229	259
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	2	1	1	1	1
Cap, veh/h	767	2727	1650	259	284	828
Arrive On Green	0.36	0.77	0.74	0.73	0.16	0.16
Sat Flow, veh/h	1795	3647	4655	704	1795	1598
Grp Volume(v), veh/h	261	1026	965	495	229	259
Grp Sat Flow(s),veh/h/ln	1795	1777	1716	1758	1795	1598
Q Serve(g_s), s	3.5	11.3	20.4	20.5	14.8	0.0
Cycle Q Clear(g_c), s	3.5	11.3	20.4	20.5	14.8	0.0
Prop In Lane	1.00			0.40	1.00	1.00
Lane Grp Cap(c), veh/h	767	2727	1262	647	284	828
V/C Ratio(X)	0.34	0.38	0.76	0.76	0.81	0.31
Avail Cap(c_a), veh/h	767	2727	1521	780	477	999
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.61	0.61	0.69	0.69	1.00	1.00
Uniform Delay (d), s/veh	22.5	4.6	12.7	12.9	48.7	16.6
Incr Delay (d2), s/veh	0.1	0.2	3.1	5.9	2.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	3.5	4.7	5.3	6.8	8.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.6	4.8	15.8	18.8	50.8	16.7
LnGrp LOS	C	A	B	B	D	B
Approach Vol, veh/h		1287	1460		488	
Approach Delay, s/veh		8.4	16.9		32.7	
Approach LOS		A	B		C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		96.9		23.1	48.0	48.9
Change Period (Y+Rc), s		5.3		4.6	5.3	* 5.3
Max Green Setting (Gmax), s		78.7		31.4	22.0	* 53
Max Q Clear Time (g_c+I1), s		14.3		17.8	6.5	23.4
Green Ext Time (p_c), s		20.4		0.7	0.3	20.2

Intersection Summary	
HCM 6th Ctrl Delay	15.9
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



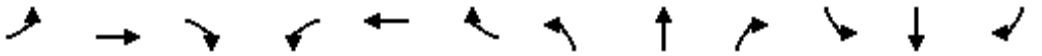
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	16	955	269	452	1064	329	219	228	418	211	217	67
v/c Ratio	0.06	1.04	0.46	0.97	0.69	0.41	0.73	0.75	0.63	0.73	0.72	0.14
Control Delay	16.6	81.3	6.9	70.3	33.4	15.3	60.4	61.7	9.3	61.6	60.5	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	81.3	6.9	70.3	33.4	15.3	60.4	61.7	9.3	61.6	60.5	7.3
Queue Length 50th (ft)	4	~425	33	~305	364	83	169	176	0	164	168	0
Queue Length 95th (ft)	m15	#536	45	#656	#565	191	246	255	106	242	246	32
Internal Link Dist (ft)		440			2455			2238			219	
Turn Bay Length (ft)	330			265		150	105					
Base Capacity (vph)	340	914	589	466	1540	798	389	394	666	368	383	563
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	1.04	0.46	0.97	0.69	0.41	0.56	0.58	0.63	0.57	0.57	0.12

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

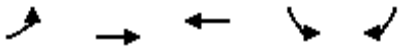
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	945	266	447	1053	326	315	128	414	261	162	66
Future Volume (vph)	16	945	266	447	1053	326	315	128	414	261	162	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1805	3574	1615	1770	3539	1615	1681	1704	1509	1715	1783	1615
Flt Permitted	0.23	1.00	1.00	0.11	1.00	1.00	0.95	0.98	1.00	0.95	0.99	1.00
Satd. Flow (perm)	429	3574	1615	210	3539	1615	1681	1704	1509	1715	1783	1615
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	16	955	269	452	1064	329	318	129	418	264	164	67
RTOR Reduction (vph)	0	0	176	0	0	96	0	0	323	0	0	49
Lane Group Flow (vph)	16	955	93	452	1064	233	219	228	95	211	217	18
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%	2%	5%	7%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	Over	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	38.0	30.8	30.8	62.7	51.5	51.5	21.4	21.4	27.3	20.2	20.2	32.6
Effective Green, g (s)	38.0	30.8	30.8	62.7	51.5	51.5	21.4	21.4	27.3	20.2	20.2	32.6
Actuated g/C Ratio	0.32	0.26	0.26	0.52	0.43	0.43	0.18	0.18	0.23	0.17	0.17	0.27
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	218	917	414	464	1518	693	299	303	343	288	300	438
v/s Ratio Prot	0.00	0.27		c0.22	0.30		0.13	c0.13	0.06	c0.12	0.12	0.01
v/s Ratio Perm	0.02		0.06	c0.29		0.14						
v/c Ratio	0.07	1.04	0.22	0.97	0.70	0.34	0.73	0.75	0.28	0.73	0.72	0.04
Uniform Delay, d1	28.4	44.6	35.2	36.0	28.0	22.8	46.6	46.8	38.2	47.3	47.3	32.2
Progression Factor	0.86	0.91	0.66	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	40.1	1.2	34.8	2.7	1.3	8.9	10.1	0.4	9.3	8.4	0.0
Delay (s)	24.7	80.8	24.3	70.8	30.7	24.2	55.5	56.9	38.7	56.6	55.6	32.2
Level of Service	C	F	C	E	C	C	E	E	D	E	E	C
Approach Delay (s)		67.8			39.3			47.7			52.9	
Approach LOS		E			D			D			D	

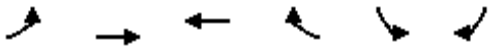
Intersection Summary			
HCM 2000 Control Delay	50.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	338	1094	1407	252	347
v/c Ratio	0.73	0.43	0.56	0.69	0.50
Control Delay	40.8	7.9	4.1	55.0	25.7
Queue Delay	0.0	0.5	0.4	0.0	0.0
Total Delay	40.8	8.5	4.5	55.0	25.7
Queue Length 50th (ft)	129	155	23	185	180
Queue Length 95th (ft)	#253	231	m56	264	249
Internal Link Dist (ft)		480	440	186	
Turn Bay Length (ft)	135				
Base Capacity (vph)	461	2527	2517	467	788
Starvation Cap Reductn	0	920	543	0	0
Spillback Cap Reductn	0	244	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.73	0.68	0.71	0.54	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



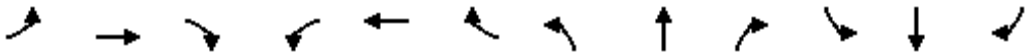
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	314	1017	1078	231	234	323
Future Volume (veh/h)	314	1017	1078	231	234	323
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1900	1870	1885	1885	1885	1900
Adj Flow Rate, veh/h	338	1094	1159	248	252	347
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	1	1	1	0
Cap, veh/h	689	2687	1864	399	290	699
Arrive On Green	0.27	0.76	0.88	0.88	0.16	0.16
Sat Flow, veh/h	1810	3647	4414	908	1795	1610
Grp Volume(v), veh/h	338	1094	937	470	252	347
Grp Sat Flow(s),veh/h/ln	1810	1777	1716	1722	1795	1610
Q Serve(g_s), s	4.1	13.0	8.8	8.8	16.4	0.0
Cycle Q Clear(g_c), s	4.1	13.0	8.8	8.8	16.4	0.0
Prop In Lane	1.00			0.53	1.00	1.00
Lane Grp Cap(c), veh/h	689	2687	1507	756	290	699
V/C Ratio(X)	0.49	0.41	0.62	0.62	0.87	0.50
Avail Cap(c_a), veh/h	689	2687	1507	756	470	860
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.63	0.63	0.43	0.43	1.00	1.00
Uniform Delay (d), s/veh	23.6	5.2	4.6	4.6	49.1	24.5
Incr Delay (d2), s/veh	0.1	0.3	0.8	1.7	5.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	4.1	1.9	2.0	7.9	11.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.7	5.4	5.5	6.3	54.6	24.7
LnGrp LOS	C	A	A	A	D	C
Approach Vol, veh/h		1432	1407		599	
Approach Delay, s/veh		9.8	5.7		37.3	
Approach LOS		A	A		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		96.0		24.0	38.0	58.0
Change Period (Y+Rc), s		5.3		4.6	5.3	* 5.3
Max Green Setting (Gmax), s		78.7		31.4	22.0	* 53
Max Q Clear Time (g_c+I1), s		15.0		18.4	6.1	10.8
Green Ext Time (p_c), s		22.6		0.9	0.4	24.7

Intersection Summary	
HCM 6th Ctrl Delay	12.9
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



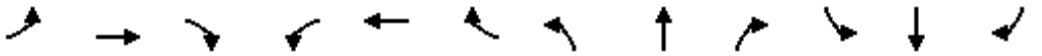
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	1047	232	369	1030	437	177	183	268	219	223	84
v/c Ratio	0.13	1.04	0.43	1.58	0.94	0.66	0.58	0.58	0.55	0.46	0.46	0.12
Control Delay	18.8	74.5	13.3	307.5	57.4	20.7	53.2	52.9	18.4	40.6	40.4	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.8	74.5	13.3	307.5	57.4	20.7	53.2	52.9	18.4	40.6	40.4	5.9
Queue Length 50th (ft)	9	~466	37	~357	408	128	135	140	62	145	148	0
Queue Length 95th (ft)	m22	#580	101	#552	#543	247	204	209	102	243	246	35
Internal Link Dist (ft)		440			2455			2238			214	
Turn Bay Length (ft)	330		150	265		150	105					
Base Capacity (vph)	201	1003	542	233	1093	663	464	480	630	473	485	672
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	1.04	0.43	1.58	0.94	0.66	0.38	0.38	0.43	0.46	0.46	0.13

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

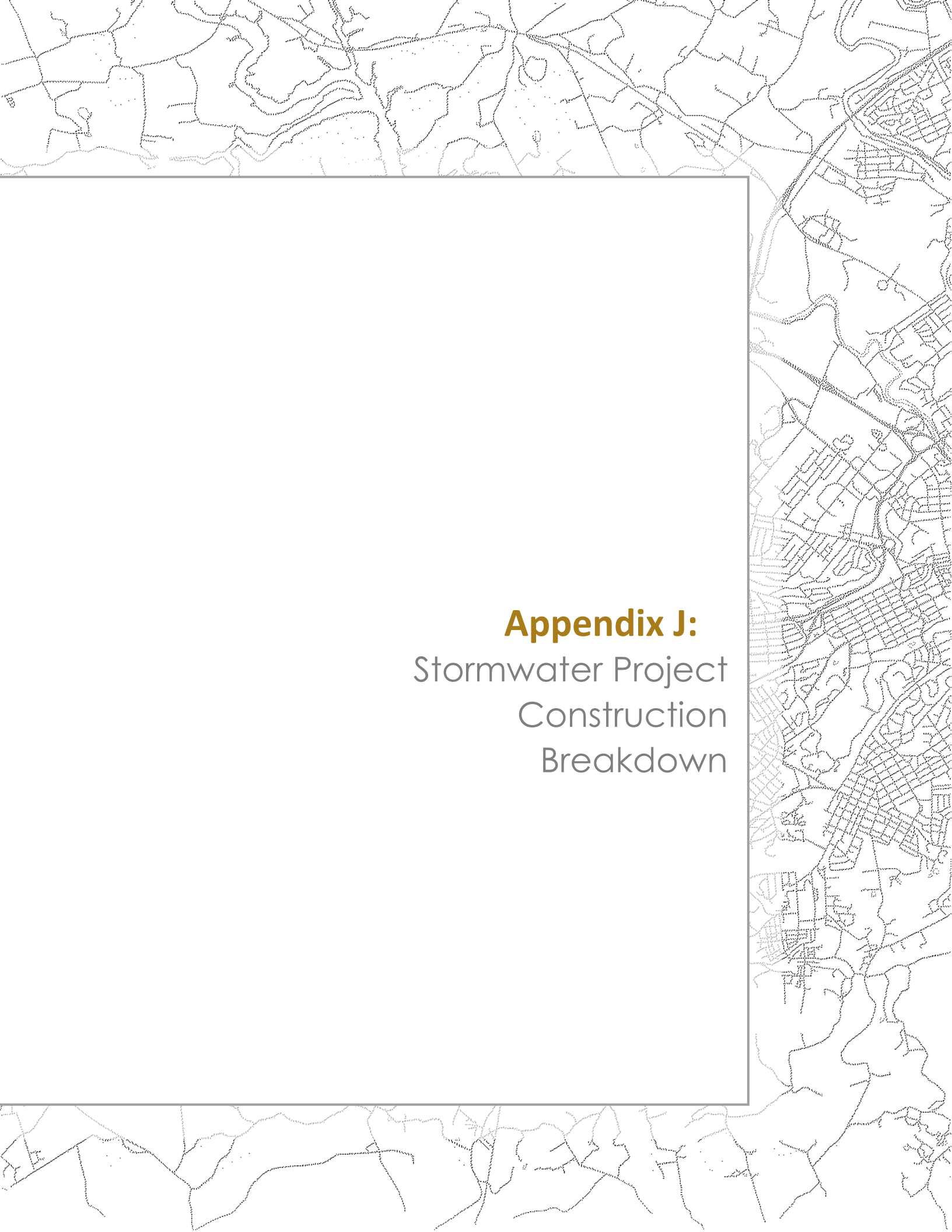
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



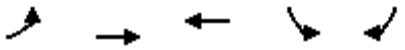
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1026	227	362	1009	428	237	116	263	330	103	82
Future Volume (vph)	26	1026	227	362	1009	428	237	116	263	330	103	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	5.2	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1805	3574	1615	1787	3574	1615	1698	1756	1615	1715	1758	1615
Flt Permitted	0.12	1.00	1.00	0.11	1.00	1.00	0.95	0.98	1.00	0.95	0.97	1.00
Satd. Flow (perm)	226	3574	1615	205	3574	1615	1698	1756	1615	1715	1758	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	27	1047	232	369	1030	437	242	118	268	337	105	84
RTOR Reduction (vph)	0	0	88	0	0	169	0	0	49	0	0	51
Lane Group Flow (vph)	27	1047	144	369	1030	268	177	183	219	219	223	33
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%	1%	1%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	pt+ov	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	3 1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	42.7	33.7	33.7	48.1	36.7	36.7	21.5	21.5	32.9	33.1	33.1	47.3
Effective Green, g (s)	42.7	33.7	33.7	48.1	36.7	36.7	21.5	21.5	32.9	33.1	33.1	47.3
Actuated g/C Ratio	0.36	0.28	0.28	0.40	0.31	0.31	0.18	0.18	0.27	0.28	0.28	0.39
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2		5.2	5.2	
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	198	1003	453	232	1093	493	304	314	442	473	484	636
v/s Ratio Prot	0.01	0.29		c0.15	0.29		c0.10	0.10	0.14	c0.13	0.13	0.02
v/s Ratio Perm	0.04		0.09	c0.49		0.17						
v/c Ratio	0.14	1.04	0.32	1.59	0.94	0.54	0.58	0.58	0.49	0.46	0.46	0.05
Uniform Delay, d1	28.5	43.1	34.1	32.8	40.6	34.7	45.1	45.1	36.6	36.1	36.0	22.5
Progression Factor	0.85	0.81	0.68	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	39.2	1.7	285.2	16.5	4.2	1.8	1.8	0.3	3.2	3.1	0.0
Delay (s)	24.3	74.4	24.8	318.0	57.1	38.9	47.0	46.9	36.9	39.3	39.2	22.5
Level of Service	C	E	C	F	E	D	D	D	D	D	D	C
Approach Delay (s)		64.5			105.2			42.7			36.6	
Approach LOS		E			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	75.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



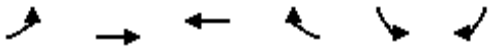
Appendix J:

Stormwater Project Construction Breakdown



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	261	1026	1460	229	259
v/c Ratio	0.60	0.38	0.51	0.76	0.44
Control Delay	29.2	6.0	9.2	63.1	27.5
Queue Delay	0.0	0.4	0.2	2.0	2.9
Total Delay	29.2	6.4	9.3	65.1	30.4
Queue Length 50th (ft)	59	122	104	171	135
Queue Length 95th (ft)	160	196	51	243	185
Internal Link Dist (ft)		480	440	166	
Turn Bay Length (ft)	135				
Base Capacity (vph)	483	2678	2869	475	735
Starvation Cap Reductn	0	1014	521	132	363
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.54	0.62	0.62	0.67	0.70

Intersection Summary



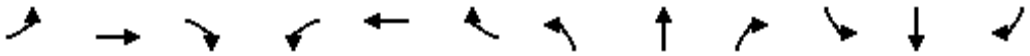
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	253	995	1224	192	222	251
Future Volume (veh/h)	253	995	1224	192	222	251
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1885	1870	1885	1885	1885	1885
Adj Flow Rate, veh/h	261	1026	1262	198	229	259
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	2	1	1	1	1
Cap, veh/h	767	2727	1650	259	284	828
Arrive On Green	0.36	0.77	0.74	0.73	0.16	0.16
Sat Flow, veh/h	1795	3647	4655	704	1795	1598
Grp Volume(v), veh/h	261	1026	965	495	229	259
Grp Sat Flow(s),veh/h/ln	1795	1777	1716	1758	1795	1598
Q Serve(g_s), s	3.5	11.3	20.4	20.5	14.8	0.0
Cycle Q Clear(g_c), s	3.5	11.3	20.4	20.5	14.8	0.0
Prop In Lane	1.00			0.40	1.00	1.00
Lane Grp Cap(c), veh/h	767	2727	1262	647	284	828
V/C Ratio(X)	0.34	0.38	0.76	0.76	0.81	0.31
Avail Cap(c_a), veh/h	767	2727	1521	780	477	999
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.61	0.61	0.69	0.69	1.00	1.00
Uniform Delay (d), s/veh	22.5	4.6	12.7	12.9	48.7	16.6
Incr Delay (d2), s/veh	0.1	0.2	3.1	5.9	2.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	3.5	4.7	5.3	6.8	8.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.6	4.8	15.8	18.8	50.8	16.7
LnGrp LOS	C	A	B	B	D	B
Approach Vol, veh/h		1287	1460		488	
Approach Delay, s/veh		8.4	16.9		32.7	
Approach LOS		A	B		C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		96.9		23.1	48.0	48.9
Change Period (Y+Rc), s		5.3		4.6	5.3	* 5.3
Max Green Setting (Gmax), s		78.7		31.4	22.0	* 53
Max Q Clear Time (g_c+I1), s		14.3		17.8	6.5	23.4
Green Ext Time (p_c), s		20.4		0.7	0.3	20.2

Intersection Summary	
HCM 6th Ctrl Delay	15.9
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



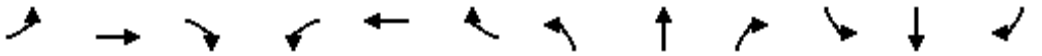
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	16	955	269	452	1064	329	219	228	418	211	217	67
v/c Ratio	0.06	1.04	0.46	0.97	0.69	0.41	0.73	0.75	0.63	0.73	0.72	0.14
Control Delay	16.6	81.3	6.9	70.3	33.4	15.3	60.4	61.7	9.3	61.6	60.5	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	81.3	6.9	70.3	33.4	15.3	60.4	61.7	9.3	61.6	60.5	7.3
Queue Length 50th (ft)	4	~425	33	~305	364	83	169	176	0	164	168	0
Queue Length 95th (ft)	m15	#536	45	#656	#565	191	246	255	106	242	246	32
Internal Link Dist (ft)		440			2455			2238			219	
Turn Bay Length (ft)	330			265		150	105					
Base Capacity (vph)	340	914	589	466	1540	798	389	394	666	368	383	563
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	1.04	0.46	0.97	0.69	0.41	0.56	0.58	0.63	0.57	0.57	0.12

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

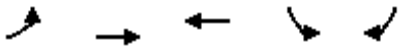
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	945	266	447	1053	326	315	128	414	261	162	66
Future Volume (vph)	16	945	266	447	1053	326	315	128	414	261	162	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1805	3574	1615	1770	3539	1615	1681	1704	1509	1715	1783	1615
Flt Permitted	0.23	1.00	1.00	0.11	1.00	1.00	0.95	0.98	1.00	0.95	0.99	1.00
Satd. Flow (perm)	429	3574	1615	210	3539	1615	1681	1704	1509	1715	1783	1615
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	16	955	269	452	1064	329	318	129	418	264	164	67
RTOR Reduction (vph)	0	0	176	0	0	96	0	0	323	0	0	49
Lane Group Flow (vph)	16	955	93	452	1064	233	219	228	95	211	217	18
Heavy Vehicles (%)	0%	1%	0%	2%	2%	0%	2%	5%	7%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	Over	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	38.0	30.8	30.8	62.7	51.5	51.5	21.4	21.4	27.3	20.2	20.2	32.6
Effective Green, g (s)	38.0	30.8	30.8	62.7	51.5	51.5	21.4	21.4	27.3	20.2	20.2	32.6
Actuated g/C Ratio	0.32	0.26	0.26	0.52	0.43	0.43	0.18	0.18	0.23	0.17	0.17	0.27
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	4.6	5.2	5.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	218	917	414	464	1518	693	299	303	343	288	300	438
v/s Ratio Prot	0.00	0.27		c0.22	0.30		0.13	c0.13	0.06	c0.12	0.12	0.01
v/s Ratio Perm	0.02		0.06	c0.29		0.14						
v/c Ratio	0.07	1.04	0.22	0.97	0.70	0.34	0.73	0.75	0.28	0.73	0.72	0.04
Uniform Delay, d1	28.4	44.6	35.2	36.0	28.0	22.8	46.6	46.8	38.2	47.3	47.3	32.2
Progression Factor	0.86	0.91	0.66	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	40.1	1.2	34.8	2.7	1.3	8.9	10.1	0.4	9.3	8.4	0.0
Delay (s)	24.7	80.8	24.3	70.8	30.7	24.2	55.5	56.9	38.7	56.6	55.6	32.2
Level of Service	C	F	C	E	C	C	E	E	D	E	E	C
Approach Delay (s)		67.8			39.3			47.7			52.9	
Approach LOS		E			D			D			D	

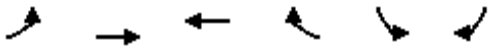
Intersection Summary			
HCM 2000 Control Delay	50.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	338	1094	1407	252	347
v/c Ratio	0.73	0.43	0.56	0.69	0.50
Control Delay	40.8	7.9	2.8	55.0	25.7
Queue Delay	0.0	0.5	0.5	0.0	0.0
Total Delay	40.8	8.5	3.3	55.0	25.7
Queue Length 50th (ft)	129	155	15	185	180
Queue Length 95th (ft)	#253	231	m38	264	249
Internal Link Dist (ft)		480	440	186	
Turn Bay Length (ft)	135				
Base Capacity (vph)	461	2527	2517	467	788
Starvation Cap Reductn	0	920	579	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.73	0.68	0.73	0.54	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



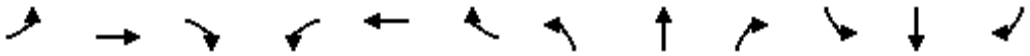
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	314	1017	1078	231	234	323
Future Volume (veh/h)	314	1017	1078	231	234	323
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1900	1870	1885	1885	1885	1900
Adj Flow Rate, veh/h	338	1094	1159	248	252	347
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	1	1	1	0
Cap, veh/h	689	2687	1864	399	290	699
Arrive On Green	0.27	0.76	0.88	0.88	0.16	0.16
Sat Flow, veh/h	1810	3647	4414	908	1795	1610
Grp Volume(v), veh/h	338	1094	937	470	252	347
Grp Sat Flow(s),veh/h/ln	1810	1777	1716	1722	1795	1610
Q Serve(g_s), s	4.1	13.0	8.8	8.8	16.4	0.0
Cycle Q Clear(g_c), s	4.1	13.0	8.8	8.8	16.4	0.0
Prop In Lane	1.00			0.53	1.00	1.00
Lane Grp Cap(c), veh/h	689	2687	1507	756	290	699
V/C Ratio(X)	0.49	0.41	0.62	0.62	0.87	0.50
Avail Cap(c_a), veh/h	689	2687	1507	756	470	860
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.63	0.63	0.19	0.19	1.00	1.00
Uniform Delay (d), s/veh	23.6	5.2	4.6	4.6	49.1	24.5
Incr Delay (d2), s/veh	0.1	0.3	0.4	0.7	5.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	4.1	1.8	1.8	7.9	11.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.7	5.4	5.0	5.4	54.6	24.7
LnGrp LOS	C	A	A	A	D	C
Approach Vol, veh/h		1432	1407		599	
Approach Delay, s/veh		9.8	5.1		37.3	
Approach LOS		A	A		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		96.0		24.0	38.0	58.0
Change Period (Y+Rc), s		5.3		4.6	5.3	* 5.3
Max Green Setting (Gmax), s		78.7		31.4	22.0	* 53
Max Q Clear Time (g_c+I1), s		15.0		18.4	6.1	10.8
Green Ext Time (p_c), s		22.6		0.9	0.4	24.7

Intersection Summary	
HCM 6th Ctrl Delay	12.7
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



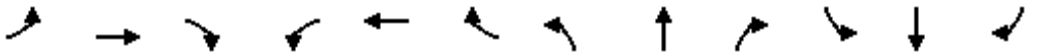
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	1047	232	369	1030	437	177	183	268	219	223	84
v/c Ratio	0.09	1.15	0.46	1.26	1.09	0.73	0.58	0.58	0.50	0.48	0.47	0.11
Control Delay	18.6	112.4	16.1	171.4	99.1	26.8	53.3	53.1	16.0	41.6	41.4	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.6	112.4	16.1	171.4	99.1	26.8	53.3	53.1	16.0	41.6	41.4	5.1
Queue Length 50th (ft)	10	~505	41	~307	~473	149	135	140	60	147	150	0
Queue Length 95th (ft)	m25	#619	119	#502	#606	278	204	210	94	245	248	32
Internal Link Dist (ft)		440			2455			2238			214	
Turn Bay Length (ft)	330		150	265		150	105					
Base Capacity (vph)	291	914	501	293	944	595	393	407	617	460	471	737
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	1.15	0.46	1.26	1.09	0.73	0.45	0.45	0.43	0.48	0.47	0.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1026	227	362	1009	428	237	116	263	330	103	82
Future Volume (vph)	26	1026	227	362	1009	428	237	116	263	330	103	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2	5.2	5.2	5.2	5.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1805	3574	1615	1787	3574	1615	1698	1756	1615	1715	1758	1615
Flt Permitted	0.13	1.00	1.00	0.13	1.00	1.00	0.95	0.98	1.00	0.95	0.97	1.00
Satd. Flow (perm)	248	3574	1615	237	3574	1615	1698	1756	1615	1715	1758	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	27	1047	232	369	1030	437	242	118	268	337	105	84
RTOR Reduction (vph)	0	0	89	0	0	169	0	0	47	0	0	47
Lane Group Flow (vph)	27	1047	143	369	1030	268	177	183	221	219	223	37
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%	1%	1%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Split	NA	pt+ov	Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3	3 1	4	4	4 5
Permitted Phases	2		2	6		6						
Actuated Green, G (s)	45.7	30.7	30.7	47.1	31.7	31.7	21.4	21.4	36.8	32.2	32.2	52.4
Effective Green, g (s)	45.7	30.7	30.7	47.1	31.7	31.7	21.4	21.4	36.8	32.2	32.2	52.4
Actuated g/C Ratio	0.38	0.26	0.26	0.39	0.26	0.26	0.18	0.18	0.31	0.27	0.27	0.44
Clearance Time (s)	4.0	5.3	5.3	4.6	5.3	5.3	5.2	5.2		5.2	5.2	
Vehicle Extension (s)	2.0	5.0	5.0	2.0	5.0	5.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	289	914	413	291	944	426	302	313	495	460	471	705
v/s Ratio Prot	0.01	0.29		c0.16	0.29		c0.10	0.10	0.14	c0.13	0.13	0.02
v/s Ratio Perm	0.02		0.09	c0.33		0.17						
v/c Ratio	0.09	1.15	0.35	1.27	1.09	0.63	0.59	0.58	0.45	0.48	0.47	0.05
Uniform Delay, d1	26.4	44.6	36.5	34.5	44.1	39.0	45.2	45.2	33.4	36.8	36.8	19.5
Progression Factor	0.91	0.83	0.73	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	77.4	2.1	145.0	57.3	6.9	1.9	1.8	0.2	3.5	3.4	0.0
Delay (s)	23.9	114.4	28.9	179.4	101.5	45.8	47.1	47.0	33.6	40.3	40.2	19.5
Level of Service	C	F	C	F	F	D	D	D	C	D	D	B
Approach Delay (s)		97.3			103.9			41.3			36.9	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	84.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.3
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			