JOSH GREEN, M.D.
GOVERNOR

EDWIN H. SNIFFEN
DIRECTOR

Deputy Directors
DREANALEE K. KALILI
TAMMY L. LEE
ROBIN K. SHISHIDO

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:

DIR 0402
HWY-PL 2.1327

May 18, 2023

Ms. Kelcee Fujimoto
Austi Tsutsumi & Associates
1871 Wili Pa Loop, Suite A
Wailuku, HI 96793

Dear Ms. Fujimoto:

Subject: Request for Traffic Management Plan (TMP) Review
AES Waiawa Phase 2 Solar Project
Waiawa, Oahu, Hawaii
Tax Map Key: (1) 9-4-006: 034, 035 (Por) and 037 (Por)
(1) 9-6-004: 024 (Por), 025 and 026

Thank you for your letter dated March 30, 2023, requesting our review and acceptance of the TMP pursuant to the fulfillment of the Land Use Commission (LUC) decision and order under Case No. A87-610.

The applicant proposes to install a 30-megawatt alternating current/60-megawatt direct current ground-mounted solar photovoltaic array, including a 240-megawatt-hour battery energy storage system, a substation, and related interconnection and ancillary facilities.

The LUC approved solar farm project is broken down into Phase 1 and Phase 2 sites under the LUC description. During the review, our staff reached out to the applicant (AES) and confirmed the request is for the project's work related to Phase 2 even though it is shown as Phase 1 in the LUC report.

The project site will be accessed from Ka Uka Boulevard and east of the Ka Uka Boulevard and H-2 Interchange.

The Hawaii Department of Transportation (HDOT) has the following comments:

1. The HDOT has completed the review of the TMP. At this preliminary level review in absence of any construction submittal, we find that the document is adequate and satisfies

the LUC decision and order condition. However, it shall be subject to the final acceptance by the HDOT Highways, Construction and Maintenance Branch, and the Oahu district during construction permit review.

2. The HDOT reviewed the last request (see attached letter STP 8.3339 dated January 22, 2022) related to the LUC's motion to modify conditions, including Condition 5. This was based on the 2020 Condition 5 modifications approved for Phase 2, which states that: "Prior to the start of construction, Petitioner shall submit a Traffic Consultation Management Plan for review and acceptance by the DOT."

If you have any questions, please contact Jeyan Thirugnanam, Land Use Planning Engineer, Highways Planning Branch at (808) 587-6336 or by email at jeyan.thirugnanam@hawaii.gov. Please reference file review number PL 2023-028.

Sincerely,

EDWIN H. SNIFFEN
Director of Transportation

c: Land Use Commission

DAVID Y. IGE
GOVERNOR

JADE T. BUTAY
DIRECTOR

Deputy Directors
ROSS M. HIGASHI
EDUARDO P. MANGLALLAN
PATRICK H. MCCAIN
EDWIN H. SNIFFEN

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
DIR 1190
STP 8.3339

January 20, 2022

VIA EMAIL: dbedt.op.lud@hawaii.gov

TO: MARY ALICE EVANS
DIRECTOR
OFFICE OF PLANNING AND SUSTAINABLE DEVELOPMENT (OPSD)

THRU: RODNEY FUNAKOSHI
PLANNING PROGRAM ADMINISTRATOR
OPSD, LAND USE DIVISION

ATTN: LORENE MAKI
PLANNER
OPSD, LAND USE DIVISION

FROM: JADE T. BUTAY
DIRECTOR OF TRANSPORTATION

SUBJECT: MOTION FOR MODIFICATION, TIME EXTENSION, AND RELEASE AND MODIFICATION OF CONDITIONS
LAND USE COMMISSION (LUC) DOCKET NO. A87-610
WAIAWA PHASE 2 SOLAR, LLC
WAIAWA, OAHU, HAWAII
TAX MAP KEYS: (1) 9-4-006: 034, 035, 036, 037 (POR.); 9-6-004: 024 (POR.), 025, 026

Thank you for your letter dated December 17, 2021 requesting the review and comments for the Motion for LUC Docket No. A87-610. The Hawaii Department of Transportation (HDOT) understands Kamehameha Schools (KS) acquired the subject petition area in 2012, and in 2014 obtained an LUC approval to develop two utility-scale solar projects (Phase 1 and Phase 2) as interim uses for 35 years within the petition area. KS received LUC approval in 2020 for modifications to the 2014 Phase 2 project and relevant conditions. KS is now requesting LUC approvals for the Phase 1 project. The request is for the modification of the Phase 1 solar farm project as approved in 2014, a time extension for decommissioning of the two parcels of the Phase 1 project, and the release of two conditions and modification of eight conditions which were approved in the 2014 Findings of Fact, Conclusions of Law, and Decision and Order.

Access to the Phase 1 site is from the Ka Uka Boulevard to Mililani Memorial Park Road and Waiawa Prison Road to the project site's driveway.

HDOT has the following comments:

Airports Division (HDOT-A)

The HDOT-A has reviewed the Petitioner's request and does not have any concerns. The modification to Condition No. 4, Aircraft Hazard, on page 11 of the Memorandum in Support of Motion is valid and is applicable to both Phase 1 and 2.

Highways Division (HDOT-HWY)

The HDOT-HWY has the following comments relevant to State highways.

1. The HDOT-HWY concurs with the findings and recommendations of the Mobility Assessment, summarized as follows:

    a. During Phase 1 operations, there would be less than 5 employees onsite at one time for periodic maintenance. Operations would have a negligible impact on State highways.

    b. Construction duration would be 15 to 18 months, with completion anticipated in Fall 2023. The project would generate 142 trips (workers and construction trucks) during peak traffic hours during the three-month peak construction period. The analysis included a carpool factor of 1.5 workers per vehicle. The number of worker trips is an overestimate, because the workday would begin and end outside of the peak traffic hours. The projected 2023, without the project, includes: a population growth factor, completion of the HDOT-HWY programmed Ka Uka Boulevard/H-2 improvements are complete, and development of Increment 1, Phase 1 of the Koa Ridge project. The three Ka Uka Boulevard/H-2 intersections included in the Mobility Assessment were at the H-2 southbound off-ramp, southbound on-ramp, and northbound ramps. All three intersections would operate at acceptable Levels of Service (LOS), LOS D or better, in 2023 with or without the construction traffic. The project traffic would result in minor delays at the intersections, but the impacts would be temporary. No significant impacts to State highways capacity were identified, and no intersection improvements are warranted.

    c. Potential construction impacts to Mililani Memorial Park Road and Waiawa Prison Road traffic safety will be addressed in a detailed Traffic Construction Management Plan (CMP). The Mobility Assessment mentions County approval of the CMP; however, the HDOT-HWY shall also approve the CMP per LUC Condition 5 modifications (See HDOT-HWY Comment 2). The HDOT-HWY supports travel demand strategies to reduce peak hour traffic, such as worker

carpools and schedule management, mentioned in the Mobility Assessment. These and other strategies should be specified in the CMP.

2. Table 1, Page 9 of the Memorandum in Support of Motion summarizes the proposed modifications to the 2014 Phase 1 LUC conditions. Condition 5, Traffic Impacts, is the only condition relevant to roadways and traffic. The following proposed language is based on the 2020 Condition 5 modifications approved for Phase 2: "Prior to the start of construction, Petitioner shall submit a Traffic Construction Management Plan for review and acceptance by the DOT."

   The HDOT has no concerns regarding the proposed modification to Condition 5.

3. 2014 LUC Condition 1, Revised Master Plan, requires a revised master plan for the petition area, and Condition 9, Metes and Bounds Map and Description, requires a map of Phase 1 and 2 project areas. KS has met both conditions.

   The HDOT has no concerns regarding releasing these two conditions, as requested in the 2021 motion.

4. Due to delays in Phase 1 construction, the current motion requests the Phase 1 decommissioning deadline approved in 2014, November 26, 2049, be extended. The proposed decommissioning deadlines are December 31, 2044, for Parcel A, and December 31, 2054, for Parcel B.

   The HDOT has no concerns regarding the proposed time extensions.

If there are any questions, please contact Mr. Blayne Nikaido of the HDOT Statewide Transportation Planning Office at (808) 831-7979 or via email at blayne.h.nikaido@hawaii.gov.

BN:nt

bc: AIR-EP, HWY-P (PS 2022-000), STP (21-127)

AUSTIN, TSUTSUMI & ASSOCIATES, INC. CIVIL ENGINEERS • SURVEYORS
CONTINUING THE ENGINEERING PRACTICE FOUNDED BY H. A. R. AUSTIN IN 1934

TERRANCE S. ARASHIRO, P.E.
ADRIENNE W.L.H. WONG, P.E., LEED AP
DEANNA M.R. HAYASHI, P.E.
PAUL K. ARITA, P.E.
ERIK S. KANESHIRO, L.P.L.S, LEED AP
MATT K. NAKAMOTO, P.E.
GARRETT K. TOKUOKA, P.E.

ADRIENNE W.L.H. WONG, P.E., LEED AP
Maui Branch Manager

#23-203

March 30, 2023

Ms. Michelle Kwan
Hawaii Department of Transportation
Highways Division, Construction and Maintenance Branch
Permit Construction Unit
869 Punchbowl Street, Room 404
Honolulu, HI 96813
Submitted via email: michelle.s.kwan@hawaii.gov

Dear Ms. Kwan:

Subject: AES Waiawa Phase 2 Solar Project; TMKs: (1) 9-4-006:034 and 035 (por.), and 037 (por.), 9-6-004:024 (por.), 025, and 026. Review and Approval of Traffic Management Plan (TMP)

Pursuant to conditions set forth by the State of Hawaii Land Use Commission in Docket No. A87-610 in Decision and Order, Part 6, which states: "Prior to the start of construction of the Updated Phase 1 Project, Petitioner shall cause the solar farm operator to submit a traffic construction management plan for review and acceptance by the State Department of Transportation", a Traffic Management Plan has been prepared and attached to this letter.

Your timely review and approval of this TMP will allow the AES Waiawa Phase 2 Solar project to be on track for an on-time completion. If you have any questions regarding the information provided herein, please do not hesitate to contact me.

Sincerely,

AUSTIN, TSUTSUMI & ASSOCIATES, INC.

By
KELCEE A. FUJIMOTO, P.E.
Project Manager

KF

cc: Mr. Blaine Kawamura
Ms. Megan Kane (AES)

Attachment: Traffic Management Plan (TMP)

Austin, Tsutsumi & Associates, Inc. is an affirmative action employer and is firmly committed to full and equal employment opportunity for all. In accordance with our affirmative action policy, we conduct recruiting, hiring, training, promotions and terminations in all job titles without regard to race, color, religion, sex or national origin.

AES WAIAWA PHASE 2 SOLAR PROJECT

TRANSPORTATION MANAGEMENT PLAN

WAIPIO, OAHU, HAWAII

DRAFT FINAL

March 28, 2023

Prepared for:
AES Distributed Energy
282 Century Place, Suite 200
Louisville, CO 80027

Austin, Tsutsumi & Associates, Inc.
Civil Engineers • Surveyors
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817-5031
Telephone: (808) 533-3646
Facsimile: (808) 526-1267
E-mail: atahnl@atahawaii.com
Honolulu • Wailuku

AES WAIAWA PHASE 2 SOLAR PROJECT
TRANSPORTATION MANAGEMENT PLAN

Waipio, Oahu, Hawaii

DRAFT FINAL

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Prepared by
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Civil Engineers • Surveyors
Honolulu • Wailuku

March 28, 2023

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AUSTIN, TSUTSUMI & ASSOCIATES, INC. CIVIL ENGINEERS • SURVEYORS
CONTINUING THE ENGINEERING PRACTICE FOUNDED BY H. A. R. AUSTIN IN 1934

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GARRETT K. TOKUOKA, P.E.

DRAFT FINAL
TRANSPORTATION MANAGEMENT PLAN
AES Waiawa Phase 2 Solar Project
Waipio, Oahu, Hawaii

1. INTRODUCTION

This Transportation Management Plan (TMP) provides recommendations to describe and mitigate potential traffic impacts resulting from construction activities for the proposed Waiawa Solar plus Storage Project (hereinafter referred to as the "Project") located in Waipio, Oahu, Hawaii. Once operational, the Project will generate minimal trips during the peak AM(PM) hours of traffic.

According to criteria in the Hawaii Department of Transportation, Highways Division (HDOT) "Determination of a Significant Highway Project" flow chart, this project was determined to be a Level 1 Project. Refer to the TMP Determination in Appendix A.

1.1 ROLES AND RESPONSIBILITIES

TMP Manager:	Ramsey Parry, Project Manager (808) 365-3301
Author:	Austin, Tsutsumi & Associates, Inc. (ATA)
TMP Monitor:	To Be Determined
Emergency Contacts:	Soane Carroll, Site Safety Manager (808) 281-5242

REPLY TO:
501 SUMNER STREET, SUITE 521 • HONOLULU, HAWAII 96817-5031
PHONE (808) 533-3646 • FAX (808) 526-1267
EMAIL : atahnl@atahawaii.com

OFFICES IN:
HONOLULU, HAWAII
WAILUKU, MAUI, HAWAII

2. PROJECT DESCRIPTION

2.1 Project Type

The Project will host a 30-megawatt (MW) alternating current/60 MW direct current (approx.) ground-mounted solar photovoltaic (PV) array, coupled with a 240 MW-hour battery energy storage system, a substation, and related interconnection and ancillary facilities. Figure 2.1 shows the Project location and Figure 2.2 shows the Project site plan.

2.2 Project Area/Corridor

The Project is located in Waipio on the island of Oahu on parcels of land more specifically identified as TMKs: (1) 9-4-006:034 and 035 (por.), and 037 (por.), 9-6-004:024 (por.), 025, and 026. The Project will be located on approximately 383 acres of land mauka (mountainside) of the H-2 Freeway. The site will be accessed via an existing driveway from Waiawa Prison Road. An easement agreement allows Project use of this roadway. Figure 2.3 shows the anticipated heavy vehicle access routes for the Project.

2.3 General Schedule and Timeline

Grading is anticipated to begin on May 1, 2023, pending receipt of the grading permit. Vertical construction is anticipated to begin soon after following receipt of building permits. Construction activity is planned to occur over a 15- to 18-month period and conclude in Fall 2024.

Normal construction hours are anticipated to be 7:00 AM – 5:00 PM, Monday through Thursday, and Fridays on an as-needed basis. No weekend work is expected.

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

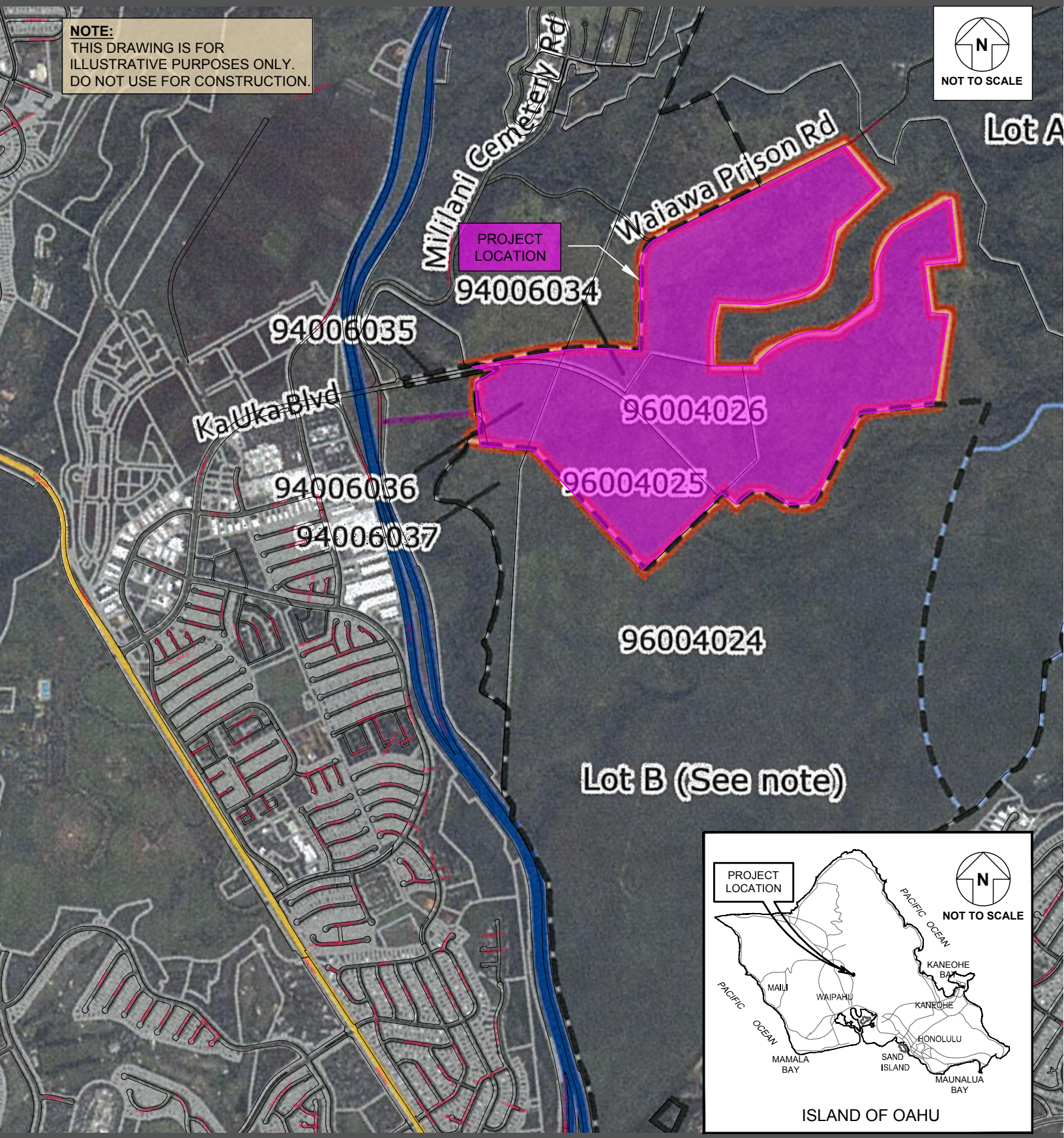
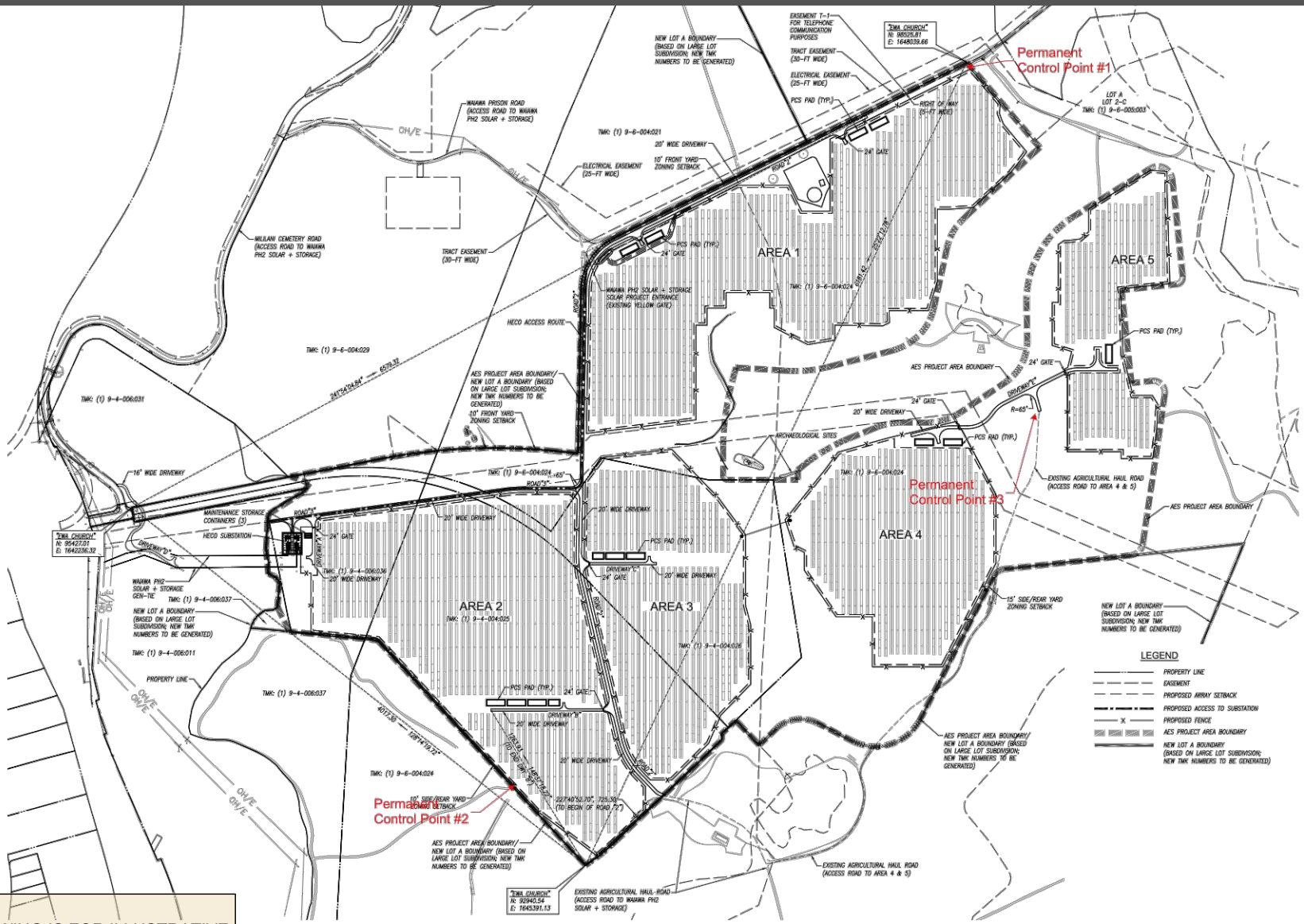


FIGURE 2.1

PROJECT LOCATION

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors



NOTE:
THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. DO NOT USE FOR CONSTRUCTION.

FIGURE 2.2

PRELIMINARY PROJECT SITE PLAN

WAIAWA PHASE 2 SOLAR TMP

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Engineers & Surveyors

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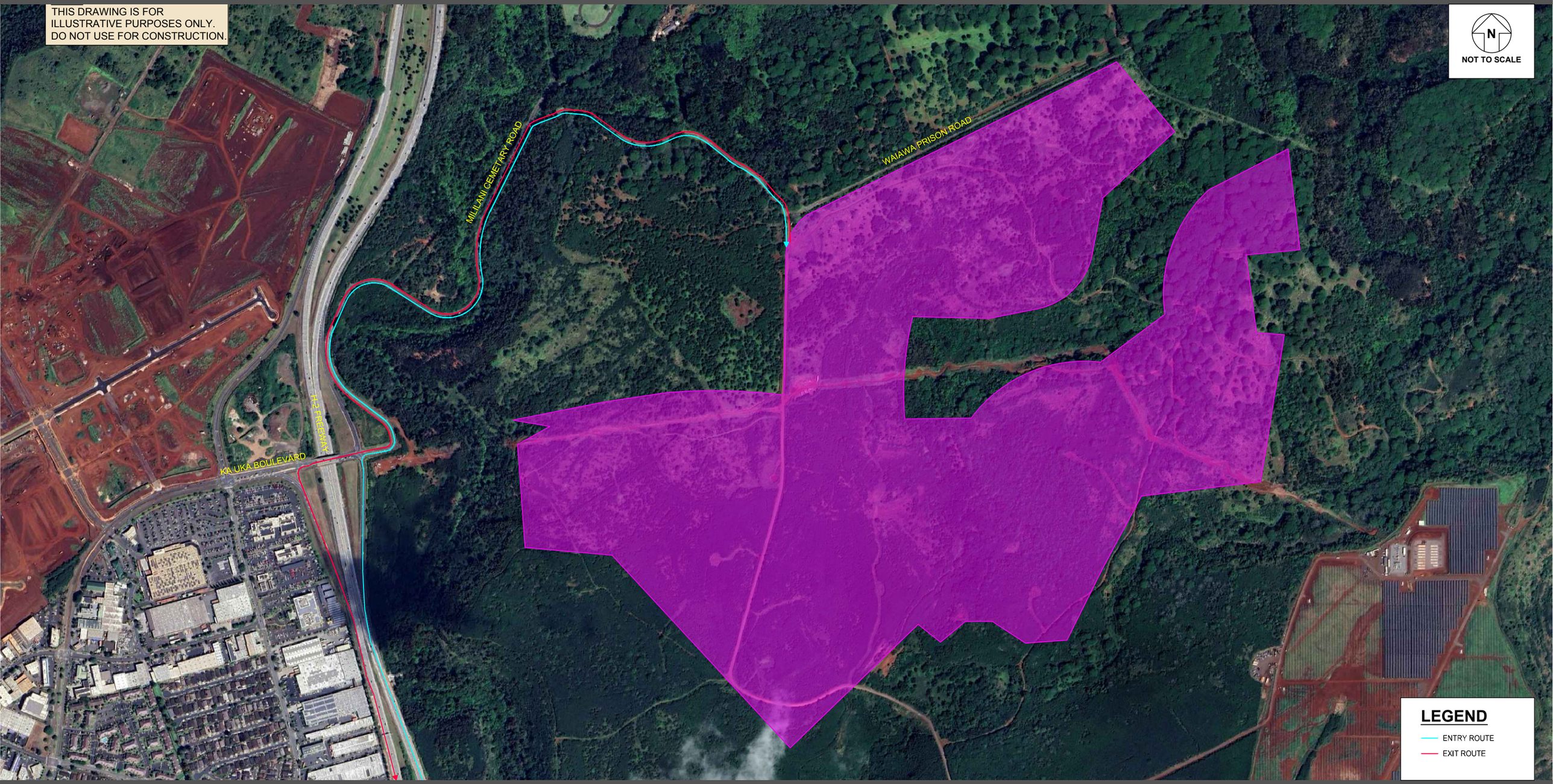

FIGURE 2.3

SITE ACCESS ROUTES

3. EXISTING CONDITIONS

3.1 Roadway Characteristics

Below are descriptions of the existing roadways in the vicinity of the Project. These roadway conditions reflect the existing conditions at the time of this report.

Veterans Memorial Freeway (H-2) is a highway which begins to the south at the interchange with the Queen Liliuokalani (H-1) Freeway in Pearl City and extends northward until it transitions to Wilikina Drive (Route 99) near the Wheeler Army Airfield. In the vicinity of the Project, the H-2 is a two-way, eight-lane, divided roadway with a posted speed limit of 55 miles per hour (mph).

Ka Uka Boulevard begins to the east where it transitions from Mililani Cemetery Road and extends westward over the H-2 Freeway and beyond, until terminates to the west within the Patsy T. Mink Central Oahu Regional Park. In the vicinity of the Project, Ka Uka Boulevard is a two-way, four-lane divided roadway with a posted speed limit of 25 mph.

Mililani Cemetery Road begins to the south at the terminus of Ka Uka Boulevard and extends north until it terminates within the Mililani Memorial Park and Mortuary. In the vicinity of the Project, Mililani Cemetery Road a two-way, two-lane undivided roadway with no posted speed limit.

Waiawa Prison Road begins to the west at its terminus at Mililani Cemetery Road and extends eastward until it terminates at Waiawa Correctional Facility.

3.2 Existing Traffic Data

Traffic data for the Existing conditions can be found in the Figure 3 of the Traffic Impact Analysis Report (TIAR) for the Project completed by Fehr & Peers in August 2021 (2021 Fehr & Peers TIAR), which is included in Appendix B.

Based on 2021 Fehr & Peers TIAR, new traffic count data was not collected for the project in 2020 due to effects of COVID-19. Instead, analysis of existing conditions was based upon peak hour intersection turning movement counts collected in February 2019, which were increased by a growth factor to estimate traffic volumes for Year 2021 conditions. Per the 2021 Fehr & Peers TIAR, the Project is anticipated to generate approximately 348 daily vehicle trips during the peak of construction, including 142 vehicle trips during the AM and PM peak hours.

The 2021 Fehr & Peers TIAR found that “the proposed point of access is sufficient for the anticipated construction traffic generated by the project” and no improvements are recommended at the study intersections.

3.3 Sight Distance Analysis

The required sight distance for turns from the Project driveway was calculated according to guidelines for Intersection Sight Distance provided in A Policy on Geometric Design of Highways and Streets by the American Association of State Highway and Transportation Officials (AASHTO), 7th Edition, 2018.

Sight distance analysis is approximate, and was completed using imagery from Google Earth. Based on the most recent aerial imagery between 2021-2022, it appears that the current sight

distance is adequate; however growth of the vegetation near the sight distance triangles should be maintained by the contractor at all times during the construction process. Figure 3.1 shows the required sight distances.

WAIAWA PHASE 2 SOLAR TMP

AustinTsutsumi & ASSOCIATES, INC.
Engineers & Surveyors

FIGURE 3.1

SIGHT DISTANCE

4. WORK ZONE IMPACTS ASSESSMENT

4.1 Qualitative Summary of Anticipated Work Zone Impacts

4.1.1 Anticipated Work Zone Impacts

Construction-related impacts will generally be confined to lands within the Kamehameha Schools Waiawa, with all equipment storage/staging, loading/unloading, and worker parking occurring off of State of Hawaii or City & County roadways. As a result, surrounding roadway network and intersections are not expected to experience any significant impacts to their pre-construction levels of service and delays.

4.1.2 Detour Routes and Temporary Traffic Control

Due to the location of the Project and the consolidation of all construction activities to occur off of State of Hawaii and City & County roadways, no lane closures or detour routes on public roadways are expected during construction. The only exception is for special tractor trailer deliveries that are either oversized and/or overweight loads. These specialty trailer deliveries may require more than the width of a single travel lane to navigate a roadway and thus may need special duty police officers to escort the trailer while being transported. Because of the nature of these loads, specialty permits prior to hauling on City & County of Honolulu (C&C) or State roadways will need to be applied for and any temporary traffic control measures or escorts would be addressed when applying for the specialty haul permits with the C&C and/or State.

In the event that modifications to roadway fixtures (striping, lights, poles, signs, posts, pavement, etc.) is necessary to transport oversized and/or overweight tractor trailer deliveries, all existing fixtures should be documented prior to modification and hauling. Upon completion of transporting the tractor trailers, all modified fixtures should be restored back to the condition they were documented in prior to the modification.

5. SELECTED WORK ZONE IMPACTS MANAGEMENT STRATEGIES

5.1 Project Coordination

To further minimize or mitigate any unanticipated adverse impacts of the Project's construction on surrounding roadways, additional measures to further facilitate smooth traffic operations should be considered.

Delivery of some construction materials and equipment are anticipated to arrive to the site as an oversized and/or overweight load. Delivery of items that require special permitting to utilize City and/or State facilities should occur outside of peak traffic hours (7:15 AM – 8:15 AM and 4:30 PM – 5:30 PM). In addition to the oversized and/or overweight deliveries to the site, the remainder of all construction materials and equipment will arrive to the Project site via tractor trailer deliveries. To the point where it is still feasible and practical, typical tractor trailer deliveries should also be timed to occur outside of peak traffic hours (7:15 AM – 8:15 AM and 4:30 PM – 5:30 PM) to further minimize any potential impacts of deliveries to surrounding roadways.

- Although it is not anticipated that construction traffic will affect operations at adjacent streets, the Contractor will encourage that construction-related deliveries occur during off-peak traffic hours (7:15 AM – 8:15 AM and 4:30 PM – 5:30 PM) to the extent practicable to minimize any possible disruption to traffic on local streets.

In addition, if any other projects in the vicinity are actively in construction or planning future construction activities, the schedule and timing of freight deliveries should be coordinated between parties in order to minimize any traffic related impacts.

5.2 Temporary Traffic Control Devices

Construction-related activities are not anticipated to require closure or traffic control on any of the adjacent roadways. Similarly, pedestrian and/or bicycle traffic is not anticipated to be impacted during construction. Temporary traffic control or escorts may be required for a single extra-wide, heavy-haul load for the transformer. The TMP Manager shall be responsible for coordination with agencies to obtain permits related to hauling wide/overweight loads.

5.3 Best Management Practice (BMP) Controls

Newly created roadways internal to the Project site will have crushed rock driveways and the driveway to the project substation will be asphalt paved. Roadways external to the project area (Mililani Cemetery Road and Waiawa Prison Road) are existing asphalt paved roads.

In adherence to BMP controls, the following should be practiced to reduce the tracking of mud and dirt onto public roadways:

- Provide a pad of aggregate underlain with filter cloth at the site exit.
- Provide a tire wash area to remove sediment from tires and under vehicles at the site exit.
- Provide a sediment trap to collect wash water runoff at the tire area.
- Sweep and vacuum adjacent public streets regularly.

If construction vehicle traffic results in damage to the surrounding roadways, the affected roads should be repaired immediately and restored back to pre-construction conditions.

5.4 Public Information

Community members should be kept apprised of the Projects construction status. Area representatives, neighborhood board, residents, businesses, first responders and public transportation should be provided prior notice of any construction related traffic impacts to roadways.

6. TMP MONITORING DURING CONSTRUCTION

The TMP Manager shall monitor all phases of the construction work and shall document any problems, issues, or recommendations for use by future projects.

7. RECOMMENDATIONS

- Accommodate all equipment storage/staging, loading/unloading, and worker parking off of State of Hawaii and City & County roadways to eliminate impacts to traffic on adjacent streets.
- Limit construction-related deliveries during the weekdays to off-peak traffic hours (outside the hours of 7:15 AM – 8:15 AM and 4:30 PM – 5:30 PM) to the extent practicable to minimize any possible disruption to traffic on the local streets.
- Delivery of construction materials and equipment using oversized trucks which require permits to use City and/or State facilities should occur during off-peak traffic hours.
- Repair/restore any and all damages to C&C right-of-way as a result of construction activities to the current City standards and Americans with Disabilities Act requirements.
- Cut back and maintain vegetation at the project driveway to preserve required sight distance
- In adherence to BMP controls, the following should be practiced to reduce the tracking of mud and dirt onto public roadways:
    - Provide crushed rock driveways for newly created roadways internal to the site.
    - Provide a pad of aggregate underlain with filter cloth at the site exit.
    - Provide a tire wash area to remove sediment from tires and under vehicles at the site exit.
    - Provide a sediment trap to collect wash water runoff at the tire area.
    - Sweep and vacuum adjacent public streets regularly.
- Keep members of the community appraised of the status of the project and the impacts, if any, that may affect them.

8. REFERENCES

1. City and County of Honolulu Department of Environmental Services, Storm Water Best Management Practices for Construction Sites Quick Reference Booklet, July 2013.
2. Fehr & Peers, Mobility Assessment for the Proposed Waiawa Phase 2 Solar Plus Storage Project, August 2021.
3. State of Hawaii Department of Transportation Highways Division, Work Zone Safety and Mobility Process, October 2007.
4. Federal Highway Administration (FHWA), Traffic Analysis Tools Volume IX: Work Zone Modeling and Simulation, December 2000.

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APPENDICES

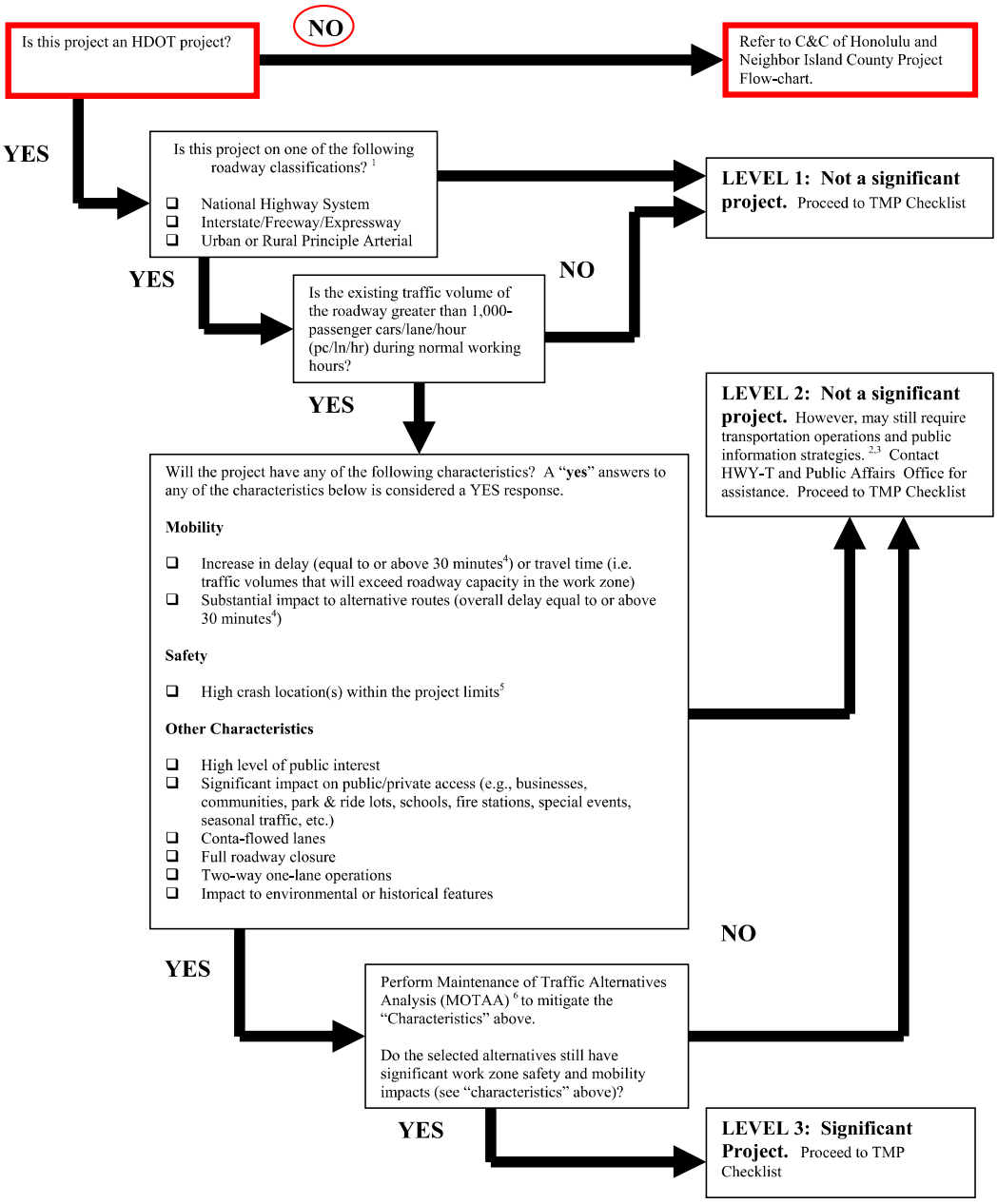
APPENDIX A

TMP DETERMINATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATON
HIGHWAYS DIVSION

DETERMINATION OF A SIGNIFICANT HIGHWAY PROJECT

Hawaii Department of Transportation Projects



Notes:

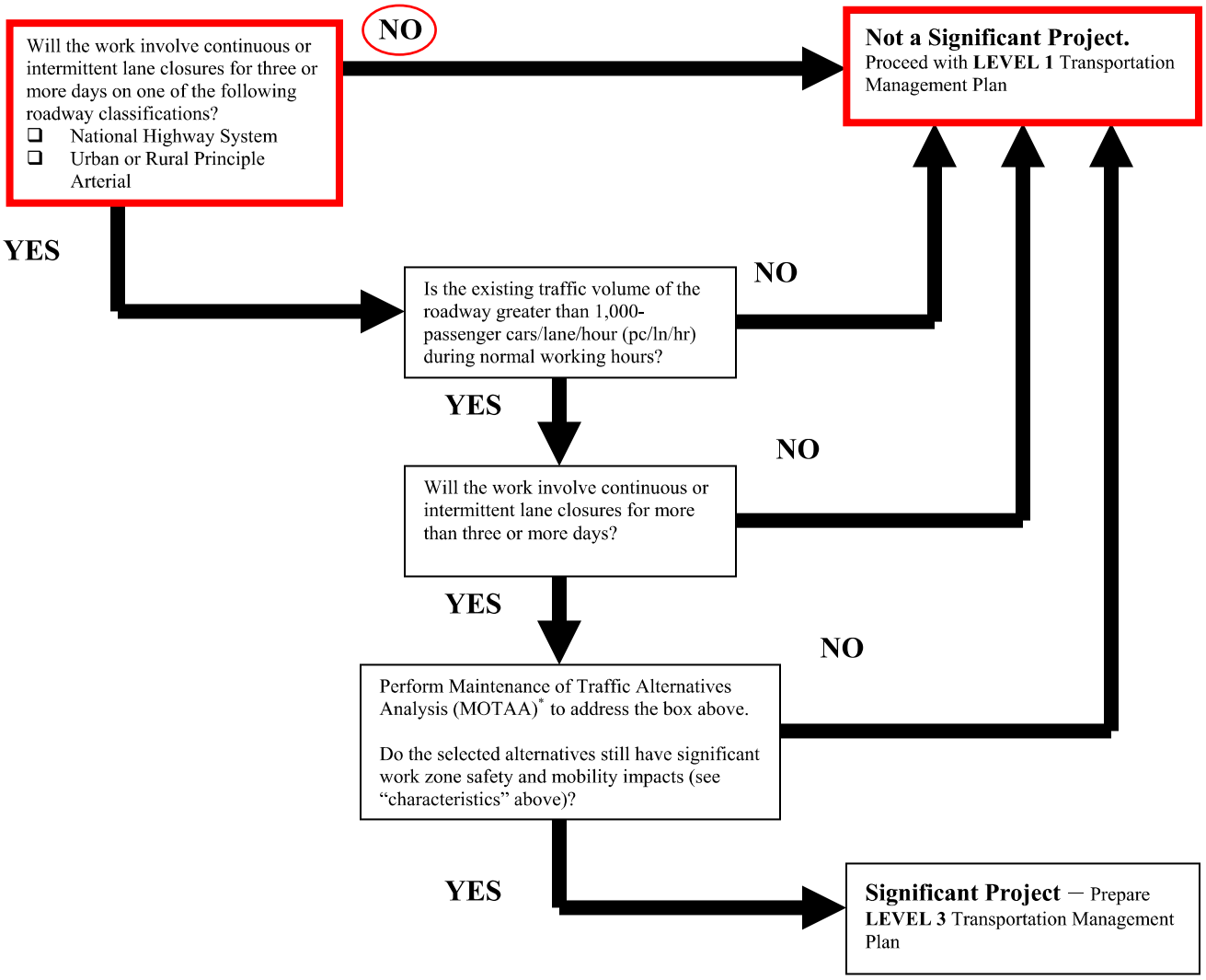
1. Roadway classification can be found on the Straight Line Diagram or contact HWY-P
2. Some projects may not fall under the Significant Project definition, but may still benefit from transportation operations and/or public information strategies. For example, projects that impact a moderated number of travelers with moderated public interest, such as single lane closures in urban areas or commercial business districts. The preparation of a TMP should be considered for these types of projects.
3. A project in the Interstate system that are within the boundaries of a designated Transportation Management Area (TMA) and occupies a location for more than three days with either intermittent or continuous lane closures will require the submittal of an exception request. Contact the Traffic Branch to determine if your project is within a TMA.
4. Reference CalTrans Transportation Management Plan Guidelines, June 11, 2001.
5. High crash locations are determined by requesting a crash analysis for the segment of roadway or intersection within the project limits. HWY-T should be contacted to perform the crash analysis.
6. The Maintenance of Traffic Alternatives Analysis (MOTAA) is intended to develop and evaluate the best combination of construction phasing/staging, project design options, temporary traffic control, transportation operations strategies, public information, and outreach strategies. The MOTAA should be conducted during analysis of detailed alternatives, before each final alternative is selected to proceed to design. Each alternative's ability to conform to the Work Zone Mobility Process should be reviewed at this stage.
   Guidance on performing a MOTAA can be obtained from the HDOT - Design Branch or the Traffic Branch.

r10-3-07

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATON
HIGHWAYS DIVSION

DETERMINATION OF A SIGNIFICANT HIGHWAY PROJECT

C&C of Honolulu and Counties of Hawaii, Kauai, and Maui Projects



* Notes:

The MOTAA should be conducted during analysis of detailed alternatives, before a final alternative is selected to proceed to design. Each alternative's ability to confirm with the Work Zone Mobility Policy should be reviewed at this stage. Guidance on performing a MOTAA can be obtained from the HDOT - Design Branch or the Traffic Branch.

APPENDIX B

2021 FEHR & PEERS TIAR

FEHR PEERS

August 11, 2021

Waiawa Phase 2 Solar, LLC
282 Century Place, Suite 2000
Louisville, CO 80027

w/ copy to:
Ms. Tracy Camuso, Group 70
111 S. King Street, Suite 170
Honolulu, HI 96813

Subject: **Mobility Assessment for the Proposed Waiawa Phase 2 Solar Plus Storage Project (Oahu, HI)**

Executive Summary

Fehr & Peers has prepared a mobility assessment for a proposed solar project to be constructed by Waiawa Phase 2 Solar, LLC in the Waiawa area on the island of O'ahu. This assessment was prepared to support the project in obtaining permits and approvals from the City and County of Honolulu Department of Planning and Permitting (DPP) and possibly the State Land Use Commission. This letter includes an assessment of the vehicle trip generation anticipated during both project construction and typical project operations, as well as an analysis of intersection operations to determine any transportation-related impacts from the project.

The solar farm will generate a negligible amount of vehicle traffic once fully operational. The primary traffic issues for solar farm projects are associated with temporary construction traffic impacts and site access. Construction for the proposed project is anticipated to occur over a 15 to 18-month period and is forecast to generate up to a total of 348 daily vehicle trips during the peak of construction, including up to 142 trips in the AM and PM peak hours. The assessment concludes that the study intersections and proposed point of access for the project via Ka Uka Boulevard are sufficient for accommodating the anticipated construction traffic generated by the project. All study intersections are forecast to operate at level of service (LOS) D or better under all study scenarios. A detailed traffic management plan will be prepared and submitted for approval prior to the start of construction to minimize impacts to the transportation system during the construction period.

Once operational, the site will be primarily self-sustaining with minimal periodic maintenance required. The solar farm is anticipated to have no more than five (5) employees on-site at any given time. No traffic impacts are anticipated once the site is operational.

Project Description

The Project involves construction and operation of a 30-megawatt (MW) alternating current/60 MW direct current (approx.) ground-mounted solar photovoltaic system coupled with a 240 MW-hour battery energy storage system, a substation, and related interconnection and ancillary facilities. A series of solar photovoltaic panels would be mounted on a racking system arranged in evenly spaced rows throughout the Project area. The energy storage system would consist of containerized lithium-ion battery units distributed throughout the solar arrays. This equipment would connect via underground and overhead electrical wiring with a Project substation. The substation would be located near the existing Hawaiian Electric Company, Inc. (Hawaiian Electric) Waiau-Mililani and Wahiawa-Waimano 46-kilovolt (kV) sub-transmission lines and would include equipment to allow interconnection with the electrical grid; (2) 46 kV overhead lines would deliver power from the Project substation to the existing Waiau-Mililani and Wahiawa-Waimano 46 kV sub-transmission lines. The Project would be accessed via an existing gated entry off Waiawa Prison Road and would utilize a network of existing on-site access roads. Within the Project area, a series of new gravel access roads would be installed to accommodate construction vehicles and to allow ongoing access for operations and maintenance. Temporary construction staging and laydown occurs within the Project area. The power generated by the Project would be sold to Hawaiian Electric under a new power purchase agreement. At the end of the Project's useful life, the Project equipment would be decommissioned, and the land would be returned to substantially the same condition as existed prior to Project development.

This assessment focuses on transportation impacts related to the construction and operations of the proposed facility.

The project site will be accessed from Ka Uka Boulevard just east of the Ka Uka Boulevard/H-2 Interchange. Materials for construction are expected to be transported from the Sand Island area in Honolulu to the site. All truck trips are expected to be made to and from Sand Island along the H-1 and H-2 freeways. It is anticipated that all project traffic will pass through the interchange to access the project site. **Figure 1** shows the project location and vicinity.

The project is anticipated to open for operation in fall of 2023 following construction. Construction is expected to begin spring 2022 and continue through the fall of 2023, for a duration of approximately 15 to 18 months. Construction is anticipated to require up to 200 workers per day on-site during the peak three months of construction, with fewer workers needed throughout the remaining 12 to 15 months of the construction period. As a conservative approach, this assessment evaluates the peak construction level with 200 workers on-site. Construction workers will be encouraged to carpool, and the analysis assumes 1.5 employees per vehicle; therefore, it is estimated that up to 134 construction worker vehicles will be arriving and departing the site each day during the peak of construction. Workers will generally be on-site between 7:00 AM and 4:00 PM Monday through Friday.

Once operational, the site will be primarily self-sustaining with minimal periodic maintenance required. The solar farm is anticipated to have no more than five (5) employees on-site at any given time. No permanent employees will be on-site; however, employees will visit the site over the course of the year to perform maintenance activities. As a result, the number of employee vehicle trips generated by the proposed project during typical operations is considered negligible (i.e., far less than the standard daily variation in traffic during peak hours).

Project Location and Study Area

The proposed project will be constructed on an undeveloped site in Pearl City, east of the H-2 freeway near Waipio Village and southeast of the Mililani Cemetery. The project will be accessed via Ka Uka Boulevard east of the Ka Uka Boulevard/H-2 interchange. The traffic assessment evaluated the operations at the following three (3) intersections near the site and along the primary vehicular travel route:

1. Ka Uka Boulevard/H-2 Southbound Off-Ramp/Moaniani Street
2. Ka Uka Boulevard/H-2 Southbound On-Ramp
3. Ka Uka Boulevard/H-2 Northbound Ramps

Figure 2 shows the locations of the study intersections as well as the project site and site access.

Study Scenarios

The operations of the study intersections were evaluated during the busiest peak (one) hour in the morning (between 7:00 and 9:00 AM) and in the afternoon (between 4:00 and 6:00 PM). The peak hour for each intersection was determined from traffic count data collected in 2019, which serves as the basis of the Existing Conditions analysis. Construction of the project site is anticipated to occur from spring 2022 through fall 2023, with the project beginning operations in fall of 2023.

Traffic operations were evaluated for the following scenarios:

- **Existing Conditions** – New traffic count data was not collected for the project in 2020 due to travel restrictions related to the COVID-19 global pandemic and shifts in travel patterns. Therefore, the analysis of existing traffic conditions was based on peak hour intersection turning movement counts collected in February 2019, which were increased by a growth factor to estimate traffic volumes for Year 2021 under typical travel conditions (i.e. unrestricted by travel restrictions).
- **2023 No Project Conditions** – Construction year volumes without the project were estimated based on existing conditions volumes plus traffic from ambient growth from approved projects in the vicinity of the project site. Expected traffic generated by Increment 1 Phase 1 of the Koa Ridge development was added to the existing conditions

traffic volumes, plus ambient growth in regional traffic to calculate 2023 No Project traffic volumes.

- **2023 Plus Project Construction Conditions** – Analysis of 2023 Plus Project Construction traffic conditions includes 2023 No Project peak hour traffic volumes plus the estimated maximum traffic generated by the project during the approximately 15-month construction period.
- **2023 Plus Project Typical Operating Conditions** – This scenario includes 2023 No Project peak hour traffic volumes plus the addition of project-generated traffic once the project is fully operational.

Vehicle Access

The proposed access for construction traffic, including trucks and employees' personal vehicles, is from Ka Uka Boulevard east of the Ka Uka Boulevard/H-2 interchange. From there, vehicles will travel along Mililani Cemetery Road and Waiawa Prison Road to reach the project site. The site access driveway is located approximately one (1) mile from the Ka Uka Boulevard interchange and any temporary queueing at the project driveway would not impact freeway interchange operations. **Figure 2** shows the access roads serving the project site.

Traveling north from Ka Uka Boulevard, vehicles on Mililani Cemetery Road will approach the Waiawa Prison Road intersection, then turn right (east) onto the existing road and drive approximately one-half mile before arriving at the construction staging area south of Waiawa Prison Road. Mililani Cemetery Road and Waiawa Prison Road serve a limited amount of traffic and provide for travel in both directions; however, Waiawa Prison Road generally includes a narrower paved section of roughly 18 to 20 feet and includes a one lane bridge section just east of Mililani Cemetery Road where the posted speed limit is 15 miles per hour.

Ka Uka Boulevard in the immediate vicinity of the H-2 freeway is under the jurisdiction of the Hawaii Department of Transportation – Highways Division (HDOT). Mililani Cemetery Road is maintained by the City and County of Honolulu Department of Transportation Services (DTS), while Waiawa Prison Road is a private street with multiple owners.

Existing Traffic Volumes

The addition of traffic from the proposed project may temporarily impact operations of intersections near the site during the anticipated construction period. To determine potential impacts, the operations of the three (3) study intersections were evaluated during weekday AM and PM peak hour conditions. Traffic counts were collected at the study intersections in February 2019 and are included in **Attachment A**. Existing lane configurations and signal controls were obtained as part of the 2019 data collection effort. Due to the COVID19 pandemic and impact to travel patterns, new count data could not be obtained for the project and new data for the study intersections was unavailable. Therefore, existing traffic volumes were estimated at each location

based on available 2019 traffic and field data. Year 2019 volumes were grown by one percent per year to estimate typical traffic volumes for Year 2021. This rate was determined by considering the difference between historic and future traffic projections and planned growth in the study area and accounts for the recent completion of the first phases of the Koa Ridge development. **Figure 3** shows the 2021 existing traffic volumes and lane configurations.

2023 Transportation Improvements

Local roadway improvements are currently under construction by the Koa Ridge development with scheduled completion in 2021. The following improvements are assumed to be completed by 2023 for the purposes of this analysis:

- **Ka Uka Boulevard/H-2 Southbound Off-Ramp/Moaniani Street:**
  - Westbound: two left-turn lanes and two through lanes on Ka Uka Boulevard.
  - Southbound: two southbound departure lanes along Moaniani Street to accommodate the double left-turn lanes from westbound Ka Uka Boulevard.
  - Southbound: Provide additional lane on the southbound approach that results in an exclusive left-turn lane, exclusive through lane, and an exclusive right-turn lane.
  - Eastbound: additional through lane on Ka Uka Boulevard between Moaniani Street and the H-2 Southbound On-Ramp.
  - Northbound: Channelized right-turn lane on Moaniani Street.
  - Modified traffic signal timing to provide simultaneous left-turn movements for the northbound and southbound approaches.
- **Ka Uka Boulevard/H-2 Southbound On-Ramp:**
  - Eastbound: two exclusive right-turn lanes and a through lane on Ka Uka Boulevard.
- **Ka Uka Boulevard/H-2 Northbound Ramps:**
  - Eastbound: Provide an exclusive left-turn lane and a shared left-turn/through lane.
  - Northbound: Widen the northbound on-ramp to provide two left-turn lanes.
  - Modified traffic signal system to accommodate lane changes.
  - Modified traffic signal system and operations to provide split phasing.

2023 No Project Traffic Volumes

For purposes of this analysis, 2019 traffic volumes were increased by a growth factor of one percent per year and rounded to the nearest ten to forecast 2023 traffic volumes accounting for ambient growth. This rate was determined by considering the difference between historic and future traffic projections and planned growth in the study area.

Traffic generated by Increment 1 Phase 1 of the Koa Ridge development was then added to the grown volumes to determine 2023 No Project traffic volumes. The Koa Ridge development is located west of H-2 and north of Ka Uka Boulevard. Increment 1 Phase 1 of the Koa Ridge Development will include 1,754 housing units, 384,000 square feet of retail, 83,000 square feet of industrial, 16 acres of parks, 28.38 acres of healthcare, a 150-room hotel, 12.59 acres of schools, and a fire station, daycare, community center, and church. This analysis conservatively assumed all of Increment 1 Phase 1 being completed by 2023, although development completed by 2023 may be less. **Figure 4** shows the 2023 No Project traffic volumes and lane configurations.

Project Trip Generation Estimates

Construction traffic is comprised of private vehicles driven by construction workers and trucks delivering materials, hauling earth and debris, and providing other services (e.g., water trucks). In general, workers are assumed to make one (1) inbound trip and one (1) outbound trip for a total of two (2) daily trips. Detailed information on construction activities was provided by AES and included the number of trucks needed to deliver major project components and equipment This information was used to estimate the total number of truck trips during the planned construction period of 15 to 18 months. It is important to note that this information is preliminary and may be refined once a specific contractor is selected to construct the project. At that time, a construction traffic management plan must be prepared and submitted to the City and County of Honolulu DPP Traffic Review Branch (TRB) for review and approval.

This assessment considered two (2) project scenarios: the first, 2023 Plus Project Construction, represents 2023 No Project traffic volumes plus the forecasted construction-related traffic during the peak of construction when the highest volume of trucks and worker vehicles will be on-site. The second scenario, 2023 Plus Typical Project Operations, represents 2023 No Project traffic volumes plus the addition of project-generated traffic once the site is fully operational.

The 2023 Plus Project Construction scenario evaluates the peak periods of construction when a maximum of 200 workers are anticipated to be on-site. All construction worker-related traffic was conservatively assumed to occur during the peak hours of the study intersections. With an anticipated carpool factor of 1.5 workers per vehicle, the assessment estimates approximately 134 construction worker vehicles will arrive at the project site during the AM peak hour and depart from the project site during PM peak hour. In reality, it is expected that additional carpooling will occur, and that many worker trips would be made outside of the peak hours because they will be expected to be on-site between 7:00 AM and 4:00 PM.

Construction truck traffic was spread equally throughout the hours of operation to reflect the rotation of trips typical for construction activity. Ten percent of construction truck trips or eight (8) trips were assumed to occur during each of the AM and PM the peak hours . Trip generation for the project during construction is summarized in **Table 1**. The project is expected to generate 348 daily vehicle trips and 142 trips during each of the peak hours.

Table 1 –Construction Vehicle Trip Generation

Trip Type	Daily Trips	AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out
Auto[1]	268	134	134	0	134	0	134
Trucks[2,3]	80	8	4	4	8	4	4
Total	348	142	138	4	142	4	138

[1] Assumes 134 worker vehicles arrive and depart during peak hours
[2] Assumes equipment debris, hauling, excavation, etc. trucks arrive and depart during peak hours as well as off peak hours
[3] This analysis estimates 40 daily construction and work trucks, or 80 daily round trips. In the intersection operations calculation, a PCE factor of 2.5 per truck was applied to all truck trips. The resulting PCE trip generation is 200 daily truck trips.

Once operational, the solar project is anticipated to have a maximum of five (5) employees on site at any given time. As a result, the employee trips generated by the proposed project are nominal. The trip generation summary for the project during typical operations is presented in **Table 2**. Under this scenario, the project is expected to generate a negligible amount of traffic including 10 daily vehicle trips and five (5) trips each during the AM and PM peak hours.

Table 2 – Typical Project Operations Trip Generation

Trip Type	Daily Trips	AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out
Employees[1]	10	5	5	0	5	0	5

[1] Assumes five (5) employees on-site once the project is operational

Project Trip Distribution and Assignment

Based on the available regional access points/interchanges and the fact that materials will be transported from the Sand Island area in Honolulu to the site, all heavy trucks are expected to use the H-2 Freeway and access the site via the Ka Uka Boulevard interchange. Construction workers and employees are expected to travel to the site via Ka Uka Boulevard west of H-2, as well as the northbound and southbound directions on the freeway.

The trip distribution for the project was estimated based on the locations of urbanized residential communities on Oahu and the likelihood of workers to commute to and from those areas. The estimated trip distribution for construction worker vehicle trips is listed below:

- To/From the north – 20%
- To/From the south –75%
- To/From the west – 5%

Trip distribution percentages were applied to the forecasted trip generation for each scenario and assigned to the surrounding roadway network to assess potential traffic impacts in the area. **Figure 5** illustrates the project trip distribution and trip assignment. It should be noted that 75%

of construction worker traffic is expected to travel in the opposite direction of peak traffic flows during each peak hour.

2023 Plus Project Construction Traffic Volumes

Construction traffic generated by Waiawa Phase 2 Solar Plus Storage was added to the 2023 No Project traffic volumes to determine 2023 Plus Project Construction traffic volumes. **Figure 6** shows the 2023 Plus Project Construction traffic volumes and lane configurations.

2023 Plus Typical Project Operations Traffic Volumes

Typical operations traffic generated by Waiawa Phase 2 Solar Plus Storage was added to the 2023 No Project traffic volumes to determine 2023 Plus Typical Project Operating Conditions traffic volumes. **Figure 7** shows the 2023 Plus Typical Project Operating Conditions traffic volumes and lane configurations.

Intersection Operations Analysis

The analysis of roadway operations performed for this study is based upon procedures presented in the Highway Capacity Manual (HCM), published by the Transportation Research Board. The operations of roadway facilities are described with the term level of service (LOS). LOS is a qualitative description of traffic flow based on factors such as speed, travel time, delay, and freedom to maneuver. Six (6) levels are defined from LOS A, with the least congested operating conditions, to LOS F, with the most congested operating conditions. LOS E represents "at-capacity" operations. Operations are designated as LOS F when volumes exceed capacity, resulting in stop-and-go conditions. A computerized analysis of intersection operations was performed utilizing the SYNCHRO 10 traffic analysis software.

For construction trucks, a Passenger Car Equivalent (PCE) factor of 2.5 vehicle trips per truck was applied in the intersection operations calculation to account for the slower speeds of construction vehicles and greater impact to roadway network operations as compared to a typical passenger vehicle or light-duty truck. This approach is consistent with standard traffic engineering practice and appropriate given the temporary but concentrated truck activity associated with construction.

Signalized Intersection Analysis

HCM methodology defines LOS for signalized intersections in terms of delay, or more specifically, average stopped delay per vehicle. Delay is a measure of driver and/or passenger discomfort, frustration, fuel consumption and lost travel time. This technique uses 1,900 vehicles per hour per lane (VPHPL) as the maximum saturation volume of an intersection. This saturation volume is adjusted to account for lane width, on-street parking, pedestrians, traffic composition (i.e., percentage trucks) and shared lane movements (i.e., through and right-turn movements originating from the same lane). The LOS criteria used for this technique are described in **Table 3**.

Table 3 – Signalized Intersection Level of Service Criteria

Average Stopped Delay Per Vehicle (seconds)	Level of Service (LOS) Characteristics
<10.0	LOS A describes operations with very low delay. This occurs when progression is extremely favorable, and most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
10.1 – 20.0	LOS B describes operations with generally good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
20.1 – 35.0	LOS C describes operations with higher delays, which may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
35.1 – 55.0	LOS D describes operations with high delay, resulting from some combination of unfavorable progression, long cycle lengths, or high volumes. The influence of congestion becomes more noticeable, and individual cycle failures are noticeable.
55.1 – 80.0	LOS E is considered the limit of reasonable delay. Individual cycle failures are frequent occurrences.
>80.0	LOS F describes a condition of excessively high delay, considered unacceptable to most drivers. This condition often occurs when arrival flow rates exceed the LOS D capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay.

Unsignalized Intersection Analysis

The HCM outlines methodology for unsignalized intersections, including two-way and all-way stop controlled intersections. The SYNCHRO 10 software supports this methodology and was utilized to produce LOS results. The LOS for a two-way stop controlled (TWSC) intersection is determined by the computed control delay and is defined for each minor movement. **Table 4** summarizes the LOS criteria for unsignalized intersections.

Table 4 – Unsignalized Intersection Level of Service Criteria

Average Control Delay (sec/veh)	Level of Service (LOS)
<10	A
>10 and <15	B
>15 and <25	C
>25 and <35	D
>35 and <50	E
>50	F

Intersection Impact Methodology and Criteria

The analysis compares 2023 No Project Conditions to 2023 Plus Project Construction Conditions to determine if the addition of estimated construction traffic to existing roadways is expected to result in a significant impact on the surrounding area. Similarly, the results of the 2023 Plus Typical Project Operating Conditions analysis is compared to 2023 No Project Conditions to determine whether or not project implementation is expected to result in significant impacts. Typically, construction-related impacts are considered temporary and are addressed with provisional mitigation measures during construction.

Based on previous studies conducted for both HDOT and DPP TRB, the minimum desirable operating level for a signalized intersection is LOS D. If the addition of project traffic is expected to degrade desirable service levels (LOS D or better) to lower than desirable service levels (LOS E or F), then the project is considered to have a project-specific impact. Impacts are also defined to occur when the addition of project traffic exacerbates locations already operating or projected to operate at LOS E or F, which are referred to as cumulative impacts. An impact is also considered a cumulative impact at a signalized intersection if the addition of project trips exacerbates baseline (or no project) LOS E or F operations and increase overall intersection delay by more than five (5) seconds.

For unsignalized intersections, the criterion for a project-specific impact is the same as for signalized intersections regarding LOS as described above, but one or more signal warrants must also be met. The signal warrants used for this evaluation are described in Chapter 4V of the Manual on Uniform Traffic Control Devices (MUTCD, 2009) published by the U.S. Department of Transportation Federal Highways Administration (FHWA). However, the project is determined to have a potentially significant cumulative impact when it adds any amount of traffic to a study location which includes a controlled approach operating at an unacceptable level (i.e., LOS E or F) and one or more volume-based signal warrants are met.

Impacts to public transit, pedestrian facilities and travel, and bicycle facilities and travel are considered significant if the proposed project conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or if it will generate additional demand that cannot be reasonably accommodated by existing or planned multi-modal facilities.

Intersection Operations Analysis Results

The analysis of intersection operations was completed for all scenarios, including Existing Conditions, 2023 No Project Conditions, 2023 Plus Construction Conditions, and 2023 Plus Project Typical Operating Conditions. The results of the intersection LOS analysis are summarized in **Table 5**. **Attachment B** includes the detailed LOS calculation worksheets. Peak hour traffic volumes and LOS results for 2023 No Project Conditions, 2023 Plus Construction Conditions, and 2023 Plus Operating Conditions are shown on **Figures 4, 5, and 6**, respectively.

Table 5 – Peak Hour Intersection Operations LOS Summary

Intersection	Peak Hour	Existing		2023 No Project		2023 Plus Construction		2023 Plus Typical Operations	
		Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
1. Ka Uka Blvd/H-2 SB Off-Ramp	AM	14.3	B	19.2	B	19.5	B	19.3	B
	PM	50.3	D	26.7	C	26.7	C	26.7	C
2. Ka Uka Blvd/H-2 SB On-Ramp*	AM	8.2	A	8.5	A	8.6	A	8.5	A
	PM	9.6	A	10.4	B	11.5	B	10.4	B
3. Ka Uka Blvd/H-2 NB Ramps	AM	8.2	A	11.0	B	11.8	B	11.2	B
	PM	47.9	D	24.6	C	31.8	D	24.9	C

Source: Fehr & Peers, January 2021 *indicates unsignalized intersection
[1] Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized intersections. The worst movement is presented for unsignalized intersections.
LOS calculations performed using the Highway Capacity Manual (HCM) 6th Edition method.

As shown, all study intersections currently operate at desirable (LOS D or better) levels and are expected to continue to operate at LOS D or better conditions under all study scenarios.

Decreases in delay from Existing to 2023 conditions during the PM peak hour are a result from planned intersection improvements at the Ka Uka Boulevard/H-2 intersections, which are expected to be completed by 2023. Small increases in delay during the AM peak hour at all study intersections and the PM peak hour at the SB On-Ramp are a result of traffic growth due to the Koa Ridge development on critical movements where infrastructure improvements provide less benefit. An increase in delay is forecast with the addition of project construction traffic, however none of the study intersections are forecast to result in LOS E or F under any study scenario. In addition, the relatively minor increases in delay during project construction will be temporary.

Once operational, the solar site is anticipated to generate a maximum of five (5) trips per peak hour. This additional traffic would have a negligible effect on intersection turning movement operations at all study locations. If Mililani Cemetery Road becomes unavailable in the future when the project is operational, alternate project access may occur on Waihona Street. However, the addition of operational project traffic (i.e., less than 10 total daily trips) would be imperceptible to drivers and the volume is well within the daily variation of volumes in the area.

No study intersections are expected to be significantly impacted by project construction (i.e., temporarily) or typical operations on a permanent basis. Therefore, no improvements are recommended at the study intersections.

Roadway Segment Operations

H-2 and Ka Uka Boulevard are higher capacity roadways that include typical lane widths and are built to higher standards than other roadways. Mililani Cemetery Road is a two-lane roadway with lane widths of approximately 12 feet in each direction plus shoulder areas along most of the segment between Ka Uka Boulevard and Waiawa Prison Road. The cemetery and prison do not generate a substantial amount of existing traffic, and the addition of truck traffic to these roadways is not anticipated to result in excess demand compared to capacity.

Waiawa Prison Road is relatively narrow, particularly for heavy vehicles transporting construction equipment and materials. The width of the roadway varies between approximately 18 to 20 feet along several sections between Mililani Cemetery Road and the staging area, with some curves in the roadway where sight distance and shoulder width may be limited. A construction traffic management plan will be required to address how adequate sight distance will be provided for drivers on Waiawa Prison Road approaching and departing the staging area. Separate construction activities have previously occurred in the area that added heavy truck traffic to Waiawa Prison Road and Mililani Cemetery Road. This activity included the decommissioning of several reservoirs that required trucks to transport heavy material and water along these roadways. For a four-month period, at least two heavy trucks would make daily rounds on and off Waiawa Prison Road without incident. No significant operational or safety issues were identified by Kamehameha Schools' representatives who monitored the construction activities. In addition, Hawaiian Electric (HECO) recently used Kamehameha School lands as a laydown area for 138kV (kilovolt) pole replacements with no known complaints during construction activity.

To minimize the potential for conflicts and to maintain adequate traffic operations, the contractor will be responsible for preparing a construction traffic management plan (CMP) for review and approval by DPP TRB that may address the following:

- Provide signage between the Ka Uka Boulevard interchange and the staging area off Waiawa Prison Road that trucks are travelling and entering/exiting the roadway.
- Ensure that adequate sight distance is provided for drivers on Waiawa Prison Road approaching and departing the staging area. Measures may include traffic control signage (e.g., stop or yield signs) and removal of vegetation that impede standard approach, departure, and height sight distances.
- Coordinate with the City and County of Honolulu if needed to prune or remove vegetation in the public right of way that might impede large construction vehicles on both Mililani Cemetery Road and Waiawa Prison Road.
- Provide manual traffic control on Waiawa Prison Road to manage construction and prison traffic and to minimize conflicts. This could include the use of radios, flag persons, and/or temporary signals and lighting to assist with the control of vehicles and the provision of adequate sight distance (as needed).

- Maintain access to the Waiawa Correctional Facility.

Non-Automobile Mode Access

Bicycle and Pedestrian Travel

Given the undeveloped nature of the site and the low-density development of the immediate surrounding area, the potential conflict is low between site-generated traffic and non-automobile modes including walking and biking. North of the site at Ka Uka Boulevard east of the H-2 freeway, the amount of pedestrian and bicycle activity is negligible. Mililani Cemetery Road and Waiawa Prison Road both include vehicle travel lanes only and are not intended to accommodate separate bicycle and pedestrian travel. Given the long distances between the H-2 interchange and both the cemetery (approximately 1.2 miles) and the correctional facility (approximately 2.9 miles), significant use of non-automobile modes is not anticipated. In addition, no sidewalks or bike lanes are currently provided or planned on the Ka Uka Boulevard overcrossing over H-2.

Transit

Transit service in the study area consists of one route makai of H-2; no transit service is currently provided mauka of the freeway. The nearest existing transit stop to the site is the Moaniani Street/Ka Uka Boulevard bus stop served by TheBus route 433, which provides access between Waipahu and Waikele. Route 433 operates with 30-minute headways during the AM and PM peak hours.

In the future, planned rail service operated by the Honolulu Authority for Rapid Transportation (HART) will initially extend from Kapolei to Aloha Stadium and is expected to initiate service later in 2021. Full operations with service from the stadium station to Ala Moana Shopping Center is anticipated sometime after 2026. The closest stop to the site will be the Pearl Highlands station, located makai of Kamehameha Highway opposite Waihona Street. The Pearl Highlands station will serve as a regional transit hub and will include a park and ride facility, as well as a transfer center for buses from Central Oahu including service from Waipio and Mililani. The existing stop controlled Waihona Street/Kamehameha Highway intersection will be signalized as part of the rail project and will improve overall access to the uses on Waihona Street.

While separate bicycle, pedestrian, and transit facilities are typically encouraged to reduce vehicle traffic, the rural circulation system, distant land uses in the vicinity of the site, and nature of the proposed project are typically not conducive to multi-modal travel.

Potential Impacts to Active Modes and Transit

The City and County of Honolulu and HDOT do not specify impact criteria for pedestrian, bicycle, and transit impacts. However, these impacts are generally evaluated based on whether a proposed project would: 1) conflict with existing or planned pedestrian, bicycle, or transit facilities, or 2) create walking, bicycling, or transit use demand without providing adequate and appropriate

facilities for non-motorized mobility. As noted above, the project is not expected to conflict with any existing active transportation modes (i.e., bicycling and walking) or transit, and it would not create demand for these modes given its isolated location. Accordingly, no impacts to non-automobile travel are anticipated.

Conclusion

The proposed project will generate a negligible amount of vehicle traffic when fully constructed and operational. The project is expected to generate approximately 348 daily vehicle trips during the peak of construction, including 142 vehicle trips during the AM and PM peak hours. Construction activity is planned to occur over a 15- to 18-month period and any construction-related traffic will be temporary. Based on the evaluation presented in this report, the proposed point of access is sufficient for the anticipated construction traffic generated by the project. A detailed construction management plan (CMP) will be prepared and submitted for approval prior to the start of construction to minimize impacts to the transportation system during the construction period.

Sincerely,

FEHR & PEERS

Sohrab Rashid, TE
Principal

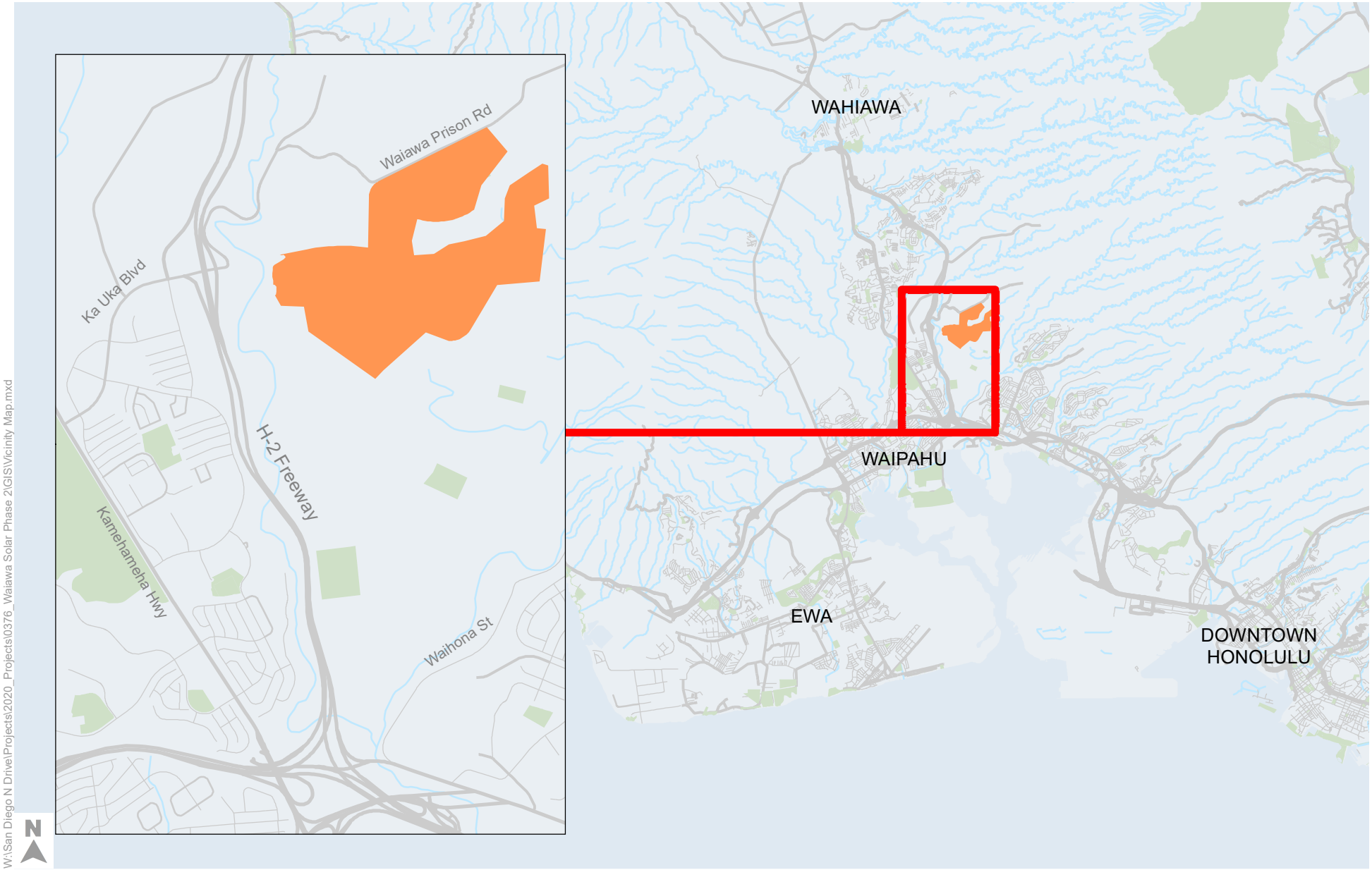
Andrew Scher
Transportation Engineer

SD20-0376

Attachments:

Figure 1 – Project Location and Vicinity
Figure 2 – Project Site and Study Intersections
Figure 3 – Peak Hour Traffic Volumes and Lane Configurations – Existing Conditions
Figure 4 – Project Construction Trip Distribution and Peak Hour Trip Assignment
Figure 5 – Peak Hour Traffic Volumes and Lane Configurations – 2023 No Project Conditions
Figure 6 – Peak Hour Traffic Volumes and Lane Configurations – 2023 Plus Project Construction Conditions
Figure 7 – Peak Hour Traffic Volumes and Lane Configurations – 2023 Plus Typical Project Operating Conditions

Attachment A – Traffic Count Data
Attachment B – Level of Service Analysis Worksheets



LEGEND

Project Site

Figure 1

Project Location and Vicinity

Waiawa Solar Phase 2 Mobility Assessment

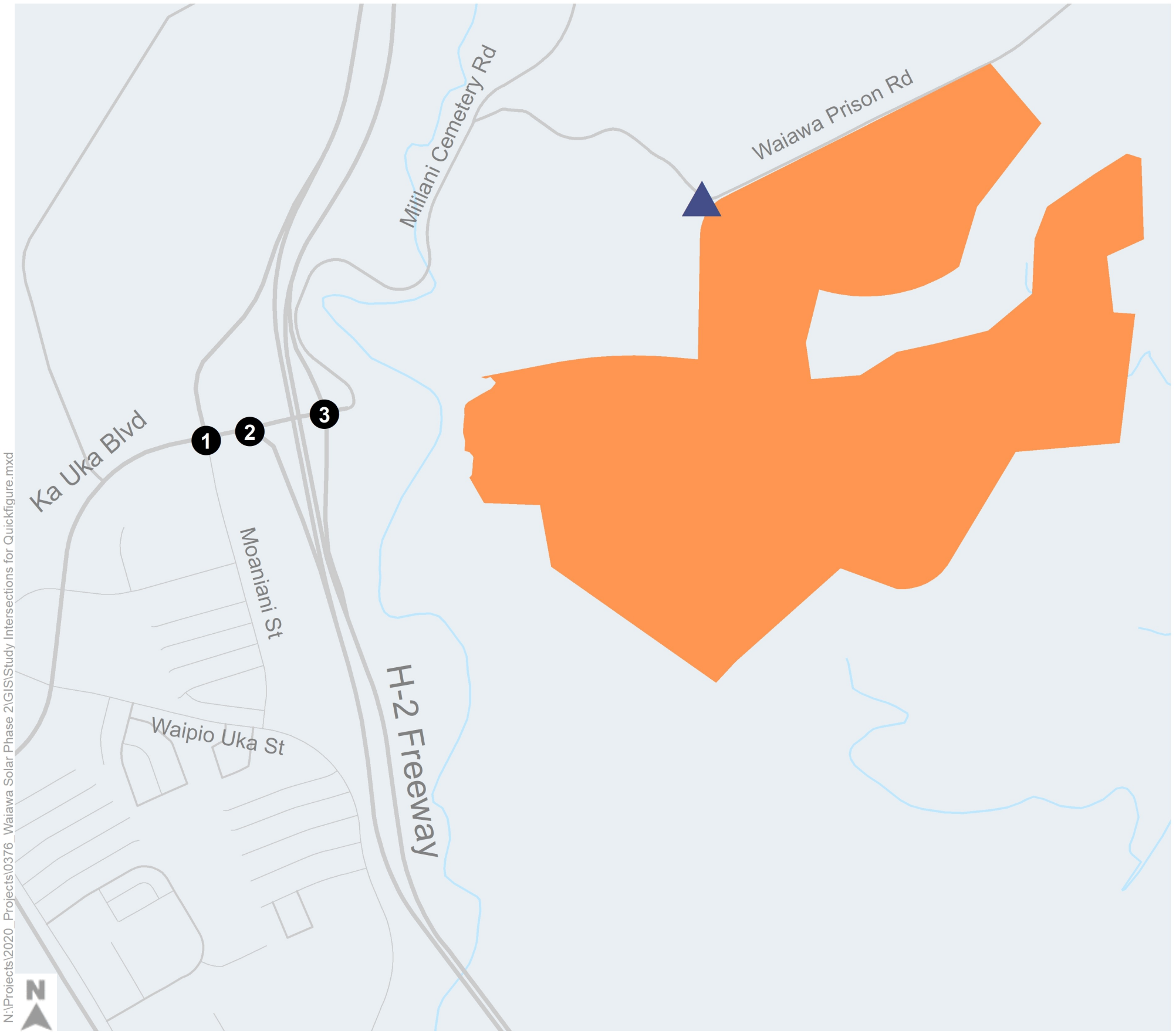
LEGEND

- Study Intersections
- Site Access
- Project Site

Figure 2

Project Site & Study Intersections

Waiawa Solar Phase 2 Mobility Assessment



LEGEND

- Study Intersections
- Site Access
- AM (PM) Peak Hour Traffic Volumes
- Project Site
- Lane Configuration
- AM / PM Level of Service (LOS)

A-C | E | D | F

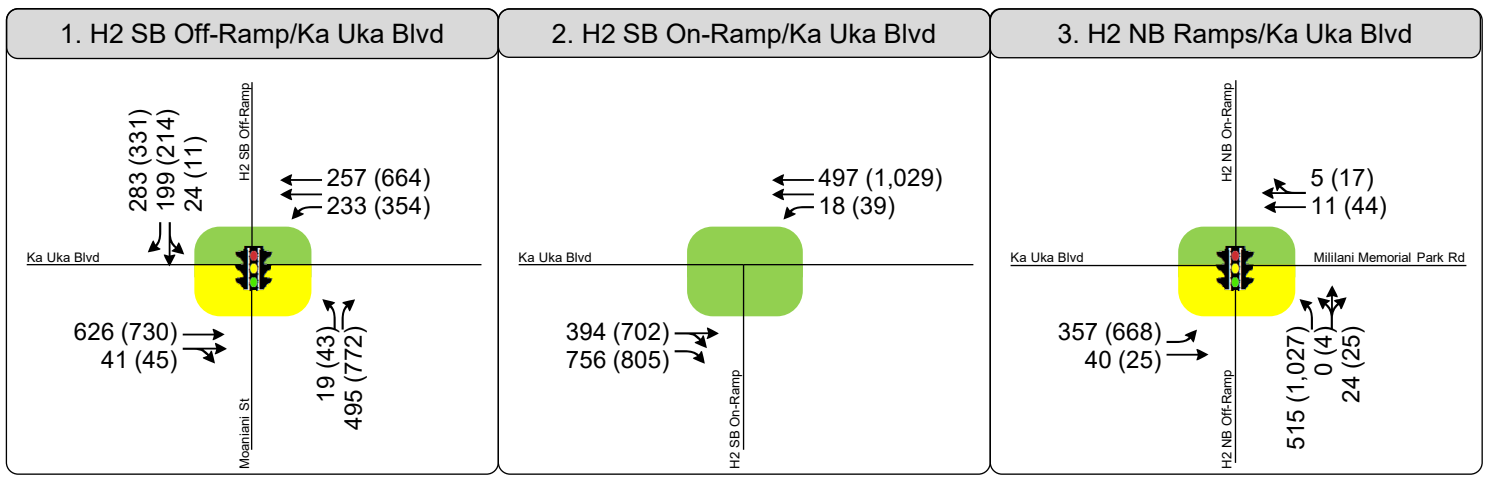
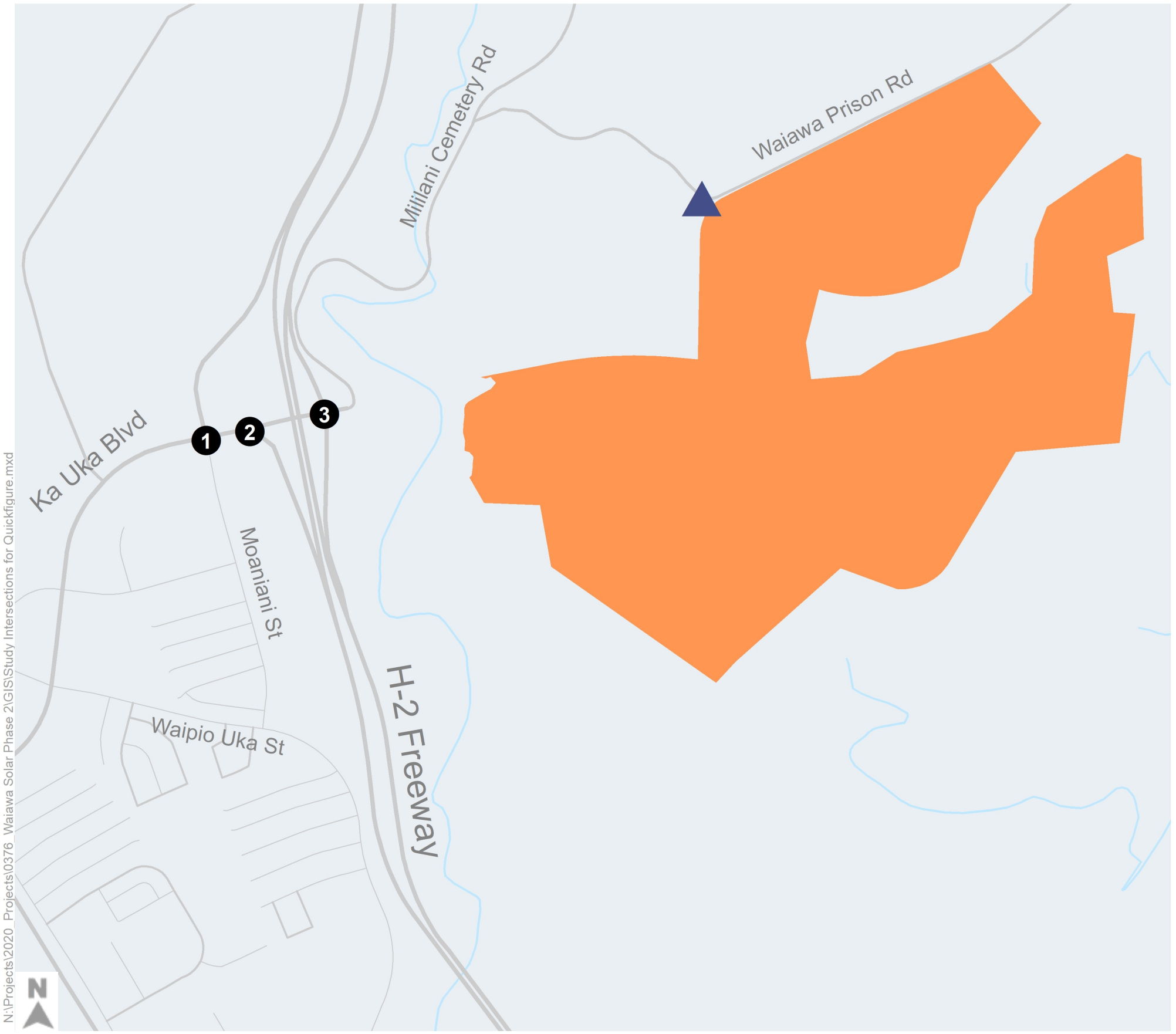


Figure 3

Peak Hour Traffic Volumes and Lane Configurations - Existing Conditions



LEGEND

- Study Intersections
- Site Access
- AM (PM) Peak Hour Traffic Volumes
- Project Site
- Lane Configuration
- AM / PM Level of Service (LOS)

A-C | E | D | F

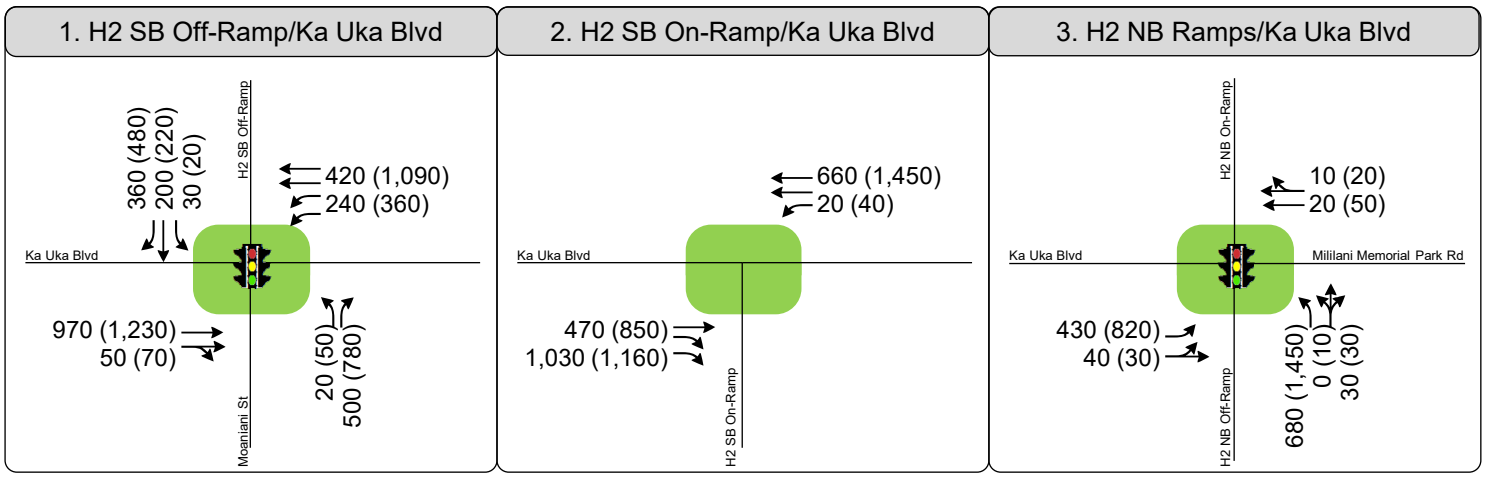
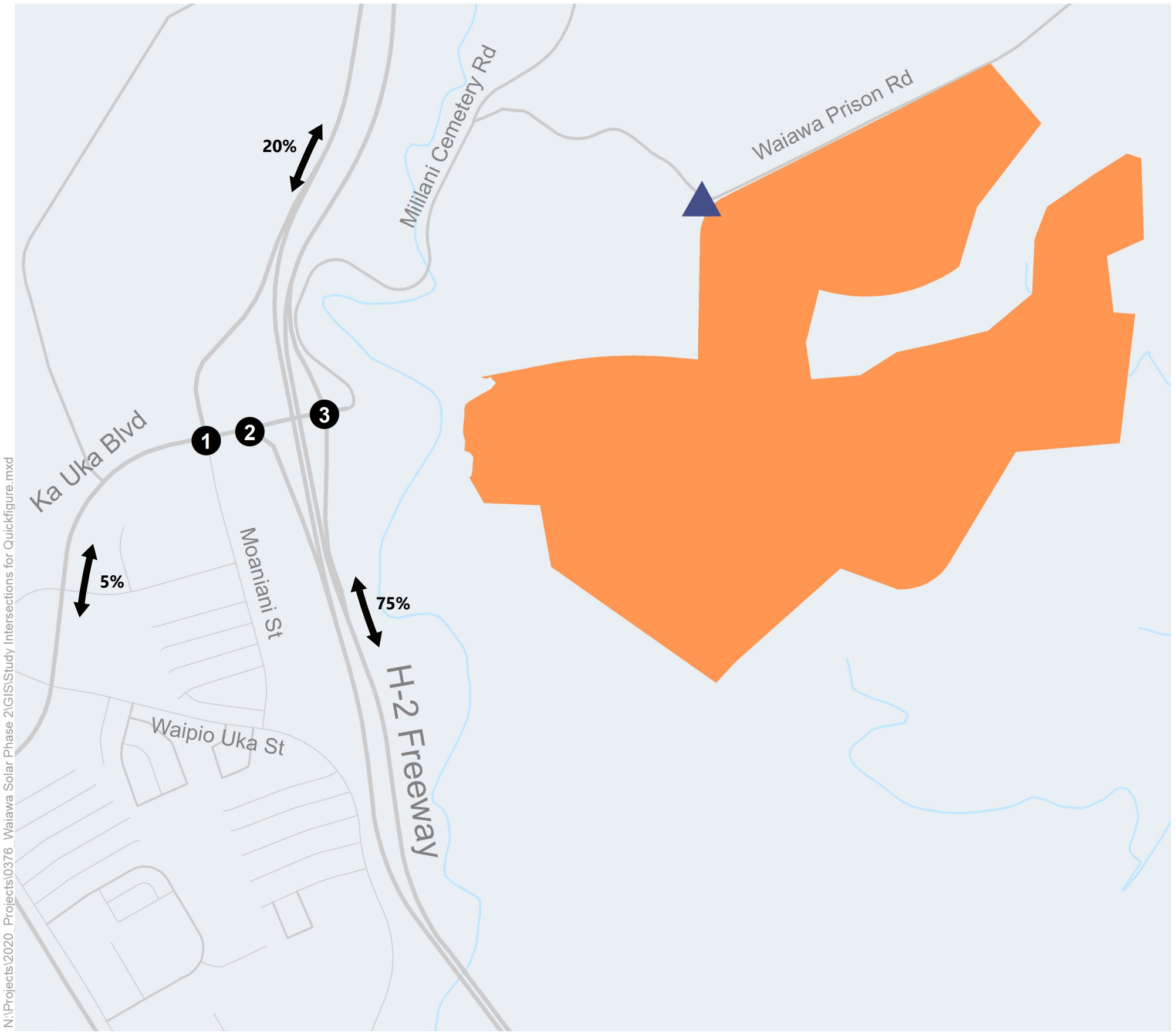


Figure 4

Peak Hour Traffic Volumes and Lane Configurations - 2023 No Project Conditions



LEGEND

- Study Intersections
- Site Access
- AM (PM) Peak Hour Traffic Volumes
- Project Site
- Lane Configuration
- % Project Trip Distribution

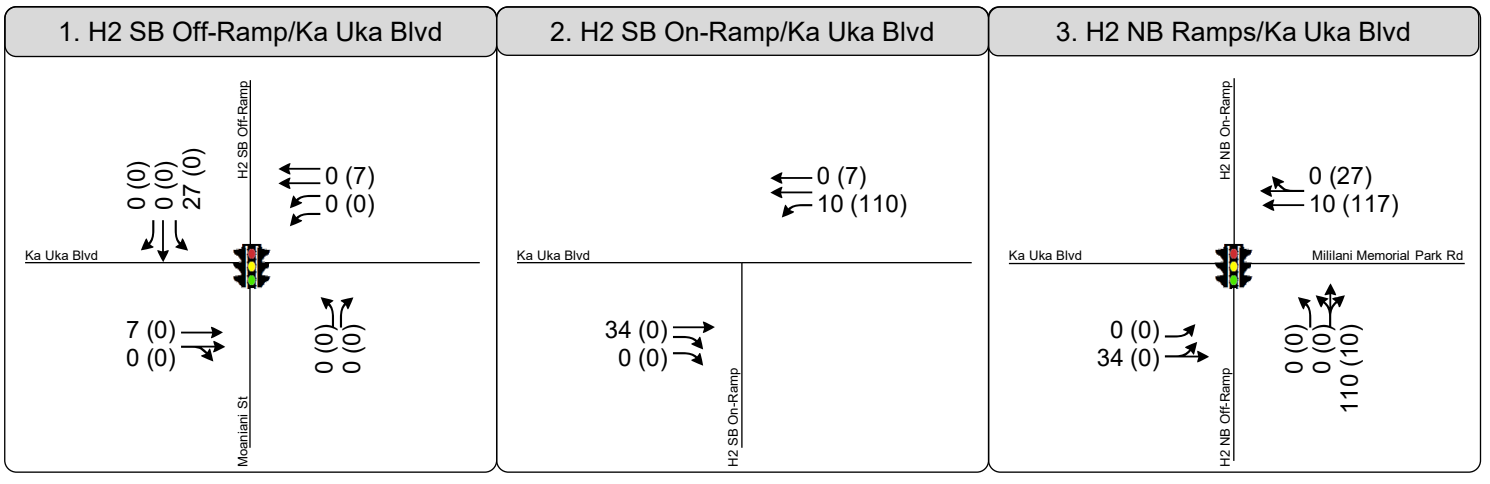
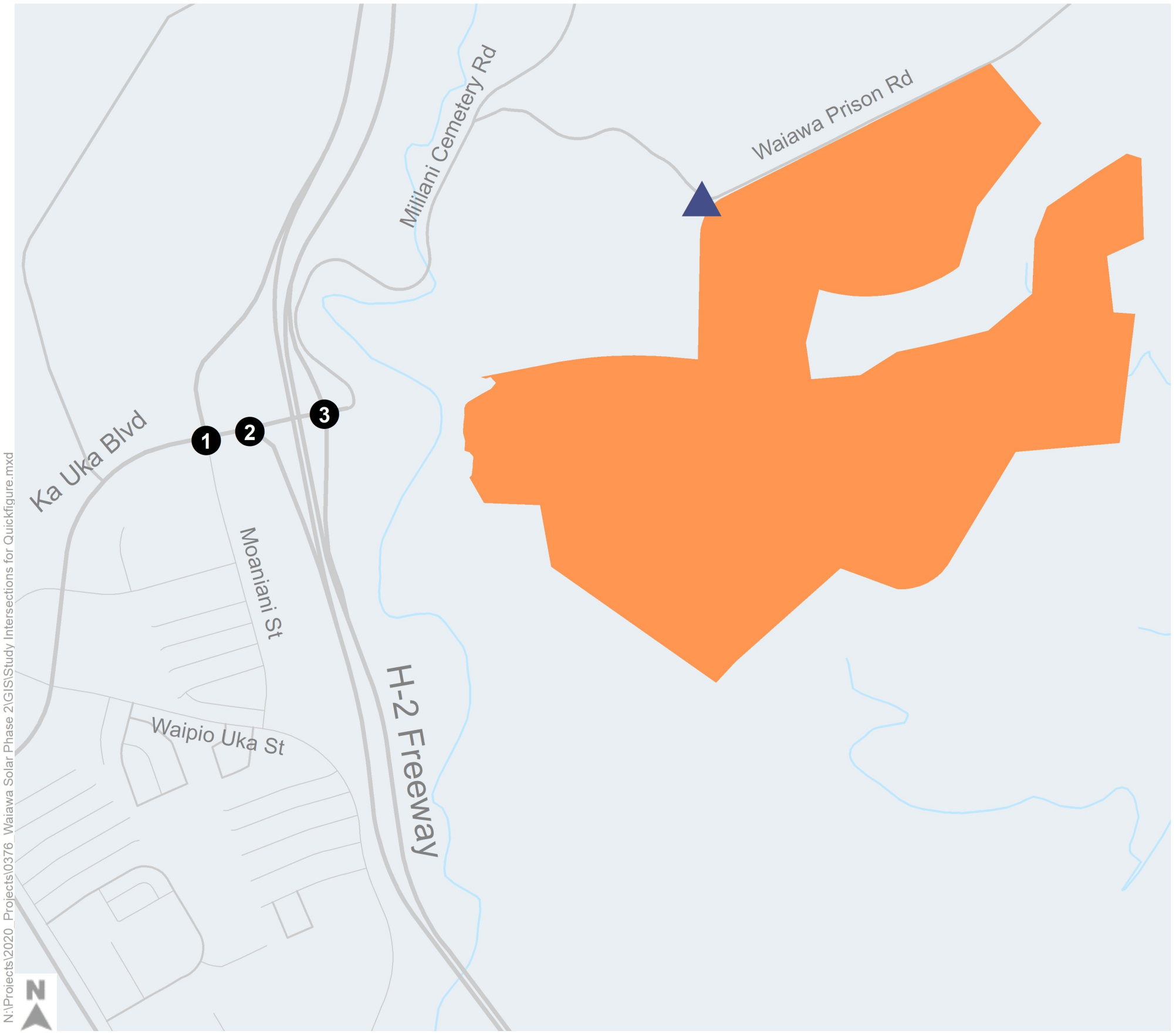


Figure 5

Project Construction Trip Distribution and Peak Hour Trip Assignment



LEGEND

- Study Intersections
- Site Access
- AM (PM) Peak Hour Traffic Volumes
- Project Site
- Lane Configuration
- AM / PM Level of Service (LOS)

A-C | E | D | F

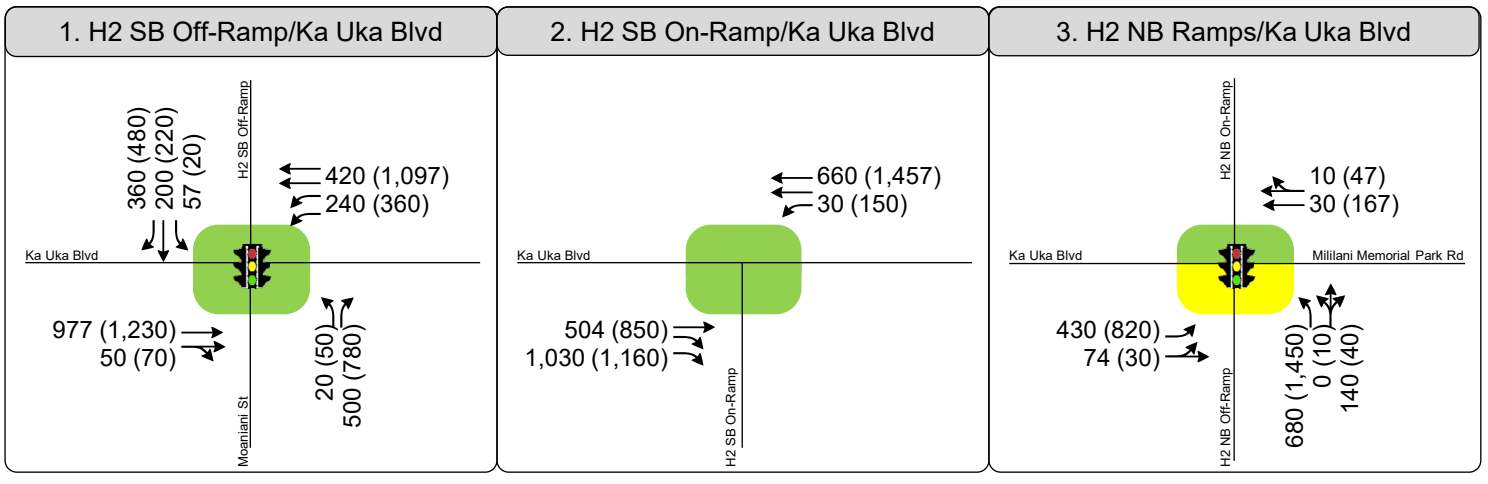
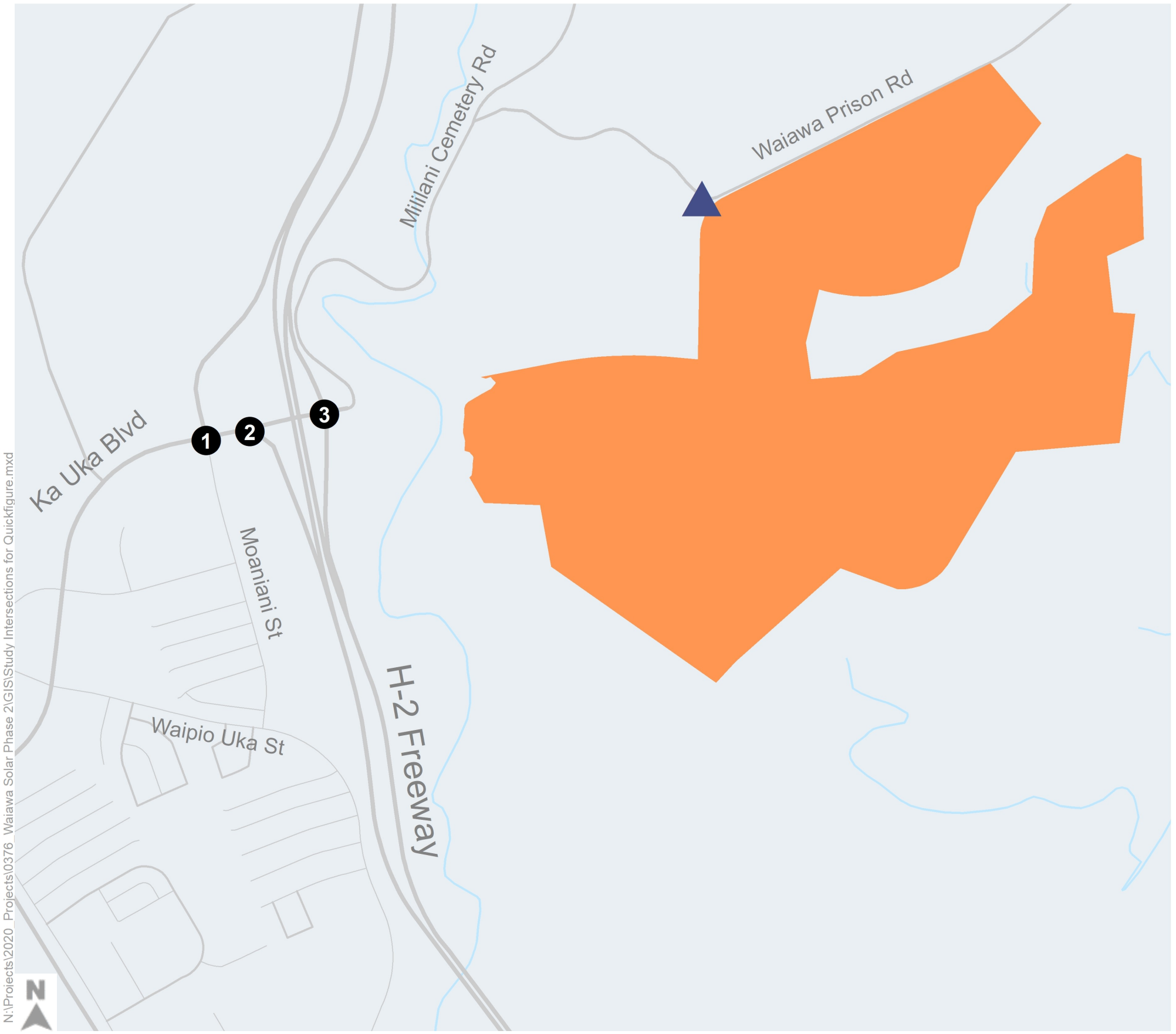


Figure 6

Peak Hour Traffic Volumes and Lane Configurations - 2023 Plus Project Construction Conditions



LEGEND

- Study Intersections
- Site Access
- AM (PM) Peak Hour Traffic Volumes
- Project Site
- Lane Configuration
- AM / PM Level of Service (LOS)

A-C | E | D | F

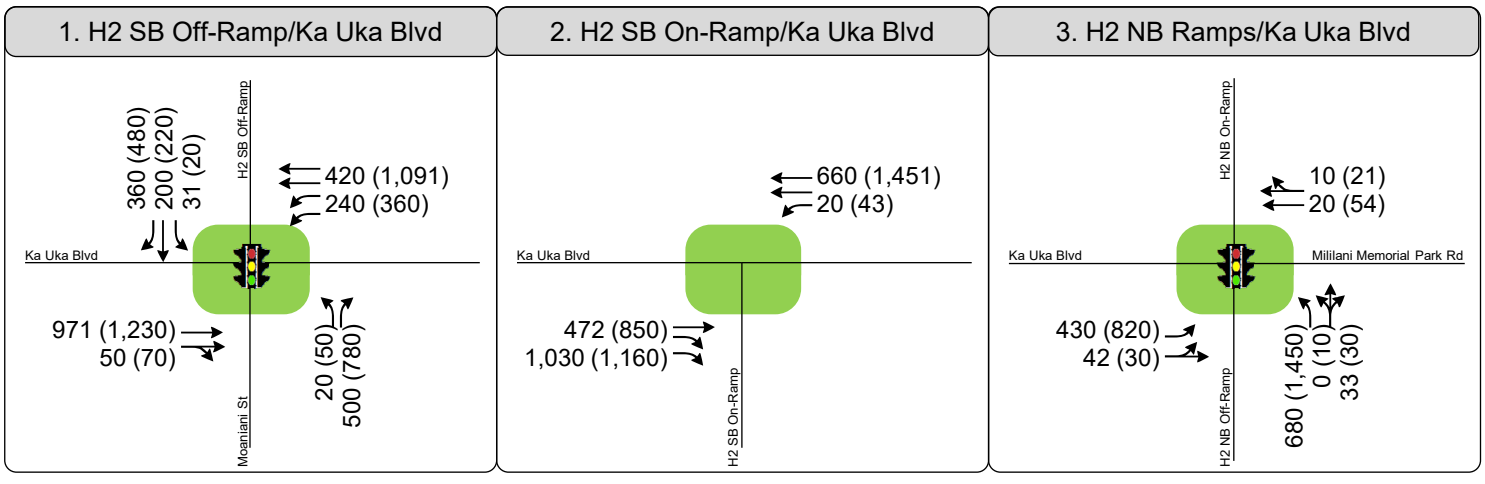


Figure 7

Peak Hour Traffic Volumes and Lane Configurations - 2023 Plus Typical Project Operating Conditions

Attachment A: Traffic Count Data

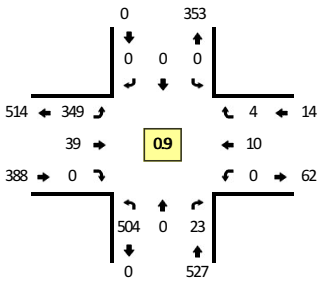
Type of peak hour being reported: User-Defined

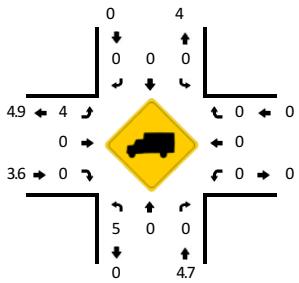
Method for determining peak hour: Total Entering Volume

LOCATION: I- H-2 NB Off Ramp -- Mililani Memorial Park Rd
CITY/STATE: Waipahu, HI

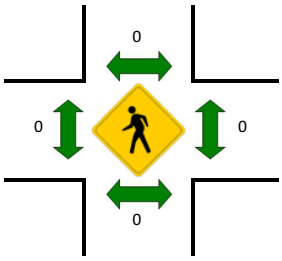
QC JOB #: 14901903
DATE: Tue, Feb 19 2019

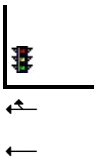
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

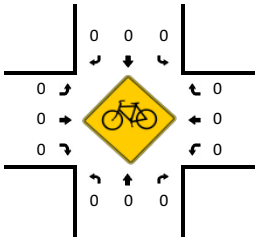


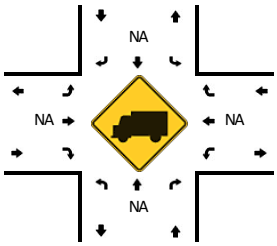


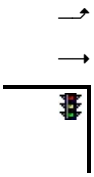
Quality Counts
DATA THAT DRIVES COMMUNITIES

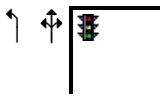


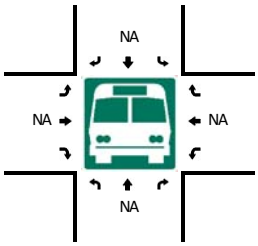












15-Min Count Period Beginning At	I- H-2 NB Off Ramp (Northbound)				I- H-2 NB Off Ramp (Southbound)				Mililani Memorial Park Rd (Eastbound)				Mililani Memorial Park Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	76	0	1	0	0	0	0	0	79	3	0	0	0	4	0	0	163	
7:15 AM	108	0	3	0	0	0	0	0	97	2	0	0	0	2	1	0	213	
7:30 AM	115	0	6	0	0	0	0	0	102	18	0	0	0	1	0	0	242	
7:45 AM	154	0	8	0	0	0	0	0	76	14	0	0	0	5	2	0	259	877
8:00 AM	127	0	6	0	0	0	0	0	74	5	0	0	0	2	1	0	215	929
8:15 AM	160	0	5	0	0	0	0	0	66	3	0	0	0	2	1	0	237	953
8:30 AM	95	0	8	0	0	0	0	0	68	5	0	0	0	4	1	0	181	892
8:45 AM	133	0	4	0	0	0	0	0	75	11	0	0	0	7	0	0	230	863

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	616	0	32	0	0	0	0	0	304	56	0	0	0	20	8	0	1036
Heavy Trucks	36	0	0		0	0	0		24	0	0		0	0	0		60
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 2/22/2019 2:54 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

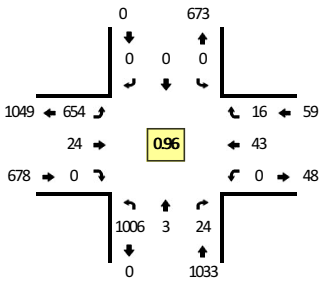
Type of peak hour being reported: User-Defined

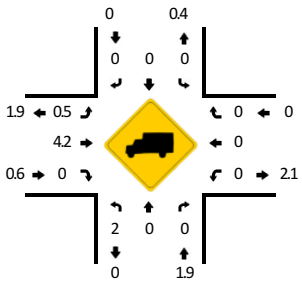
Method for determining peak hour: Total Entering Volume

LOCATION: I- H-2 NB Off Ramp -- Mililani Memorial Park Rd
CITY/STATE: Waipahu, HI

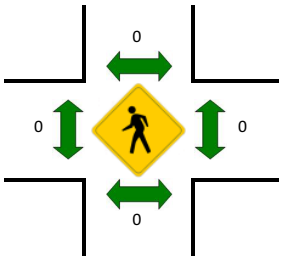
QC JOB #: 14901904
DATE: Tue, Feb 19 2019

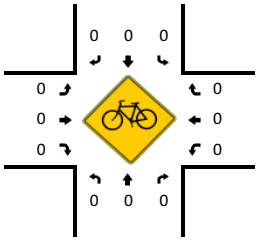
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

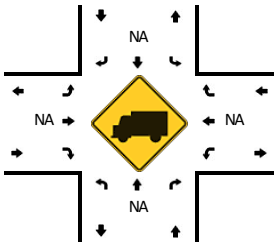


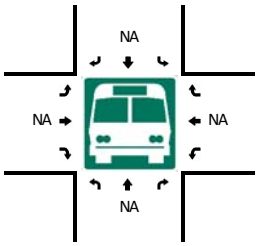


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	I- H-2 NB Off Ramp (Northbound)				I- H-2 NB Off Ramp (Southbound)				Mililani Memorial Park Rd (Eastbound)				Mililani Memorial Park Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	262	2	1	0	0	0	0	0	147	4	0	0	0	12	3	0	431	
4:15 PM	248	0	5	0	0	0	0	0	149	8	0	0	0	12	1	0	423	
4:30 PM	225	2	9	0	0	0	0	0	165	6	0	0	0	14	4	0	425	
4:45 PM	283	0	7	0	0	0	0	0	149	6	0	0	0	6	4	0	455	1734
5:00 PM	262	0	3	0	0	0	0	0	176	6	0	0	0	10	4	0	461	1764
5:15 PM	236	1	5	0	0	0	0	0	164	6	0	0	0	13	4	0	429	1770
5:30 PM	309	0	5	0	0	0	0	0	130	8	0	0	0	4	4	0	460	1805
5:45 PM	232	0	7	0	0	0	0	0	138	7	0	0	0	11	2	0	397	1747

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	1048	0	12	0	0	0	0	0	704	24	0	0	0	40	16	0	1844
Heavy Trucks	28	0	0		0	0	0		0	0	0		0	0	0		28
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 2/22/2019 2:55 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

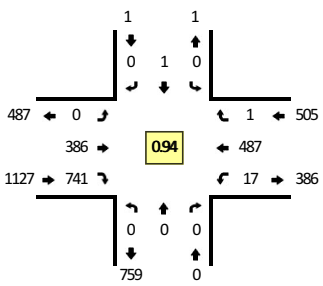
Type of peak hour being reported: User-Defined

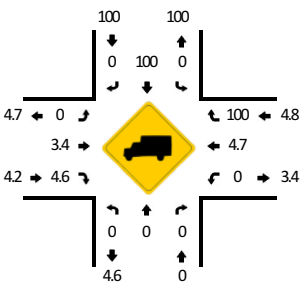
Method for determining peak hour: Total Entering Volume

LOCATION: I- H-2 SB On Ramp -- Ka Uka Blvd
CITY/STATE: Waipahu, HI

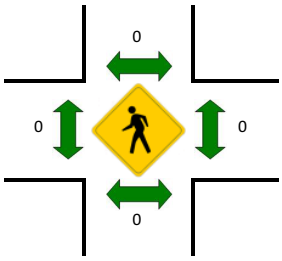
QC JOB #: 14901905
DATE: Tue, Feb 19 2019

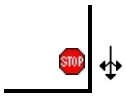
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

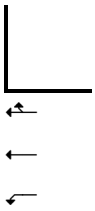


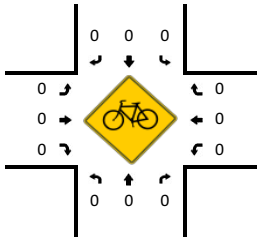


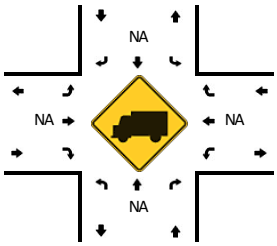
Quality Counts
DATA THAT DRIVES COMMUNITIES

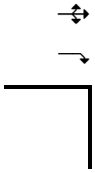


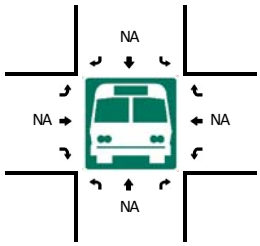












15-Min Count Period Beginning At	I- H-2 SB On Ramp (Northbound)				I- H-2 SB On Ramp (Southbound)				Ka Uka Blvd (Eastbound)				Ka Uka Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	87	214	0	3	77	0	0	381	
7:15 AM	0	0	0	0	0	0	0	0	0	97	197	0	7	100	0	0	401	
7:30 AM	0	0	0	0	0	0	0	0	0	121	196	0	3	113	1	0	434	
7:45 AM	0	0	0	0	0	1	0	0	0	91	181	0	4	155	0	0	432	1648
8:00 AM	0	0	0	0	0	0	0	0	0	77	167	0	3	119	0	0	366	1633
8:15 AM	0	0	0	0	0	0	0	0	0	65	146	0	8	153	0	0	372	1604
8:30 AM	0	0	0	0	0	0	0	0	0	72	160	0	3	99	0	0	334	1504
8:45 AM	0	0	0	0	0	0	0	0	0	82	146	1	10	128	0	0	367	1439

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	484	784	0	12	452	4	0	1736
Heavy Trucks	0	0	0		0	0	0		0	12	40		0	12	4		68
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 2/22/2019 2:54 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

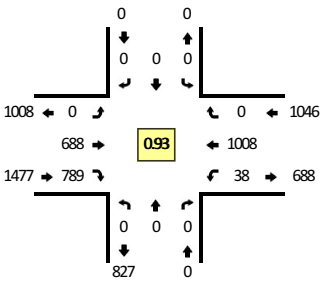
Type of peak hour being reported: User-Defined

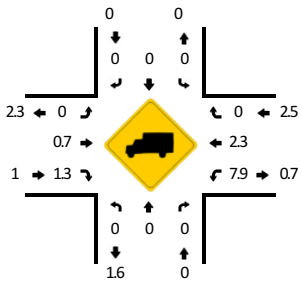
Method for determining peak hour: Total Entering Volume

LOCATION: I- H-2 SB On Ramp -- Ka Uka Blvd
CITY/STATE: Waipahu, HI

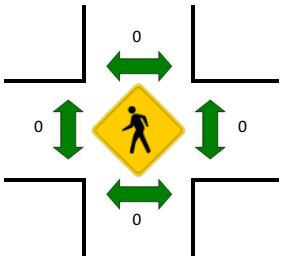
QC JOB #: 14901906
DATE: Tue, Feb 19 2019

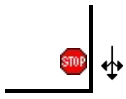
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

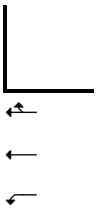


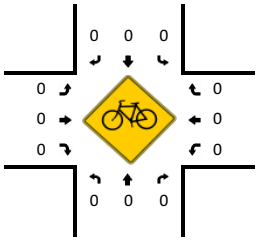


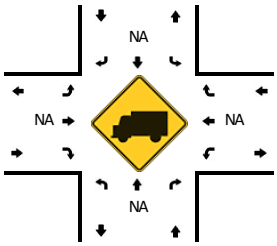
Quality Counts
DATA THAT DRIVES COMMUNITIES

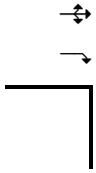


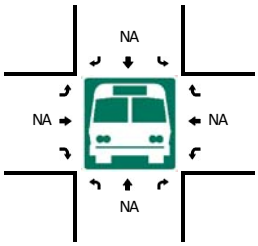












15-Min Count Period Beginning At	I- H-2 SB On Ramp (Northbound)				I- H-2 SB On Ramp (Southbound)				Ka Uka Blvd (Eastbound)				Ka Uka Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	0	162	194	0	13	261	0	0	630	
4:15 PM	0	0	0	0	0	0	0	0	0	150	162	0	8	252	0	0	572	
4:30 PM	0	0	0	0	0	0	0	0	0	172	178	0	13	226	0	0	589	
4:45 PM	0	0	0	0	0	0	0	0	0	164	178	0	9	280	0	0	631	2422
5:00 PM	0	0	0	0	0	0	0	0	0	183	222	1	10	260	0	0	676	2468
5:15 PM	0	0	0	0	0	0	0	0	0	168	211	0	6	242	0	0	627	2523
5:30 PM	0	0	0	0	0	0	0	0	0	150	178	0	7	295	0	0	630	2564
5:45 PM	0	0	0	0	0	0	0	0	0	139	142	0	7	245	0	0	533	2466

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	736	888	4	40	1040	0	0	2708
Heavy Trucks	0	0	0		0	0	0		0	0	8		0	28	0		36
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 2/22/2019 2:55 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

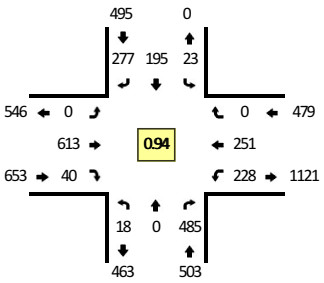
Type of peak hour being reported: User-Defined

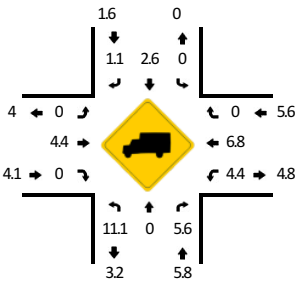
Method for determining peak hour: Total Entering Volume

LOCATION: Moaniani St/H2 SB Off Ramp -- Ka Uka Blvd
CITY/STATE: Waipahu, HI

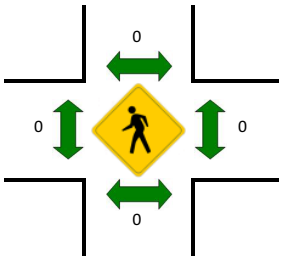
QC JOB #: 14901907
DATE: Tue, Feb 19 2019

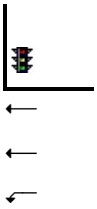
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

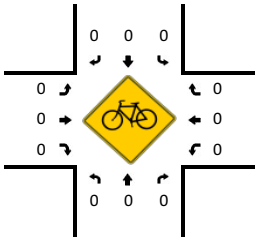


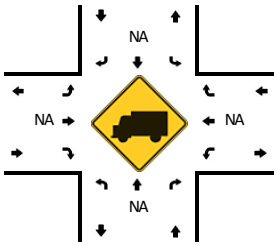


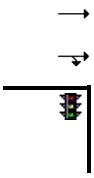
Quality Counts
DATA THAT DRIVES COMMUNITIES

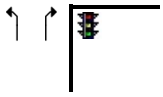


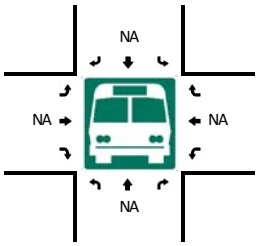












15-Min Count Period Beginning At	Moaniani St/H2 SB Off Ramp (Northbound)				Moaniani St/H2 SB Off Ramp (Southbound)				Ka Uka Blvd (Eastbound)				Ka Uka Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	127	0	2	38	63	0	0	170	6	0	37	49	0	0	492	
7:15 AM	6	0	137	0	1	37	50	0	0	159	7	0	39	59	0	0	495	
7:30 AM	4	0	132	0	10	43	75	0	0	170	13	0	55	51	0	0	553	
7:45 AM	6	0	111	0	10	56	80	0	0	145	10	0	73	76	0	0	567	2107
8:00 AM	2	0	105	0	2	59	72	0	0	139	10	0	61	65	0	0	515	2130
8:15 AM	6	0	102	0	4	57	56	0	0	99	11	0	69	74	0	0	478	2113
8:30 AM	9	0	112	0	0	50	51	0	0	123	15	0	59	48	0	0	467	2027
8:45 AM	7	0	94	0	3	51	47	0	0	130	13	0	61	66	0	0	472	1932

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	24	0	444	0	40	224	320	0	0	580	40	0	292	304	0	0	2268
Heavy Trucks	4	0	20		0	12	0		0	40	0		20	20	0		116
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 2/22/2019 2:54 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

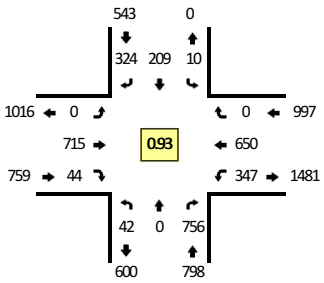
Type of peak hour being reported: User-Defined

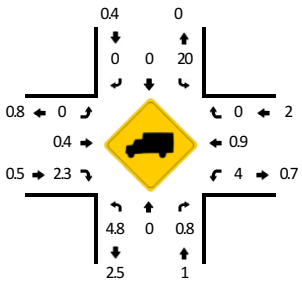
Method for determining peak hour: Total Entering Volume

LOCATION: Moaniani St/H2 SB Off Ramp -- Ka Uka Blvd
CITY/STATE: Waipahu, HI

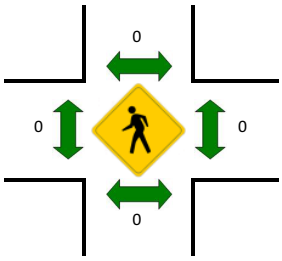
QC JOB #: 14901908
DATE: Tue, Feb 19 2019

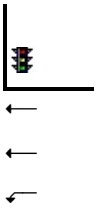
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

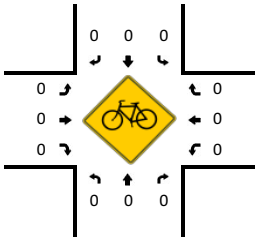


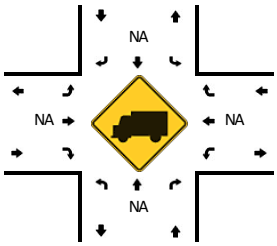


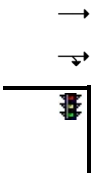
Quality Counts
DATA THAT DRIVES COMMUNITIES

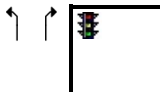


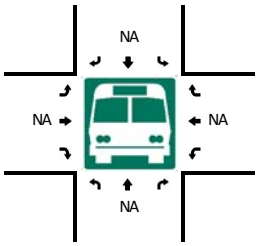












15-Min Count Period Beginning At	Moaniani St/H2 SB Off Ramp (Northbound)				Moaniani St/H2 SB Off Ramp (Southbound)				Ka Uka Blvd (Eastbound)				Ka Uka Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	12	0	169	0	2	60	83	0	0	181	12	0	97	163	0	0	779	
4:15 PM	9	0	192	0	8	75	68	0	0	105	8	0	104	162	0	0	731	
4:30 PM	12	0	180	0	2	42	95	0	0	177	11	0	91	145	0	0	755	
4:45 PM	9	0	180	0	4	60	81	0	0	150	9	0	80	152	0	0	725	2990
5:00 PM	8	0	194	0	3	42	74	0	0	216	14	0	86	200	0	0	837	3048
5:15 PM	13	0	202	0	1	65	74	0	0	172	10	0	90	153	0	0	780	3097
5:30 PM	6	0	181	0	5	50	63	0	0	140	9	0	110	168	0	0	732	3074
5:45 PM	8	0	156	0	3	74	74	0	0	110	9	0	104	167	0	0	705	3054

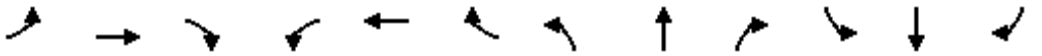
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	32	0	776	0	12	168	296	0	0	864	56	0	344	800	0	0	3348
Heavy Trucks	0	0	4		0	0	0		0	4	0		16	8	0		32
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 2/22/2019 2:55 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Attachment B: Level of Service Analysis Worksheets



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	626	41	233	257	0	19	0	495	24	199	283
Future Volume (veh/h)	0	626	41	233	257	0	19	0	495	24	199	283
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	0	1841	1841	1841	1796	0	1737	0	1811	1856	1856	1870
Adj Flow Rate, veh/h	0	666	40	248	273	0	20	0	56	26	212	61
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	4	4	4	7	0	11	0	6	3	3	2
Cap, veh/h	0	1103	66	323	2088	0	0	0	0	39	315	304
Arrive On Green	0.00	0.33	0.33	0.18	0.61	0.00	0.00	0.00	0.00	0.19	0.19	0.19
Sat Flow, veh/h	0	3444	201	1753	3503	0		0		202	1644	1585
Grp Volume(v), veh/h	0	347	359	248	273	0		0.0		238	0	61
Grp Sat Flow(s),veh/h/ln	0	1749	1805	1753	1706	0				1845	0	1585
Q Serve(g_s), s	0.0	7.6	7.6	6.2	1.5	0.0				5.5	0.0	1.5
Cycle Q Clear(g_c), s	0.0	7.6	7.6	6.2	1.5	0.0				5.5	0.0	1.5
Prop In Lane	0.00		0.11	1.00		0.00				0.11		1.00
Lane Grp Cap(c), veh/h	0	575	594	323	2088	0				354	0	304
V/C Ratio(X)	0.00	0.60	0.60	0.77	0.13	0.00				0.67	0.00	0.20
Avail Cap(c_a), veh/h	0	2119	2187	976	6371	0				1028	0	883
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.9	12.9	17.7	3.8	0.0				17.2	0.0	15.6
Incr Delay (d2), s/veh	0.0	1.0	1.0	3.8	0.0	0.0				2.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.7	2.8	2.6	0.3	0.0				2.3	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	13.9	13.9	21.6	3.8	0.0				19.4	0.0	15.9
LnGrp LOS	A	B	B	C	A	A				B	A	B
Approach Vol, veh/h		706			521						299	
Approach Delay, s/veh		13.9			12.2						18.7	
Approach LOS		B			B						B	

Timer - Assigned Phs		3	4		6		8					
Phs Duration (G+Y+Rc), s		12.9	19.6		13.3		32.5					
Change Period (Y+Rc), s		4.5	4.5		4.5		4.5					
Max Green Setting (Gmax), s		25.5	55.5		25.5		85.5					
Max Q Clear Time (g_c+I1), s		8.2	9.6		7.5		3.5					
Green Ext Time (p_c), s		0.7	5.4		1.5		2.1					

Intersection Summary	
HCM 6th Ctrl Delay	14.3
HCM 6th LOS	B

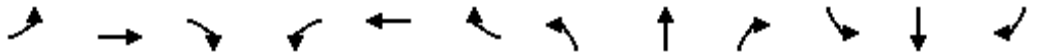
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	394	756	18	497	0	0	0	0	0	0	0
Future Vol, veh/h	0	394	756	18	497	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	94	94	94	94	92	94	92	94	92	92	92
Heavy Vehicles, %	2	3	5	2	5	2	2	2	2	2	2	2
Mvmt Flow	0	419	804	19	529	0	0	0	0	0	0	0

Major/Minor	Major1			Major2					Minor2		
Conflicting Flow All	-	0	-	419	0	0			986	986	265
Stage 1	-	-	-	-	-	-			567	567	-
Stage 2	-	-	-	-	-	-			419	419	-
Critical Hdwy	-	-	-	4.13	-	-			6.63	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-			5.83	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-			5.43	5.53	-
Follow-up Hdwy	-	-	-	2.219	-	-			3.519	4.019	3.319
Pot Cap-1 Maneuver	0	-	0	1138	-	0			259	247	734
Stage 1	0	-	0	-	-	0			532	506	-
Stage 2	0	-	0	-	-	0			663	589	-
Platoon blocked, %		-			-						
Mov Cap-1 Maneuver	-	-	-	1138	-	-			255	0	734
Mov Cap-2 Maneuver	-	-	-	-	-	-			255	0	-
Stage 1	-	-	-	-	-	-			532	0	-
Stage 2	-	-	-	-	-	-			652	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.3	0
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBL	WBT	SBLn1
Capacity (veh/h)	-	1138	-	-
HCM Lane V/C Ratio	-	0.017	-	-
HCM Control Delay (s)	-	8.2	-	0
HCM Lane LOS	-	A	-	A
HCM 95th %tile Q(veh)	-	0.1	-	-

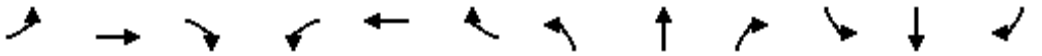


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	357	40	0	0	11	5	515	0	24	0	0	0
Future Volume (veh/h)	357	40	0	0	11	5	515	0	24	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1841	1870	0	0	1870	1870	1826	1870	1826			
Adj Flow Rate, veh/h	397	44	0	0	12	3	586	0	0			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	4	2	0	0	2	2	5	2	5			
Cap, veh/h	771	695	0	0	1057	254	1039	559	0			
Arrive On Green	0.37	0.37	0.00	0.00	0.37	0.37	0.30	0.00	0.00			
Sat Flow, veh/h	1376	1870	0	0	2936	682	3478	1870	0			
Grp Volume(v), veh/h	397	44	0	0	7	8	586	0	0			
Grp Sat Flow(s),veh/h/ln	1376	1870	0	0	1777	1748	1739	1870	0			
Q Serve(g_s), s	7.0	0.4	0.0	0.0	0.1	0.1	3.9	0.0	0.0			
Cycle Q Clear(g_c), s	7.1	0.4	0.0	0.0	0.1	0.1	3.9	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.39	1.00		0.00			
Lane Grp Cap(c), veh/h	771	695	0	0	661	650	1039	559	0			
V/C Ratio(X)	0.51	0.06	0.00	0.00	0.01	0.01	0.56	0.00	0.00			
Avail Cap(c_a), veh/h	1544	1746	0	0	1658	1631	7064	3799	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	7.6	5.5	0.0	0.0	5.4	5.4	8.1	0.0	0.0			
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	0.1	0.0	0.0	0.0	0.0	1.0	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.2	5.6	0.0	0.0	5.4	5.4	8.6	0.0	0.0			
LnGrp LOS	A	A	A	A	A	A	A	A	A			
Approach Vol, veh/h		441			15			586				
Approach Delay, s/veh		7.9			5.4			8.6				
Approach LOS		A			A			A				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		12.7		14.7				14.7				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		55.5		25.5				25.5				
Max Q Clear Time (g_c+I1), s		5.9		9.1				2.1				
Green Ext Time (p_c), s		2.4		1.4				0.0				

Intersection Summary	
HCM 6th Ctrl Delay	8.2
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	730	45	354	664	0	43	0	772	11	214	331
Future Volume (veh/h)	0	730	45	354	664	0	43	0	772	11	214	331
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	0	1870	1870	1841	1870	0	1826	0	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	785	45	381	714	0	46	0	281	12	230	62
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	4	2	0	5	0	2	2	2	2
Cap, veh/h	0	1240	71	405	2205	0	0	0	0	13	251	224
Arrive On Green	0.00	0.36	0.36	0.23	0.62	0.00	0.00	0.00	0.00	0.14	0.14	0.14
Sat Flow, veh/h	0	3510	196	1753	3647	0		0		93	1773	1585
Grp Volume(v), veh/h	0	408	422	381	714	0		0.0		242	0	62
Grp Sat Flow(s),veh/h/ln	0	1777	1835	1753	1777	0				1866	0	1585
Q Serve(g_s), s	0.0	32.3	32.3	36.3	16.2	0.0				21.8	0.0	5.9
Cycle Q Clear(g_c), s	0.0	32.3	32.3	36.3	16.2	0.0				21.8	0.0	5.9
Prop In Lane	0.00		0.11	1.00		0.00				0.05		1.00
Lane Grp Cap(c), veh/h	0	645	666	405	2205	0				264	0	224
V/C Ratio(X)	0.00	0.63	0.63	0.94	0.32	0.00				0.92	0.00	0.28
Avail Cap(c_a), veh/h	0	645	666	521	2205	0				280	0	238
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	44.8	44.8	64.2	15.3	0.0				72.0	0.0	65.2
Incr Delay (d2), s/veh	0.0	2.0	2.0	22.2	0.4	0.0				32.0	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	14.9	15.4	18.9	6.9	0.0				12.9	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	46.8	46.7	86.4	15.7	0.0				104.0	0.0	65.9
LnGrp LOS	A	D	D	F	B	A				F	A	E
Approach Vol, veh/h		830			1095						304	
Approach Delay, s/veh		46.8			40.3						96.3	
Approach LOS		D			D						F	

Timer - Assigned Phs		3	4		6		8					
Phs Duration (G+Y+Rc), s		43.8	66.2		28.5		110.0					
Change Period (Y+Rc), s		4.5	4.5		4.5		4.5					
Max Green Setting (Gmax), s		50.5	50.5		25.5		105.5					
Max Q Clear Time (g_c+I1), s		38.3	34.3		23.8		18.2					
Green Ext Time (p_c), s		1.0	5.1		0.3		6.4					

Intersection Summary												
HCM 6th Ctrl Delay		50.3										
HCM 6th LOS		D										

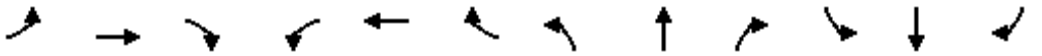
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	702	805	39	1029	0	0	0	0	0	0	0
Future Vol, veh/h	0	702	805	39	1029	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	93	93	93	93	92	93	92	93	92	92	92
Heavy Vehicles, %	2	2	2	8	2	2	2	2	2	2	2	2
Mvmt Flow	0	755	866	42	1106	0	0	0	0	0	0	0

Major/Minor	Major1			Major2					Minor2		
Conflicting Flow All	-	0	-	755	0	0			1945	1945	553
Stage 1	-	-	-	-	-	-			1190	1190	-
Stage 2	-	-	-	-	-	-			755	755	-
Critical Hdwy	-	-	-	4.22	-	-			6.63	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-			5.83	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-			5.43	5.53	-
Follow-up Hdwy	-	-	-	2.276	-	-			3.519	4.019	3.319
Pot Cap-1 Maneuver	0	-	0	821	-	0			64	64	478
Stage 1	0	-	0	-	-	0			252	260	-
Stage 2	0	-	0	-	-	0			463	416	-
Platoon blocked, %		-			-						
Mov Cap-1 Maneuver	-	-	-	821	-	-			61	0	478
Mov Cap-2 Maneuver	-	-	-	-	-	-			61	0	-
Stage 1	-	-	-	-	-	-			252	0	-
Stage 2	-	-	-	-	-	-			439	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.4	0
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBL	WBT	SBLn1
Capacity (veh/h)	-	821	-	-
HCM Lane V/C Ratio	-	0.051	-	-
HCM Control Delay (s)	-	9.6	-	0
HCM Lane LOS	-	A	-	A
HCM 95th %tile Q(veh)	-	0.2	-	-

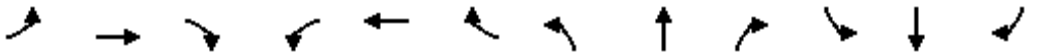


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	668	25	0	0	44	17	1027	4	25	0	0	0
Future Volume (veh/h)	668	25	0	0	44	17	1027	4	25	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1841	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	696	26	0	0	46	11	1096	0	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	4	0	0	2	2	2	2	2			
Cap, veh/h	755	989	0	0	1540	355	1460	767	0			
Arrive On Green	0.54	0.54	0.00	0.00	0.54	0.54	0.41	0.00	0.00			
Sat Flow, veh/h	1346	1841	0	0	2960	662	3563	1870	0			
Grp Volume(v), veh/h	696	26	0	0	28	29	1096	0	0			
Grp Sat Flow(s),veh/h/ln	1346	1841	0	0	1777	1751	1781	1870	0			
Q Serve(g_s), s	85.6	1.1	0.0	0.0	1.3	1.3	44.6	0.0	0.0			
Cycle Q Clear(g_c), s	87.0	1.1	0.0	0.0	1.3	1.3	44.6	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.38	1.00		0.00			
Lane Grp Cap(c), veh/h	755	989	0	0	954	941	1460	767	0			
V/C Ratio(X)	0.92	0.03	0.00	0.00	0.03	0.03	0.75	0.00	0.00			
Avail Cap(c_a), veh/h	828	1088	0	0	1050	1035	1460	767	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	39.0	18.5	0.0	0.0	18.5	18.5	42.7	0.0	0.0			
Incr Delay (d2), s/veh	14.8	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	31.3	0.5	0.0	0.0	0.5	0.6	20.7	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.8	18.5	0.0	0.0	18.5	18.5	46.3	0.0	0.0			
LnGrp LOS	D	B	A	A	B	B	D	A	A			
Approach Vol, veh/h		722			57			1096				
Approach Delay, s/veh		52.6			18.5			46.3				
Approach LOS		D			B			D				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		74.2		95.8				95.8				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		60.5		100.5				100.5				
Max Q Clear Time (g_c+I1), s		46.6		89.0				3.3				
Green Ext Time (p_c), s		4.1		2.3				0.4				

Intersection Summary	
HCM 6th Ctrl Delay	47.9
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	970	50	240	420	0	20	0	500	30	200	360
Future Volume (veh/h)	0	970	50	240	420	0	20	0	500	30	200	360
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	0	1841	1841	1841	1796	0	1737	0	1811	1870	1856	1870
Adj Flow Rate, veh/h	0	1032	48	255	447	0	21	0	0	32	213	59
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	4	4	4	7	0	11	0	6	2	3	2
Cap, veh/h	0	1282	60	369	1944	0	41	0		63	282	241
Arrive On Green	0.00	0.38	0.38	0.11	0.57	0.00	0.03	0.00	0.00	0.04	0.15	0.15
Sat Flow, veh/h	0	3495	158	3401	3503	0	1654	21		1781	1856	1585
Grp Volume(v), veh/h	0	530	550	255	447	0	21	34.9		32	213	59
Grp Sat Flow(s),veh/h/ln	0	1749	1812	1700	1706	0	1654	C		1781	1856	1585
Q Serve(g_s), s	0.0	14.5	14.5	3.8	3.5	0.0	0.7			0.9	5.9	1.7
Cycle Q Clear(g_c), s	0.0	14.5	14.5	3.8	3.5	0.0	0.7			0.9	5.9	1.7
Prop In Lane	0.00		0.09	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	659	683	369	1944	0	41			63	282	241
V/C Ratio(X)	0.00	0.81	0.81	0.69	0.23	0.00	0.51			0.51	0.76	0.25
Avail Cap(c_a), veh/h	0	745	772	415	2160	0	376			913	373	318
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	14.9	14.9	22.9	5.7	0.0	25.6			25.2	21.6	19.9
Incr Delay (d2), s/veh	0.0	5.8	5.6	4.2	0.1	0.0	9.2			6.2	6.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.0	6.2	1.7	1.0	0.0	0.4			0.5	2.9	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	20.7	20.5	27.1	5.7	0.0	34.9			31.4	27.8	20.4
LnGrp LOS	A	C	C	C	A	A	C			C	C	C
Approach Vol, veh/h		1080			702						304	
Approach Delay, s/veh		20.6			13.5						26.7	
Approach LOS		C			B						C	

Timer - Assigned Phs	1		3	4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4		10.3	24.6	5.8	12.6		34.8				
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	27.3		6.5	22.7	12.1	10.7		33.7				
Max Q Clear Time (g_c+I1), s	2.9		5.8	16.5	2.7	7.9		5.5				
Green Ext Time (p_c), s	0.1		0.1	3.6	0.0	0.4		3.4				

Intersection Summary	
HCM 6th Ctrl Delay	19.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

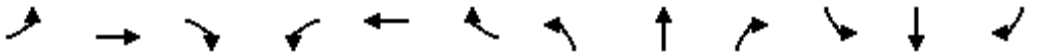
Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱↑	↰	↑↑						✣	
Traffic Vol, veh/h	0	470	1030	20	660	10	0	0	0	0	0	0
Future Vol, veh/h	0	470	1030	20	660	10	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	94	94	94	94	92	94	92	94	92	92	92
Heavy Vehicles, %	2	3	5	2	5	2	2	2	2	2	2	2
Mvmt Flow	0	500	1096	21	702	11	0	0	0	0	0	0

Major/Minor	Major1			Major2					Minor2		
Conflicting Flow All	-	0	-	500	0	0			1250	1250	357
Stage 1	-	-	-	-	-	-			750	750	-
Stage 2	-	-	-	-	-	-			500	500	-
Critical Hdwy	-	-	-	4.13	-	-			6.63	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-			5.83	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-			5.43	5.53	-
Follow-up Hdwy	-	-	-	2.219	-	-			3.519	4.019	3.319
Pot Cap-1 Maneuver	0	-	0	1062	-	-			177	172	640
Stage 1	0	-	0	-	-	-			428	418	-
Stage 2	0	-	0	-	-	-			608	542	-
Platoon blocked, %		-			-	-					
Mov Cap-1 Maneuver	-	-	-	1062	-	-			173	0	640
Mov Cap-2 Maneuver	-	-	-	-	-	-			173	0	-
Stage 1	-	-	-	-	-	-			428	0	-
Stage 2	-	-	-	-	-	-			596	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.2	0
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1062	-	-	-
HCM Lane V/C Ratio	-	0.02	-	-	-
HCM Control Delay (s)	-	8.5	-	-	0
HCM Lane LOS	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0.1	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	430	40	0	0	20	10	680	0	30	0	0	0
Future Volume (veh/h)	430	40	0	0	20	10	680	0	30	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1841	1870	0	0	1870	1870	1826	1870	1826			
Adj Flow Rate, veh/h	509	0	0	0	22	0	756	0	0			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	4	2	0	0	2	2	5	2	5			
Cap, veh/h	806	430	0	0	98	0	1144	615	0			
Arrive On Green	0.23	0.00	0.00	0.00	0.03	0.00	0.33	0.00	0.00			
Sat Flow, veh/h	3506	1870	0	0	3741	0	3478	1870	0			
Grp Volume(v), veh/h	509	0	0	0	22	0	756	0	0			
Grp Sat Flow(s),veh/h/ln	1753	1870	0	0	1777	0	1739	1870	0			
Q Serve(g_s), s	4.3	0.0	0.0	0.0	0.2	0.0	6.1	0.0	0.0			
Cycle Q Clear(g_c), s	4.3	0.0	0.0	0.0	0.2	0.0	6.1	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.00			
Lane Grp Cap(c), veh/h	806	430	0	0	98	0	1144	615	0			
V/C Ratio(X)	0.63	0.00	0.00	0.00	0.22	0.00	0.66	0.00	0.00			
Avail Cap(c_a), veh/h	1558	831	0	0	544	0	2344	1261	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	11.3	0.0	0.0	0.0	15.5	0.0	9.4	0.0	0.0			
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.0	1.1	0.0	0.7	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.0	0.0	0.1	0.0	1.8	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.1	0.0	0.0	0.0	16.7	0.0	10.1	0.0	0.0			
LnGrp LOS	B	A	A	A	B	A	B	A	A			
Approach Vol, veh/h		509			22			756				
Approach Delay, s/veh		12.1			16.7			10.1				
Approach LOS		B			B			B				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		15.2		12.0				5.4				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		22.0		14.5				5.0				
Max Q Clear Time (g_c+I1), s		8.1		6.3				2.2				
Green Ext Time (p_c), s		2.7		1.3				0.0				
Intersection Summary												
HCM 6th Ctrl Delay			11.0									
HCM 6th LOS			B									

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1230	70	360	1090	0	50	0	780	20	220	480
Future Volume (veh/h)	0	1230	70	360	1090	0	50	0	780	20	220	480
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	0	1870	1870	1841	1870	0	1826	0	1870	1604	1870	1870
Adj Flow Rate, veh/h	0	1323	73	387	1172	0	54	0	0	22	237	215
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	4	2	0	5	0	2	20	2	2
Cap, veh/h	0	1600	88	464	2318	0	71	0		36	301	256
Arrive On Green	0.00	0.47	0.47	0.14	0.65	0.00	0.04	0.00	0.00	0.02	0.16	0.16
Sat Flow, veh/h	0	3518	189	3401	3647	0	1739	54		1527	1870	1585
Grp Volume(v), veh/h	0	685	711	387	1172	0	54	59.6		22	237	215
Grp Sat Flow(s),veh/h/ln	0	1777	1836	1700	1777	0	1739	E		1527	1870	1585
Q Serve(g_s), s	0.0	30.9	31.1	10.2	15.8	0.0	2.8			1.3	11.2	12.2
Cycle Q Clear(g_c), s	0.0	30.9	31.1	10.2	15.8	0.0	2.8			1.3	11.2	12.2
Prop In Lane	0.00		0.10	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	830	858	464	2318	0	71			36	301	256
V/C Ratio(X)	0.00	0.83	0.83	0.83	0.51	0.00	0.77			0.62	0.79	0.84
Avail Cap(c_a), veh/h	0	990	1023	534	2711	0	724			1000	354	300
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	21.4	21.4	38.9	8.3	0.0	43.9			44.7	37.2	37.6
Incr Delay (d2), s/veh	0.0	5.0	5.0	9.8	0.2	0.0	15.7			16.1	9.6	16.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	13.4	14.0	4.9	5.5	0.0	1.5			0.7	5.9	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	26.4	26.4	48.7	8.5	0.0	59.6			60.8	46.8	54.4
LnGrp LOS	A	C	C	D	A	A	E			E	D	D
Approach Vol, veh/h		1396			1559						474	
Approach Delay, s/veh		26.4			18.5						50.9	
Approach LOS		C			B						D	

Timer - Assigned Phs	1		3	4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7		17.1	47.7	8.3	19.4		64.8				
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	60.5		14.5	51.5	38.5	17.5		70.5				
Max Q Clear Time (g_c+I1), s	3.3		12.2	33.1	4.8	14.2		17.8				
Green Ext Time (p_c), s	0.1		0.4	10.1	0.1	0.7		12.8				

Intersection Summary	
HCM 6th Ctrl Delay	26.7
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

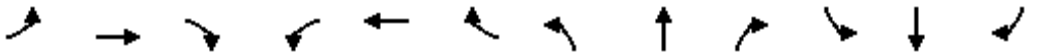
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑↑	↰	↑↑						✣	
Traffic Vol, veh/h	0	850	1160	40	1450	0	0	0	0	0	0	0
Future Vol, veh/h	0	850	1160	40	1450	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	93	93	93	93	92	93	92	93	92	92	92
Heavy Vehicles, %	2	2	2	8	2	2	2	2	2	2	2	2
Mvmt Flow	0	914	1247	43	1559	0	0	0	0	0	0	0

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	-	914	0	0	2559	2559	780
Stage 1	-	-	-	-	-	-	1645	1645	-
Stage 2	-	-	-	-	-	-	914	914	-
Critical Hdwy	-	-	-	4.22	-	-	6.63	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	5.83	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.43	5.53	-
Follow-up Hdwy	-	-	-	2.276	-	-	3.519	4.019	3.319
Pot Cap-1 Maneuver	0	-	0	713	-	0	25	26	339
Stage 1	0	-	0	-	-	0	143	156	-
Stage 2	0	-	0	-	-	0	390	351	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	-	-	-	713	-	-	24	0	339
Mov Cap-2 Maneuver	-	-	-	-	-	-	24	0	-
Stage 1	-	-	-	-	-	-	143	0	-
Stage 2	-	-	-	-	-	-	367	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.3	0
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBL	WBT	SBLn1
Capacity (veh/h)	-	713	-	-
HCM Lane V/C Ratio	-	0.06	-	-
HCM Control Delay (s)	-	10.4	-	0
HCM Lane LOS	-	B	-	A
HCM 95th %tile Q(veh)	-	0.2	-	-



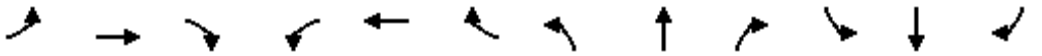
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	820	30	0	0	50	20	1450	10	30	0	0	0
Future Volume (veh/h)	820	30	0	0	50	20	1450	10	30	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1841	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	876	0	0	0	52	0	1545	0	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	4	0	0	2	2	2	2	2			
Cap, veh/h	1034	534	0	0	151	0	1789	939	0			
Arrive On Green	0.29	0.00	0.00	0.00	0.04	0.00	0.50	0.00	0.00			
Sat Flow, veh/h	3563	1841	0	0	3741	0	3563	1870	0			
Grp Volume(v), veh/h	876	0	0	0	52	0	1545	0	0			
Grp Sat Flow(s),veh/h/ln	1781	1841	0	0	1777	0	1781	1870	0			
Q Serve(g_s), s	18.9	0.0	0.0	0.0	1.2	0.0	31.1	0.0	0.0			
Cycle Q Clear(g_c), s	18.9	0.0	0.0	0.0	1.2	0.0	31.1	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.00			
Lane Grp Cap(c), veh/h	1034	534	0	0	151	0	1789	939	0			
V/C Ratio(X)	0.85	0.00	0.00	0.00	0.35	0.00	0.86	0.00	0.00			
Avail Cap(c_a), veh/h	1374	710	0	0	783	0	2486	1305	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	27.3	0.0	0.0	0.0	38.0	0.0	17.9	0.0	0.0			
Incr Delay (d2), s/veh	4.0	0.0	0.0	0.0	1.4	0.0	2.5	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.4	0.0	0.0	0.0	0.5	0.0	12.4	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.2	0.0	0.0	0.0	39.4	0.0	20.4	0.0	0.0			
LnGrp LOS	C	A	A	A	D	A	C	A	A			
Approach Vol, veh/h		876			52			1545				
Approach Delay, s/veh		31.2			39.4			20.4				
Approach LOS		C			D			C				

Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		45.5		28.2				8.0				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		57.0		31.5				18.0				
Max Q Clear Time (g_c+I1), s		33.1		20.9				3.2				
Green Ext Time (p_c), s		7.9		2.8				0.2				

Intersection Summary												
HCM 6th Ctrl Delay			24.6									
HCM 6th LOS			C									

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	977	50	240	420	0	20	0	500	57	200	360
Future Volume (veh/h)	0	977	50	240	420	0	20	0	500	57	200	360
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	0	1841	1841	1841	1796	0	1737	0	1811	1870	1856	1870
Adj Flow Rate, veh/h	0	1039	48	255	447	0	21	0	0	61	213	57
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	4	4	4	7	0	11	0	6	2	3	2
Cap, veh/h	0	1285	59	369	1946	0	41	0		99	281	240
Arrive On Green	0.00	0.38	0.38	0.11	0.57	0.00	0.03	0.00	0.00	0.06	0.15	0.15
Sat Flow, veh/h	0	3496	157	3401	3503	0	1654	21		1781	1856	1585
Grp Volume(v), veh/h	0	534	553	255	447	0	21	34.9		61	213	57
Grp Sat Flow(s),veh/h/ln	0	1749	1812	1700	1706	0	1654	C		1781	1856	1585
Q Serve(g_s), s	0.0	14.6	14.6	3.9	3.5	0.0	0.7			1.8	5.9	1.7
Cycle Q Clear(g_c), s	0.0	14.6	14.6	3.9	3.5	0.0	0.7			1.8	5.9	1.7
Prop In Lane	0.00		0.09	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	660	684	369	1946	0	41			99	281	240
V/C Ratio(X)	0.00	0.81	0.81	0.69	0.23	0.00	0.51			0.61	0.76	0.24
Avail Cap(c_a), veh/h	0	744	771	414	2155	0	375			911	372	318
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	14.9	14.9	22.9	5.7	0.0	25.7			24.6	21.7	19.9
Incr Delay (d2), s/veh	0.0	6.0	5.8	4.2	0.1	0.0	9.2			6.0	6.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.2	6.3	1.7	1.0	0.0	0.4			0.9	2.9	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	20.9	20.7	27.2	5.7	0.0	34.9			30.7	27.9	20.4
LnGrp LOS	A	C	C	C	A	A	C			C	C	C
Approach Vol, veh/h		1087			702						331	
Approach Delay, s/veh		20.8			13.5						27.1	
Approach LOS		C			B						C	

Timer - Assigned Phs	1		3	4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5		10.3	24.7	5.8	12.6		34.9				
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	27.3		6.5	22.7	12.1	10.7		33.7				
Max Q Clear Time (g_c+I1), s	3.8		5.9	16.6	2.7	7.9		5.5				
Green Ext Time (p_c), s	0.1		0.1	3.6	0.0	0.4		3.4				

Intersection Summary												
HCM 6th Ctrl Delay			19.5									
HCM 6th LOS			B									

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

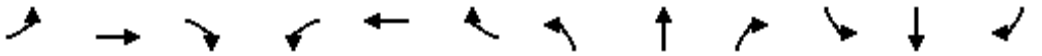
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	504	1030	30	660	10	0	0	0	0	0	0
Future Vol, veh/h	0	504	1030	30	660	10	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	94	94	94	94	92	94	92	94	92	92	92
Heavy Vehicles, %	2	3	5	2	5	2	2	2	2	2	2	2
Mvmt Flow	0	536	1096	32	702	11	0	0	0	0	0	0

Major/Minor	Major1			Major2					Minor2		
Conflicting Flow All	-	0	-	536	0	0			1308	1308	357
Stage 1	-	-	-	-	-	-			772	772	-
Stage 2	-	-	-	-	-	-			536	536	-
Critical Hdwy	-	-	-	4.13	-	-			6.63	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-			5.83	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-			5.43	5.53	-
Follow-up Hdwy	-	-	-	2.219	-	-			3.519	4.019	3.319
Pot Cap-1 Maneuver	0	-	0	1030	-	-			163	159	640
Stage 1	0	-	0	-	-	-			417	408	-
Stage 2	0	-	0	-	-	-			586	522	-
Platoon blocked, %		-			-	-					
Mov Cap-1 Maneuver	-	-	-	1030	-	-			158	0	640
Mov Cap-2 Maneuver	-	-	-	-	-	-			158	0	-
Stage 1	-	-	-	-	-	-			417	0	-
Stage 2	-	-	-	-	-	-			568	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.4	0
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1030	-	-	-
HCM Lane V/C Ratio	-	0.031	-	-	-
HCM Control Delay (s)	-	8.6	-	-	0
HCM Lane LOS	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0.1	-	-	-

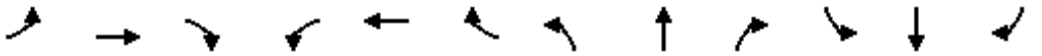


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	430	74	0	0	30	10	680	0	140	0	0	0
Future Volume (veh/h)	430	74	0	0	30	10	680	0	140	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1841	1870	0	0	1870	1870	1826	1870	1826			
Adj Flow Rate, veh/h	537	0	0	0	33	0	835	0	0			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	4	2	0	0	2	2	5	2	5			
Cap, veh/h	814	434	0	0	139	0	1201	646	0			
Arrive On Green	0.23	0.00	0.00	0.00	0.04	0.00	0.35	0.00	0.00			
Sat Flow, veh/h	3506	1870	0	0	3741	0	3478	1870	0			
Grp Volume(v), veh/h	537	0	0	0	33	0	835	0	0			
Grp Sat Flow(s),veh/h/ln	1753	1870	0	0	1777	0	1739	1870	0			
Q Serve(g_s), s	4.9	0.0	0.0	0.0	0.3	0.0	7.3	0.0	0.0			
Cycle Q Clear(g_c), s	4.9	0.0	0.0	0.0	0.3	0.0	7.3	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.00			
Lane Grp Cap(c), veh/h	814	434	0	0	139	0	1201	646	0			
V/C Ratio(X)	0.66	0.00	0.00	0.00	0.24	0.00	0.70	0.00	0.00			
Avail Cap(c_a), veh/h	1443	770	0	0	504	0	2172	1168	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	12.3	0.0	0.0	0.0	16.4	0.0	9.9	0.0	0.0			
Incr Delay (d2), s/veh	0.9	0.0	0.0	0.0	0.9	0.0	0.7	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.0	0.0	0.1	0.0	2.2	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.2	0.0	0.0	0.0	17.3	0.0	10.7	0.0	0.0			
LnGrp LOS	B	A	A	A	B	A	B	A	A			
Approach Vol, veh/h		537			33			835				
Approach Delay, s/veh		13.2			17.3			10.7				
Approach LOS		B			B			B				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		16.7		12.7				5.9				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		22.0		14.5				5.0				
Max Q Clear Time (g_c+I1), s		9.3		6.9				2.3				
Green Ext Time (p_c), s		2.9		1.3				0.0				

Intersection Summary	
HCM 6th Ctrl Delay	11.8
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1230	70	360	1097	0	50	0	780	20	220	480
Future Volume (veh/h)	0	1230	70	360	1097	0	50	0	780	20	220	480
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	0	1870	1870	1841	1870	0	1826	0	1870	1604	1870	1870
Adj Flow Rate, veh/h	0	1323	73	387	1180	0	54	0	0	22	237	216
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	4	2	0	5	0	2	20	2	2
Cap, veh/h	0	1599	88	464	2317	0	71	0		36	302	256
Arrive On Green	0.00	0.47	0.47	0.14	0.65	0.00	0.04	0.00	0.00	0.02	0.16	0.16
Sat Flow, veh/h	0	3518	189	3401	3647	0	1739	54		1527	1870	1585
Grp Volume(v), veh/h	0	685	711	387	1180	0	54	59.6		22	237	216
Grp Sat Flow(s),veh/h/ln	0	1777	1836	1700	1777	0	1739	E		1527	1870	1585
Q Serve(g_s), s	0.0	31.0	31.1	10.3	16.0	0.0	2.8			1.3	11.3	12.2
Cycle Q Clear(g_c), s	0.0	31.0	31.1	10.3	16.0	0.0	2.8			1.3	11.3	12.2
Prop In Lane	0.00		0.10	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	830	857	464	2317	0	71			36	302	256
V/C Ratio(X)	0.00	0.83	0.83	0.83	0.51	0.00	0.77			0.62	0.78	0.84
Avail Cap(c_a), veh/h	0	989	1022	533	2708	0	724			999	354	300
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	21.4	21.4	38.9	8.4	0.0	44.0			44.8	37.2	37.6
Incr Delay (d2), s/veh	0.0	5.0	5.0	9.9	0.2	0.0	15.7			16.1	9.5	17.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	13.5	14.0	4.9	5.6	0.0	1.5			0.7	5.9	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	26.4	26.4	48.8	8.6	0.0	59.6			60.9	46.7	54.7
LnGrp LOS	A	C	C	D	A	A	E			E	D	D
Approach Vol, veh/h		1396			1567						475	
Approach Delay, s/veh		26.4			18.5						51.0	
Approach LOS		C			B						D	

Timer - Assigned Phs	1		3	4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7		17.1	47.7	8.3	19.5		64.8				
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	60.5		14.5	51.5	38.5	17.5		70.5				
Max Q Clear Time (g_c+I1), s	3.3		12.3	33.1	4.8	14.2		18.0				
Green Ext Time (p_c), s	0.1		0.4	10.1	0.1	0.7		13.0				

Intersection Summary	
HCM 6th Ctrl Delay	26.7
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

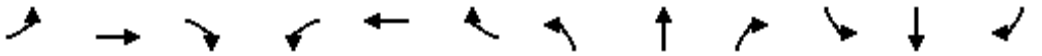
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑↑	↰	↑↑						✣	
Traffic Vol, veh/h	0	850	1160	150	1457	0	0	0	0	0	0	0
Future Vol, veh/h	0	850	1160	150	1457	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	93	93	93	93	92	93	92	93	92	92	92
Heavy Vehicles, %	2	2	2	8	2	2	2	2	2	2	2	2
Mvmt Flow	0	914	1247	161	1567	0	0	0	0	0	0	0

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	-	914	0	0	2803	2803	784
Stage 1	-	-	-	-	-	-	1889	1889	-
Stage 2	-	-	-	-	-	-	914	914	-
Critical Hdwy	-	-	-	4.22	-	-	6.63	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	5.83	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.43	5.53	-
Follow-up Hdwy	-	-	-	2.276	-	-	3.519	4.019	3.319
Pot Cap-1 Maneuver	0	-	0	713	-	0	17	18	337
Stage 1	0	-	0	-	-	0	105	118	-
Stage 2	0	-	0	-	-	0	390	351	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	-	-	-	713	-	-	13	0	337
Mov Cap-2 Maneuver	-	-	-	-	-	-	13	0	-
Stage 1	-	-	-	-	-	-	105	0	-
Stage 2	-	-	-	-	-	-	302	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.1	0
HCM LOS			A

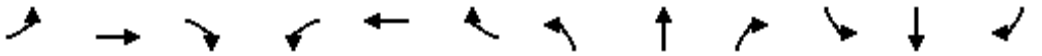
Minor Lane/Major Mvmt	EBT	WBL	WBT	SBLn1
Capacity (veh/h)	-	713	-	-
HCM Lane V/C Ratio	-	0.226	-	-
HCM Control Delay (s)	-	11.5	-	0
HCM Lane LOS	-	B	-	A
HCM 95th %tile Q(veh)	-	0.9	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	820	30	0	0	167	47	1450	10	40	0	0	0
Future Volume (veh/h)	820	30	0	0	167	47	1450	10	40	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1841	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	876	0	0	0	174	27	1555	0	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	4	0	0	2	2	2	2	2			
Cap, veh/h	999	516	0	0	262	40	1750	919	0			
Arrive On Green	0.28	0.00	0.00	0.00	0.08	0.08	0.49	0.00	0.00			
Sat Flow, veh/h	3563	1841	0	0	3184	472	3563	1870	0			
Grp Volume(v), veh/h	876	0	0	0	99	102	1555	0	0			
Grp Sat Flow(s),veh/h/ln	1781	1841	0	0	1777	1785	1781	1870	0			
Q Serve(g_s), s	22.0	0.0	0.0	0.0	5.1	5.2	37.0	0.0	0.0			
Cycle Q Clear(g_c), s	22.0	0.0	0.0	0.0	5.1	5.2	37.0	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.26	1.00		0.00			
Lane Grp Cap(c), veh/h	999	516	0	0	150	151	1750	919	0			
V/C Ratio(X)	0.88	0.00	0.00	0.00	0.66	0.68	0.89	0.00	0.00			
Avail Cap(c_a), veh/h	1194	617	0	0	340	342	2161	1135	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	32.3	0.0	0.0	0.0	41.7	41.8	21.6	0.0	0.0			
Incr Delay (d2), s/veh	6.7	0.0	0.0	0.0	4.8	5.2	4.2	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	10.3	0.0	0.0	0.0	2.4	2.5	15.7	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.9	0.0	0.0	0.0	46.5	46.9	25.8	0.0	0.0			
LnGrp LOS	D	A	A	A	D	D	C	A	A			
Approach Vol, veh/h		876			201			1555				
Approach Delay, s/veh		38.9			46.7			25.8				
Approach LOS		D			D			C				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		50.7		30.8				12.5				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		57.0		31.5				18.0				
Max Q Clear Time (g_c+I1), s		39.0		24.0				7.2				
Green Ext Time (p_c), s		7.1		2.3				0.8				
Intersection Summary												
HCM 6th Ctrl Delay			31.8									
HCM 6th LOS			C									

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	971	50	240	420	0	20	0	500	31	200	360
Future Volume (veh/h)	0	971	50	240	420	0	20	0	500	31	200	360
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	0	1841	1841	1841	1796	0	1737	0	1811	1870	1856	1870
Adj Flow Rate, veh/h	0	1033	48	255	447	0	21	0	0	33	213	59
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	4	4	4	7	0	11	0	6	2	3	2
Cap, veh/h	0	1282	60	369	1944	0	41	0		65	282	241
Arrive On Green	0.00	0.38	0.38	0.11	0.57	0.00	0.03	0.00	0.00	0.04	0.15	0.15
Sat Flow, veh/h	0	3495	158	3401	3503	0	1654	21		1781	1856	1585
Grp Volume(v), veh/h	0	531	550	255	447	0	21	34.9		33	213	59
Grp Sat Flow(s),veh/h/ln	0	1749	1812	1700	1706	0	1654	C		1781	1856	1585
Q Serve(g_s), s	0.0	14.5	14.5	3.8	3.5	0.0	0.7			1.0	5.9	1.7
Cycle Q Clear(g_c), s	0.0	14.5	14.5	3.8	3.5	0.0	0.7			1.0	5.9	1.7
Prop In Lane	0.00		0.09	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	659	683	369	1944	0	41			65	282	241
V/C Ratio(X)	0.00	0.81	0.81	0.69	0.23	0.00	0.51			0.51	0.76	0.25
Avail Cap(c_a), veh/h	0	745	772	415	2159	0	376			913	373	318
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	14.9	14.9	22.9	5.7	0.0	25.6			25.2	21.6	19.9
Incr Delay (d2), s/veh	0.0	5.8	5.6	4.2	0.1	0.0	9.2			6.1	6.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.1	6.3	1.7	1.0	0.0	0.4			0.5	2.9	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	20.7	20.5	27.1	5.7	0.0	34.9			31.3	27.8	20.4
LnGrp LOS	A	C	C	C	A	A	C			C	C	C
Approach Vol, veh/h		1081			702						305	
Approach Delay, s/veh		20.6			13.5						26.8	
Approach LOS		C			B						C	

Timer - Assigned Phs	1		3	4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4		10.3	24.6	5.8	12.6		34.8				
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	27.3		6.5	22.7	12.1	10.7		33.7				
Max Q Clear Time (g_c+I1), s	3.0		5.8	16.5	2.7	7.9		5.5				
Green Ext Time (p_c), s	0.1		0.1	3.6	0.0	0.4		3.4				

Intersection Summary												
HCM 6th Ctrl Delay			19.3									
HCM 6th LOS			B									

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

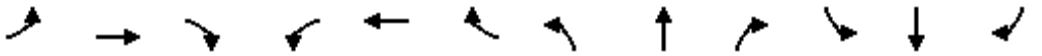
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱↑	↰	↑↑						↔	
Traffic Vol, veh/h	0	472	1030	25	660	10	0	0	0	0	0	0
Future Vol, veh/h	0	472	1030	25	660	10	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	94	94	94	94	92	94	92	94	92	92	92
Heavy Vehicles, %	2	3	5	2	5	2	2	2	2	2	2	2
Mvmt Flow	0	502	1096	27	702	11	0	0	0	0	0	0

Major/Minor	Major1			Major2					Minor2		
Conflicting Flow All	-	0	-	502	0	0			1264	1264	357
Stage 1	-	-	-	-	-	-			762	762	-
Stage 2	-	-	-	-	-	-			502	502	-
Critical Hdwy	-	-	-	4.13	-	-			6.63	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-			5.83	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-			5.43	5.53	-
Follow-up Hdwy	-	-	-	2.219	-	-			3.519	4.019	3.319
Pot Cap-1 Maneuver	0	-	0	1060	-	-			174	169	640
Stage 1	0	-	0	-	-	-			422	413	-
Stage 2	0	-	0	-	-	-			607	541	-
Platoon blocked, %		-			-	-					
Mov Cap-1 Maneuver	-	-	-	1060	-	-			170	0	640
Mov Cap-2 Maneuver	-	-	-	-	-	-			170	0	-
Stage 1	-	-	-	-	-	-			422	0	-
Stage 2	-	-	-	-	-	-			592	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.3	0
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1060	-	-	-
HCM Lane V/C Ratio	-	0.025	-	-	-
HCM Control Delay (s)	-	8.5	-	-	0
HCM Lane LOS	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0.1	-	-	-

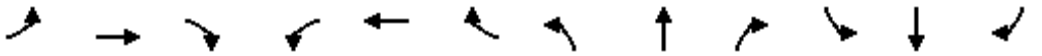


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	430	42	0	0	25	10	680	0	33	0	0	0
Future Volume (veh/h)	430	42	0	0	25	10	680	0	33	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1841	1870	0	0	1870	1870	1826	1870	1826			
Adj Flow Rate, veh/h	512	0	0	0	28	0	759	0	0			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	4	2	0	0	2	2	5	2	5			
Cap, veh/h	805	429	0	0	122	0	1141	614	0			
Arrive On Green	0.23	0.00	0.00	0.00	0.03	0.00	0.33	0.00	0.00			
Sat Flow, veh/h	3506	1870	0	0	3741	0	3478	1870	0			
Grp Volume(v), veh/h	512	0	0	0	28	0	759	0	0			
Grp Sat Flow(s),veh/h/ln	1753	1870	0	0	1777	0	1739	1870	0			
Q Serve(g_s), s	4.4	0.0	0.0	0.0	0.3	0.0	6.2	0.0	0.0			
Cycle Q Clear(g_c), s	4.4	0.0	0.0	0.0	0.3	0.0	6.2	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.00			
Lane Grp Cap(c), veh/h	805	429	0	0	122	0	1141	614	0			
V/C Ratio(X)	0.64	0.00	0.00	0.00	0.23	0.00	0.66	0.00	0.00			
Avail Cap(c_a), veh/h	1536	819	0	0	537	0	2312	1243	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	11.5	0.0	0.0	0.0	15.6	0.0	9.6	0.0	0.0			
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.0	0.9	0.0	0.7	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.0	0.0	0.1	0.0	1.8	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.3	0.0	0.0	0.0	16.5	0.0	10.2	0.0	0.0			
LnGrp LOS	B	A	A	A	B	A	B	A	A			
Approach Vol, veh/h		512			28			759				
Approach Delay, s/veh		12.3			16.5			10.2				
Approach LOS		B			B			B				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		15.4		12.1				5.6				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		22.0		14.5				5.0				
Max Q Clear Time (g_c+I1), s		8.2		6.4				2.3				
Green Ext Time (p_c), s		2.7		1.3				0.0				

Intersection Summary	
HCM 6th Ctrl Delay	11.2
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1230	70	360	1091	0	50	0	780	20	220	480
Future Volume (veh/h)	0	1230	70	360	1091	0	50	0	780	20	220	480
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	0	1870	1870	1841	1870	0	1826	0	1870	1604	1870	1870
Adj Flow Rate, veh/h	0	1323	73	387	1173	0	54	0	0	22	237	215
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	2	2	4	2	0	5	0	2	20	2	2
Cap, veh/h	0	1600	88	464	2318	0	71	0		36	301	256
Arrive On Green	0.00	0.47	0.47	0.14	0.65	0.00	0.04	0.00	0.00	0.02	0.16	0.16
Sat Flow, veh/h	0	3518	189	3401	3647	0	1739	54		1527	1870	1585
Grp Volume(v), veh/h	0	685	711	387	1173	0	54	59.6		22	237	215
Grp Sat Flow(s),veh/h/ln	0	1777	1836	1700	1777	0	1739	E		1527	1870	1585
Q Serve(g_s), s	0.0	30.9	31.1	10.2	15.8	0.0	2.8			1.3	11.2	12.2
Cycle Q Clear(g_c), s	0.0	30.9	31.1	10.2	15.8	0.0	2.8			1.3	11.2	12.2
Prop In Lane	0.00		0.10	1.00		0.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	830	858	464	2318	0	71			36	301	256
V/C Ratio(X)	0.00	0.83	0.83	0.83	0.51	0.00	0.77			0.62	0.79	0.84
Avail Cap(c_a), veh/h	0	990	1023	534	2711	0	724			1000	354	300
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	21.4	21.4	38.9	8.3	0.0	43.9			44.7	37.2	37.6
Incr Delay (d2), s/veh	0.0	5.0	5.0	9.8	0.2	0.0	15.7			16.1	9.6	16.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	13.4	14.0	4.9	5.5	0.0	1.5			0.7	5.9	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	26.4	26.4	48.7	8.5	0.0	59.6			60.8	46.8	54.4
LnGrp LOS	A	C	C	D	A	A	E			E	D	D
Approach Vol, veh/h		1396			1560						474	
Approach Delay, s/veh		26.4			18.5						50.9	
Approach LOS		C			B						D	

Timer - Assigned Phs	1		3	4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7		17.1	47.7	8.3	19.4		64.8				
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	60.5		14.5	51.5	38.5	17.5		70.5				
Max Q Clear Time (g_c+I1), s	3.3		12.2	33.1	4.8	14.2		17.8				
Green Ext Time (p_c), s	0.1		0.4	10.1	0.1	0.7		12.9				

Intersection Summary	
HCM 6th Ctrl Delay	26.7
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

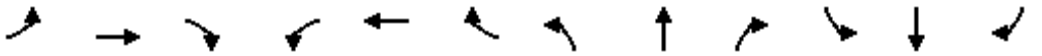
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱↑	↰	↑↑						↕	
Traffic Vol, veh/h	0	850	1160	43	1451	0	0	0	0	0	0	0
Future Vol, veh/h	0	850	1160	43	1451	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	80	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	93	93	93	93	92	93	92	93	92	92	92
Heavy Vehicles, %	2	2	2	8	2	2	2	2	2	2	2	2
Mvmt Flow	0	914	1247	46	1560	0	0	0	0	0	0	0

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	-	914	0	0	2566	2566	780
Stage 1	-	-	-	-	-	-	1652	1652	-
Stage 2	-	-	-	-	-	-	914	914	-
Critical Hdwy	-	-	-	4.22	-	-	6.63	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	5.83	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.43	5.53	-
Follow-up Hdwy	-	-	-	2.276	-	-	3.519	4.019	3.319
Pot Cap-1 Maneuver	0	-	0	713	-	0	25	26	339
Stage 1	0	-	0	-	-	0	142	155	-
Stage 2	0	-	0	-	-	0	390	351	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	-	-	-	713	-	-	23	0	339
Mov Cap-2 Maneuver	-	-	-	-	-	-	23	0	-
Stage 1	-	-	-	-	-	-	142	0	-
Stage 2	-	-	-	-	-	-	365	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.3	0
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBL	WBT	SBLn1
Capacity (veh/h)	-	713	-	-
HCM Lane V/C Ratio	-	0.065	-	-
HCM Control Delay (s)	-	10.4	-	0
HCM Lane LOS	-	B	-	A
HCM 95th %tile Q(veh)	-	0.2	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	820	30	0	0	54	21	1450	10	30	0	0	0
Future Volume (veh/h)	820	30	0	0	54	21	1450	10	30	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1841	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	876	0	0	0	56	1	1545	0	0			
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96			
Percent Heavy Veh, %	2	4	0	0	2	2	2	2	2			
Cap, veh/h	1032	533	0	0	158	3	1787	938	0			
Arrive On Green	0.29	0.00	0.00	0.00	0.04	0.04	0.50	0.00	0.00			
Sat Flow, veh/h	3563	1841	0	0	3666	64	3563	1870	0			
Grp Volume(v), veh/h	876	0	0	0	28	29	1545	0	0			
Grp Sat Flow(s),veh/h/ln	1781	1841	0	0	1777	1859	1781	1870	0			
Q Serve(g_s), s	19.0	0.0	0.0	0.0	1.2	1.3	31.4	0.0	0.0			
Cycle Q Clear(g_c), s	19.0	0.0	0.0	0.0	1.2	1.3	31.4	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.03	1.00		0.00			
Lane Grp Cap(c), veh/h	1032	533	0	0	79	82	1787	938	0			
V/C Ratio(X)	0.85	0.00	0.00	0.00	0.35	0.35	0.86	0.00	0.00			
Avail Cap(c_a), veh/h	1366	706	0	0	389	407	2472	1298	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	27.5	0.0	0.0	0.0	38.1	38.1	18.0	0.0	0.0			
Incr Delay (d2), s/veh	4.0	0.0	0.0	0.0	2.7	2.6	2.5	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.5	0.0	0.0	0.0	0.6	0.6	12.5	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.5	0.0	0.0	0.0	40.8	40.7	20.6	0.0	0.0			
LnGrp LOS	C	A	A	A	D	D	C	A	A			
Approach Vol, veh/h		876			57			1545				
Approach Delay, s/veh		31.5			40.7			20.6				
Approach LOS		C			D			C				

Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		45.7		28.3				8.1				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		57.0		31.5				18.0				
Max Q Clear Time (g_c+I1), s		33.4		21.0				3.3				
Green Ext Time (p_c), s		7.9		2.8				0.2				

Intersection Summary												
HCM 6th Ctrl Delay			24.9									
HCM 6th LOS			C									

Notes

User approved volume balancing among the lanes for turning movement.

Date: 05/11/2023

State of Hawaii
DEPARTMENT OF TRANSPORTATION

Log No: DIR 0402

Suspense: 05/25/2023

FROM: DIRECTOR

TO: HWY

- [x] DIR
- [ ] AIR
- [ ] DEP-S
- [ ] HAR
- [ ] DEP-A
- [x] HWY
- [x] DEP-H
- [ ] BUS
- [ ] DEP-HWY
- [ ] BUS-F
- [ ] DIR-CZ
- [ ] BUS-O
- [ ] DIR-P
- [ ] CON
- [ ] OCR
- [ ] CSS
- [ ] PER
- [ ] LEG
- [ ] PMN
- [ ] PPB
- [ ] STP
- [ ] __

FOR: APPROPRIATE ATTENTION & ACTION

- [x] Appropriate Attention & Action
- [ ] Arrange Meeting
- [ ] Investigate & Report Back
- [ ] Comments & Recommendations
- [ ] Draft Reply
- [ ] Final Reply for Gov's Sig
- [ ] Direct Action/Reply
- [ ] Information
- [ ] See Me
- [ ] Signature
- [ ] Submit Copy of Response
- [ ] File
- [ ] Review
- [ ] Return
- [ ] Phone Call _____
- [ ] Follow-up Interim Reply

Subject: AES WAIAWA PHASE 2 SOLAR PROJECT; TMKS (1) 9-4-006:034 AND 035 (POR.), AND 037 (POR.), 9-6-004:024 (POR.), 025, AND 026. REVIEW AND APPROVAL OF TRAFFIC MANAGEMENT PLAN (TMP)

DO NOT REMOVE FROM CORRESPONDENCE